

THE OCEAN ENTERPRISE CONCEPT

by

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WHY OCEAN SPACE?

Today less than one percent of the annual resources consumed in the U.S. comes from the sea. Yet the Exclusive Economic Zone (EEZ) Proclamation gave the U.S. exclusive jurisdiction to the resources of the ocean out to 200 nautical miles. This is an addition of over 3.9 billion acres of new territory--more than doubling the size of the U.S. To date, the potentially great rewards from the development of the resources of the ocean by the private sector have been greatly inhibited by the scale of risks of such candidate projects. The following areas show the most promise: marine mining of coastal heavy minerals; ocean energy conversion; offshore waste treatment plants; mariculture (fish and shellfish), and platforms for air and space operations (floating ocean military bases).

The Ocean Enterprise Concept has been proposed as an exciting and challenging mechanism for launching a new era of awareness, practical development, and utilization of ocean resources beginning in the early 1990's. It is only through a cooperative "pulling together" of government, academia, and industry, that significant new areas of operational economic interest can be developed or current ones strongly bolstered in the oceans sector. The original Stratton Report (*Our Nation and the Sea*, 1969) recognized the great basic potential of the oceans and provided a broad discussion of the many appropriate areas for scientific and economic development. An assessment at this time (some 20 years later) suggests some interesting observations.

- Great strides in the scientific understanding of the oceans have been made in some areas: the recent work on ocean rift zone geology, thermal vents, and their implications for ocean chemistry and biology, for example.
- No new major economic area has been developed in the ocean sector. The principal economic payoff areas remain those of shipping (merchant marine), fisheries, and offshore oil and gas. Heavy R&D investment has been made in such areas as mineral deposits (manganese nodules) and OTEC, but no practical business of net economic value has developed.
- A strong well recognized constituency has not yet developed for the oceans, although a lively basis for such a constituency appears to exist.

The construction of large (1-2 sq km) stable ocean platforms could also provide this Nation with mobile overseas military bases to meet the future need of decreased reliance on overseas military bases for the USAF-Army/Marines-Navy. The U.S. has a worldwide military basing structure that will very likely dwindle significantly in the next ten years. Air bases in Panama, Spain, and the Philippines are becoming extremely expensive, less useful, and less available. The Soviets have approached the problem differently by employing mostly movable or removable assets (floating piers, tenders and repair ships,

floating dry docks). Ocean bases can provide key aspects to hemispheric defense systems including border and internal defense. Large stable ocean bases can also serve as centers to suppress sabotage, terrorism, narcotics trafficking, and arms shipment; major weather stations for enhanced weather prediction, global climate studies; air traffic routing centers (considerable fuel savings); alternative energy generating plants (OTEC); and serve as platforms to provide indirect U.S. military assistance to third world countries (such as training, intelligence, communications, transportation, construction, medical supplies, physicians or disaster relief, logistics, etc.).

Many actions have been initiated and ideas and technologies developed which, if supported under a strong long-term commitment by government, academic, and industrial sectors could provide a basis for very significant scientific and economic expression of our use of the oceans.

THE PRIVATE SECTOR ENVIRONMENT

Perhaps the major "disappointment" of the past 20 years has been the failure of any major new ocean economic area to develop. Broad technological and economic constraints have been suggested as the primary factors in preventing many of the Stratton Report goals from being achieved. The development of these ocean resources (from the use of ocean space to the development of individual resources) has been constrained by the lack of: public/private venture infrastructure; legal/regulatory implementation strategies; environmental, economic, social, and political guidelines; and technical and engineering problems that arise from the "marinization" of land-based engineering concepts, technologies, structures and facilities for use in ocean enterprises. The limiting factors are really leadership, infrastructure and venture capital (because the scales of risk are perceived to be large). The infrastructure needs can be developed and supported by a Federal in-house incubator, an ocean going Fannie Mae, and a quasi government non-profit corporation (chartered through Federal enabling legislation). This quasi government corporation is needed to provide the limitation of liability to that normally accepted by the Federal government, and minimize the risk of intervenor legal action (similar to the Trans-Alaska Pipeline, or COMSAT Corp). Several national and international workshops have stated that the key technologies exist, but have not been utilized in such a manner on a commercial scale.

It is in the interest of this Nation to create organizational infrastructures which bring together the resources of government, industry, and the academic sectors to undertake large-scale resource and technology development projects, where scales of time, risk, and/or magnitudes are too great for one sector alone to bridge the NO MAN'S LAND gap between research and development as illustrated in Figure 1. The bridging mechanism requires a larger more integrated effort with private/public sharing of funding to support special development activities.

WHAT IS AN OCEAN ENTERPRISE?

Ideally an ocean enterprise should generate economic revenues, not only by cost savings, but also generate new revenues; create jobs and economic benefits from the development of ocean resources and technologies; protect and conserve the developed resources and ocean environments; provide the benefits of a public service and reduce public risk; and support the Nation's interests overseas.

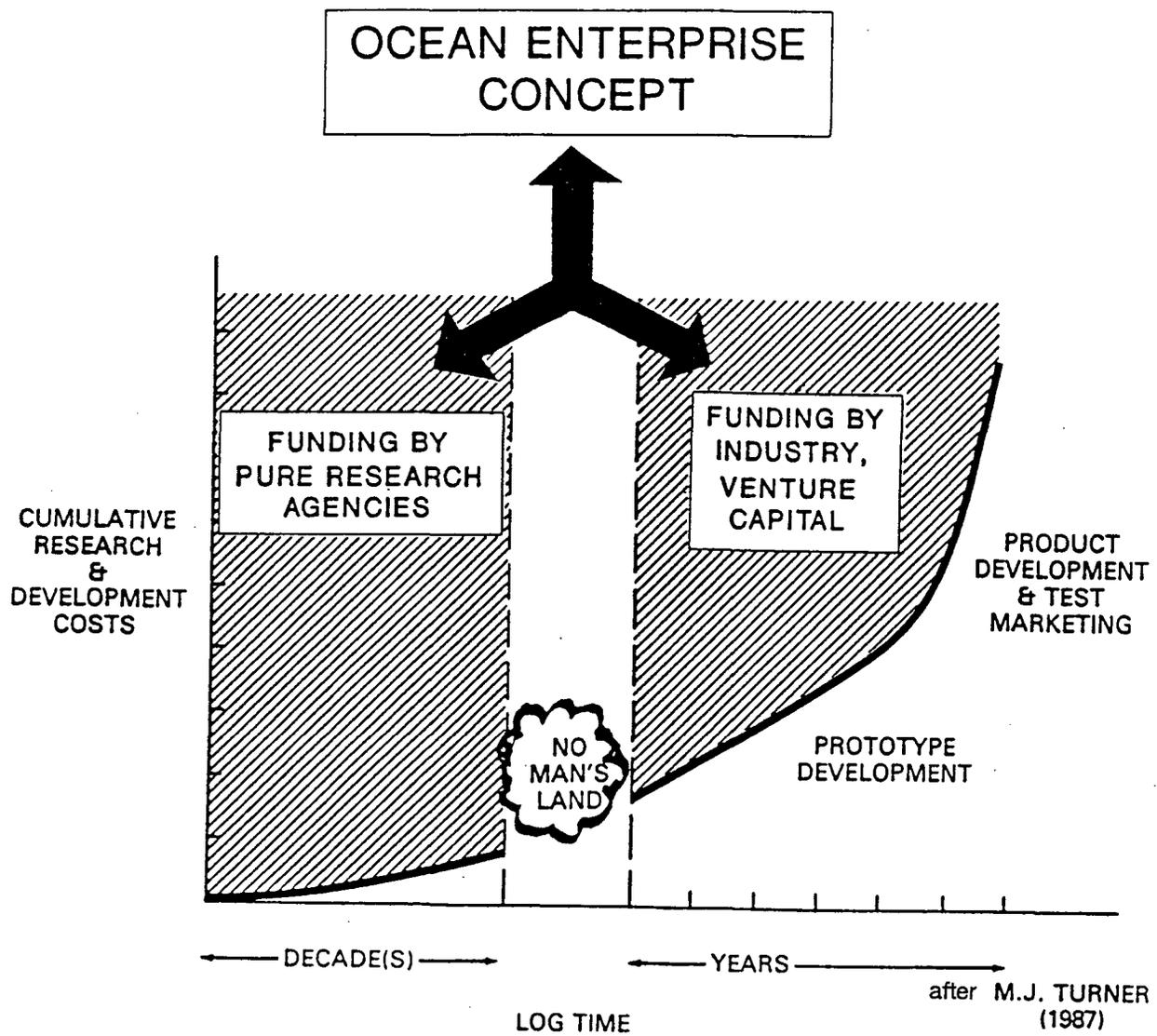


Figure 1. The Ocean Enterprise Concept to Bridge the NO MANS LAND Gap.

It is also timely and desirable to foster new civilian and military partnerships to enhance this nation's competitiveness and economic growth, with current and future budget limitations (the trade deficit and the increasing national debt). It is also desirable to stimulate military/civilian synergy, because projects of this scale (such as large ocean platforms) have costs that require multiple use benefits to society. Also these large projects must maximize the commercial spin-offs (e.g., as NASA with the space program) to increase the benefits to society and distribute the construction and operation costs across a wider array of users. Different kinds of ocean platforms (from ocean airports, mining facilities, to recreational facilities - hotels, resorts, etc.) will spin-off entirely new commercial industries, providing significant public and private economic benefits (see Figure 2).

Ocean enterprises have to develop from a succession of small scale projects that perhaps develop for application in the shallow, near coastal waters, providing local public service benefits. These projects should have a dual use being initially developed with public-private sector funds for civilian use, however, engineered and evaluated with a military perspective and application in mind. Examples of these could be a moored floating ocean platform designed and engineered for a NIMBY (not in my back yard) public service project such as a coastal airport or waste treatment facility (e.g., high temperature garbage processing and treatment plant).

In the U.S., not a single major airport has been built since the early 1960s. By the year 2000, 80 percent of the U.S. population will live within 60 miles of the coast, and public air transportation which has air space limitations today, will not be able to meet the demands for services in large U.S. coastal cities (New York, Los Angeles, San Francisco, etc.). The construction of stable ocean platforms for airports could be initially supported by public and private funding with repayment from user fees and capitalization of infrastructure.

Vigorous efforts have been supported by the U.S. government, to encourage private capital involvement through a cooperative partnership approach to the development of new technologies and to the transfer of technology from the R&D environment to practical economic application in the marketplace. These have, in some cases, shown a modest degree of success. Yet, significant investment from the private sector for potential new economic areas is usually lacking. "Why doesn't industry get more excited about the oceans?", Federal agencies and academia have asked. The direct answer is that there are no perceived returns on investment justifying the perceived risk.

FUNDING LIMITATIONS

Due to the increasing national debt and the trade deficit, it will be the policy of the administration to reduce Federal support for many programs for which such support would seem to be reasonable and appropriate from the state and local governments and/or private sectors. Thus, one cannot really expect major direct Federal financial support for the increased efforts needed to truly develop and exploit new ocean resources. It can also be argued that, even under a variety of administrations with differing philosophies, there has really never been a basis for a major increase in Federal funding for major new ocean projects. The constant dollar support for underlying programs in basic and applied ocean sciences, charting and mapping, and related activity has been maintained at a fairly steady rate (though slowly decreasing through inflation). This situation is not likely to change in the future, regardless of administration. The real question is: with the understanding that major increases in developmental funding from the Federal government or from foundations are not to be expected, is there any basis for a major increase from the private sector?

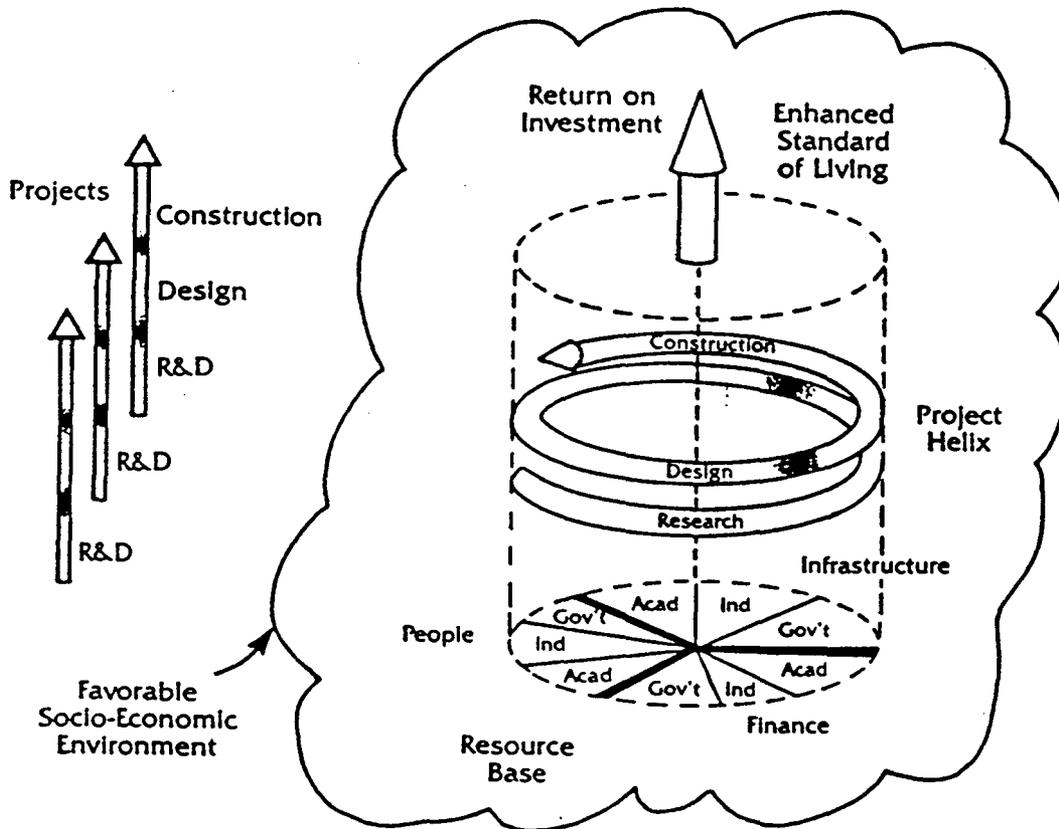


Figure 2. Partnership of Industry, Academia, and Government to Conduct Research, Design, and Construct Large Scale Ocean Projects.

PRIVATE SECTOR INCENTIVES FOR OCEANS DEVELOPMENT

The prime requisite for private capital financing of development is that an investment yield a profitable return. Moreover, most investors or companies looking at rewards for their own R&D efforts tend to evaluate the worth of investment opportunities in terms of near-term returns. The combination of potential immediate tax benefits and profitable return on investment realized in the 2-5 year time frame seems to be characteristic of the most attractive private sector investment opportunities. Investments in 5-20 year time payoff areas are only of interest in certain highly specialized industrial areas: oil and minerals exploration, timber production, and development of public and private power resources, to name a few. These long term areas are characterized by the long life-time of assets and the highly predictable long-term general requirements for their products (although short-term market conditions may fluctuate wildly). The basic reason that short-term payoff is so important is that futures can be "reasonably" predicted over a 2-3 year period at most, in the perceptions of a majority of investors.

What constitutes an attractive R&D investment opportunity in the private sector? A few critical elements which must be present to validate a first class investment risk are suggested below:

- A well defined end product.
- A well prepared development strategy and business plan.
- Definable markets and specific paths to those markets.
- A basis for prediction of comfortable profit margins.
- Technological uncertainties well defined and directly addressed by a planned R&D program.
- The business plan adequately structured within the international and national socio-political and economic environment.
- A direct identified path for Return On Investment (ROI).

This implies a clear economic model for the investment program showing how ROI will be generated.

There are doubtless additional important points. The bottom line argument is that the level of private investment will be strongly coupled to the degree to which the investment environment and market place is understood, and the potential for a reasonable ROI.

It seems self-evident that the reason for capital investment in the oil/gas, merchant marine, and fisheries areas, basically lies in the fact that these are perceived as well understood economic areas by the operators and investors. In the oil/gas area, certain developmental investments are regarded as essential, based on past experience (the need to explore, develop more efficient techniques, etc.). In shipping and in fisheries, requirements for investment in capital equipment are well understood, but the potential of R&D to improve profits through increased efficiency, understanding, etc. is less well recognized or accepted. New techniques in these traditional areas often must be spurred by Federal government R&D or by regulation.

In most other new technology areas of ocean exploration, development has been all but non-existent outside of those projects based on Federal government funding. A notable exception has been the once vigorous but now moribund investment in the manganese nodule mining potential. Here it looked as though all elements were in place to make industrial investment attractive, and large amounts of investment were actually undertaken by several large consortia of companies.

As it turned out, a declining metals market, the general long-term malaise of the world economy, and the recently concluded Law of the Sea Treaty, have all acted together to make the planned manganese nodule industrial development economically unfeasible. This has stung the investors severely, and has contributed to a doubly cautious approach on the part of private investors with regard to future opportunities requiring major investment levels.

AN APPROACH FOR THE OCEAN ENTERPRISE CONCEPT

An Improved Approach would seem to be a necessary part of any program designed to make the Ocean Enterprise Initiative a success in terms of the infrastructure that will lead to economic benefits. In addition to activities well within the operational potential of the current oceanic community, a new set of techniques and organizational methods must be developed. These methods must be expected to enhance the probabilities that major projects and new economic potentials will in fact be realized, as opposed to just being studied, evaluated, and then left to await some future development. This Improved Approach must in fact concentrate on bringing new elements of the private sector strongly into the ocean development arena. Government and academic resources are already there and do not have major new sources of support to draw from. Under this Improved Approach some things need to be recognized as rather fundamental:

- The basic incentive for private sector interest is that of perceived future return on investment.
- The basic reality for the legislative branch of the government is the perceived connection between congressional action and the reaction of individual congressional constituencies (i.e., programs must have real social/political/economic impact on real constituencies of Senators and Representatives). Strong private sector involvement enhances legislative interest.
- The primary resources for basic ocean research lie within academia (including the various oceanographic institutes) and the Federal government.
- The primary resources for development lie within the private sector.
- The private sector is becoming increasingly aware of the perils of investment posed by uncertainties in policy and the socio-political environment. A carefully planned and prepared basis of support in these areas, as well as a generally favorable economic projection, is becoming a requisite to investment.

Considering all of the above, a series of new mechanisms (as a means of attracting new private sector participation) is suggested to introduce new programs and initiatives.

TRIPLE ALLIANCE R&D PARTNERSHIPS

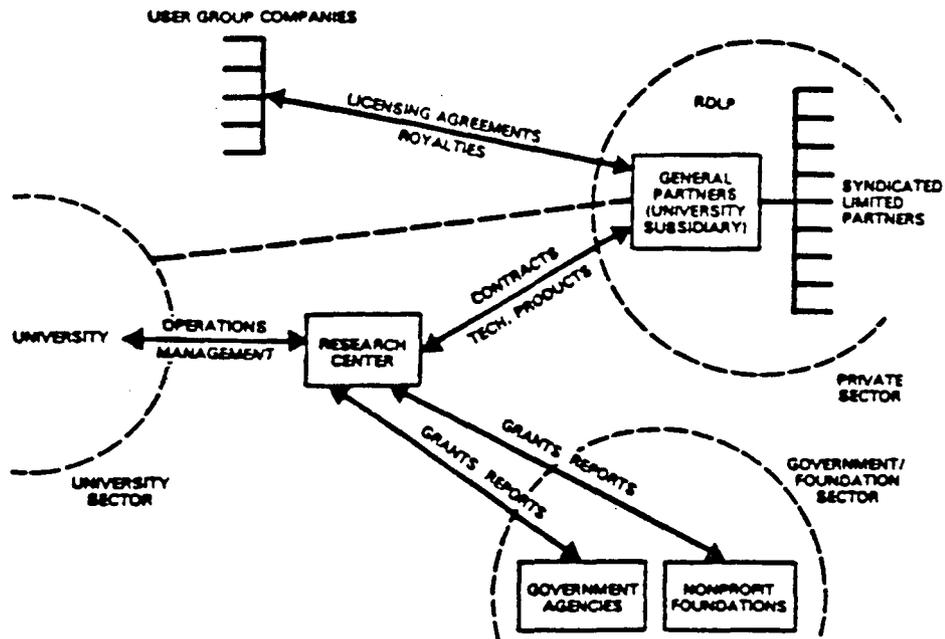
This mechanism is used to develop a model for R&D Limited Partnership investments. It proposes a partnership of government, academia, and private capital sectors to establish long term and vigorous support for applied R&D in the oceans area. The proposed structure is diagrammed in Figure 3a: an operating R&D center established under the auspices of one or more academic institutions. Support from the private sector is provided through an R&D Limited Partnership (RDLP), thereby providing a direct path for technology transfer and market application directed by the General Partners through agreements with user industries, who pay royalties to the RDLP in return for manufacturing and marketing rights received. The royalties are used to provide return on investment to the RDLP investors, and to self-endow the center after the RDLP limited partners are paid out. Ideally, the academic participants will be one of the General Partner. Figure 3b is a more complex example of a two phase model.

Government and nonprofit foundation support is separately solicited by each project, but has the added attractiveness for projects and grants by providing leverage based on the concurrent programs supported by the RDLP contracts with the Ocean Space Initiative. In this way, a formal tie is established between the successful market application of project developments and the future financial support of the initiative itself. Industrial (private sector) participants are protected by limited investments and benefit both through tax credits and by RDLP distributions or individual user contracts. The General Partners, through the RDLP, provide sufficient isolation that antitrust requirements are met. Finally, joint academic and government support of the center helps validate the products which are applied and sold through the private sector channels. This validation can be critical in reducing perceived risk and encouraging private sector investment. This mechanism can provide a helpful umbrella for encouraging a significant increase in private sector investment.

MAJOR ECONOMIC AREA JOINT VENTURE

This mechanism also emphasizes the role of the private sector. Rather than relying on a single major industrial developer, a team of industrial and investor partners, perhaps through a joint venture corporation, would be established to develop a particular area of great potential economic benefit. Such an area would be characterized by some of the following traits:

- Development path featuring a graded investment startup.
- Backup by favorable policy and socio-political environment.
- Meets environmental protection issues.
- Takes short and long range economic and market conditions into account.
- Does not require development of basic scientific understanding, i.e., is a technology development.
- Scaling models exist for transition from laboratory to industrial practice.
- Spin-off developments are inherent in the approach.



SUPPORT OF A NEW ECONOMIC SECTOR DEVELOPMENT

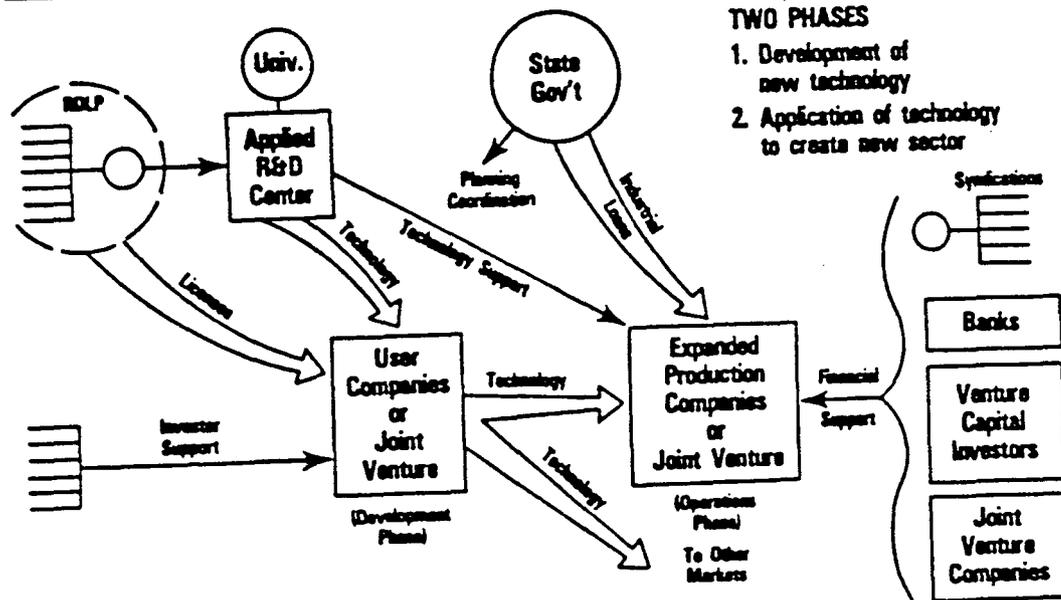


Figure 3. Simple (a) and Complex (b) Examples of Organizational Infrastructure Models for Ocean Enterprise Projects.

These fundamental traits allow the development of a business plan which permits the highest technological risk problems to be solved with a modest initial investment. Operations and market testing would be conducted under a prototype operation which again does not require a full scale manufacturing investment. It is also important to identify multiple potential paths for market development so that more than one option for investment pay back exists. A goal for the Ocean Enterprise Initiative might be to launch in early 1990 at least one major effort, with an initial 10 year development and business plan.

NATIONAL OCEAN POLICY STATEMENT

Simply stated, this would seek to provide an Ocean Economic Development Policy statement by the President which follows up on the EEZ proclamation of March 1983 and would include specific backup actions which strongly support ocean resource development by the private sector. Features of the policy should include:

- Operation within the EEZ.
- Cooperative guidelines for working with LOS signatories.
- Policies providing incentives for ocean development investment (tax credits, small business loans, SEC and Justice opinions on consortia, etc.).
- Emphasis on ties to economically depressed areas.
- Assurances on commitments to protect ocean environment while undertaking development; i.e., an intelligent balance between ecological concerns.

COALITION OF OCEAN RESOURCE STATES

In conjunction with those new incentives and special projects which could be directly encouraged by Federal actions, a movement to organize those states having direct or strong indirect interests in ocean development as well as currently established ocean business would be helpful in establishing a strong constituency for the oceans. Similarly, a parallel association of city governments might be developed for ports and other cities whose economic basis may depend or could depend heavily on ocean development and economies. Spearheading this effort should be the ocean related industries and professional societies, backed up by the general interest of the Departments of Commerce, Transportation, and Interior, and the National Science Foundation. Such an organization would, through the associated Congressional delegation of the member states, have a strong effect on the development of a broader Congressional constituency as well. The coalition would, among its goals, act to:

- Promote understanding of the interdependence of state and local economy and environment on ocean related development and industry, both present and future.
- Identify and support the development and adoption of appropriate policies, legislation, and planning at local, state, and national levels

which will best serve state and local requirements and interests, as well as meeting national concerns.

- Develop appropriate state-to-state operating relationships and agreements which will aid in the beneficial development of mutually shared ocean related opportunities.

One very appropriate path to the establishment of such a coalition may well be to obtain the support of the following organizations: Coastal States Organization (CSO) [the sponsor of the Ocean Enterprise special session with the Marine Technology Society at the Ocean '88 Meeting in Baltimore, Maryland, November 1, 1988], the National Association of Counties (NACO), the U.S. Conference of Mayors (USCM), and the League of Cities (LOC). These groups already have well knit operating committees and organizational objectives which broadly parallel the actions suggested above. For example, among the NGA standing committees, one or more of the committees on: National Resources and Environmental Management; Transportation, Commerce and Technology; and Community and Economic Growth, might be very receptive to developing a working group of interested states in the ocean area. Further, the NGA already sponsors various coalition (cf: Coalition of Northeastern Governors) and Regional Commissions (cf: Four Corners Regional Commission, Old West Regional Commission, etc.). Such organizational sub-elements are a natural part of the NGA operating structure. The USCM, LOC, and NACO have similar objectives, structure, and operating methods. USCM maintains continuing efforts in areas of Energy and Environment, Urban Economic Policy, and Transportation, for example. The development of such a coalition in formal recognition of the increasing importance of the oceans as a major factor in state and local economic structure would provide a strong and effective boost to the Ocean Enterprise Concept.

IMPLEMENTATION STRATEGIES FOR THE OCEAN ENTERPRISE CONCEPT

The overall program for the Ocean Enterprise Concept should, of course, embody much more than such major new thrusts as are discussed in the preceding sections. Implementation of the Ocean Enterprise Concept ought to establish a total environment for the enhancement of ocean related activities and interests of all types. The principal measure of the long range effectiveness of the program will be the initiation of major new development areas which can sustain growth. Without the total environment created by the program, such new approach initiatives, as are discussed in the previous section, would have little chance of successfully developing. Without the resulting realization of such new initiatives, the program would be judged, over the long term, as a failure. The program must then have two objectives which are interrelated:

- The creation of a heightened environment of ocean related awareness and actions.
- The initiation of some significant new development with both technological and economic impact which will last (i.e., become an integral part of the national dynamic economic structure).

If these two objectives are met, then the Ocean Enterprise Concept may well be judged to have ushered in a new area of ocean utilization.

The foregoing arguments suggest that the basic operating approach for the program must be that of a team effort, with coordination by key Federal agencies backed by specific White House approval, supporting major activities in five areas:

- Policy development.
- Constituency establishment.
- Awareness enhancement.
- New enterprise initiation.
- Research and development direction and augmentation.

Figure 4 suggests a general way in which the team effort might take place under Federal coordination. Each of the participating sectors would contribute to the appropriate activities through a program master plan. Participation by the White House (particularly the Office of Science & Technology Policy) and other departments and agencies would be most important. Especially beneficial would be a Presidential memorandum or statement ushering in the program, and designating Federal agency responsibilities.

The Ocean Enterprise Initiative can, if vigorously encouraged and coordinated, yield a strong turning point for the history of ocean research and enterprise.

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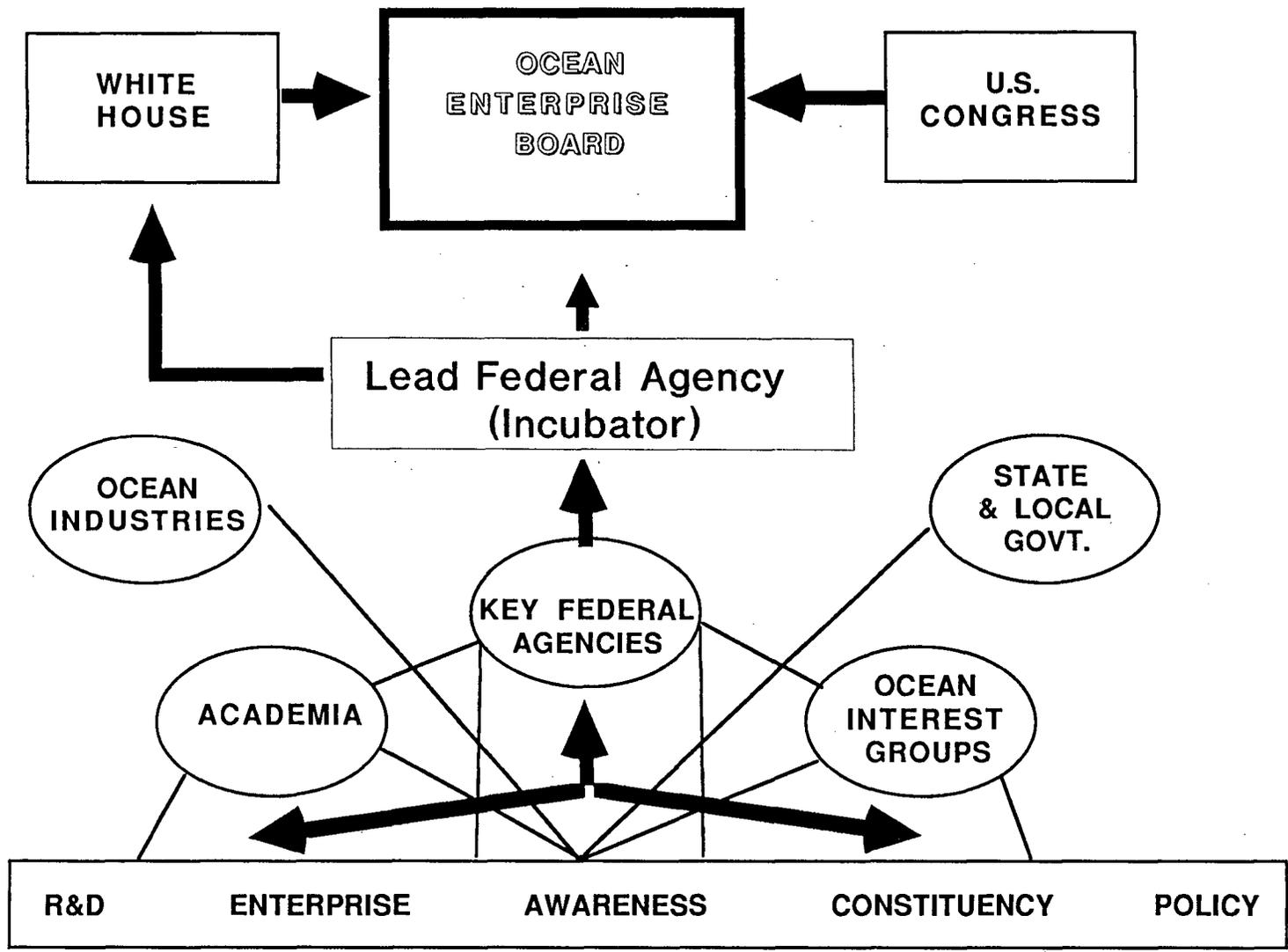


Figure 4 Proposed Ocean Enterprise Organization