Forecast of World Ocean Objectivities

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FORECAST OF WORLD OCEAN OBJECTIVES

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ABSTRACT

National Ocean Goals must be supported by a series of discreet objectives which concurrently enhance World Ocean Goals. In general terms these goals are: "Improve the Ocean Environment, Promote Economic Development of Ocean Resources, Increase Scientific Knowledge of the Ocean, Assure World Peace and Security, and Enhance International Understanding."

The Forecast of World Ocean Objectives has been developed through the year 2000. These objectives have been established in accordance with a time sequence of activities associated with a horizontal consideration of the world ocean.

THE MAJOR OCEAN INTERFACES

Aerospace objectives are those activities which will be performed in space but interrelate directly with the world ocean. Surface objectives are those uses of the surface of the ocean as man progresses from the coastal regions out to more effective uses of the total water surface. The sub-surface is that portion of the ocean extending outward from the shallow Continental Shelf to the deep ocean and bottom interface is concerned with those activities which will be related to the occupation, use and control of the land beneath the sea. The policy and support objectives are to provide institutional references for integrated ocean operations. This is necessary to provide a perspective for the significance of world interest in the ocean to satisfy the needs of man.

THE AEROSPACE OBJECTIVES

During the past decade satellite launch and operations have provided meaningful experience relating to our capability for conducting meteorological operations from space. The Tiros and Nimbus programs have proven the value of such space operations. The earth orbit stations which will be established during the early 1970s will allow for improved weather forecasting and for more precise navigation. Experiments will be conducted as to the feasibility of further using these stations for survey of fish populations and other world resources. Satellites may also be effectively used for ASW surveillance. The significance of space and ocean operations will increase by use of multiple purpose space stations and the World Weather Watch should be operational by 1985. The development of space/ocean technology will lead to world resource and environmental condition monitoring from space during the latter part of the 20th century.

THE SURFACE OBJECTIVES

The immediate considerations at the surface are those concerning the multiple use of the coastal zone. The coastal zone is composed of the estuaries and the margins of the ocean. It constitutes one of mankind's most valuable natural resources. Most of our population lives near this zone and uses it for recreation, fishing, trade and commerce, industry, mining, a source of fresh water, and disposal of waste. As the population increases, the economic value of the coastal zone will increase and add to the competing uses of this zone.

A major candidate for technological development in the early 1970s will be the Surface Effect Ship program. The SES transportation concept will be a candidate for commuter service along waterways adjacent to those cities like Washington, D.C. which already experience critical highway transportation problems. Early areas for potential application will be in support of oil operations in Alaska and for passenger and cargo movement in the Caribbean. By 1985 large ocean going SES vehicles may be the major means of transportation along the surface of the world ocean.

By 1975 the coastal recreational requirements will be more than double those of 1965. New technologies will be added to existing recreational products. Water jets will be a major propulsion system for recreational boating, gliding will be a companion to water skiing and a type of wet submersible will have added to the dimension of recreational diving.

By 1980 stable ocean platform systems will be used as large sea station systems for airports, for shipping terminals off the coast, for resorts and possibly as oil refineries. It has been proposed that long-haul transportation will be from sea station to sea station and that the short-haul within a region will be by VTOL and STOL aircraft, hydrofoils, SES and conventional surface craft.

By 1985 the World Weather Watch should have pro-
gressed to the degree that we will have initial sea state control which will allow us to modify local weather, and severe storms such as hurricanes, and possible to create artificial upwelling in selected areas in order to improve both commercial and sports fishing.

The doubling of the world’s population by the year 2000 will lead to serious considerations of mobile floating cities. A prototype will be designed and launched before the turn of the century. Such a mobile community would be a logical candidate for those type of space operations associated with the launch of nuclear propulsion systems into space. Mobile cities will be candidate locations for processing plants for food resources from the sea, for special research activities such as, for a breeder reactor and they should provide an ideal intellectual environment for advanced educational facilities.

THE SUB-SURFACE OBJECTIVES

The period of the 1960s has led to the development of extensive technology associated with submersible design and operations. The Alvinaut, Alvin, Deep Star, Deep Diver, NR-1, and Pisces are examples of sophisticated special purpose submersibles that have been developed in order that men might explore and extend his knowledge about and learn how to perform difficult operations in the ocean environment below the surface.

Research vehicles capable of operating independently in the deep sea will become routine in 15 years. The interim period will be mostly one of research, development, and experiment. At least until 1975, these vehicles will be specialized. Many will serve strictly military purposes of surveillance, interdiction, and tactical weaponry. Some will be largely logistic in purpose, providing links for the transfer of supplies, equipment, and personnel.

By 1975, the U.S. Navy expects to be able to salvage large objects, such as crippled submarines, from depths of 850 feet, and it predicts that divers will assist in doing this. The Navy has conducted successful experiments involving humans at 1000 foot depths. A large national mobile laboratory will regularly be able to operate to 6000 foot depths before 1980. The laboratory will contain modules which will be able to descend to 10000 foot depths. This laboratory will be able to perform long-range surveillance over extensive portions of the ocean. Experience in the mobile laboratory will lead to development of buoyant submersible mobile mining systems which initially will be able to mine nodules from the Continental Shelves and by about 1980 manganese nodules will probably be regularly mined from the shallow portions of our ocean basins.

With the cooperation of the developing nations, the fishing industry could be completely revitalized by 1980, providing greatly increased protein supplies to improve the health of the populace of the entire world. Sea harvests can be significantly increased by improving political, social, and hardware arrangements for food-producing sea life.

By 1985 large submersible systems will be regularly processing at sea, both plants and animals which will be used as food for portions of the world. World demand for fishery products is expected to reach 350 billion pounds by the year 2000, up from the present 123 billion pounds.

Large commercial submersible vehicles, such as freighters and tankers, will be regularly operating in the world oceans by 1990. It is now possible to design experimental vehicles capable of submerged hydrodynamic speeds of 100 knots. Submerged ports to handle these special submarine transport vehicles will be of serious consideration.

THE BOTTOM OBJECTIVES

The bottom area of operations will extend outward from the Continental Shelves. Man in the sea experiments during 1960s have led to successful operations by Captain Bond of the U.S.Navy with the Sea Lab Program, the Conshelf series by Cousteau in France and the U.S.industry-government sponsored Tektite project.

Some 100 companies are now active in offshore petroleum work off the coasts of 75 countries. In 1968, $1.3 billion annually was being spent by the U.S. petroleum industry, and its total offshore investment since 1950 stood at about $17 billion.

During 1968, petroleum leases brought a total of $1.7 billion directly into the U.S.Treasury.

By 1980 the U.S. petroleum services and equipment market will be $3.5 billion. Offshore petroleum has generated new products and growing service businesses, and offers an expanding market for construction, contracting, maintenance, and production.

Offshore oil provides 15% of today's 12.8 billion barrels per year, and is projected to provide 33% of the supply in ten years. The total oil production growth rate is about 7%, whereas the offshore oil production growth rate is over 15%.

In the early 1970s the national objective will be to develop a manned Continental Shelf station to be operated as a test and evaluation facility. Segments of the programs will include the undersea facility, its emplacement and retrieval, routine facility operations, experimental and training programs and logistic support.

In addition to the United States, the Soviet Union, Japan, the United Kingdom, Italy and West Germany have initiated research programs which should develop sufficient technology for any of
them to maintain manned stations on selective sea mounts by the latter 1970s.

By 1980 extensive ocean ridge expeditions will be conducted. A manned submersible system will be able to conduct an exploratory mission commencing at Iceland and proceeding southward along the Mid-Atlantic Ridge through the Atlantic Ocean and around the Cape of Good Hope into the Indian Ocean. Such a mission could be able to evaluate realistically the economic potential of the resources and provide a factual basis for rational decisions about their jurisdiction and utilization.

In the early 1980s large undersea stations will be possible at depths of greater than 10,000 feet. These stations will be supported by nuclear power and they will initially be used for research.

By 1990 deep ocean surveys into extreme depths will have been completed and considerations will be given to possible uses of calcium carbonate, silicon dioxide and red clays that might be retrieved from those depths.

Complete underwater resorts will be established by 1995 since the technology will exist to safely transport people to sophisticated habitats at most locations within the ocean.

**POLICY AND SUPPORT**

The Marine Science Council and Commission initiated activities during the 1960s which will result in the creation of a national ocean program during 1970. The Commission's Report calls for the establishment of a new and independent government agency to coordinate and guide the government's efforts.

It recommends six national projects - to include marine test facilities and ranges, a lake restoration project, Continental Shelf laboratories, a Continental Shelf submerged nuclear plant, deep exploration submersible systems, and a pilot buoy network. In addition, it suggests feasibility studies of five other possible national projects to follow later.

It calls for Federal expenditures of around $8 billion over a 10-year period to put its basic recommendation into effect.

Science and engineering centers are needed to provide test and engineering information on a more timely scale, and to provide a scientific capability to support environmental testing, computerized systems analysis, and inter-disciplinary use of engineering information.

The Sea Grant Program will be extended and will provide education and training for more effective use of ocean resources. Educational institutions will be users of sub-surface oceanographic data for their own research and academic purposes, as well as for sponsored research. University research groups will undertake studies for federal, state, and local governments, as well as for the ocean engineering industry. Their laboratories and their facilities will include seagoing craft and undersea vehicles. They will also support manned undersea operations.

The Malta resolution will lead to the establishment of an international sea bed registry by mid-1970. The registry will provide legal controls for ocean exploration and development beyond national boundaries and some of the benefits sponsored by the international agency will be for specialized research programs and training to insure safe and effective operations.

By 1980 nations of the world should be cooperating with regional resource planning and management organizations. A major factor will be the desire for pollution control and environment improvement. This will require the international cooperation of governments and industries.

By 1985 many significant natural resources required by the world will be coming from the ocean. There will be a requirement for low cost ocean products and major operations will be centered around power, desalination, food and drugs.

By the turn of the century technology will have allowed us to consider the ocean as the major source of food, power, fresh water and other commodities and the total sovereignty of the oceans will have been resolved.
FORECAST OF WORLD OCEAN OBJECTIVES


- **AEROSPACE**
- **WEATHER**
- **WEATHER ENVIRONMENT**
- **WEATHER MONITORING**
- **WEATHER STATIONS**
- **ENHANCEMENT**
- **ENHANCEMENT SYSTEMS**
- **ENHANCEMENT STATIONS**
- **ENHANCEMENT TECHNOLOGY**
- **ENHANCEMENT TOOLS**

- **FORECAST**
- **FORECAST SYSTEMS**
- **FORECAST TECHNOLOGY**
- **FORECAST TOOLS**

- **WORLD**
- **WORLD OCEAN**
- **WORLD OCEAN OBJECTIVES**
- **WORLD OCEAN RESOURCES**
- **WORLD OCEAN TECHNOLOGY**

- **MANNED**
- **MANNED ENVIRONMENT**
- **MANNED SYSTEMS**
- **MANNED TECHNOLOGY**

- **SUB-SURFACE**
- **SUB-SURFACE OBJECTIVES**
- **SUB-SURFACE SYSTEMS**
- **SUB-SURFACE TECHNOLOGY**

- **BOTTOM**
- **BOTTOM OBJECTIVES**
- **BOTTOM SYSTEMS**
- **BOTTOM TECHNOLOGY**

- **POLICY & SUPPORT**
- **POLICY ENVIRONMENT**
- **POLICY TECHNOLOGY**
- **POLICY TOOLS**

- **LONG-TERM FORECAST**
- **LONG-TERM FORECAST SYSTEMS**
- **LONG-TERM FORECAST TECHNOLOGY**
- **LONG-TERM FORECAST TOOLS**

- **SHORT-TERM FORECAST**
- **SHORT-TERM FORECAST SYSTEMS**
- **SHORT-TERM FORECAST TECHNOLOGY**
- **SHORT-TERM FORECAST TOOLS**

- **WORLD RESOURCES**
- **WORLD RESOURCES ENVIRONMENT**
- **WORLD RESOURCES TECHNOLOGY**
- **WORLD RESOURCES TOOLS**

- **SUB-SURFACE ENVIRONMENT**
- **SUB-SURFACE TECHNOLOGY**
- **SUB-SURFACE TOOLS**

- **BOTTOM ENVIRONMENT**
- **BOTTOM TECHNOLOGY**
- **BOTTOM TOOLS**

- **POLICY ENVIRONMENT**
- **POLICY TECHNOLOGY**
- **POLICY TOOLS**

- **LONG-TERM FORECAST ENVIRONMENT**
- **LONG-TERM FORECAST TECHNOLOGY**
- **LONG-TERM FORECAST TOOLS**

- **SHORT-TERM FORECAST ENVIRONMENT**
- **SHORT-TERM FORECAST TECHNOLOGY**
- **SHORT-TERM FORECAST TOOLS**

- **WORLD RESOURCES ENVIRONMENT**
- **WORLD RESOURCES TECHNOLOGY**
- **WORLD RESOURCES TOOLS**

- **SUB-SURFACE ENVIRONMENT**
- **SUB-SURFACE TECHNOLOGY**
- **SUB-SURFACE TOOLS**

- **BOTTOM ENVIRONMENT**
- **BOTTOM TECHNOLOGY**
- **BOTTOM TOOLS**

- **POLICY ENVIRONMENT**
- **POLICY TECHNOLOGY**
- **POLICY TOOLS**

- **LONG-TERM FORECAST ENVIRONMENT**
- **LONG-TERM FORECAST TECHNOLOGY**
- **LONG-TERM FORECAST TOOLS**

- **SHORT-TERM FORECAST ENVIRONMENT**
- **SHORT-TERM FORECAST TECHNOLOGY**
- **SHORT-TERM FORECAST TOOLS**

- **WORLD RESOURCES ENVIRONMENT**
- **WORLD RESOURCES TECHNOLOGY**
- **WORLD RESOURCES TOOLS**

- **SUB-SURFACE ENVIRONMENT**
- **SUB-SURFACE TECHNOLOGY**
- **SUB-SURFACE TOOLS**

- **BOTTOM ENVIRONMENT**
- **B BOTTOM TECHNOLOGY**
- **B BOTTOM TOOLS**

- **POLICY ENVIRONMENT**
- **POLICY TECHNOLOGY**
- **POLICY TOOLS**

- **LONG-TERM FORECAST ENVIRONMENT**
- **LONG-TERM FORECAST TECHNOLOGY**
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