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CHES/NAVFAC-FPO-7605

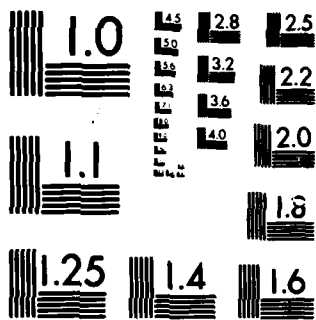
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# OCEAN CONSTRUCTION

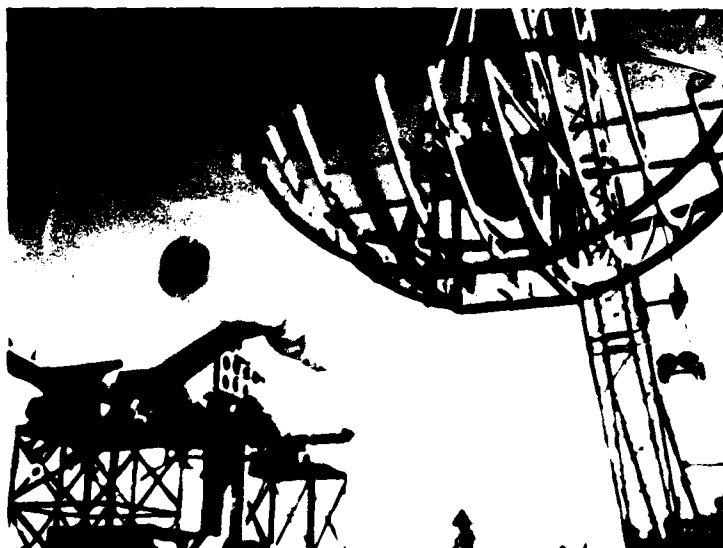


Navy construction platform underway to construction site at sea

With skill and ingenuity, today's Navy persists in its centuries-long probe to extend the sea's frontiers. One of the newest frontiers—ocean construction—was given impetus in 1969 when the Chief of Naval Material assigned to the Naval Facilities Engineering Command (NAVFACENGCOM) the responsibility to design and construct ocean structures.

NAVFACENGCOM's ocean facilities mission is to conduct the design, construction, maintenance, and repair of Navy ocean facilities which support Fleet strategic and tactical readiness. The requirement for naval ocean facilities has continued to increase and to create a demand for this unique engineering discipline.

Seabees assembling an underwater acoustic array

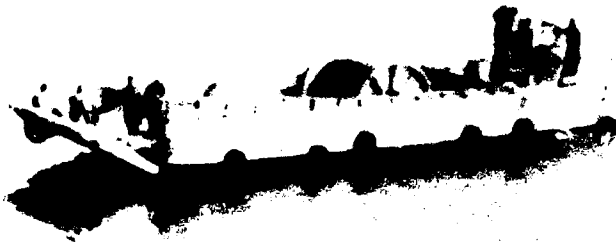


Cover:

Diver propulsion vehicle carries CHESNAVFACENGCOM diver on cable inspection

# mission and organization

Paying out cable for an underwater transducer installation



To assist them in this mission, NAVFACENGCOM established the Ocean Engineering and Construction Project Office within the Chesapeake Division (CHESNAVFACENGCOM). The Project Office, also known as FPO-1 (Facilities Project Office One), was established in 1971 for the purpose of meeting Navy requirements for the design and construction of fixed ocean facilities—installations mounted on structures erected on the ocean floor or suspended above the ocean floor by means of a mooring system.

The Project Office consists of civilian and military professional engineers with discrete areas of ocean engineering expertise. It has global responsibility for the systematic application of engineering and scientific knowledge concerning the design, construction, and maintenance of naval fixed ocean facilities. The office directly supports the other key members of the Navy's ocean construction "team" who are officer and enlisted (Seabee) personnel of Underwater Construction Teams One and Two, components of the Naval Construction Forces.

Seabees hoisting underwater transducer



Seabees placing protective pipe on underwater cable



# CAPABILITIES

FPO-1's distinctive blend of talents, experience, and technology has been utilized on ocean construction projects throughout the world—from the Chesapeake Bay to the Indian Ocean. There are still unknowns that compromise the ocean engineers' best efforts. Consequently, the ocean engineer is unable to work from a fixed guidebook because each project brings with it a new set of engineering problems. It is through the solving of these problems that the Project Office has developed capabilities that are unmatched anywhere in the world.

## ◆ ENGINEERING DESIGN

CHESNAVFACENGCOM has assembled a special engineering team in order to carry out its unusual mission. The design of fixed ocean facilities calls for a mix of disciplines, which includes not only civil, mechanical, and electrical engineering, but several scientific and engineering specialties not required in shore construction. Therefore, the personnel who are

part of this team are trained and experienced in such areas as the behavior of cables supporting heavy weights at great ocean depths, the effects of sea water and high pressure on construction material, and the ability to determine if the seabed can support foundations or hold structures.

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# CAPABILITIES

## ◆ ENGINEERING STUDIES

CHESNAVFACENCOM's expertise in ocean engineering has led to the performance of conceptual engineering studies in such areas as the protection of Navy assets from covert underwater attack and mission analyses for undersea cable burial requirements. In addition, since the state-of-the-art of ocean engineering and construction is less advanced than of that on land, the Project Office continually analyzes the needs for increased ocean engineering capabilities and defines the research and development required to achieve these capabilities.

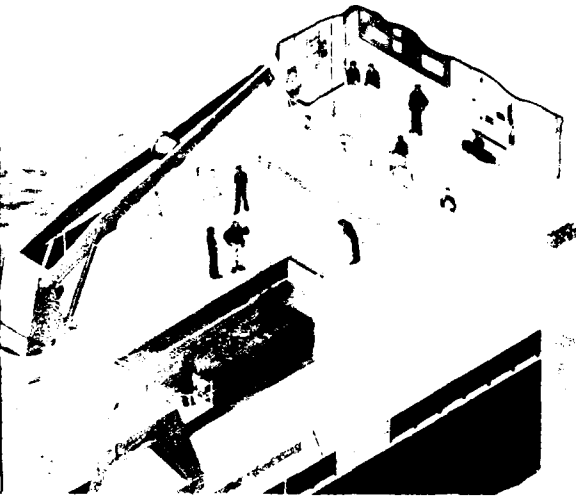


## ◆ SYSTEMS ENGINEERING

The Project Office has also acted in a systems engineering and acquisition management role on major procurements of a predominantly ocean engineering nature. These projects have been in support of other systems commands and Government agencies. The projects have included undersea surveillance systems and ocean energy applications. The architect/engineer method of contracting for facility design has been used to expedite procurements in support of such projects.



## CAPABILITIES

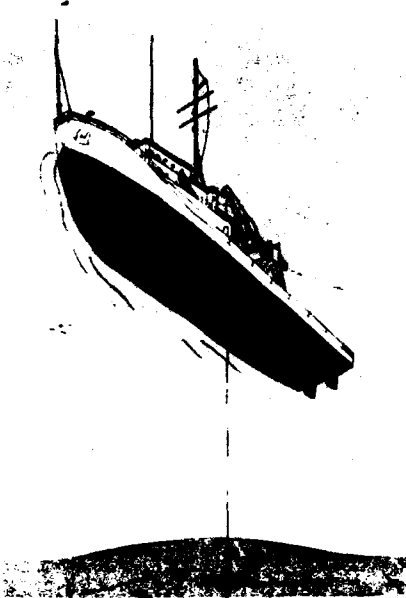


Designed and constructed an ocean construction platform, which forms part of CHESNAV-FACENCOM's construction equipment inventory.

## CONSTRUCTION SUPPORT

The Navy's ocean construction program is executed by personnel with many years of experience in the planning, managing, and executing of fixed ocean facilities projects. These personnel have the capability to construct and install or recover large structures and equipment in the deep ocean, and to lay and maintain cables and

pipelines. In addition to these capabilities, FPO-1 has a substantial inventory of specialized ocean construction equipments. The on-the-shelf availability of this equipment provides rapid response to emergency repair or to new construction requirements, reduces construction risks, and frequently eliminates the cost of new-equipment purchases.



In support of engineering and construction operations, the Project Office has available optical and electronic surveying and measuring equipment, so that site surveys and project-related environmental measurements can be expeditiously performed.



In order to go where the action is, many FPO-1 engineers are Navy-qualified divers. The office thus has an integral capability for on-site underwater supervision and inspection.

# PROJECTS



The following recent projects are illustrative of the Project Office's capabilities in engineering studies, design, construction, support installation, and repair.

- Planned, designed, and installed an innovative cable-pipe sewer outfall at Centerville Beach, California. The cable-pipe, which extended 3000 feet offshore into the Pacific Ocean, was installed over terrain and surf conditions that had caused conventional installation techniques to be unsafe and uneconomical.

- Planned and conducted conceptual studies for the Waterborne Intrusion Detection System which will provide waterborne security for the Nation's future primary strategic deterrent system.

- Managed the design, fabrication, and installation of four, large offshore towers in the Atlantic Ocean in support of the Air Combat Maneuvering Range (ACMR).

- Provided technical support to the Air Force for the offshore towers to be used in the new Air Combat Maneuvering Instrumentation (ACMI) range in the Gulf of Mexico.

- Conducted the conceptual plan and design for the new ocean arrays to be used for the Navy's Advanced Magnetic Silencing project.

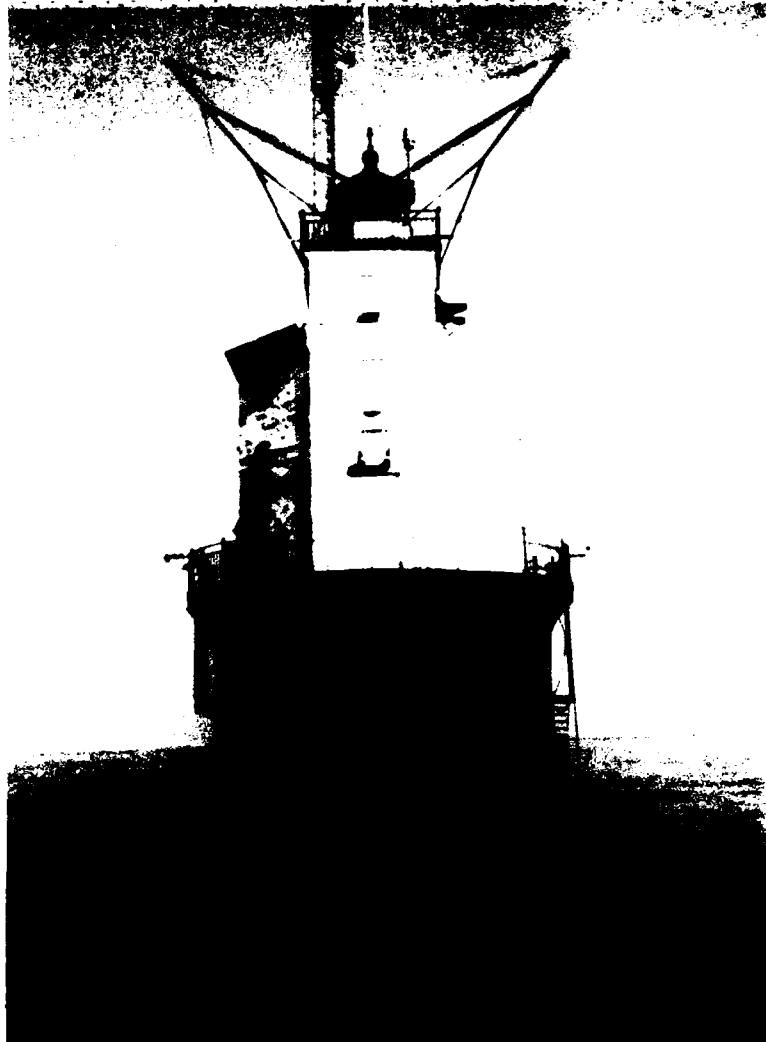
- Installed the lightning protection system at the St. Croix underwater weapons range.

- Directed the construction activities involved in the repair and upgrading of the Underwater Tracking Range, Atlantic Fleet Weapons Training Facility at St. Croix.



# PROJECTS

- Conducted cable route surveys and supported cable installations for the U.S. Coast Guard in the Lighthouse Automation and Modernization Program (LAMP) to provide shore power to offshore lighthouses.



- Extended ocean engineering technical support, assistance, and guidance to the Energy Research and Development Agency (ERDA) in the Ocean Thermal Energy Conversion (OTEC) project.

- Reviewed/defined requirements of RDT&E projects associated with ocean engineering and underwater construction.



- Planned, designed, and procured a multiple-use deep water mooring system for mooring large vessels in the deep ocean and for meeting other Fleet needs.

# PROJECTS



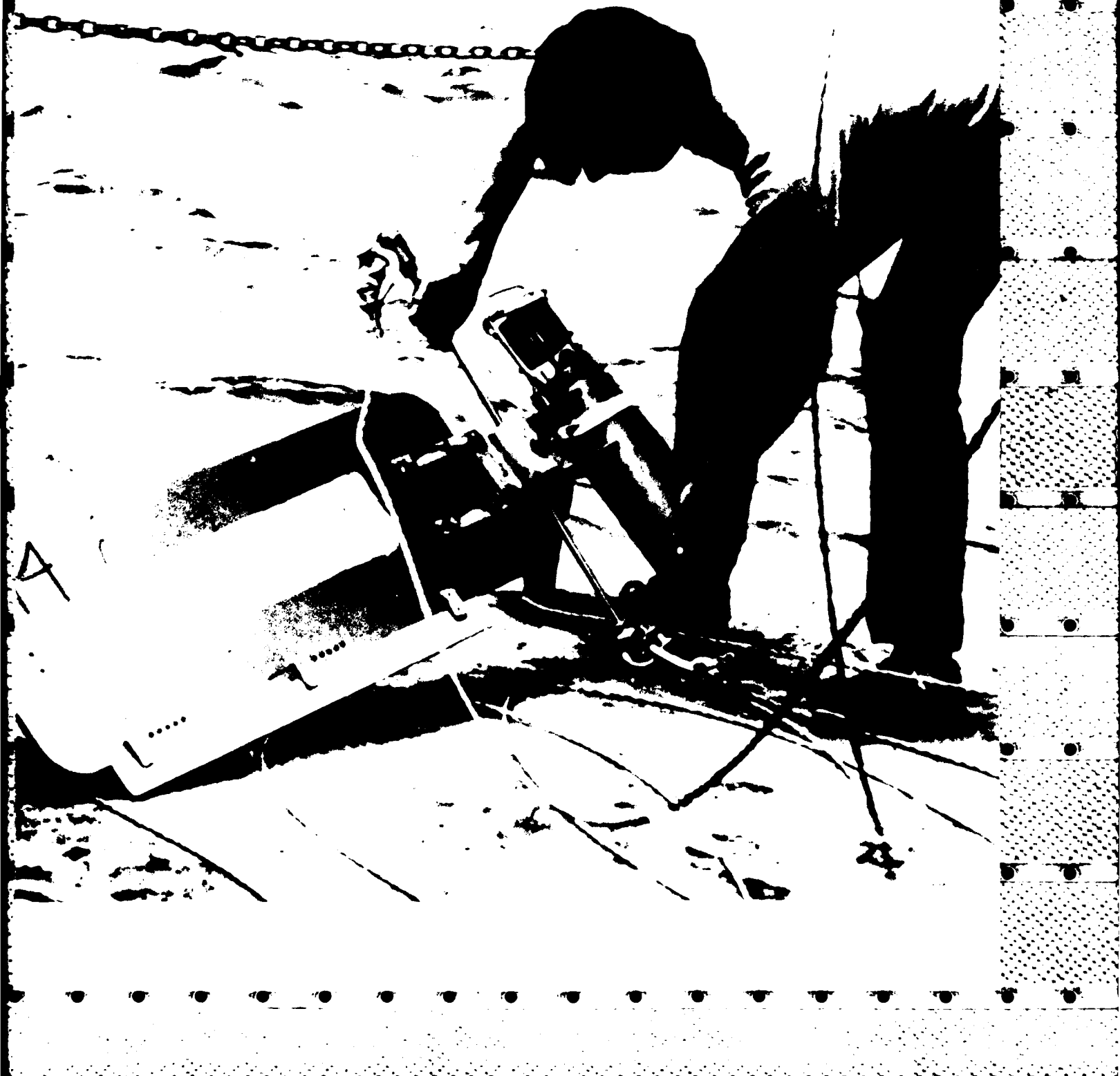
- Provided technical and engineering support and procurement assistance to the Naval Construction Forces in the installation of fueling facilities and propellant embedment mooring systems.



- Provided technical and engineering support to the Fleet and the Naval Electronic Systems Command in undersea surveillance project work, such as cable inspection surveys, physical environmental measurements, and technical concept and feasibility studies of new surveillance systems.

# PROJECTS

- Performed engineering services for the expansion of the Barking Sands Undersea Tactical Range (Hawaii), and directed the installation of the shore interface cables.
- Made detailed environmental surveys of currents in the vicinity of the TRIDENT Refit Facility, Hood Canal, Bangor, Washington.



# PROJECTS

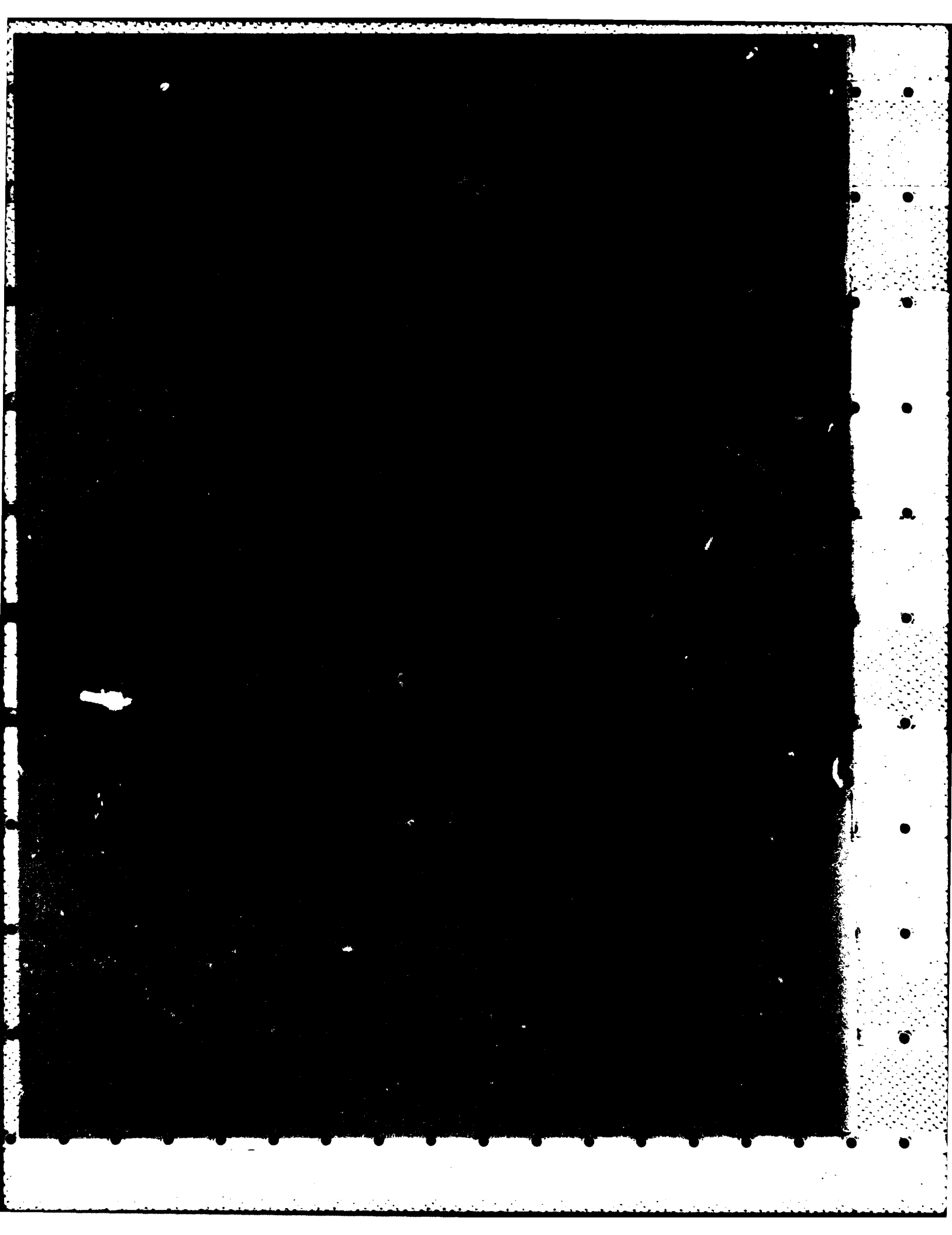
- Developed and documented criteria and methods to assist Navy planners and engineers in cable strumming prevention, deep ocean current measurements, and standard procedures for planning and designing fixed ocean facilities.

- Procured, maintained, and managed an inventory of specialized ocean engineering and construction equipment that is used by the Naval Construction Force, Navy contractors, and Navy agencies to accomplish ocean surveys and construction projects that are of national interest. This equipment pool includes an ocean construction platform large enough for an adequate staging area and an accurate positioning system. These features enable large ocean construction projects to be conducted at sea.

Defined requirements for and procured SNOOPY, an underwater surveying instrument. ▶



CHESNAVFACENGCOM's ocean engineering capabilities are flexible and responsive to a diverse Fleet workload. By providing competent response to Fleet underwater and ocean construction needs at minimum cost, by effectively using ocean engineering and construction equipment, by strengthening and improving existing facilities systems, the Project Office has gained unique skills in the field of ocean construction which directly impact on the Fleet's air, sea, and subsea combat readiness.



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