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FUNDACIÓ FERRAN SORRYER I BALAGUER

THE OFFICE OF NAVAL RESEARCH

CONTRACT RESEARCH PROGRAM



DEPARTMENT OF THE NAVY
WASHINGTON, D. C.

ONR-1

(Rev. Sept. 1959)

Since its establishment in 1946 under Public Law 588, 79th Congress, the Office of Naval Research has played a central role in bringing scientific research to bear on naval problems. Part of the ONR program is conducted in its own laboratories and part is a sponsored program in universities, nonprofit institutions, and industrial laboratories. This booklet contains information on the contract and grant research program sponsored by the Naval Research, Naval Applications, and Naval Analysis Groups of ONR under the Assistant Chief for Research. It is intended for prospective contractors and others interested in the ONR program.

One important phase of the work of ONR is its sponsorship of a broad program of basic research in selected scientific fields having important bearing on Navy problems. Support in these fields is given to proposals having the greatest scientific merit, with careful consideration given to the competence of the investigator and to the facilities available for the research. ONR recognizes that basic research should not be impeded by security restrictions. In unclassified projects, investigators are encouraged to communicate their ideas to their colleagues, and to publish their results in recognized scientific journals.

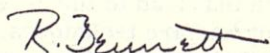
In addition to its basic research program, ONR supports a major applied research program and constantly looks for new ideas or principles which may lead to the development of new weapons or warfare techniques. It is general practice to carry a project based on such a new idea to a point where the technical feasibility of the principle has been established. At this point such exploratory development projects normally are turned over to a Navy bureau for further development and production.

From time to time ONR calls upon scientists for assistance in solving urgent naval problems. Study projects, in which selected scientists, functioning as a group, are asked to examine an important phase of naval warfare, are having a major influence on research and development planning.

The ONR Contract Division has pioneered in adapting standard Navy contract procedures to the requirements of a sponsored research program. Flexibility has been achieved through standard types of open contract which permit a simplified relationship between the Navy and the contractor. Contractual and grant procedures are centralized in the Contract Division, ONR, Washington, with major aspects of contract administration delegated to ONR Branch Offices, Resident Representatives, and other Navy field offices.

Under Public Law 85-934 the Office of Naval Research is now authorized, where it is deemed to be in furtherance of its objectives, to make grants to nonprofit institutions of higher education and to nonprofit organizations whose primary purpose is the conduct of scientific research.

Research sponsored by the Office of Naval Research results in many inventions of significance in military and scientific affairs. The Navy's right to use these inventions as expressed in licenses or assignments is a basic product of the research program. The ONR Patent Counsel provides consultation and advice to contractors and their inventors on matters of patent interest to the Navy. In addition, the Office of Naval Research has been assigned the over-all patent responsibility in the Navy Department.



Rawson Bennett
Rear Admiral, USN
Chief of Naval Research

Introduction



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The Chief of Naval Research maintains his headquarters in Building T-3, 17th Street and Constitution Avenue, N. W., Washington, D. C.

Field units under the supervision of the Office of Naval Research include the Naval Research Laboratory in Washington; Naval Training Device Center, Sands Point, Long Island, New York; Underwater Sound Reference Laboratory, Orlando, Florida; Naval Biological Laboratory, Oakland, California; and Branch Offices in Boston, New York, Chicago, Pasadena, San Francisco, and London, England. Contract field administration for the southeastern portion of the United States is located in Washington.

Assistant Chief for Research

Responsibility for scientific and technical management of ONR's contract research program rests with the Assistant Chief for Research and the Research Director. Under them are three operating units, the Naval Research Group, the Naval Applications Group, and the Naval Analysis Group.

Responsibility for negotiation, execution, and administration of ONR contractual documents rests with the Contracting Officer, who serves as Director, Contract Division.

Naval Research Group

The Director of the Naval Research Group is responsible for the planning and administration of the contract research programs of the six divisions within the Naval Research Group. The principal areas of interest of the branches in the six divisions are outlined below.

The Earth Sciences Division consists of four branches:

Acoustics - including physical acoustics and underwater sound.

Geography - including coastal and island geography; systematic and regional geography; photo-interpretation; and Arctic research.

Geophysics - including oceanography; atmospheric physics and solid-earth physics.

Field Projects - including the specific application of earth sciences to military problems.

The Material Sciences Division consists of four branches:

Metallurgy - including physics and chemistry of metals; physical metallurgy; mechanical behavior of solids; imperfections in solids; surface phenomena, corrosion and deterioration; ceramics and related inorganic and ionic solids; materials for high temperature, energy conversion, and nuclear applications.

Chemistry - including physical, organic, inorganic, and colloid chemistry; synthesis of compounds containing new types of chemical bonds; correlation of polymer structure and properties; and selected areas of applied chemistry such as production of important chemical materials and primary batteries.

Propulsion Chemistry - including those aspects of chemistry relating directly to non-air breathing propulsion systems. Typical areas are synthesis of propellant ingredients (both liquid and solid), physical chemistry of propellants and propellant systems, combustion, and high temperature chemistry relating to the conversion of chemical potential energy to thrust.

Power - including combustion dynamics, thermodynamics, and properties of working fluids; air, surface, sub-surface, missiles and space vehicle primary and secondary propulsion systems; supporting research in direct conversion of energy, plasma and ionized systems, magnetohydrodynamics in new power generation, and nuclear power sources.

The Physical Sciences Division consists of three branches:

Physics - including radiation and optics; solid state physics; atomic and molecular physics; plasma and ionic physics; and theoretical and astro physics.

Nuclear Physics - including properties and characteristics of atomic nuclei and elementary particles; cosmic rays; and particle accelerators.

Electronics - including propagation of electromagnetic energy; physical electronics; electron ballistics; solid state devices; electronic circuits; electronic systems; and radio astrophysics.

The Mathematical Sciences Division consists of five branches:

Mathematics - including applied mathematics; numerical analysis; studies in pure mathematics in areas contributing most actively to modern applications of mathematics, and certain aspects of astronomy of special interest to the Navy.

Logistics and Mathematical Statistics - including the theories of probability, mathematical statistics, games, programming, inventories and other decision

Logistics and Mathematical Statistics—
(Cont'd)

- processes; logistics data processing equipment; and application of descriptive analysis, simulation, and new statistical techniques to logistical and other military problems.

Information Systems

- including advanced computer design and components; the structure and operation of automatic data processing systems; analytical studies of filtering, prediction, and feedback techniques; signal versus noise problems; and information theory.

Fluid Dynamics

- including rarefied gas dynamics, high-temperature aerodynamics and magnetohydrodynamics in the field of aeromechanics; and hydrodynamic noise, turbulence, and boundary layer flow, cavity flow, ship motion and seaworthiness, water exit problems, and wave phenomena in the field of hydromechanics.

Structural Mechanics

- including stress analysis, buckling, elasticity, plasticity, vibrations, shock and impact, thermoelasticity, photoelasticity, aeroelasticity, hydroelasticity, structure-borne-noise, mechanisms and mechanics of materials.

The Biological Sciences Division consists of five branches:

Physiology

- including nerve and muscle function; aviation physiology; diving and submarine physiology; biophysics; physiological implications of climatic and operational hazards; energy metabolism; and comparative and cell physiology.

Biochemistry

- including general biochemistry; enzymology; immunology; energy metabolism; physical biochemistry; and toxicology.

Microbiology

- including bacteriology; mycology; parasitology; virology; epidemiology; immunology; host-parasite relationships; marine microbiology; and environmental influences on infectivity and microbial activity.

Medicine and Dentistry

- including application of fundamental sciences to selected problems of naval medicine and dentistry dealing with the prevention and treatment of injuries with emphasis on preservation and transplantation of tissues.

Biology

- environmental biology including marine, estuarine and fresh water biology; biological orientation; entomology; and biogeography.

The Psychological Sciences Division consists of four branches:

Group Psychology

- including studies of the behavior of the individual as a group member, and the structure and function of the group as a whole in normal and stressful situations.

Physiological Psychology

- including audition, vision, and other special senses; response mechanisms; perception and spatial orientation; neurophysiological correlates of behavior; and psychophysiological factors in human tasks under normal and stressful conditions.

Engineering Psychology - including the development, compilation, and dissemination of human engineering data and principles for use in the design of Navy man-machine systems.

Personnel and Training - including differential psychology; selection, classification and training of personnel; learning theory; and criteria of performance.

Naval Applications Group

The Director of the Naval Applications Group is responsible for the planning and administration of the contract research programs in the three program areas of the Naval Applications Group. The principal interests within these areas are outlined below.

Air - including research and exploratory development in the field of aircraft and missile systems; aircraft design; and advanced techniques pertaining to aircraft, space vehicles, and air warfare.

Surface and Amphibious - including research and exploratory development in surface weapon systems; advanced surface vessel problems; harbor defense, mine warfare and countermeasures; amphibious warfare systems; landing and amphibious craft.

Undersea - including research and exploratory development in underwater weapons; factors affecting the detection, localization, and classification of submarines; underwater communications and navigation; noise reduction in naval vessels; and advanced submarine problems.

Naval Analysis Group

The Director of the Naval Analysis Group is responsible for the planning and administration of a program of systems and warfare analysis, dealing with major problem areas of interest to the commands, bureaus, and offices of the Navy and the Marine Corps. Studies are undertaken within the Naval Analysis Group and also are sponsored under contracts with industrial and research organizations. Components of the Naval Analysis Group with their main functions are:

Advanced Planning - conducts preliminary investigations of systems and warfare problems intended to delineate specific areas for further detailed analysis by the Systems Analysis Division or the External Studies Division.

Systems Analysis Division - conducts operations analytical studies of systems and warfare problems by means of ad hoc project teams composed of Naval Analysis Group personnel augmented by outside consultants.

External Studies Division - directs and monitors systems and warfare analysis studies undertaken by the Naval Warfare Research Center and selectively sponsored under contract with industry, research institutes, and universities.

Branch Offices

The Office of Naval Research has established branch offices in Boston, New York, Chicago, San Francisco, Pasadena, and London, England. Resident representatives are located at other points within certain of the branch office areas.

Because the branch offices provide direct liaison between the Office of Naval Research and scientific institutions in their areas, each has a Scientific Department, composed of a chief scientist and several associated scientists, who maintain contact with scientific developments in the area. Both the Scientific and Contract Administration Departments of the Branch Offices are prepared to advise and assist prospective contractors in preparing proposals. The Patent Departments provide assistance and consultation to contractors in patent and copyright matters.

The Branch Office in London, under the supervision of a Commanding Officer who is also Assistant Naval Attache for Research, was established under the Naval Attache, Embassy of the United States, London. This Office maintains active liaison with research in western Europe, and keeps the Department of the Navy informed concerning scientific endeavor in the United Kingdom and on the Continent.

ONR Offices

Additional information concerning the Contract Research Program, Research Reserve, Patents, etc., may be obtained from the following field or branch offices:

Boston Area

Office of Naval Research Branch Office
495 Summer Street
Boston 10, Massachusetts
Telephone: Liberty 2-5100, Ext. 270

Boston Area (Cont'd.)

Resident Representatives

Office of Naval Research
Resident Representative
Harvard University
Room 215a Pierce Hall
Oxford Street
Cambridge 38, Massachusetts
Telephone: Kirkland 7-7600, Ext. 127

Office of Naval Research
Resident Representative
Massachusetts Institute of Technology
Room 20E-226
Cambridge 39, Massachusetts
Telephone: University 4-6900, Ext. 2581

New York Area

Office of Naval Research Branch Office
346 Broadway
New York 13, N. Y.
Telephone: Rector 2-8000, Ext. 156 or 157

Resident Representatives

Office of Naval Research
Resident Representative
University of Rochester
Federal Bldg., Room 122
Church and Fitzhugh Sts.
Rochester 14, New York
Telephone: Hamilton 6-6210

Office of Naval Research
Resident Representative
University of Pittsburgh
Room 107, Salk Hall
Pittsburgh 13, Pennsylvania
Telephone: Museum 1-6366 or
Mayflower 1-3500,
Ext. 7135

Office of Naval Research
Resident Representative
University of Pennsylvania
Room 213, Hare Building
Philadelphia 4, Pennsylvania
Telephone: Evergreen 6-5116

Resident Representatives (Cont'd.)

Office of Naval Research
Resident Representative
Columbia University
Hudson Laboratories
145 Palisade Street
Dobbs Ferry, New York
Telephone: Dobbs Ferry 3-5800

Office of Naval Research
Resident Representative
James Forrestal Research Center
Chemical Sciences Bldg. Room A-4
Princeton University
Princeton, New Jersey
Telephone: Walnut 1-8000, Ext. 261

Chicago Area

Office of Naval Research Branch Office
The John Crerar Library Building
86 East Randolph Street
Chicago 1, Illinois
Telephone: Central 6-4288

Resident Representatives

Office of Naval Research
Resident Representative
The Ohio State University Research
Center
1314 Kennear Road
Columbus 8, Ohio
Telephone: Hudson 6-4341, Ext. 303

Office of Naval Research
Resident Representative
University of Michigan
820 E. Washington Street
Ann Arbor, Michigan
Telephone: Normandy 3-1511, Ext. 546

Office of Naval Research
Resident Representative
Purdue University
223 Executive Building
West Lafayette, Indiana
Telephone: Lafayette 92-2126

Resident Representatives (Cont'd.)

Office of Naval Research
Resident Representative
University of Illinois
1209 West Illinois Street
Urbana, Illinois
Telephone: Urbana 7-6611, Ext. 2959

Office of Naval Research
Resident Representative
University of Minnesota
Room 102, Johnston Hall
Minneapolis 14, Minnesota
Telephone: Main 2-8177, Ext. 7052

Office of Naval Research
Resident Representative
University of Kansas
Room 108, Malott Hall
Lawrence, Kansas
Telephone: Viking 3-2700, Ext. 563

Office of Naval Research
Resident Representative
University of Texas
Post Office Box 7786
Austin 12, Texas
Telephone: Greenwood 8-8196

San Francisco Area

Office of Naval Research Branch Office
1000 Geary Street
San Francisco 9, California
Telephone: Prospect 6-4312

Resident Representatives

Office of Naval Research
Resident Representative
Stanford University
Electronics Research Laboratory
Stanford, California
Telephone: Davenport 1-3300, Ext. 211
or 212

Resident Representatives (Cont'd.)

Office of Naval Research
Resident Representative
University of California
Room 201, Building T-9
Berkeley 4, California
Telephone: Thornwall 5-6000, Ext. 8345

Office of Naval Research
Resident Representative
University of Washington
Administration Building
Seattle 5, Washington
Telephone: Lakeview 4-6000, Ext. 2559

Pasadena Area

Office of Naval Research Branch Office
1030 East Green Street
Pasadena 1, California
Telephone: Sycamore 5-5971

Resident Representative

Office of Naval Research
Resident Representative
Building 349
Scripps Institution of Oceanography
La Jolla, California
Telephone: Academy 2-6311, Ext. 395

Southeastern Area

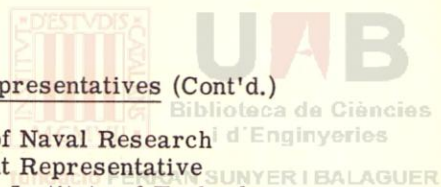
Contract Administrator Southeastern Area
Office of Naval Research
2110 G Street, N. W.
Washington 7, D. C.
Telephone: Sterling 3-4539, Ext. 60 or 61

Resident Representatives

Office of Naval Research
Resident Representative
Institute for Cooperative Research
The Johns Hopkins University
Whitehead Hall
34th and Charles Streets
Baltimore 18, Maryland
Telephone: Hopkins 7-3300, Ext. 487

Resident Representatives (Cont'd.)

Office of Naval Research
Resident Representative
Georgia Institute of Technology
763 Techwood Drive, N. W.
Atlanta 13, Georgia
Telephone: Trinity 6-3094, Ext. 447

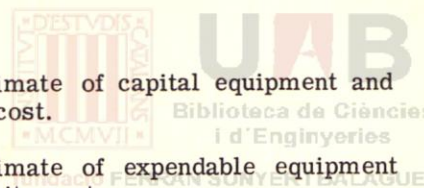


Guide for Preparation of Research Proposals

Any qualified scientist, institution, or other organization may present to the Office of Naval Research a proposal for a research project. An original and five copies of each proposal should be directed to the ONR Branch Office for the area in which the organization is located (or via the ONR Resident Representative, if any, for the area). The original and one copy of a proposal must be signed by the principal investigator and the head of the department and approved by an authorized business official.

New proposals should contain the following information:

- a. General statement requesting consideration of proposal.
- b. A brief review of the scientific background of the proposed investigation.
- c. A reasonably complete technical description of the proposed work.
 - (1) Statement of the objectives of the project.
 - (2) The scientific methods to be employed.
- d. Description of general and special facilities available for performing the contemplated work.
- e. Name and background of principal investigator(s) and professional associates.
- f. Bibliography of pertinent publications.
- g. Estimated duration of project and yearly budget breakdown, itemizing the following:
 - (1) Individual salaries, including an enumeration of research personnel who will devote full or part time to the project as professional investigators, graduate or undergraduate students, and technicians, whether or not reimbursed through the Office of Naval Research.

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- (2) Estimate of capital equipment and its cost.
 - (3) Estimate of expendable equipment and its cost.
 - (4) Other expenses (travel, clerical, etc.).
 - (5) Overhead.
 - (6) Extent of participation by the institution.
- h. Other research projects, governmental and otherwise, currently being undertaken by the principal investigator.
- (1) Title.
 - (2) By whom research sponsored.
 - (3) Amount of years of support.
- i. Information as to any other agencies to whom the proposal is being submitted for possible financial support or assistance.

There are types of research which institutions would be likely to sponsor themselves, perhaps to a limited extent, as part of their own educational and research programs. When the Office of Naval Research receives proposals of this kind, it may expect the proposing institutions to share some part of the project's total cost.

REPORTS POLICY

A basic tenet of ONR is that an investigation is not completed until the investigator has reported his results to his interested professional colleagues in all necessary detail. There are three mutually dependent ways to do this.

All significant information developed under a sponsored program must be disclosed first to the sponsor and to the sponsor's sister agencies. ONR provides for this disclosure by means of a system of status and technical reports; a unique

feature of this system is that the investigator makes the initial distribution. Subsequent distribution to DOD agencies and their contractors is made by the Armed Services Technical Information Agency.

The regularly established scientific and technical journals constitute the primary channel for subsequent releases to the public; extended monographs are released through the publishers of scientific and technical books. Early publication is not only encouraged but supported financially; for example, ONR honors the page charge assessments which many non-profit journals levy on all contributors. In addition, each investigator is encouraged to participate in the appropriate meetings of his professional society.

All unclassified and declassified technical reports to ONR are released to the Office of Technical Services, a public service agency of the Department of Commerce which was established by Public Law 776 of the 81st Congress. Those few technical reports which have not been published otherwise are made available, on a cost-of-reproduction basis, by this agency.

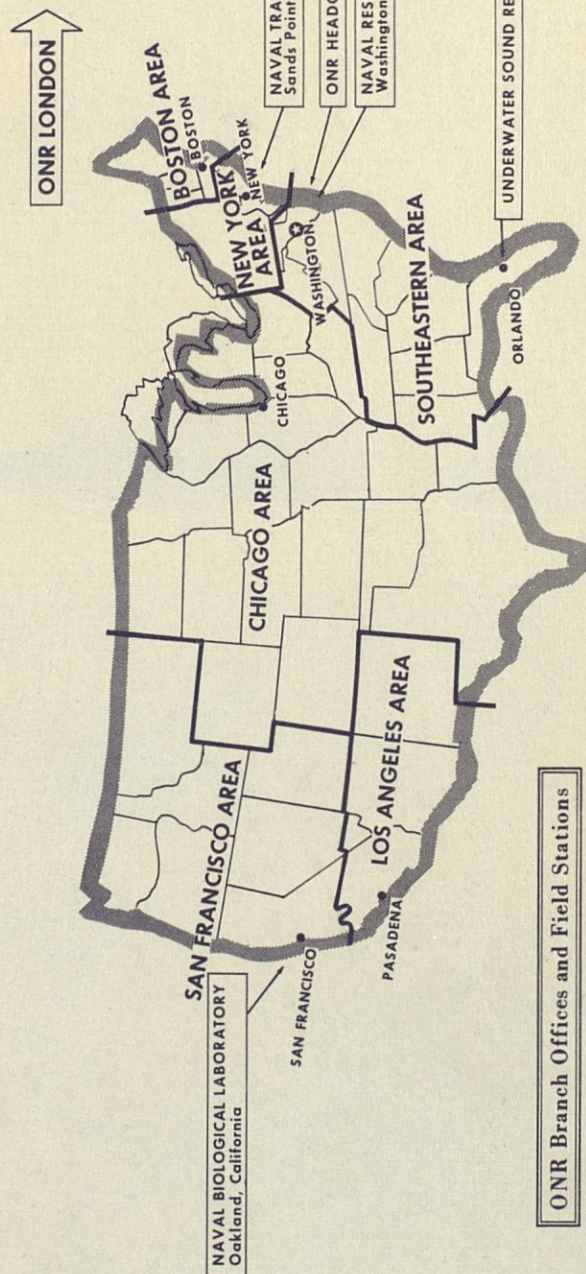


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