1967 FACT BOOK

NAVAL RESEARCH LABORATORY

WASHINGTON, D.C.

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This document has been prepared as a reference source of factual information about the Naval Research Laboratory.

December 15, 1967

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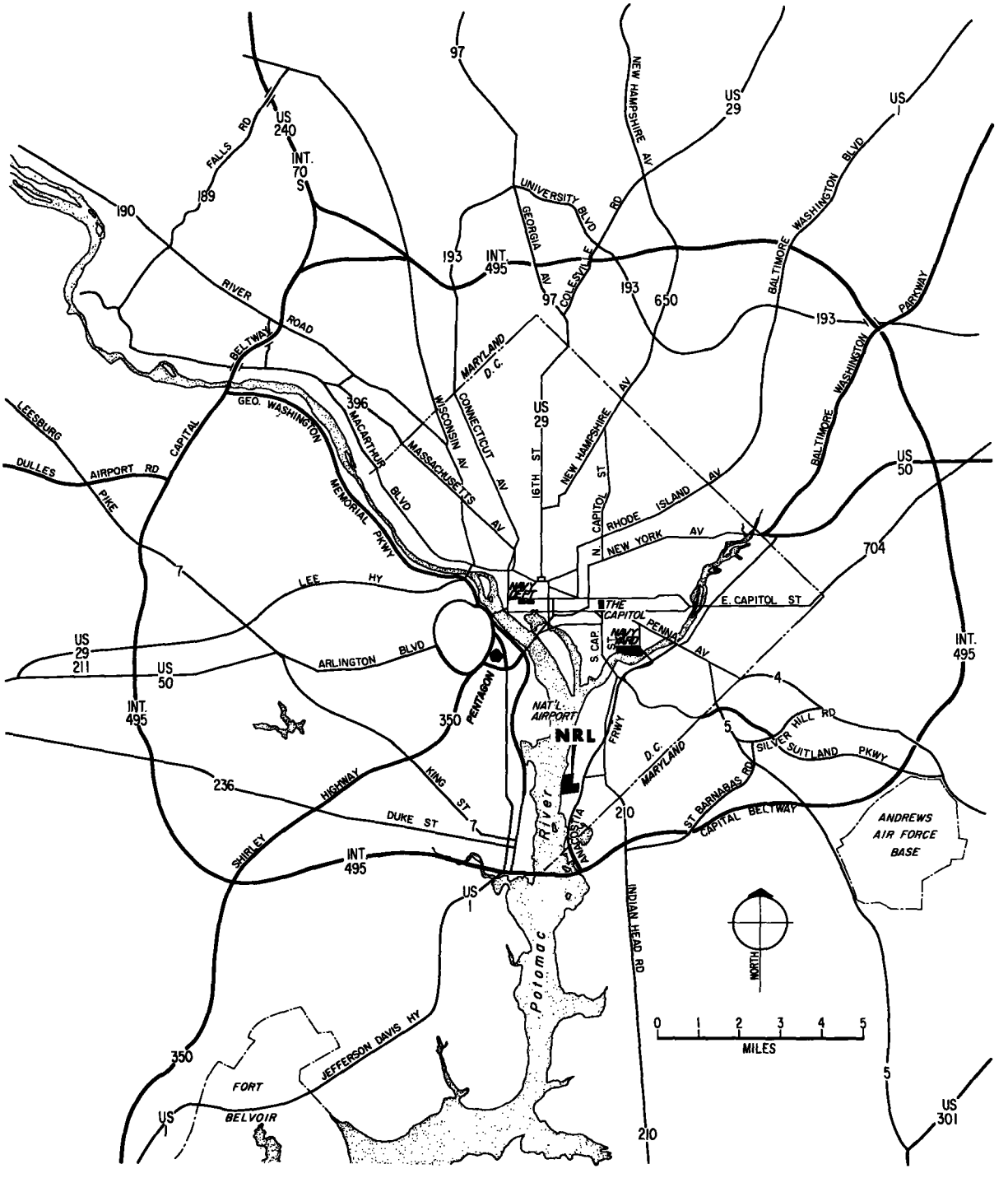
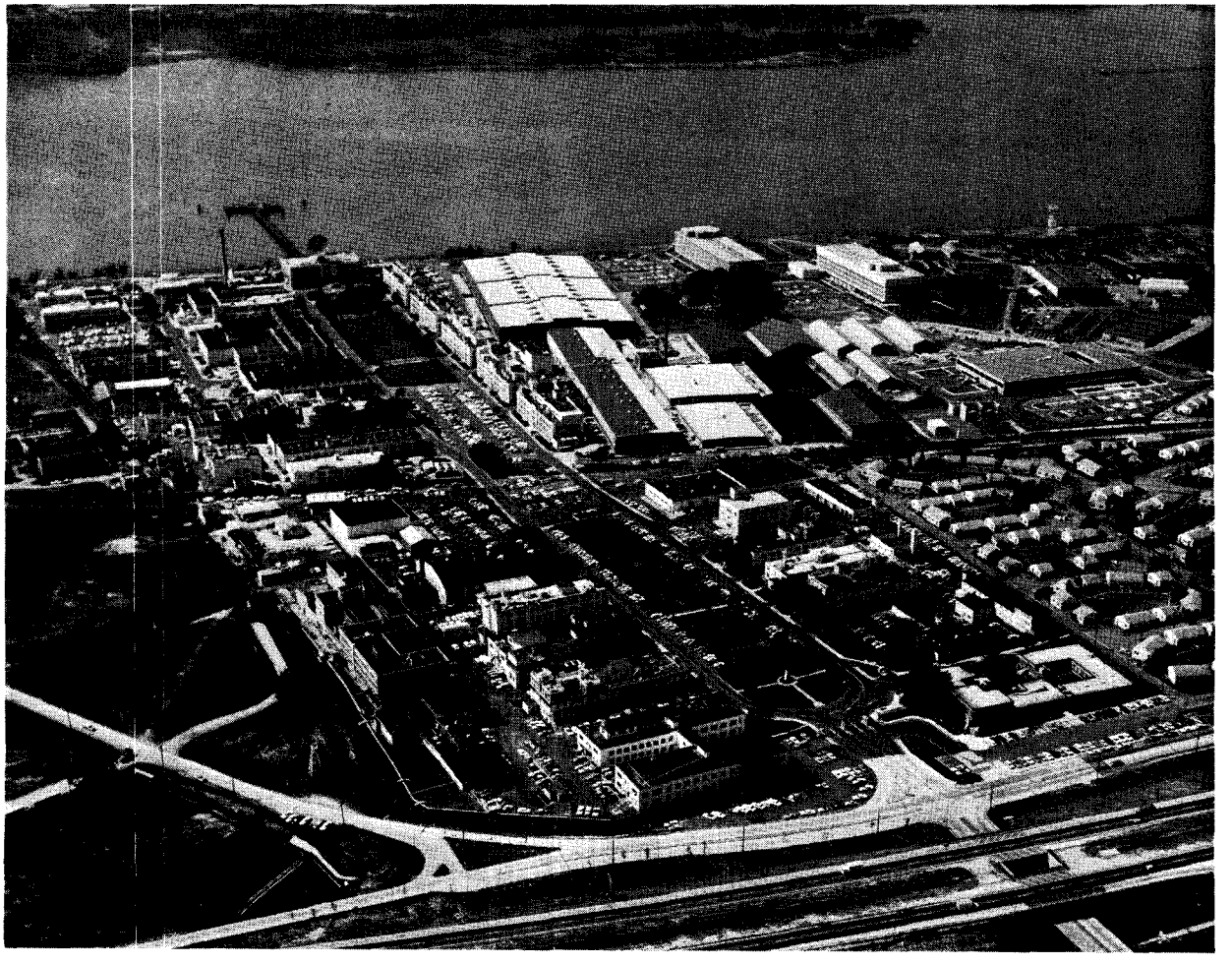
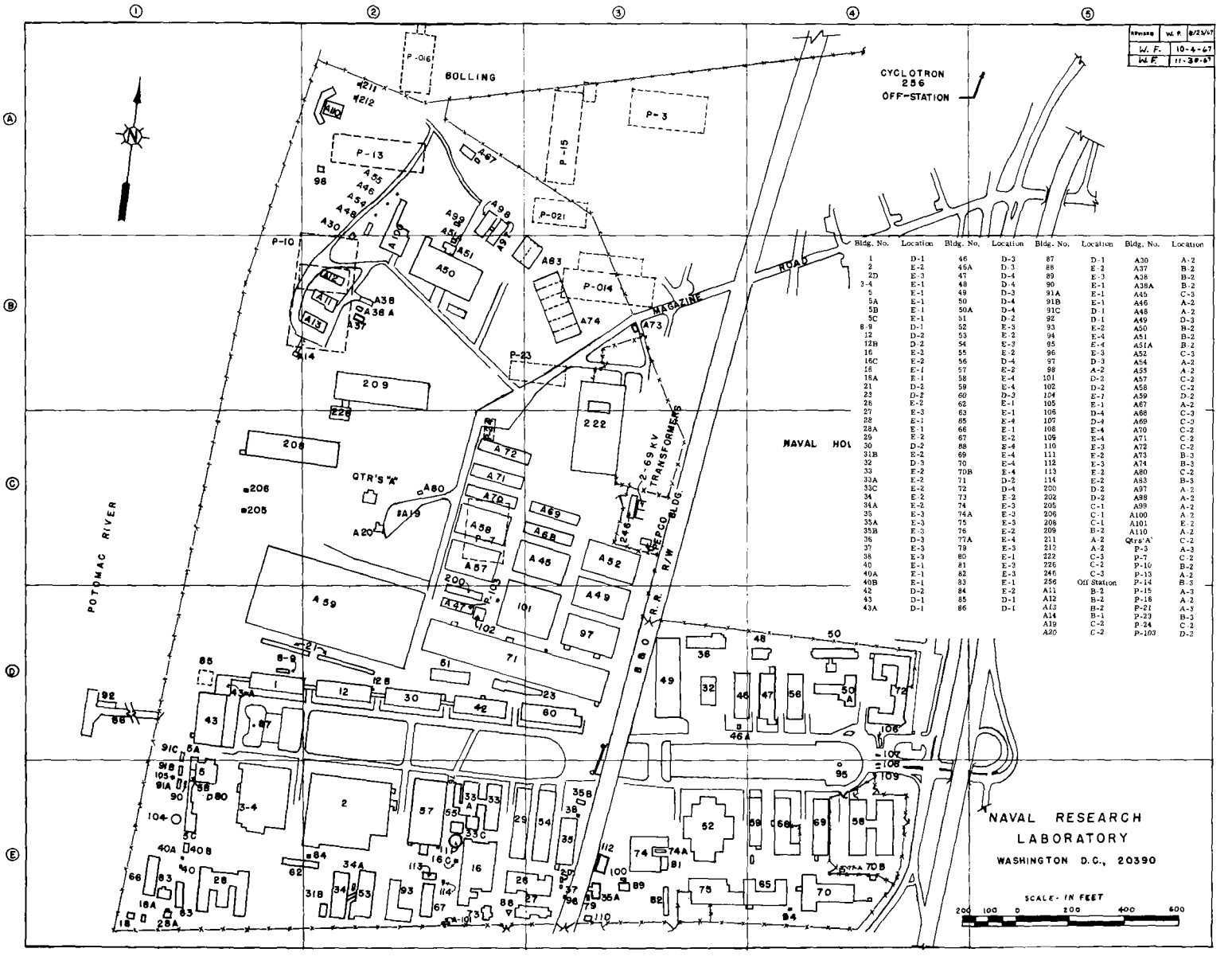
Part 1
The Corporate Structure



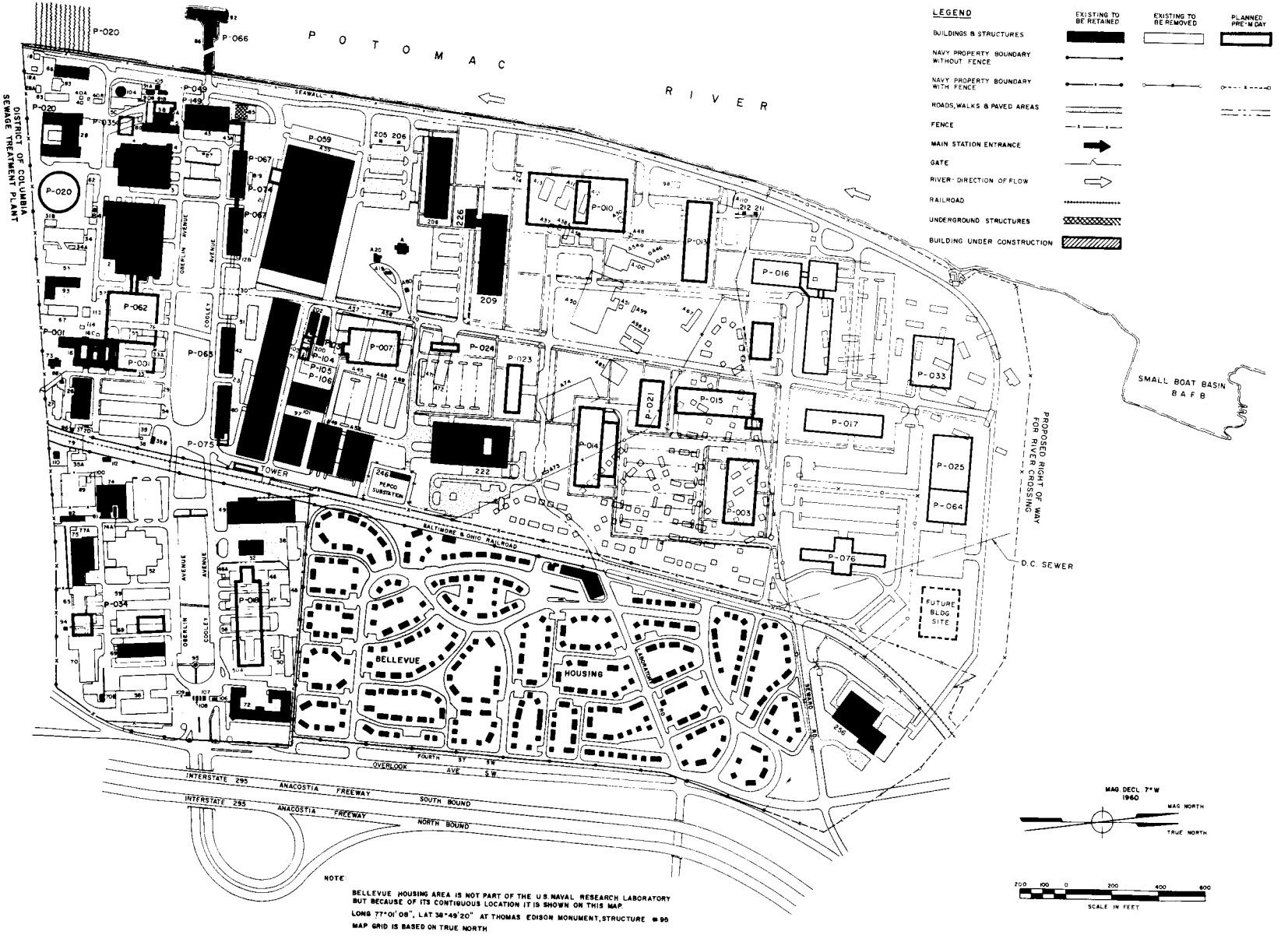
Map showing location of NRL



Aerial view of the Naval Research Laboratory main site



Plat of NRL main site

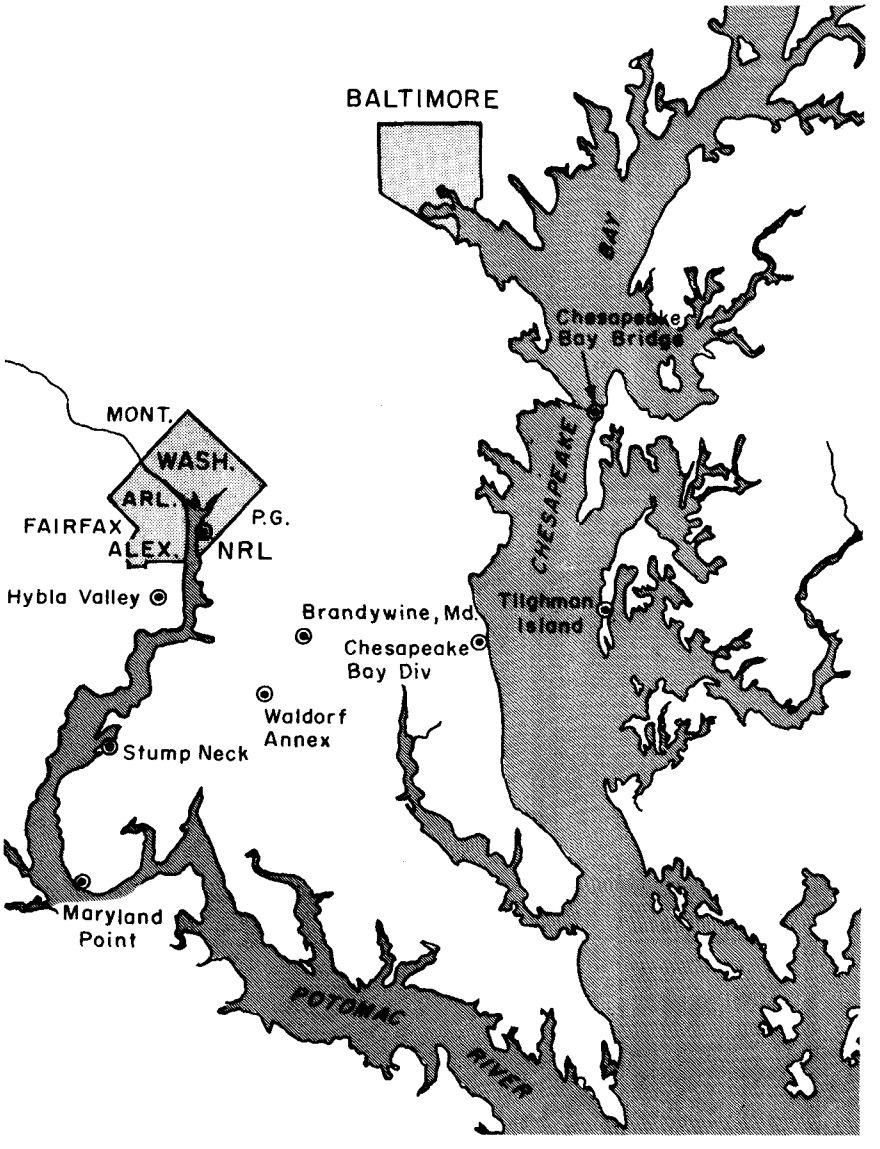


General development plan

DETAILED LISTING OF NRL SITES AND FACILITIES

September 30, 1967

Station and Location	Acreage			Class I & II Plant Account	
	Fee Title	Easement or Purchase	Permit or Lease	Value	No. of Buildings, Structures, and Utilities
Naval Research Laboratory Washington, D.C.	125.90		1.29	$36,231,647	191
Radio Research Site, Blue Plains, D.C.			24.73	1,900	3
Cyclotron Building Site Bolling Air Force Base, D.C.			5.24	2,875,832	1
Environmental Surveillance Sites 2 & 3 Anacostia Freeway, D.C.			NA		
Environmental Surveillance Site 4, D.C. Village			NA		
Environmental Surveillance Site 5, D.C. Sewage Plant			NA		
Environmental Surveillance Site 6, Slater's Lane, Alexandria, Va.			NA		
Environmental Surveillance Site 7, Sailing Marina, Alexandria, Va.			NA		
Radio Research Site, Coast Guard Radio Station, Alexandria, Va.			55.40		
Pier for Sound Barge, Alexandria, Va.			NA		
Optical Observation Tower, Federal Records Center, Alexandria, Va.			NA		
Radio Test Area, Hybla Valley, Va.			1262.46		
A&A Test Site, Shenandoah National Park, Luray, Va.			NA		
Optics Experimental Site, Ginny Beach, Va.			0.46		
Chesapeake Bay Division, Chesapeake Beach, Md.	174.90			9,597,752	206
Multiple Research Site, Tilghman Island, Md.	2.00			81,617	7
Dock Facility, Chesapeake Bay, Md.			0.60	13,505	3
Theodolite Station, North Beach, Md.			0.29	800	1
John Hyde Quarry Site Westminster, Md.			NA		
Tunnel under Maryland State Road 261			NA		
Optics Research Platform in the Chesapeake Bay, Md.			0.23	1,500	2
2 Foghorn Platforms Chesapeake Bay Bridge, Md.			NA		
Research Gondola, Chesapeake Bay Bridge, Md.			NA		
NRL Waldorf Annex, Md.	23.94	35.16		1,209,703	43
Radio Astronomy Observatory, Maryland Point, Md.	24.30		200.00	187,437	22
Radio Antenna Range, USAF Receiver Site, Brandywine, Md.			22.98		
Metallurgy and Radio Research Site, Stump Neck Annex, Naval Ordnance Station, Indian Head, Md.			NA		
Navy Radio Research Station, Sugar Grove, West Va.				74,091	4
Transducer Calibration Facility, Dresden, Lake Seneca, N.Y.			4.52	24,243	2
Satellite Tracking Facility Blossom Point, Md.			23.00		
Satellite Tracking Station, Roma, Texas	27.84	1.00		724,536	12
Satellite Tracking Station, Raymondville, Texas	171.55	2.85		1,209,599	10
Underwater Sound Reference Division, Orlando, Fla.	10.46			1,184,605	39
USRD, Leesburg Facility, Bugg Spring, Fla.			6.92	157,042	7
Marine Corrosion Laboratory, Key West, Fla.			NA		
Underwater Track Facility, Argus Island (near Bermuda)			NA		
Totals:	560.89	39.01	1608.12	$55,575,809	



Location of the principal field stations. Others are at Sugar Grove, W.Va., and on Lake Seneca, N.Y. (near Dresden). The Underwater Sound Reference Division is located at Orlando, Fla.

RESEARCH PLATFORMS

Aircraft

1. The S2D (BUNO 149240), contains specially installed equipment and wing-mounted pods for cloud physics research. Also used in chaff research and for short-term experiments compatible with space limitations of the aircraft.

2. The C-54 (BUNO 50851), presently being used for the Omega navigation system and for infrared countermeasures studies.

3. The EC-121-K (BUNO 128324), used strictly for wave propagation studies in the four-frequency radar system.

4. The EC-121-K (BUNO 135753), used for research in cloud physics, navigation, low-frequency radar, and other projects requiring only minimal aircraft conversion.

5. The EC-121-K (BUNO 141297), used basically for matched filter radar project. Equipment may be installed for navigation experiments and other projects requiring only a small space.

Available Ships

1. USNS MIZAR (T-AGOR-11), scheduled by NRL.

2. USNS GILLISS (T-AGOR-4), USNS SANDS (T-AGOR-6), and USNS LYNCH (T-AGOR-7). Each under operational control of MSTSLANT for utilization East Coast Navy Labs with direction of NAVOCEANO; schedules prepared by NOL.

3. USNS MISSION CAPISTRANO (T-AG-162), under operational control of MSTSLANT for use in ONR-supported Project Artemis. Former tanker modified to accommodate a high-powered sonar transducer, approximately five stories high and weighing hundreds of tons, which is lowered through center well.

4. SS GROUPER (AG(SS)214), carries the XDG-1 sonar transducer and mount.

5. SSX-1, used mainly for oceanographic research; scheduled by NRL.

6. USS ALLEGHENY (ATA-179), scheduled by ONR under operational control of COMSERVRON 8. A converted fleet tug available for research work.

7. Other surface vessels and submarines occasionally scheduled for NRL use by OPTEVFOR.

THE NAVY'S CORPORATE LABORATORY

The Naval Research Laboratory is one of the principal in-house research and development institutions of the U.S. Government. It was established in 1923 to ensure that advancements in science and engineering could be readily applied to the Navy's needs. Directed always toward this end, the NRL research program has developed to its present status as a broadly based and coordinated effort in the physical, mathematical, and environmental sciences, in advanced engineering, and in naval analysis. The work of the Laboratory is conducted at the main establishment in the District of Columbia and at various field sites that provide unique environment and facilities not available at the main site.

Some principal elements of the research program include fundamental and applied work in radio wave propagation, oceanography, deep-sea instrumentation, submarine air purification, structural design theory, fracture mechanics, surface chemistry, optical physics, radar, underwater sound propagation, acoustic signal processing, sonar transducers, nuclear physics, radio astronomy, high-temperature lubricants, high-energy fuels, plasma physics, refractory metals, exotic materials for high-performance structures, x-ray astronomy, high-power lasers, solid-state physics, and stress-corrosion cracking of high-strength titanium, steels, and aluminum alloys. The NRL FY 1968 Program Budget is $82.9 million.

The Laboratory has about 3500 employees, including over 1100 professional scientists and engineers. During the year 1966, almost 230 official technical reports were processed, about 160 scientific papers were published in professional journals, and about 260 scientific presentations were made at meetings, both at home and in many foreign countries. Also, in the same year, 92 patents were issued to NRL personnel, and 65 additional applications were filed with the U.S. Patent Office.

In its investigations of broad scientific areas, in considering its findings for potential military applications, and in furnishing to the naval systems commands and Secretariat expert consultative services relating to science and military systems, NRL functions as the corporate laboratory of the Navy. Thus it provides a central focus of research and development activity that supports the Navy. When NRL findings and capabilities have borne fruit in particular areas, the results are made known to and used by not only the Navy but also the Army, the Air Force, the Advanced Research Projects Agency, the Atomic Energy Commission, and other agencies of the government.

MISSION

The mission of the Naval Research Laboratory is to conduct scientific research and development in the physical sciences and related fields directed toward new and improved materials, equipment, techniques, and systems for the Navy. In fulfillment of this mission, the Naval Research Laboratory:

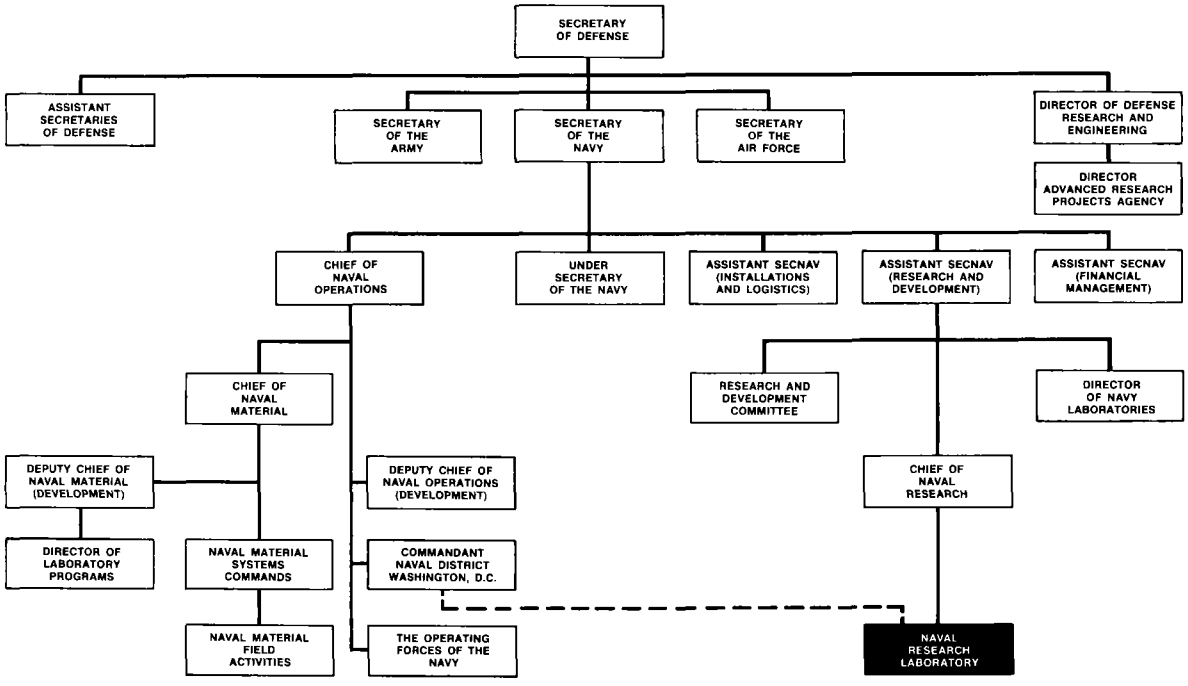
1. Initiates and conducts scientific research and development of a basic and long-range nature in scientific areas of special interest to the Navy.

2. Performs scientific research and development for the Systems Commands and offices of the Navy and, where specially qualified, for the Defense Department and, in defense related efforts, for other government agencies.

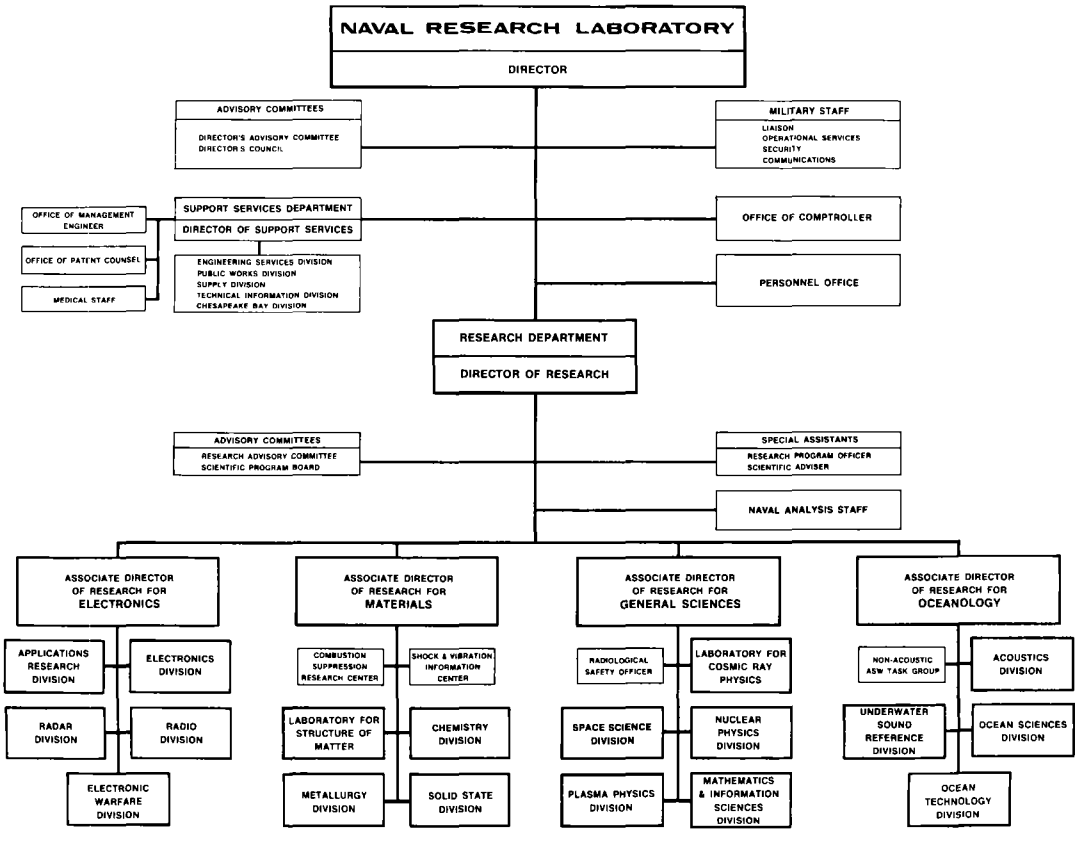
3. Provides to the Navy and its contractors standardized techniques and procedures for measurements and for the accurate calibration of standard instruments in areas of special Navy needs.

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

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



Position of NRL in the Department of Defense structure



Organization chart of NRL

NRL BUDGET BY MAJOR SPONSORS

Sponsor	FY 1967 (Act)		FY 1968 (Est)		FY 1969 (Est)	
	Millions of Dollars	Percent	Millions of Dollars	Percent	Millions of Dollars	Percent
R&D PROGRAM						
ONR	28.8	33.8	27.8	32.5	29.6	34.4
SHIP SYS	11.4	13.3	11.1	13.0	12.0	14.0
ELEC SYS	2.2	2.6	5.0	5.8	5.0	5.8
AIR SYS	14.1	16.6	13.9	16.2	14.0	16.3
ORD SYS	0.4	0.5	0.4	0.5	0.4	0.5
OTHER NAVY	2.6	3.0	3.6	4.2	2.8	3.3
TOTAL NAVY R&D	59.5	69.8	61.8	72.2	63.8	74.3
OTHER DOD	16.4	19.3	13.7	16.0	13.8	16.0
NON DOD	6.3	7.4	7.4	8.6	5.7	6.6
TOTAL R&D	82.2	96.5	82.9	96.8	83.3	96.9
NON R&D PROGRAM	1.7	2.0	1.2	1.4	1.1	1.3
TOTAL NIF	83.9	98.5	84.1	98.2	84.4	98.2
CAPITAL IMPROVEMENT	1.3	1.5	1.5	1.8	1.6	1.8
TOTAL FUNDS	85.2	100.0	85.6	100.0	86.0	100.0

OPERATING COSTS
(Excluding Plant Account Funds)
FY 1967-1968

Purpose	During FY 1967	During FY 1968
Materials, supplies and parts	9,974,894	10,534,000
Salaries and wages	38,020,144	40,033,000
Contractural services and other costs	32,284,756	30,896,000
Total	80,279,794	81,463,000

CAPITAL PROPERTY

	As of September 30, 1967
Class 1 (Land)	374,391
Class 2 (Buildings and improvements)	58,256,973
Class 3 (Equipment)	14,528,720
Class 4 (Industrial production equipment)	8,293,990
Total Capital Property	81,454,074

MILITARY AND CIVILIAN PERSONNEL

Military Personnel Attached to NRL as of September 30, 1967

Officers	*Authorized*	*On Board*
Captain	3	2
Commander	8	8
Lieutenant Commander	9	8
Lieutenant	6	5
Lieutenant (Junior Grade)	0	1
Ensign	0	1
Warrant Officer	1	0
Total	27	25
Enlisted	67	57

Civilian Employees on Rolls as of September 30, 1967

10 USC 1581 (formerly Public Law 313)		19
Classification Act (GS)		2553
Scientific & Professional	1188	
Technical Supporting	635	
General Administrative & Clerical	730	
Wage Board		919
General Wage Service (WB)	751	
Apprentices, Planning, Estimating, etc. (WD)	71	
Printing & Lithographic Service (WI)	16	
Supervisory General Wage Service (WS)	73	
Inspection Service (WX)	8	
Total		3491

Annual Civilian Turnover Rate (percent)

	1964	1965	1966
Research Department	3.7	9.5	8.6
Nonresearch Areas	9.8	12.8	14.9
Entire Laboratory	6.7	11.1	11.7

Highest Academic Degrees Held by Permanent Employees as of September 30, 1967

Bachelors	740
Masters	266
Doctors	232

AWARDS RECEIVED BY CIVILIAN EMPLOYEES

As of September 30, 1967

Government Awards	Number
The Medal of Merit from the President of the United States	1
The Certificate of Merit from the President of the United States	11
The President's Award for Distinguished Federal Civilian Service	2
Department of Defense Distinguished Civilian Service Award	4
Department of Defense Certificate of Merit	1
Department of the Navy Award for Distinguished Achievement in Science	2
Navy Distinguished Civilian Service Award	50
Navy Captain Robert Dexter Conrad Award	2
Navy Superior Civilian Service Award (established 1959)	21
Navy Meritorious Civilian Service Award	185
E. O. Hulburt Annual Science Award (local NRL award)	12
Non-Government Awards	
Henry Draper Medal of the National Academy of Sciences	1
Engineering Science Award of the Washington Academy of Sciences	3
Physical Sciences Award of the Washington Academy of Sciences	3
Morris Liebmann Memorial Prize of the Institute of Radio Engineers	1
Medal of Merit Award of the Institute of Radio Engineers	2
Harry Diamond Award of the Institute of Radio Engineers	4
John Scott Medal of the City of Philadelphia	1
Patrons Award of the Institute of Radio Engineers (Washington section)	1
Reliability and Quality Control Award of the Radio Engineers Professional Group	1
Frederic Ives Award of the Optical Society of America	2
Joseph S. Seaman Gold Medal Award of the American Foundrymen's Society	1
John A. Penton Gold Medal Award of the American Foundrymen's Society	1
Burgess Prize Award of the American Society for Metals	2
Charles B. Dudley Medal of the American Society for Testing Materials	1

Non-Government Awards (Continued)	Number
Gold Medal Award of the American Society of Naval Engineers	1
Stuart Ballantine Medal of the Franklin Institute of Pennsylvania	1
A. K. Doolittle Award of the National American Chemical Society	1
Kendall Company Award of the American Chemical Society	1
Hillebrand Prize of the American Chemical Society	1
William Blum Award of the Washington-Baltimore Electrochemical Society	1
National Award of the American Society of Lubrication Engineers	1
Annual Award of the Society for Applied Spectroscopy	1
E. Edward Pendray Award of the American Rocket Society	1
James H. Wyld Memorial Award of the American Rocket Society	1
Space Science Award of the American Institute of Aeronautics and Astronautics	1
Eddington Medal of the Royal Astronomical Society (Great Britain)	1
Janssen Medal of the French Photographic Society	1
Ancel Prize of the French Photographic Society	1
Progress Award of the Photographic Society of America	1
Professional Achievement Award of the D. C. Council of Engineers and Architectural Studies	1
National Capital Award of the D. C. Council of Engineers and Architectural Studies	3
Award for Technical Achievement of the American Society of Mechanical Engineers	1
Service to Mankind Award of the Washington Sertoma Club	1
Pittsburgh Spectroscopy Award of the Spectroscopy Society of Pittsburgh	1
Pure Science Award of the Scientific Research Society of America (NRL Branch)	11
Applied Science Award of the Scientific Research Society of America (NRL Branch)	11
Arthur S. Fleming Award of the Washington Chamber of Commerce	1
Notre Dame Centennial of Science Award	2
National Civil Service League Merit Citation	1

Part 2
Office of the Director

JAMES C. MATHESON

CAPTAIN, USN

Captain Matheson [redacted], in [redacted]. He attended the University of Chicago from 1939 to 1941 and was graduated from the United States Naval Academy in 1944. He holds degrees in Naval Architecture and Nuclear Engineering from the Massachusetts Institute of Technology and has completed the Advanced Management Program at the Harvard School of Business Administration.

Captain Matheson is an Engineering Duty Officer. He is qualified in submarines and served aboard the submarine DACE in the Pacific during World War II. He has held positions at the Portsmouth Naval Shipyard, at the Bureau of Ships (now Naval Ship Systems Command), and with the Atomic Energy Commission as Chief of the West Milton Site of the Knolls Atomic Power Laboratory. From 1961 to 1965 he served as the Nuclear Power Superintendent at the Mare Island Naval Shipyard. He reported to the Naval Research Laboratory as Director of Support Services in October 1965, and assumed command of the Laboratory on May 29, 1967.

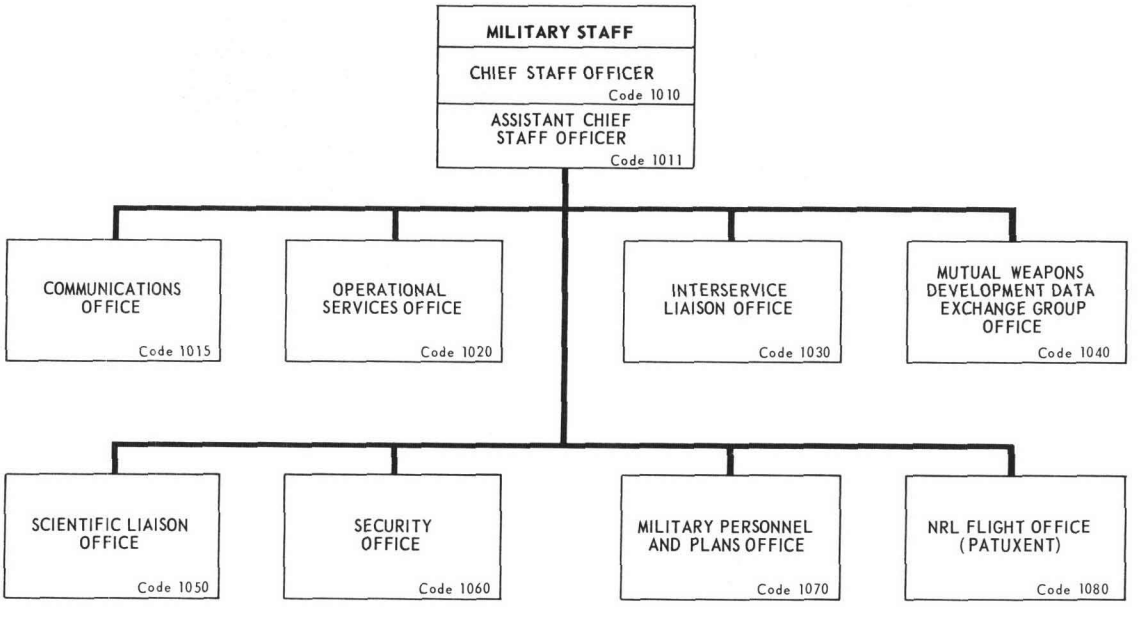
He is a member of Sigma Xi, the Research Society of America, the Society of Naval Engineers, and the Philosophical Society of Washington.

Captain James C. Matheson, USN
Director, Naval Research Laboratory

CAPT R. M. Davis, USN

Military Staff Office

- MILITARY PERSONNEL
- MILITARY PLANS
- MUTUAL WEAPONS DEVELOPMENT DATA EXCHANGE
- OPERATIONAL SERVICES
- INTERSERVICE LIAISON
- SCIENTIFIC LIAISON
- SECURITY
- COMMUNICATIONS



Basic Responsibilities

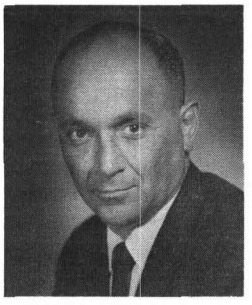
The Military Staff maintains liaison with the systems commands and offices of the Navy Department, with other units of the Naval establishment ashore and afloat, and with other governmental and nongovernmental agencies concerned with the coordination of military application of the scientific work of the Laboratory. It supports five multi-engine Laboratory aircraft and obtains and coordinates such additional air, surface, and subsurface services as are required. The Military Staff is also responsible for personnel and plant security, communications, and control of classified material.

Key Personnel

Name	*Title*
CAPT R. M. Davis, USN	Chief Staff Officer
CDR M. M. Gibson, USN	Assistant to the Chief Staff Officer
ENS P. A. Hughes, USNR(W)	Communications Officer
CDR A. V. McPhillips, USNR	Operational Services Officer
LTCOL G. Caridakis, USMC	Marine Corps Liaison Officer
CAPT A. M. Megrditchian, USAF	Air Force Systems Command Liaison Officer
Mr. F. W. Shannon	Head, Mutual Weapons Development Data Exchange Group
CDR M. R. Kalnitzky, USN	Scientific Liaison Officer
LCDR J. H. Dal Pian, USN	Security Officer
Mr. J. J. Bagley	Classified Material Control Officer
LCDR D. W. Richmond, USNR	Military Personnel and Plans Officer
CDR H. D. Fechtelkotter, USN	Head, NRL Flight Office (Patuxent)

Personnel Complement

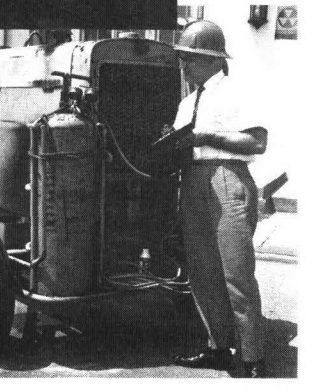
On Board: 186
(104 Civilian, 82 Military)

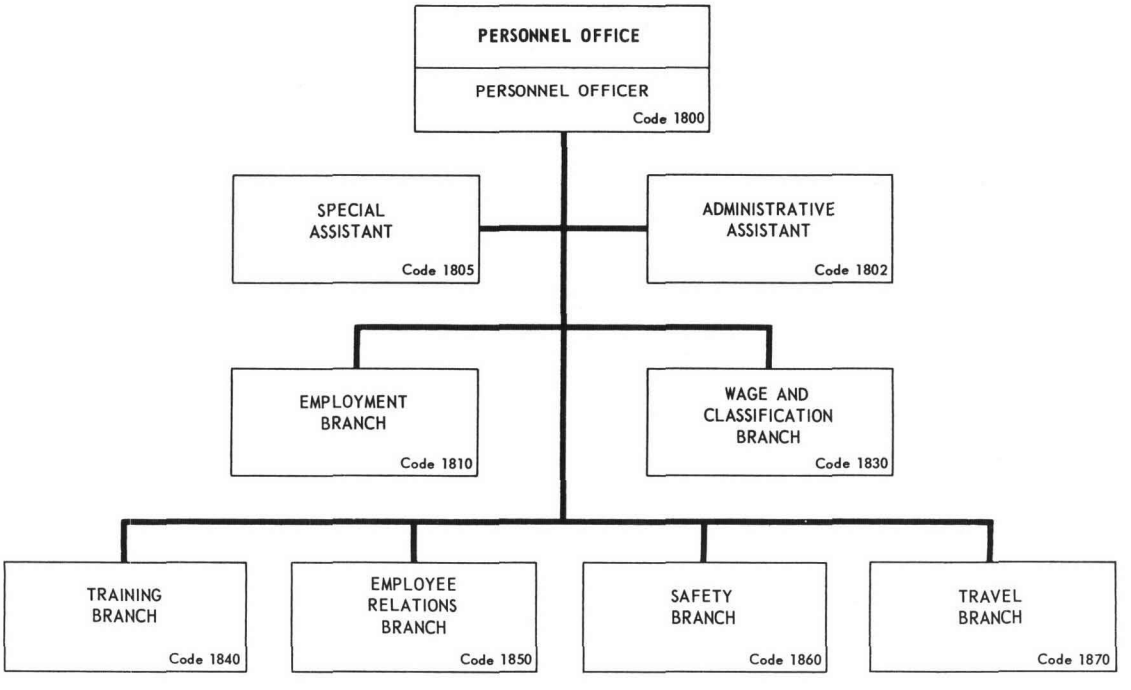


Personnel Office

Mr. A. G. Gross

- EMPLOYMENT
- WAGE AND CLASSIFICATION
- TRAINING
- EMPLOYEE RELATIONS
- SAFETY
- TRAVEL





Basic Responsibilities

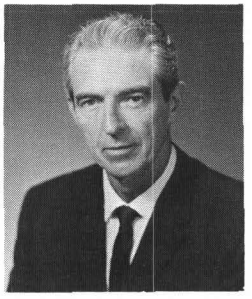
The Personnel Office administers the Laboratory's personnel program, which provides for the selection, development, promotion, utilization, appropriate recognition, travel, and safety of all civilian personnel. It is also responsible for the establishment and review of all Classification Act and ungraded positions.

Key Personnel

Name	*Title*
Mr. A. G. Gross	Personnel Officer
Mr. C. N. Mason, Jr.	Special Assistant
Mr. W. A. Reyno	Head, Employment Branch (Acting)
Mr. K. R. Harper	Head, Wage and Classification Branch
Mr. W. J. McLaughlin	Head, Training Branch
Mr. H. H. Kay	Head, Employee Relations Branch
Dr. R. G. Nebelung	Head, Safety Branch
Mrs. B. E. Michaud	Head, Travel Branch

Personnel Complement

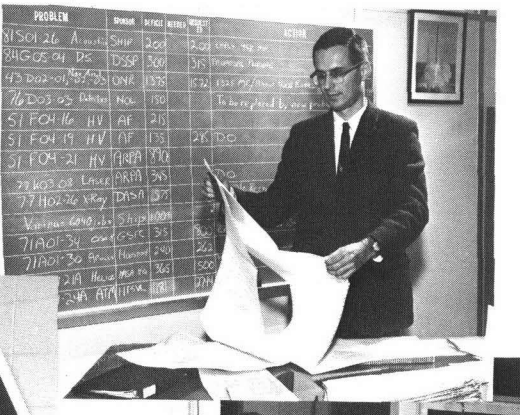
On Board: 57

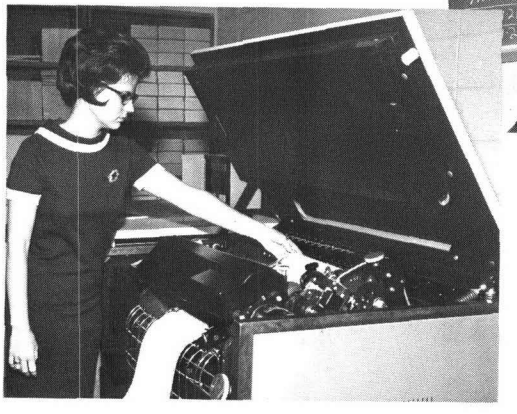


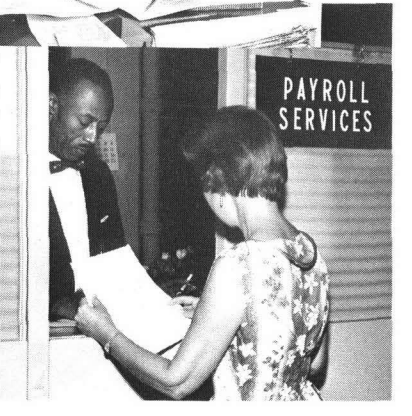
Mr. J. P. Donovan

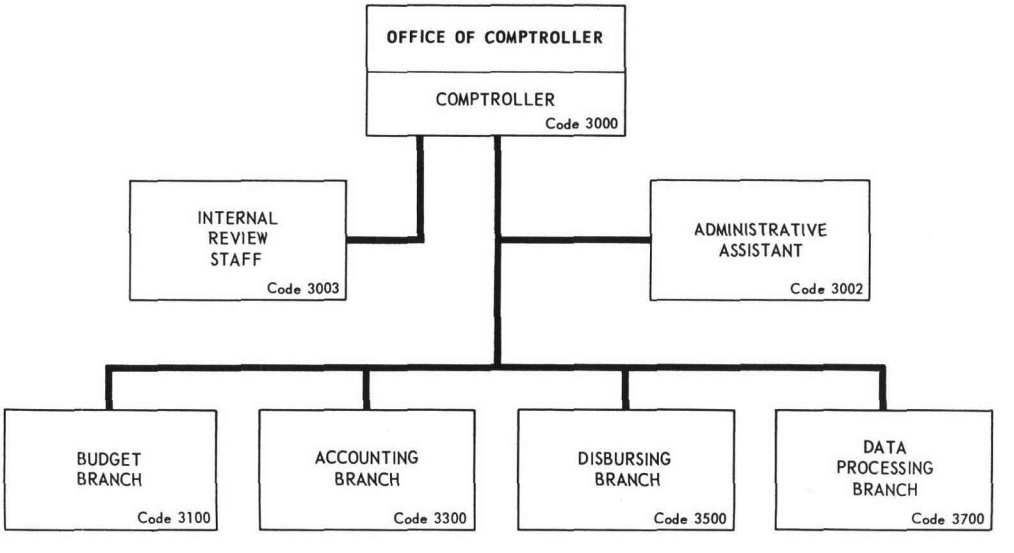
Office of the Comptroller

- BUDGET
- ACCOUNTING
- DISBURSING
- DATA PROCESSING









Basic Responsibilities

The Comptroller is the financial adviser to the Director and other officials of the Laboratory. He administers the financial program of the Laboratory.

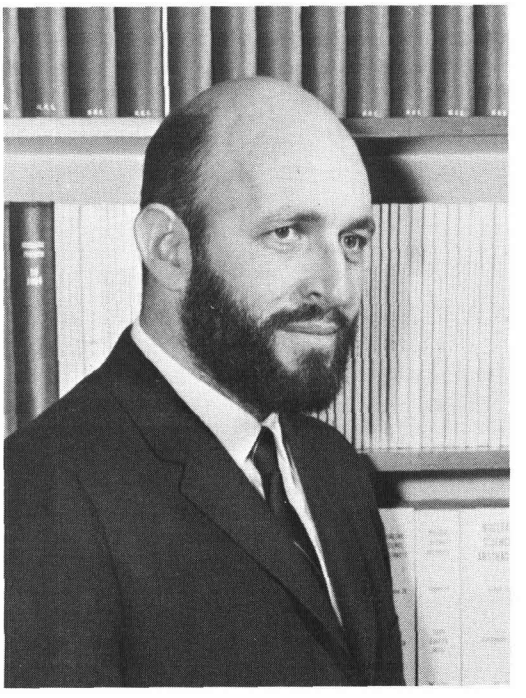
Key Personnel

Name	*Title*
Mr. J. P. Donovan	Comptroller
Mr. W. S. Slater	Budget Officer
Mr. H. I. Deichert	Accounting Officer
LTJG C. R. Grant, SC, USNR	Disbursing Officer
Mr. D. A. Staudt	Data Processing Officer
Mr. R. A. Showman	Head, Internal Review Staff

Personnel Complement

On Board: 81

Part 3
The Research Department



Dr. Alan Berman
Director of Research

Dr. Berman [redacted]. He received the A.B. degree in Physics from Columbia College in 1947 and the Ph.D. degree in Physics from Columbia University in 1952.

From 1952 to 1955 he was a research scientist at the Hudson Laboratories of Columbia University. He became Assistant Director of Hudson Laboratories in 1955, Associate Director in 1957, and Director in 1963. On May 29, 1967, Dr. Berman became Director of Research for the Naval Research Laboratory.

Dr. Berman's research specialties include the areas of underwater acoustics, oceanography, and signal processing. He has published numerous papers on these and related subjects. At present he is a member or chairman of a wide variety of Navy and oceanographic advisory groups. He also provides advisory services for a number of Department of Defense and other Government agencies.

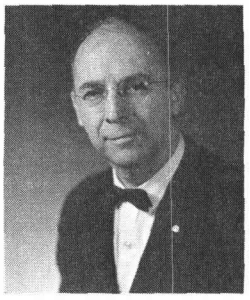
Dr. Berman has on three occasions been visiting scientist to the Admiralty Research Laboratory, Teddington, England (1955, 1957, 1960), and once at the SACLANT ASW Research Center, La Spezia, Italy (1960).

THE RESEARCH DEPARTMENT

The Research Department is headed by a distinguished civilian scientist and administrator. The research effort is divided into four major fields — electronics, materials, general sciences, and oceanology — which correspond to the principal areas of the Navy's interest in the physical and engineering sciences. There is an associate director of research for each of these four broad areas. Sixteen scientific divisions, each headed by a civilian scientist, pursue work in specific fields. Branches within these divisions form interrelated working units.

Key Personnel

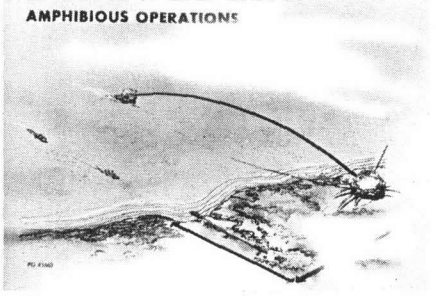
Name	Title	Code
Dr. A. Berman	Director of Research	4000
Mr. A. J. Hollings	Research Program Office	4010
Dr. P. Waterman	Head, Naval Analysis Staff	4300
Dr. C. E. Cleeton	Associate Director of Research for Electronics	5000
Dr. J. H. Schulman	Associate Director of Research for Materials	6000
Dr. W. C. Hall	Associate Director of Research for General Sciences	7000
Dr. V. J. Linnenbom	Associate Director of Research for Oceanology (Acting)	8000



Dr. P. Waterman

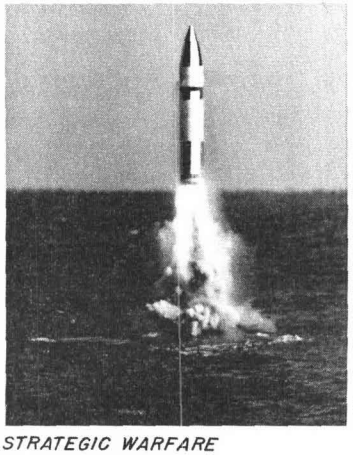
Naval Analysis Staff

AMPHIBIOUS WARFARE STUDIES



NAVAL ANALYSIS ACTIVITY

- ADVANCED NAVAL WARFARE ANALYSIS
- ADVANCED COMMAND AND CONTROL CONCEPTS
- ENVIRONMENTAL AND SPECIAL WARFARE ANALYSIS
- NAVAL IMPLICATIONS OF TECHNOLOGY

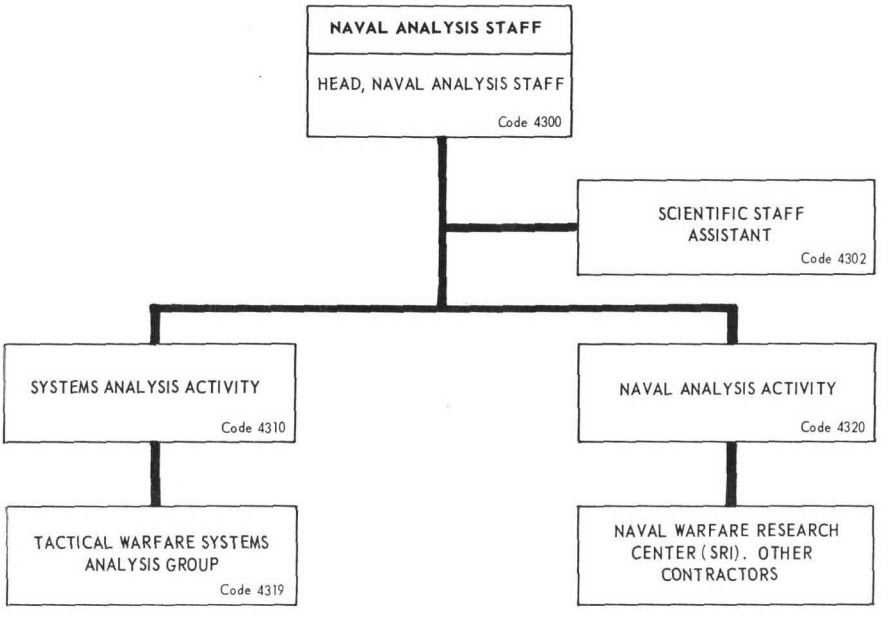


STRATEGIC WARFARE STUDIES

SYSTEMS ANALYSIS ACTIVITY

- STRATEGIC WARFARE
- HUMAN FACTORS ANALYSIS
- SURFACE AND AMPHIBIOUS WARFARE
- ELECTRONIC WARFARE
- RESEARCH PROGRAM ANALYSIS
- UNDERSEAS WARFARE
- COMMAND SUPPORT
- SPECIAL SYSTEMS
- AIR TACTICAL WARFARE

STRIKE WARFARE STUDIES



Basic Responsibilities

The Naval Analysis Staff program is designed to provide staff support to the Director of Research in the field of naval analysis. The program consists of providing a single point of contact with other organizations and programs, as directed; furnishing analytical support for the employment of future strategic and tactical naval systems, with emphasis on providing the appropriate technological base; developing measures of effectiveness and other criteria for decision; making technological projections; analyzing threats; and designing operational models to support analysis of warfare capabilities and advanced concept formulations.

Staff Activities

Systems Analysis Activity
- Strategic warfare
- Air/tactical warfare
- Surface and amphibious warfare
- Underseas warfare
- Electronic warfare
- Research program analysis
- Human factors analysis
- Command support
- Special systems

Naval Analysis Activity
- Advanced naval warfare analysis
- Advanced command and control concepts
- Environmental and special warfare analysis
- Naval implications of technology and techniques

Key Personnel

Name	*Title*
Dr. P. Waterman	Head, Naval Analysis Staff
Mr. W. Hodgson	Associate Head, Naval Analysis Staff
Mr. P. Stine	Head, Systems Analysis Activity
Mr. R. Tuttle	Head, Naval Analysis Activity

Personnel Complement

On Board: 37

Total Estimated R&D Funding

Fiscal Year 1968: $3,900,000

RESEARCH PROGRAM OFFICE

Basic Responsibilities

The Research Program Office serves as staff to the research directorate of the Laboratory. It provides an orderly plan for coordinating NRL research programs with those of ONR and other sponsors or potential sponsors throughout the Departments of the Navy, the Army, and the Air Force, the Advanced Research Projects Agency, and other agencies of the government. It also serves as a focal point for program information for project managers and other key personnel of sponsoring activities on work in progress or in various stages of planning. The Research Program Office maintains a management information center which serves as a working tool for the Laboratory directorate, and it maintains appropriate records of the Laboratory's research programs.

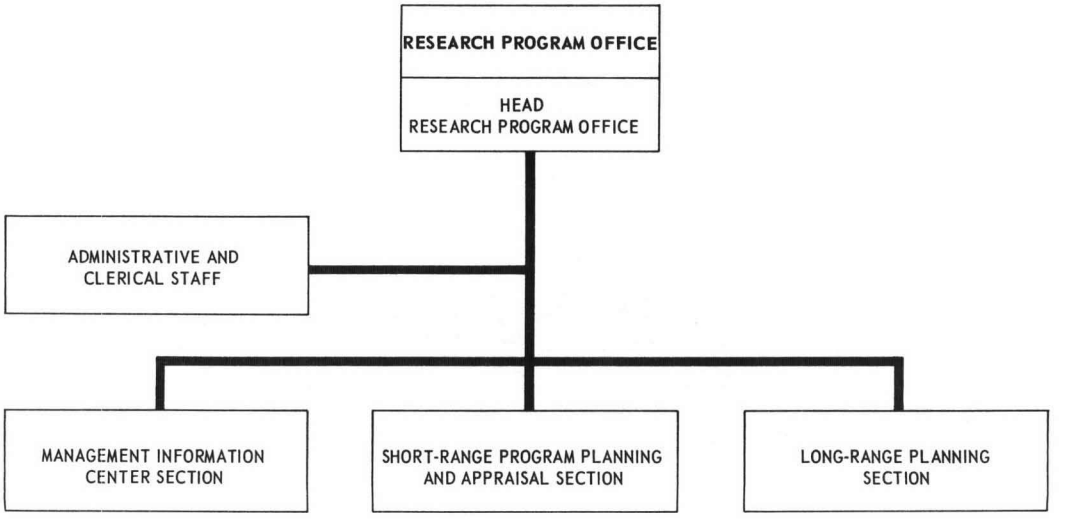
Key Personnel

Name	*Title*
Mr. A. J. Hollings	Head, Research Program Office
Mr. R. E. Seebold	Deputy Head, Research Program Office
Mr. R. C. Spragg	Head, Management Information Center Section
Mr. R. E. Seebold	Head, Short-Range Program Planning and Appraisal Section
Mr. A. J. Hollings	Head, Long-Range Planning Section (Acting)

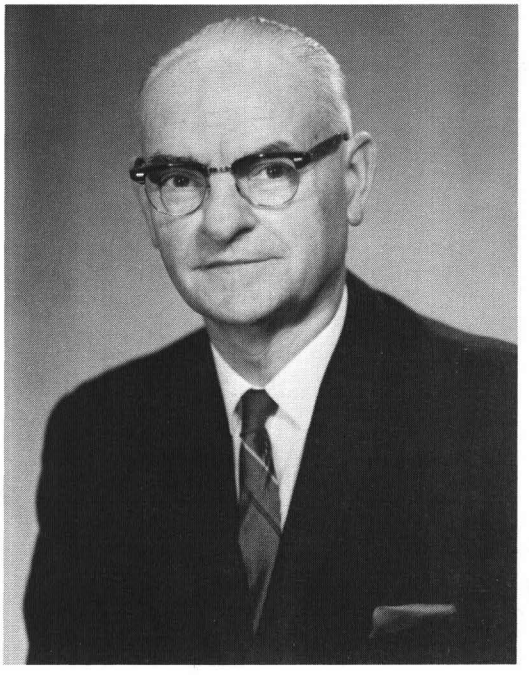
Mr. A. J. Hollings

Personnel Complement

On Board: 7



Electronics Area



Dr. Claud E. Cleeton
Associate Director of Research for Electronics

Dr. Cleeton [redacted]. He received the B.S. degree from Missouri State Teachers College in 1928, the M.A. degree from the University of Missouri in 1930, and the Ph.D. in physics from the University of Michigan in 1935. His Ph.D. thesis has become a classical paper in the annals of microwave spectroscopy.

Before joining NRL's Radio Division in 1936, he taught physics and mathematics at Northeast Missouri State College, Moberly Junior College, and the University of Michigan. His first five years at the Laboratory were devoted to pioneer research in microwave communications and digital electronic circuits. He then directed his efforts to electronic identification systems, radio control, and guided missile electronics.

In 1942 Dr. Cleeton was named Technical Head of the Combined Research Group, which consisted of approximately 300 British, Canadian, and American scientists stationed at NRL and entrusted with the development of a uniform radar identification and recognition system for the Allied military forces. For his efforts he was awarded the President's Certificate of Merit (1946) and the Meritorious Civilian Service Award (1947).

In 1946 Dr. Cleeton was named head of NRL's Security Systems Branch, where he directed research and development of identification and radar beacon systems for use by all the service branches. He was appointed Superintendent of Radio Division I in 1952 and Superintendent of the Applications Research Division in 1954. For the next six years he was responsible for data processing, display of information collected by radar, organization of combat information centers, man-machine systems, and associated digital devices for computing and data transfer. His division was also responsible for the detailed technical direction of the research, development, and operation of the Space Surveillance System, which is designed to detect, track, identify, and determine the orbits of nonradiating space objects. Dr. Cleeton was named Associate Director of Research for Electronics in January 1965.

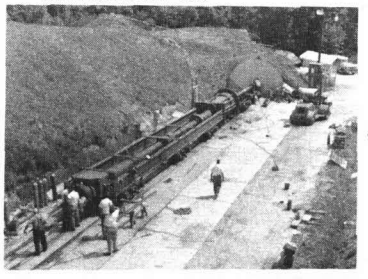
Dr. Cleeton has been granted 13 patents, and two others are pending. He is also the author and co-author of several papers published in technical journals. He is a Fellow of the Institute of Electronic and Electrical Engineers and a member of the American Physical Society and Sigma Xi.

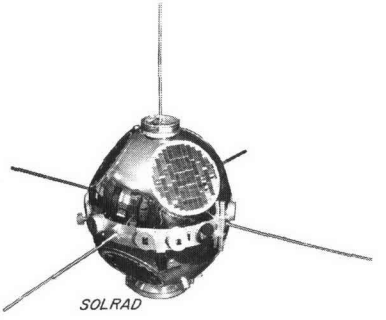
Dr. W. R. Faust

Applications Research Division

- APPLIED PHYSICS
- OPERATIONAL RESEARCH
- SPACE APPLICATIONS
- SATELLITE TECHNIQUES
- DYNAMICS

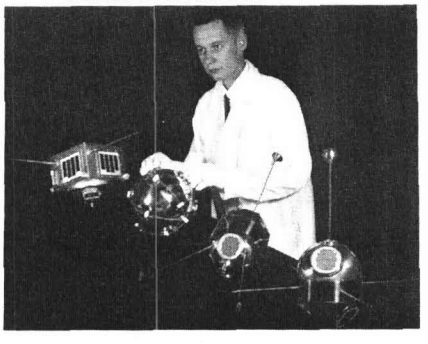
HYPERVELOCITY GUN



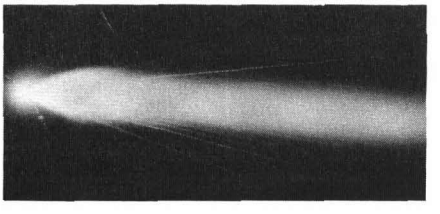


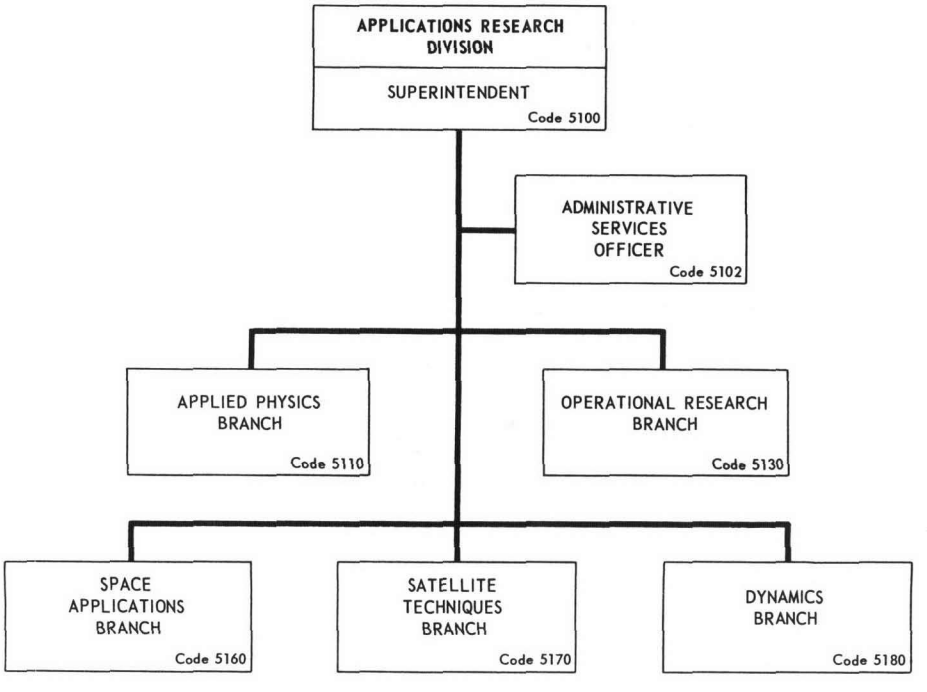
SOLRAD

SATELLITE PREPARATION



ROCKET PLASMA STUDIES





Basic Responsibilities

The Applications Research Division conducts research and development in the fields of plasma physics, the effects of nuclear weapons on naval systems, defense against ballistic missiles including impact and penetration ballistics, data handling and processing, space surveillance, and celestial mechanics and navigation. As a result of these studies the Division designs and develops systems (e.g., satellites) and components (e.g., antennas for use in space) as related to such naval requirements as surveillance, navigation, guidance, and communication and provides for the evaluation of such systems.

Branches

Applied Physics

- Manned orbiting laboratory experiments
- Intercept control
- Data processing and display
- IFF display
- Lasers for data processing
- Space and plasma physics and quantum electronics

Operational Research

- Orbit computation and celestial mechanics
- Computation and digital facilities (for SPASUR)
- Fire and missile control evaluation instrumentation

Space Applications

- Profile techniques
- Space surveillance
- Rapid navigation satellite readout

Satellite Techniques

- Satellite development
- Calibration satellites
- Research satellites, especially solar radiation devices
- Navigation satellites

Dynamics

- Vulnerability mechanics
- Hypervelocity kill mechanisms
- Hypervelocity impact mechanics
- Penetration into earthy materials

Key Personnel

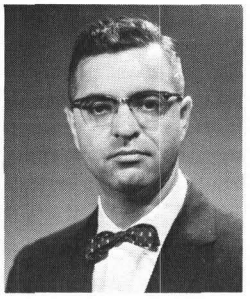
Name	*Title*
Dr. W. R. Faust	Superintendent
Dr. W. S. Ament	Consultant
Mr. E. F. Kulikowski	Head, Applied Physics Branch
Mr. C. H. Chrisman	Head, Operational Research Branch
Mr. R. L. Easton	Head, Space Applications Branch
Mr. P. G. Wilhelm	Head, Satellite Techniques Branch
Mr. W. W. Atkins	Head, Dynamics Branch

Personnel Complement

On Board: 173

Total Estimated R&D Funding

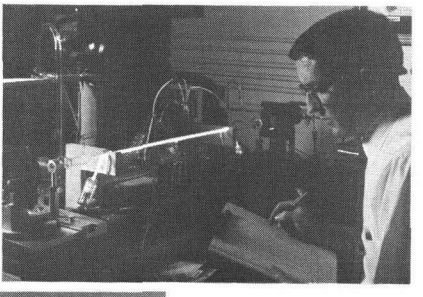
Fiscal Year 1968: $9,984,000



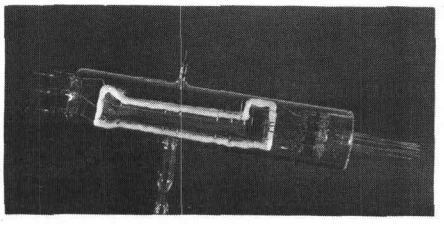
Mr. A. Brodzinsky

Electronics Division

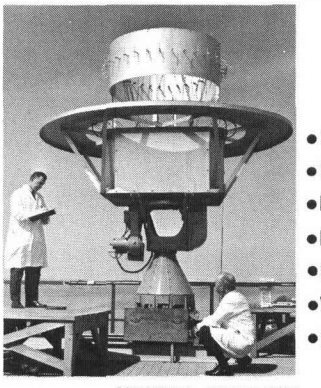
MICRO-CIRCUITRY



GAS LASERS

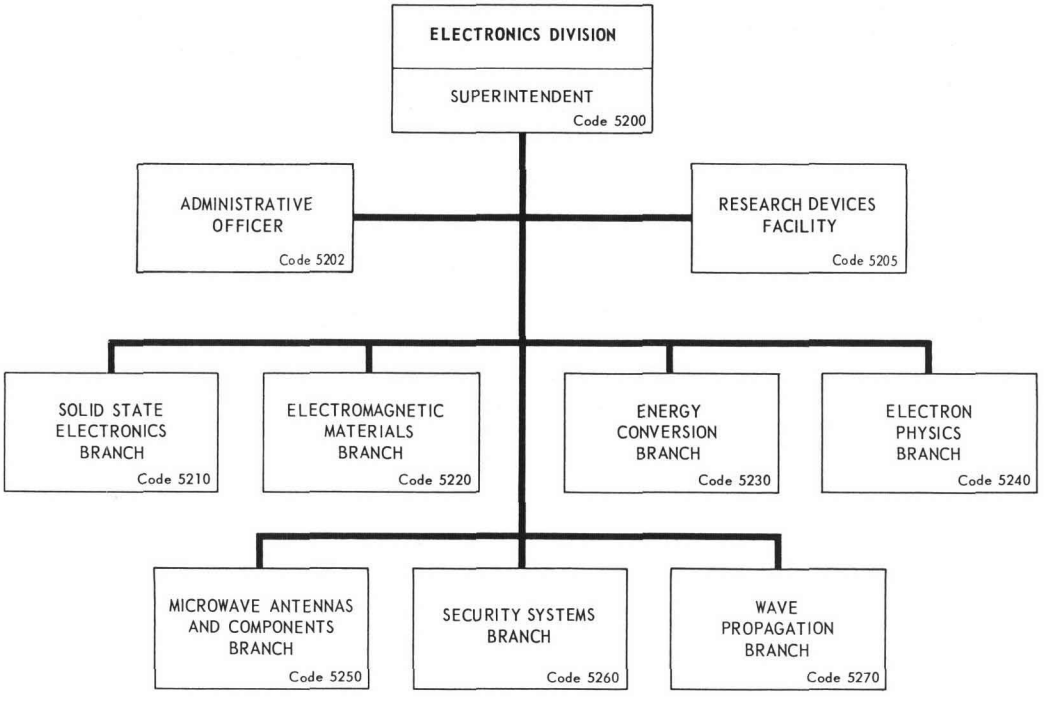


ELECTRON TUBE RESEARCH



ANTENNA RESEARCH

- SOLID STATE ELECTRONICS
- ENERGY CONVERSION
- ELECTRON PHYSICS
- MICROWAVE ANTENNAS & COMPONENTS
- SECURITY SYSTEMS & NAVIGATION
- WAVE PROPAGATION
- ELECTROMAGNETIC MATERIALS



Basic Responsibilities

The Electronics Division carries out programs of basic and applied research and development in the fields of: electronic properties of solid materials; energy conversion methods; microwave antennas and components; microelectronic technology; electronic identification systems; electromagnetic wave propagation; properties of ground and sea surface radar returns; and vacuum and gaseous electron devices.

Branches

Solid State Electronics

- Semiconductor devices, materials, and circuits, both low and microwave frequencies
- Thin films

Electromagnetic Materials

- Backscatter from surfaces and particles
- Determination of loss tangent characteristics of materials
- Radar protective coatings
- Advisory services on absorbent materials

Energy Conversion

- Advanced electric sources
- Energy processing for pulsed and low voltage
- Electric power and energy control
- Seawater battery

Electron Physics

- Gas lasers
- Millimeter wave generation
- Vacuum breakdown
- Surface physics research

Microwave Antennas and Components

- Millimeter wave communication system
- Naval electronic scanning antennas for airborne use
- Advanced microwave antenna research
- Microwave electronic components

Security Systems

- Development of new IFF system
- Miniature transponder development
- Development of solid state transmitter at L-band
- Consulting services to AIMS* tri-service program

Wave Propagation

- Properties of ground and sea surface radar echoes
- Meteorological phenomena and their effects

*AIMS

A - Air Traffic Control Radar Beacon
I - IFF (Identification Friend or Foe)
M - Mark XII
S - System

Key Personnel

Name	*Title*
Mr. A. Brodzinsky	Superintendent
Mr. T. E. Hanley	Head, Research Devices Facility
Mr. C. V. Parker	Head, Solid State Electronics Branch
Dr. R. W. Wright	Head, Electromagnetic Materials Branch
Mr. B. J. Wilson	Head, Energy Conversion Branch
Dr. A. E. Marston	Head, Microwave Antennas and Components Branch
Mr. G. E. Hart	Head, Security Systems Branch (Acting)
Mr. N. W. Guinard	Head, Wave Propagation Branch (Acting)

Personnel Complement

On Board: 146

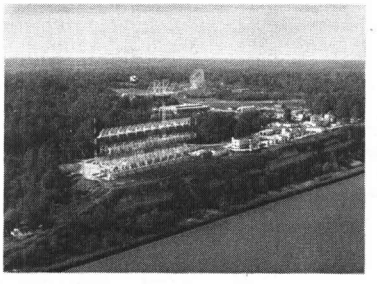
Total Estimated R&D Funding

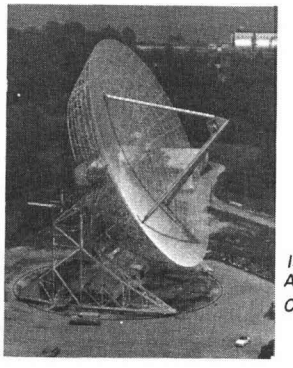
Fiscal Year 1968: $3,768,000

Dr. M. I. Skolnik

Radar Division

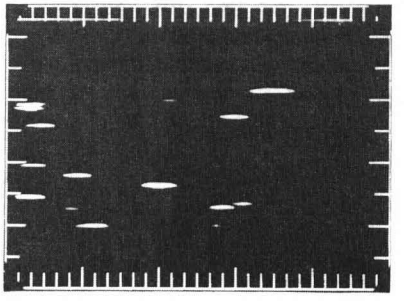
LONG-RANGE RADAR ANTENNA



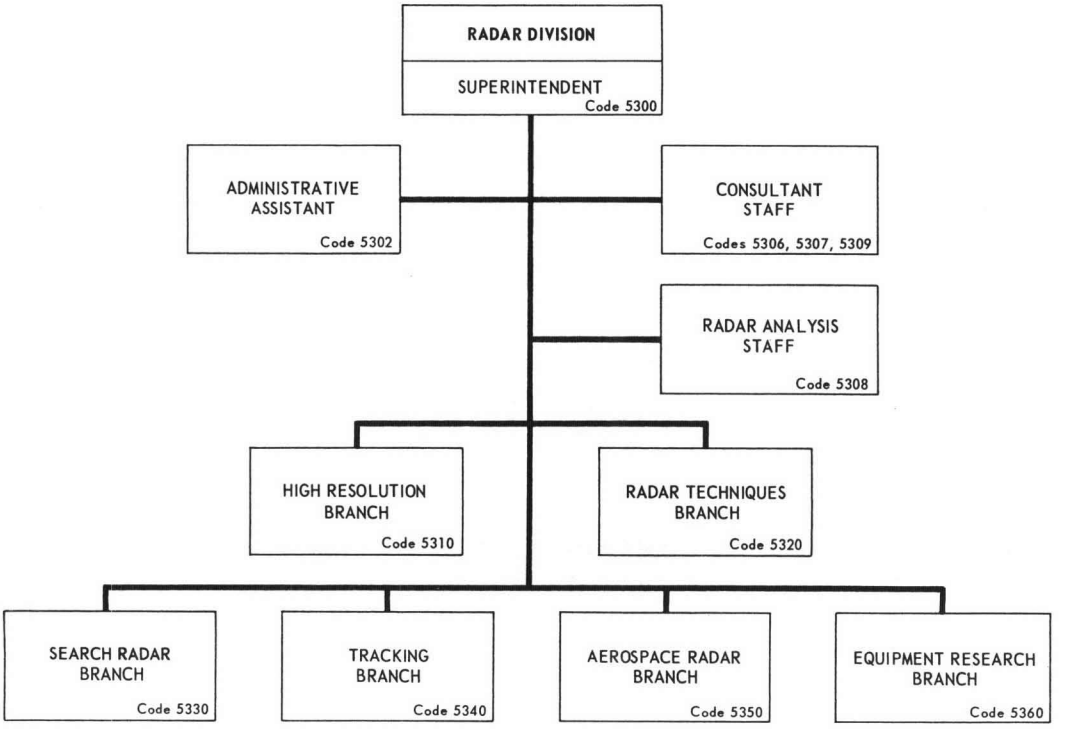


150 FOOT ANTENNA CBD

RADAR TARGETS



- HIGH RESOLUTION
- RADAR TECHNIQUES
- SEARCH RADAR
- TRACKING
- EQUIPMENT RESEARCH
- AEROSPACE RADAR



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.

Branches

High Resolution

- High resolution techniques
- ASW radar
- Ocean surface effects

Radar Techniques

- High-frequency radar
- Signal processing

Search Radar

- Phased array techniques
- Studies of the ionosphere by means of radar and satellite transmissions
- Radar measurements of satellites and ballistic missiles
- Moving target indication techniques for ship and airborne radars
- Airborne early warning radar

Tracking

- Radar target noise studies
- Precision tracking radar techniques
- Target signature analysis
- Microwave and laser techniques
- Radar evaluation

Aerospace Radar

- Satellite radar

Equipment Research

- Radar and infrared counter-countermeasures
- Target radar-spectra studies
- Airborne intercept radar consultative services

Radar Analysis

- Signal processing theory
- Mathematical analysis

Key Personnel

Name	*Title*
Dr. M. I. Skolnik	Superintendent
Mr. W. N. Shaddix	Technical Assistant to the Superintendent
Mr. I. H. Page	Consultant
Mr. S. F. George	Consultant (Radar Analysis Staff)
Mr. C. H. Dodge	Consultant
Mr. L. V. Blake	Consultant
Mr. I. W. Fuller, Jr.	Head, High Resolution Branch
Mr. F. M. Gager	Head, Radar Techniques Branch
Dr. R. J. Adams	Head, Search Radar Branch
Mr. J. H. Dunn	Head, Tracking Branch
Mr. R. E. Ellis	Head, Aerospace Radar Branch
Mr. H. Gordon, Jr.	Head, Equipment Research Branch (Acting)

Personnel Complement

On Board: 152

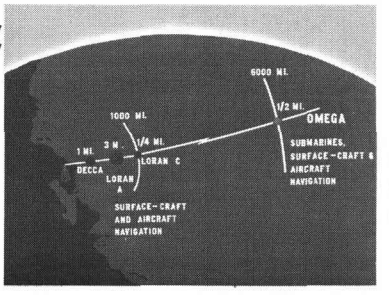
Total Estimated R&D Funding

Fiscal Year 1968: $6,100,000

Mr. L. A. Gebhard

Radio Division

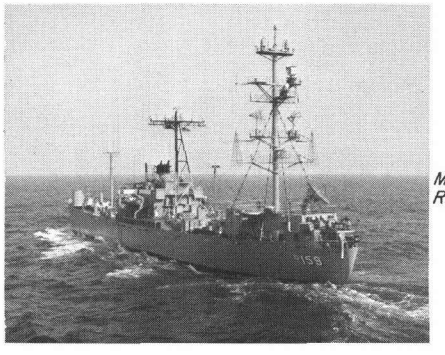
NAVIGATION SYSTEM



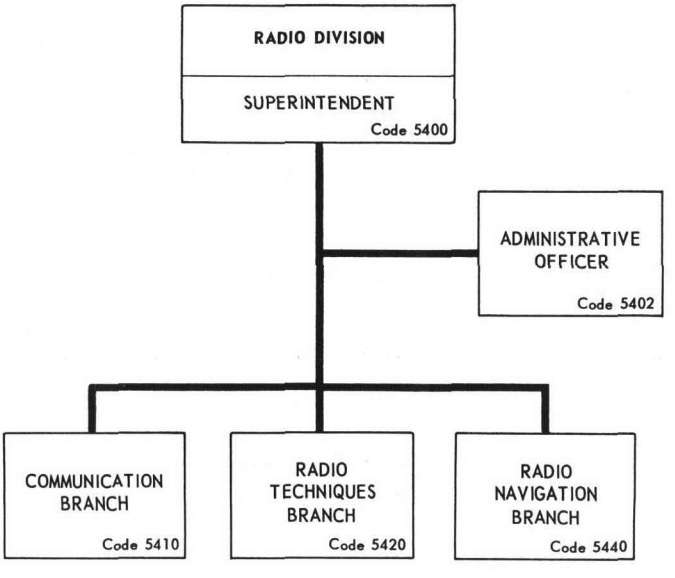
- COMMUNICATION
- RADIO TECHNIQUES
- RADIO NAVIGATION

RADIO RESEARCH FACILITY

MICROWAVE SPACE RESEARCH FACILITY



MOON RELAY



Basic Responsibilities

The Radio Division conducts research and development in the fields of radio communication, radio navigation, radio propagation, precise frequency and time, and centralized electronic control. Consultative services are a major division effort.

Branches

Communication

- Secure communication
- Crypto-logic systems
- Communication antennas and circuitry
- ELF, VLF, and HF tropospheric propagation
- Facsimile, teletype, modem, and interface functions

Radio Techniques

- Satellite communication
- Precise frequency and time
- Centralized electronic control
- Radio channel certainty and spectral purity

Radio Navigation

- Long-range navigation—OMEGA
- Short-range and precise navigation
- TACAN
- Navigation security
- Underwater propagation and reception

Key Personnel

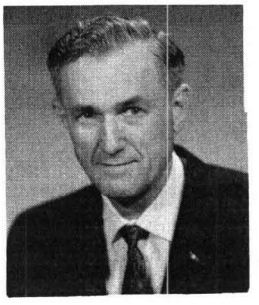
Name	*Title*
Mr. L. A. Gebhard	Superintendent
Mr. C. B. Davis	Head, Communication Branch
Mr. E. Toth	Head, Radio Techniques Branch
Dr. A. W. Coven	Head, Radio Navigation Branch

Personnel Complement

On Board: 122

Total Estimated R&D Funding

Fiscal Year 1968: $6,382,000

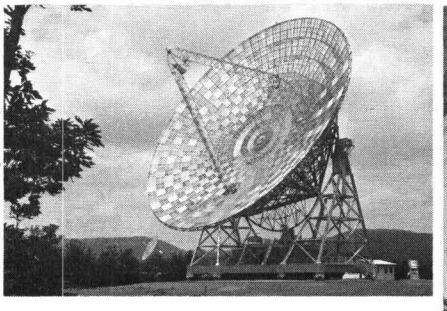


Electronic Warfare Division

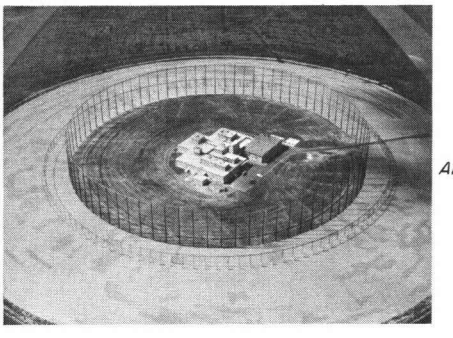
Mr. H. O. Lorenzen

TACTICAL DATA PROCESSING

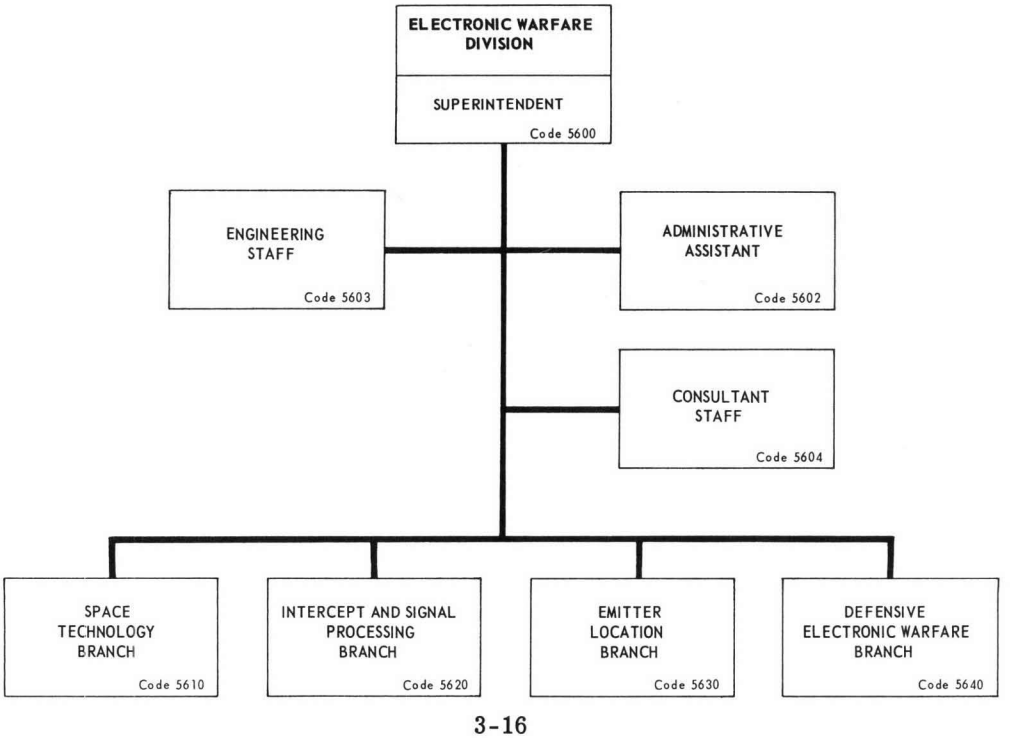
- SPACE TECHNOLOGY
- SIGNAL INTERCEPT AND SIGNAL PROCESSING
- EMITTER LOCATION
- DEFENSIVE ELECTRONIC WARFARE



150 FOOT ANTENNA
Sugar Grove



HF ANTENNA



Basic Responsibilities

The Electronic Warfare Division is responsible for the research and development required in support of the Navy's electronic warfare mission in the fields of space technology, intercept and signal processing, emitter location, and defensive electronic warfare.

Branches

Space Technology

- Large parabolic antenna systems
- Electromagnetic radiation control
- Special media propagation
- Electromagnetic exosphere phenomena
- Satellite systems
- National radio quiet zone

Intercept and Signal Processing

- Intercept systems
- Signal processing
- Data storage
- Data processing
- Recording
- Display

Emitter Location

- Direction finding systems
- Ionospheric propagation studies
- Infrared countermeasures
- Large antenna studies

Defensive Electronic Warfare

- Deception techniques
- Jamming
- Electromagnetic reflectors
- Defensive systems

Key Personnel

Name	*Title*
Mr. H. O. Lorenzen	Superintendent
CAPT F. Welden, USN (Ret)	Consultant
Mr. W. E. Withrow	Consultant
Dr. G. P. Ohman	Consultant
Mr. J. H. Trexler	Head, Space Technology Branch
Mr. R. D. Misner	Head, Intercept and Signal Processing Branch
Mr. M. J. Sheets	Head, Emitter Location Branch
Mr. L. A. Cosby	Head, Defensive Electronic Warfare Branch

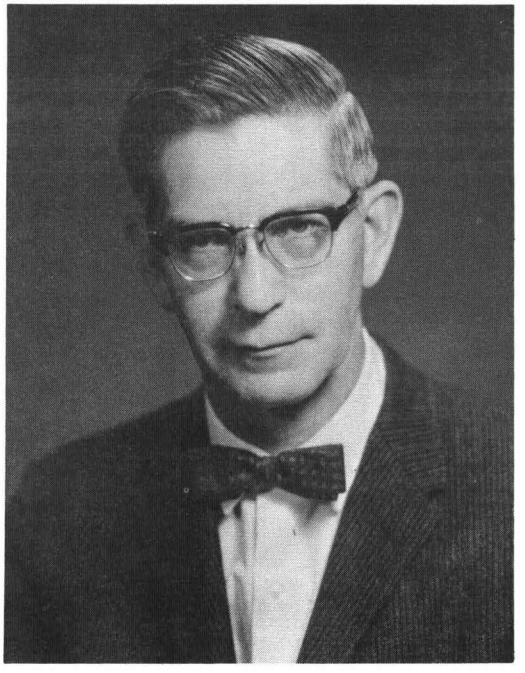
Personnel Complement

On Board: 93
(Graded 91, Ungraded 2)

Total Estimated R&D Funding

Fiscal Year 1968: $10,024,000

Materials Area



Dr. James H. Schulman
Associate Director of Research for Materials

Dr. Schulman [redacted] He is a graduate of the Massachusetts Institute of Technology, from which he received the B.S. degree in 1939 and the Ph.D. degree in 1942, both in the field of chemistry. While working toward his doctorate he held an instructorship at Suffolk, Boston, and a Teaching Fellowship at M.I.T. In 1941, he joined the staff of the M.I.T. Laboratory for Insulation Research, where he headed a section concerned with selenium rectifiers and photocells.

Dr. Schulman joined the Sylvania research laboratories in 1944 to carry out research on luminescent materials for use in cathode-ray tubes and fluorescent lamps. He came to NRL in 1946 to initiate a research program on luminescence, with particular emphasis on inorganic luminescent materials. At NRL he has served as Head, Chemical Metallurgy Branch, Metallurgy Division; Head, Dielectrics Branch, Solid State Division; Acting Associate Superintendent, Solid State Division; and Superintendent of the former Optical Physics Division. From August 1960 until December 1961, he was Deputy Scientific Director and Liaison Scientist for Solid State Physics with the London Branch of the Office of Naval Research. Upon his return to NRL in November 1964, Dr. Schulman was appointed to the Chair of Materials Sciences in recognition of his distinguished research accomplishments. In September 1967, he was appointed Associate Director of Research for Materials.

Dr. Schulman received the Applied Science Award of the NRL Branch of the Research Society of America (1957) and the Navy Superior Civilian Service Award (1965), both in recognition of his many contributions to the study of solid luminescent materials and phenomena, the investigation of radiation-induced optical effects in solids, and the application of the radiation-sensitive properties of solids to the dosimetry of nuclear and other high-energy radiations.

Dr. Schulman is a member of the Steering Committee of the Solid State Panel of the National Academy of Sciences, a former member of the Visiting Committee of the Argonne National Laboratory, and a former Chairman of the National Academy of Sciences–National Research Council Committee on High-Level Radiation Dosimetry. He is an Associate Editor of the Journal of the Optical Society of America and of the Materials Research Bulletin. Dr. Schulman is a Fellow of the American Physical Society, of the Optical Society of America, and of the American Association for the Advancement of Science. He has written numerous technical papers, coauthored a book in a special area of solid state physics, and been awarded several patents.

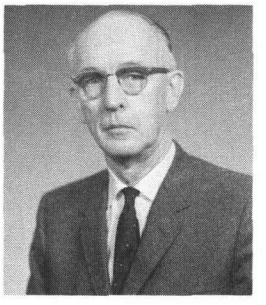
SHOCK & VIBRATION INFORMATION CENTER

Basic Responsibilities

The Shock & Vibration Information Center is one of the information centers established by the Director of Technical Information, DDR&E, and assigned to Navy for management and operation. It provides a single source within the Department of Defense for up-to-date information in the fields of shock and vibration for scientists and engineers in government agencies and for government contractors.

Key Personnel

Name	*Title*
Dr. W. W. Mutch	Head, S&V Information Center



Dr. W. W. Mutch

Personnel Complement

On Board: 4

Total Estimated R&D Funding

Fiscal Year 1968: $210,000

LABORATORY FOR STRUCTURE OF MATTER

Basic Responsibilities

The Laboratory for the Structure of Matter carries out experimental and theoretical investigations of the atomic, molecular, and crystalline structure of materials. The methods of x-ray and electron 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.

Key Personnel

Name	*Title*
Dr. J. Karle	Head, Laboratory for Structure of Matter

Dr. J. Karle

Personnel Complement

On Board: 9

Total Estimated R&D Funding

Fiscal Year 1968: $400,000

COMBUSTION SUPPRESSION RESEARCH CENTER

Basic Responsibilities

The Combustion Suppression Research Center conducts basic and applied research and development in the chemistry of materials and the engineering of methods for fire extinguishment in Naval air, ship, and shore operations. Emphasis is on the study of the phenomena surrounding uncontrolled combustion of fuels of all types, its diminishment by superior chemical materials and mechanical methods, and the development of suitably designed equipment and techniques for employing these materials.

Key Personnel

Name	*Title*
Dr. R. L. Tuve	Head, Combustion Suppression Research Center
Mr. H. B. Peterson	Head, Fire Engineering Research Group
Mr. H. E. Moran, Jr.	Head, Special Chemical Problems Group

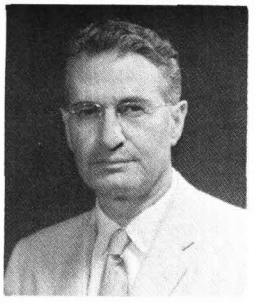
Dr. R. L. Tuve

Personnel Complement

On Board: 11

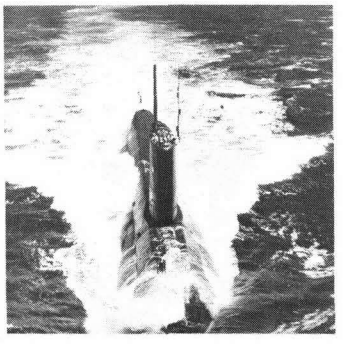
Total Estimated R&D Funding

Fiscal Year 1968: $300,000

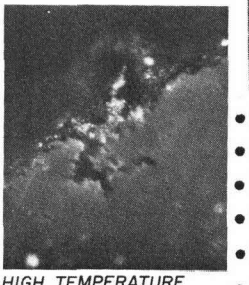


Chemistry Division

Dr. W. A. Zisman

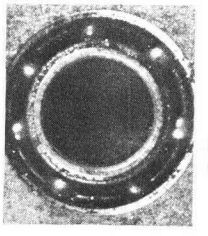


SUBMARINE HABITABILITY

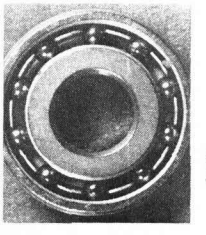


HIGH TEMPERATURE CORROSION

- PHYSICAL CHEMISTRY
- ORGANIC AND BIOLOGICAL CHEMISTRY
- INORGANIC AND NUCLEAR CHEMISTRY
- PROTECTIVE CHEMISTRY
- ELECTROCHEMISTRY
- SURFACE CHEMISTRY
- FUELS

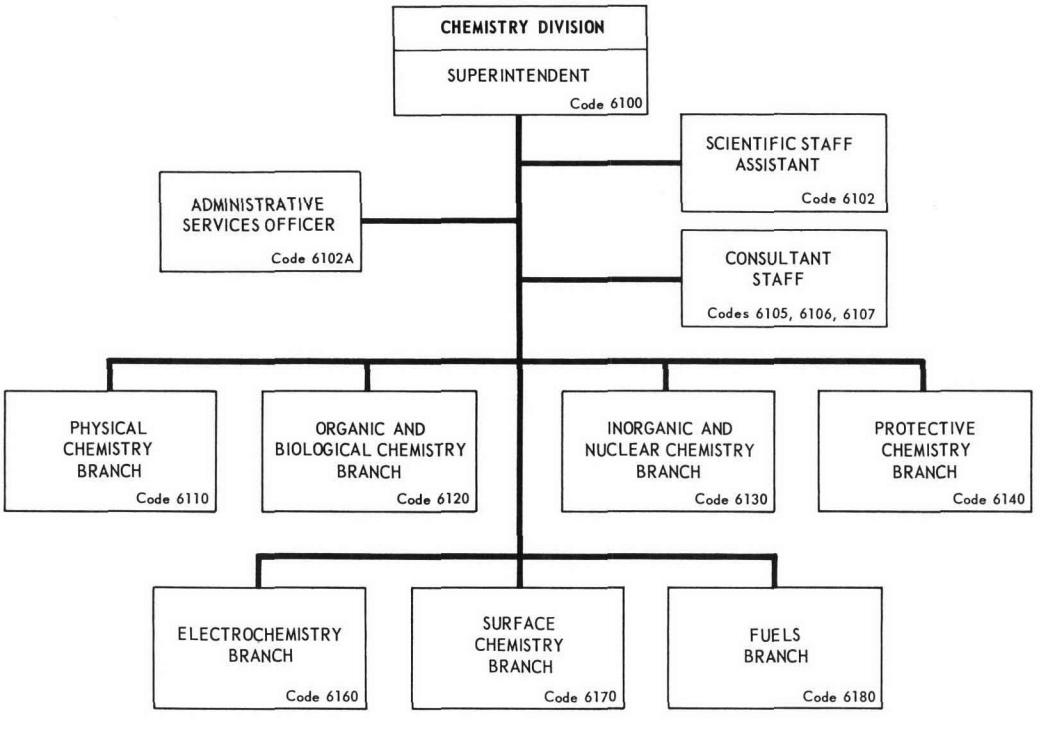


OLD SYSTEM 500 hrs.



NEW SYSTEM 3000 hrs.

BEARING LUBRICANTS



Basic Responsibilities

The Chemistry Division conducts a diversified program of basic and applied research and development in physical, organic, inorganic, nuclear, and biological chemistry. Specialized programs within these fields include fuels, lubricants, corrosion, surface chemistry, protective coatings, polymers, electrochemistry, molecular structure, submarine atmosphere purification, and BW/CW personnel protection. Consultative services form an important element in the division effort.

Branches

Physical Chemistry

- Atmospheric radioactivity
- Infrared and ultraviolet spectroscopy
- Analytical mass spectrometry
- Nuclear magnetic resonance spectroscopy

Organic and Biological Chemistry

- Microbiological research
- Functional organic coatings
- Properties of resins under high compressive loads

Inorganic and Nuclear Chemistry

- High temperature materials
- Submarine air purification
- Oxygen generating chemicals
- Corrosion mechanisms

Protective Chemistry

- CW/BW ship defense
- Adsorbents
- Properties of microbial surfaces

Electrochemistry

- Fuel cells
- Fundamental electrode reactions
- Electrochemical power sources
- Nuclear submarine atmosphere analysis and control

Surface Chemistry

- Lubricants
- Adsorption-desorption equilibria
- Salvage of equipment damaged by sea water
- Surface properties of fibers

Fuels

- Organic contaminants in submarine atmosphere
- Distillate fuels research
- Liquid propellant properties

Key Personnel

Name	*Title*
Dr. W. A. Zisman	Superintendent
Dr. T. F. Ford	Consultant
Mr. R. C. Taylor	Consultant
Dr. M. C. Bloom	Consultant
Dr. L. B. Lockhart, Jr.	Head, Physical Chemistry Branch
Dr. A. L. Alexander	Head, Organic and Biological Chemistry Branch
Mr. R. R. Miller	Head, Inorganic and Nuclear Chemistry Branch
Dr. E. A. Ramskill	Head, Protective Chemistry Branch
Dr. J. C. White	Head, Electrochemistry Branch
Dr. C. R. Singleterry	Head, Surface Chemistry Branch
Dr. H. W. Carhart	Head, Fuels Branch

Personnel Complement

On Board: 124

Total Estimated R&D Funding

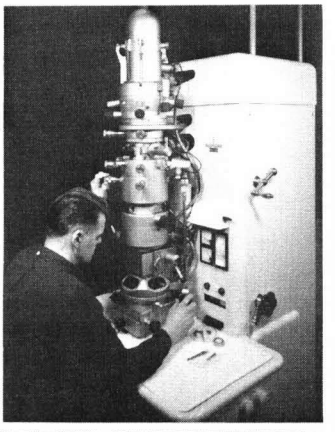
Fiscal Year 1968: $3,371,000

Metallurgy Division

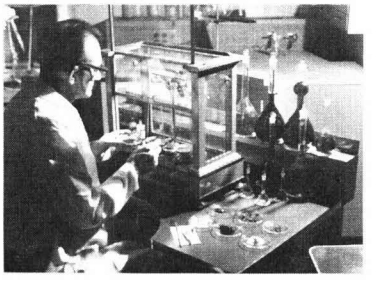
Mr. W. S. Pellini

- PHYSICAL METALLURGY
- METAL PHYSICS
- HIGH TEMPERATURE ALLOYS
- ANALYTICAL CHEMISTRY
- STRENGTH OF METALS
- REACTOR MATERIALS

ELECTRON MICROSCOPE

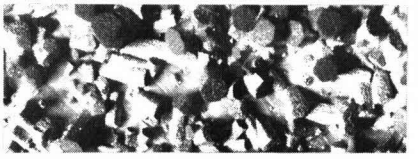


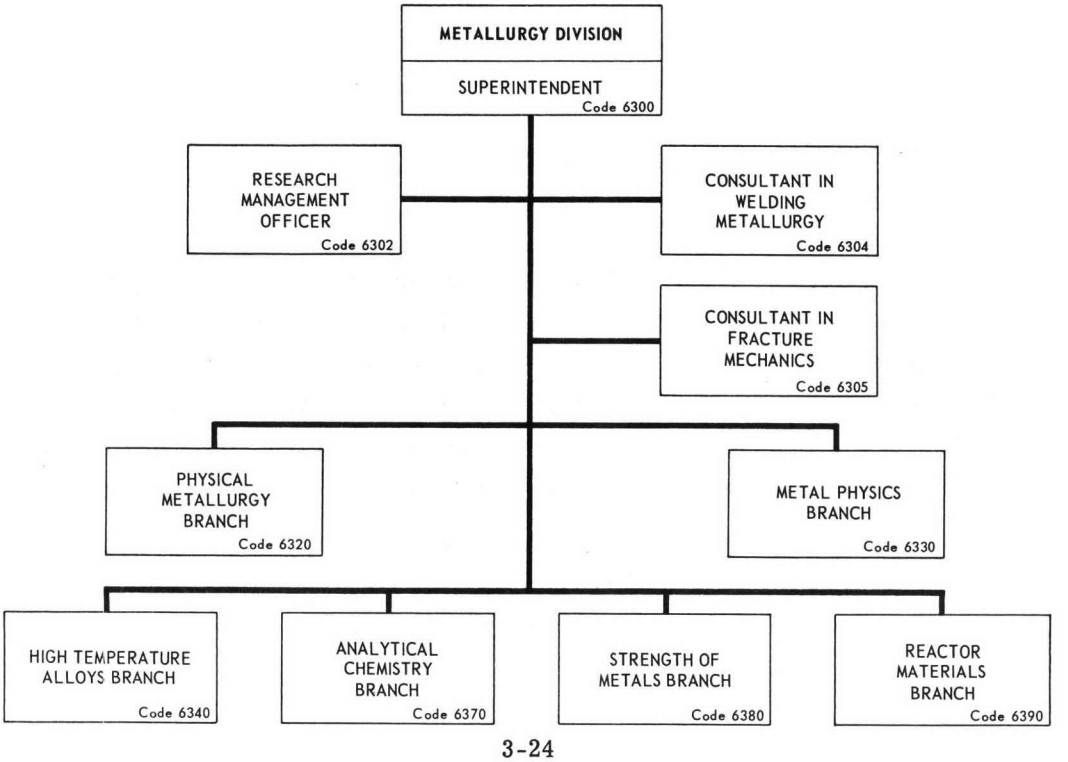
CHEMICAL ANALYSIS



REMOTE HANDLING ROOM

CORUNDUM CRYSTALS





Basic Responsibilities

The Metallurgy Division conducts research, development, and evaluation in the field of metallurgy, including the physical, mechanical, chemical, and structural aspects of metals. Important consultative services are provided to Navy and other DOD activities.

Branches

Physical Metallurgy

- Physical metallurgy of high-temperature materials
- Micromechanical metallurgy
- Marine corrosion studies

Metal Physics

- Solidification studies
- Properties of metals in liquid state
- Electronic properties of metallic materials
- Metallic imperfection studies
- Effects of irradiation upon the solid state properties of metals

High-Temperature Alloys

- High-temperature flow and fracture
- Effects of environment on fatigue and creep
- Single crystals of refractory metals

Analytical Chemistry

- Precision chemical analysis
- Analytical techniques development
- Determination of trace quantities of elements in small samples

Strength of Metals

- Properties, selection criteria, and fracture-safe design parameters for high and ultra-high-strength structural metals

Reactor Materials

- Properties of irradiated structural metals and alloys
- Mechanisms of radiation degradation of metals
- Engineering application of reactor materials
- Neutron spectra and dosimetry

Key Personnel

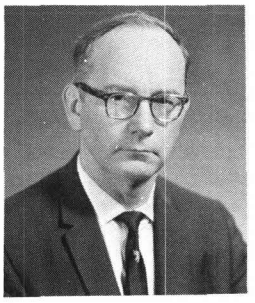
Name	*Title*
Mr. W. S. Pellini	Superintendent
Dr. P. P. Puzak	Consultant
Dr. J. M. Krafft	Consultant
Dr. B. F. Brown	Head, Physical Metallurgy Branch
Dr. A. I. Schindler	Head, Metal Physics Branch
Dr. M. R. Achter	Head, High Temperature Alloys Branch
Mr. D. I. Walter	Head, Analytical Chemistry Branch
Mr. R. J. Goode	Head, Strength of Metals Branch
Mr. J. R. Hawthorne	Head, Reactor Materials Branch (Acting)

Personnel Complement

On Board: 103

Total Estimated R&D Funding

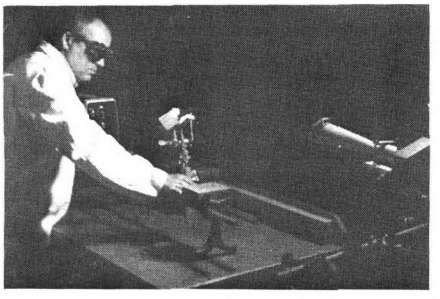
Fiscal Year 1968: $4,354,000



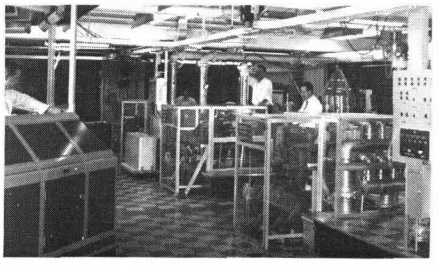
Dr. J. deLaunay

Solid State Division

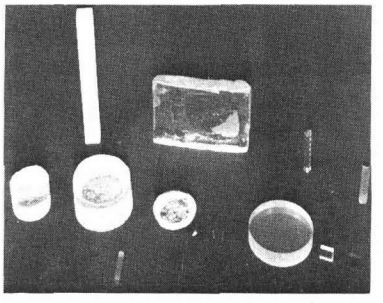
LASER DEVELOPMENT



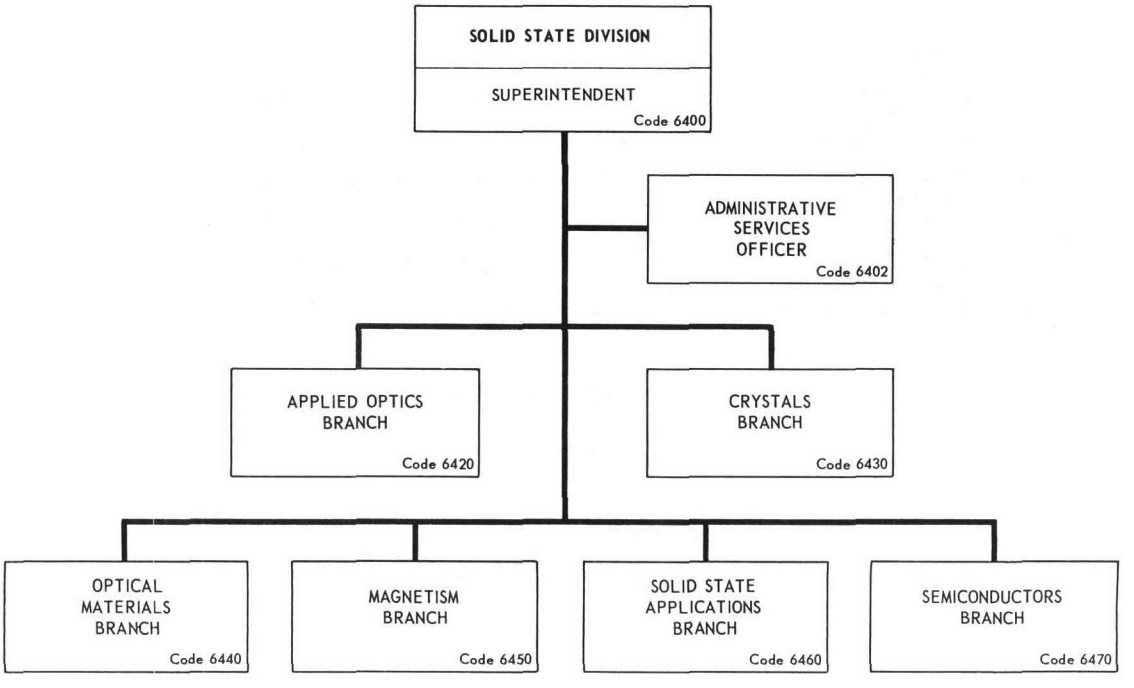
HIGH MAGNETIC FACILITY



LUMINESCENT PROPERTIES OF GLASS



- APPLIED OPTICS
- CRYSTALS
- OPTICAL MATERIALS
- MAGNETISM
- SOLID STATE APPLICATIONS
- SEMICONDUCTORS



Basic Responsibilities

The Solid State Division is concerned with fundamental and applied research in the physics of materials, including metals, semiconductors, dielectrics, and glasses. Areas under investigation include optical and electronic properties, magnetism, radiation damage, cyrogenics, behavior under high pressures, and structure and preparation of materials. Optical properties of the atmosphere and the ocean are also under study.

Branches

Applied Optics

- Scattering and twinkle of light
- Lasers
- Undersea optics
- Optical properties of materials, the atmosphere, and the ocean

Crystals

- Growth and structure of crystals
- Electromagnetic ceramics
- High-pressure effects

Optical Materials

- Optical and radiation-sensitive properties of nonmetallic materials
- Color centers
- Thermoluminescence
- Lasers

Magnetism

- Electronic and nuclear paramagnetism
- Spin-ordered magnetic phenomena
- Properties of materials at low temperatures

Solid State Applications

- Radiation effects on semiconductor material and devices used in satellites
- Radiation effects on dielectric materials

Semiconductors

- Electronic energy levels and band structure
- Semiconductor applications
- Physical properties of semiconductors
- Cryomagnetism

Key Personnel

Name	*Title*
Dr. J. deLaunay	Superintendent
Dr. C. C. Klick	Associate Superintendent (Acting)
Mr. J. R. Clement	Consultant
Dr. L. F. Drummeter, Jr.	Head, Applied Optics Branch
Dr. P. B. Alers	Head, Crystals Branch
Dr. C. C. Klick	Head, Optical Materials Branch
Dr. G. T. Rado	Head, Magnetism Branch
Mr. E. L. Brancato	Head, Solid State Applications Branch
Dr. R. F. Wallis	Head, Semiconductors Branch

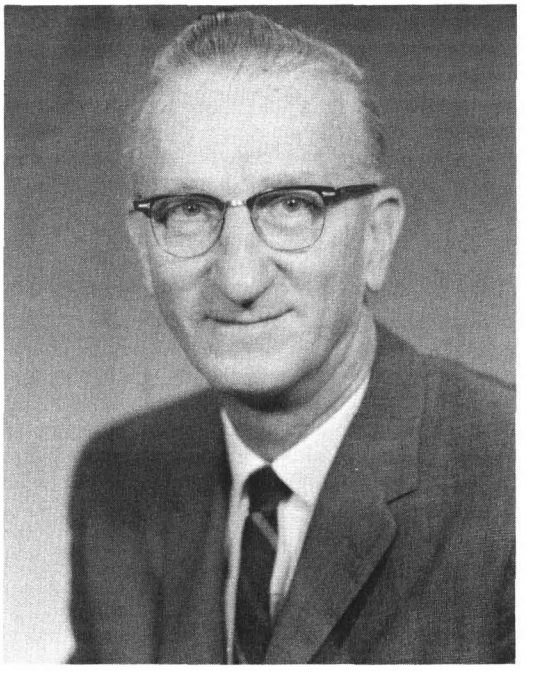
Personnel Complement

On Board: 123

Total Estimated R&D Funding

Fiscal Year 1968: $4,400,000

General Sciences Area



Dr. Wayne C. Hall
Associate Director of Research for General Sciences

Dr. Hall [redacted]. He was educated at the University of Kansas, where he received a Bachelor of Science degree in Electrical Engineering in 1931, a Master of Science degree in Physics in 1933, and a Ph.D. in Physics in 1936. He was an Assistant Instructor in the Physics Department at the University of Kansas from 1931 to 1935.

Dr. Hall came to the Laboratory in 1935 for research on the use of fuel cells to effect direct conversion of heat energy. During the next ten years he was also involved in studies of energy conversion, electronic strain gages, and torsion meters. His work on the problem of interference of precipitation static on aircraft radio communications ultimately led to development of the antiprecipitation static antenna and fittings now used on military and civilian aircraft to ensure the reliability of radio communications and radio navigational aids during severe weather conditions.

In January 1945 Dr. Hall was appointed Assistant Head of the Aircraft Electricity Division and later, in 1946, Superintendent of the Division. In this position he was responsible for a group of scientists conducting research and development on electrical power systems for aircraft, basic research in electricity and magnetism, and basic research in solid state physics and physical phenomena at ultralow temperatures. From 1948 through 1951, in addition to his duties as a Division Superintendent, he was Scientific Officer at NRL in charge of a project from the Los Alamos Scientific Laboratory involving diagnostic measurements in the atomic weapons program. Early in 1954 he became Superintendent of the Solid State Division at the Laboratory and was shortly thereafter appointed to the position of Associate Director of Research for Nucleonics. The title of this position was redesignated Associate Director of Research for General Sciences in February 1966.

Dr. Hall received the Distinguished Civilian Service Award in 1946 "for distinguished achievement in research on mitigation of precipitation static interference encountered by aircraft flying in adverse weather conditions."

Dr. Hall is a member of several professional societies, including the American Physical Society, Sigma Xi, RESA, Tau Beta Pi, and the National Philosophical Society and is a Fellow of the American Institute of Electrical Engineers and the Washington Academy of Sciences. He is the author of many technical papers and has been granted a number of patents.

RADIOLOGICAL SAFETY OFFICE

Basic Responsibilities

The Health Physics staff is assigned the overall responsibility for radiological safety at the Naval Research Laboratory. The NRL radiological safety program has two primary purposes: to assure that all operations in which ionizing radiation is used are safe and in compliance with Federal regulations; and to provide employees with conditions, instruments, instructions, and assistance that will assure radiological safety in the performance of their duties.

Key Personnel

Name	*Title*
Mr. L. A. Brauch	Radiological Safety Officer
Mr. R. L. Flournoy	Assistant RSO for Monitoring
Mr. T. L. Johnson	Assistant RSO for Special Projects

Mr. L. A. Brauch

Personnel Complement

On Board: 18

Total Estimated Funding

Fiscal Year 1968: $253,800

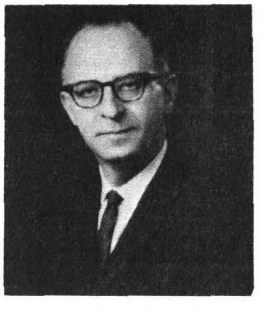
LABORATORY FOR COSMIC RAY PHYSICS

Basic Responsibilities

The Laboratory for Cosmic Ray Physics conducts a program of fundamental investigations of cosmic radiation—its composition and spectra, its origin, its "age," its propagation through space, its interactions with particles and fields in the regions of space that it traverses, and its role in various high-energy astrophysical phenomena. The program is framed so as to be broadly responsive to the anticipated technical requirements of the Navy and the general research and development program of the Department of Defense.

Key Personnel

Name	*Title*
Dr. M. M. Shapiro	Chief Scientist
Mr. B. Stiller	Head, Emulsion Techniques Section
Mr. N. Seeman	Head, Counter Techniques Section



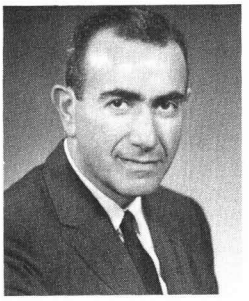
Dr. M. M. Shapiro

Personnel Complement

On Board: 28

Total Estimated R&D Funding

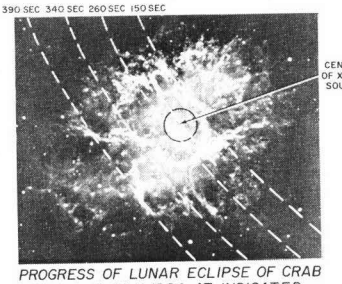
Fiscal Year 1968: $721,000



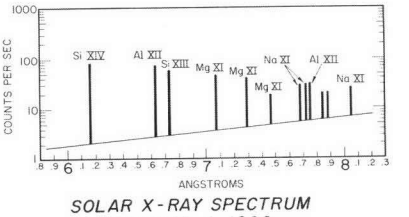
Space Science Division

Dr. H. Friedman

UPPER AIR PHYSICS
RADIO ASTRONOMY
ROCKET SPECTROSCOPY
•••••••••
E. O. HULBURT CENTER

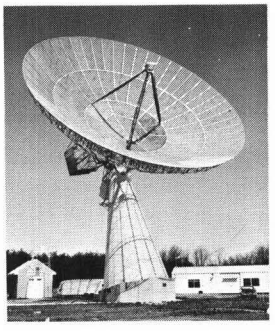


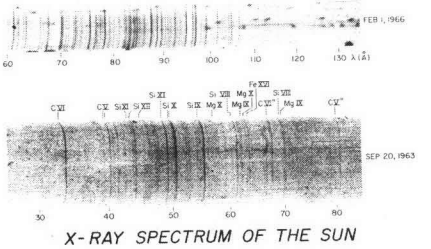
PROGRESS OF LUNAR ECLIPSE OF CRAB NEBULA, 7 JULY 1964 AT INDICATED TIMES AFTER ROCKET LAUNCH



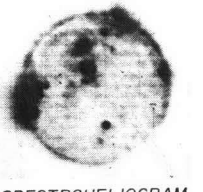
SOLAR X-RAY SPECTRUM OCTOBER 4, 1966

RADIO TELESCOPE MARYLAND POINT

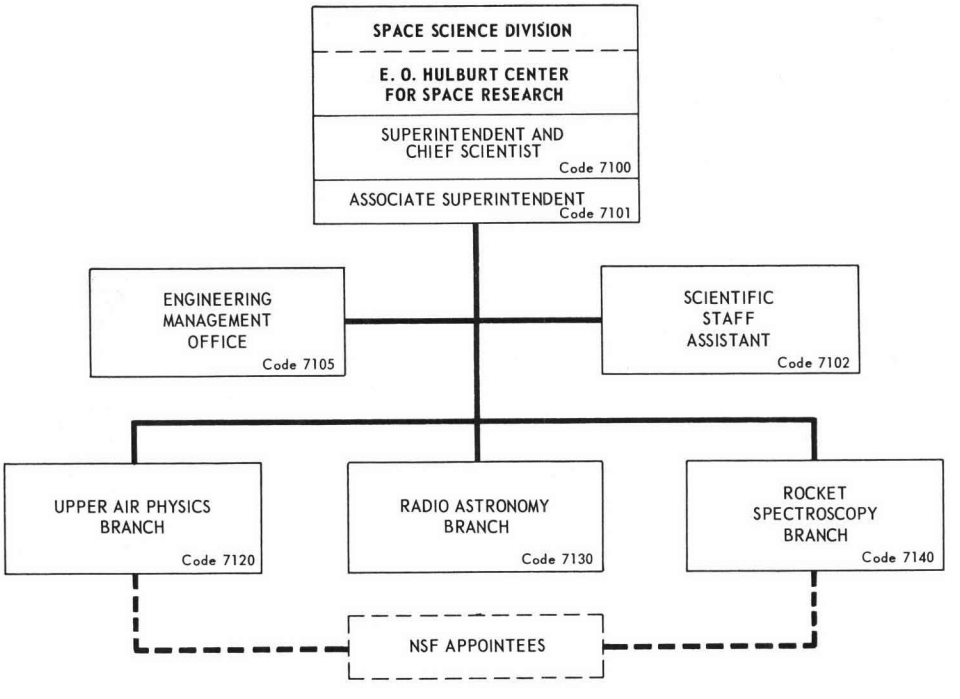




X-RAY SPECTRUM OF THE SUN



SPECTROHELIOGRAM 171-400 Å (APPROX) JULY 27, 1966



Basic Responsibilities

The Space Science Division conducts research, development, and test in the fields of upper air physics, astronomy, and astrophysics. Satellites and rockets are used to obtain information on radiation from the sun and celestial sources, and to study the composition and behavior of the ionosphere. Radio telescopes are used for astronomical observations. Results are of importance to radio communications, to utilization of the space environment, and to the fundamental understanding of natural radiation phenomena.

Branches

Upper Air Physics

- Gamma-ray, x-ray, ultraviolet, and infrared astronomy
- Aeronomy
- Solar x-ray monitoring satellites
- Electronic imaging studies
- Meteor astronomy

Radio Astronomy

- Galactic and extragalactic radio astronomy
- Radar measurements of earth-moon distance and topography of moon
- Refined measurements of the astronomical unit

Rocket Spectroscopy

- X-ray and ultraviolet solar spectroscopy
- Spectroheliographic and coronagraphic research
- Airglow measurements from rockets and manned space vehicles
- Laboratory astrophysics

E. O. Hulburt Center for Space Research

The program is that of the combined Upper Air Physics, Rocket Spectroscopy, and Radio Astronomy Branches. It allows graduate and post-graduate students and visiting faculty members to cooperate with NRL in space research.

Key Personnel

Name	*Title*
Dr. H. Friedman	Superintendent
Dr. P. W. Mange	Associate Superintendent (Acting)
Mr. R. C. Meyer	Engineering Consultant
Dr. T. A. Chubb	Head, Upper Air Physics Branch
Mr. E. F. McClain	Head, Radio Astronomy Branch
Dr. R. Tousey	Head, Rocket Spectroscopy Branch
Dr. H. Friedman	Chief Scientist, Hulburt Center

Personnel Complement

On Board: 120

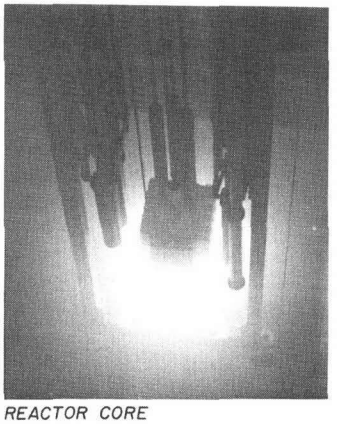
Total Estimated R&D Funding

Fiscal Year 1968: $11,152,000

Dr. J. McElhinney

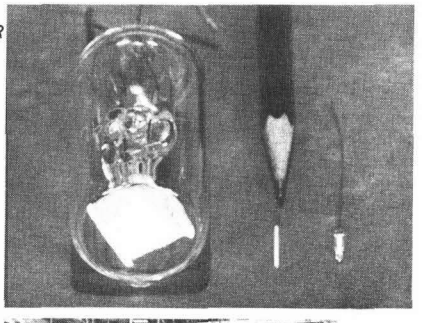
Nuclear Physics Division

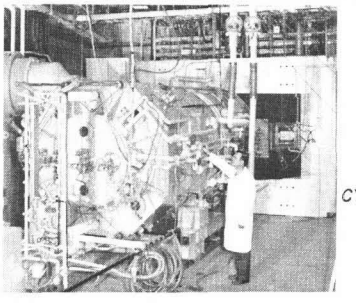
- CYCLOTRON
- DOSIMETRY
- LINAC
- NUCLEAR SYSTEMS
- REACTORS
- THEORY
- VAN DE GRAAFF
- X-RAY OPTICS



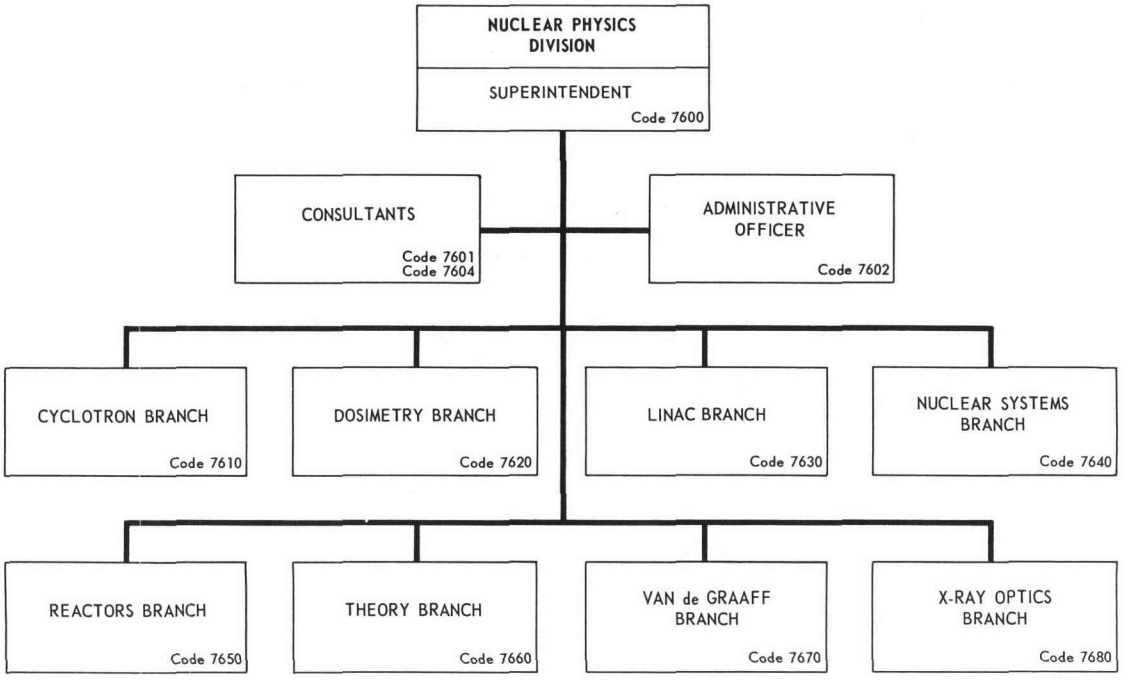
REACTOR CORE

DOSIMETER





CYCLOTRON



Basic Responsibilities

The Nuclear Physics Division is engaged in a broad program of basic and applied research in nuclear physics and related areas. Included are theoretical and experimental programs in properties of nuclei, nuclear forces, nuclear reactions, shielding studies, x-ray and electron optics, materials analysis, and weapon-related research. The Division employs the NRL 75-Mev sector focussing cyclotron, 60-Mev Linac, 1-megawatt reactor, 5-Mev Van de Graaff, 14-Mev neutron generator, and other particle accelerators and radiation sources.

Branches

Cyclotron

- Charged particle nuclear reactions
- Nuclear structure
- Charged particle scattering
- Neutron shielding
- Radioactivation analysis
- Production of radioactive sources

Dosimetry

- Personnel dosimeters
- Thermoluminescence dosimetry
- Dosimetry of gamma rays, neutrons, and charged particles
- Radiation calibration facilities

Linac

- Electron scattering
- Photonuclear reactions
- Nuclear excitation
- Neutron capture reactions
- Pulsed radiation effects
- Radioactivation analysis

Nuclear Systems

- Low-level nuclear radiation detectors for special purposes

Reactor

- Neutron activation analysis
- Production of radioactive sources
- Neutron diffraction
- Polarized neutron scattering

Theory

- Nuclear reactions
- Field theory
- Elementary-particle physics
- Nuclear structure
- Nonlinear optics
- Mathematical physics

Van de Graaff

- Charged particle nuclear reactions
- Nuclear structure
- Ion beam optics
- Radiation damage due to charged particles
- Surface and film analysis by nuclear techniques

X-ray Optics

- X-ray and electron optics
- Materials analysis

Key Personnel

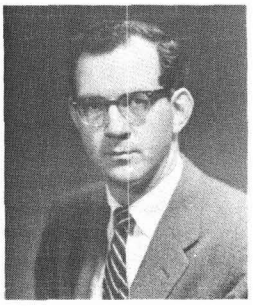
Name	*Title*
Dr. J. McElhinney	Superintendent
Dr. E. A. Wolicki	Consultant and Associate Superintendent (Acting)
Dr. C. V. Strain	Consultant
Dr. R. B. Theus	Head, Cyclotron Branch (Acting)
Mr. F. H. Attix	Head, Dosimetry Branch
Dr. T. F. Godlove	Head, Linac Branch
Mr. D. C. Cook	Head, Nuclear Systems Branch
Dr. C. V. Strain	Head, Reactors Branch (Acting)
Dr. A. W. Sáenz	Head, Theory Branch
Mr. K. L. Dunning	Head, Van de Graaff Branch
Mr. L. S. Birks	Head, X-Ray Optics Branch

Personnel Complement

On Board: 125

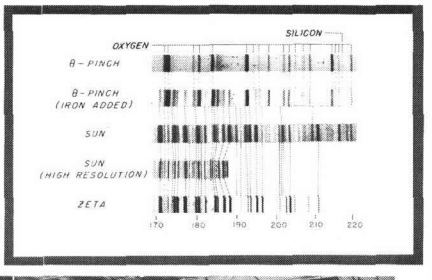
Total Estimated R&D Funding

Fiscal Year 1968: $4,447,000

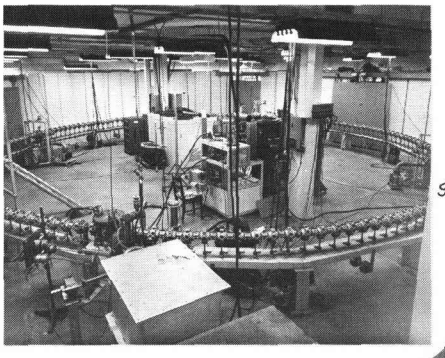


Dr. A. C. Kolb

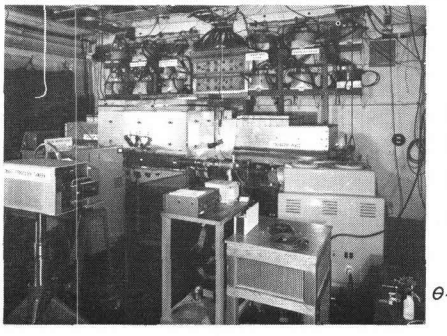
Plasma Physics Division



STAR vs. LAB SPECTRA



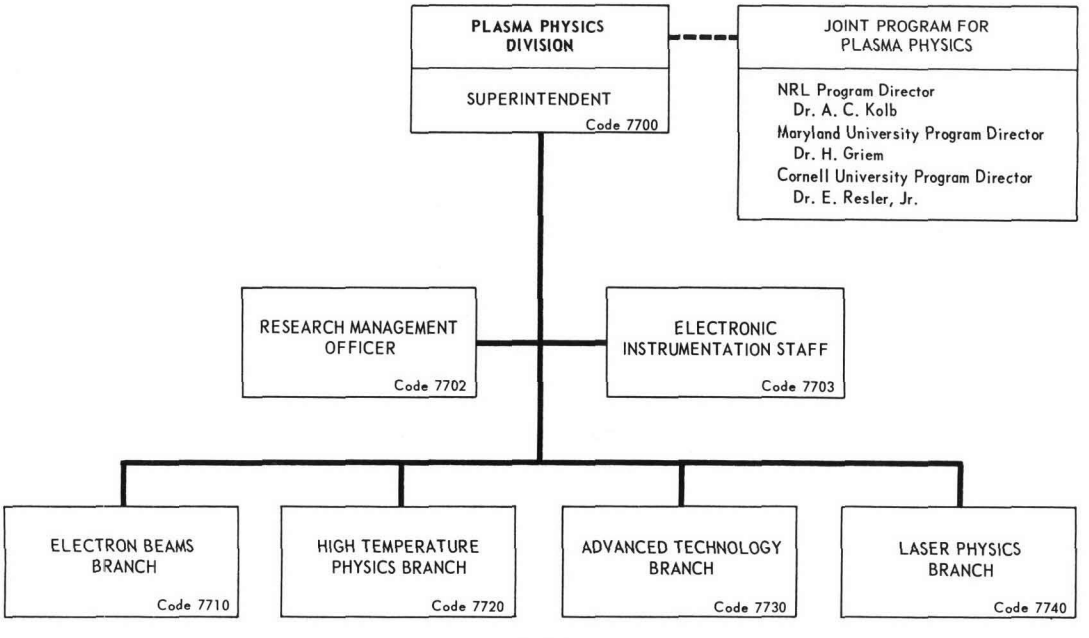
SOZOTRON



θ-PINCH FACILITY

- ELECTRON BEAMS
- HIGH TEMPERATURE PHYSICS
- ADVANCED TECHNOLOGY
- LASER PHYSICS

LASER STUDIES



Basic Responsibilities

The Plasma Physics Division conducts both basic and applied research. Examples of effort under way include: fusion physics and the generation and containment of high-temperature plasmas, directed toward eventual power sources; laboratory astrophysics; electron beams; and high-power lasers. This Division, the University of Maryland, and Cornell University engage in a joint program of research in plasma physics. In addition to increasing significantly the scientific breadth of the participating institutions, the program is acquainting graduate students with research frontiers in plasma physics through association with leading scientists in the field. Students have an opportunity to use NRL facilities and talent for thesis research, and NRL scientists, in turn, are able to use the research facilities of both universities.

Branches

Electronic Instrumentation

Instrumentation support to the Division for control measurement of experiments

Electron Beams

Production and applications of intense electron beams
Beam stabilization

High Temperature Physics

Physics and utilization of ultra-high-temperature plasmas
Nonlinear optics

Advanced Technology

Technological support to the Division in the form of electrical, mechanical, optical, and vacuum systems

Laser Physics

Physics of solid state and gas lasers

Key Personnel

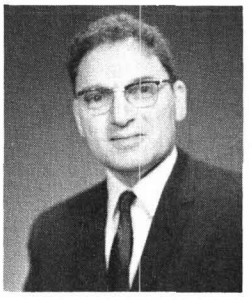
Name	*Title*
Dr. A. C. Kolb	Superintendent
Dr. A. J. Glass	Associate Superintendent (Acting)
Mr. J. D. Shipman	Head, Electronic Instrumentation Staff
Mr. D. C. dePackh	Head, Electron Beams Branch
Dr. A. C. Kolb	Head, High Temperature Physics Branch
Dr. W. A. Lupton	Head, Advanced Technology Branch
Dr. A. J. Glass	Head, Laser Physics Branch

Personnel Complement

On Board: 49

Total Estimated R&D Funding

Fiscal Year 1968: $2,555,000

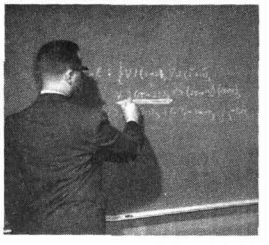


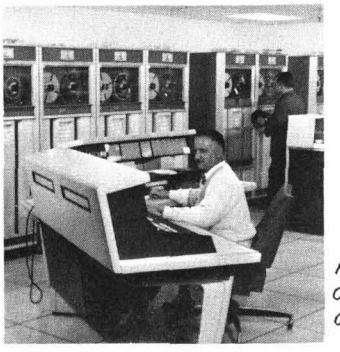
Dr. H. Hauptman

Mathematics and Information Sciences Division

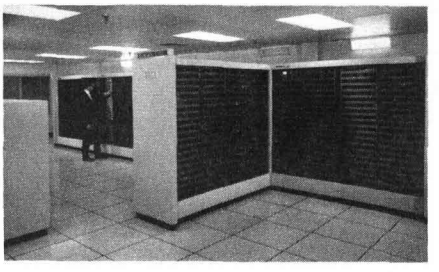
- RESEARCH COMPUTATION
- MATHEMATICAL PHYSICS
- COMPUTER MATHEMATICS
- INFORMATION SYSTEMS

MATHEMATICAL PHYSICS

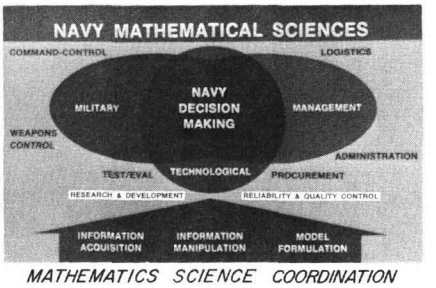




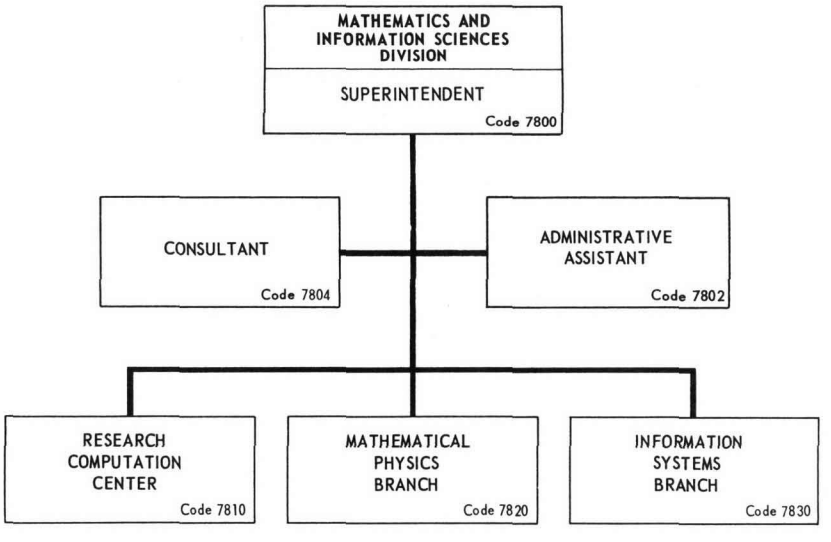
RESEARCH COMPUTATION CENTER



CDC 3800 COMPUTER



MATHEMATICS SCIENCE COORDINATION



Basic Responsibilities

The Mathematics and Information Sciences Division conducts basic and applied research in the mathematical sciences; determines present and future Navy needs with reference to mathematics and the computer-oriented sciences; and creates and maintains the competence required to formulate and to meet these needs.

Branches

Research Computation

- Data engineering and operations
- Analog computer
- Programming
- Programming systems
- Information retrieval

Mathematical Physics

- Consultative mathematical services
- Mathematical concepts of physical phenomena
- Optimization
- Probability and statistics
- Numerical analysis
- Pure and applied mathematics

Information Systems

- Information processing
- Adaptive systems
- Systems simulations

Key Personnel

Name	*Title*
Dr. H. Hauptman	Superintendent (Acting)
Dr. B. Lepson	Consultant
Mr. A. B. Bligh	Head, Research Computation Branch
Dr. H. Hauptman	Head, Mathematical Physics Branch
Dr. B. Wald	Head, Information Systems Branch

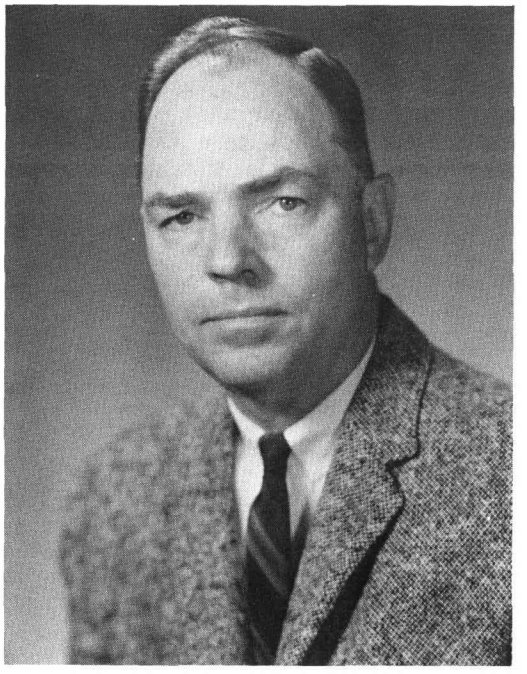
Personnel Complement

On Board: 56

Total Estimated R&D Funding

Fiscal Year 1968: $560,000

Oceanology Area



Dr. Victor J. Linnenbom
Associate Director of Research for Oceanology (Acting)

Dr. Linnenbom [redacted]. He attended the State University of Iowa, where in 1938 he received the B.A. and M.S. degrees. After working at the Monsanto Chemical Company for four years and serving a four-year tour of duty in the U. S. Marine Corps, he entered Washington University, at St. Louis, where he earned the Ph.D. degree in radiochemistry in 1949.

Dr. Linnenbom came to NRL in 1949. His early work included the development of chemical methods for the separation and purification of radioisotopes from irradiated target materials and research on the problems of corrosion and diffusion in support of the Navy's Nuclear Submarine Program. After directing the chemical phases of NRL's Pressurized Loop Project, he assumed complete responsibility for the Project in 1955 and directed its completion and subsequent installation and operation at the National Reactor Test Station in Idaho. The loop subsequently was transferred to the Knolls Atomic Power Laboratory for use in testing new types of reactor fuel elements for the Navy's Nuclear Submarine Program.

The results of Dr. Linnenbom's fundamental research in radiation chemistry and on the effects of radiation on materials, plus his service as a United States delegate to the International Electrochemical Commission, have contributed greatly to the establishment of feasible standards for irradiation testing. In addition to his regular duties, Dr. Linnenbom served for a number of years, as Chairman of the NRL Radiological Safety Committee. In May 1960, he was appointed Head of the Radiation Effects Branch. While serving in this position, Dr. Linnenbom was assigned collateral duty as Associate Superintendent of the Radiation Division.

In recent years, the trend of his work shifted towards the application of chemical and nuclear techniques to the field of oceanography. In December 1966, he was designated to organize the new Ocean Science and Engineering Division and to serve as its first Superintendent. In September 1967, he was appointed Acting Associate Director of Research for Oceanology.

Dr. Linnenbom received the E. O. Hulburt Science Award in 1964 for his contributions to the fields of nuclear and radiation chemistry; he also has been granted several patents.

Dr. Linnenbom is a member of the American Chemical Society, the Scientific Research Society of America, Phi Lambda Upsilon (a National Honorary Chemical Society), Phi Beta Kappa, Sigma Xi, the Washington Academy of Sciences, the American Association for the Advancement of Science, and the Institute of Electrical and Electronic Engineers. He is also a member of the United States Marine Corps Reserve Officers Association.

NONACOUSTIC ASW R&D TASK GROUP

Basic Responsibilities

The Nonacoustic ASW R&D Task Group consolidates the NRL efforts in the area of nonacoustic anti-submarine warfare research and development and also acts as the management center for the Nonacoustic Submarine Effects (NASE) program fiscally supported by the NAVAIRSYSCOM.

Key Personnel

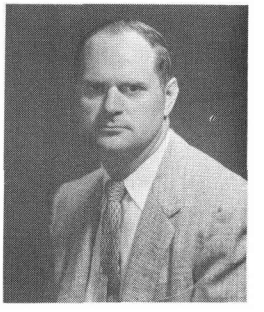
Name	*Title*
Dr. J. O. Elliot	Director, Nonacoustic ASW R&D Task Group

Personnel Complement

On Board: 3

Total Estimated R&D Funding

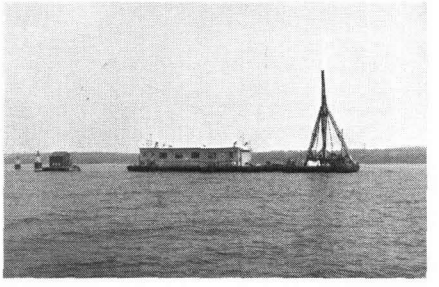
Fiscal Year 1968: $585,000



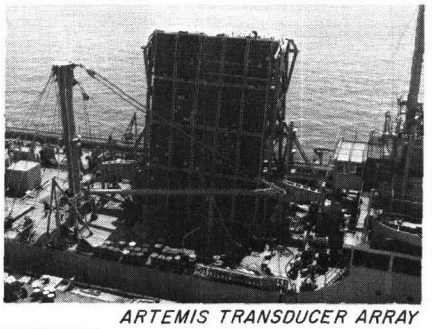
Dr. J. O. Elliot

Mr. A. T. McClinton

Acoustics Division

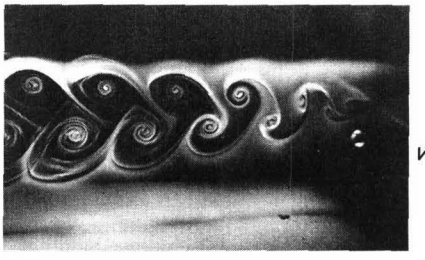


TRANSDUCER CALIBRATION FACILITY

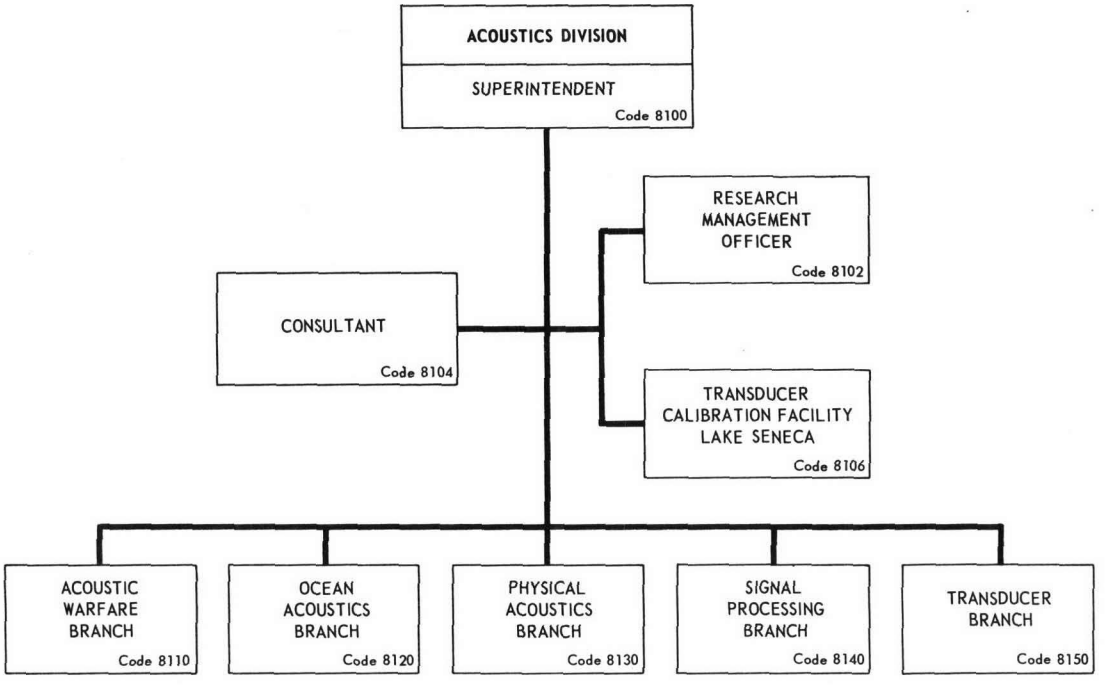


ARTEMIS TRANSDUCER ARRAY

- ACOUSTIC WARFARE
- OCEAN ACOUSTICS
- PHYSICAL ACOUSTICS
- SIGNAL PROCESSING
- TRANSDUCER



VORTEX STUDIES



Basic Responsibilities

The Acoustics Division conducts theoretical and experimental research programs in physical acoustics, ocean acoustics, and predictive oceanography to develop theory and models of the interaction of acoustic fields with structures and the ocean environment. In addition, the program is oriented so as to provide information required for the Navy Undersea Warfare programs and for research and development programs of the Division, in the fields of transducers, signal processing, countermeasures, and acoustic warfare. The Acoustics Division works closely with other Divisions that conduct research and development programs in materials, oceanography, and deep ocean technology.

Branches

Acoustic Warfare

- Acoustic countermeasure techniques
- Assured sonar range studies
- Undersea warfare
- Submarine ocean interactions

Ocean Acoustics

- Sound scattering in the ocean
- Sound speeds in the ocean
- Signal analysis
- Shallow water propagation
- Predictive oceanography

Physical Acoustics

- Microacoustics
- Flow acoustics
- Ultrasonics

Signal Processing

- Signal processing
- Communication theory
- Data presentation

Transducer

- Basic radiation theory
- Electroacoustic modeling
- Transducer physical models
- Transducer mathematical models
- Calibration of large transducer arrays
- Transducer materials research

Key Personnel

Name	*Title*
Mr. A. T. McClinton	Superintendent (Acting)
Mr. H. R. Baker	Consultant
Mr. A. L. Gotthardt	Head, Transducer Calibration Facility
Mr. R. H. Mathes	Head, Techniques Branch
Mr. R. H. Ferris	Head, Ocean Acoustics Branch (Acting)
Dr. R. L. Steinberger	Head, Physical Acoustics Branch
Mr. H. L. Peterson	Head, Signal Processing Branch (Acting)
Mr. S. Hanish	Head, Transducer Branch

Personnel Complement

On Board: 101
(Graded 97, Ungraded 4)

Total Estimated R&D Funding

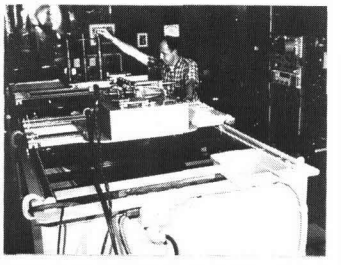
Fiscal Year 1968: $3,311,000

Underwater Sound Reference Division

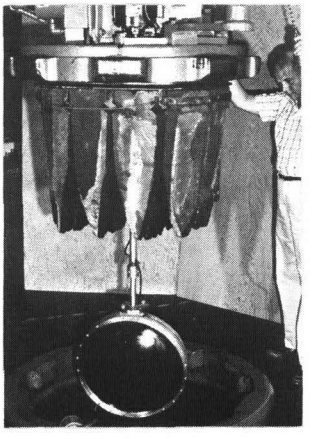
Mr. R. J. Bobber

- UNDERWATER ELECTROACOUSTIC MEASUREMENT METHODS
- UNDERWATER ELECTROACOUSTIC STANDARDS
- UNDERWATER ELECTROACOUSTIC TEST & EVALUATION

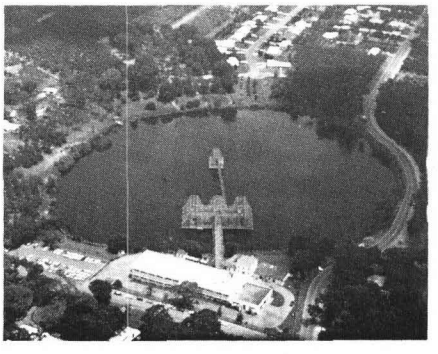
HIGH-FREQUENCY LABORATORY



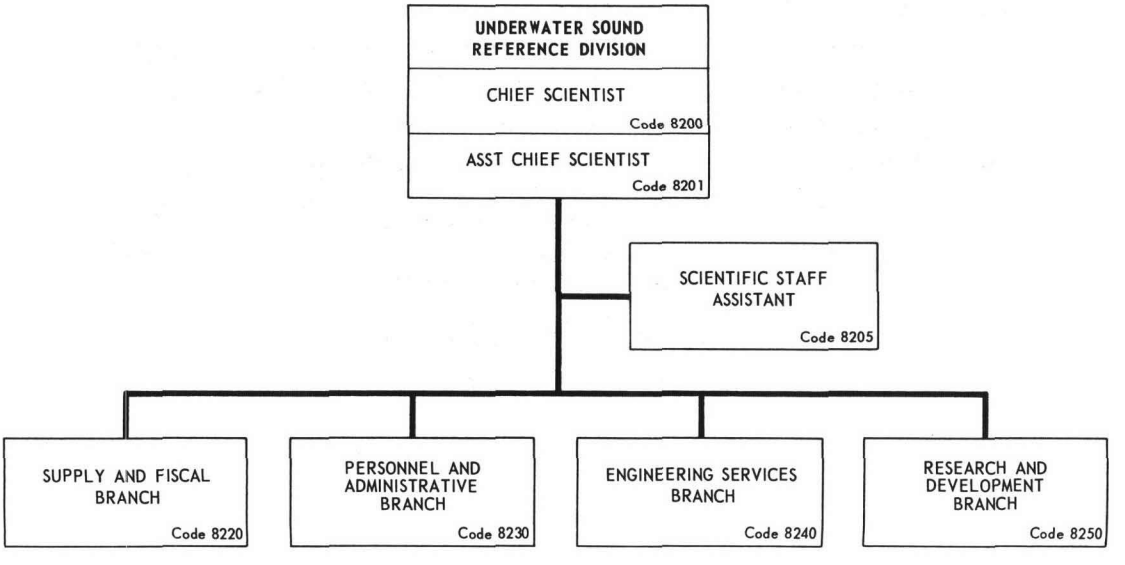
ANECHOIC TANK



UNDERWATER SOUND REFERENCE DIVISION, ORLANDO, FLORIDA



LEESBURG FACILITY - CALIBRATION BARGE



Basic Responsibilities

The Underwater Sound Reference Division is engaged in a program of research and development in the field of underwater acoustics. Specialized programs include acoustical measurement theory; development of measuring techniques and instrumentation; and development of electroacoustic transducers. It provides primary reference calibration services for underwater acoustic devices and equipment. It also provides consultative services to government agencies and contractors engaged in underwater sound research and development.

Research Sections (Within R&D Branch)

Acoustic Calibration

- Open-water calibration
- Calibration techniques
- Data reduction

Research

- Acoustical measurement methodology
- Mathematical physics
- Simulated deep-submergence measurements
- Cavitation studies
- Measurement systems

Electronics Engineering

- Measuring and recording systems
- Electronic equipment calibration
- Electrical measurement methodology

Transducer

- Acoustic materials research
- Standard transducer design and maintenance
- Electroacoustic studies
- Special purpose transducer design and fabrication

Key Personnel

Name	*Title*
Mr. R. J. Bobber	Chief Scientist (Acting)
Mr. D. T. Hawley	Assistant Chief Scientist
Mr. J. M. Taylor	Scientific Staff Assistant
Mr. D. T. Hawley	Head, Security Branch (Acting)
Mr. J. C. Michael	Head, Supply and Fiscal Branch
Mrs. W. M. Scott	Head, Personnel Branch
Mr. C. C. Sims	Head, Research and Development Branch (Acting)
Mr. W. L. Paine	Asst Head, R&D Branch for Test and Evaluation
Mr. J. F. Prandoni	Head, Engineering Services Branch

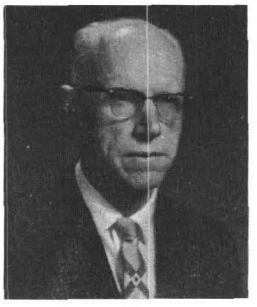
Personnel Complement

On Board: 100

(Graded 80, Ungraded 20)

Total Estimated R&D Funding

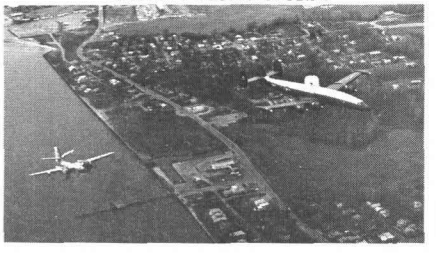
Fiscal Year 1968: $1,297,000

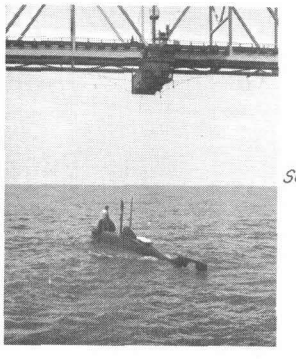


Dr. J. E. Dinger

Ocean Sciences Division

CLOUD PHYSICS STUDIES

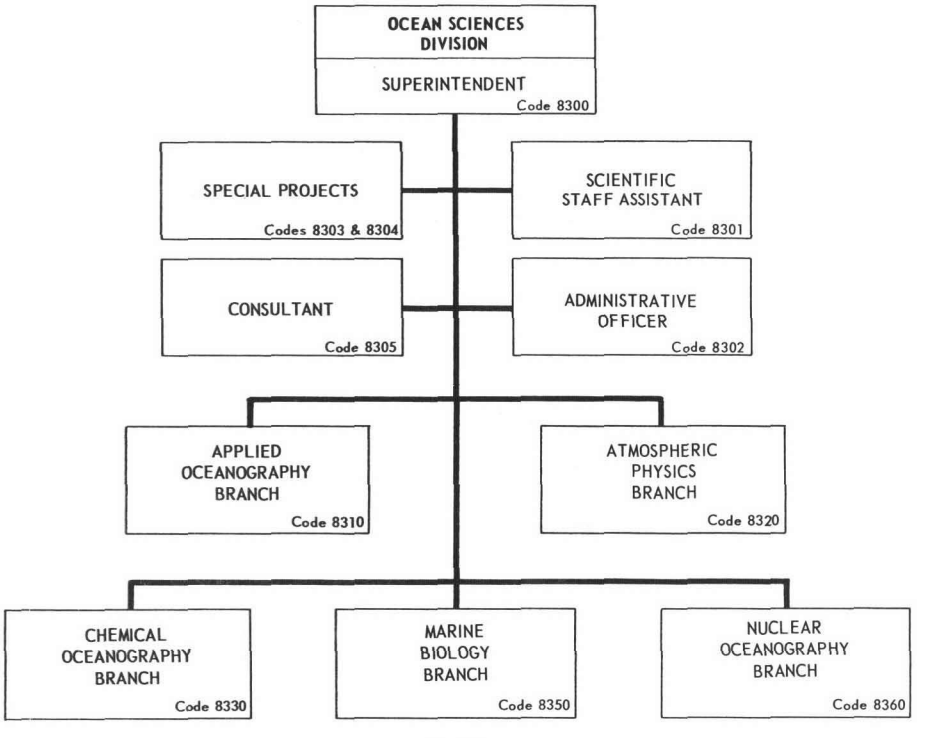




SURFACE EFFECTS

- APPLIED OCEANOGRAPHY
- ATMOSPHERIC PHYSICS
- CHEMICAL OCEANOGRAPHY
- MARINE BIOLOGY
- NUCLEAR OCEANOGRAPHY
- PHYSICAL OCEANOGRAPHY
- AIR/SEA INTERACTIONS
- GEOPHYSICS AND SEA FLOOR

NANSEN BOTTLE PREPARATION



Basic Responsibilities

The Ocean Sciences Division conducts basic and applied research and development in the ocean sciences. Included are studies of the physics, chemistry, geology, and biology of the oceans and of engineering applications directed toward an improved understanding and use of the oceans as the major operating environment of the Navy. Practical results lead ultimately to improvement in the design and effectiveness of naval equipment, materials, and systems.

Branches

Applied Oceanography

- Nonacoustic detection of submarines
- Hydrodynamics of submerged bodies
- Infrared characteristics of the ocean

Atmospheric Physics

- Interactions between the atmosphere and the ocean
- Dynamics of the atmosphere
- Physics of clouds
- Weather instrumentation

Chemical Oceanography

- Physical and analytical chemistry of sea water, dissolved gases, and marine sediments

Marine Biology and Biochemistry

- Plankton physiology and biochemistry
- Biophysical studies of marine environments

Nuclear Oceanography

- Application of nuclear techniques to oceanography

Key Personnel

Name	*Title*
Dr. J. E. Dinger	Superintendent (Acting)
Dr. A. H. Schooley	Senior Research Scientist
Dr. M. F. M. Osborne	Consultant
Mr. H. L. Clark	Head, Applied Oceanography Branch
Dr. J. E. Dinger	Head, Atmospheric Physics Branch
Dr. C. H. Cheek	Head, Chemical Oceanography Branch
Dr. J. M. Leonard	Head, Marine Biology and Biochemistry Branch
Mr. J. I. Hoover	Head, Nuclear Oceanography Branch

Personnel Complement

On Board: 90

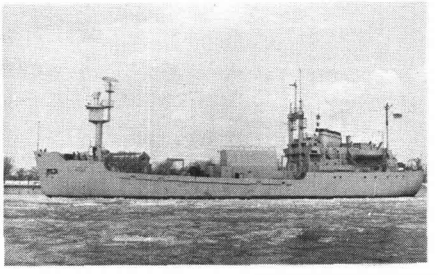
Total Estimated R&D Funding

Fiscal Year 1968: $10,097,000

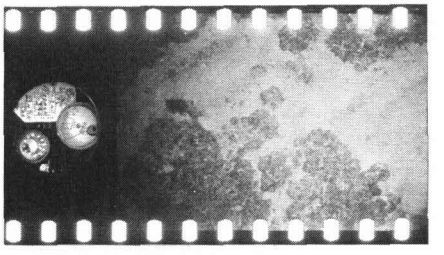
Mr. J. A. Kies

Ocean Technology Division

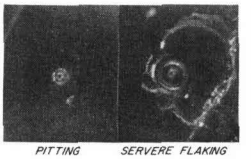
MIZAR



BOTTOM STUDIES

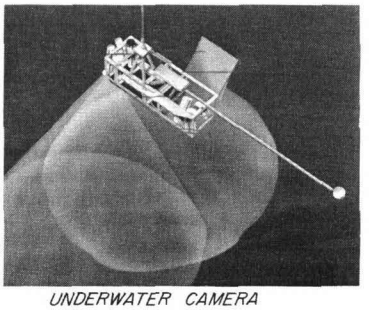


- OCEAN ENGINEERING
- OCEAN FLOOR OPERATIONS
- OCEAN MATERIALS CRITERIA
- OCEAN STRUCTURES

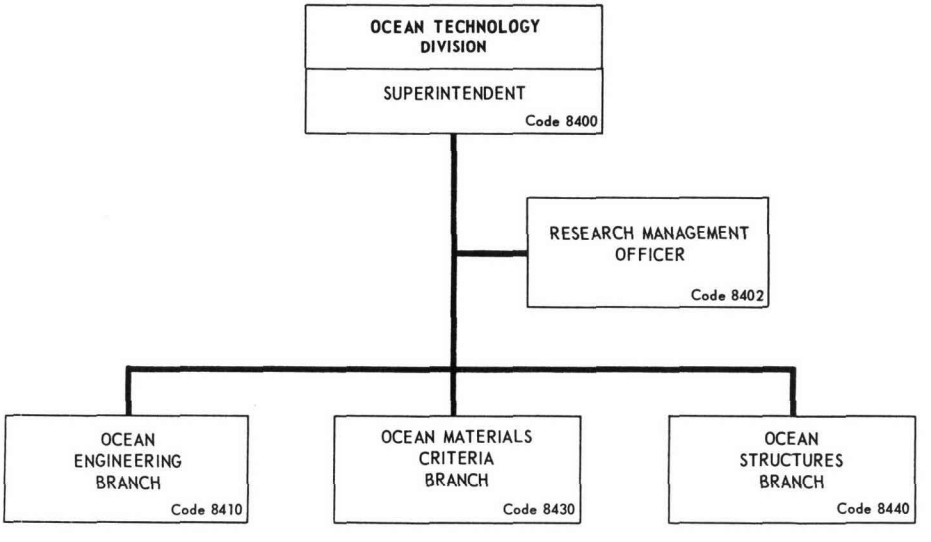


PITTING SERVERE FLAKING

HYDROSTATIC PRESSURE FAILURE STUDIES



UNDERWATER CAMERA



Basic Responsibilities

The Ocean Technology Division researches, develops, and applies specialized equipment, instrumentation, techniques for conducting ocean and ocean-floor operations, and evolves operational technology for advanced systems. The Division utilizes advanced materials and design technology for engineering optimization of required equipment. It also conducts research activities in select areas of ocean technology with coupling and support activities related to other ongoing research and development in these and other fields of interest. This Division in conjunction with other Divisions of NRL and out-of-house agencies brings to bear on crucial problems the collective expertise available.

Branches

Ocean Engineering

- Deep-ocean instrumentation and investigations
- Hydrodynamics of deep towing
- Reliable acoustic paths

Ocean Materials Criteria

- Fracture mechanics and fracture strength
- Plastic flowing
- Compression failure mechanisms
- Armor research and development
- Deep submergence materials-structures
- Missile component failure
- Nondestructive testing

Ocean Structures

- Shipboard shock fundamentals
- Shock protection for weapons systems
- Methods for design against shock
- Fracture mechanics design studies
- Developmental studies of prototypes
- Shock strength of materials
- Shock propagation and instrumentation

Key Personnel

Name	*Title*
Mr. J. A. Kies	Superintendent (Acting)
Dr. W. H. Sanders	Consultant
Dr. Henri Marcus	Consultant
Mr. C. L. Buchanan	Head, Ocean Engineering Branch
Dr. I. Wolock	Head, Ocean Materials Criteria (Acting)
Dr. R. O. Belsheim	Head, Ocean Structures Branch

Personnel Complement

On Board: 74

Total Estimated R&D Funding

Fiscal Year 1968: $2,793,000

Part 4
The Support Services Department

Captain George Maragos, USN
Director of Support Services

Captain George Maragos is a native of St. Louis, Missouri. He is a graduate of the U. S. Naval Academy (1946), the Massachusetts Institute of Technology (BSEE, 1949), and various service schools. He has had sea duty with the cruisers PORTSMOUTH and HOUSTON and the aircraft carrier SAIPAN. From 1950-1952 he was assigned to the Production Department, Portsmouth, N.H., Naval Shipyard, where he was Ship Superintendent, New Construction Submarines.

CAPT Maragos spent the next two years as Staff Electronics Officer with the Florida Group, Atlantic Reserve Fleet, and then reported to the Bureau of Ships for an assignment as Assistant to the Head of the Submarine Electronics Engineering Section (1954-1956). While assigned to the Electric Boat Division of General Dynamics, Groton, Conn. (1956-1960), he was Head of the Contract and Materials Department, which administered shipbuilding and repair contracts for submarines of all types, including nuclear and FBM (Polaris) submarines, and was responsible for fitting out new construction submarines.

CAPT Maragos returned to the Naval Academy in 1960 as an Instructor of Electronics and Electricity and as Military Chairman of the Science Department's Electronics Committee. On July 14, 1966, he reported for duty at NRL as Engineering Services Officer. He came to NRL from the Ship Systems Command Headquarters; there he was Liaison Officer, Surface Missile Systems (Talos, Tartar, and Terrier) Project Office (1962-1966).

CAPT Maragos became Director of Support Services on May 29, 1967. In this position, he administers five divisions that provide engineering and other services in support of the Laboratory's research and development program.

The Director of Support Services is a Naval Officer with the appropriate rank, training, and experience. His primary responsibility is the supervision, coordination, and control of the administrative and service operations required in support of the work of the Research Department.

Key Personnel

Name	Title	Code
CAPT G. Maragos, USN	Director of Support Services	1100
Mr. S. L Cohen	Management Engineer	1103
Mr. R. S. Sciascia	Patent Counsel	1104
LT D. L. Keleher, MC, USN	Medical Officer	1106
CDR O. L. Woodbury, SC, USN	Supply Officer	1900
Mr. E. L. Smith	Head, Technical Information Division	2000
CDR R. B. Hayman, USN	Engineering Services Officer	2300
CDR S. D. Lowe, CEC, USN	Public Works Officer	2500
CDR R. S. Mason, USN	Chesapeake Bay Division Officer	2700

OFFICE OF THE MANAGEMENT ENGINEER

Basic Responsibilities

The Office of the Management Engineer provides staff support to management officials of the Laboratory in matters of administrative operations, management control, and facilities planning.

Key Personnel

Name	*Title*
Mr. S. L. Cohen	Management Engineer
Mr. A. M. Toscano	Deputy Management Engineer

Personnel Complement

On Board: 9

Mr. S. L. Cohen

PATENT COUNSEL STAFF

Basic Responsibilities

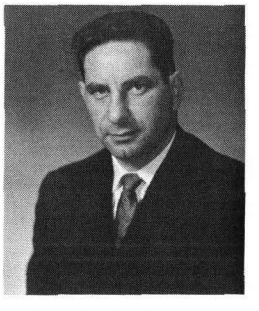
The NRL Office of Patent Counsel provides services concerning inventions, patents, trademarks, copyrights, and other related matters. Patent applications are prepared, filed, and prosecuted on NRL inventions of significance to the Government. The patent Counsel serves as consultant and adviser on patent and data clauses in R&D and procurement contracts. Assistance is provided the Research Department through state-of-the-art searches in the patent literature pertinent to particular research problems.

Key Personnel

Name	*Title*
Mr. R. S. Sciascia	Patent Counsel
Mr. R. J. Erickson	Deputy Patent Counsel

Personnel Complement *

On Board: 22



Mr. R. S. Sciascia

*Includes personnel physically located at ONR headquarters.

MEDICAL STAFF

Basic Responsibilities

The Medical Staff provides a comprehensive industrial health program. Its members serve in an advisory capacity on the Radiological, Safe Driving, Eye Hazard, and other Laboratory Committees, as directed.

Key Personnel

Name	*Title*
LT D. L. Keleher, MC, USN	Medical Officer
Mrs. H. N. East, RN	Occupational Health Nurse

Personnel Complement

On Board: 8

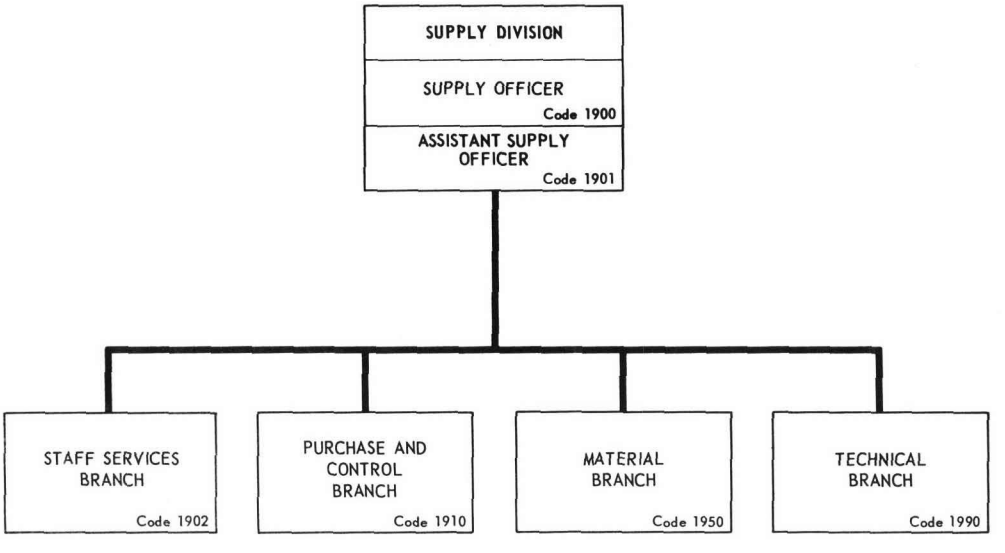
(Civilian, 4, Military, 4)

LT D. L. Keleher

CDR O. L. Woodbury, USN

Supply Division

- STAFF SERVICES
- PURCHASE & CONTROL
- MATERIAL
- TECHNICAL



Basic Responsibilities

The Supply Division is responsible for the operation of all supply functions of the Naval Research Laboratory. These include procurement, stock control, and contract administration; physical receipt, storage, issue, sales, delivery, and shipment of supplies; disposal of excess and unusable property; and the conduct of inventories. During the fiscal year 1967, the Division occupied approximately 235,000 square feet of space, and its inventory was valued at $800,000. Its activities for FY '67 included 39,000 purchase actions valued at $21,000,000; 2,000,000 issues from stores; 4600 shipments with a combined weight of 1800 tons; and disposal of 1500 tons of surplus property valued at $5,000,000.

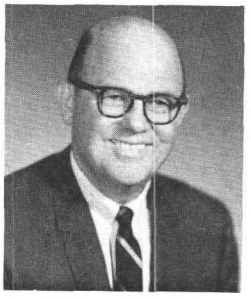
Key Personnel

Name	*Title*
CDR O. L. Woodbury, (SC) USN	Supply Officer
LT J. E. Simon, (SC) USN	Assistant Supply Officer
Mrs. P. Griffin	Head, Staff Services Branch
Mrs. I. L. Bivins	Head, Purchase and Control Branch
Mr. H. W. Dickinson	Head, Material Branch
Mr. R. R. Black	Head, Technical Branch

Personnel Complement

On Board: 149

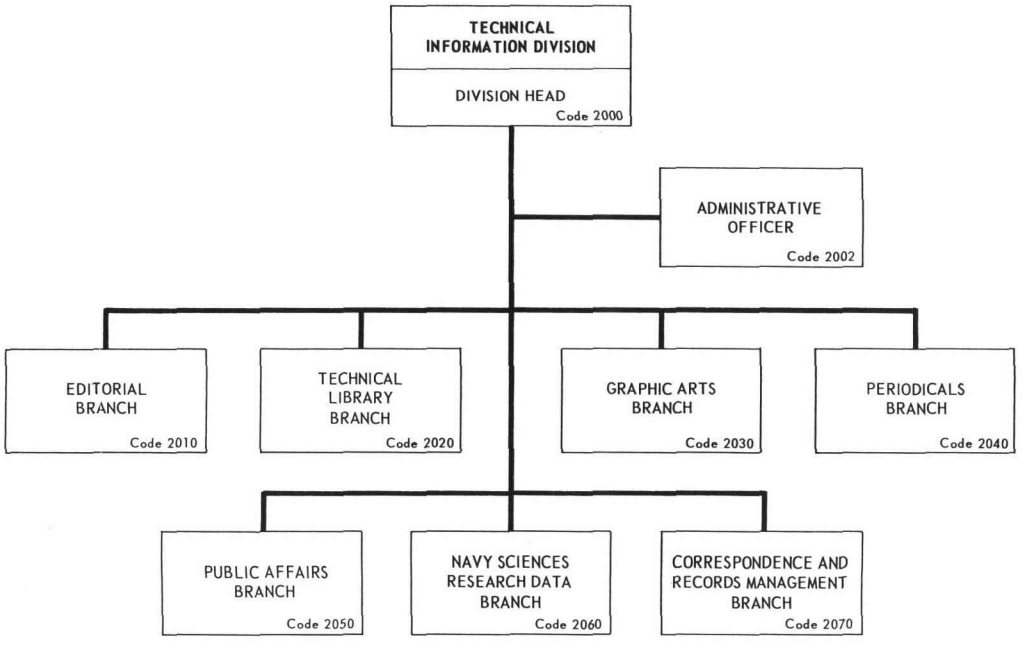
(Graded 89, Ungraded 58, Military 2)



Technical Information Division

Mr. E. L. Smith

- EDITORIAL
- LIBRARY
- GRAPHIC ARTS
- PERIODICALS
- PUBLIC AFFAIRS
- NAVY SCIENCES RESEARCH DATA – ONR
- CORRESPONDENCE AND RECORDS MANAGEMENT



Basic Responsibilities

The Technical Information Division plans and administers the Laboratory's program of preparing and disseminating the results of scientific research through official publications, scientific journals, presentations, films, exhibits, and news media. It provides centralized professional services to both NRL and ONR in writing, editing, printing, exhibits, photography, graphic arts, public affairs, documentation, language-translations, and mail-records services. It operates one of the Navy's largest integrated technical libraries with holdings of 100,000 bound volumes and 250,000 technical reports.

Key Personnel

Name	*Title*
Mr. E. L. Smith	Head, Technical Information Division
Mrs. D. E. Cameron	Administrative Officer
Miss L. A. Morgan	Librarian
Mrs. D. P. Baster	Head, Library Services Section
Mrs. D. Folen	Head, Documents Section
Mr. W. H. Ramey	Head, Graphic Arts Branch
Mr. W. M. Leak	Head, Periodicals Branch
Mr. I. S. Rudin	Head, Editorial Branch
Mr. J. J. Lister	Head, Public Affairs Branch
Mr. R. Greenbaum	Head, Navy Sciences Research Data Branch
Mrs. M. G. Beall	Head, Correspondence and Records Management Branch

Personnel Complement

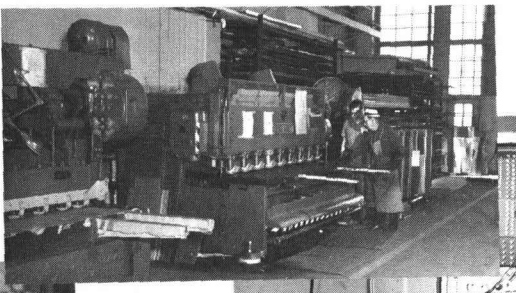
On Board: 175

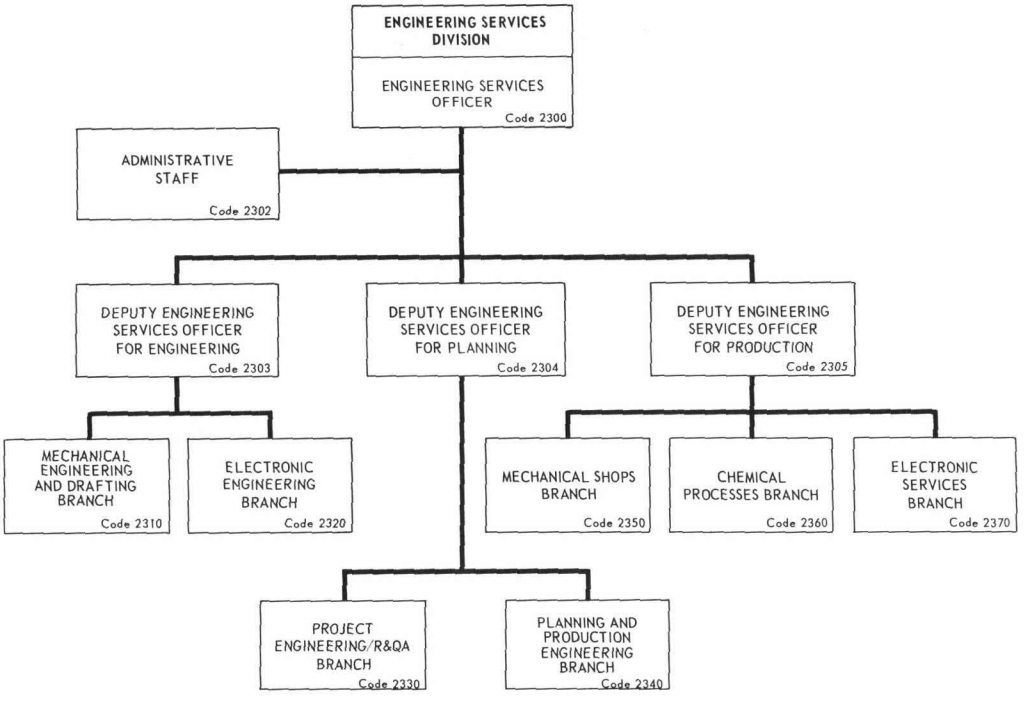
(Graded 158, Ungraded 17)

Engineering Services Division

CDR R. B. Hayman, USN

- MECHANICAL ENGINEERING AND DRAFTING
- ELECTRONIC ENGINEERING
- MECHANICAL SHOPS
- CHEMICAL PROCESSES SHOPS
- ELECTRONIC SERVICES
- PLANNING & PRODUCTION ENGINEERING
- PROJECT ENGINEERING





Basic Responsibilities

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

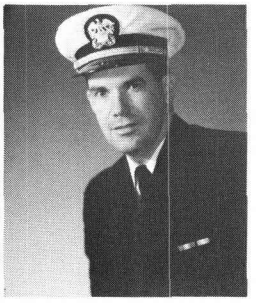
Key Personnel

Name	*Title*
CDR R. B. Hayman, USN	Engineering Services Officer
Mr. P. R. Shifflett	Deputy Engineering Services Officer for Engineering
Mr. J. P. Manning	Deputy Engineering Services Officer for Production
Dr. L. A. DePue	Deputy Engineering Services Officer for Planning
Mr. C. T. McComb	Head, Mechanical Engineering and Drafting Branch
Mr. J. Brotzman	Head, Electronic Engineering Branch
Mr. J. L. Woods	Head, Mechanical Shops Branch
Mr. J. L. Woods	Head, Chemical Processes Branch (Acting)
Mr. J. L. Leizear	Head, Electronic Services Branch
Mr. L. G. Votta	Head, Planning and Production Engineering Branch
Mr. E. Trexler	Head, Project Engineering/R&QA Branch

Personnel Complement

On Board: 565

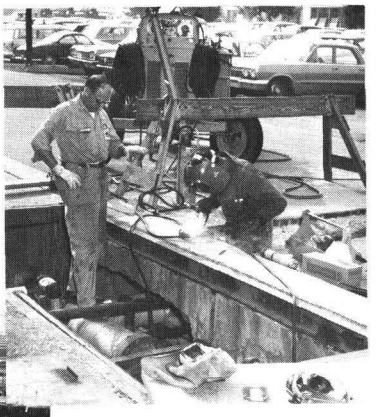
(Graded 165, Ungraded 399, Military 1)

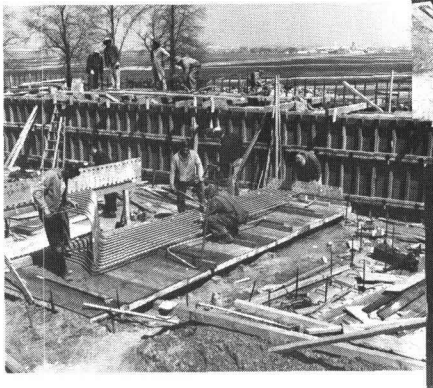


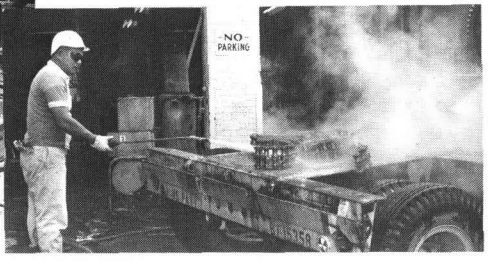
CDR S. D. Lowe, USN

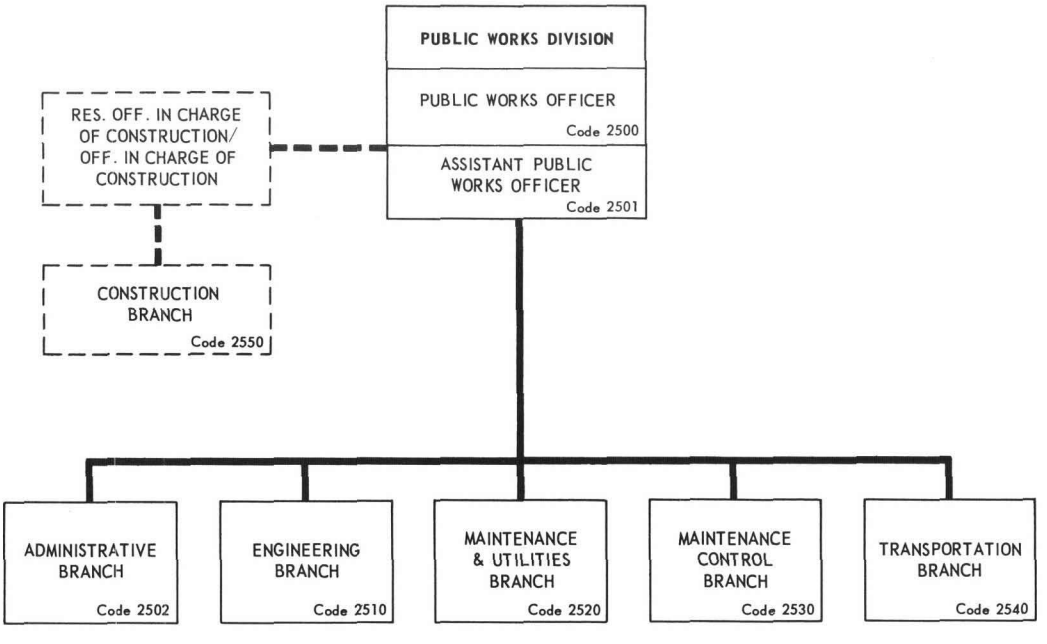
Public Works Division

- ENGINEERING
- MAINTENANCE AND UTILITIES
- MAINTENANCE CONTROL
- TRANSPORTATION
- CONSTRUCTION









Basic Responsibilities

The Public Works Division is responsible for the physical plant of NRL. This includes responsibility for the design, construction, operation, maintenance, and repair of all buildings, grounds, roads, utilities, and other structures and activities. Also included are transportation; weight-handling and heavy-construction equipment; heating and refrigeration plants; electric, water, steam, air, and gas supply distribution; telephone communication systems; and sewage disposal.

The Public Works Division provides professional consulting services to the scientific divisions on facilities planning and engineering.

Key Personnel

Name	*Title*
CDR. S. D. Lowe, CEC, USN	Public Works Officer
Mr. J. R. Lescault	Administrative Officer
Mr. R. J. Zampell	Head, Engineering Branch
Mr. A. N. Gawthrop	Head, Maintenance & Utilities Branch
Mr. G. H. Seaver, Jr.	Head, Maintenance Control Branch
Mr. C. P. Trexler	Head, Transportation Branch
*LTJG. J. H. Miller, CEC, USNR	Assistant ROICC
*Mr. C. R. Parsons	Construction Engineer (ROICC/OICC)

Personnel Complement

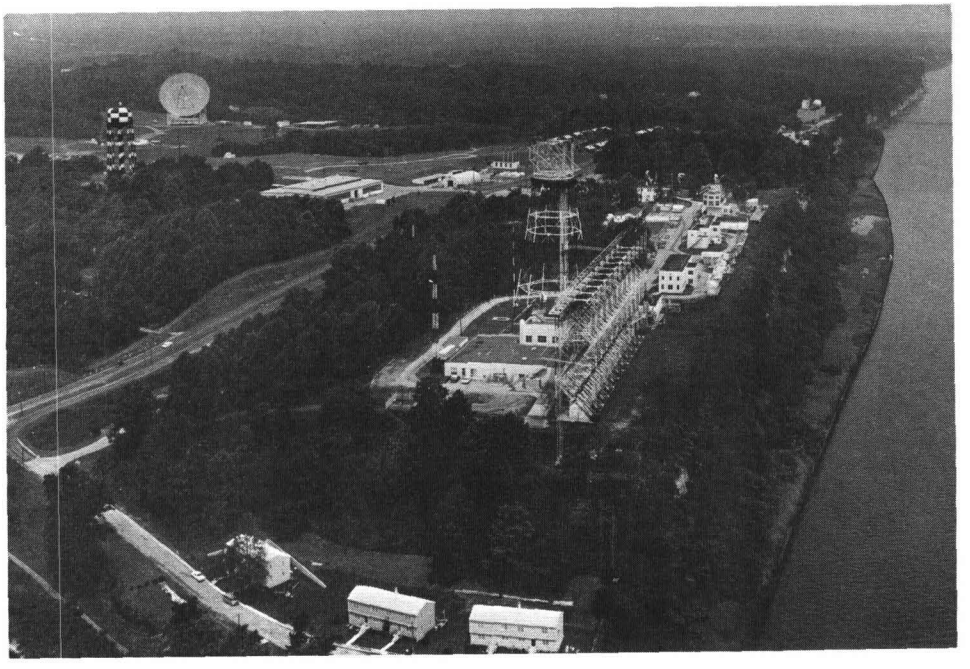
On Board: 404

(Graded 43, Ungraded 360, Military 1)

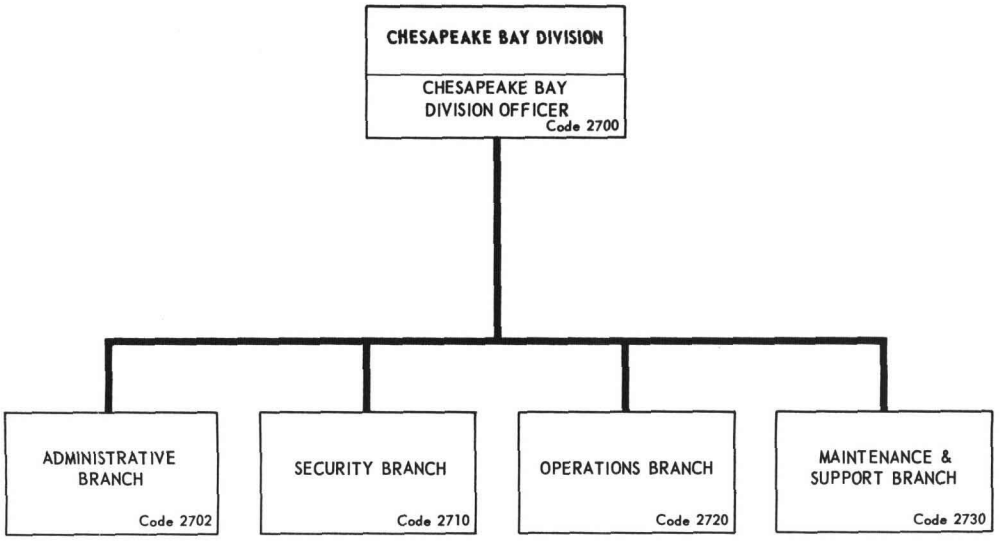
*On ceiling of Naval Facilities Engineering Command (Chesapeake Division)

CDR R. S. Mason, USN

Chesapeake Bay Division



Aerial view of Chesapeake Bay Division
Chesapeake Beach, Md.



Basic Responsibilities

The Chesapeake Bay Division provides and maintains facilities and services for test, development and evaluation of radar, radio, and fire control equipment. It also services and supports all research projects conducted at the Chesapeake Beach and Tilghman Island complexes of NRL.

The Physical Plant

Located in a relatively clear area away from any congestion or industrial interference, the main site, at Chesapeake Beach, covers 174.9 acres containing 197 structures of various size and construction, six of which are major laboratory buildings. There is over 200 feet of usable dock space with a water depth of 4 to 7 feet, located 2 miles north of the main site. Off-site facilities include the Tilghman Island Facility, located directly across the Bay from CBD at a distance of about 10 miles; the Theodolite House, at North Beach; and the Off-shore Platform, approximately 2 miles southeast of CBD in the Bay.

One 36-foot diesel-powered boat and five wherries are used in support of research projects and for transportation between off-site facilities. Housing includes 24 public quarters and two dormitories.

Key Personnel

Name	*Title*
CDR R. S. Mason, USN	Division Officer
Mr. F. R. Theodore	Administrative Officer
Mr. K. V. Davis	Security Officer
BMCM T. D. Brunson, USN	Operations Officer
Mr. R. M. Conlyn	Station Engineer

Research Division Representatives

Applications Research Division

Mr. A. C. Grosvenor, Applied Physics Branch

Mr. C. D. Porter, Dynamics Branch

Ocean Sciences Division

Mr. D. F. Wilson, Marine Biology & Biochemistry Branch

Radar Division

Mr. M. W. Lehman, Search Radar Branch and Division Representative

Mr. J. R. Ward, Equipment Research Branch

Mr. A. K. Bramlett, Tracking Branch

Solid State Division

Mr. T. H. Cosden, Applied Optics Branch

Personnel Complement

On Board: 97

(Graded 34, Ungraded 60, Military 3)

The Naval Research Laboratory has a continuing need for physical scientists, mathematicians, engineers, and supporting personnel. Information concerning current vacancies will be gladly furnished upon request. Address all such inquiries to the Personnel Office (Code 1800), Naval Research Laboratory, Washington, D. C. 20390