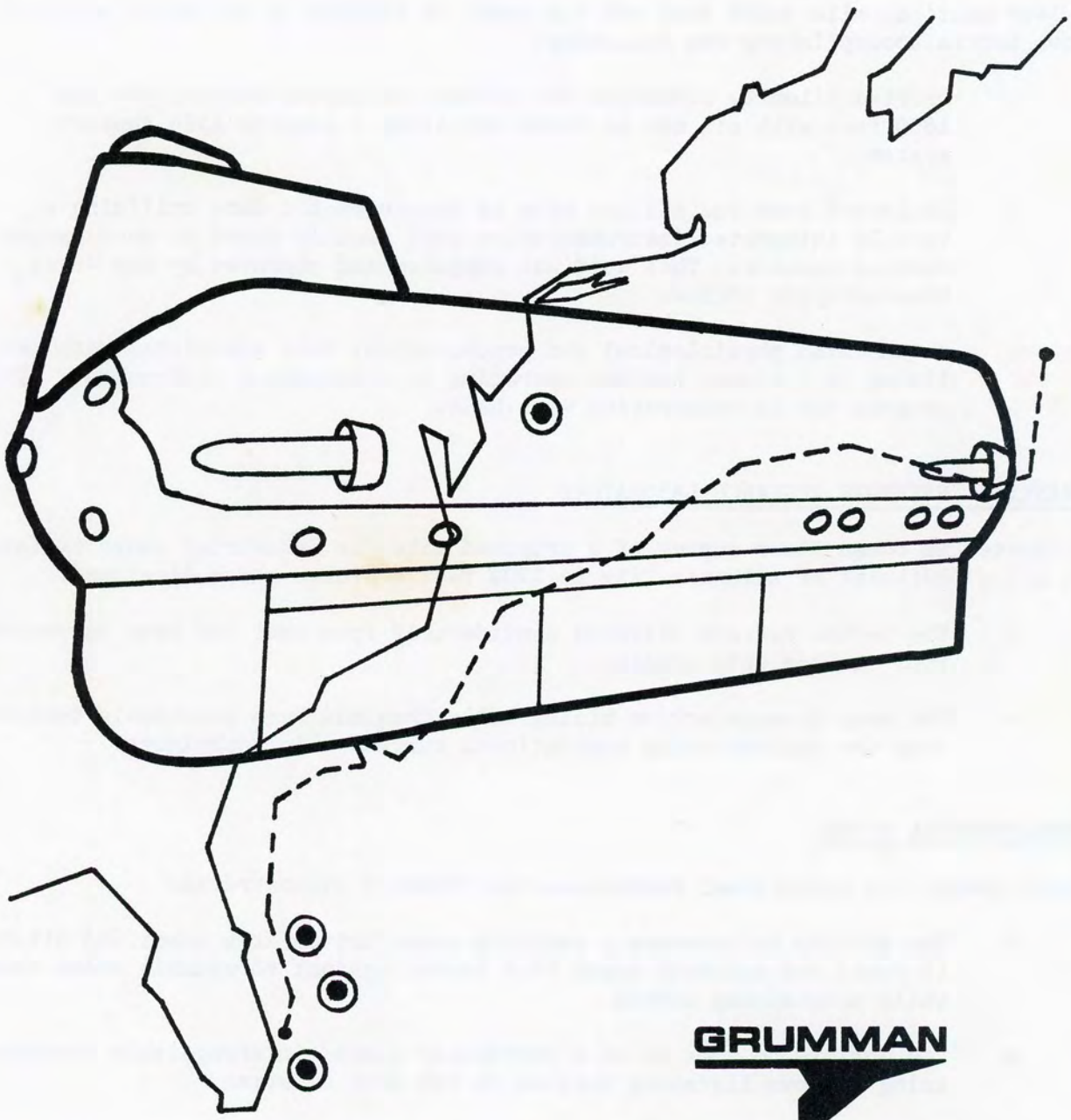
BEN FRANKLIN



GRUMMAN

OCEAN SYSTEMS DEPARTMENT

ACCOMPLISHMENTS

Grumman's 130 ton submersible, BEN FRANKLIN, is currently the world's largest privately owned vehicle of this type in operation. Capable of carrying up to nine men in addition to her crew of three, FRANKLIN can perform many diverse tasks in the ocean at depths to 2000 feet. To date, FRANKLIN has accomplished the following:

GULF STREAM DRIFT MISSION

A 1444 nautical mile drift from off the coast of Florida to 300 miles south of Nova Scotia accomplishing the following:

- Drifted silently submerged for 30 days at depths between 600 and 1800 feet with six men on board utilizing a passive life support system.
- Collected over one million bits of oceanographic data utilizing a totally integrated instrumentation suit usually found on much larger surface vessels. This suit was supplied and operated by the Naval Oceanographic Office.
- Accumulated physiological and psychological data associated with men living in a closed habitat operating in a hazardous environment. This program was in cooperation with NASA.

FRANKLIN INSTITUTE RESEARCH LABORATORY

Conducted an ocean floor survey of a proposed site for industrial waste outfall 80 miles southeast of Atlantic City in 1200 feet of water which disclosed:

- The bottom terrain differed considerably from what had been determined from surface ship studies.
- The area is more active biologically than had been previously determined from the surface using conventional surface ship techniques.

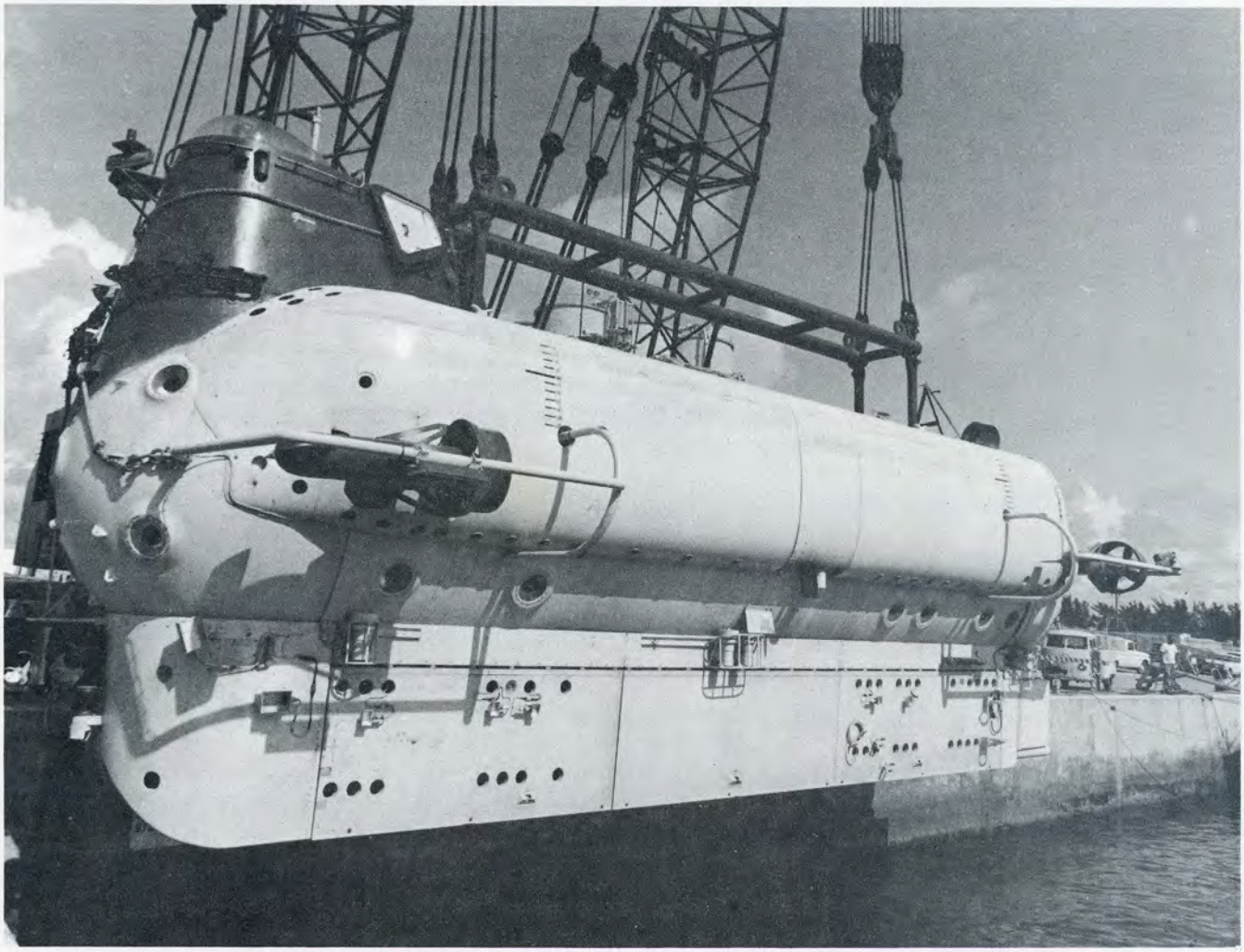
DEVELOPMENTAL DIVES

While perfecting operational techniques the FRANKLIN demonstrated:

- The ability to traverse a variable ocean bottom at a specified altitude (5 feet) and maintain speed (0.8 knots) against formidable cross currents while maintaining course.
- The ability to home in on a previously placed interrogatable transponder using her own listening devices in 600 feet of water.
- Capability of using a manipulator to pick up geological and biological samples from the ocean floor in 300 feet of water.

PHILCO - FORD EXPERIMENT

This dive was designed to accumulate quantitative data for oceanographic imagery from spacecraft or aircraft which may be achieved by the use of new camera and film techniques. This type of imagery can be directly applied to increasing mans knowledge of ocean currents, upwelling, pollution and water depths over wide areas.



BEN FRANKLIN

An external view of FRANKLIN being launched to start another of her operating periods.

CAPABILITIES

BEN FRANKLIN is ideally suited for missions in the following areas:

ECOLOGY - Assessment of the ocean environment

- o POLLUTION - Investigate the effects of waste disposal, industrial out fall, and thermal disturbances.
- o TOPOGRAPHY - Assess the effects of under sea mining, sand and gravel dredging and bottom implacement of under sea hardware.
- o OCEANOGRAPHY - Collection of parametric data, water samples, radioactivity data and photographic records.

BIOLOGY - Research and development to improve utilization of biological resources.

- o FISHERIES - Assessment of resources via population counts of selected species to determine commercial value.
- o LIFE CYCLES -Study the life cycle and environments of selected species in order to better understand the controlling factors and improve commercial markets.
- o HARVESTING - Evaluate current techniques and new methods via in-situ studies to determine effectiveness and potential improvements.

GEOLOGY - Resource exploration of our off shore areas.

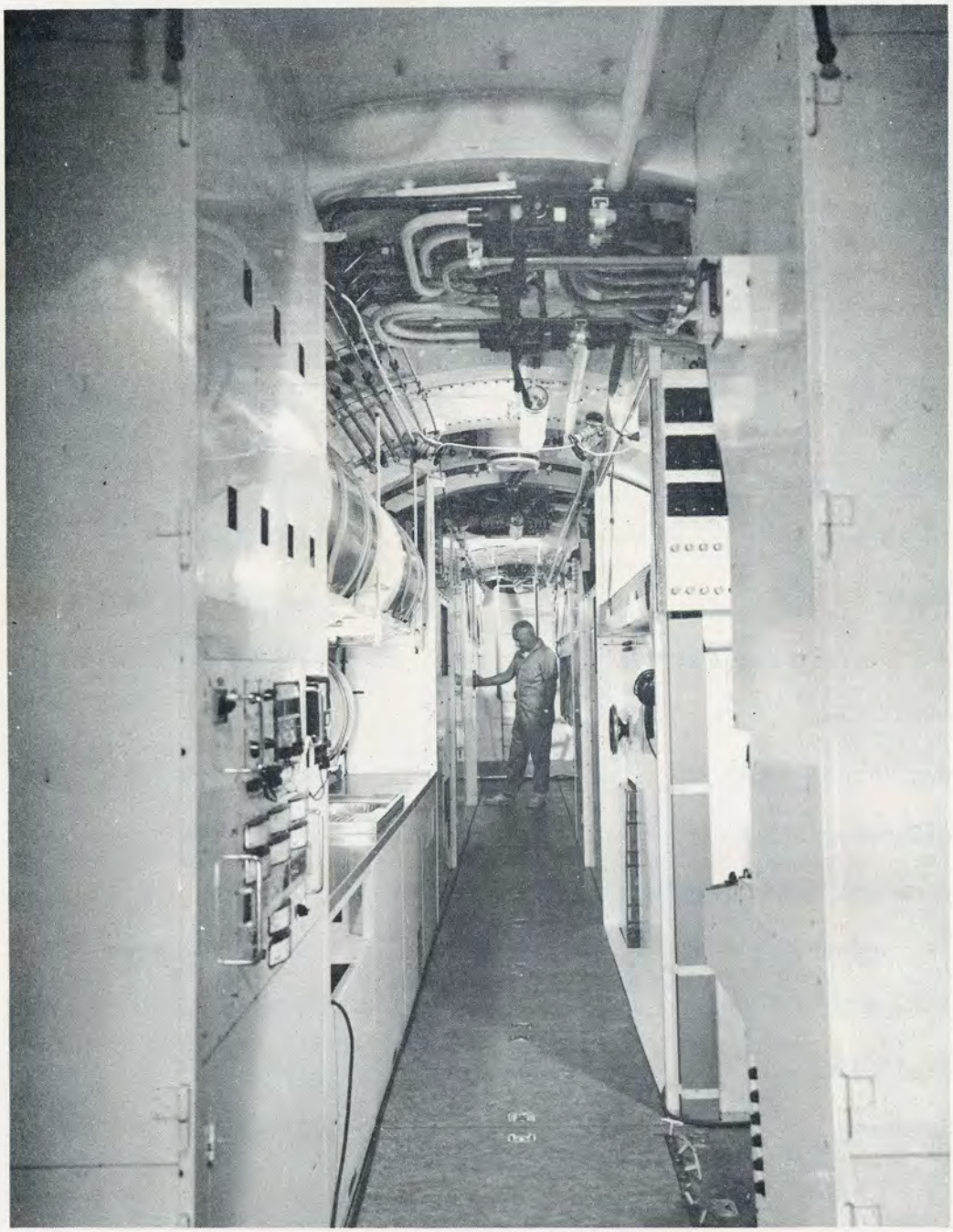
- o MINERALS - Exploration to determine petroleum resources and availability of sand and gravel deposits for construction and beach control.
- o MAPPING - Survey and map undersea geological features to improve our understanding of earth structure and processes.

ENGINEERING Provide a laboratory facility for advancing the state of the technology in ocean engineering.

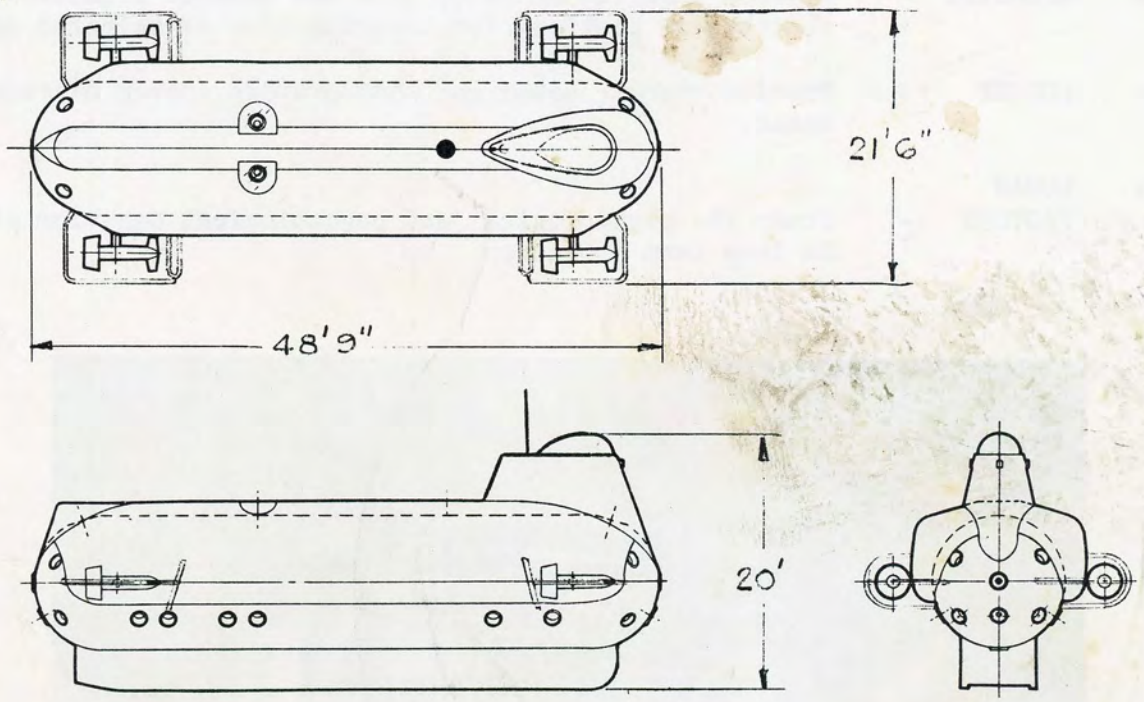
- o TESTING - Determine feasibility of engineering designs and under sea hardware systems.
- o WORK - Provide maintenance and inspection of undersea systems, retrieve selected objects and deploy undersea instruments.
- o SPACE ANALOG-Use as a facility to test and evaluate space station hardware while providing additional physiological and psychological data on men living and working in a confined isolated environment for extended lengths of time.

MILITARY - Research and development for military and space applications.

- o ACOUSTIC - Measure baseline acoustic data and provide a quiet observation platform for investigation of selected areas.
- o SURVEY - Provide visual, sonar and photographic survey of selected areas.
- o HUMAN FACTORS - Study the physiological and psychological behavior of man in long term isolation.



BEN FRANKLIN INTERIOR VIEW



General Specification

Displacement	130 Tons
Length	48 feet, 9 inches
Beam (over motor guards)	21 feet, 6 inches
Height	20 feet
Operational Depth	2000 feet
Collapse Depth	4000 feet
Submerged Speed (maximum)	4 knots
Life Support	6 men for 6 weeks
Payload	5 Tons
Total Power	756 Kwh
Viewports	29