

Report by a Panel of the

NATIONAL ACADEMY OF
PUBLIC ADMINISTRATION

*for the National Ocean Service
National Oceanic and
Atmospheric Administration*

JUNE 1996



A
Performance Based
Organization
for Nautical Charting
and Geodesy

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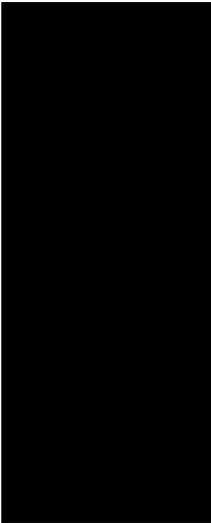
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A Performance Based Organization for Nautical Charting and Geodesy



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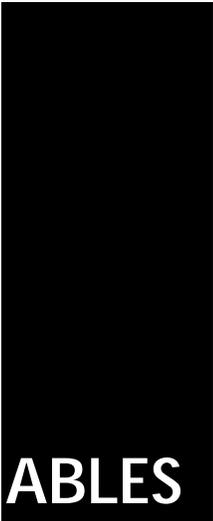
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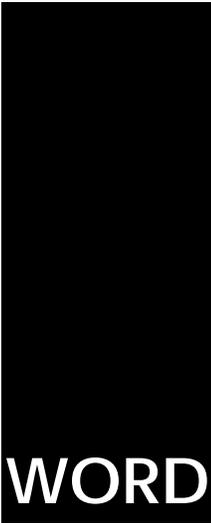
LIST OF ABBREVIATIONS AND ACRONYMS

Code of Federal Regulations	CFR
Continuously Operating Reference Stations	CORS
Cooperative Research and Development Agreement	CRADA
Coast Survey	CS
Defense Mapping Agency	DMA
Department of Commerce	DOC
Department of Defense	DOD
Department of the Interior	DOI
Department of Transportation	DOT
Electronic Display and Information Systems	ECDIS
Federal Aviation Administration	FAA
Federal Register	FR
Freedom of Information Act	FOIA
full time equivalent personnel	FTE
Federal Technology Transfer Act	FTTA
Fiscal Year	FY
Government Corporation Control Act	GCCA
Global Positioning System	GPS
Geodetic Reference System	GRS
Harbor Maintenance Trust Fund	HMTF
International Hydrographic Organization	IHO
International Maritime Organization	IMO
International Terrestrial Reference Frame	ITRF
Memorandum of Understanding	MOU
National Geodetic Reference System	NGRS
National Geodetic Survey	NGS
National Performance Review	NPR
National Oceanic and Atmospheric Administration	NOAA
National Ocean Service	NOS
Natural Resources Canada	NRC
National Spatial Reference System	NSRS
National Technical Information Service	NTIS

List of Abbreviations
and Acronyms

Organization for Economic Cooperation and Development	OECD
Office of Information and Regulatory Affairs	OIRA
Office of Management and Budget	OMB
Office of NOAA Corps Operations	ONCO
Patent and Trademark Office	PTO
Performance Based Organization	PBO
Paperwork Reduction Act	PRA
Surveys, Mapping, and Remote Sensing Sector (Canada)	SMRSS
Special Operating Agency (Canada)	SOA
Safety of Life at Sea	SOLAS
Treasury Board (Canada)	TB
United States Code	USC
United States Coast and Geodetic Survey	USCGS
United States Geological Survey	USGS
Vector Product Format	VPF





FOREWORD

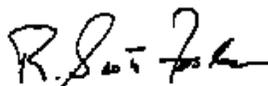
The National Ocean Service (NOS), a part of the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce, is responsible for a variety of functions. Among them are developing and maintaining the National Geodetic Reference System (used for surveying, mapping and construction); and providing marine navigation information, including nautical charts, and tide and current predictions for U.S. waters.

Keeping up with technological advances in geodesy and charting and meeting the requirements of a diverse group of customers for up-to-date and comprehensive products are increasing challenges, particularly in today's environment of severely constrained fiscal and personnel resources. At the same time, the federal government as a whole is undergoing self-evaluation and "reinvention" under the impetus of the National Performance Review led by the Vice President. Agencies are also being required by Congress and the administration to streamline their operations.

To help it face these challenges, NOS contracted with the National Academy of Public Administration to advise on the feasibility and desirability of establishing "an enterprise organization" to provide marine navigation and geodesy services. As is its usual practice, the Academy established a panel of experts, consisting of Fellows and others with relevant expertise, to conduct the study. The panel's report and recommendations propose innovations in organization design for federal agencies that the panel believes should be of interest to all of those agencies considering the establishment of performance based organizations.

The Academy is pleased to have been asked to carry out this study. It follows and builds upon the developmental work of a number of earlier studies that led to proposals for enterprise organizations, often in the form of government corporations.

We hope that this report will prove helpful, not only to the Department of Commerce, NOAA and NOS, but to the Office of Management and Budget, the National Performance Review, the Office of Personnel Management and congressional committees that are developing or reviewing proposals for performance based organizations.



R. Scott Foster
President

EXECUTIVE SUMMARY

GOALS AND STUDY APPROACH

The National Ocean Service (NOS) is a part of the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce. This report deals with three principal functions of NOS: nautical charting, tide and current predictions, and geodesy. All together, if one includes the costs of the NOAA fleet and the NOAA Corps that support the functions, more than \$90 million is spent annually on these three functions.

The Academy panel was charged with determining if the three functions could be assigned to an “enterprise organization.” It concluded that the answer was clearly “yes.” While the responsible agency would be vested with functions serving the public interest, the organization should have a number of the entrepreneurial characteristics of a business-type activity.

In evaluating the prospects for vesting these three functions in a business-like organization, the panel reviewed the problems that have confronted NOS in carrying them out, considered what remedies there might be for such problems, evaluated the need for public performance of the functions, assessed the applicability of experience with performance driven or performance based organizations in the United States and in other countries, and determined that the performance of the functions could be significantly enhanced by adapting some of the models for such organizations to the unique requirements of NOS.

FINDINGS

The panel found that the marine navigation services of NOS, in particular, had fallen far short of meeting the nation’s requirements for safe and efficient marine transportation. The budget for these services has remained essentially the same in nominal dollars since 1979 while inflation had eroded the agency’s capacity to meet even modest goals for providing current and accurate nautical charts. About 60 percent of NOAA’s nautical charts are based on pre-1940 data collected with obsolete technologies. Two-thirds of tidal predictions are based on data more than 40 years old.

The resulting risk of serious accidents is high. Between 1980 and 1988, tankers in U.S. waters were involved in 468 groundings. The potential consequences for safety of life and property, and for preservation of the environment, are severe. A single oil spill resulting from an out-of-date chart could cause damage exceeding the costs of the nautical charting program for a decade or more.

The panel determined that current statutory and administration policies calling for funding data acquisition services from general tax revenues assured that these functions could not become self-sustaining. Accordingly, there was not a basis for assigning the functions to a government corporation. The panel also concluded that the public interest requires that basic responsibility for the three functions remain in the government.

Under current interpretations of cost-recovery authority, NOS receipts from sales of nautical charts and other geodetic and navigation services amount to only about eight percent of its direct appropriations for the three functions included in this study. And, with a few minor exceptions, the revenues are not returned to NOS for subsequent use.

In order to make it possible to provide marine navigation and geodesy services on a more business-like basis, the panel turned its attention to experiences with Performance Based Organizations (PBO). These are government organizations that are set up in such a way as to capture as many of the incentives and efficiencies of private firms as are appropriate for a public agency.

Although criteria for establishing PBOs under development by the National Performance Review and the Office of Management and Budget (OMB) do not include a requirement that a PBO raise funds to support all or part of its activities, the panel believes that such a requirement is a significant, probably essential, characteristic of a PBO. That is because the objective of transforming a government agency into a performance driven organization cannot be achieved fully without changing the incentives, motivations and, indeed, the culture of the agency.

CONCLUSION

The panel has concluded that nautical charting and geodesy functions have a clear, operational mission, and customer-service characteristics that are quite suitable for conduct by a PBO. Performance measures could be developed that would be included in a “framework agreement” for the PBO; in a performance agreement with its chief executive officer (CEO); and in performance agreements between the CEO and the heads of various activities. Appropriate waivers of statutory restrictions concerning personnel, procurement and financial management would equip the PBO to perform in a business-like manner. The result should be an organization that is entrepreneurial, customer-focused and cost-conscious.

RECOMMENDATIONS

The panel is making 20 recommendations, of which the most significant are summarized below.

The Academy panel recommends that the PBO for nautical charting and geodesy have the following characteristics:

- a clear operational mission, with policy responsibilities vested in its parent agency
- a four-year “framework agreement” with annual, measurable performance goals
- a chief executive appointed for a four-year term on the basis of qualifications, held accountable for performance, and paid at market rates

The PBO should have the ability and incentives to raise funds to cover a significant portion of its expenses, and to operate efficiently and effectively.

Therefore, the Academy panel also recommends:

- expansion of the scope of activities that are subject to cost-reimbursement
- copyright and trademark or seal protection rights for the PBO’s products
- receipts from sales or fees to be deposited in a revolving fund
- appropriations, whether from relevant trust funds or from general revenues, to be made without fiscal year limitation
- flexibility in personnel, procurement and financial administration

The panel was asked to exclude aeronautical charting from its study because DOC had determined that this function should be transferred to the Federal Aviation Administration (FAA). During the course of the study, OMB asked the inspectors general of DOC and the Department of Transportation (DOT) to make a joint study of this proposed transfer.

Because of the possible transfer of aeronautical charting functions; the persistence of congressional proposals to dissolve DOC or to relocate nautical charting and geodesy functions; and the fact that many tidal predictions and nautical charts are not current or accurate; the panel determined that it must evaluate whether navigation services, especially, should remain in NOAA or be lodged in another agency. It considered alternative locations, such as DOT, a new independent agency, the Department of Defense or the Department of the Interior.

The panel’s recommendations for creating a PBO are not dependent on its conclusion regarding where the PBO might best be located. The panel believes that organizational location, alone, will not determine the success or failure of the PBO. The conditions for success include a coherent mission, a clear charter, sufficient autonomy, strong leadership, a dedicated work force and a commitment to customer service. With all of those, and vigorous support from its parent agency in obtaining the needed resources, it should succeed wherever it is housed.

In view of the years of relative neglect of geodesy and marine navigation functions in their current organizational home, where their mission is not vital to other programs of NOAA or DOC, the panel has concluded that transfer to another agency is desirable. It recommends transfer to DOT because it believes that the prospects for needed support for the programs of the PBO are much greater there, where the PBO’s mission would strongly complement the other transportation programs of that department. This conclusion assumes that aeronautical charting would be moved to DOT (rather than directly to FAA).

The panel understands that such a transfer is not certain to occur.

Many of the panel's recommendations require action by Congress. But there is no reason to stand still until legislation is enacted. The panel hopes that DOC, NOAA, NOS and OMB will promptly initiate action to plan for establishing a PBO for nautical charting and geodesy, and to take such steps to implement the reform as are possible within existing statutory authority.

CHAPTER

1

Project Scope and Goals

The National Academy of Public Administration (NAPA) was requested by the National Ocean Service (NOS) of the National Oceanic and Atmospheric Administration (NOAA) to assess whether nautical charting and geodesy functions were suitable for assignment to a wholly-owned government corporation. The Academy asked two Senior Fellows to examine the issue. They determined that a government corporation was not appropriate for performance of the functions, principally because they did not meet a key criterion for corporate status: being self-sufficient on the basis of revenues raised, or at least having the prospect of becoming nearly self-sufficient. NOS then asked for a more formal study to see if the same functions could be assigned to an “enterprise organization.”

The Academy was also asked to consider changes in human resource management, including the status of the NOAA Corps. The panel did not conduct a further review of the need for a commissioned officer corps, as the Department of Commerce (DOC) and the administration had already decided to convert NOAA Corps members into civilian employees (although this will require legislative action, which is not assured). The panel did, however, consider the issues involved in this proposed merging of the officer corps with NOAA’s body of civilian employees.

Among the NOS functions **outside** the scope of this study are:

- Aeronautical charting. The Office of Management and Budget (OMB) has consigned analysis of the appropriate location for this function to a joint study that is being undertaken by the inspectors general of DOC and the Department of Transportation.
- The status of the NOAA fleet. Both Congress and the administration are continuing to review issues connected with the fleet. The panel did, however, consider the implications for the functions being studied of the various options regarding the fleet.

GOALS

NOS asked the panel to make specific recommendations about how the conduct of nautical charting and geodesy functions might be enhanced by the establishment of an enterprise organization. In arriving at these recommendations, the panel understood that such an organization must have many of the characteristics of a private business: it must be customer-oriented, motivated to enhance products and services as well as to control costs, and led by individuals with a stake in the achievement of its goals. But it must also be fully responsive to its public service requirements.

In framing its recommendations, the panel considered the experience with enterprise organizations in this country and around the world, reviewed proposals under development in the administration and in Congress, and added its own ideas. The panel agreed upon the following goals and objectives, against which its recommendations should be measured. We recognize that some of these goals may compete with others; but that is not unusual for public sector programs. Policy makers must often strive to optimize across a number of competing goals, rather than to optimize for each goal independently. The enterprise organization should:

- be limited to functions necessary to serve the public interest
- perform those functions directly only if they cannot be performed as well or better by the private sector
- be empowered to retain the revenues it raises and apply them to financing its programs
- have adequate funding for both its ongoing operations and its capital investments
- have performance incentives to curtail costs and enhance services to its customers, both governmental and private
- have the capacity to manage its resources effectively (for example, through flexible budget, personnel, and contracting authority)
- be capable of exploiting technological opportunities in a timely manner
- be accountable to the administration and Congress for achieving measurable objectives
- not compete unnecessarily or unfairly with the private sector
- charge full costs for the relevant products or services to customers receiving special benefits

CHAPTER 2

Statement of the Problem

The principal NOS functions addressed in this study are developing and maintaining the National Geodetic Reference System (NGRS), and providing marine navigation information, including nautical charts and tide and current predictions for U.S. waters.

As with most federal programs in the current resource-constrained environment, NOS could better meet the needs of its NGRS customers in a more complete or timely fashion if it were given more resources. But NOS does not appear to have any problems with the NGRS that, in themselves, create a need for restructuring.

The situation regarding nautical charting, however, stands in sharp contrast. Simply stated, the objective of providing the information needed for safe navigation is not being accomplished. Charts are neither current nor accurate. More specifically:

- Nautical charts are not updated and reissued as frequently as customers desire.
- Even when reissued, charts often continue to use data from old surveys conducted with outdated technology.
- Charts are not produced with state-of-the-art digital technology, as needed by NOS' customers in the Department of Defense, and as international agreements now require.
- Charts for some navigable waters have never been prepared, thus failing to meet the needs of some recreational boaters.
- Many tidal gauges are antiquated, expensive to use and repair, and tidal current predictions have become so out of date that some have been withdrawn, leaving both recreational and commercial customers unserved.

Equally important, and true to some degree for geodesy as well as for nautical charting, NOS is hard-pressed to deliver the new products and services made possible by computer technology and by the Global Positioning System (GPS).¹

¹ GPS is a system of twenty-four satellites broadcasting signals to earth. With signals from as few as four of these satellites, it is possible to determine one's position, time, and velocity accurately in three dimensions. With the addition of ground reference stations, one's position can be known to within a few meters.

This chapter provides a description of the context, circumstances and details of these deficiencies.

REQUIREMENTS FOR SAFE NAVIGATION

A cogent statement of the problems confronting U.S. navigation interests is contained in a 1995 DOC publication, *Safe Passage Into The 21st Century*.² An excerpt from this statement appears in the text box below. While the panel did not independently verify the existence of the problems to which the statement alludes, those interviewed in our study, both in and out of the government, confirmed that these problems do exist and are cause for concern. Accordingly, the panel finds this situation to be sobering.

Domestic laws and international agreements require that vessels carry charts to ensure safe navigation in U.S. waters. Vessels larger than 1600 tons are required by U.S. Coast Guard regulations to carry the most recent charts, together with all officially distributed updates. Many commercial fishing vessels and boats carrying six or more passengers for hire are also required to carry charts.³ Recreational boaters are an increasingly important user group, although their use of NOS charts is optional; the number of recreational boaters in the United States has doubled since 1970 to an estimated 17 million or more. The U.S. military is also a major user of NOS charts. In recent years, almost 40 percent of NOS' production of 1.4 million charts has been purchased by the Defense Mapping Agency (DMA).

The importance of U.S. maritime commerce underscores the significance of NOS' responsibility to make navigation safe. For example, 98 percent of the nation's foreign trade tonnage is water borne, with a value of about \$500 billion; and one out of six U.S. manufacturing jobs is linked to exports. Thirty-three percent of the total U.S. grain crop is exported by ship.

Further, more than half of today's marine cargo is oil or hazardous material; this makes the nation's coastal areas vulnerable to disastrous spills. The maritime shipping industry is constructing larger and larger vessels, with the potential for greater environmental damage when an accident occurs. And marine accidents **will** occur; there are nearly 3,500 each year. According to the Natural Resources Defense Council, between 1980 and 1988, tankers in U.S. waters were involved in 468 groundings, as well as 371 collisions, 97 ramming, 55 fires and explosions, and 95 deaths.⁴

Currency

² *Safe Passage Into The 21st Century*, Department of Commerce, August 1995, p. 2.

³ Various sections of 46 CFR require carriage of charts by miscellaneous vessels smaller than 1600 tons.

⁴ *No Safe Harbor: Tanker Safety in America's Ports*, 1990, p. 2.

**From: Safe Passage Into The 21st Century,
Commerce Department, August 1995, p. 2.**

Our nation's waters may not be as safe as most Americans think they are. In and surrounding many of our busiest ports, uncharted wrecks and obstructions silently wait to be discovered by hapless mariners.

U.S. Maritime laws and international agreements require our government to provide charts and related information "adequate to ensure safe navigation in U.S. waters." Yet, U.S. coastal waters have never been completely surveyed, and about 60 percent of NOAA's nautical charts are based on pre-1940 data collected with obsolete technologies. Tidal predictions for many locations are also unreliable: two-thirds are based on data over 40 years old, another 10 percent are over sixty years old, and a few even date from the turn of the century. And because dredging and filling change circulation patterns, even recently published data for some of our major

All of this emphasizes the need for up-to-date, accurate marine charts. Yet NOAA itself has stated that "Under the current system, [we are] barely treading water."⁵ NOS has set a goal of 400 new chart editions per year (out of the 1,000 charts that it maintains), but was able to produce only 250 last year. Because of the lag in preparing new editions, a large number of corrections from such sources as the Coast Guard's Local Notice To Mariners must be manually added by customers to keep their charts current. Formerly, some 30 changes were made, on average, before a new edition came out. Now the number of changes can be in the hundreds. This further draws out chart preparation time. As a result, more users are forced to rely on increasingly out-of-date charts.

Accuracy

Potentially more dangerous than the growing lag time for new chart editions are the inaccuracies in many of the charts that are produced. New chart editions may show depth and ocean floor information based on hydrographic surveys made 50 or more years ago. In fact, U.S. coastal waters have never been completely surveyed. NOAA has stated that about 60 percent of its charts are based on pre-1940 data collected with obsolete technologies that were able to chart only a fraction of the bottom, and with less accuracy than is now possible.⁶ In the time since these data were collected, ships have doubled in length, width, and draft, while seagoing commerce has tripled.

In carrying out its responsibility for collecting data on tides and currents, NOS is trying to improve the existing network of old and obsolete tidal gauges. The larger size of today's commercial ships is increasing the demand for real-time tide and current data. Tidal current prediction charts for several ports, including New York and San Francisco, have been withdrawn because their accuracy had deteriorated to a potentially dangerous level. Tide

⁵ Safe Passage ... Op. cit., p.2.

⁶ Ibid., p.2.

and tidal current tables for Galveston Bay, which carries large volumes of hazardous materials, may be off by as much as two hours.⁷

OBSTACLES TO ADDRESSING PROBLEMS

The problems with currency and accuracy outlined above represent significant challenges to NOS, and significant risks to marine navigation. A wide range of “stakeholders” have an interest in accurate charts and related data: commercial transport, the military, recreational boaters, fishing fleets, and non-navigation users in areas such as coastal land development, conservation, and coastal zone planning. Users of geodetic data, likewise, need accurate and current data, easily accessible with the latest technology.

However, NOS's ability to address the concerns raised above has been hampered by a number of technological, administrative, and funding factors. Some of these are unique to NOS, while some are problems that face a wide range of government agencies and departments in an era of cutbacks and downsizing.

Requirements for Spatial Reference

The impact of Global Positioning System satellite navigational technology on the classic geodetic reference methods has been substantial. However, accurate and updated reference points are still needed. For example, a pilot using GPS could not safely land a plane in zero or low visibility without a high degree of confidence in the location of runways, buildings, and other obstructions. Similarly, someone navigating a ship with the aid of GPS has an even greater need for accurate information on the location of shorelines, navigational aids, and hazards.

Technology Lag

NOS has sought to keep abreast of technological developments, but it has not been given funding to acquire modern equipment. This results, in part, from the fact that NOS has not put forward a comprehensive modernization plan that could compete successfully with the large investment demands of the National Weather Service, satellites, and fleet modernization.

NOAA believes that the three ships currently used for hydrographic surveying are in good enough repair to serve for another decade. However, assuming this fleet survives in the face of proposals by the inspector general of DOC and some congressional committees to terminate it on grounds that it is not cost-effective, modest investments in on-board systems will be required to stay current with the state of the art. There is also some concern that NOS invests inadequately in research and development.

Funding

Because NOS functions have been given low priority within NOAA in the past, some of its personnel believe that their importance is not appreciated. Users of NOS products have characterized NOS as “an orphan” in the competition for resources in NOAA and DOC. Some of those interviewed suggested that this may be because NOAA regards itself as a

⁷ Ibid., p.5.

science agency, and most NOS programs are not viewed as science. Another possible explanation is that NOS functions are not as visible, popular, or glamorous as NOAA's weather and satellite programs. Moreover, it appears that there has been little pressure from constituent groups or Congress for increased funding. Indeed, the panel was informed that the Under Secretary for Oceans and Atmosphere has told NOS customers that he would probably propose more funds for NOS programs if there were more evident constituent or congressional concern.

Appropriations for nautical charting and geodesy have remained relatively level for years, but inflation has eaten away at NOS' ability to do its job. Between FY 1979 and FY 1995, effective funding (in 1994 dollars) dropped by almost 50 percent. At the same time, new chart production has dropped from 341 to about 250 per year, and "days at sea," an approximate measure of survey activity, has dropped from almost 1500 days to about 900 days per year. Despite the effective loss of half of its resources to inflation, NOS' chart production declined by only 27 percent.

Table 2-1 below shows appropriations for nautical charting and geodesy since 1990. Other agencies with mapping and charting functions have fared better than NOS. For example, DMA funding increased by 67 percent from 1984 to 1994 (not adjusted for inflation), and U.S. Geological Survey funding increased by 40 percent in the same period.

In addition to limitations stemming from insufficient appropriated funds, NOS is not allowed to retain revenues from the sale of its nautical charts. Under existing law (P.L. 99-

TABLE 2-1: APPROPRIATIONS FOR CHARTING AND

	1990	1991	1992	1993	1994	1995	1996	1997 Budget
▪ Mapping and Charting*	\$29.5	\$31.7	\$32.3	\$31.2	\$28.5	\$29.1	\$36.5	\$38.6
▪ Geodesy	18.0	18.1	18.6	18.0	19.7	20.7	20.2	20.3
Total	\$47.5	\$49.8	\$50.9	\$49.2	\$48.2	\$49.8	\$56.7*	

*Note: NOAA's survey ships and aircraft, as well as tide and current observations and predictions, are funded separately. Their appropriations have declined sharply, so that the apparent increase for FY 1996 and 1997 for mapping, charting and geodesy has been offset, and the total program continues to erode with inflation. The mapping and charting appropriations include aeronautical charting (currently about \$13 million), which is outside the scope of this study.

272, enacted in 1986), receipts from the sale of nautical charts are deposited to "the miscellaneous receipts fund of the United States Treasury" (44 USC 1307). Thus, there is little incentive for NOS to look for ways of increasing these revenues.

The statute also indirectly sets a cap on how much may be charged for these charts by prohibiting the inclusion of the costs of data acquisition in the price calculations. There is also a statutory impediment to NOS' revenue-raising potential, since the United States, unlike other nations, does not allow copyrights on government documents, including nautical

charts. Thus, others are free to copy NOS' charts, and to copyright and sell the copies they make.

But even if revenues could be enhanced and retained, the revenues generated by nautical chart sales and other income would be inadequate to make nautical charting and geodesy services self-sustaining. With about \$6.5 million from sales to the public⁸ and payments from other sources of about \$15 million — primarily from DMA for data management and compilation of nautical charts — revenues fall far short of the \$94 million spent annually to finance NOS nautical charting and geodesy services (see Table 6-1 on page 38).

The greatest part of these expenditures is incurred in the performance of NOS' data acquisition function which, under current statutory policies must be performed at public expense and cannot be covered by charges or fees. However, fees currently charged constitute a substantial percentage of the costs **that are allowed** to be charged to users.

DMA has notified NOS of its intention to “zero out” its contribution to the funding of data management and compilation by FY 1998. This would eliminate funding for 118 personnel within NOS, or about 15 percent of the total employment in nautical charting and geodesy.

Personnel

The current administration has moved rapidly to delegate more personnel authority and flexibility to departments and agencies. Most departments and agencies, however, have been slow to redelegate such authority to their subordinate units. Appendix A reviews the personnel problems faced by NOS, discusses what is required for managers to operate more effectively, and assesses whether such requirements could be met without new legislation.

NOS managers report that they have experienced problems with hiring, position classification, disciplinary actions, terminations, reassignments, reorganization and generally cumbersome, tedious and process-oriented personnel policies and practices. They would greatly prefer a more mission-oriented personnel management regime.

Procurement

Procurement reform legislation has been enacted by Congress, but implementation has been slow. Contracting could be accomplished more quickly, and more cost-effectively if NOS were authorized, as the Federal Aviation Administration has been, to bypass lengthy and labor-intensive procurement processes, with their elaborate appeal provisions. Although NOS nautical charting and geodesy programs have not extensively used contractors, one example might serve to illustrate the potential for problems in this area: a \$1.2 million procurement contract for a shallow water multibeam survey took some 15 months from inception to contract award in 1993-94. It is also significant that NOS has chosen to use the U.S. Army Corps of Engineers as a contracting agency because it employs a more cost-effective negotiated procurement process under legislation that, until

⁸ About another \$1 million comes from chart sales to DMA, but these receipts are retained in the Aeronautical Charting Division for costs of printing. DMA has made separate contributions for data management and compilation.

recently, was not available to NOS. (See discussion of the Brooks Act on page 32.)

Leadership

Until a few years ago, NOS suffered from rapid turnover in all its senior positions, which were held by political appointees. The short tenure of NOS leaders may partly explain why it fell so far behind in its efforts to maintain current and accurate charts. Under constantly changing leadership, it is difficult to develop and implement long-range plans, which often are redone with each new incumbent. The current leaders, now almost all career officials, have made some modest progress in gaining attention and support from DOC leaders. However, except for an appropriations increase by Congress last year, there is little evidence of a reversal in the decline in NOS' capacity to maintain current and accurate nautical charts.

The NOAA Corps and NOAA Fleet

NOS does not directly control most of the hydrographic survey vessels, but depends on the NOAA fleet and NOAA Corps officers. This aging fleet is badly in need of modernization or replacement, but Congress has been unwilling to fund more than a small portion of the administration's previous requests for upgrading the fleet. It appears that Congress may be opposed to major replacement investments, although the Senate may be more inclined than the House to preserve a limited NOAA fleet.

For NOS to make progress in its hydrographic survey program, it will have to do more contracting with the private sector. Indeed, for FY 1996, NOS agreed to use two fewer NOAA hydrographic ships so that it might use the funds thus saved to engage private sector firms. These funds, however, were not initially transferred to NOS, which therefore had to find other ways to pay for private contracts. The funds have recently been restored in part.

CHAPTER

3

History and Operations

This chapter traces the history and organizational evolution of the geodetic and nautical charting functions of the National Ocean Service. It outlines NOS' current statutory authority underlying the programs and describes the agency's activities in carrying out its geodesy, nautical charting, and tides and currents responsibilities.

HISTORY

Geodetic surveying and nautical charting date back to the early 1800s. The young United States consisted of some interior territory and 16 states along the eastern seaboard. Maritime commerce was absolutely essential for both foreign trade — upon which the expansion of the national economy depended — and the development of the nation's natural resources.⁹ A lack of nautical charts made navigation dangerous in the unknown waters along the coasts and in the harbors. Shipwrecks were common, insurance rates high, and the prices of shipped goods correspondingly high.

Thomas Jefferson, among others, saw the need for comprehensive, reliable nautical charts, and he believed the government should be responsible for producing them. On February 10, 1807, Congress authorized President Jefferson:

... to cause a survey to be taken of the coasts of the United States, in which shall be designated the islands and shoals and places of anchorage

Although begun in 1807, the coast survey function did not become an ongoing operation until the 1830s. The first superintendent, Ferdinand Hassler (who was a geodesist):

... forged a union of applied and theoretical science through a precise measurement of lines and angles and a rigorous search for errors. He was solicitous about training his staff so that there would be a uniform practice in mapmaking, and he initiated studies in such affiliated subjects as tides, currents, and magnetism.¹⁰

⁹ Historical material adapted from: Nautical Chart Manual (Draft 2) National Ocean Service, July 12, 1988 and U.S. Coast Survey vs. Naval Hydrographic Office, Thomas G. Manning, The University of Alabama Press, 1988.

¹⁰ Manning, Op.cit. p.1.

The first U.S. government-produced nautical chart was a black and white print of Bridgeport Harbor, Connecticut, made in 1835 from a stone engraving. Acquisition of a copperplate printing press in 1842 enabled the Coast Survey to publish a chart of New York harbor with finer definition than was possible from a stone engraving.

Many nautical products and services now offered by NOS were begun in the early days of its predecessor agencies. For example, the first U.S. Coast Pilot was published in 1875 after the government purchased the copyright and stereotype plates for the Coast Pilots, commercially produced by the Blunt Company. In the post-Civil War years, the agency became a leader in the theory and mechanics of tidal forecasting.

During this period, much of the Survey's staff focused primarily upon geodesy.¹¹ The division of the land into a system of measured or computed lines, observed angles and directions, and computed or astronomically determined geographical points and directions constituted the science of geodetic surveying, and underlay the topographic and hydrographic work of the Coast Survey.

Topography was the other major focus of the Survey staff. In the post-Civil War period, topographers worked in Maine, along the Gulf from Florida to Texas, and on the west coast into southeastern Alaska. The ultimate goal was a finished chart covering undersea and coastline topography. By the end of the century, the Coast Survey scientists had constructed some 500 charts.

In 1866, Congress created the Hydrographic Office in the Navy Department. Originally, it flourished as a maritime publishing organization, producing new and revised ocean charts, including reproductions of charts from the British government. Eventually, as its hydrographic capability became established, it found itself in conflict with the Coast Survey over areas of charting responsibility. (See Chapter Six for a discussion of a newly-emerging conflict of roles between the Department of Defense and NOS.)

For the next three decades, the Navy's supporters in the Congress made several attempts to transfer the Coast Survey to the Navy Hydrographic Office. Interestingly, however, not all the naval surveying contingent worked for the Navy itself. The Department of the Navy assigned one or two score officers and several hundred enlisted men to perform oceanographic research with the Coast Survey. These naval forces constituted the hydrographic parties of the Coast Survey.

Efforts at consolidation ended in the congressional session of 1900 when the Navy's advocates were defeated. Perhaps in response, the Navy ended its practice of assigning Navy personnel to the Coast Survey. In December 1900, for the first time in its history, the Coast Survey was a completely civilian organization.

Since its beginning, the Coast Survey had been part of the Department of the Treasury. Many of those supporting a move to the Department of the Navy believed that Treasury was a poor location. This concern was addressed with the founding of the Department of

¹¹Ibid. p. 4-7.

Commerce and Labor in 1903 and the transfer of the Coast Survey to the new department. It stayed with DOC when Commerce and Labor were split in 1913.

In order to prevent presumed duplication in hydrographic activities, President Hoover issued a reorganization order to move Navy's Hydrographic Office to the Coast Survey late in 1932. However, a Democratic Congress refused to approve this reorganization in January 1933.

During World War I, a new feature of the Coast Survey was established. In a move to improve the pay and benefits of the Coast Survey scientists, the Personnel Act of 1917 authorized the President to appoint field officers, who were designated as hydrographic or geodetic engineers. The act also made the Coast Survey one of the six commissioned services of the government, allowing its engineers serving with the military to rank as lieutenant, captain, or colonel, and to receive the corresponding salaries. After the war, Congress agreed to extend and continue this practice in the peacetime Coast Survey. This uniformed service was the forerunner of the current NOAA Corps. In 1937, the director of the Coast Survey received the title, rank and salary of rear admiral — the same as bureau chiefs in the Navy Department.

The original Coast Survey title and organizational placement have changed many times over the years. In 1878, the Coast Survey was renamed the Coast and Geodetic Survey. Along with the Weather Bureau of DOC, it became a part of the Environmental Science Services Administration (ESSA) in July, 1965. ESSA was abolished by Reorganization Plan Number 4 of 1970,¹² which created NOAA. At that time, the U.S. Lake Survey, created in 1841 to conduct surveys and produce nautical charts of the Great Lakes and connecting waterways, was transferred to the National Ocean Survey from the Corps of Engineers. In December 1970, the Coast and Geodetic Survey was renamed the National Ocean Survey by order of the acting Assistant Administrator of NOAA.¹³

Since 1972, defense mapping has been the responsibility of DMA. However, the Navy still conducts a limited number of hydrographic surveys.

The National Ocean Survey was renamed the National Ocean Service by order of the Administrator of NOAA on December 1, 1982. In the early 1990s, both the Coast Survey and the National Geodetic Survey (NGS) became parts of the reconstituted Coast and Geodetic Survey (within the National Ocean Service). However, the Coast and Geodetic Survey was once again disestablished in 1995, and the Coast Survey and NGS now report directly to the NOAA Assistant Administrator for Ocean Services and Coastal Zone Management — the head of NOS.

¹²5 USC App.

¹³35 F.R. 19249, December 19, 1970.

CURRENT STATUTORY FRAMEWORK

Title 33 of the U.S. Code¹⁴ provides that:

To provide charts and related information for the safe navigation of marine and air commerce and to provide basic data for engineering and scientific purposes and for other commercial and industrial needs the Secretary of Commerce is authorized to conduct the following activities:”

The activities listed in the statute include hydrographic, topographic and geodetic control surveys, and tide and current observations.

How NOS Navigation Service Functions Are Carried Out

The goal of NOS in NOAA’s strategic plan is to “provide safe navigation.” The objectives of this goal are to:

- Build, maintain and deliver a digital nautical charting database to underpin new electronic navigational systems which integrate satellite positioning, tidal heights and currents, radars and sonars, and navigational aids.
- Update nautical surveys of the Nation’s coastlines and coastal ocean areas using full-bottom coverage technologies.
- Install measurement and communication systems to provide mariners with real-time observations and forecasts of water levels, tides and currents, and weather conditions in ports.
- Transform the obsolete geodetic reference frame into a GPS-based system of monumented marks, and continuously-operating reference stations to support the digital revolution in mapping, charting and surveying.

The pursuit of this goal is accomplished by activities described below.

Geodesy

The role of the NGS has been to establish, develop, and maintain the NGRS, which serves as a common base of reference for latitude, longitude, height, scale, orientation, and gravity measurements throughout the United States. This is the framework for a multitude of surveying, mapping, and construction projects occurring every day. As part of its NGRS responsibilities, NGS conducts research in all aspects of geodetic science, including studies of crustal motion, gravity, polar motion, earth and ocean tides, and irregularities in the earth’s orbit.

In the past, NGS and its predecessors maintained the NGRS as a system of monumented control points. The need to expand and refine this system has substantially passed with the advent of new technologies, particularly the GPS satellite technology. NGS’ focus is now on improving the accuracy and accessibility of a much smaller set of monuments,

¹⁴33 USC 883a.

complemented with an active reference system called the Continuously Operating Reference Stations (CORS). Using new technology, the NGS is now establishing programs to supply users with highly accurate, time-dependent, spatial reference information. This evolving framework is known as the National Spatial Reference System (NSRS). However, state governments do continue to maintain and extend the monument system, since many “old hands” prefer to use the older methods, dependent on the monuments.

Nautical Charting

NOS’ statutory authority to produce nautical charts for U.S. waters makes it responsible for charting some 95,000 miles of coastline and 3.5 million square nautical miles of oceans. In addition to the marine community, NOS’ customers include those involved in coastal land development, conservation, and coastal zone planning.

The Coast Survey of NOS currently maintains about 1,000 paper nautical charts of U.S. shorelines, coastal waters, and ports, although many are badly out of date. In addition to nautical charts, the Coast Survey produces and maintains more than 400 bathymetric charts, nine coast pilots, and numerous supporting publications, including tide and current data.

NOS currently produces very few charts “from scratch.” As with hydrographic offices around the world, the bulk of its activity consists in updating existing charts. The basic data for the charts are compiled from hydrological surveys of shorelines and coastal waters, many of which were conducted years or even decades ago. Natural changes, deliberate waterway modification, accumulation of obstructions, changes in traffic patterns, improvements in technology, and need to exploit smaller draft margins necessitate ongoing survey efforts.

Other data on changes in the coastal areas flow to NOS from a wide variety of sources. Most come from the Coast Guard’s Local Notice to Mariners and from the Corps of Engineers. DMA also disseminates a Notice to Mariners, which includes a subset of the Coast Guard data of greatest importance to deep-draft shipping. Charts aboard large vessels are required by Coast Guard regulation to be current with all changes included in DMA’s Notice to Mariners. The Coast Survey strives to minimize the need for manual corrections of charts by aiming to issue new editions of 30-40 percent of its inventory of charts annually.

The production staff checks data changes for accuracy before they are accepted. Other new data, such as recent hydrographic survey data on depth and ocean floor mapping, are also entered into the data base. Then, the staff prepares an electronic program from which negatives for the press are created. Finally, a production run is made at the NOS printing facility in the basement of the DOC headquarters building. This facility is operated by the Aeronautical Charting Division of NOS, whose charts constitute the majority of production.

The printed charts are then prepared for shipping and distribution. Most distribution of NOS charts to the public is done under contract with a private firm, the DDD Company, from a facility outside Washington, D.C. The new charts are sold to the public either directly or through a network of private “chart agents.” Distribution of charts to military

agencies and the Coast Guard is handled by DMA, which is the largest purchaser of the charts.

Rapidly changing technology is causing NOS to offer alternatives to the traditional paper charts and to consider creating a digital, nautical data base. This could be used to produce paper charts; or a copy of the data base itself could be sold to users with software that allows the data to be displayed electronically in chart format. At present, all NOS charts are available in raster form. (See “Electronic Chart Systems” on page 24 for a description of types of electronic charts.)

Tides and Currents

An additional function of NOS is the provision of data on tides and currents. Data from a marine chart must be supplemented by information on tides and currents so that ships can maneuver safely. NOS and its predecessors have been producing tables of tides and currents since the last century. This area is also changing with the development of modern technology. The Tides and Currents Tables were formerly produced, printed, and sold by NOS. While the data are still compiled by NOS, printing and distribution of the tables have been completely privatized, and the tables are now published and sold by McGraw-Hill’s International Marine Publishing Division.

The larger size of today’s commercial ships is urgently increasing the demand for real-time tide and current data. Currently, about one-third of the tidal stations in the country operate with a system that requires staff to go to the mechanical tidal gauge station and physically collect gauge measurements, which are recorded every six minutes on tape. Assisted by new technological developments, NOS is moving to replace tide gauges with modern, automated instruments, and to install the Physical Oceanographic Real-Time System (PORTS), which allows ships to access real-time nautical data from a variety of instruments at several locations in ports and harbors. The system is currently installed in San Francisco and partial systems are in place at three other ports. NOS plans to install the system in 15 ports.

CHAPTER 4

The Environment in Which NOS Operates

This chapter provides a more detailed discussion of the NOS organizational placement within NOAA and the Department of Commerce. Included is an outline of related functions in other agencies, as well as the arrangements for mapping coordination and the international agreements which affect the NOS missions. The chapter concludes with sections on the rapid-fire technological changes which are having significant impact on the mapping and geodesy functions, and the business environment in which NOS operates. This latter discussion covers the issues of competition in map production and sales as well as NOS' efforts to meet its customers' needs.

ORGANIZATION OF CHARTING AND GEODETIC FUNCTIONS

Department of Commerce

Nautical charting and geodesy functions have been assigned to NOAA and its predecessor, ESSA, since 1965. In 1995, the organizational unit and title of the Coast and Geodetic Survey were abandoned as part of a NOAA streamlining effort. The Coast Survey and geodetic functions, now separate, both report to the head of NOS, who is an Assistant Administrator of NOAA.

NOAA is the largest single component of DOC, with 1995 budget authority of about \$2 billion — about one half of the department's \$4.0 billion in obligations. NOAA also accounts for more than 14,000, or about 41 percent, of DOC's 36,000 full time equivalent (FTE) personnel. NOS, however, is a relatively small part of NOAA. The NOS functions covered by this study had FY 1995 obligations of \$93.6 million and 781 FTE personnel, including program support provided by the Office of NOAA Corps Operations (ONCO), ship and aircraft operations, and officer and wage-board personnel funded under different accounts.

NOS has five program offices:

- Coast Survey
- National Geodetic Survey

- Aeronautical Charting and Cartography
- Ocean Resources Conservation and Assessment
- Ocean and Coastal Resource Management

Of these, only the first two are within the scope of the panel's study.

The Coast Survey produces nautical charts and related projects. As a result of a planned internal transfer, the Survey will also be responsible for tide and current data. NGS — which administers the National Spatial Reference System (NSRS) covering both land and water, and which includes a Photogrammetry Division — is involved in the production of both aeronautical and marine charts.

Related Functions in Other Agencies

Through an informal agreement with DMA, NOS is responsible for charting U.S. coastal waters and DMA is responsible for maintaining charts of all other coastal areas, generally by securing permission to reproduce other nations' charts. This informal interagency agreement, however, is crumbling (see pages 47-48).

The U.S. Geological Survey (USGS), in the Department of the Interior, makes a variety of maps of the United States. When coastal areas are involved, NOS provides data to USGS. The Corps of Engineers is responsible for maintaining ship channels in U.S. rivers and harbors. This involves dredging and other work that changes the contours of channels used for navigation. The Corps provides survey data and engineering drawings of its projects to NOS for incorporation into charts. Both the Corps and USGS have established geodetic monuments that need to be tied into the NSRS.

Other agencies that have extensive mapping and geodesy-related activities include the Forest Service and the National Resources Conservation Service in the Department of Agriculture; and the Bureau of Land Management, the Fish and Wildlife Service, the Minerals Management Service, and the National Park Service in the Department of the Interior.

Coordination of Mapping Agencies

Coordination of mapping functions was once the responsibility of OMB, but this duty has since 1990 been vested in the Federal Geographic Data Committee (FGDC).¹⁵ It consists of representatives of 14 agencies and is chaired personally by the Secretary of the Interior. It receives staff support from the Geological Survey.

The Committee was given additional leadership responsibilities for development of a coordinated National Spatial Data Infrastructure in 1994.¹⁶ These include promoting standards of accuracy and currency in geodetic data, exchanging information on technological improvements in acquiring geodetic data, and encouraging the federal and nonfederal communities to identify and adopt standards for geodetic data.

¹⁵The Committee was established by OMB Circular A-16 in 1990.

¹⁶Executive Order 12906, April 11, 1994.

NGS is the lead agency responsible for coordinating geodetic data-related activities among federal and nonfederal agencies, and for disseminating information on technological improvements. It chairs the FGDC's Federal Geodetic Control Subcommittee, as well as the GPS Interagency Advisory Council. The Coast Survey chairs FGDC's Bathymetric Subcommittee.

International Agreements

The United States is a party to the International Convention for the Safety of Life at Sea (SOLAS). The contracting nations of the Convention have agreed to follow its decisions, one of which is Regulation 20:

All ships shall carry adequate and up-to-date charts, sailing directions, lists of lights, notices to mariners, tide tables, and all other nautical publications necessary for the intended voyage.

Although this regulation does not directly address the provision of charts by member nations, a requirement to produce charts can be inferred. In order to make that clear, a new regulation is pending. The policies of the SOLAS Convention, which was last held in 1992, can be changed by the International Maritime Organization (IMO), of which the United States is a member. The proposed IMO regulation would require member nations, as far as possible, to:

- Provide for hydrographic surveying adequate to the requirements of safe navigation.
- Prepare and issue official nautical charts, sailing directions, lists of lights, notices to mariners, tide tables, and other nautical publications that address the needs of safe navigation.
- Promulgate notices to mariners in order to keep nautical charts and publications up to date.

This requirement to prepare charts does not set standards for such charts. That is a matter within the jurisdiction of the International Hydrographic Organization (IHO), of which the United States is also a member. While compliance with IHO standards is voluntary, groups like it provide the standards on the basis of which courts generally judge if a nation is living up to its treaty obligations.

The international geodetic framework has been adopted largely by consensus. The need for standardization is growing with dependence on GPS. The Geodetic Reference System of 1980 (GRS 80) was adopted by the International Association of Geodesy. The World Geodetic System of 1984 (WGS 84) and the North American Datum of 1983 (NAD 83) are realizations of GRS 80. NAD 83 is the horizontal datum maintained by the National Spatial Reference System. WGS 84 and NAD 83 are the geodetic reference frames recommended by the IHO. Adoption of NAD 83 for aeronautical charts was mandated by PL 101-508 (Sec. 9102) and it became effective through agreement with Canada on October 15, 1992.

THE POLITICAL ENVIRONMENT

Congress

NOS' difficulty in receiving sufficient funding to maintain and improve its marine navigation and geodetic services has not resulted from appropriations reductions by Congress. Indeed, last year Congress added about \$3 million to the administration's appropriations request. Still, funds allocated for charting and geodesy are inadequate to the task. While Congress cannot be unaware of the risks that out-of-date and inaccurate charts pose to commerce and the environment, it has allowed a steady decline in the ability of NOS to meet even its modest goals.

Authorization jurisdiction in the Senate is vested in the Commerce, Science, and Transportation Committee. In the House, three authorizing committees share jurisdiction: Resources; Science; and Transportation and Infrastructure; with the resources committee asserting primary jurisdiction over marine navigation functions. Authorizing and appropriations committees in both houses insist that NOAA should contract for more, if not all, of its charting activities, with the House committees pushing harder for contracting than the Senate committees.

Interest Groups

Users of NOS products have not traditionally expended much effort lobbying in support of NOS' functions. On the other hand, there has been no outright opposition to continued federal responsibility for these functions, although criticisms of the slow pace of NOS' efforts to increase contracting have been heard — especially from would-be contractors.

The successful push for additional congressional funding last year was spearheaded by coal interests, which were being adversely affected by inadequate charting of ports and approaches. Ships were not able to handle quantities of coal that might have been safely carried, owing to uncertainty about depths and clearances. This effort was supported by other boating interests, including recreational boaters. However, most industry associations with an interest in navigation have not pushed for redress of widely-acknowledged deficiencies in nautical charting, apparently because the various interest groups, while concerned, have also not given this matter high priority.

DOC, OMB, and the President

In the past, NOAA has assigned a low priority to charting and geodesy.¹⁷ Not surprisingly, considering the absence of any significant pressure from user groups and the current budgetary constraints, DOC, OMB, and the President have not chosen to propose increased funding for these functions, although the administration allowed last year's congressional add-on to be included in this year's base. NOS has had to contend with very stringent funding constraints, which have caused it to fall further and further behind in the pursuit of its goals, especially in marine navigation. As noted earlier, it was able to produce only 250 new chart editions in 1995 — far short of its goal of 400. Policy makers in the executive branch (just as those in Congress) have clearly countenanced a growing and, the

¹⁷NOAA's December 1994 list of ten items in priority order (as sent to OMB) placed safe navigation ninth. The 1995 list (for FY 1997) lists safe navigation as fifth of nine items.

panel believes, unacceptable risk to public and environmental safety, and to economical marine transportation.

TECHNOLOGICAL CHANGE

Electronic Charting and Data Dissemination

The charting and mapping world is in the midst of rapid-fire technological change. The electronic chart is rapidly gaining acceptance, raising questions about the kind of electronic data the Coast Survey should be developing, and about the impact of the sale of such electronic charts on the demand for paper charts.

Hydrographic Data Acquisition

There have also been significant changes in methods of gathering and manipulating data. Conventional charting of depths and hazards by single beam radar is being supplemented by side-scan sonar, multibeam echo sounders, airborne laser systems, and satellite-assisted positioning.

Private firms, military departments, and foreign governments are all using technology for nautical charting that NOS has had difficulty acquiring because of resource constraints. After years of research, development, and testing, NOS still has no laser bathymetric system and only one shallow water multibeam system. Private firms, the Corps of Engineers, and the Canadian Hydrographic Service have been able to employ these technologies much more quickly. Provision needs to be made for NOS to acquire appropriate technological capabilities under its new structure, so that it can use and understand such technology itself, rather than simply employing contractors that have it.

Global Positioning System

GPS is a revolutionary system that will affect all mapping efforts, all forms of transportation, and many other aspects of everyday life. NGS has fostered the development of GPS, and its own role is being radically changed by the widespread acceptance of GPS.

Geodetic information

The development of GPS has transformed geodesy. GPS technology is significantly more accurate, more efficient, and more economical than traditional geodetic survey methods. The horizontal component of the U.S. geodetic reference system is now being improved, primarily by using GPS. GPS technology is also used by NGS to monitor crustal motions across the United States.

The advent of GPS has meant a shift of NGS resources from field surveys for monumented points to the development of applications and standards for GPS technology. The NGS estimates that GPS field observations average about one-fifth the cost of traditional surveys.¹⁸ Geodetic control networks are evolving from traditional physical monumentation-based ones to real-time, active control networks.

¹⁸National Geodetic Survey: Its Mission, Vision, and Strategic Goals, Coast and Geodetic Survey, Oct. 1994 p.14.

THE BUSINESS ENVIRONMENT AND COMPETITION

Nautical Charts

Users' needs for nautical charts are expanding and changing. Some form of electronic charts will clearly become the norm for commercial and military vessels, and for upscale recreational vessels. NOS needs to be able to anticipate and meet these changing needs in a timely manner.

Geodesy

Historically, the principal uses of geodesy related to mapping, charting, and surveying. Chief applications involved military, public works, and private property development. GPS and Geographic Information Systems have revolutionized the practice of navigation. Automobiles, airplanes, trucks, trains, ships, and boats now have real-time access to precise positioning data. These systems will also allow major advances in farming by providing precise, optimal locations for crops and fertilizer.

Paper Charts

The total market for charts of U.S. waters is probably in the order of \$30 million.¹⁹ NOS operates, however, in a world where there are many producers of nautical charts.

Competition is most stiff in the recreational boating area, where chart makers take NOS charts and produce a wide variety of versions customized for the recreational market. These "custom" versions range from relatively simple copies of portions of NOS charts to highly sophisticated versions with much data added, including the location of marinas, fueling stations, and other land features. Some chart producers include updates that have not yet made it onto NOS charts. Others add local survey data. Private producers also use waterproofing, conversion into booklets, and different orientations to make their charts attractive to customers. Some, aiming for the fishing market, may add "fish location" information, while others add photogrammetric maps of coastal areas.

Virtually all producers indicate somewhere on their charts that they are "not for navigation," in an attempt to avoid potential liability. Even though some of the advertising for the charts made by these producers compares their prices favorably to those of NOS, the producers interviewed by project staff did not consider themselves in competition with NOAA so much as they considered themselves to be NOS' customers.

There is also competition in the commercial chart area. Some private firms reproduce full-size charts for commercial purposes, and add features such as waterproofing to make them more saleable than NOS products. The greatest competition, however, is not from domestic private chart makers but from foreign governments. The British Admiralty is NOS' biggest competitor; it buys U.S. charts and reproduces them. NOS staff estimates that the Admiralty sells about 100,000 commercial-size nautical charts of U.S. waters per year. The prices are \$24 or more, which would then yield more than \$2.4 million in sales revenues. The government of Canada also sells some charts of U.S. waters. Some users prefer the Canadian charts as being "less cluttered" with data than U.S. charts.

¹⁹See discussion of "market size" in Chapter Six and Appendix B.

DMA plans to begin producing nautical charts of parts of the U.S. coastline, using a different data format from that used by NOS.²⁰ In addition to reducing DMA's own purchases from NOS, this means that NOS could lose some of its other sales, since DMA maps can also be sold to the public.

Electronic Charts

NOS does not currently produce electronic charts for sale. Rather, NOS has entered into a Cooperative Research and Development Agreement (CRADA) under the authority of the Federal Technology Transfer Act (FTTA) with a consortium of firms doing business as BSB Electronic Charts. The CRADA and subsequent licensing agreement provide BSB with an exclusive right to produce raster versions of NOS charts, using electronic data provided by NOAA and technology developed under the CRADA. BSB has been issued a copyright for electronic raster charts it produces under the license granted by NOAA. (See "Electronic Chart Systems" on the following page for a description of electronic chart terms.)

The exclusivity of the agreement was upheld by a recent court decision which allows NOAA to withhold its raster data from other potential competitors for five years after the date of their development.²¹ Depending on the interpretation of the "five year" phrase, that could mean a virtually perpetual exemption from competition, since data change more frequently than that, or it could mean that BSB's competitors will be able to produce raster charts from new electronic data as they become available, once an initial five-year exemption has expired.

The electronic charting industry still is in its infancy and is expected to grow rapidly.²² There is already some competition; for example, there is nothing to prevent any firm that has the required technology from scanning an existing NOS chart into a raster format and marketing it. In fact, at least one firm has done so. However, scanned raster products are reputedly of lesser quality than the official versions produced from basic electronic data. The British Admiralty is also developing its own version of high quality raster charts of U.S. waters and has offered to pay royalties to NOS for permission to do so. Pursuant to existing U.S. policies, NOS indicated that no compensation or permission was required.

²⁰See discussion on p. 48.

²¹U.S. District Court, District of Maine, DeLorme Publishing Co, v NOAA, Judgment, March 12, 1996.

²²See discussion on pp. 42-43.

Electronic Chart Systems

Electronic Chart Systems is a term that encompasses a variety of electronic, nautical navigation systems. Electronic display and information systems (ECDIS) refers to systems that meet the requirements of the IMO as equivalent to paper charts and sufficient to meet the carriage requirements of the SOLAS convention.

Data for electronic chart systems appear in two principal forms: raster and vector.

Raster Charts are digitized versions of paper charts, created by scanning the chart or tracing it with an electronic scribe. The electronic image can be stored, and is viewed on a computer screen or reproduced on paper. The image consists of dots or pixels, much like the text produced by a dot matrix printer. The electronic image cannot be manipulated.

Vector Charts are more abstract representations of chart data. A buoy, for instance, is coded as a buoy, with a geographic location and a set of characteristics. A shoreline is a series of points with appropriate labels. Subsets of vector data can be selected and manipulated as needed. The vector format supports more informed decisions than does raster. It also enables alarms of impending danger to be generated automatically. At this time, ECDIS requires vector data, but it is possible that the IMO will change its regulations to permit use of raster charts.

Hybrid Charts are now being produced that use a combination of raster and vector. A vector overlay can be placed on a raster chart background. The overlay may contain real time data, such as information on tides and currents, that the ship's operator may want to have

Still more market competition comes from products using vector data, which contains information enabling a computer to interpret and manipulate data, rather than merely providing an electronic image of a paper chart. The vector format allows users to block out data they do not wish to use, thereby eliminating data "clutter." A ship's master, for example, might wish to block out all data below a certain depth, and concentrate only on information that is directly useful in a given circumstance. This can be done with vector data but not with raster. A representative of the American Institute of Merchant Shipping offered the opinion that operators of deep sea vessels would prefer vector electronic charts. Vector charts enable content analysis, as well as automatic alarms if, for instance, a ship is headed toward a charted hazard.

IHO has adopted a format for vector data called S-57 or DX-90. DMA, together with other NATO members, has adopted a Vector Product Format, or VPF. Differences about the merits and costs of VPF and raster charts have been a source of dispute between DMA and NOS.

NOS is currently working on hybrid products that provide the data most important to

navigation in vector form, with the background in raster form. Central to NOS' effort is capturing data from original sources, providing accuracy commensurate with GPS. Some of the BSB partners also have developed software which allows a vector overlay on a raster chart and provides other means to manipulate data on raster charts.

The competitive picture in electronic charting is still developing. It is unlikely, however, that NOS and BSB will be unchallenged in this area.

Geodesy

NGS produces a wide range of products and services that provide geodetic information. Examples include: data sheets for all of the United States provided on CD-ROM (\$50 for each group of states); GPS orbital data (\$30); and personal computer software packages (\$30). NGS also offers aerial photographs at various prices (\$9-\$100) depending on size, and type of film. All of the NGS products yielded total sales receipts of about \$375,000 in fiscal year 1995. These receipts are retained for reuse by NGS since the products are considered "special compilations."

NGS geodetic data are currently used by private firms and state and local governments for a wide range of surveying, mapping, and related activities. Unlike the situation in mapping, NGS faces no direct competition in the provision of basic geodetic data. Rather, the challenge for NGS is to educate current and potential users of these data about the advantages of accurate, consistent coordinates made possible by tying into the NSRS and using new GPS-based products and services. A growing base of knowledgeable data users could increase NGS' non-appropriated revenue, which could strengthen its programs.

NGS uses a number of techniques to educate its customers in this area. It carries out a cost-sharing geodetic advisory program with several states. Advisors instruct local surveyors and others on how to use and preserve the NSRS. It also conducts workshops throughout the United States on a variety of geodesy-related topics; these are cooperative ventures involving NGS, professional societies, universities, and state and local organizations. NGS also uses the World Wide Web to make its information accessible, and receives as many as 26,000 inquiries per month.

One NGS product that is subject to competition is aerial photographs, which are also offered by many private firms. In fact, the industry trade group (the Management Association for Private Photogrammetric Surveyors) strongly insists that the private sector is fully capable of undertaking all aspects of photogrammetry under contract.

MEETING DIVERSE CUSTOMER NEEDS

NOS may never be able to meet the perceived needs of all its customers fully, especially in nautical charting. NOS' biggest single customer, DMA, has decided that NOS cannot meet its needs in the nautical charting area. However, DMA will continue to depend upon NOS to make basic charts, of which it plans to buy single copies that it will then convert into its own preferred format. It is unclear to the panel why DMA could not supply NOS with the technology to do the conversion, rather than going into the duplication business. Long term irritation over institutional relationships seems to have entered into the DMA decision-making process.

Some other customers think that NOS is ignoring their needs. For example, recreational boaters believe, probably correctly, that NOS considers commercial shipping to be its primary customer. Ironically, some commercial shipping representatives think NOS is paying too much attention to the recreational community. There are many complaints from chart producers that NOS does not consider them to be customers, and should.

As might be expected, complaints have been made that NOS is not issuing updated charts often enough, and is not including up-to-date data when the revisions are issued. Some users complain about too much information on the charts and suggest that NOS might produce different charts for recreational and commercial use.

NOS is well aware of all of these complaints. It does extensive surveys and makes an effort to respond to correspondence. NOS has taken steps to meet with customers and has conducted outreach sessions with a number of groups, both to find out what was on their minds and to bring them up to date on what NOS was doing. One group contacted by project staff said that they had been unaware of the benefits provided by NOS to its clients until they attended one of these outreach sessions.

Many of these complaints, especially those related to the updating of data, could be addressed with the application of sufficient funds. But the panel believes that the problems should be addressed more broadly, such as by creating new opportunities and incentives, rather than simply by increasing appropriations.

One NOS chart agent, with 25 years of experience dealing with 250 public and private mapping organizations, stated that NOS was the most responsive and efficient of all. The agent said that only one private firm compared favorably with NOS, but its performance had deteriorated badly when it was acquired by a larger publishing company.

With respect to the geodetic services provided by NGS, there appear to be no significant customer relations problems. All user organizations contacted expressed satisfaction with the services rendered. The only complaint expressed was one not within the ability of NGS to correct; namely, that there are too many agencies involved in the positioning area and it often took calls to seven or eight agencies to get necessary control point information.

CHAPTER

5

The Public Interest

This chapter addresses the question of the public good and how this relates to NOS' policies and products. Important administrative elements such as personnel and contracting (including the Brooks Architect-Engineers Act) are reviewed, along with the significant issue of liability. The unique policy of the United States on copyright of government materials and its impact on NOS are set forth, as well as the panel's conclusion that copyright and trademark protection would be appropriate for nautical charts.

THE PUBLIC INTEREST IN NAUTICAL CHARTING AND GEODESY

Public Goods and Nautical Charts

To help answer the question of why the government should be financing the activities examined in this study, the panel found the following definition of a "pure" public good:^{2,3}

A public good is defined as having two major characteristics. The first is that once the public good has been paid for and is available there is no cost for an additional person to use it. The second is that it is impossible or very expensive to prevent anyone from using the public good. There are very few truly "pure" public goods. The best example is national defense and security, where there is a clear need for a central government to provide the service.

These economic characteristics, however, are not the whole story. A government can decide that a good is "public" through legislation. That is, in the interest of pursuing legitimate government ends such as providing for safety or public welfare, a government can opt to provide certain goods and services that may not be textbook public goods. The government may believe that markets have failed or would fail — that is, that the private sector would not offer these goods or services at an appropriate level or at reasonable prices, thus excluding people who the government believes should be served. Inter-city passenger service by AMTRAK offers one example of a service that was previously provided by

^{2,3}See Harvey S. Rosen, *Public Finance*, Richard Irvin, Inc., 1985, p.99.

the private sector, but was taken over by the government because the service was in danger of disappearing.

The creation of public goods through legislation may cause policy problems because these goods and services are not pure public goods as defined in economic terms. Currently, in the United States, there is a trend toward more reliance on the competitive market system and away from government provision of goods and services.

There is a long history in the United States of government involvement in making and providing nautical charts. The U.S. Code states that the Secretary of Commerce is authorized "... to provide charts and related information for the safe navigation of marine and air commerce" Nautical charts are a good example of a good with both public and private characteristics. The general safety of marine transportation is clearly a concern of the government; on the other hand, the private sector would welcome an opportunity to provide charts that meet the needs of some of NOS' commercial, governmental and private customers.

Public or Private?

It is clear that the government should not be seeking full recovery of all costs involved in the preparation of nautical charts, as they do provide general benefits to the public. But a good case can be made that seeking additional cost recovery, beyond that now deemed to be authorized, would be appropriate.

NOS' nautical charting function represents, in part, a government response to the general public's interest in safe and efficient navigation. The public at large also benefits from an accurate geodetic reference system. Moreover, the private sector would have little interest in producing a substantial number, perhaps even a majority, of the 1,000 nautical charts that NOS currently provides, nor for maintaining long-term tide records or circulation data. Similarly, there is no prospect for looking to the private sector to maintain a national geodetic reference system.

Thus, surrendering NOS' charting functions to private firms would create a dilemma for the government concerning what to do with the charts that private firms would not have a commercial incentive to provide. One possibility would be for the government to "regulate" the nautical charting industry by requiring firms to serve areas for which there is no viable market. Thus, they would be forced to cross-subsidize low-volume areas with revenues from the higher-volume areas. This would be difficult to justify to those paying the subsidies.

Alternatively, the government could agree to privatize chart production in those areas where there would be viable business opportunities. It could then focus on producing charts for the uneconomic areas; or it could contract with private firms to produce charts for those areas. However, this could create a situation in which certain areas would be covered by market-priced charts, whereas others would have inexpensive charts provided at government expense.

The Legal Situation

On its face, current legislation merely authorizes, rather than requires, the government to perform nautical charting functions. But, according to NOS, international agreements, the

legislative history of the statutory provisions, and the long history of congressional funding of these activities make nautical charting mandatory. Thus, legislation would be required for the government to abandon its nautical charting responsibilities. And even if enacted, such legislation would likely be ruled invalid because of the supremacy of treaties. If nautical charting were left to private markets and some areas were no longer charted, this would probably violate international agreements. Indeed, it could be argued that the United States is already violating the SOLAS agreement, which requires all ships to have “adequate and up-to-date charts.”

The Federal Interest

A number of government programs could be adversely affected by further deterioration in U.S. nautical charting capacity: preservation of wetlands, wild life, and estuaries; the provision of safe drinking water; and so on. Catastrophic damage, especially from oil or other hazardous material spills, is not only possible but likely if the United States fails to upgrade and maintain the nautical charts needed to enhance marine safety.

The military interest in safe navigation in U.S. waters is also important. As discussed in Chapter Six, there is an unfolding crisis in relations between DMA and NOS. Considering the resource constraints facing military as well as civilian agencies, the panel believes that it is a very bad idea for the two agencies to go their separate ways.

HOW THESE FUNCTIONS CAN BE CARRIED OUT

Direct Government Performance

Project staff asked individuals knowledgeable about chart production what would happen if the data acquisition and compilation function were fully privatized — that is, if the government removed itself completely and left private companies to supply charts based on purely market factors. These individuals agreed that perhaps 40 percent or more of the charts would no longer be produced because market demand for that portion of nautical charts is insufficient. In fact, most of those interviewed in the private chart making and chart distribution sector stated that data acquisition for charting should remain the government’s responsibility.

But even if the responsibility for basic charting functions remains with the government, opportunities exist for privatizing some chart printing and distribution functions, as well as for producing and selling electronic versions of NOS charts. Representatives of private firms interviewed were unanimous in their belief that the printing and distribution of charts should be done by contract, and that such contracting could be undertaken very quickly and efficiently.

The panel believes that a regime in which a significant portion of the data acquisition function is contracted to private firms should be carefully considered by NOS. However, contracting should be a business decision, based on cost-effectiveness, rather than on philosophy. Even if wide-spread contracting is undertaken, the government should retain enough technical competence to plan the program, design contract specifications and performance requirements, evaluate bids, negotiate terms, oversee contract execution, assess performance, and reward or sanction contractors. The government might also need to

retain a limited capacity to do the work itself, in order to assure that it was fully knowledgeable, could meet emergent conditions, and could operate wherever cost-effective contracts proved infeasible.²⁴

Personnel

The paper on personnel issues (Appendix A) suggests steps that need to be taken to improve human resource management in NOS. Additionally, plans need to be completed for converting the NOAA Corps to civilian status and including them in the resource pool. The paper also discusses this subject. The panel's personnel recommendations are in Chapter Seven.

Data Acquisition Platforms and Technology

The status and future of the NOAA fleet remains in doubt. Its fate is beyond the scope of this study, but the panel nevertheless believes that NOS must have more control over whatever government resources are used for the data acquisition functions that remain to be performed by the federal government, whether directly or by contract. One cannot expect an organization to be effective and accountable if it is not responsible for managing the resources required to perform its functions.

The Academy panel recommends that NOS:

- **Work with OMB and Congress to arrange that funding all personnel and ship operations costs in support of the relevant functions, whether contracted or not, be subject to accrual accounting, and that all funding be under the full control of the executive in charge of the program.**

CONTRACTING

Current Status

Historically, all aspects of charting and geodesy, from basic data gathering to database maintenance and chart making, have been done in-house by NOS. However, contracting activity has picked up in recent years. A private contractor is being used for the acquisition of survey data in Long Island Sound. Several smaller surveys are being contracted through the Corps of Engineers, and some photogrammetric survey work on airports is being contracted by NGS, also through the Corps of Engineers.

In part, the move toward contracting has been encouraged by congressional actions. Both the House and Senate appropriations committees, in reporting out FY 1996 NOAA appropriations, have included directives to increase the amount of contracting. House report 104-177, dated July 11, 1995, included the following statement:

The Committee intends that NOAA increase its reliance on contracting with the private sector to conduct mapping and charting activities. An increased reliance on the

²⁴A fuller discussion of the requirements for effective management of contracting can be found in a 1989 report of another Academy panel, *Privatization: The Challenge to Public Management*, NAPA, 1989.

private sector will enable NOAA to decrease its FTE requirements and the need for additional vessels of its own for these purposes. The Committee intends that the entire increase provided will be used to contract with the private sector

An equally direct statement appears in Senate report 104-139, dated September 5, 1995:

The Committee supports efforts to privatize the charting and mapping functions and expects NOAA to rely more on use of contract vessels for these purposes instead of its own fleet.

The panel notes that the Senate committee used the term “privatize” to include contracting. The panel uses the word “privatize” only to refer to cases in which responsibility for a function is handed over completely to private enterprise. When the government retains responsible for the performance of a function, and merely contracts with private industry to carry out that function, the panel uses the terms “contract” or “contracting.”

On the authorizing side, the House Committee on Science, in reporting out the NOAA Authorization Act of 1995, gave NOAA a choice: contract for days at sea, or contract for the data; and no more new vessels or retrofitting in either case. Although this committee does not have legislative jurisdiction over nautical charting and geodesy, the directive is worded so as to cover the whole fleet, not just those ships involved in hydrography for NOS. The congressional consensus on hydrography is that private contractors can do much or all of it. The House committee report states that the only cost effective alternative available to NOAA is the University-National Oceanographic Laboratory Service (UNOLS) and private vessels.²⁵ The panel does not necessarily agree with that conclusion and notes that UNOLS is subsidized both by the federal and state governments and, thus, may be an unfair competitor with private firms.

The Senate authorizing committee would reduce the fleet, but not eliminate it. The Senate view appears to be that NOS should contract only in locations where private capability exists. For example, Senate staff said that it makes sense to contract with private firms for charting functions in the Gulf of Mexico, but not necessarily in Alaska. Thus, while the Senate Committee calls for more contracting, it does not go as far as the House.

Project staff asked survey companies and charts makers about the private sector’s ability to accept this work. The general response was that a number of firms would be ready and able to perform basic survey work within three months after a decision to contract for the work. Private representatives also insisted that, if adequate funds were available, there would indeed be bids for charting in remote areas such as Alaska.

There also appears to be potential for increased contracting in the geodetic and photogrammetry sector. As geodetic measurement shifts from the old monumented system to one relying on CORS, the NGS needs fewer staff for field surveys; field work could be contracted out. In photogrammetry, some work already has been contracted using the Corps of Engineers’ contracting resources. Additional contracts with the private sector that meet NGS standards

²⁵House Report No 104-237, The National Oceanic and Atmospheric Administration Authorization Act of 1995, to accompany H.R. 1815, dated August 8, 1995, p.39.

could be developed. Indeed, industry representatives believe that firms already in the photogrammetry business could undertake all NGS requirements.

The Brooks Act

The Brooks Architect-Engineers Act (40 U.S.C. 541-544) requires the procurement of architect and engineering services by negotiation with the best of three firms — all of which have been judged to be qualified — rather than by competitive bid. NOAA has used the contracting services of the Corps of Engineers on some occasions specifically because Brooks Act authority was being used by the Corps. In the omnibus FY 1996 appropriations act, Congress gave NOS the right to use this authority to purchase nautical charting, photogrammetry, and geodesy services. The language in the appropriations act does not require NOS to use the Brooks Act, but NOS staff believe that the accompanying committee report mandates its use.

Liability Issue

Perhaps of greatest concern to NOS is the issue of liability for chart accuracy when contracting for data acquisition. Generally, private firms have been held to a higher standard of liability (based on harm done without regard to negligence, i.e., strict liability) than government agencies, which may be liable only if negligence is proven.

Some NOS representatives stated that, because a ship might have an accident decades after a survey was done, a contractor would probably be required to obtain insurance that would cover potential liability in perpetuity, in order to protect the government from liability. Such insurance does not exist. Most standard insurance for contractors in this area covers “errors and omissions” only for the year in which the policy was issued. Some form of limited liability, or assumption by the government of the risk, will probably be necessary to maintain contracting as a realistic option. However, this runs contrary to the government’s longstanding policy that contractors bear the risk of liability for their actions or inactions.

The Justice Department issued an opinion on liability in 1985 to the Chairman of the Committee on Merchant Marine and Fisheries. This opinion includes the following three points:

1. The United States retains all legal liability for all NOAA charts whether or not portions of the work have been performed by contractor employees.
2. While the U.S. would be liable to a third party who relies on the charts, the U.S. could seek some form of indemnification from a contractor who was involved in the production process if the contractor’s negligence were the cause of the liability.
3. Justice would recommend that any contract contain either an indemnification provision, a hold-harmless provision, or a requirement to obtain sufficient insurance naming the United States as an insured, so as to protect the United States from any sort of unjustified liabilities.

If agencies are bound by this opinion, it would probably preclude all contracting, since contractors are unlikely to agree to unlimited indemnification. And no “in perpetuity” insurance is available.

One recent contract requires placement of a federal employee on board the survey ship to do on-the-spot quality control, on the theory that this changes the nature of the enterprise from a purely arms-length contract arrangement to one in which the contractor is an agent of the government. The legal sufficiency of this approach from a liability point of view has not been determined. NOS counsel advises that a meeting with Justice on the issue will take place soon.

It is interesting to note how other agencies with mapping and charting functions cope with the threat of liability in contracting. The Corps of Engineers does extensive contracting with only standard errors and omissions insurance protecting its contractors. The Federal Emergency Management Agency's Federal Insurance Administration, which does flood plain mapping, operates in the same fashion. DMA, on the other hand, has legislation which specifically exempts it from any liability related to its navigation aids.^{2 6}

Since NOS will likely be contracting for an increasing portion of its activities — which the panel thinks is desirable — it must deal with this issue. The panel believes it would be in NOS' interest to take a leadership role in addressing such difficulties with contracting and in expanding, whenever cost-justified, its current use of contractors.

Conclusion

The panel concludes that the federal government should retain responsibility for nautical charting and geodesy functions. Although participation by the private sector might be substantially increased through contracts, the panel does not favor privatization of basic nautical charting or geodetic survey functions.

The Academy panel recommends that:

- **Responsibility for nautical charting and geodesy should remain in the federal government and the relevant activities be performed by federal personnel, or by contractors, based upon determinations of what method will be most cost-effective in meeting the public's needs.**
- **NOS be exempted from liability for damages resulting from alleged deficiencies in nautical charts, as has been done for DMA.**

Cooperative Agreements

NOS has some experience with cooperative arrangements, for example, with state marine agencies in identifying hazards, but has little experience with cooperative agreements with private firms. Some complain that NOS does not accept data from the states or from others for purposes of updating and correcting its nautical charts and might enter into such agreements to do so. NOS defends its position on the basis of its liability for errors in the charts. This matter needs to be resolved, and attention should also be given to other perceived obstacles to cooperation with states. Assuming this issue can be resolved, there are opportunities for NOS to engage some states and others in cooperative agreements.

The Academy panel recommends that NOS:

^{2 6}10 USC 2798.

- **Develop cooperative agreements with private firms, providing for cost or revenue sharing.**
- **Develop cooperative agreements with state governments for providing data to be incorporated into NOS charts, and for other purposes.**

POLICIES REGARDING PUBLIC ACCESS TO GOVERNMENT INFORMATION

OMB Circular A-130, Management of Federal Information Resources (50 F.R. 52730), interprets how government information resources should be managed, disseminated, and paid for in accordance with acts of Congress, including the Copyright Act. The circular was originally issued December 24, 1985, to provide a policy framework for federal information resources management. Congress has enacted several laws bearing on the information technology management section of the circular, especially the Paperwork Reduction Act and its amendments (44 U.S.C. Chapter 35) which assigns the Director of OMB responsibility for maintaining a comprehensive set of information resources management policies. OMB has recently been involved in a phased updating of the circular.

Copyright

The Copyright Act (17 USC 105) has long provided that creative works of the federal government cannot be copyrighted, although the government is not “precluded from receiving and holding copyrights transferred to it by assignment, bequest, or otherwise.” The general principle of the ban on government copyrights recognizes that government information is a valuable national resource, and that benefits to society are greater when government information is available in a timely and equitable fashion to all.

The law allows private producers and other countries to copy U.S. nautical charts, add information, copyright the products, and market them in competition with NOS products. An NOS analysis of the copyright issue indicated that changes to the law in this area may be difficult to obtain.²⁷ However, this analysis also noted that an exception granted to the Secretary of Commerce in P.L. 90-396 might be built upon. That exception allows the secretary authority to copyright collections, compilations, and publications of standard reference data. NOS adds considerable value in the compilation of data, a step required before charts can be made. At least one representative of private enterprise stated that it was not the data that should be copyrighted so much as the value added from compilation of the data.

Opinions vary on the utility of copyrights in this area. The panel was advised that the United States is the only country in the world which does not copyright valuable information such as charts. Both Canada and the United Kingdom copyright their charts, and their representatives believe that this aids significantly in their cost recovery efforts. However, despite the Canadian and British experiences, some of those interviewed by project staff saw the copyright as potentially of only marginal benefit to NOS. OMB staff noted that private parties’ right to secure government information under the Freedom of Information Act (FOIA) could undermine the value of the information for sale by the government, and said that such a right does not exist in other countries that copyright nau-

²⁷Internal draft document by A. Heckelman, c. 1987.

tical charts. That is true for the United Kingdom, but Canada has an Access to Information Program that is comparable to the FOIA.

The panel has been advised by staff of the Office of Information and Regulatory Affairs (OIRA) at OMB that OIRA would strongly oppose copyright protection for nautical charts. On the other hand, it is worth noting that one of the House bills to abolish DOC would have given NOAA authority to protect intellectual property. Also, NOS' partner in the CRADA for raster charts, BSB Electronic Charts, has taken out a copyright with NOS' knowledge. Since BSB is a private enterprise that itself adds value to the product, there is no restriction on its ability to copyright.

Trademark

DMA has statutory protection against the use of its name, its initials, its seal, and any imitation of the name or seal without the written permission of the Secretary of Defense.²⁸ DOC legal staff indicate, however, that no special legislation is necessary to receive trademark protection for an agency seal. In fact, a trademark application for the NOAA seal — for both paper and electronic products — was filed on August 31, 1995. The Patent and Trademark Office is expected to approve the application before the end of 1996.

However, OIRA representatives have advised staff that the point of a government trademark is not to restrict use or to raise revenue. Rather, it is a quality control mechanism. This view is reinforced in a September 1995 memorandum from the OMB Director. Nevertheless, the panel believes that copyright or trademark protection presents a number of possibilities, especially when combined with a licensing and royalty arrangement for printing or production of paper or electronic charts.

Conclusion

The panel believes that copyright or trademark protection would be appropriate for nautical charts. However, any additional resulting revenues might be at the expense of existing commercial firms. This would probably increase the political difficulties in gaining an exception from the Copyright Act and related laws and regulations. If NOS is able to obtain either copyright or seal protection, together with the right to charge license fees for the use of its documents, this would likely increase the Service's revenues significantly. Although NOS does not now have, nor is it likely to have, the staff to police violations, experience in other countries suggests that companies paying the fees would provide the "eyes and ears" to inform NOS about those violating license requirements. Copyright or licensing fees might have a major impact on revenues received from sales to the British Admiralty.

The Academy panel recommends that NOAA:

- **Seek copyright protection for nautical charts, and continue to seek trademark protection for the NOAA seal from the Patent and Trademark Office, or from Congress if necessary.**

²⁸10 USC 167, Section 2797.

CHAPTER

6

Financing the Functions

This chapter sets forth the funding levels and sources of existing revenue for NOS. It notes some of the gaps in the accounting data which would need to be filled in order to obtain more accurate program cost data. Included is a discussion of the incentives needed to recover more of the costs of NOS products, as well as the impact of legislation and OMB Circular A-130 on full cost recovery.

The chapter also reviews the rapid growth of electronic charting and its impact on NOS' pricing policies. A major problem for NOS, the announced intent of the Defense Mapping Agency to withdraw important financial support, is discussed. Finally, other possible sources for NOS funding, including trust funds and taxes, are analyzed.

FINANCIAL DIMENSIONS

After deducting overhead charges by DOC and NOAA, net appropriations for NOS nautical charting and geodesy functions in FY 1995 were \$41.1 million. Adding these overhead charges and estimated NOAA Corps costs in support of these functions brings the total of appropriated funds to \$77.9 million. Adding "reimbursements"—funds from other agencies, primarily DMA — brings the grand total to \$93.6 million, supporting 781 personnel. A tabulation of these numbers appears in Table 6-1.

In addition to these resources, NOS nautical activities — primarily sales of charts — bring in about \$6.5 million, all of which is deposited to the miscellaneous receipts of the Treasury, and is not available for use by NOS.

NOS' resources represent a minuscule portion of the billions of DOC dollars and tens of thousands of FTEs. NOAA alone had funding in excess of \$2 billion and more than 14,000 FTEs in FY 1995.

One of the complaints the panel has heard is that NOS is a "stepchild" within NOAA and DOC. Anecdotal evidence supports this contention. Many government agencies have a natural tendency to put small budget items in a low priority category, and NOS is a small

item in the NOAA budget. For whatever reason, safe navigation was very near the bottom of the NOAA priority list in 1994, although it is now fifth of nine.²⁹

TABLE 6-1: FY 1995 FUNDING — NAUTICAL CHARTING, GEODESY, AND RELATED PROGRAMS (\$ millions)

Funding Source	Charting	Observation and Prediction	Geodesy	Surveys	Other	Total
▪ Appropriation to NOS	\$12.6	\$12.8	\$19.7	\$8.7		\$53.8
▪ NOAA Corps				19.7		19.7
▪ NOAA Other					4.3	4.3
▪ Total, Appropriated Funds	12.6	12.8	19.7	28.4	4.3	77.9*
▪ Reimbursements						
▪ DMA	11.5					11.5
▪ Other	0.3	1.1	2.9			
Total	\$24.4	\$13.9	\$22.6	\$28.4	\$4.3	

*Totals may not add due to rounding.

The numbers cited above cannot be used with certainty as to the full cost of nautical and geodesy functions because the NOAA accounting system does not attribute these costs by function. The accounting system does provide figures on appropriated funds and overhead charged to these activities, but does not show the distribution by function of other related costs such as depreciation of major capital assets. A similar problem exists with respect to income received from the sale of nautical charts. The accounting data do not differentiate among the types of charts sold, so forecasts are based on best estimates.

The costs of the uniformed NOAA Corps and fleet and aircraft support attributed to nautical charting and geodesy represent best estimates by knowledgeable staff within NOS. The panel acknowledges these estimates as only an approximate measure of the financial package with which NOS must work. If all of NOAA wishes to operate on a more businesslike basis, a change in the basic accounting procedures to include all relevant costs for each program is needed. But such a change is mandatory for a performance based organization that must raise some of its revenues to pay for the costs of services provided.

Some NOS staff question the size of overhead costs allocated to their functions. Project staff briefly reviewed the basic material on the allocation procedure described by NOAA

²⁹See footnote 17 re: NOAA priority lists on p. 20.

accounting staff, and observed that it results in a substantial charge against appropriated funds. DOC is now conducting a major review of its administrative accounting system, which includes overhead allocation procedures. The panel believes that a reasonable charge should be set as a percentage of appropriated funds, based upon practices in other agencies. A performance driven organization should have some say in how much it is charged for services received. Clearly defined policies and procedures for setting overhead charges would be important if a separate agency is created for the functions, or if they are moved to another department, so that the funds to be transferred with the functions can be fairly determined.

The Academy panel recommends that NOS:

- **In cooperation with NOAA staff, develop modifications in accounting to identify all charges and income properly attributable to nautical charting and geodesy functions.**

Near-Term Budget Projections

In testimony before a congressional committee, the American Pilots Association noted that the budget for nautical charting and ocean tides and current prediction programs has been cut by nearly 50 percent over the last several years.³⁰ In fact, it has remained relatively constant since 1979 in nominal terms but, when adjusted for inflation, it has indeed been reduced by almost half. This is dramatically demonstrated in a recent NOAA publication, which also notes a drop in chart production and in survey ship days-at-sea over the same period.³¹ Despite a \$3 million congressional add-on in FY 1995, funding is unlikely to increase from its current modest levels.

NOS staff advise that official five-year forecasts in the President's budget assume a straight-line projection, which would mean a continuing reduction in NOS' ability to produce up-to-date charts and data. Without some substantive change in either funding or mission, the long-range outlook is for a continued deterioration in the ability of NOS to do its job. In contrast, OMB has advised NOAA that its weather and satellite systems "will be funded" (which means that their needs will be met) and that funding for its environmental programs will be "protected" (that is, from erosion due to inflation). This reinforces the panel's observation that the administration gives lower priority to nautical charting and geodesy functions than to other NOAA programs.

REVENUE OPTIONS

In the discussion of performance based organizations (PBOs) in Chapter Seven, the panel notes that there is no administration requirement that a PBO recover all or any of its costs. However, one goal of this study is to review options for increasing revenue from NOS' charting and geodesy functions, and to consider how those options might be related to performance.

Incentives and Cost Recovery Policies

³⁰Testimony of Captain Jack Sparks, President of the American Pilots Association, before the House Committee on Resources; Subcommittee on Fisheries, Wildlife and Oceans, June 15, 1995.

³¹Safe Passage ... Op. cit., pp. 24-25.

During its interviews with NOS personnel, the project staff repeatedly heard the statement that NOS has no incentive to recover the costs of producing its nautical charts. This is because NOS is not allowed to retain and use revenues from chart sales. NOS is also prohibited from including the costs of data acquisition and processing in its price calculations, which indirectly sets a cap on the amount that may be charged for nautical charts. Because the provision of new products or services frequently entails additional cost to NOS, the prohibition on retaining revenues discourages product innovation.

In contrast, NOAA has taken advantage of the FTTA, which allows an agency to receive and retain payments for products incorporating inventions resulting from its research and development with a non-federal partner. Other legislation authorizes the Secretary of Commerce to establish a fund in which to deposit receipts from the provision of special studies.³²

Impact of OMB Circular A-130

One of the guiding principles enunciated in Circular A-130 is that the free flow of information between the government and the public is essential to a democratic society. The circular also sets policy for the pricing of information. It provides that user charges for information dissemination products shall be set at a level sufficient to recover the cost of dissemination, but no higher. It specifically provides that the calculation of the charges shall exclude costs associated with original collection and processing of the information. Exceptions to this policy include the following:

- Where **statutory requirements** are at variance with the policy;³³
- Where the agency collects, processes, and disseminates the information **for the benefit of a specific identifiable group** — beyond the benefit to the general public;³⁴
- Where the agency plans to establish user charges at less than cost of dissemination because of a determination that higher charges would constitute a significant barrier to ... reaching members of the public whom the agency has a responsibility to inform; or
- Where the Director of OMB determines an exception is warranted.

Several changes to A-130 were issued on February 20, 1996 in accordance with provisions of the Paperwork Reduction Act. These were initially included in a Memorandum to Heads of Executive Agencies and Departments by the OMB Director.³⁵ The changes pertinent to this discussion emphasize and strengthen the free flow of information in such matters as encouraging consultation with users. The changes also clarify that agencies may legitimately seek to use the services of private contractors or other governmental entities, provided that such intermediaries do not impose restrictions that interfere with agencies'

³² 15 USC 1525-6 provides that the Secretary of Commerce may make special studies, data compilations, and reports, charge the estimated or actual cost of such work, and retain the funds in a special account which may be used to pay the cost of such special work.

³³ Emphasis added.

³⁴ Emphasis added.

³⁵ Implementing the Provisions of the Paperwork Reduction Act of 1995, dated September 29, 1995. (M-95-22).

information dissemination responsibilities. The costs of engaging private contractors may be included in dissemination costs.

The circular also cautions agencies not to attempt to exert control over the secondary uses of their information dissemination products. To meet concerns over data quality and integrity, however, an agency may check for accuracy and certify the data or value-added processing of private disseminators. This includes use of trademarks pursuant to the Lanham Trademark Act of 1946 (15 USC 1055, 1135, 1127). However, this does not allow an agency to regulate how the public actually uses the information or to restrict the flow and free use of the information.

NOS has adopted policies on information dissemination that conform with A-130 and the Paperwork Reduction Act. However, it can be argued that NOS products benefit specific, identifiable groups beyond the benefit to the general public. In that case, an exception to the A-130 policies applies and there would be a basis for including some of the costs of data acquisition and processing in setting charges for NOS products. A statutory finding that chart users are special beneficiaries would automatically meet the first standard mentioned in the OMB circular.

NOS already has one arrangement which differs from the general A-130 policies. As indicated in the discussion of electronic charts, NOS has an exclusive agreement for the development and distribution of raster charts under the authority of the Federal Technology Transfer Act. This arrangement evidently qualifies as an exception based on a statute, and it has already survived one court challenge.

While the OMB Director has authority to grant exceptions to the prohibition against recovery of data acquisition costs, OMB is clearly not inclined to do so. Therefore, legislative action would probably be required to achieve such an objective.

The panel believes that, while 100 percent cost recovery is not a defining element of a PBO, an entrepreneurial spirit is. One of the manifestations of an entrepreneurial spirit is an attitude that customized services should be provided and the costs charged to users.

The Academy panel recommends that NOS:

- **Develop a simple, uniform policy and procedure for establishing charges for products and services (both standard and customized) so that customers for various services and products are not treated differently.**

Allowing NOS to retain receipts from sales of its products or services also would tend to support an entrepreneurial culture. Legislation is therefore needed to permit NOS to retain these revenues. Permission to retain receipts now deposited to miscellaneous receipts of the Treasury would not, however, ordinarily provide additional funds for NOS to use. Under current interpretations of the Budget Enforcement Act, the retention of this income would have to be offset by an equal reduction in spending from the funds allocated to the appropriations subcommittee responsible for NOS.

Thus, while legislation could provide otherwise, the most likely scenario is that autho-

rization to retain revenues from chart sales would involve an initial offset against NOS appropriated funds. The panel does not believe that this is an undesirable outcome. When at least part of the resources necessary to fund operations comes from retained revenues, it creates a powerful incentive for making products attractive to customers. As a result, the panel expects that NOS' income from sales of products and services will increase, whether or not prices are raised, since the costs of providing the services could be recovered and reused.

The Academy panel recommends that NOS:

- **Seek legislation allowing it to retain in a revolving fund for reuse the revenues derived from the sale of products and services, including funds derived from products developed under the Federal Technology Transfer Act.**

MARKET FACTORS

Market Size

Underlying any consideration of possible increases in revenues is an assessment of the market for nautical charts. However, no reliable estimates exist for the total U.S. market for such charts. In fact, there is not even a reliable estimate of the total market for all types of maps and charts, nautical or otherwise. Appendix B offers some methodologies for calculating the total U.S. market for nautical charts and concludes that a reasonable guess would put the current market at about \$30-\$35 million a year. Discussions with industry representatives suggest that such an estimate is not unreasonable.

One implication of this estimate is that it is not possible to fund more than a modest portion of NOS' nautical charting functions from sales of products. Therefore, the key economic questions are whether the market will grow, if an entrepreneurial NOS can help make it grow, and whether NOS can retain a reasonable share of the market growth without inhibiting private enterprise (which might allow NOS to gain some of the resources it needs for addressing the problems of chart currency and accuracy mentioned above).³⁶ NGS has cost-sharing geodetic advisory programs with several states, which, together with its use of the World Wide Web, could lead to increasing revenues from sales of its products and services.

Growth of Electronic Charting

A major growth area — perhaps the major one — in the nautical charting market is electronic charting. The electronic charting industry, according to a number of forecasts, is on the verge of substantial growth. With the ability to get exact positioning on an electronic chart through a tie-in to GPS, more commercial, recreational, and other users are turning to electronic charts. NOS has helped spur this growth through a CRADA with private industry to facilitate the development of raster charts. NOS is receiving a small amount of retainable income from private sales of this product which must be applied to continuing research and development under the CRADA.³⁷

In an interview with a software development and marketing firm, project staff heard a fore-

³⁶See discussion on pp. 25-26.

³⁷Pursuant to the Federal Technology Transfer Act.

cast of an exponential increase in the use of electronic charting products worldwide over the next 20 years. Another interviewee in the commercial shipping market predicted that all merchant ships would have an “integrated bridge” in less than 20 years.³⁸

One element that remains unknown in all these predictions is the effect of the increasing popularity of electronic charts on the market for paper charts. Virtually all interviewees stated that there would always be a need for paper charts. Some recreational boaters will never invest in electronic equipment. And many commercial vessels of all sizes and types will still want a paper chart on hand, since computers can crash and the prudent mariner will always want a back-up. On the other hand, the new technology can also mean that NOS might not have to print most paper charts directly but, instead, could sell CD-ROMs with the data from which private producers could print high quality charts.

Pricing of Paper Charts

The pricing of nautical charts as governed by P.L. 99-272 (44 USC 1307) is based on the costs of production, excluding costs of data acquisition and processing. The law allows data base management, compilation (converting the data base into a product), and printing and distribution costs to be included in the prices. As indicated in Table 6-2 below, costs have been higher than the \$14 price for paper charts that has prevailed over the last several years. For FY 1996, allowable pricing based on current calculations of unit cost would be about nine percent higher than actual pricing.

The panel believes that the methodology NOS uses to calculate chart costs and prices should be reviewed. Using the current methodology, NOS charged 92 percent of allowable costs in 1994. However, revenues received represent only about one-half of costs for all elements of chart production except for data acquisition.

NOS has not seriously considered raising prices in recent years. The last major price rise took place after legislation was passed authorizing price increases to reflect the inclusion

TABLE 6-2:

Fiscal Year	Conventional Nautical Charts		Small Craft Folios	
	Unit Cost	Public Price	Unit Cost	Public Price
1991	\$20.52	\$14.00	\$21.45	\$14.00
1992	23.39	14.00	21.86	14.00
1993	21.90	14.00	22.67	14.00
1994	15.28	14.00	13.56	14.00

NOTE: Units cost assumes a standard condemnation rate of 10.1 percent of copies produced.

³⁸An “integrated bridge” includes an electronic chart on the bridge, which eliminates the need for a ship’s captain to consult paper charts in a chart room. For further information on the integrated bridge, see *Global Navigation-A GPS User’s Guide*, by Neil Ackroyd and Robert Lorimer, Lloyd’s of London Press, LTD, 1994, Chapter 1.1, “The integrated ship.”

of data base management and compilation costs, in addition to the previously authorized costs of printing, distribution, overhead, and administration. Prices were raised in three steps from 1986 to 1988, from \$3.50 per chart to the current price of \$14.00.

P.L. 99-272 also mandated a report to Congress on the impact of price increases on sales and safety. In a September 1992 NOAA report, a substantial drop in chart sales was shown.³⁹ However, the numbers could be interpreted in various ways, including as a continuation of a general trend toward declining chart sales worldwide. Other possible reasons for the decline include decreases in the number of new editions being produced by NOS, the availability of alternatives such as reproductions of uncopyrighted NOAA data by private chart producers, and dissatisfaction with obsolete data reproduced on NOS charts.⁴⁰ The report concluded that, while chart sales have decreased, it was not possible to locate the cause with any certainty.

The report also concluded, based on Coast Guard statistics, that there appears to have been no adverse impact on marine safety due to price increases. In fact, according to the official U.S. Coast Guard publication on boating statistics, safety seems to have improved, with the fatality rate per 100,000-numbered boats falling from 11.6 in 1985 to 6.9 in 1994.⁴¹ This is not correlated with chart sales, but rather is related to a number of other factors such as decreased alcohol use and increased effectiveness of safety instruction.

If the public price of charts were increased, NOS would not gain the full increase, even if sales remained stable. The public price is discounted by 40 percent to NOS' chart agents, so that, if the estimated \$1.28 by which allowable costs exceed public price were added, NOAA would receive only 77 cents of that amount. This would mean additional income of less than \$500,000. Nevertheless, such an increase in resources for a small, resource-starved organization is worth pursuing. Such a small price increase is likely to have little effect on demand.

The Academy panel recommends that NOS:

- **Increase chart prices to the full charge now authorized by law, i.e., from \$14.00 to \$15.28, and reevaluate its methodology for computing allowable charges.**
- **Conduct a periodic review of the relationship of the price of charts to the cost of chart production, and establish a schedule for price revisions, taking into account the current and potential availability and prices of products from alternative sources.**

In the opinion of the panel, raising prices significantly without changing the product could be self-defeating, in that sales might well decline. If, on the other hand, NOS were in a position to provide up-to-date information on charts and more frequent revisions — or to produce charts that could be more easily used by private producers to make their own versions — a larger price increase might be warranted. British Admiralty charts,

³⁹Second Report to Congress on the Impact of Increased Nautical and Aeronautical Chart Prices Resulting from Public Law 99-272 on Public Sales and Navigation Safety, Sept. 1992.

⁴⁰Project staff were advised by producers of private versions of NOAA charts that they might buy more charts from NOAA if it put out more new editions.

⁴¹U.S. Coast Guard, Commandant's Publication P16754.8, Sept. 1995.

which are based on NOAA charts, sell for \$24-\$32 in the United States. Canadian charts, on the other hand, cost the equivalent of less than \$10.

CRADAs and New Products

As suggested earlier, potential growth in the market for nautical charts appears to be mainly in the area of electronic charting. The CRADA for raster charts calls for BSB Electronic Charts, the private partner, to remit to NOS five percent of net sales and 25 percent of profits in the form of payment for continued research and development. Project staff estimate that a reasonable estimate for revenue from that source would be in the neighborhood of \$1 million. However, depending on the interpretation of a recent court opinion, BSB's exclusive rights may be in peril, leaving the door open to further competition from other sources in the future.⁴²

Nevertheless, this CRADA is an example of how NOS can generate income through an innovative partnership with private industry — a partnership in which the product itself is provided by private industry, but under standards and conditions set by the government. However, since the CRADA is based on R&D authority, the income could be jeopardized at such time as the product reaches a fully developed, commercial stage.

NOS is currently working on the development of other products that would combine the mapping qualities of raster charts with the flexibility of vector data. The panel is advised that possibilities exist for combining such “smart charts” with real-time updates of currents and tides data. Software already exists to tie course plotting to GPS location and known hazard avoidance. With such new products, ships' masters would have tools for making their passage not only safer, but also more profitable, since data on the depth of a channel may determine how much a ship can be loaded and still clear the bottom. This is not an insignificant calculation for shippers. Robert Sullivan, a spokesman for the American Petroleum Institute, was quoted as saying, “Every inch of draft means thousands of dollars worth of cargo.”⁴³

At this time, however, NOS is giving little attention to the pricing of new products, even though successful marketing of such products could bring significant increases in revenue. NOS may, in fact, preclude itself from proceeding in this direction, as it plans to make more and more data available free on the Internet.

The current financing structure of NOS provides no incentive to think in market terms. With the right legislation, this attitude could change, thus freeing NOS to find ways of becoming innovative and market oriented — perhaps through a reward system for new ideas and the addition of a marketing function.

If NOS were a private firm, it would utilize a concept of “value pricing” — setting prices based not only on what it costs to produce the product, but on the value that the product has to the customer. For innovative products such as those mentioned above, NOS could charge much more than the cost of data base management, compilation, printing (if applicable), and distribution, without driving users away.

⁴²See footnote 21 on p. 23.

⁴³The Journal of Commerce, Thursday, Jan. 4, 1996.

The Academy panel recommends that NOS:

- **Be authorized by Congress to charge fees for licenses to use trademarked or seal-protected NOS documents; and be allowed to price electronic products on a market rather than a cost basis.**
- **Avoid taking steps (such as making increasing amounts of data available electronically at no charge to users) that would compromise its ability to develop income in future years.**

Printing Options

Another possibility for increasing income as well as decreasing expense would be to change the way paper products are printed and disseminated. Based on data supplied by NOS staff, it appears that about \$2 million is spent on printing nautical charts. The current process of printing a paper chart includes the creation of an electronic product that is then used for two purposes — to supply data to the CRADA partner that produces the raster product, and to make the plates that are used for printing. NOS might consider changing its method of dissemination to a purely electronic operation, selling high quality disks suitable for quality printing to producers, who then would be responsible for paper chart production.

However, without some of the other changes the panel is recommending, getting out of the printing business would result in a loss of sales revenues. NOS therefore would need to make decisions on what to print, what to contract, and what functions, if any, to privatize, based on business judgments that must await the outcome of congressional action on the panel's recommendations.

A number of steps are necessary in advance of initiating such a process. First, it would be necessary to give producers at least several months to adapt. Even though many sophisticated producers are already using electronic means of production, many others simply copy paper products issued by NOS. Some of the latter firms might not be able to adapt and, thus, could go out of business. In addition, while some printers are already capable of producing the very large charts used by commercial vessels, some chart makers would need to make an investment in this capability.

Second, some form of licensing arrangement with quality control would have to be developed. To protect NOS' CRADA partner, producers should not be given the right to make official raster disks from the electronic product until such time as that product falls into the public domain. NOAA is already seeking trademark protection for its seal. At a minimum, the right to use the NOAA seal should be strictly regulated, and contingent on the producer's adhering to quality standards established by NOS.

Third, a substantial proportion of NOS' suite of nautical charts would not be commercially viable. Should NOS get out of the printing business entirely, it might be necessary to seek legislation allowing NOAA to subsidize some producers to make unprofitable charts which could then be sold at a reasonable price.

While there are many unknowns in this area, the panel believes that the possibilities need to be explored. If NOS is placed on a more businesslike basis where it can retain and use its revenues from sales, it becomes more important to pursue options such as this.

The Academy panel therefore recommends that NOS:

- **Be authorized by Congress to recover a substantially-enlarged portion of the full costs of developing nautical charts through the fees charged; and criteria be established for charging all purchasers of NOS charts either on a uniform basis or on the basis of an appropriate schedule of differential charges.**
- **Evaluate the degree to which allowing the private sector to print nautical charts from a NOS data base, provided by it in return for license fees paid, can be accomplished without jeopardizing the assured availability of charts for all locations now included in the suite of charts.**

INTERAGENCY REIMBURSEMENT AND COOPERATION

The DMA Problem

A major problem facing NOS is the announced, imminent withdrawal of financial support from DMA. DMA is the biggest purchaser of NOS nautical charts, but pays only a small printing charge (\$1.50) for the charts it buys to supply the Navy and the Coast Guard. In addition, DMA makes a payment to NOS to reflect its share of compilation and database management costs. DMA has advised NOS in writing of its intention to phase out the payments from \$9.6 million in FY 1995 to \$8.6 million in 1996, \$7 million in 1997, and zero in 1998.

The financial relationship with DMA has been contentious since about 1986, when legislation changing the basis for chart pricing was enacted, and OMB decided to set a figure for DMA to pay NOS. Allegedly, NOS' appropriation was reduced and the funds transferred to DMA, although that has proven impossible to verify. In contrast, some DMA personnel believe that NOS succeeded in having OMB move money from DMA to NOS. DMA's payments have been increasing since that time — the increases being pass-throughs of inflation increases received by DMA. There has never been a Memorandum of Understanding to govern this relationship.

The origins of the current problem can be traced to a joint project with DMA, which was covered by a Memorandum of Agreement, to produce digital nautical charts to meet special Navy requirements. Correspondence and staff interviews on the subject indicate a history of misunderstanding and lack of communication, along with major technical disagreements on the correct format in which to produce the data: DMA wants charts in Vector Product Format (VPF), usable for both land and sea operations, while NOS supports another internationally accepted format, DX-90, which is used exclusively for nautical charts.

In the final analysis, NOS was unable to meet DMA's expectations, although the correspondence does not make clear which party was primarily responsible for the breakdown in cooperation. But it is very clear that DMA is unhappy over both the basic arrangement and the format issue. Therefore, it has decided to terminate its current relationship with NOS. Instead of buying a full supply of charts from NOS to meet its customers' needs, it plans to buy one of each chart that NOS produces and then produce its own charts in DMA's preferred format, in part by using special equipment to scan and digitize the NOS charts. The panel was advised that DMA will not do original surveys, but may contract with

the Corps of Engineers or private sources if new data are needed. One DMA source said that the DMA plan is, eventually, to produce a full suite of VPF charts for the entire U.S. coastline. DMA has refused to negotiate with NOS on the issue.

The implications of this action are quite serious. First, NOS will have insufficient funds for database management and compilation without either continuation of the DMA payment or the substitution of appropriated funds in lieu of this payment. Second, without the payments from DMA, the public cost of nautical charts can be expected to increase to \$25 or more for conventional charts — in effect, re-establishing a subsidy to the Defense Department (which pays only \$1.50 for the costs of printing each chart) that OMB sought to end when DMA was directed to make these payments. Third, the government will be allowing wasteful duplication of effort and interagency competition. NOS advises that the issue has been raised at DOC and OMB, but no resolution has yet occurred. The FY 1997 budget makes no explicit change respecting this issue.

Although the sums involved are small in comparison with the overall NOAA budget, the panel does not believe the issue can be ignored. Handling this kind of interagency dispute used to be one of the functions of an OMB organization and management staff distinct from the budget examining (now program examining) staff. Such duplication could be termed a violation of the coordination provisions of OMB Circular A-16. But DMA could argue that its activities fall under the exception clause, which deals with activities designed to meet specific agency program needs. Whether or not DMA's proposed chart production is subject to OMB Circular A-16, the panel believes that it is not tolerable for the federal government to allow different agencies purposefully to engage in duplication of activities, thus reverting to the rivalry between military and civilian hydrographic charting that was ended by Congress in 1900.

However, this dispute raises not only the issue of coordination among federal agencies, but also the issue of meeting customer needs. The correspondence between DMA and NOS does not reflect an NOS view that DMA is or should be a valued customer. For example, to meet limitations in funding, it appears that NOS scaled back services that were valued by DMA.⁴⁴ Moreover, it is unclear whether NOS made any effort to satisfy DMA's requirement for VPF charts; the reason for NOS' inability to produce digital data in this format is also unclear.

The Academy panel recommends that OMB:

- **Require DMA to continue its contributions to the cost of chart development for at least the next three years, provided that NOS includes as one of its performance goals the goal of meeting the needs of DMA, and allow DMA to make a business decision for the fourth year based upon NOS performance.**

Other Agency Relationships

No other agency is involved in financing such a large part of NOS' nautical activities as DMA. (There are substantial agency contributions from both the Federal Aviation

⁴⁴Some of the correspondence which DMA produced as background for its action dealt with an NOS decision to stop printing (that is, to privatize) tide and tidal current tables.

Administration and DMA for aeronautical charting activities, which are outside the scope of this study.) About \$3 million in other reimbursements is included in the NOS accounts from the Department of State, the Agency for International Development, the Coast Guard, the Corps of Engineers, the Environmental Protection Agency, state and local governments, and miscellaneous National Geodetic Survey product sales. There should be potential for more revenues from these sources.

Shared Facilities

NOS nautical charts are printed in a facility organizationally located in its Aeronautical Charting Division. The government-owned printing plant is in the basement of the main DOC building in Washington D.C. Its primary activity is printing aeronautical charts. Nautical chart printing fills in the time available after deadline-driven aeronautical charting, and represents about 40 percent of printing volume. Staff of that division also do price calculations for nautical charts. If responsibility for aeronautical charts is split off from nautical charts, new printing arrangements might have to be made by both chart-producing entities. One such arrangement could, of course, be an interagency agreement to make joint use of a single printing facility.

Borrowing

Borrowing authority is appropriate for organizations that are self-sustaining, or nearly so, as lenders require assurance that loans can be repaid out of income. These conditions do not exist for the NOS functions under review, and will not exist even if the panel's recommendations are implemented. Thus, there is no need to examine the matter further.

OTHER POSSIBLE SOURCES OF FUNDS

The panel would prefer to see an enterprise organization rely on funds obtained from satisfied customers, rather than from taxes. An organization is not likely to be as customer-focused if its receipts are not connected with the delivery of products or services. However, as noted above, the predominant portion (about 85 percent) of nautical charting and geodetic service costs is not eligible for cost recovery under existing statutes and policies. Therefore, the panel sees a need for continued appropriations support, even if its recommendations to allow charging for a greater portion of total costs are adopted by the administration and Congress. There should be no difference in the effect on an agency's entrepreneurial spirit or incentives from the receipt of revenues derived from a special tax on one hand, or from those derived from general taxes on the other. Congress might, however, be more willing to increase the total of appropriated funds if a portion came from a relevant trust fund.

Thus, it would be acceptable to use taxes or license fees to support all or a portion of the costs of services that are deemed to benefit the public at large. There are three such sources that the panel has considered: the Harbor Maintenance Trust Fund, a marine fuels tax, and the Oil Spill Liability Trust Fund.

Harbor Maintenance Trust Fund

For many years, NOAA has been submitting budget proposals to seek funding from the Harbor Maintenance Trust Fund (HMTF). The 1997 budget also includes this proposal.

The HMTF was established by the Harbor Maintenance Revenue Act of 1986 (P.L. 99-662, Title XIV, as amended). It is funded by the collection of an ad valorem tax on cargo handled in deep-draft ports and in the St. Lawrence Seaway. (Deep water ports handle oceangoing vessels or coastal shipping; inland waterways have a separate fuel tax system.)

This tax is 0.125 percent of the value of cargo based upon bills of lading. It is levied on all cargo, whether foreign or domestic. If a ship is moving between two U.S. ports the tax is charged only once on the same cargo. The FY 1997 budget shows collections in FY 1995 of \$671 million, projected to rise to \$818 million in FY 1997. Receipts are made available primarily to the Corps of Engineers and the St. Lawrence Seaway Development Corporation for the preservation, operation, and maintenance of harbors and channels.

According to Corps of Engineers reports, the ad valorem tax calculation included 0.01 percent to reimburse NOAA on an annual basis for approximately \$45.5 million for the costs of NOAA's activities pertaining to commercial navigation.⁴⁵ Despite repeated proposals in the President's budget to tap this source, Congress has been unwilling to allow NOAA access to the HMTF. Unappropriated receipts, including those allegedly intended for NOAA, amounted to more than \$600 million at the end of FY 1995, and may grow to more than \$1 billion by the end of FY 1997.

One of the reasons Congress has taken no action on a possible transfer to NOAA is that any such transfer, under current budget accounting rules, would be "scored" as budget authority. An offsetting reduction would be required. The budget proposals have assumed an offsetting reduction in NOAA's appropriated funds, making the transfer substantively meaningless.

Hydrographic charting of ports could logically be charged to harbor maintenance. However, not everyone connected with the original legislation agrees that NOAA was an intended beneficiary of HMTF funding. Staff of the Water Resources Subcommittee of the House Transportation Committee advise that some clarification of existing legislation may be necessary to authorize an HMTF appropriation to NOAA. There has also been opposition from some trade organizations, which believe that the HMTF should be used for harbor maintenance, narrowly defined, and not for related activities.

While port officials were generally opposed in the past, their position appeared to be changing in light of the serious deficiencies in NOS charting of harbors and approaches, until a new legal problem arose. Even if all the budget and political problems connected with receiving monies from the HMTF were solved, the future of that source of funds is now in doubt. In an October 1995 decision by the U.S. Court of International Trade, the court ruled that the ad valorem tax, when imposed on merchandise exported from the United States, violates Article I, Section 9, Clause 5 of the U.S. Constitution, which provides that no tax or duty shall be laid on articles exported from any state.⁴⁶ The court dealt with the issue of whether or not the tax could be considered a user fee, and found that "lit-

⁴⁵Third Annual Report to Congress on the Status of the Harbor Maintenance Trust Fund for Fiscal Year 1994. The Corps of Engineers, which receives the bulk of monies from the HMTF, also administers the fund.

the nexus binds the imposition of the ad valorem tax on cargo to the costs of port maintenance and regulation of shipping,” and stated that “the tax raises revenue, and is not a user fee imposed pursuant to the regulation of commerce.”⁴⁷

In February, the United States appealed the trade court’s decision to the U.S. Court of Appeals for the Federal Circuit. Because of a stay of execution pending resolution in the appellate process, the tax is still being collected on exports and imports, and balances in the fund are being used and proposed for use in the FY 1997 budget.⁴⁸ But if the appeal proves unsuccessful, all that will be left of the ad valorem tax is the tax on imports. The expectation among those familiar with the program is that, if this tax is levied only on imports, it will be invalidated under the General Agreement on Tariffs and Trade (GATT), which prohibits discriminatory taxes.

It is unlikely that Congress will agree to appropriating a portion of this trust fund to NOS with the status of the fund in doubt. However, in connection with legislation to restructure the fund in order to respond to the court’s decision, it would be appropriate for Congress to clarify the eligibility of nautical charting to use some of the fund’s receipts. As noted above, this would not necessarily increase the funds available to NOS, but it would substitute a tax or fee on maritime commerce for at least a portion of the funds that would otherwise be collected from taxpayers at large.

Marine Fuels Tax

Several years ago, NOS staff looked into other revenue raising options. In one paper, staff proposed a tax on marine fuels purchased for propulsion, with the rationale that fuel use would be a proxy for vessel use and size, and would therefore reflect direct or implied services.⁴⁹ The idea was to fund both NOS and Coast Guard services through this tax, with the tax receipts to go into a joint U.S. Waters Safety Trust Fund.

As with the HMTF, such funding should not be considered a substitute for receipts derived from customers. However, it would be acceptable to substitute it for a portion of the appropriations needed to support NOS nautical charting services.

Oil Spill Liability Trust Fund

The Oil Spill Liability Trust Fund, originally established in 1986 by the Federal Water Pollution Control Act, could be another source of funding. The Omnibus Budget Reconciliation Act of 1989, P.L. 101-239, triggered collection of a five cent tax on each barrel of oil produced domestically or imported to be deposited in the trust fund. The fund is also replenished by interest on U.S. Treasury investments currently held, and monies recouped from identified polluters. The authority to collect the tax was suspended for one year starting in July 1993, when the fund reached a \$1 billion cap, then expired at the end of 1994. The President’s FY 1997 budget request includes a proposal to reinstate the authority to collect the tax and raise the cap from \$1 billion to \$2.5 billion.

⁴⁶United States Shoe Corp. v United States, U.S. Court of International Trade, Court No. 94-11-00668, decided October 25, 1995.

⁴⁷Ibid., p. 15.

⁴⁸See pp. 388-389, FY 1997 Budget Appendix.

⁴⁹NOS staff paper by A. Heckelman, undated, c. late 1980s.

Under Provisions of the Oil Pollution Act of 1990⁵⁰ (OPA 90), resources from the fund are used, subject to appropriations language, to finance oil pollution **prevention** and clean up by a number of federal agencies, primarily the Coast Guard and the Environmental Protection Agency (EPA). The Coast Guard is reimbursed for a variety of programs that support OPA 90 including expenses for ocean-going buoy tenders with oil spill response capabilities and for the provision of vessel traffic services. EPA was appropriated \$15 million in FY 1996 for readiness and management of oil spill response in the inland zone. The Department of the Interior, Corps of Engineers, Department of Transportation and Department of the Treasury also received lesser appropriations.

The National Boating Safety Advisory Council (NBSAC) made clear the connection between nautical charting and the prevention of oil spills. This advisory body to the Coast Guard, consisting of 21 members drawn equally from state officials responsible for boating safety programs, representatives of the boating industry, and representatives of the national recreational boating organizations and the general public are appointed by the Secretary of Transportation.

In November, 1994⁵¹, NBSAC concluded “declining support within NOAA for maintaining and modernizing the production of nautical charts is compromising both the accuracy and availability of charts and chart data” and “the hazard of a serious boating accident or fatality, a disaster such as the AMTRAK derailment, the grounding of the QE II, or another U.S. oil spill increases as NOAA charts decline in accuracy” and resolved “that the Coast Guard use every available avenue to encourage top officials within the Department of Transportation, National Transportation Safety Board, members of Congress, and the NOAA Administrator to provide the resources necessary for production and maintenance of accurate nautical charts, as well as modernization of U.S. chart production.”

OPA 90 also calls for an interagency coordinating committee on oil pollution research. The program was intended, in part, to conduct “research to improve information to improve decision making including the use of data from coastal mapping, baseline data, and other data related to the environmental impacts”⁵² and to pursue the “development of technologies and methods to protect public health and safety from oil discharges.” OPA 90 clearly speaks to the relationship between oil spill prevention and nautical charting and other NOS activities. More accurate charting could serve as one means of oil spill prevention.

The panel has recommended against imposing a tax unrelated to products or services being financed. But it sees no objection to this additional source of funds so long as it substitutes for general tax revenues. There may be a strong case for using this already-established trust fund to finance the survey of areas where oil spills are known hazards.

The Academy panel recommends that NOS:

- **Continue to seek appropriations of funds from the Harbor Maintenance Trust Fund, as well as initiate a request for appropriations from the Oil Spill Liability**

⁵⁰P.L. 101-380.

⁵¹154th Meeting of the National Boating Safety Advisory Council, November 14-14, 1994, Scottsdale, AZ.

⁵²33 USC 2761 (c) (2), (E) and (F).



Trust Fund, but only in amounts that would otherwise come from appropriated funds rather than from user charges.

- Intensify efforts to inform leaders in the executive branch and Congress of the serious safety and environmental implications of deficiencies in charting activities, as well as the potential benefits of improvements; and, to the extent authorized by law, expand related information programs for users.

CHAPTER

Organization Design

7

This chapter proposes a number of changes in the performance of NOS functions that would allow a new entity responsible for the functions to operate in a more entrepreneurial style. They would be consistent with the administration's proposed criteria for performance based organizations and with the experience of such organizations in the United States and in other countries. The chapter also reviews the merits of lodging the functions in agencies other than NOAA.

CHARACTERISTICS OF PERFORMANCE DRIVEN ORGANIZATIONS

The Statement of Work for this project cites the recommendation of the National Performance Review (NPR) that NOAA's mapping and charting functions should be restructured into a "performance-driven, customer-oriented agency" that is to "[implement] commercial business practices, be granted waivers, and be accountable for agreed-upon performance goals."^{5 3}

Since then, NPR has set forth a number of principles to guide the establishment of what are now widely called "performance based organizations" (PBOs). The President's 1997 budget^{5 4} also sets forth criteria for PBOs. The following is a restatement of the presidential and NPR principles:

- The PBO must have a clear mission, with broad support from stakeholders.
- It must focus on ends (and customers) rather than means; that is, it must concentrate on outputs, rather than inputs.
- It will function under a three-to-five-year "framework agreement" that sets goals and authorizes the PBO to use more flexible personnel, procurement and financial management procedures.

^{5 3}Common Sense Government; Works Better and Costs Less, Third Report of the National Performance Review, Sept. 1995, p.121.

^{5 4}Op. cit., Supplement, p.133.

- Operations must be separated from policy making and regulatory activities, which will be conducted outside the PBO.
- The chief executive will be compensated at market rates, and will be held accountable for results; appropriate rewards or sanctions will be provided.

NPR and OMB have decided not to make the ability to raise revenues a condition for the creation of a PBO. Nonetheless, the panel believes that a requirement to raise some revenues may contribute significantly to the culture changes needed to make organizations entrepreneurial or businesslike.

FOREIGN EXPERIENCE

In democratic governments around the world, there has been a significant increase in businesslike arrangements for the conduct of certain government functions. A substantial amount of such experimentation has occurred in British Commonwealth countries, including the United Kingdom itself, Canada, Australia, and New Zealand. Other members of the Organization for Economic Cooperation and Development (OECD) have also embarked on such efforts, including Sweden, which was in the vanguard.

Both the United Kingdom and Canada have established business-type arrangements for their charting and geodesy activities. These are described below and are illustrative of the structures for other functions in those countries. The experience of these two nations and that of New Zealand with businesslike forms for government programs is described in more detail in Appendix C.

The United Kingdom

The United Kingdom launched its “Next Steps” program in 1988. More than 100 government programs have been transformed into performance driven organizations as part of Next Steps.

Typically, certain functions of a department in a government ministry are assigned to an “agency,” headed by a chief executive. Each agency operates under a “framework document” that defines its duties, establishes annual performance goals, and confers freedoms from specified government-wide requirements respecting procurement, budgeting, and personnel. Chief executives are accountable for achieving the performance goals, are appointed competitively from among candidates in the civil service and the private sector, and report directly to the ministers.

Nautical charting activities, except surveying, are carried out by the U.K. Hydrographic Office (HO), which is a Next Steps agency. It operates under a framework document and is held accountable for achieving performance targets, such as issuing timely navigational warnings, improving the currency of charts, controlling costs, and increasing revenues.

Geodetic work is part of the mission of the Ordnance Survey, Britain’s primary mapping and geographical information agency. The Survey became a Next Steps agency on May 1, 1990. The Secretary of State for the Environment determines, and is responsible to Parliament for, the policy and financial framework within which the Survey operates. Day-to-day management is delegated to the Director General of the Survey, its chief executive.

The Director General is directly accountable to the Secretary of State for the performance of the Ordnance Survey in accordance with the framework document and the corporate plan.

A new framework document, completed in April 1995, increased the Survey's flexibility through a major shift toward self-financing, from reliance on appropriations from Parliament. It also established a dozen strategic objectives, such as maintaining a high-quality National Topographic Database, producing a range of products and services from this database, anticipating the future needs of customers through new products and services, progressively moving toward full cost recovery, investigating the costs and benefits of privatization, and setting high standards for staff development. It sets forth a framework for pricing policy, and stipulates that work carried out for other government agencies is to be charged on a full cost recovery basis. Further, it sets forth the performance measures against which the agency will be judged.

Performance against key targets is reported in the Survey's Annual Reports and Accounts. Criteria on the basis of which the Survey is judged include quality (turn-around time for customer orders and currency of topographic data); financial performance (cost recovery); and efficiency (sales revenue per employee).

Canada

Canada has tried to conduct government operations in a more business-like manner through a number of pilot projects. These have been launched under the Increased Ministerial Authority and Accountability (IMAA) initiative, as well as through the introduction of Special Operating Agencies (SOAs) and various government-wide changes to policies and rules. The IMAA initiative requires departments to agree, through a Memorandum of Understanding (MOU) with the Treasury Board (TB), to changes in its planning, monitoring, control, internal audit, and program evaluation functions, in return for increased operational flexibility.

Nautical charting and related activities are carried out by the Canadian Hydrographic Service, part of the Department of Fisheries and Oceans. Geodetic work is conducted by the Geodetic Survey of Canada, part of the Earth Sciences Sector of Natural Resources Canada (NRC). The Geodetic Survey has adopted most of the elements of an SOA, but is no longer seeking that formal status.

As an example of Canada's use of SOAs, an agreement between TB and the predecessor agency to NRC set forth parameters for financial management, human resources, and accountability to be achieved during the fiscal year. In return for contracting to achieve the stated goals, TB provided the Sector with specific authority and flexibility to achieve its four main goals of gathering, processing, and analyzing landmass information; supporting the Canadian geomatics industry through contracting and technology transfer on a cost recovery basis; maximizing cost recovery and cost sharing; and satisfying client needs for products and services. The Sector developed a number of performance indicators to monitor its success in these areas. The indicators are reviewed on a quarterly basis.

Thus, the MOU serves two purposes. First, it gives ministers and senior managers increased authority and flexibility to deal with changing circumstances and to manage

effectively with limited resources. Second, it enhances the accountability of ministers and senior managers.

The MOU includes several provisions relating to revenue-sharing, which specify that NRC may retain some of the enhanced revenues it receives as a result of efficiency improvements. In addition, NRC can roll over five percent of unspent funds at the year's end. NRC now annually submits to TB a multi-year operational plan, as well as a three-year business or operational plan for each sector covered by the revenue-sharing provisions. Unlike the United States, Canada provides copyright protection for government agencies, and NRC has found this provides a steady stream of revenues from products with longer shelf lives.

All of these elements take place in what the MOU calls the accountability framework, which defines the performance data, targets, and reporting methods that serve as a basis for monitoring and assessing departmental performance. The agency must submit an annual management report which includes a description of the environment facing the department; an assessment of the performance of the department against expectations identified in the MOU; and a statistical report (if appropriate and feasible) on the quantitative performance data required by the MOU. This document, as well as other audits and program evaluations, contributes to a "major accountability review" that focuses on the extent to which the expectations defined in the MOU have been achieved.

New Zealand

Over the last decade, successive New Zealand governments have undertaken significant reforms in the public sector in response to major economic and fiscal problems. Although New Zealand has a far smaller population, economy, and public sector than the United States, and is not a federal system, its experience in government reform—which has been more extensive than that of Canada or the United Kingdom — has some relevance for the United States.

Reform initially took the form of corporatization. Numerous business-type activities were being run by government departments that also had policy responsibilities. These were established as State Owned Enterprises (SOEs) with private sector boards of directors and government ministers as shareholders. SOEs were required to operate profitably, borrow from the financial markets, and pay dividends and taxes at commercial rates. They had to agree on a five-year business plan with their shareholders, and were subject to extensive monitoring and reporting requirements. The results were dramatic. All SOEs are now profitable businesses and pay substantial dividends and taxes. Services to customers have also improved significantly.⁵⁵

Although the corporatization process resulted in substantial efficiency gains, the government believed that some SOEs were still suboptimal because they tied up money that could be used to repay debt, and were not subject to the ultimate discipline of the market. The government then went a step further, privatizing commercial activities that the government did not need to own. Major privatizations have included financial institutions; transport operations; infrastructural assets; and other trading operations.

⁵⁵Ibid., p. 3.

After corporatization and privatization, attention was turned to reform of the “core” departmental public sector, which includes activities that are not appropriate for corporate status. A substantial part of the entire government now has been transformed. Continued reform efforts are based on a number of principles including: departmental functions should be clearly specified, and their policy and operations functions should be separated; departmental managers should be fully accountable for running their organizations efficiently; and the costs of state activities should, as far as possible, be fixed through real market factors.⁵⁶

Another aspect of reform redefined the accountability relationships between government ministers and their departments, thus improving the incentives for managers to respond to the government’s policy priorities. Key features of the new public sector management system include appointment of departmental chief executives on limited term, performance-based contracts; annual agreements between ministers and chief executives specifying performance expectations; annual assessment of chief executive performance against these agreements; a budgeting and appropriations system that allows ministers to make decisions about outputs to be delivered, rather than line items for inputs; the near-total delegation of input control to chief executives; and the use of accrual accounting to measure the true cost of departmental operations, assets, and liabilities.

PERFORMANCE BASED ORGANIZATIONS IN THE UNITED STATES

Public Authorities and Corporations

The concept of the PBO is not new. Public authorities and public corporations in the United States are, essentially, performance based. They are generally self-sustaining through revenues collected from their customers. They are typically set up as somewhat autonomous units of government, and are in varying degrees not subject to the rules and regulations governing the management of ordinary departments and agencies.

Cities, states, regional and interstate bodies, and the federal government have made wide use of such organizational structures. A few examples include the Port Authority of New York and New Jersey, numerous airport authorities, and a number of federal government corporations, including the Federal Deposit Insurance Corporation, the Tennessee Valley Authority (TVA), AMTRAK, and the U.S. Postal Service. (Although the act that created the Postal Service⁵⁷ did not incorporate it, or provide for its incorporation, it has most of the features of a wholly-owned government corporation. Accordingly, three studies of government corporations have classified it as such.)

An Academy panel found 39 federal government corporations in 1981, the Congressional Research Service identified 31 in 1983, and the General Accounting Office found 45 in 1988. There is some disagreement on the exact number because each has been created by

⁵⁶New Zealand’s Reformed State Sector, State Services Commission, Wellington, New Zealand, 1994, p. 4.

⁵⁷The Postal Reorganization Act of 1970, 39 USC 101 et seq.

a separate statute; they have varying titles (such as corporation, bank, authority, association, and service); their authority and autonomy vary greatly; some are called corporations when they have few or no corporate characteristics; and some, but not all, are subject to a 1945 statute called the Government Corporation Control Act (GCCA).^{5 8}

The GCCA established some common practices for those corporations it covered, such as the submission of a “business-type budget.” Although the budgets of the corporations covered by the GCCA are reviewed in OMB and are part of the President’s budget, they are not subject to line-item revision in the executive branch or Congress. However, the GCCA does not automatically apply to corporations created after its enactment. Thus, each of these corporations has unique attributes set forth in its enabling act, is subject to the GCCA only if the act so provides, and is free from certain government-wide management laws only if so provided in its statute.

Some of these corporations are completely self supporting. Others receive small sums (as the Postal Service did until recently) or significant sums (AMTRAK) through appropriations by Congress. As noted earlier, the two Senior Fellows of the Academy who were consulted by NOS concluded in phase one of this study that the nautical charting and geodesy functions of NOS were not suitable candidates for corporate status, primarily because there was little prospect for funding a significant portion of their total costs from sales or fees.

Industrial Funds and Revolving Funds

A number of agencies, such as the Department of Defense, have industrial funds that are chiefly used for transactions that are internal to the government. A supply agency, for example, may be authorized by statute to charge for the materials or services it provides and to retain funds for future use without having to go through the appropriations process.

Some agencies that have substantial transactions with the public have also been authorized by Congress to retain and use the funds received without going through the appropriations process. Such funds are, instead, placed in a “public enterprise” or “revolving” fund. The Bonneville Power Administration is an example.

Engaging the Private Sector in State and Municipal Functions

A number of U.S. cities, counties, and states have experimented with methods for engaging the private sector in the performance of what had been government functions. But this, too, is not a recent phenomenon.

Often, the private sector has been engaged through contracts, and the government remains responsible for providing the function in question. In some cases, however, there has been genuine privatization, in which the government withdraws entirely (sometimes called “load shedding”) from the provision of a service in favor of having the private sector take it on. For example, while a number of cities have let contracts to collect garbage, some have given private firms an exclusive franchise to do so in one or more parts of the

^{5 8}31 USC 9101.

city, while others have fully privatized the function so that private companies can compete for customers throughout the city.

Federal Contracting for Services and Supplies

From the earliest days of this nation, contracting has been common. Federal government agencies spend hundreds of billions of dollars through contracts. In addition to the Department of Defense, major contracting agencies include the Department of Energy and the National Aeronautics and Space Administration. Indeed, in both of the latter cases, concern has been expressed that the agencies contract for so much of their work that the public interest has been compromised, because the agencies lack the personnel or competence to set contracting policies or administer contracts effectively. In light of this concern, the panel believes strongly in the need for NOS to maintain significant capacity to manage its contracting efforts effectively.

Cost Recovery

As discussed earlier, the administration's proposals for PBOs do not include a cost recovery criterion. In the panel's view, however, forming such an organization should include steps to foster an entrepreneurial culture, which includes at least some cost recovery. The extent to which costs are recovered — and the accomplishment of steps necessary to produce that income — can and should be subject to performance indicators.

To succeed, there must be a marketing strategy linked to the goal of cost recovery. At present, marketing in NOS appears to be either not a major concern — as in the case of basic sales for which all income goes to the Treasury — or a “target of opportunity,” which appears to be the case for raster charts. While targets of opportunity can and should be pursued, this ought to be within an overall strategy, and should not become a strategy by default. The concept of “value pricing,” for example, could be one of the tools of a long-range marketing strategy

The subject of changing underlying legislation to remove the basic disincentive to a marketing strategy — that is, that income from sales cannot be retained and used by NOS — has already been discussed. Additional incentives, however, can also be considered, including rewards for the development of innovative products, as well as authority to charge for some part of the services now supported by appropriations.

This may sound at first like a violation of the principles of OMB Circular A-130. Although such a circular in itself would not necessarily be controlling, A-130 is based, in part, on the Copyright Act and Paperwork Reduction Act, which gives it the force of law. But, to reiterate a key point, it is not only information per se that NOS produces and disseminates, but also products that have characteristics of both public and private goods. This provides ample grounds for exceptions to the A-130 policies. Legislation is probably required to permit charging for a greater share of the costs of chart production. If enacted, it would meet the conditions for an exception to Circular A-130.

It should be noted that cost recovery is included in other administration proposals for PBOs, including three in DOC: the Patent and Trademark Office (PTO), the seafood inspection service of NOAA, and the National Technical Information Service (NTIS). NTIS is especially pertinent, since its business is the sale of documents containing information

developed by government agencies. (Other NAPA panels have recommended that both PTO and NTIS be converted to self-sustaining government corporations.)

Implications for NOS

A number of possible changes should be considered with respect to the structure, financing, and organizational location of NOS' functions, short of transferring them to a government corporation.

It seems clear that the functions could readily be organized in a way that would be consistent with the NPR and presidential criteria for PBOs. This is because:

- The functions have a clear mission, with broad support from stakeholders.
- NOS can (and already does) focus on and attempt to meet the needs of its customers.
- If it were allowed to retain and use revenues from the sale of its products and services, NOS would have increased incentives for improving customer service.
- NOS' activities are suitable for measurement; they could be benchmarked against measures used by comparable organizations in the United Kingdom and in Canada, as well as by public and private organizations in the United States.
- NOS' functions are primarily operational, not regulatory, and its operations can readily be separated from policy making.
- NOS could develop a three to five year "framework agreement" to set goals, and could make effective use of increased flexibilities in personnel, personnel ceiling, procurement, and financial regulations and procedures.
- A capable chief executive, compensated at market rates, could probably be found either within NOS or from outside.
- The chief executive could be held accountable for a number of relatively concrete results, including, for example, increasing revenues and productivity, and improving the timeliness of response to customers' needs.
- Appropriate rewards or sanctions could be based upon the chief executive's success or failure in achieving agreed-upon goals.

Geodetic services could be organized in accordance with the foregoing principles. Nautical charting functions have an additional character that the panel believes would make them suitable for a PBO: they already produce significant revenues for the government. Although these revenues do not constitute a major share of the total costs of operations, allowing their retention and reuse could provide a meaningful incentive for effective customer service. The panel notes that the Canadian Special Operating Agencies and the U.K. Next Steps agencies have similar characteristics to those it is suggesting.

Efficiency incentives could be built into the goals in the framework agreement. For example, the agreement could require an annual increase in productivity, such as three percent. And, in addition to allowing the retention and reuse of receipts from sales or fees, appropriated funds could continue to be made available without fiscal year limitation. This would allow the accumulation of funds for needed investments, and it would foreclose any incentive to use up funds as the end of the fiscal year draws close.

Conclusion

The Academy panel has concluded that both nautical charting and geodesy are entirely suitable for assignment to a PBO, that the performance of these functions would be enhanced thereby, that customer service would improve, and that costs would be reduced. Experience with such organizations suggests that the PBO and its chief executive be given at least four years to demonstrate that it can meet or exceed its goals.

The Academy panel recommends that the administration:

Vest nautical charting and geodesy functions in a PBO that

- has a clear operational mission, with policy responsibility (such as representing the United States at the International Hydrographic Organization) vested in the office to which the organization reports
- is headed by a chief executive, hired for a four-year term appointment on the basis of qualifications for the office, who is held accountable for results, compensated at market rates, with incentives for meeting or exceeding goals
- has a culture and methods of identifying its customers' needs, and of setting its priorities so as to meet those needs
- is allowed to retain, in a revolving fund for reuse, the revenues derived from the sale of products and services, including funds derived from products developed under the FTTA
- has funds appropriated without fiscal year limitation
- is authorized and required to raise revenue through sales and fees adequate to cover as much of its costs as feasible
- establishes performance measures and goals (such as frequency and accuracy of updated charts, revenue raising, cost sharing and cooperative agreements, productivity improvements, cost savings, and customer satisfaction) after review of possible "benchmark" measures used by comparable organizations in the United Kingdom and Canada, as well as by public and private organizations in the United States
- has a four-year framework agreement to set goals
- has flexibilities in personnel management through extension of the Title 5 demonstration authority, which would allow "broad banding," authority to determine premium pay (e.g., for overtime) rates, and expedited proceedings for appeals of adverse actions; in procurement management (such as authority to limit appeals of awards made); and financial regulations and procedures (such as authority to "manage to budget," which would provide for controls over the number of personnel through the budget, rather than FTE ceilings).

A few comments may be in order about the relation of these proposals to those being developed by the Office of Personnel Management, NPR, and OMB. The panel has already made clear its position that some responsibility for cost recovery is an important consideration in achieving the culture change needed if a PBO is to succeed. The panel is pleased

that these three agencies have been working on “templates” for personnel and procurement reform to be used in individual PBO proposals, or perhaps in generic PBO legislation.

The panel notes that the template for procurement reform is somewhat prescriptive. It requires a “two stage” competition for procurement when substantial experience shows that one stage, followed by negotiation with a pre-qualified vendor is more expeditious, less costly, and fully protects the government’s interests. Moreover, the template proposes to vest contracting officers with discretion to require competition among more than the required two vendors in the second stage if they wish. Thus, they could subvert the intent of the reform. This is not to suggest that such officers would wish to do so. But they, too, are products of their culture; and their current culture is heavily influenced by the objective of protecting the agency from criticism, rather than helping it to accomplish its mission.

For these reasons, the panel believes that NOS would be better advised to rely principally on its new Brooks Act authority for one-stage competition, followed by a negotiated contract, rather than to seek authority along the lines of the administration’s procurement template. Since the Brooks Act does not simplify the process for appeals by unsuccessful vendors, however, authority should be sought to do so. Additionally, the scope of the new authority might not be broad enough to cover a variety of procurements for products and services that support the functions named in the authorization. If so, NOS should seek to have Congress clarify or expand its scope.

ALTERNATIVE LOCATIONS IN THE EXECUTIVE BRANCH

In addition to addressing the issue of how best to organize and finance nautical charting and geodesy functions, attention needs to be given to the question of whether they should remain in the same organization, or should be separated from each other.⁵⁹ The answer to that question turns, in part, on whether a case can be made to move them from DOC, or from NOAA, to another agency.

Ordinarily, this issue would not arise unless there were a clear reason to believe that location in a different agency would strengthen these programs. However, in the circumstances that the panel has reviewed, the panel believes that consideration of an alternative location is obligatory. As previously discussed, charting and geodesy functions ranked very near the bottom of NOAA’s official priority list in December 1994. The panel believes that the high risks facing the nation’s shipping, ports, and waterways from out-of-date and inaccurate chart, tide, and current data demand a higher priority and increased funding. The panel is not optimistic about the prospects for obtaining the needed support from NOAA since, with a budget 30 times larger than the expenditures on the functions under review, it had not hitherto seen fit to give them a higher priority. But the panel notes that promoting safe navigation has now moved up to fifth place (of nine) on NOAA’s current

⁵⁹These issues and others relating to organization of the government’s mapping and charting functions are expected to be addressed in a study of federal mapping agencies that several agencies are now considering as a jointly funded project.

priority list.

It has already been suggested that NOAA regards itself as a “science agency” and that most NOS programs are not “science.” While the National Weather Service, which accounts for a major share of the NOAA budget, is primarily operational, it has a strong constituency that nautical charting and geodesy lack. Whatever the reason for NOAA’s failure to seek aggressively additional resources for charting and geodesy services, the panel believes that it must consider whether these functions that so vitally affect the public interest would fare better in a different organizational home. In doing so, however, the panel also feels obliged to consider unintended consequences, such as whether a transfer might unduly weaken other elements of NOS or NOAA from which it would be separated.

Additional reasons to consider the advantages and disadvantages of a new organizational home exist. For example, some in Congress strongly believe that DOC should be dissolved. Indeed, the House of Representatives has passed bills three times to abolish the department. Although such a bill has not reached the President’s desk, and he is expected to veto such a bill if it does, Congress has not abandoned its efforts.

Some of the versions of House proposals to dissolve DOC (originating as H.R. 1756) would have relocated nautical charting and geodesy functions in agencies where the panel fears that they might decline even further.

The principal alternative locations (other than DOC or NOAA) for either or both functions are: DMA, the U.S. Army Corps of Engineers, a new independent agency, the Department of the Interior’s USGS, or the Department of Transportation (DOT). In considering alternative locations, the panel took into account 12 questions posed in a 1986 book by Harold Seidman and Robert Gilmour,⁶⁰ which provides a checklist of items that policy makers considering such organizational changes ought to consider (see page 66).

Defense Mapping Agency

The Department of Defense (DOD) has sometimes engaged in the support of functions that are not directly part of its national security mission. Examples are the civil functions of the Corps of Engineers, drug interdiction, responding to civil unrest, and economic redevelopment in the wake of military base closings.

There could be important benefits to reassigning nautical charting to DMA, although geodesy would have less synergy with other DOD activities. DMA is technologically advanced in map making. It has made great strides toward digitization and “printing on demand.” It has the know-how and the resources to undertake nautical charting successfully. Moreover, it has recently completed a reengineering effort designed to focus the agency’s entire structure on customer service. Transferring nautical charting to DMA would, of course, obviate the wasteful duplication of effort inherent in DMA’s plans to produce its own charts of U.S. waters — duplication that Congress sought to end almost 100 years ago (see pages 12-13).

Despite these potential advantages, the panel believes that assigning extraneous missions

⁶⁰Politics, Position, and Power, Fourth Edition, Oxford University Press, pp. 339-340.

From: Politics, Position, and Power, by Harold Seidman and Robert Gilmour, Fourth Edition, pp. 339-340.

Concluding Observations

- 1. What is the nature of the constituency that is being created, or acquired, and to what extent will it be able to influence policies and program administration?**
- 2. Is the constituency broadly based or does it represent narrow interests antithetical to some of the public purposes to be accomplished by the program?**
- 3. What committees of the Congress will exercise jurisdiction and to what extent do they reflect the interests of the constituencies to be served by the program or those of groups hostile to program objectives?**
- 4. What is the culture and tradition of the administering department or agency? Will it provide an environment favorable to program growth, stunt development, or produce a hybrid?**
- 5. What are the constituencies to whom the administering agency responds? Would there be any obvious conflicts of interest?**
- 6. Where are the loci of power with respect to program administration: the President, the agency head, the bureaus, congressional committees, professional guilds, interest groups, and so on? Are provisions made to ensure an appropriate balance of power and to prevent domination by any single group? Are the ultimate powers of the president protected and supported?**
- 7. To what extent and in what way is access to those with decision-making power limited?**
- 8. Does the program design foster dominance by a particular professional perspective and will this result in distortion of program goals?**
- 9. Is provision made for an "open" system engineered in such a way that there are no built-in obstacles to joint administration with related government programs and cooperative efforts?**
- 10. What safeguards are provided to ensure that no group or class of people is excluded from participation in the program and an equitable share in program benefits?**
- 11. Do the type of institution and proposed organization provide the status, visibility, public support, and administrative system appropriate to the function to be**

to DOD is not generally wise. First, it may detract from the effective performance of the department's primary duties. Second, such functions are not likely to be accorded high priority, especially since they would be in competition with defense programs for resource allocation. In a period when the government is striving to make federal agencies more attuned to customers' needs, it would be counterproductive to assign to a defense agency a function on which diverse civilian customers depend.

To the extent that there is a basic organizational framework of the federal government, it is that functions ought to be assigned to a particular department or agency on the basis of their fit with the mission and purpose of that department or agency.⁶¹ Charting and geodesy functions are more closely aligned with the major purpose of at least three other executive departments than they are with that of DOD.

Corps of Engineers

As previously mentioned, the U.S. Army Corps of Engineers modifies ports and navigation channels, and supplies information on such modifications for updating nautical charts. It also has extensive experience in contracting.

Although the clientele of the Corps' civil functions is civilian, some of the factors discussed above with respect to DMA would militate against a transfer of charting and geodesy functions to the Corps. The staffing of the Corps' civil functions is almost entirely civilian, but they are headed by a military officer, and are a component of a military organization in DOD. Nautical charting and geodesy would have to compete for attention with long-established Corps functions. Accordingly, the panel would not favor reassigning these functions to the Corps. This conclusion might bear reexamination if the Corps were transferred to a civilian department. However, no serious attention has been given to such a reorganization for a number of years.

An Independent Agency

Bills in both houses of Congress proposed to include virtually all of NOAA in a new, independent science agency. However, H.R. 1756, as reported, would transfer nautical and aeronautical charting to DMA, and geodesy functions to USGS. And S. 929, as reported, would transfer aeronautical charting to the Federal Aviation Administration. If a bill making NOAA an independent agency, with nautical charting, were to be enacted, the panel believes that this arrangement would provide a more effective location for that function than would the Department of Defense. However, it would not likely mitigate, and might exacerbate, the problem of the low priority heretofore given to this program within NOAA.

Department of the Interior

The Department of the Interior (DOI) has responsibility for most nationally owned public lands and natural resources. The department's USGS provides information about the earth and its physical resources. Its National Mapping Program (NMP) provides geo-

⁶¹See Report of "First Hoover Commission," General Management of the Executive Branch, 1949.

graphic, cartographic, and remote sensing information, maps, and technical assistance, and also conducts related research responsive to national needs. The NMP also makes available maps, images, spatial data, remote sensing data, and related information; provides assistance in selecting, acquiring, and using geographic and cartographic products; and designs, prints, and distributes maps of the National Atlas. The Secretary of the Interior chairs the FGDC, an interagency group that provides policy guidance for agency efforts to coordinate geographic data activities.

One of the House-passed bills to abolish DOC (H.R. 2491) would have transferred nautical charting and geodesy functions to USGS. The two agencies already have close working relations. USGS uses NOS hydrographic data when mapping coastal areas. Both agencies are members of the FGDC and its subcommittees.

Geodetic Survey functions have some synergy with those of USGS, which produces a wide variety of maps. While the orientation of USGS is, like that of NOAA, primarily scientific, its topographic mapping function — like nautical charting — is largely operational. The functions of NGS in NOS have always had and continue to have a scientific character. NGS' activities have been transformed since the advent of GPS technology, which it helped to foster. Further, another more scientific portion of NOS' geodesy work is the responsibility of the Geosciences Laboratory, which is being transferred to NGS.

Transferring NOAA to DOI was among the proposals considered during the development of legislation to abolish DOC. In fact, when it was first established, locating NOAA in DOI was a strong possibility, but (for reasons not now relevant) the decision was made to vest it in DOC.

Assigning nautical charting and geodetic survey functions to USGS, with or without the rest of NOAA, would probably not significantly improve their reputedly “second class” status in competition with more scientific programs, although they would not likely be any worse off than the existing mapping functions of USGS. The question of priority would ultimately depend on the attitudes of DOI and USGS leaders, and on their ability to “sell” the program to Congress should they decide to propose more resources for it than has NOAA.

The matter of congressional jurisdiction could be especially important here (see item 3 in text box on p. 66). If the functions were assigned to DOI, Congress might shift jurisdiction to the committees handling its programs. Those committees, like DOI itself, have a focus on lands, water, recreation, and wildlife, especially in the western part of the nation. They could not be expected to be particularly supportive of marine navigation functions. The panel does not favor the transfer of nautical charting and geodesy to USGS or DOI.

Department of Transportation (DOT)

As noted earlier, the aeronautical charting function of NOS is not included in the scope of this study because DOC had previously determined that this function, which receives roughly \$16 million annually from the Federal Aviation Administration (FAA) should be transferred to FAA because it primarily supports aviation. This proposed transfer accords

with the organizational theory that functions should be assigned to a particular department or agency on the basis of their fit with the major purposes of that department or agency.

Nautical charting, of course, supports maritime transportation in much the same way that aeronautical charting supports air transportation. The U.S. Coast Guard, a DOT agency, is perhaps NOS' closest collaborator. It provides much of the data, for example, on new or relocated navigation aids that NOS incorporates in its chart revisions. The Coast Guard is not only a principal supplier of NOS information but is, of course, also a principal user. Accordingly, the panel believes that the nautical charting function could logically be transferred either to the Coast Guard or to another location in DOT.

One NOS official observed that "we had it right for almost 200 years," when a Coast and Geodetic Survey was responsible for both nautical charting and geodesy. The panel agrees that these functions should be kept together. If nautical charting and geodesy are kept together and both functions are transferred to DOT, the question arises whether the Coast Guard is the best place for them. Unlike nautical charting, geodesy does not fit well with the Coast Guard's mission. So another location in DOT should be considered.

In sum, the panel thinks it would be sound policy to assign charting and geodesy functions to the agency whose major purposes they most directly support: DOT. The rationale for such a transfer is similar to that underlying the DOC proposal to transfer aeronautical charting to FAA, whose mission it directly supports. Further, DOT has a long and successful working relationship with DOD. The panel believes that DOT would not have allowed a dispute with DMA to reach a point where DMA refused even to discuss the funding and service issues further. Finally, DOT already has many responsibilities relating to transportation safety, and regards safety as a high priority concern. Therefore, it is very likely that the department would push strongly to bring nautical charting to the level of currency and accuracy that it demands for aeronautical charting.

These considerations argue strongly for placing all three functions somewhere in DOT, but **not** in FAA or the Coast Guard. There is some precedent for lodging such functions at the departmental level, rather than in one of the modal administrations. Until recently, there was an Office of Space Transportation reporting directly to the Secretary. But a more appropriate location, consistent with DOT's traditional organizational structure, would be in the DOT Research and Special Programs Administration, which already has operational and regulatory functions regarding hazardous materials transportation and pipeline safety. Another possible location in DOT would be the recently-established Bureau of Transportation Statistics.

Department of Commerce/NOAA

As noted above, there is always a presumption in favor of leaving an organization where it is, unless there are compelling reasons to move it. NOAA, like DOT, has important safety concerns. Protection of life and property is a primary NOAA mission and underlies much of the National Weather Service program. Except for the current impasse with DMA, NOAA also has had a successful working relationship with DOD, for example, in meteorology, oceanography, and satellite convergence.

Nonetheless, the panel has commented on DOC's uncertain future, the congressional efforts to relocate nautical charting and geodesy functions, and on the low priority given to these functions in the past by NOAA and DOC. While any one of these issues might lead to a proposal to transfer the functions, the panel also noted that consideration should be given to what harm might be done to the performance of other NOAA functions if charting and geodesy were to be removed. Some congressional proposals would preserve NOAA (albeit, in some House versions, **without** nautical charting and geodesy), while dismantling DOC. Therefore, the panel considered the advantages of leaving nautical charting and geodesy services in NOAA, wherever it might end up.

Some NOS personnel have suggested that the National Coastal Service might be a more appropriate name for NOS, as its concern with ocean waters is primarily coastal. The fact that the geodetic functions of NGS would be an anomaly in a "coastal" agency is no different from its present anomalous location in an "ocean" agency. What is more important is that there are some significant synergies with other parts of NOS, such as coastal resource management, conservation, and assessment, including oil spill response. Moreover, the nautical charting and tides and current prediction functions of NOS have important synergies with other parts of NOAA, notably the weather service, the marine fisheries service, and the environmental satellite service.

At present, NOS strives to serve as a "convening agency" on coastal matters. It has had some success in doing so because NOS coastal activities, together with other NOAA activities affecting the coastal areas, constitute a "critical mass" of responsibilities, which makes NOS an appropriate convener. Moving nautical charting functions out of NOAA might well impair NOS' ability to serve this function. Moreover, wherever else nautical charting might go, there would probably not be enough concentration of coastal responsibilities there for the new agency to serve this function. Consequently, the U.S. interests in managing issues affecting coastal areas might be jeopardized.

Conclusion

The panel has carefully considered what would be the best location for the PBO it is proposing. However, it wishes to stress that location, alone, will not determine the success or failure of this organization. The conditions for success include a coherent mission, a clear charter, sufficient autonomy, strong leadership, a dedicated work force, and a commitment to customer service. With all of these, and support from its parent agency in the process of securing the resources needed to carry out an effective program, it should succeed wherever it is based. However, considering the years of relative neglect in its current organizational home, where its mission is not clearly vital to other programs of NOAA or DOC, the panel has concluded that the prospects for support would be much greater in DOT, where the PBO's mission would strongly complement the other transportation services of the department, than they are in its current organizational location. This conclusion **assumes that aeronautical charting**, which the panel did not review, **would be moved to DOT** (rather than directly to FAA) along with nautical charting and geodesy.

The Academy panel recommends that the administration:

- **Propose legislation to transfer nautical charting and geodesy functions to the**

Department of Transportation, in recognition of the strong contribution made by these functions to the efficiency and safety of marine, highway, rail, and pipeline transportation.

Organization Design

CHAPTER

8

A Business or Performance Plan

LIMITATIONS OF BUSINESS OR PERFORMANCE PLANNING FOR A NEW PBO

The contract with the Academy called for the development of a business plan for the enterprise organization that the panel was asked to study. For a number of reasons, discussed throughout the foregoing chapters, a full-fledged business plan cannot be presented here. Among them:

- The PBO proposed by the panel is currently raising revenues from product and service sales equal only to about eight percent of direct appropriations.
- Major increases in the revenue-raising potential of the PBO are dependent on changes in longstanding and deeply-entrenched statutory and administration policies that currently require the principal costs of the functions addressed in this study to be borne by the general public, rather than by direct users of the products and services.
- Absent such changes, an aggressive and highly successful effort to cut costs, and expand markets and sales, would have only a marginal impact on the percentage of total costs recovered; and without new legislation, even those funds would not be available for use in support of the program.
- Nautical charting functions are now receiving significant support from funds contributed (at OMB's direction) by DMA, an agency with which NOS has no more than an unwritten agreement, and which is proposing to reduce unilaterally its contribution during the next fiscal year, and to terminate it after that.
- The prospects for increased appropriations in a time of continuing, even worsening, resource constraints are not good.
- The nature (and cost) of program operations depends in part on the existence of the NOAA Corps and the NOAA fleet, both of which have been targeted for termination by elements of Congress and the administration, although their fate remains uncertain.

- Rapidly changing technologies will have a significant impact on both program expenditures and revenues for charting and geodesy functions; the panel was not charged with assessing such technological developments, and did not do so.

What this adds up to is a charting and geodesy PBO that cannot be the master of its own destiny. Nevertheless, the panel is confident that a new organizational structure, status, and culture can emerge from the recommendations in this report. Therefore, the panel is making some forecasts of program accomplishments over a five-year period, the expenditures needed to achieve them, and the sources of revenues required to finance them. These forecasts might better be termed part of a “performance plan” than a “business plan.” The forecasts assume that authority **will be granted** to deposit revenues in a revolving fund for use by the agency.

Like all other agencies, NOS has had to develop a five-year plan each year as part of the budget process. The project staff informally reviewed NOS plans for the next period, which are still under development. But until such plans mature and become part of the administration’s program, the panel could not use them as a basis for its own projections. So the panel begins with a review of the budget proposals now before Congress.

THE FISCAL YEAR 1997 BUDGET

NOS’ FY 1997 budget proposes appropriations of \$47.4 million for nautical charting, and geodesy activities. Including the relevant portion of funds appropriated for marine predictions, the NOAA Corps, NOAA fleet, aircraft services, and overhead, the total of appropriated funds would be about \$79.4 million. Of this, the 1997 budget proposes that \$45.5 million be financed by appropriations from the HMTF. The budget assumes that such appropriations would be matched by reductions in other appropriated funds so that the program level would not be affected.

NOS estimates a need for \$9.3 million from DMA in order to maintain current marine navigation services. DMA has stated, however, that it plans to reduce its support for nautical charting to \$7 million in 1997 and to zero in 1998. Even that \$7 million is uncertain since DMA and NOS may not have the same understanding about the portion of DMA’s support that is used for aeronautical charting. Assuming that the \$7 million includes aeronautical charting, which DOC has proposed to transfer to FAA, NOS would allocate 70 percent, or \$4.9 million, to nautical charting.

If DMA were to pay something in the neighborhood of \$7 million, and other reimbursements continue at about \$2.3 million, the FY 1997 budget would add up to about \$89 million. Using categories shown in NOAA’s budget presentations, the 1997 budget would be as shown in Table 8-1 on the next page.

Income

Against this total of nearly \$89 million, receipts from the sale of nautical charts (which the panel recommends be retained for use in a revolving fund) are estimated at \$6.5 million. This is the amount collected for FY 1995, without reflecting any possible variations, such as changes in chart sales or prices.

Receipts are based on a calculation of “recoverable costs,” which include nautical chart printing, distribution, compilation, and database management. The official budget category that most closely approximates these functions is “Build Nautical Charting Database.” If the \$6.5 million in receipts were compared with the budget figure for that category, cost recovery would be estimated at only 52 percent in FY 1995 and 44 percent in 1996 and 1997. This is far lower than the agency’s calculation of 92 percent cost recovery, which is the ratio of the chart price of \$14.00 to the estimated \$15.28 per chart in allowable charges. (A significant part of the difference in percentage of allowed costs that are recovered stems from the fact that the majority of charts are sold at wholesale prices to dealers so that the \$14.00 per chart price is not representative of the revenues actually raised.)

**TABLE 8-1: NAUTICAL CHARTING AND GEODESY IN
FY 1997 BUDGET (\$ millions)**

Category	1995	1996	1997
▪ Build Nautical Charting Database (includes printing and distribution)	12.6	15.1	14.9
▪ Update Nautical Surveys	28.4	29.2	27.6
▪ Provide Marine Predictions	12.8	11.4	11.4
▪ Establish National Spatial Reference System	19.7	19.6	19.3
▪ Fleet Modernization and Conversion*	0.8	1.4	2.6
▪ Other*	3.5	3.4	3.6
▪ Total, Appropriated Funds	77.9	80.1	79.4
▪ Reimbursements (including DMA)	15.8	10.9	9.3
Total Program	93.6	91.0	88.7

* Portion allocable to nautical charting

PROJECTED FUTURE BUDGETS

With the uncertain foundation of an FY 1997 budget that depends in part on continued contributions from DMA, projecting for the future is equally uncertain. NOS is currently considering a proposal to increase appropriations for charting and geodesy functions. Significantly, NOS is not now planning to propose an increase in funding for any of the functions relating to the preparation and printing of nautical charts.

The NOS proposal that emerges could, however, have an impact on the level of nautical charting activity in a number of areas. The anticipated changes in the areas described below have not reached the status of official budget projections, nor are they a complete report of what is under consideration in NOS. Rather, they represent informed thinking as to where the future might lead NOS programs.

Increase in Number of New Editions

NOS now estimates that, within its base funding, improvements will continue to be made in the process of compiling and printing nautical charts. Having moved increasingly to electronic data management, compilation, and printing techniques, NOS' plans call for increased conversion to digitally-based methods of chart production. The plan would set a goal of increasing the percentage of the chart suite that can be updated regularly. If this goal is reached, NOS estimates that it could significantly increase the number of new editions each year.

This will not happen, however, unless the problem of the DMA payment, which has been used for compilation and data base management, is resolved. Without either a continued payment at the current level, or the substitution of appropriated funds, NOS will not be able to meet the program objectives that it is considering. The panel has recommended that OMB require continuation of the DMA payment for at least three years. The assumption of continued funding from this source, or from additional appropriations, is a significant element of the panel's illustrative performance plan.

Although not reflected in NOS' current projections, the production of new editions should result in some increase in total sales and revenues, which the panel assumes will be made available to NOS for reuse as a result of legislation.

Increasing Nautical Surveys and Updating Survey Systems

NOS plans call for beginning to resurvey and remap bottoms and shorelines that have not been looked at for decades. NOS proposes to update its own equipment, as well as to increase contracting. This would allow NOS to increase its level of critical areas resurveyed.

Combined with NOS' ability to produce new editions at a faster rate, the availability of more up-to-date data should also result in some increase in income from chart sales.

Geodesy—GPS Height Exploitation

NOS is planning an initiative for the NSRS that would renovate the existing coordinate reference system to provide higher accuracy and different accessibility for use with GPS. Improvements in height reporting are needed for a variety of purposes, including storm surge modelling, crustal motion projects in coastal areas, mapping and charting of all kinds, property delineation, and so on. Such improvements are also very important for navigation, both in the air and at sea. In addition, improvements in the National Height System (NHS) will be important in measuring tides.

Water Levels/Physical Oceanography Real-Time Systems (PORTS)

NOS also plans to complete the National Water Levels Observation Network (NWLON) and to expand the PORTS system. Real-time tide and water level information, which is critical for safe navigation, marine boundary determinations, and coastal flood warnings, is also of potentially great value in combination with new electronic charting technology. Hybrid products now under development could display real-time tide and current information right on the chart.

OTHER PANEL PROJECTIONS

The Market

As discussed in Chapters Four and Five, technological developments are rapidly reshaping geodetic and nautical charting products and markets. Geodesy customers will be receiving data and technical assistance primarily. Customers for nautical charts will increasingly want electronic forms, although the market for paper charts for the 17 million U.S. recreational boat owners is likely to remain for some time.

As previously discussed, NOS has no significant competitors for geodesy services, but has many in the area of nautical charting. Among them are private firms and foreign governments that produce maps based upon NOS charts; looming on the horizon is the emergence of DMA as a competitor in the production of charts for U.S. waters. NOS has lacked the financial resources to produce digital charts, but DMA evidently is not similarly constrained.

Income Generation from Chart Sales

A straight-line projection of the \$6.5 million in receipts from sale of nautical charts does not take into account possible changes that the panel believes are desirable and feasible. This report has described the growing market for electronic chart products, and has suggested a number of possibilities for increasing sales of paper charts through improved marketing efforts.

A major thesis of this report is that, given the proper incentives, the PBO's staff will take steps to increase income. Establishment of a revolving fund within a PBO that depends on sales receipts for a portion of its operating budget should create a powerful incentive. The panel has also recommended the establishment of a simple, uniform policy and procedure for establishing charges for products and services.

As discussed above, there is increased income potential simply from producing a larger number of new editions with more up-to-date and accurate data. Increased sales and income will not, however, occur automatically. Not only will the PBO need to produce products that its customers want, but it must have a strong marketing effort. If new editions and better data are aimed primarily at the "captive" market of commercial users, increases in income will be small, because that market is small — some 75,000 commercial vessels are required by Coast Guard regulations to carry current nautical charts. If, on the other hand, new products are designed to appeal to the huge market of recreational boaters (17 million boats), then a dramatically different picture could emerge.

In any event, most increased chart sales are likely to be to map producers, who are now both customers and competitors to NOS. Unless the PBO sets out to displace such producers, they probably will continue to be the principal source of nautical charting products for the recreational boater.

Public sales of conventional nautical charts, mostly through agents, totalled approximately 435,000 last year. If more and better editions produced a five percent increase in sales, it would result in about 21,750 more charts sold. Agents pay 60 percent of the public price

of \$14.00, or \$8.40 per chart; thus, a five percent increase in volume would yield additional income of \$182,700. (If this income resulted from increased expenses in activities not subject to cost recovery, the added revenue would not all be a net increase.)

Cost Reductions

A fundamental premise of a PBO is that it creates both the incentives and the opportunity to cut costs. The incentives will come from the chief executive's performance agreement, the performance measures by which the various parts of the agency will be judged, and the "no-year" money that the panel has recommended, as well as from the right to retain receipts from sales and fees for program operations. The opportunities will come from greater flexibility in personnel, procurement, and financial management, for example through better planning, reengineering, more efficient deployment of personnel, contracting, or giving managers more flexibility to manage by dollars, rather than by FTEs and other inputs, which is sometimes known as "manage to budget."

Increased Prices

As discussed in Chapter Six, a small increase in price to reflect allowable charges under the current interpretation of the law could bring in about \$500,000 more. Over the longer term, however, this might be offset under current statutory prescriptions if the costs of chart production that are subject to cost recovery decline.

CRADA Income

This report has already discussed income received from revenues and profits on the sale of raster charts by NOS' private CRADA partner. Under the FTTA, the agency may retain this income and use it for further research and development, but cannot use it for general agency purposes. The income so far is quite small, but has the potential for growing significantly. Project staff have estimated that income could be about \$65,000 in FY 1997, based on the sale of about 10,000 disks. This possible income has not been included in NOS' income forecasts.

With rapidly growing sales expected by both NOS staff and private firms selling these electronic charts, a goal for sales of 100,000 disks a year is not unreasonable, perhaps within a five-year period. Depending on the profits made, this could result in income for the PBO between \$650,000 and \$2 million. Project staff have assumed income of \$1 million. An unknown factor is the possible negative effect of increased electronic chart sales on paper chart sales. However, any negative effect is likely to be greater for sales of paper charts generated by private producers than for PBO sales.

Geodesy Prospects

Currently included in the budget is the \$375,000 from geodetic product sales that the agency is allowed to retain. While the panel has no expectation that these sales will increase dramatically, research by the project staff suggests that there have been missed opportunities for charges for geodesy services. Although there is no firm basis for making an estimate, the panel believes that inclusion of geodesy in a PBO with greater incentives to charge for services should result in at least a modest increase in income for such activities — perhaps another \$50,000, to bring the geodetic total up to \$425,000.

Other Income Possibilities

The panel has made a number of other income-raising recommendations that, though unquantified, could have very significant effects. The principal ones are:

- seeking copyright and trademark protection, and licensing the right to produce charts with an NOS seal
- expanding the basis for recovering costs beyond the present compilation, data base management, and printing and distribution limitation
- establishing value pricing and/or differential charges, especially for new electronic products, and setting charges on a market rather than a cost basis.

The panel is unable to make specific estimates of the income that might result from implementing these recommendations, especially given the uncertainty of defining the total market, as explained in Appendix B. The impact of these measures, also, will depend on how they are administered. Prices could be set so high, for example, that they would encourage the development of alternative sources and strengthen the existing competition. New product development, on the other hand, could help by expanding the total market.

SUMMARY

Increasing Revenues

Despite all the uncertainties, the PBO clearly can take steps to maintain or increase revenues, such as the following:

- holding the line on expenditures for compilation, database management, and printing and distribution
- setting higher goals for chart production
- increasing chart prices to allowable levels, as well as determining if it has underestimated what is allowable cost recovery
- reducing costs

These steps could significantly increase the percentage of cost recovery. Estimates for additional revenues from increased production and prices total \$682,700. Adding that to the \$6,558,000 base receipt level would bring total income to \$7,240,700.

Additional Income Possibilities

Simply reflecting what is already happening in the raster chart area and setting specific numerical goals could produce substantial additional income, ranging up to \$1 million. Adding this source of income to others, the PBO could be generating in excess of \$8 million per year at the end of five years, not counting whatever else the panel's legislative proposals might bring in.

The panel was informed that in Canada a 20 percent cost recovery figure has been achieved for nautical charting, and that has created the kind of entrepreneurial climate that the panel is seeking with its PBO proposal. The PBO could well adopt 20 per-

cent cost recovery as a long-range goal, after the implementation of the panel's financing recommendations.

Appropriations

Expenditures subject to cost recovery under current statutory and administration policies amount to about eight percent of direct appropriations. As discussed in Chapter Six, it is clear that some portion of the data acquisition costs could be regarded as a special benefit to the users of nautical charts. The panel has recommended that the PBO be permitted to recover a substantially-enlarged portion of the full costs of developing nautical charts. Of course, some costs would still require support from appropriations, whether from one or more trust funds or from general tax revenues, and that is consistent with existing statutory and administration policies.

Table 8-2 portrays an illustrative five-year program, showing expenditures and revenues by major categories. The table is intended to show some of the possibilities for program enhancement as a result of the panel's recommendations for a PBO. It assumes that the PBO's status and authority will result in cost savings and revenue growth. It **does not assume**, however, the passage of legislation authorizing copyright or seal protection, or any expansion of the scope of costs that can be recovered from users.

TABLE 8-2: ILLUSTRATIVE FIVE YEAR PROGRAM, 1998-2002
(\$ millions)

Function	1998	1999	2000	2001	2002
▪ Compilation and Data Base Management	18.7	18.8	19.1	19.4	19.6
▪ Printing and Distribution	2.0	2.0	2.0	2.0	2.0
▪ Surveys	28.0	28.6	29.0	29.5	29.9
▪ Tides and Water Levels (Observation and Prediction)	17.4	17.4	17.4	17.4	17.4
▪ Geodesy and Other	27.0	27.1	27.1	27.2	27.2
Total Program	93.1	93.9	94.6	95.5	96.1
▪ Receipts from CRADA payments	0.1	0.2	0.5	0.8	0.1
▪ Receipts From Chart Sales	7.1	7.6	8.0	8.4	8.8
▪ Reimbursement From DMA	9.3	9.3	9.3	9.3	9.3
▪ Receipts from Geodesy Sales	0.3	0.4	0.5	0.5	0.6
▪ Other Reimbursements					
Total Receipts	1.9	1.9	1.9	1.9	1.9
▪ Appropriations	18.7	19.4	20.2	20.9	21.6
	74.5	74.5	74.5	74.5	74.5

Following are some important assumptions that were used in developing these illustrative expenditures and revenues:

- The \$6.5 million from chart sales now going to the Treasury will be retained by NOS, and used to offset appropriations.
- The PBO will achieve a three percent per year reduction in costs, and savings will be applied to program operations. For purposes of the table, savings support the same program, but they could be reprogrammed.
- Receipts from chart sales will increase at five percent a year, with increased income applied to data acquisition.
- CRADA receipts will be used for compilation and data base management.
- The appropriations level — whether direct or funded by transfer from trust funds — will remain constant (after downward adjustment from estimated \$80 million level in FY 1997 to reflect retention of receipts).
- Printing costs will not change, although some reduction is certainly possible, depending on the results of the recommended review of limited privatization of this function.
- No provision is made for inflation.

PERFORMANCE MEASURES

A key element of a PBO is the development of performance measures that become part of the framework agreement and the contract with the chief executive. Such measures have to be selected with care to assure that they are meaningful, rather than merely convenient. Goals set should be both ambitious and realistic. In turn, the chief executive will hold subordinates accountable for the achievement of performance measures, some of which may apply to the agency itself, and some of which may apply only to the relevant organizational units.

A good deal of work will be required to establish appropriate measures and goals. The panel is simply offering the following as a list of items that might be used as quantitative or qualitative performance measures:

- number of new surveys
- number of new chart editions with high sales volume
- number of new chart editions with low sales volume
- number of charts sold to federal and state government agencies
- number of charts sold for private sector use, divided between commercial and recreational if feasible
- revenues from paper chart sales
- revenues from electronic products
- number of customers served by NGS
- revenues from geodetic services
- revenues for tides and current data
- number of new chart products

- number of new geodetic products or services
- customer satisfaction, based on surveys of federal and state agencies and commercial and recreational ship/boat owners
- number of cooperative agreements with states, and estimated level of state effort
- number of cooperative agreements with private firms and estimated private investment resulting
- productivity increases and cost reductions
- employee satisfaction
- response time for congressional inquiries

CHAPTER 9

Implementation

SUMMARY OF RECOMMENDATIONS

The Academy panel's recommendations appear in various chapters. They are presented below, but grouped in such a manner as to provide an overview of what the panel is proposing. Following the recommendations are page citations to facilitate reference to the relevant discussions underlying the recommendations.

The Academy panel recommends that:

- **Responsibility for nautical charting and geodesy should remain in the federal government and the relevant activities be performed by federal personnel or by contractors, based upon determinations of what method will be most cost-effective in meeting the public's needs.** (page 33)
- **The administration vest nautical charting and geodesy functions in a Performance Based Organization (PBO) with the following characteristics (some of which require legislation):** (page 63)
 - a clear, operational mission, with policy responsibility (such as representation of the U.S. at the International Hydrographic Organization) vested in the office to which the organization reports
 - a Chief Executive, hired on a four-year term appointment on the basis of qualifications for the office, held accountable for results, and compensated at market rates and with incentives for meeting or exceeding goals
 - a culture and methods of identifying its customers' needs, and of setting its priorities so as to meet those needs
 - revolving fund for depositing revenues derived from the sale of products and services, including funds derived from products developed under the Federal Technology Transfer Act
 - appropriated funds made available without fiscal year limitation
 - authority and responsibility to raise revenue through sales and fees to cover as much of its costs as is feasible

- performance measures and goals (such as frequency and accuracy of updated charts, revenue raising, cost sharing and cooperative agreements, productivity improvements, cost savings, and customer satisfaction) after review of possible “benchmark” measures used by comparable organizations in the United Kingdom and in Canada, as well as by public and private organizations in the United States.
- a four-year “framework agreement” to set goals
- flexibilities in personnel management through extension of the Title 5 demonstration authority, which would allow “broad banding,” authority to determine premium pay (e.g., overtime) rates, and expedited proceedings for appeals of adverse actions; in procurement management (such as authority to limit appeals of awards made); and in financial regulations and procedures (such as authority to “manage to budget,” which would provide for controls over numbers of personnel through the budget, rather than through FTE ceilings)
- The PBO intensify efforts to inform leaders in the executive branch and Congress of the serious safety and environmental implications of deficiencies in charting activities, as well as the potential benefits of improvements; and, to the extent authorized by law, expand related information programs for users. (page 53)
- Congress allow the PBO to retain in a revolving fund for reuse the revenues derived from the sale of products and services, including funds derived from products developed under the Federal Technology Transfer Act. (page 42)
- Congress grant copyright protection for nautical charts, and NOAA continue to seek trademark protection for the NOAA seal from the Patent and Trademark Office, or from Congress, if necessary. (page 35)
- Congress authorize the PBO to recover a substantially-enlarged portion of the full costs of developing nautical charts through the fees charged; and criteria be established for charging all purchasers of such charts either on a uniform basis or on the basis of an appropriate schedule of differential charges. (page 47)
- Congress authorize the PBO to charge fees for licenses to use trademarked or seal-protected PBO documents, and allow the PBO to price electronic products on a market rather than a cost basis. (page 46)
- OMB require the Defense Mapping Agency to continue its contributions to the cost of chart development for at least the next three years, provided that NOS includes as one of its performance goals meeting the needs of DMA, and allow DMA to make a business decision for the fourth year based upon NOS performance. (page 48)
- NOS, in cooperation with NOAA staff, develop modifications in accounting to identify all charges and income properly attributable to nautical charting and geodesy functions. (page 39)
- NOS work with OMB and Congress to arrange that funding all personnel and ship operations costs in support of the relevant functions, whether contracted or not, be subject to accrual accounting, and that all funding be under the full control of the executive in charge of the program. (page 30)



- **The PBO evaluate the degree to which allowing the private sector to print nautical charts, based on a data base provided by it in return for license fees paid, can be accomplished without jeopardizing the assured availability of charts for all locations now included in the suite of charts.** (page 47)
- **The PBO develop a simple, uniform policy and procedure for establishing charges for products and services (both standard and customized) so that customers for various services and products are not treated differently.** (page 41)
- **NOS increase chart prices to the full charge now authorized by law, i.e., from \$14.00 to \$15.28, and reevaluate its methodology for computing allowable charges.** (page 44)
- **The PBO conduct a periodic review of the relationship of the price of charts to the cost of chart production, and establish a schedule for price revisions, taking into account the current or potential availability and prices of products from alternative sources.** (page 44)
- **NOS avoid taking steps now (such as making increasing amounts of data available electronically at no charge to users) which would compromise its ability to develop income in future years.** (page 46)
- **NOS continue to seek appropriations of funds from the Harbor Maintenance Trust Fund, as well as initiate a request for appropriations from the Oil Spill Liability Trust Fund, but only in amounts that would otherwise come from appropriated funds rather than from user charges.** (page 53)
- **The PBO be exempted from liability for damages resulting from alleged deficiencies in nautical charts, as has been done for the Defense Mapping Agency.** (page 33)
- **The PBO develop cooperative agreements with private firms, providing for cost or revenue sharing.** (page 34)
- **The PBO develop cooperative agreements with state governments for providing data to be incorporated into NOS charts, and for other purposes.** (page 34)
- **The administration propose legislation to transfer nautical charting and geodesy functions to the Department of Transportation (assuming that aeronautical charting is also transferred) in recognition of the strong contribution of these functions to the efficiency and safety of marine, highway, rail and pipeline transportation.** (page 71)

IMPLEMENTATION PLAN

The panel was asked by NOS to develop a “legislative proposal,” along with its organizational recommendations and proposed business plan. The foregoing recommendations contain: (1) some items that require legislation; (2) some that do not require legislation; and (3) some that might be accomplished without legislation, but that could prove infeasible to accomplish except through legislation.

Following is the panel’s analysis of the three categories of actions needed to carry out its recommendations. The panel anticipates that action could or should occur on the legislative items in 1997. After each of the other items, the year or period indicates when the panel believes action ought to be taken.

Legislation

Legislation is required to permit:

1. Hiring the Chief Executive Officer of the proposed PBO on a four-year term appointment. In order to meet constitutional requirements, the appointment power should be vested in the head of the agency in which the PBO is located.
2. Establishing a revolving fund, in which receipts from the sale or licensing of products or services (or from cooperative agreements under the FTTA) can be deposited for reuse by the PBO.
3. Making appropriations available without fiscal year limitation (“no year” money).
4. Revising appropriations accounts so that all funds that support nautical charting and geodesy activities are included in a single account for those functions.
5. Extending copyright protection to nautical charts, whether paper or electronic, and charging of sales or license fees for use of such products.
6. Charging fees to users of nautical charts that will recover a portion of the costs of data acquisition.
7. Limiting liability for nautical charts, whether produced directly by government personnel or by contract.
8. Making funds available for nautical charting from the Harbor Maintenance Trust Fund or the Oil Spill Liability Trust Fund.
9. Transferring nautical charting and geodesy functions to the Department of Transportation.

Administrative Action

Administrative action should be taken to accomplish the following steps:

1. Develop some performance measures for the PBO as a whole. (1996-97)
2. Develop a four-year “framework agreement” between the PBO and its parent agency. (1996-97)
3. Develop a four-year performance agreement between the department head and the Chief Executive Officer. (1996-97)
4. Develop a more consistent and persuasive rationale for explaining the public’s need for investments in nautical charting and geodesy. (1996-97)
5. Develop an organizational culture that recognizes and values customer service as a key objective of the PBO. (1996 et seq.)
6. Agree on a three-year transition period during which the Defense Mapping Agency is required to make a contribution to the costs of chart development (in lieu of paying the full charges for charts that are levied on other users). (1996)
7. Increase chart prices to the maximum currently allowed and reevaluate the methodology for computing allowable charges. (1996)
8. Adopt a simple, uniform policy and procedure for setting charges for products and services. (1996-97)
9. Periodically review and revise prices for nautical charts and other products and services. (1997 et seq.)

10. Review evolving methods for electronic dissemination of information with a view toward safeguarding or expanding the potential revenues to be earned from the PBO's products and services. (1996 et seq.)
11. Determine, on the basis of cost-effectiveness, what portion of data acquisition, compilation, database management, and chart printing or production and dissemination should be contracted. (1997 et seq.)
12. Determine whether any part of paper or electronic chart printing or dissemination can or should be fully privatized. (1997-98)
13. Develop cooperative agreements with state governments and with private firms. (1996 et seq.)
14. Develop performance measures for the various units of the PBO and for individual personnel. (1997 et seq.)

Other Actions

Recommended actions that might require legislation:

1. Provide trademark or seal protection for NOS products. (1996-97)
2. Allow the PBO to use the demonstration project authority under Title 5, without regard to whether the personnel reforms replicate those already adopted by other agencies under that authority. (1996-97)
3. Expedite the procurement process and focus on mission accomplishment as the principal objective. (1996 et seq.)
4. Eliminate controls on numbers of personnel, on reprogrammings and on other shifting of funds in the budget. (1996-97)

APPENDIX

A

Human Resource Management Issues

INTRODUCTION

In support of the National Academy of Public Administration's study for NOS, the NOAA Office of Human Resources Management assigned a Personnel Management Specialist to the project staff as part of the Women's Executive Leadership Program. She conducted a study of current personnel management statutes and regulations, and proposals to vest new flexibilities and authorities in Performance Based Organizations (PBO). This report is based on her research and analysis but, as revised and presented here, it is a product of the panel's study.

The objective of the Human Resource Management study is to develop proposals regarding the use of existing personnel management authorities and the acquisition of additional authority. Such proposals are intended to allow the effective performance of NOS functions that the Academy panel is proposing to assign to a PBO. In addition, issues connected with the conversion of the NOAA Corps to civilian status were taken into account.

OVERVIEW OF EXISTING LAWS AND REGULATIONS

Title 5 USC Chapter 11, Section 1104(1), Delegation of Authority for Personnel Management states:

- the President may delegate, in whole or in part, authority for personnel management functions, including authority for competitive examinations, to the Director of the Office of Personnel Management and the Director may delegate, in whole or in part, any function vested in or delegated to the Director, including authority for competitive examinations (except ... for administrative law judges ...), to the heads of agencies in the executive branch and other agencies employing persons in the competitive service.

The Office of Personnel Management (OPM) prescribes personnel management regulations for federal agencies and maintains oversight to ensure that agency personnel management activities are in accordance with merit system principles and standards

prescribed in Title 5. Agency heads may prescribe internal personnel management policies and practices in compliance with the civil service laws, rules and regulations. They have considerable latitude in exercising personnel authorities in order to assure effective and efficient personnel management.

OPM has been working with the Office of Management and Budget and the National Performance Review in developing policies and practices proposed for the activation and functioning of PBOs. OPM has created a "template," dated March 1996, setting forth personnel authorities already available to federal agencies. This is intended to permit PBO initiatives to begin quickly without, in some cases, needing to seek new legislative authority. The template calls attention to the demonstration authority in Title 5 (see below). The flexibilities and authorities mentioned in the OPM template have been delegated from the Department of Commerce (DOC) to the NOAA Human Resource (HR) Management office and, in turn, have been redelegated by the HR office. But these have not always been redelegated by program managers to lower level managers. Below is a review of the existing authorities and flexibilities used by NOAA.

Staffing and Recruiting

The HR office has been given recruiting and examining authority but this authority is not being fully utilized because of the costs of developing and operating an examining unit. NOAA is using this authority for filling meteorologist positions in the National Weather Service only, because it is an occupation that is relatively standardized and high-volume. All other existing staffing flexibilities listed in the OPM template have been delegated to NOAA but, as noted, not all are being used by managers.

OPM assists agencies in examining and recruiting efforts, but has recently imposed a charge-back fee to agencies that use their services. In the meantime, NOAA continues to use its existing recruitment practices and is currently monitoring the volume, type, cost, and outcome of requests for OPM services to determine the most cost-effective approach.

Classification

A few years ago, DOC implemented a standardized position description library to streamline the classification process. The library is an automated system containing hundreds of pre-classified position descriptions that are used by agencies, HR service providers and managers throughout DOC. These are descriptions for positions that are most commonly used.

In mid-1995, NOAA managers were delegated final signatory authority when using position descriptions from the library. They may customize the position description by adding unique requirements, which can include a particular knowledge, skill or ability needed to perform the actual duties and responsibilities of the position. DOC is adding more positions descriptions to the library, including those of supervisors.

Compensation and Pay

NOAA has full delegation to exercise all mentioned authorities. Relocation, recruitment and retention bonuses are available to NOAA managers.

Performance Management

NOAA has deregulated its performance management system within the limitations of existing statutes. NOAA's current three-level system will eventually be replaced with a two-level system.

Dispute Resolution

With the abolishment of OPM's administrative grievance process, a NOAA Administrative order is being implemented. NOAA has an alternative dispute resolution program, part of which is under a pilot program. The program provides resolution support for all conflicts including EEO complaints and grievances.

NOS MANAGERS' OPINIONS

Problems Encountered With Existing System

Managers from the NOS Office of Coast Survey and National Geodetic Survey were interviewed to obtain their views on the existing personnel system. They believe that the current personnel system is "overworked and needs to be overhauled." They feel that the OPM policies and regulations are too rigid, complex, and burdensome, and restrict their ability to hire the best qualified candidates.

Some view the personnel system as a tedious process, with too much red tape and too many obstacles that they must oftentimes confront. One manager perceives the personnel system as "a system not working for them, but actively working against them." Some managers said that the Full Time Equivalent (FTE) controls are unreasonable intrusions into management and limit their hiring flexibility.

One manager believes that some personnel policies impose "ridiculous" practices for managers. For example, they are now required to provide career transition assistance to surplus and displaced employees, which entitles them to priority consideration for vacant positions. OPM's guidance defines vacant positions to include internal movements. This has weakened the managers' authority because they are no longer permitted to reassign employees internally without considering outside, displaced employees on a priority basis. And many NOAA managers are unable to hire beyond organizational boundaries, due to FTE and budget restrictions, so flexibility in reassignments is all the more important.

Some managers have experienced problems involving poor performers and adverse-action related issues. Complaints included: that the termination/removal process takes too long; requires too much paperwork; contains a myriad of rules; and lacks flexibility to terminate employees who are no longer appropriate for program requirements.

The classification system was criticized as being too slow. One manager believes that it would be more appropriate to hire individuals to perform a task as opposed to trying to fit an individual into a series or classification.

Modifications Desired

Changes made through use of existing flexibility/discretion. Problems continue to plague managers and improvements are still needed, particularly in the areas of recruiting and the process used to discipline and terminate poor performers. Although no specific solutions were offered, the managers believe that the personnel system can become more flexible by eliminating or modifying some OPM and DOC regulations.

Overall, the managers would like less HR control and policing, and increased flexibilities in several personnel functions, such as hiring authorities -- including temporaries, and term appointments. They would also like: authority to convert wage marine employees to the general schedule system; more flexibility in offering pay and compensation incentives; and changes in the performance management system -- in particular regarding the excessive time restrictions when dealing with termination and disciplinary issues. Some would prefer a two-level performance rating system as opposed to NOAA's three-level system.

Other flexibilities needed are increased use of "buyout" authority, expansion of the department's position description library, and the ability to quickly reorganize so that changing program needs can be accomplished. Some viewed the authorities delegated to them about a year ago as being very helpful, and the level to which these authorities were delegated as suitable for getting their jobs done and making informed decisions. (These delegations included classification authority for automated generic position descriptions; approval for employee training requests, including payment with bank card as opposed to previous, lengthy procurement procedure; approval for special act and service awards including time-off awards, cash-in-a-flash, unit citations, and cash awards for performance; approval of performance plans and ratings and restoration of annual leave.)

Some managers were sympathetic to the HR office, realized that it serves as the gate-keeper for OPM and DOC regulations, and appreciated the service given. Others viewed the HR office as having a long history of providing slow responses due to lack of adequate staff. One manager mentioned that he would rather see the HR staff guiding them on supervisory/employee problems and advising on structuring organizations, by putting employees together based on one's knowledge and/or skill level.

Is a separate personnel system needed? There were mixed reactions to this question. Some believed that a new system would be too big an overhead burden on management, and that the current system would suffice as long as continuous improvements are made to support their program needs. One manager thought that a new system is desirable but that, if NOAA were allowed to adopt a new personnel system, it should serve to support rather than hinder program operations. It should follow practices of some of the best private organizations that focus on the final products or end results, and not necessarily the processes.

Features of a new or revised personnel system that would solve or mitigate current problems. Managers want more flexibilities in the personnel management system. They would like to be able to hire and fire employees within reasonable time frames, they want to reward and compensate their outstanding performers, they would like to see less micro-management by OPM, and they want a personnel management system that is flexible, accommodating, supportive, and easy to understand so that program objectives can be



effectively accomplished. Additionally, some managers are firm believers that as government program changes take place, improvements in personnel management operations should be implemented government-wide.

CREATING A FLEXIBLE PERSONNEL SYSTEM

Performance Based Organizations. In September 1995, Vice President Al Gore announced support for the concept of performance based organizations. There is no formal definition for PBOs. However the proposed creation of PBOs is based, in part, on successful approaches used in other countries, most notably in the United Kingdom. Accordingly, there are some agreed-upon criteria and characteristics.

The objective of vesting functions in a performance based organization is to create the opportunity, motivation and culture change that will cause the agency to focus on customer satisfaction and on achieving results. In return for being held accountable for measurable results, the agency would be allowed to manage its programs and resources more efficiently and effectively, without all of the usual constraints and controls on personnel, procurement and financial management.

The President's Management Council has developed the following criteria to identify candidates for conversion to PBOs.

- does the organization have a clear mission and provide a service that is measurable
- does the organization have the capacity to measure progress toward meeting its mission and objectives
- is there a clear line of accountability to an agency head and does he or she support the transformation of the unit to a PBO

The focus of the conversion process is on functions, not agencies, and not all agencies nor an entire agency can be converted to a performance based organization. PBOs should have operational functions only, like service delivery, which should not be mixed with policy and regulatory responsibilities.

Exemptions from existing personnel (and other management) systems for PBOs.

Many federal agencies are changing their ways of doing business. Three years ago, the President challenged the federal government to operate more effectively and efficiently. As a result, he established the National Performance Review (NPR) under the Vice President's leadership. The NPR has developed a number of strategies to "reinvent" the way government functions. As part of the reinvention efforts, personnel management regulations have been sharply reduced, giving managers and supervisors additional authority and greater flexibilities in managing their operations.

In Vice President Gore's speech of March 1996, he stated:

... we've got good people trapped within bad systems, it is the systems that need to change, not the personalities ... we want to change that, and that is what Performance-Based Organizations will do.

PBOs are not just a type of organizational structure. They are designed to create culture

changes in traditional government operations. Many government functions resemble activities performed by private businesses, and much of the government could be redesigned to operate more like such businesses.

In order to permit government programs to be managed differently, personnel management rules and regulations are also changing, so that personnel operations, too, can be similar to those in private businesses. Some agencies, and perhaps many more to follow, have been granted exceptions and exemptions from existing federal rules and regulations. These exceptions can include authority to change the government-wide personnel system so that PBOs can develop their own new or modified personnel system.

Flexibilities for PBOs. The Civil Service Reform Act of 1978, Chapter 47 of Title 5, established Demonstration Project authority. It allows agencies to test innovations in personnel management policies and practices that could result in improved management. Waivers can be granted for all or portions of Title 5, except for merit system principles, leave and benefits, prohibited personnel practices and political activity (Hatch Act) provisions.

In establishing PBOs, agencies have the option of fully exercising existing personnel authorities and flexibilities, and of seeking the right to use the Demonstration Project authority. Agencies should have a clear vision and understanding of their program objectives and direction, as well as of the obstacles present and the desired remedies, before developing legislation to allow use of the demonstration project authority.

With such authority, agencies can design their own personnel system, as was done in the Navy's China Lake project. Although this was widely acclaimed as a success, to date, other agencies have been able to replicate the China Lake and other "demonstrations" only with express statutory authority. Thus, GAO and the National Institute of Standards and Technology received such authority in separate statutes. NTIS and PTO are seeking legislative authority as well. On the other hand, OPM is encouraging agencies to seek demonstration authority and, perhaps, it is reinterpreting its previous position that it could not authorize such projects unless they were new demonstrations.

At a recent conference, OPM provided materials that address three demonstration project models. A summary of each model follows:

- **Skill or competency-based pay model** is an alternative competency model that has achieved widespread acceptance outside the federal government. Thus far, this model has been most extensively applied to technical work, where relevant skills or competencies can be readily identified and acquired. Applications are spreading to "less technical" work with "softer" competencies such as team performance and leadership. Employees are paid for skills and competencies that they possess, which are needed for achieving organizational goals and objectives. This approach allows shifting of personnel with obsolete skills, and training them to fill jobs that are required by updated organizational objectives or technology.
- **Mission-based pay model.** This model is not necessarily based on a specific pay approach, but rather on creating a delayed, less hierarchical organization that focuses on the accomplishment of mission as the driving force. The objectives of this model are restructuring and revaluing of work to encourage maximum performance and productivity, and motivating employees in flatter organizations. The



classification of positions is oriented more toward the agency mission and less to the general schedule system. If successful, focusing on mission, organizational performance measures, and outcomes would lead to de-emphasizing personnel policies and processes.

- **Contribution-based pay model.** This model would support agencies that wish to create a true, individual performance management system tied to mission accomplishment. Agencies determine which work is most valuable to the organization and give the greatest rewards to those who perform this work. The highest contributors are rewarded the most, regardless of the work performed; the individual is emphasized, rather than the job or the position, which encourages high contributors to stay, while encouraging turnover among lower contributors. This model goes a step further in the direction of private-sector high-performing organization models. The underlying principles contained in contribution-based pay permit adjustments of pay from year to year and over time to match the level of contribution to the organizational mission.

TWO PROPOSED PERFORMANCE BASED ORGANIZATIONS

The Patent and Trademark Office (PTO). In September 1995, Vice President Gore announced that the Patent and Trademark Office would be the first of a series of federal agencies to be transformed into a performance-driven, customer-oriented organization. Legislation proposed by the administration has been introduced (H.R. 2533) to grant PTO, to be renamed the Intellectual Property Organization, authority to use commercial business practices and be permitted waivers from selected government controls in exchange for being accountable for agreed-upon performance goals.

The PTO's Human Resources office has been conducting several studies to prepare PTO for becoming a performance based organization. These have included benchmarking studies of competency-based systems, and reviews of human resource practices and techniques used in several major corporations in the United States and Canada — companies such as Hewlett-Packard, Texaco, Inc., West Bend Co, NationsBank and Holiday Inn-Worldwide.

Human resource management changes for PTO were being developed before the issuance of OPM's template of personnel flexibilities. They include some proposed flexibilities that go beyond those described by OPM that may be found in other bills, such as S. 1458, H.R. 1659, and H.R. 3460. These bills would convert PTO to the Patent and Trademark Corporation, and make it subject to the Government Corporation Control Act (31 USC 9101). Under H.R. 3460, the corporation would have authority to: set pay rates and benefits for its employees, including annual adjustments, locality and geographic increases, and wages and compensation based on performance; and to establish awards and contributions to the retirement and benefits programs, except that gainsharing and retirement contributions could not be less than those now established under Title 5. The corporation would abide by merit system principles.

National Technical Information Service (NTIS). The National Technical Information Service is one of the programs proposed to be a PBO by the Vice President. It has drafted legislation to establish the National Technical Information Service Corporation (NTISC) as

a performance based organization in the Department of Commerce. The proposal is currently being reviewed in the administration. NTIS has a union with an exclusive bargaining arrangement. This may require negotiations or consultations with union officials before NTISC could implement any of its personnel initiatives that may be pursued under authority to be granted by Congress.

The NTIS proposal contains broader authority than is described in OPM's personnel template. NTIS believes that it must have more flexibility to make personnel changes at the managerial, supervisory, and professional levels to keep pace with changing technologies. It also believes that any changes in rules in the middle of an employee's career should be offset by more generous compensation packages than current law allows.

The bill contains language that would give the corporation an opportunity to enter into an agreement with OPM to conduct a demonstration project pursuant to section 4703 of Title 5, USC. A summary of NTISC's proposed personnel authorities follows.

The NTISC demonstration project proposal authorizes the Chief Executive Officer (CEO) to make significant changes in the current personnel system. The CEO would be permitted to make immediate appointment offers, without formal advertisement, for a limited number of positions in the competitive service. The CEO could fix employee compensation, and compensate affected employees in the event of a reduction in force by giving them special cash payments or supplementing severance payments. The proposal also authorizes the corporation to make contributions to the Thrift Savings Fund for employees covered under the Civil Service Retirement System, as well as to allow adding credit to years of service or age for the purpose of qualifying personnel for immediate retirement.

SELECTED AGENCIES EXEMPT FROM PERSONNEL STATUTES

The General Accounting Office. The General Accounting Office (GAO) Personnel Act, effective October 1980, transformed the GAO into an excepted service agency, and authorized some exclusions from Title 5. The act provided for the protection and preservation of existing employee rights and benefits. It preserved employee benefits and merit system principles, and the ceiling on senior executive service positions.

The act authorized flexibilities in compensation and pay administration and in the employee appeals process. GAO was given authority to operate under the Demonstration Projects provision in Title 5. It has adopted a pay-banding system that covers evaluator and attorney positions only, with salaries and limitations comparable to the general schedule pay system. Other positions continue to be covered under the general schedule pay system.

Its performance management system is consistent with Title 5 requirements and is like those in other agencies. GAO generally follows OPM regulations, but has adopted its own internal personnel policies.

The most unusual portion of the act involved changes in the appeals and complaint process. Employee appeals of adverse actions had been handled in GAO like those elsewhere: internally, first, then by one or more of three other agencies -- the Equal Employment Opportunity Commission, the Federal Labor Relations Authority, and the Merit Systems Protection Board. The act established an independent GAO appeals board, with full over-

sight authority and responsibility for the agency's complaint and appeals process. The board follows case law, with functional characteristics like its predecessors.

The Federal Deposit Insurance Corporation. The Federal Deposit Insurance Corporation (FDIC) is an excepted service agency. The corporation has a Board of Directors authorized to make decisions on employee compensation and benefits. The corporation is not required to follow the provisions of Title 5 USC, but has elected to apply the employee benefits and merit system principles of Title 5.

Similar to GAO, FDIC generally follows OPM regulations, and has developed its own, internal personnel policies. The corporation has special hiring authority, from OPM, to appoint term employees non-competitively to assist in bank closures.

Since its creation, FDIC's legislation has been revised, expanding the board's authority. In 1994, the corporation implemented its first locality pay program for executives, general and "liquidation-graded" (i.e., temporary) employees.

Before the locality pay implementation, FDIC established a regional pay differential as a supplement to employee base pay. The principal difference is that locality pay is based on cost of labor, whereas regional pay differential is based on cost of living for an official duty station. The regional pay differential serves as an incentive for employees relocating to different areas as a result of bank closures.

Employees are covered under the federal retirement system and the thrift savings investment plan. FDIC also has its own investment plan, with matching employer contributions for civil service employees, unlike the federal thrift savings plan. Employees have the option of participating in both investment plans.

The corporation has a Pay Advisory Committee (PAC), a joint labor-management committee, composed of employee representatives from FDIC management and the National Treasury Employees Union. The PAC developed the performance management system with continued responsibility of providing guidance, and direction on performance management issues.

FDIC's funds are derived from fees paid by banks, and are not congressionally-controlled. It has a union, with exclusive bargaining rights, covering fifty percent of its employees.

The Federal Aviation Administration (FAA). In the Department of Transportation's Appropriations Act for 1996, Congress directed FAA to develop and implement a new personnel management system by April 1, 1996. FAA is exempt from all of Title 5, with the exception of: prohibited personnel practices and merit system principles, veterans preference entitlement, anti-discrimination provisions, workers compensation and retirement, and unemployment and insurance coverage. The Congress also exempted FAA from Chapter 71 of Title 5, Labor-Management, but the agency has assured employees that it would abide by those provisions.

FAA has the discretion to adopt the substance or any portion of Title 5 as deemed appropriate, and will be an excepted service agency. It no longer operates under the umbrella of the Department of Transportation's (DOT) personnel structure. FAA has the option of pro-

viding DOT an opportunity to make recommendations on its personnel management practices and procedures. FAA continues to have discussions with OPM to develop strategies on how to implement some of its personnel initiatives.

Highlights of FAA's HR reforms follow. It replaced its Senior Executive Service with a new FAA Executive System. The executive system links compensation to performance with increasing accountability for management. It decreases the average days for executive disciplinary and performance actions to allow prompt removal of poor performers.

Hiring practices and procedures are being streamlined, by relaxing or eliminating some OPM regulations, giving managers increasing authority for on-the-spot hiring in special cases; authorizing recruitment bonuses and other incentives, and decreasing the time it takes to hire external and internal candidates. With more than half of its employees represented by unions, the FAA elected to continue the rights and benefits of union representation for its employees. The unions have not been satisfied with this arrangement and wish to have Congress legislate these representation rights.

FAA has also eliminated time-in-grade requirements, other than qualification requirements, for promotions; it is developing a reduction-in-force system and will be developing procedures to offer separation incentives, and other personnel initiatives. It is not yet clear whether these actions will require negotiations with union officials.

ELIMINATION OF THE NOAA CORPS

The National Performance Review, (NPR) Item DOC 2-05, recommends elimination of the National Oceanic and Atmospheric Administration's (NOAA) Corps. The NOAA Corps is one of the United States' uniformed services with roots tracing from the Coast Survey established in 1807, by Thomas Jefferson, and is the descendant of the commissioned officer corps of the U.S. Coast and Geodetic Survey.

The NOAA Administrator directed the NOAA Corps to develop a plan implementing his decision to eliminate the NOAA Corps and replace current officer billets with civil service positions without degrading NOAA's program capabilities or jeopardizing officer entitlements. The NOAA Corps submitted a draft plan to the Administrator in late February 1996. It described a proposed transition of officers to civilian status, gave times for implementing actions, and identified a wide range of management, operational, and legal issues. After reviewing the draft plan, the Administrator established a team to develop an implementation plan, working with the information in the draft. Since the implementation plan has not yet been completed, some of the comments that follow may prove not be relevant to it.

Impact on NOS. Uniformed officers are fully integrated into nearly all operating components of NOAA. They are an integral part of NOS' program efforts to promote safe navigation. Some NOS positions are designated for NOAA Corp officers. And many of these positions must be sustained for NOAA to accomplish its mission.

Uniformed personnel are employed in operational, management and staff positions. Officers operate and manage NOAA's fleet of scientific research ships and aircraft to support nautical charting, geodetic survey, and other NOS programs. Officers perform the

vital mission of hydrographic surveying upon which all U.S. nautical charts are based. They are involved in all aspects of the operation and management of hydrographic and geodetic field parties along with data acquisition and chart compilation.

Eliminating the NOAA Corps presents a number of challenges. Some of NOS' existing civilian staff are probably capable of fulfilling the duties that are now performed by many of the uniformed officers (except for commanding and operating ships). The workforce would then have opportunities that were not available before.

The impact on NOS personnel may be significant if officers are permitted to move into newly-established civil service positions without competition. Officers would be provided opportunities that are not offered to civilians, which could have an adverse effect on morale. On the other hand, if officers will not have the right to remain in their present positions (should they wish to do so), some other method than non-competitive entry would be necessary to avoid "jeopardizing officer entitlements."

Converting the officers to civil service positions would require that budget and other resources would have to increase to cover salaries, retirement contributions, and other benefits. Full Time Equivalent (FTE) totals would increase, including SES positions, and staff reductions could become necessary if FTE ceilings are not increased.

Contracting for Services Now Rendered by the NOAA Corps. NOAA needs experienced personnel to operate ships and aircraft, and to understand the sciences of marine, aircraft and diving services, nautical and aeronautical charting, field research and data analysis. NOAA's diverse science mission and the need to respond to changing environmental priorities demand a well-trained and knowledgeable workforce.

NOAA's programs benefit from the mobility of the uniformed personnel. Rapid response to emergencies, changing missions, and short-term requirements is essential to meet program objectives. The ability to reassign officers promptly has significantly helped to achieve these objectives. Rotational assignment of officers has resulted in the blending of technical, operational and management skills gained through formal education, field assignments and sea or aircraft tours of duty.

Congressional committees encourage federal agencies to increase the use of contracts. NOS already has contracts with firms that specialize in various aspects of nautical charting and geodesy. NOS could expand its contracting to cover some of the functions performed by uniformed personnel. Contracting for such services could be cost-effective and NOAA could, thus, minimize any problem of FTE restrictions.

Conversion to Civilian Status. This would be the first time in U.S. history that a uniformed service is eliminated. Legislative and regulatory changes would be needed to protect entitlements, and provide opportunities for officers to continue their careers with NOAA as civilian employees.

The NOAA Corps has its own personnel system. The administrative procedures, pay, assignments, promotions, and retirement policies are the same as those of other uniformed services. Eliminating uniformed officers from NOAA requires either: voluntary or invol-

untary retirement, or voluntary or involuntary separation. Entitlements vary with years of service. The Corps' draft plan recommends the Corps officers continue their careers with NOAA as civil service employees, performing duties similar to those now performed.

Under the draft plan, former officers would be offered appointments in civil service positions, with compensation and benefits on a par with those received in the uniformed system. And NOAA would establish new positions managed as a common pool providing technical, operational, and management support to NOAA programs in a manner similar to the current NOAA Corps. Employees in the pool would rotate from shore side general schedule positions to wage marine (WM) positions aboard NOAA ships. General schedule aviators within the pool would also rotate to and from non-flight positions.

The Corps' draft plan outlines numerous issues that should be considered, including: preservation of pay and benefits; career status; pay and benefits for rotational assignments; ceiling for SES positions; and overtime, premium and special pay.

Comments on Issues. The draft plan from the NOAA Corps was designed to respond to the requirements set forth by the Administrator. In summary, the draft plan contemplates that Corps officers would discard their uniforms, perform the same functions, and be provided compensation and benefits similar to the uniformed system. The transition for uniformed officers is proposed to begin October 1, 1996.

The Corps' draft proposal to provide comparable pay and benefits for officers converting to civilian status does not seem to have taken into account the substantial premium pay earned by WM personnel. If the former uniformed personnel have all their benefits preserved and then receive significant premium pay not currently offered, they would end up in a more favored position. In addition, the costs to NOAA of maintaining the same workforce will increase. This would require budget increases or offsetting savings elsewhere.

CONCLUSIONS

- There are numerous flexibilities that have been given to agencies under existing laws, but they have often not been exercised by HR offices or redelegated to program officers. The latter aspect seems to be part of the problem in NOAA, that is, the redelegations have not gone far enough.
- Agencies that have been exempted from Title 5 entirely have often elected to preserve a great deal of the government-wide personnel system.
- Setting up a new personnel system would be labor intensive and would take a long time.
- Reform efforts should focus on identified problem areas, seeking to use all existing authorities and supplementing those on a targeted basis, reflecting the needs of the agency.
- DOC and NOAA should inform top managers in NOS and in the proposed PBO of the desirability of further delegations of authority, including:
 1. Hiring authority
 2. Classification authority



- DOC and NOAA should eliminate FTE controls for the PBO
- DOC should propose legislation to provide additional authority for the proposed PBO in the areas of:
 1. Pay and benefits, including for holidays, overtime and separation and retirement (in part, to assure that benefits for NOAA Corps officers, if converted to civil service appointments, with wage marine rotational assignments, can be funded).
 2. Termination and disciplinary actions, such as the authority given to GAO to avoid multiple appeals to outside agencies.
 3. Performance ratings, that can be better tailored to program needs.
- DOC should also propose legislation to authorize the conversion of officers in the NOAA Corps to civilian status. This should authorize the PBO to:
 1. Appoint former NOAA Corps officers to appropriate positions without regard to FTE ceilings; appointments would probably have to be non-competitive, but could be either to the positions currently held, or to comparable positions; any subsequent appointments, after the initial conversion, should be on a fully-competitive basis.
 2. Compensate such personnel through funds transferred from current appropriations supporting the NOAA Corps.
 3. “Hold harmless” such personnel in converting their retirement and accumulated leave benefits to those for civilian employees.

APPENDIX

B

The Size of the Market for Nautical Charts

INTRODUCTION

There are no accurate estimates for the U.S. market for nautical charts. In fact, there is not even an accurate estimate available for the total market for maps and charts in the United States or the world. There are several reasons for this.

- Map making in the United States is heavily dependent on USGS, DMA, and other government agencies such as NOS; the private sector is often a “value-added” producer, taking the information that is uncopyrighted by the government and reproducing it.
- Therefore, private sales may be complementary to government sales (where true value has been added to the government data), or substitutes (where only reproduction services are involved).
- The cost of producing maps, with an adjustment for profit, cannot be used as even a rough indicator of revenue from sales because the U.S. government is the main supplier of map data and of uncopyrighted maps. The government produces the maps for defense and for public safety; therefore, the expenses of gathering the data are for legitimate public purposes. However, this throws any possible economic equations into chaos, since the costs of production have little to do with total revenues of map sales in the U.S.
- Map sales are spread throughout SIC (Standard Industrial Classification) categories, including printing and publishing, miscellaneous business services, professional and engineering services, electronic information, and the U.S. government.
- Many companies that sell nautical charts are very small and keep sales and income data proprietary.
- The benefits of having and using maps, therefore, also do not reflect the value, cost, or price of the maps.
- Paper map products are only one type of geographic information available and, for some markets, are being replaced by electronic or digital maps.

Nautical charts are very specialized maps, and represent only a small percentage of the

total map and chart sales. Even within NOAA, nautical charts represent only 13 percent of all chart revenues. Further complicating the estimates of the sales of nautical charts:

- NOS sells charts to other government agencies for a negotiated price (where price and value are not market-driven parameters).
- NOS charts form the basis for many private and other government products sold.
- Charts are required for certain commercial vessels; however, they are a very small percentage (less than one percent) of the total potential boating market.
- Charts are optional for recreational users, who represent the vast majority (over 99 percent) of the potential market.
- Charts are updated periodically. Although users need replacements, the replacement cycle is indeterminate — a function of when updates occur, the degree of changes incorporated, etc. Therefore, annual estimates of sales are an inaccurate and somewhat arbitrary time frame for this analysis.
- Consequently, existing estimates of demand elasticity (with respect to price) range from inelastic to very elastic, depending on the parameters measured, the time frame analyzed, and when the study was made in relationship to the update cycle.
- Charts are inexpensive, representing a very small percentage of the total value of the fixed costs of water transportation (i.e., the purchase price of any type of boat), and a small part of the variable costs of operating (e.g., fuel, marina fees, etc.) a vessel.

ESTIMATING TOTAL MAP SALES IN THE U.S.

The International Map Trade Association (IMTA) in Kankakee, Illinois has done a proprietary study of the map industry and estimated U.S. sales of maps and charts at approximately \$300 million. That study does not separate data on nautical charts. According to IMTA, the only study they know about that included a survey of users of nautical charts was one done for NOAA by Strategy Research of the United Kingdom.⁶²

However, a representative of MapLink, Inc. (a company in Santa Barbara, CA that sells a map directory and resells maps) revealed that the \$300 million IMTA estimate is for the potential map market (as defined in the IMTA survey of 1993)⁶³. MapLink's estimate is that actual map sales (road maps and travel guides) are less than \$100 million per year, and probably in the \$70 to \$80 million range. Nautical maps could be \$30 million per year. The average price of a paper road map is \$5.22 and the actual cost to print a folding paper map is in the \$0.10 to \$0.25 range. The biggest problem in valuing these maps is that the

⁶²The Strategy Research Study was commissioned by NOAA to determine the types of markets that exist for nautical charts. It was oriented toward effective marketing by the U.S. government of the charts and emphasized the types of users, their preferences (i.e., waterproof charts, books vs. individual maps, etc.), the methods used to update charts, and other data primarily for the production of a more appealing product and toward better distribution of the charts. The 1994 study was a survey of 125 interviews with boaters and a questionnaire sent to 3,020 boaters (commercial and fisherman) with 271 responses, a response rate of only 9 percent. The 1995 study was also a survey, with 181 mariners (primarily recreational) being interviewed, and a mail questionnaire sent to 3000 licensed mariners of which 862 were returned with a response rate of 29 percent. The data from these surveys represent only a small sample of the population, and may be unrepresentative of a number of categories of users.

⁶³Will Tefft, MapLink, Inc. Directory, February, 1996.

National Geographic and the AAA distribute their maps to subscribers at no charge. If they were sold instead of distributed, the revenue numbers would be quite a bit larger, since they represent a large share of the paper maps produced in the United States. Another interesting statistic is that the Rand McNally Road Atlas prints between 6 and 8 million copies each year.

A study performed for NASA in 1981 by OAO Corporation used a figure of \$890 million as being spent on mapping activities in the United States in 1979. There may be significant double counting in this number because it includes the expenditures of the federal government in mapping (84 percent of the total) and it is not clear whether the value of the interagency purchases of federal maps is netted out or not. They cite a figure for the private sector as 11 percent of the total (\$98 million) as either for private sector use or in support of other commercial firms. Note: \$98 million in 1979\$ would be the equivalent of approximately \$182 million in 1994 dollars, using the U.S. Department of Labor's Consumer Price Index adjustment.

A KPMG Pete Marwick study for NASA in 1992 (Mapsat Market Review) includes some estimates of the total mapping market. They estimated total market demand for remote sensing products (many non-mapping products are included in this estimate) as approximately \$279 million. Their estimate for revenues from a "Mapsatsat" for 1995 was \$43.5 million, which was then projected to grow to well over \$150 million by 2000. (The Mapsat satellite was not expected to be operational in their model until 1995). However, this estimate is for worldwide sales — they project foreign sales to have a greater growth potential than domestic sales — and includes raw satellite data revenues, as well as value added.

Mapping is estimated to be one of the highest potential uses for the remote sensing satellite data. The value of remote sensing information is relatively small for NOS nautical charts since remote sensing data is not available in the type of resolution needed for coastal mapping and it cannot measure ocean depth accurately. But this study does suggest that the order of magnitude for total U.S. mapping sales may be in the \$100 million range.

EVIDENCE OF THE SIZE OF THE NAUTICAL CHART MARKET

1. Market Facts, Inc. 1984 Study of Nautical Chart Demand. Market Facts performed a study of the demand for nautical charts for NOAA twelve years ago. The thrust of the study was to look at the segments of the market and to evaluate ways of improving the marketing of the charts for NOAA. They did not create an outright estimate of the total market for nautical charts. They did survey 303 retail chart agents, and reported a summary profile of the sales of those charts. Taking the largest possible sales in each range (except the unbounded highest level) and extrapolating to total sales resulted in an estimate of \$2.8 million in annual nautical chart activity, as shown in Table B-1, below.

TABLE B-1: ESTIMATED SALES OF NAUTICAL CHARTS

Annual Sales	Percent of Total	Number of Firms	Maximum Sales	Estimated
▪ < \$500	30%	91	\$500	\$45,450
▪ \$500-\$1,000	26%	79	\$1,000	\$78,780
▪ \$1,000-\$4,999	31%	94	\$4,999	\$469,556
▪ \$5,000-\$9,999	4%	12	\$9,999	\$121,188
▪ \$10,000-\$49,999	4%	12	\$49,999	\$605,988
▪ \$50,000-\$99,999	2%	6	\$99,999	\$605,994
▪ > \$100,000	3%	9	\$100,000	\$909,000
Total	100%	303		\$2,835,956

Source: Market Facts, NOAA, 1984

The above figures clearly are underestimates, since they represent only those retail outlets that answered the survey. There are many other sources of sales of nautical charts, including: the federal government, foreign governments reselling U.S. products, stores not in the survey, mail order outlets, etc. These sales figures have not been adjusted for inflation; however, the government price of NOS maps has not changed since the late-1980s.

In 1995, William G. Chandler did a survey for NOAA of companies that make and/or sell nautical charts. Of the 46 companies surveyed, only 16 gave any data that could be translated into a total revenue figure (i.e., they indicated the number sold and the price). The range of total revenue varied greatly, from about \$20,000 per year to \$2,000,000. The "typical" firm had revenues around \$200,000 per year from nautical chart sales. The sum of the 16 firms that reported figures was \$7.4 million (this is a very rough approximation, as some companies reported a wide range of products and prices and no details about the distribution). If the other 30 companies have average sales of \$200,000 per year, we could add an additional \$4.5 million to the estimate. This would result in total nautical chart revenue of about \$12 million. Add to that the reimbursable sales of NOAA of \$13 million plus the intergovernmental transfers to NOAA of \$6 million, and the sum total is a market of \$31 million annually.

2. Number of Potential Users. Another way of calculating the market is to estimate the number of potential users and to assign an average amount spent on nautical charts to each user. An estimate of the number of vessels is shown in Table B-2.

TABLE B-2:
ESTIMAT

Annual Sales	Number of Vessels	Percent
▪ Merchant Fleet	6,222	0.04%
▪ Coastal Fleet	68,200	0.39%
▪ Recreational Fleet	17,300,000	99.57%
Total	17,374,422	100.00%

Source: Proprietary estimate of fleet sizes.

Taking these estimates (in round numbers) and using the Strategy Research survey results to estimate the market for nautical charts produces the following range of estimates.

Total commercial vessels: approximately 75,000
 x 65% that update charts = 48,750
 x 73% that update annually or more often = 35,587
 x 92 % that use paper charts = 32,741
 x 48% that buy new edition = 15,716

Total recreational vessels: approximately 17,000,000
 x 48% that update charts = 8,160,000
 x 57% that update annually = 4,651,200
 x 79% that use paper charts = 3,674,448
 x 62% that buy new edition = 2,278,157

Therefore, the total potential market is about 16,000 commercial vessels and about 2,300,000 recreational boats.

If the average expenditure per commercial vessel is \$100 per year for paper charts and the average expenditure per recreational vessel is \$50 per year, then the total annual market for nautical charts is about \$131 million.

We know from other data that \$131 million is most likely too high. Either we are using a poor estimate of the number of vessels⁶⁴ or the Strategy Research survey results are incorrect. We have no available alternative data to either validate or reject the accuracy of the above numbers. Another potential error is in the average yearly expenditure for commercial and recreational boat owners on paper charts. Taking a lower expenditure, as illustrated below, brings the market estimate into the range of other estimates.

⁶⁴Coast Guard data show that there are about 11.4 million-numbered boats in the United States for 1994. They estimate the total number of boats in 1993 as approximately 20.6 million. These may include "fleets" of rental canoes and row boats used at recreational sites as well as many others that would be inappropriately in the sample if counted in the potential for purchasers of nautical charts.

Thus, if the average expenditure for commercial vessels is \$50 per year for paper charts and the average expenditure for a recreational boat owner is \$15 per year, then the total annual market for nautical charts is about \$35.3 million.

3. Another Basis for Estimated Sales. As described above, one map company's estimate of the total sales of paper maps is in the \$100 million per year range, exclusive of the interagency purchases of the federal government and of the "free" maps given to members by the AAA and the National Geographic. They confirmed that a \$30 million per year market for nautical charts is "not an unrealistic figure."

CONCLUSION

The actual numbers of yearly sales of nautical charts in the United States most likely falls between \$10 million and \$50 million per year. A "best guess" based on the information collected to date would be about \$30 million per year.

SOURCES

1. An Estimation of Demand for Nautical Chart Products, Market Facts, Inc., 1611 North Kent Street, #501, Arlington, VA 20009, March 5, 1984. (Study done under contract to U.S. DOC, NOAA.)
2. The Use and Value of Nautical Chart Information, Earl F. Epstein, Thomas D. Duchesneau, University of Maine, November 20, 1987. (Study done for NOAA.)
3. Second Report to Congress on the Impact of Increased Aeronautical and Nautical Chart Prices Resulting from Public Law 99-272 on Public Sales and Navigation Safety, Coast and Geodetic Survey, NOS, Rockville, MD 20852, September 1992.
4. Charting a Course into the Digital Era, Guidance for NOAA's Nautical Charting Mission, Marine Board, National Research Council, 1994.
5. Commercial Remote Sensing National Workshop, Market Requirements for Spatial Observation Systems, KPMG Peat Marwick, March 1-3, 1994, (Study done for NASA, Office of Advanced Concepts & Technology).
6. Mapsat Market Review, KPMG Peat Marwick, 1992. (Study done jointly by the Institute for Technology Development, Space Remote Sensing Center, and Ohio State University, Center for Mapping with funds from NASA Office of Commercial Programs.)
7. NOAA 1994 Confidential Survey of Boaters, Strategy Research and Action, Ltd, 4th Floor, Parkway House, Sheen Lane, London SW14 8LS, September 1994. (Study done under contract to NOAA.)
8. NOAA US Consumer Research Initial Trend Analysis 1995 Nautical Report, Strategy Research and Action, Ltd, 4th Floor, Parkway House, Sheen Lane, London SW14 8LS, October 1995. (Study done under contract to NOAA.)
9. Analysis of the Private Market for Landsat Products and Applications, OAO Corporation, 50/50 Powder Mill Road, Beltsville, MD 20705, March 31, 1981. (Study done for NASA Office of Space & Terrestrial Applications.)



10. Private Sector Charts: Have They Grown Up?, Rick Booth, Practical Sailor, January 1, 1990. p. 9-13.
11. Will Tefft, MapLink, Inc. Directory, 25 E. Mason St., Santa Barbara, CA 93101, (805) 965-4402, Phone interview, 2/22/96.
12. Norman Strasna, International Map Trade Association, Kankagee, IL, (815) 939-4627, Phone interview, 2/13/96.
13. William G. Chandler, Memo to Captain David MacFarland, results of informal survey of companies producing nautical charts, September, 1995. (Detailed information in study is proprietary.)

APPENDIX

C

Other Nations' Experiences With Government PBOs

THE UNITED KINGDOM

The United Kingdom launched its “Next Steps” program in 1988. More than 100 government programs have been converted to its form of PBOs.

Typically, certain functions of a department in a government ministry are assigned to an “Agency,” headed by a chief executive. Each operates under a “framework document” that defines the duties of the agency, establishes annual performance goals, and confers freedoms from specified government-wide requirements respecting procurement, budgeting, and personnel (although agency personnel remain within the civil service). Chief executives are accountable for achieving performance goals, although ministers are responsible for setting policies and approving the agencies’ corporate and business plans.

Chief executives are appointed competitively from among candidates in the civil service, as well as the private sector. They report directly to ministers, although a limited amount of staff work relative to oversight of the agencies is performed by departmental personnel to assist the ministers. For example, when an agency is within a department, the permanent secretary continues to advise the minister on matters affecting the department as a whole, including those involving the agency.

In the United Kingdom, nautical charting activities, except surveying, are carried out by the U.K. Hydrographic Office (HO), which has been made a Next Steps agency. Like NOS, HO produces charts and navigational publications for military and civilian government agencies and for commercial and private customers. It operates under a framework document and is held accountable for achieving performance targets, such as issuing timely navigational warnings, improving the currency of charts, controlling costs, and increasing revenues.

Geodetic work is part of the mission of the Ordnance Survey. Its operation as a Next Steps agency will be described in detail, as an illustration of how such agencies are established and managed.

The Ordnance Survey is Britain’s primary mapping and geographical information agency,

employing a staff of some 2,000. The head office in Southampton provides cartographic, printing, and related services; marketing; planning; and information technology. Databases and the maps created from them are kept up-to-date by field staff in offices throughout England, Scotland, and Wales, and by head office personnel.⁶⁵

Established in 1791, the Survey became a Next Steps executive agency on May 1, 1990. The Secretary of State for the Environment determines the policy and financial framework within which the Survey operates. The Secretary is answerable to Parliament for all matters concerning the Ordnance Survey, and deals with questions of policy.

Day-to-day management is delegated to the Director General of the Survey, its chief executive. The Director General is directly accountable to the Secretary of State for the performance of the Ordnance Survey in accordance with the framework document and the corporate plan. The Secretary of State appoints the Director General through open competition. The appointment is for a fixed term, with the possibility of extension contingent upon satisfactory performance. The Director General makes periodic reports to the Secretary of State on the performance and progress of the Survey.

Additional guidance comes from a management board, chaired by the Director General, and including executive directors and part-time nonexecutive directors. Nonexecutive directors are recruited for the particular business, commercial, or other skills that they bring to the Survey.

The board is responsible primarily for setting corporate policy, reviewing strategic planning, and monitoring performance to ensure that the Survey

- meets its strategic directives
- meets key targets set by the Secretary of State
- benefits from increased involvement in the commercial market place
- remains at the forefront of technological change
- conducts its business in a proper and equitable manner

Following a detailed review of the Survey's activities, a new framework document was completed in April 1995, extending the executive agency designation for another four years. In words that could apply to NOS, the Secretary of State noted that "the business and technological environment in which the Ordnance Survey operates is changing rapidly and the Ordnance Survey's activities will evolve in response to this."

The new framework document proposed to increase flexibility through a major shift in the means of financing the Survey. Under its original charter, Survey funding was appropriated in a Parliamentary Vote. Under its new charter, the Survey was to investigate moving to a trading fund (what the U.S. calls a revolving fund) basis. In addition, the Survey was to thoroughly investigate with central government departments the establishment of a national interest mapping contract covering the noncommercial aspects of the Survey's activities.⁶⁶ This combination was designed to allow the Survey to "balance its costs and

⁶⁵ Ordnance Survey, Framework Document, April 1995, p. 8.



revenues without contribution from Parliamentary Vote.”⁶⁷

In its new charter, the Survey established a dozen strategic objectives. Among them are:

- maintaining a National Topographic Database of suitable quality and currency to meet the current and future needs of all customers
- making available a range of products and services from the database to meet current customer needs
- anticipating and meeting the future needs of customers through innovative products and services
- progressively moving towards full cost recovery through exploitation of new markets and increases in efficiency
- clarifying the obstacles to — and investigating the costs and benefits of — privatization
- developing staff in a way that provides the Survey with the necessary competence and prepares employees to meet the ever-changing needs of the workplace

The charter sets forth a framework for a pricing policy as follows:

Taking into account efficiency improvements, the volume of sales, and what individual markets will bear, prices will be set to achieve the financial targets set by the Secretary of State. In doing so, Ordnance Survey will pay due regard to developing new and enduring revenue streams.⁶⁸

In addition, work carried out for other government agencies is to be charged on a full cost recovery basis.

Other planning and management documents required to be prepared by the Survey include a corporate plan covering strategic issues over a period of at least three years. The plan, among other elements, will:

- state the Survey’s aims and strategic objectives
- provide, in general terms, forecasts of trading performance and any major new marketing initiatives
- set out key performance targets, including financial objectives
- provide forecasts of anticipated resource needs, including staff and proposed capital expenditure requirements

The Survey also prepares an annual efficiency plan. Under the plan, the Survey compares its activities with the best available in the external market. Activities will be contracted “where this gives the best long-term value for money, or accords with the strategic objectives of the Corporate Plan.”⁶⁹

The framework document sets forth some examples of performance measures against

⁶⁶This parallels the panel’s view that the costs of nautical charting and geodesy services should be recovered from users to the extent possible, but that other funding arrangements are needed to support that part of the services that is “non-commercial.”

⁶⁷Ordnance Survey ... Op. cit., p. 8.

⁶⁸Ibid., p. 10.

⁶⁹Ibid., p. 10.

which the agency will be judged. Performance against key targets is reported in the Survey's Annual Reports and Accounts. Measures include:

- quality (turn-around time for customer orders and currency of topographic data)
- financial performance (cost recovery)
- efficiency (sales revenue per employee)

CANADA

Canada has tried to conduct government operations in a more businesslike manner through a number of pilot projects. These were launched under the Increased Ministerial Authority and Accountability (IMAA)⁷⁰ initiative, as well as through the introduction of Special Operating Agencies (SOAs) and various government-wide changes to policies and rules.

The first initiative allowing departments more flexibility — and requiring more accountability — took place, under the IMAA, between a number of departments and the Treasury Board (TB), which has functions analogous to those of OMB. To become involved in this initiative, a department head had to agree through a Memorandum of Understanding (MOU) to “have appropriate planning, monitoring, control, internal audit, and program evaluations systems in place.”⁷¹

These MOUs have two main purposes:

- to give ministers and senior managers increased authority and flexibility to deal with changing circumstances and to manage effectively with limited resources
- to enhance the accountability of ministers and senior managers

Nautical charting and related activities are carried out by the Canadian Hydrographic Service, part of the Department of Fisheries and Oceans. Geodetic work is conducted by the Geodetic Survey of Canada, part of the Earth Sciences Sector of Natural Resources Canada (NRC). The Geodetic Survey has adopted most of the elements of an SOA, but is no longer seeking that formal status.

As an example of Canada's use of SOAs, an agreement between TB and NRC's predecessor agency sets forth parameters for financial management, human resources, and accountability to be achieved by the department during the fiscal year. In return for contracting to achieve the stated goals, TB provides specific authority and flexibility to NRC. The four main stated goals are:

- to gather, process, analyze and improve landmass information in support of government policy and economic development
- to support the Canadian geomatics industry through contracting, and technology transfer on a cost recovery basis with respect to the international activities of the industry
- to maximize cost recovery and cost sharing

⁷⁰IMMA Agreement, Treasury Board, March 17, 1993.

⁷¹Ibid., p. 14.



- to satisfy client needs for SMRSS products and services

The SMRSS developed a number of performance indicators to monitor success against objectives. Performance indicators and milestones are reviewed on a quarterly basis. Among the “secondary performance indicators” for reviewing performance at the sub-activity level are those covering management and regulation of surveying on Canada Lands; establishment and maintenance of geodetic control points; production and maintenance of aeronautical charts; production of the National Atlas; and airborne remote sensing surveys.

In the reduced budget climate, TB undertakes to consult with NRC before making any reductions in NRC’s funds, so that TB can consider the effects as well as the performance targets before they are set by NRC. Resource savings from internal adjustments and initiatives that result in increased productivity or efficiency will remain in NRC’s base. NRC is expected to absorb normal workload increases and manage workload adjustments due to normal operational fluctuations.

The MOU includes several provisions relating to revenue-sharing, which specify that some of the new or enhanced revenues that would have gone to the Canadian equivalent of miscellaneous receipts of the Treasury remain with the NRC. In addition, NRC can roll over five percent of unspent funds at the year’s end. To provide greater flexibility to NRC for capital assets, TB raised NRC decision level authority from \$1 million to \$3 million. NRC now submits annually to TB a multi-year operational plan, as well as a three-year business or operational plan for each sector covered by the revenue-sharing provisions.

The MOU also has provisions for flexibility in such areas as position classification, accelerated expenditures, reprofiling (reprogramming) and reallocation, and inflation protection. In addition, for the period of the agreement, NRC is not subject to person-year (FTE) controls. Unlike the United States, Canada provides copyright protection for government agencies, and NRC has found this provides a steady stream of revenues from products with longer shelf lives.

All of these elements take place in what the MOU calls the “accountability framework.” This defines the performance data, targets or expectations, and reporting methods that serve as a basis for monitoring and assessing departmental performance. The agency must submit an annual management report which includes:

- a description of the environment, problems, and pressures facing the department, and how these relate to resource questions and the achievement of performance targets
- the performance of the department against specific expectations/targets identified in the MOU
- a statistical report (if appropriate and feasible) on the quantitative performance data required by the MOU

This document, as well as other audits and program evaluations, contributes to a “major accountability review” that focuses on the extent to which the expectations and targets defined in the MOU have been achieved.

NEW ZEALAND

Over the last decade, successive New Zealand governments have undertaken significant reforms in the public sector, in response to the extensive economic and fiscal problems that the country faced in the 1980s.

New Zealand has a far smaller population, economy, and public sector than the United States, Canada, or the United Kingdom. Like the latter two, it has a parliamentary system. Unlike Canada and the United States, it is not a federal system with state or provincial governments delivering a wide range of public services. Nevertheless (unlike similarly-sized governmental units in the U.S. with which it is sometimes compared, but like the UK) it is a nation state that must also perform all the functions carried out by other national governments. So its experience in government reform, which has been more pervasive than that of Canada or the United Kingdom, has some relevance for the United States.

In 1984, the newly-elected Labour government inherited an economy that was characterized by comprehensive controls on the financial sector, extensive subsidies for farmers and exporters, and a highly-sheltered private sector. It also faced a significant financial deficit, growing levels of public debt, high inflationary pressures, and a history of slow economic growth.⁷² The objective of public sector reform was to design a management system that created a resource-efficient public sector responsive to the strategic policy direction of government.

Attention first focused on the numerous business-type activities of the government. These included banks, petroleum operations, telecommunications services, forestry operations, electricity generation and distribution, and coal mining. Most of these activities were being run by government departments that also had policy responsibilities. Nearly all of them ran at a loss and required taxpayer support.

Corporatization. Reform initially took the form of corporatization — establishing these activities as State Owned Enterprises (SOEs). SOEs were set up under private sector company legislation, with private sector boards of directors and government ministers as shareholders. They were required to operate profitably (just like comparable private-sector companies), borrow from the financial markets, and pay dividends and taxes at commercial rates. They had to agree on a five-year business plan with their shareholders, and were subject to extensive monitoring and reporting requirements.

In testimony before a House subcommittee, a government official said that the results have been dramatic. All SOEs are now profitable businesses and pay substantial dividends and taxes. Services to customers have also improved significantly.⁷³

Privatization. Although the corporatization process resulted in substantial efficiency gains, there were a number of reasons the government believed that some SOEs were still a sub-optimal form:

⁷²Tony Dale, Harkness Fellow on leave, Budget Manager New Zealand Treasury. Testimony before a subcommittee of the House Committee on Government Reform and Oversight, May 2, 1995, p. 2.

⁷³Ibid., p. 3.



- They tie up money that could be used to repay debt.
- They are not subject to the ultimate discipline of the market, because there is a perception that some form of implicit government guarantee exists.
- Governments are generally unwilling (or unable) to invest the amounts of capital needed by developing businesses.
- Ownership of commercial ventures exposes governments to substantial financial risk; for example, the government had to fund a substantial rescue package to save the government-owned Bank of New Zealand.

For these reasons, successive New Zealand governments have gone a step further, privatizing commercial activities that they decided the government did not need to own. Major privatizations have included such entities as:

- financial institutions (including two trading banks, a merchant bank, a rural loan bank, and a general insurance company)
- transport operations (including a shipping company, an international airline, a railway company, and a bus network)
- infrastructural assets (including New Zealand's major telecommunications company and two computer companies)
- other trading operations (including a hotel chain, the government printer, and forests)

Reform of the Core Public Sector. After corporatization and privatization, attention was turned to reform of the "core" departmental public sector, which includes those activities that would not be turned over to government corporations. A substantial part of the entire government now has been transformed. Continued reform efforts were based on a set of organizing principles; among them:

- The state should not be involved in any activities that could be more effectively performed by communities or private businesses.
- Trading enterprises (that is, corporations) would operate most effectively if structured along the lines of private sector businesses.
- Departments should perform clearly specified and nonconflicting functions, with policy and operations functions separated, and with commercial and noncommercial functions separated.
- Departmental managers should be fully accountable for running their organizations efficiently, and with the minimum practicable central control of inputs.
- The costs of state activities should, as far as possible, be fixed through real market factors; in other words, the quality, quantity, and costs of products should be determined by the purchaser's requirements, rather than the producer's preferences.⁷⁴

The primary purpose of structural reform was to allow policy agencies to focus on assessing outcome achievement and developing policy prescriptions for improving outcomes, while freeing service delivery agencies to focus on running their operations as efficiently as possible, given the policy parameters established by the government.

⁷⁴New Zealand's Reformed State Sector, State Services Commission, Wellington, New Zealand, 1994, p. 4.

Another aspect of reform redefined the accountability relationships between government ministers and their departments, thus improving the incentives for managers to respond to the government's policy priorities. Key features of the new public sector management system were:

- appointment of departmental chief executives on limited term, performance-based contracts
- annual agreements between ministers and their chief executives specifying the performance expected of the chief executive
- annual assessment of chief executive performance against the agreement established at the beginning of the year
- defining performance in terms of the things the chief executive can be held accountable to deliver (that is outputs, rather than outcomes)
- a budgeting and appropriations system that allows ministers to make decisions about outputs to be delivered and the price/cost of these outputs, rather than line items for inputs
- the near total delegation of input control to chief executives, including personnel levels and rates of pay, and the mix of labor, capital, and various operating items
- the use of accrual accounting to measure the true cost of departmental operations, assets, and liabilities, rather than just the cash flows for the year

The government of New Zealand summarized the results of these changes as follows:

Transparency in the activities and processes of the State, the liberation of managers from central input controls (on accommodation, equipment, vehicles, consumables and the like) and the new financial management and accounting systems are revolutionizing the ways in which departments and officials work. Unnecessary and redundant processes are being exposed and eliminated, and efficiency ... is improving as departments become more skilled in specifying and pricing outputs.⁷⁵

⁷⁵Ibid., p. 14.

APPENDIX

D

Interview List

CONGRESSIONAL

- Ben Grumbles Professional Staff Member, House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment
- Scott Gudes Minority Staff Director, Subcommittee on Commerce, Justice, and State, Senate Committee on Appropriations
- Lila Harper Helms Democratic Professional Staff Member, Senate Committee on Commerce, Science and Transportation
- John Rayfield Professional Staff Member, House Committee on Resources, Subcommittee on Fisheries, Wildlife, and Oceans
- Richard Russell Professional Staff Member, House Committee on Science, Subcommittee on Energy and Environment
- Michael Strachn Professional Staff Member, House Committee on Transportation and Infrastructure, Subcommittee on Water Resources and Environment

FEDERAL AGENCIES

- Capt. Alan Anderson Office of NOAA Corp Operations, National Oceanic and Atmospheric Administration (NOAA)
- Capt. Andrew Armstrong Chief, Hydrographic Survey Division, National Ocean Service (NOS)
- Alan Balutis Budget Officer, Department of Commerce

Interview List

Richard Barazotto Executive Officer, Office of Ocean and Earth Sciences, NOS

Lee Bassoff* Deputy Director, Human Resources, General Accounting Office

William A. Bergen* Engineering Division, Directorate of Civil Works, U.S. Army Corps of Engineers

Jonathan Breul* Office of Management and Budget

Linda Cushing Chief, Program and Production Management Group, Office of Aeronautical Charting and Cartography Division, NOS

Mortimer Downey Deputy Secretary of Transportation

Patricia Dunham Acting Chief, Mapping Applications Center, U.S. Geological Survey

David B. Enabnit Deputy Chief, Marine Chart Division, Coast Survey, NOS

David Evans^{7 6} Deputy Assistant Administrator, NOS

Martin Faigin Chief, Budget and Finance Branch, Management and Budget Office, NOS

Capt. Richard Floyd Chief, Photogrammetry Division, NGS, NOS

Frederick K. Ganjon Executive Director, Coast Survey, NOS

Pete Gibson* Chief of Program Planning and Management, Coast Survey, NOS

Stephen K. Gill Chief, Tidal Analysis Branch, Office of Ocean and Earth Science, NOS

David C. Harrington Senior Personnel Management Specialist, Federal Deposit Insurance Corporation (FDIC)

Jennifer Hathaway Inspector, Office of Inspections and Resource Management, Office of Inspector General, Department of Commerce

Larry Hothem Manager, GPS Research and Applications, U.S. Geological Survey

* Denotes telephone interviews

^{7 6}Also met with project panel.

Virginia Huth Office of Information and Regulatory Affairs (OIRA),
Information and Policy Branch, Office of Management and
Budget

Diana Josephson Deputy Under Secretary of Commerce

Capt. Fred Klein Navy Liaison to NOAA

Capt. Lewis Lapine Director, National Geodetic Survey, NOS

Ed LaRue Chief, Navigation Rules Branch, U.S. Coast Guard

Sarah Laskin Program Examiner for NOAA, Office of Management and
Budget

Capt. Terry Laydon Acting Director, Office of Aeronautical Charting and
Cartography Division, NOS

Richard Legatski* Congressional Liaison, NOAA

Alethea Long-Green Director, Human Resources, Patent and Trademark Office

Capt. David MacFarland Chief, Marine Chart Division, Coast Survey, NOS

Frank Maloney Director, Coast Survey, NOS

LCdr. Craig McLean Office of NOAA Corp Operations, NOS

Katherine McNamara* Appeals Board Solicitor, General Accounting Office

Capt. Thomas Meyers Chief, Aids to Navigation, U.S. Coast Guard

M.K. Miles Chief of Surveying and Analysis, Engineering Division,
Directorate of Civil Works, U.S. Army Corps of Engineers

Matthew Miller* Hazard Identification Branch, Federal Insurance Admini-
stration, Federal Emergency Management Agency (FEMA)

Richard Moyers Staff, Program and Production Management Group, Office of
Aeronautical Charting Division, NOS

Steve Needle* National Technical Information Service, Department of
Commerce

Lisa Parker Program Analyst, Office of Inspector General, Department of
Commerce

* Denotes telephone interviews

James Plasker Chief, National Mapping Division, U.S. Geological Survey

Capt. Nicholas Prahll Deputy Director, Coast Survey, NOS

Donald Pryor⁷⁷ Coast Survey, NOS

Mark Schultz Assistant Associate Director for Customer Support, Defense Mapping Agency

Michael Sears Program Analyst, Office of Inspector General, Department of Commerce

Capt. Don M. Spillman Deputy Director, Office of NOAA Corp Operations, NOS

R.Adm. W.L. Stubblefield Director, Office of NOAA Corps Operations

Glen Tallia Deputy Assistant General Counsel for Ocean Service, NOAA

Jim Taylor* Deputy Chief Financial Officer, FEMA

Peter Weiss OIRA, Office of Management and Budget

George Wiggers Office of the Secretary, Radionavigation Staff, Department of Transportation

W. Stanley Wilson⁷⁸ Assistant Administrator, NOS

Ted Wolfgang Accountant, NOAA

PRIVATE SECTOR

Milt Baker* President, Bluewater Books and Charts

Joseph J. Cox Vice President, American Institute of Merchant Shipping (AIMS)

Dick Davis Director of Cartography, Pin Point Systems International

Elaine Dickinson Assistant Vice President, Boat Owners Association of the United States (BOATUS)

James Ellis Vice President, Boat Owners Association of the United States (BOATU.S.)

⁷⁷Served as technical adviser to the panel; met with panel and project staff innumerable times; reviewed draft materials; provided background information; served as liaison with NOS leaders and staff.

* Denotes telephone interviews

⁷⁸Met with project panel.



- Barbara Fine President, The Map Store
- Peter A. Geis Owner, Boating Almanac Co., Inc.
- Mark A. Jadcowski Senior Vice President, Chief Technical Officer, James W. Sewall Company
- Jenny Kelley* Regulatory Vice President, American Waterways Operations
- Jeff J. Leonard President and Chief Operating Officer, Photo Science Inc.
- Brad Matson* Senior Editor, National Fisherman Magazine
- Tony McDonald Director of Environmental Affairs, American Association of Port Authorities (AAPA)
- Richard Owen* Board Member, Operations and Government Agency Liaison, Association of Maryland Pilots
- James Owens President and CEO, Better Boating Association (BBA)
- John M. Palatiello Executive Director, Management Association for Private Photogrammetric Surveyors (MAPPS)
- Kenneth Porter Director of Cartography, ADC
- Scott Rainey Government Relations Representative, American Association of Port Authorities (AAPA)
- Jim Slater Program Manager, Geodetics and Geophysics Programs
- Capt. Jack Sparks* President, American Pilots Association
- Michael C. Swauger Chief of Data Research, ADC

OTHER

- Charles Bookman Executive Director, Marine Board, National Research Council
- Frank Cipolla Director, Human Resource Management Center, National Academy of Public Administration
- Mickey Courtney Natural Resources Manager, Maryland Department of Natural Resources, Licensing and Registration
- George English Retired Staffer, Office of the Director, Coast and Geodetic Survey, NOS

* Denotes telephone interviews

APPENDIX

E

Biographies of Panel Members and Project Staff

PANEL MEMBERS

Alan L. Dean*, Panel Chair — Consultant. Former Vice President for Administration, U.S. Railway Association; Deputy Assistant Director, U.S. Office of Management and Budget; Assistant Secretary for Administration, U.S. Department of Transportation; Associate Administrator for Administration, Federal Aviation Administration.

Anne D. Aylward — Senior Transportation Consultant, Volpe National Transportation Systems Center, Department of Transportation. Former Director, Port of Boston; Director, National Intermodal Transportation Commission; member, Marine Board, National Research Council.

Mark Corey — Director of the Geodetic Survey, Canada. Former Senior Policy Analyst, Strategic Planning, Mineral Policy Sector of Energy, Mines and Resources, Canada; Special Assistant and Member's Assistant, House of Commons, Parliament of Canada.

Sandra J. Hale* — President, Enterprise Management, International. Former Commissioner of Administration and Chair, Executive Management Subcabinet, State of Minnesota; Co-editor, *Managing Change: A Guide to Producing Innovation From Within*, The Urban Institute Press; Associate Professor, Metropolitan State University, Twin Cities; President and Chair, Guthrie Theater Trustees, Minneapolis; Chair, Minnesota State Arts Board; Presidential Appointments: Eighth Circuit Court of Appeals Judicial Nominating Commission and National Council for the Arts.

Gerald R. Riso* — Consultant. Former President and Chief Operating Officer, Phillips Colleges, Inc.; Counsellor to the Secretary for Financial Management, U.S. Department of Housing and Urban Development; Deputy Assistant Secretary for Student Financial Assistance, U.S. Department of Education; Associate Director for Management, U.S. Office of Management and Budget; Assistant Secretary, Policy, Budget and Administration, U.S. Department of the Interior; Vice President, Korn/Ferry International; Deputy Commissioner of the Immigration and Naturalization Service.

* Academy Fellow

Harold Seidman* — Guest Scholar, Center for the Study of American Government, Johns Hopkins University. Former Guest Scholar, The Brookings Institution; Professor, Department of Political Science, University of Connecticut; Assistant Director for Management and Organization, U.S. Bureau of the Budget.

Philip J. Stutes — President, John E. Chance & Associates, Inc., a hydrographic surveying and engineering company. Fellow, American Congress of Surveying and Mapping; Past president, Louisiana Society of Professional Surveyors; Member, Institute of Navigation, Louisiana Engineering Society and The American Society of Civil Engineers.

PROJECT STAFF

Herbert N. Jasper*, Project Director — Senior Associate, McManis Associates, Inc. Former Executive Vice President, American Council for Competitive Telecommunications; Legislative Counsel, Research Director and Chief Counsel, U.S. Senate Committee on Labor and Public Welfare; Assistant Director, Office of Legislative Reference, Assistant Chief, Government Organization Branch, U.S. Bureau of the Budget.

Arthur D. Kallen, Deputy Project Director — Consultant/Teacher. Former Director of budget and program analysis, U.S. Department of the Treasury; Legislative Fellow and Appropriations Aide to Senator Lawton Chiles. Staff, Bureau of the Budget's Government Organization Branch; Deputy Division Chief, General Government Programs Division, U.S. Bureau of the Budget. Past President, American Association for Budget and Program Analysis.

Patricia A. Bennet — Personnel Management Specialist, Department of Commerce, National Oceanic and Atmospheric Administration; FY 95 Women's Executive Leadership Program participant.

Benita C. Carr — Administrative Assistant; project and administrative support, including word processing and logistics for standing panels and related Academy projects.

Jeffrey S. Fitzpatrick — Project Coordinator/Research Associate, National Academy of Public Administration. Former Policy Analyst, U.S. Advisory Commission on Intergovernmental Relations.

Henry Hertzfeld, Consultant — Senior Research Scientist, Space Policy Institute and Adjunct Professor, Department of Economics, The George Washington University. An expert in the economic, legal, and policy issues of space and advanced technological development.

Albert J. Kliman, Senior Research Associate — Independent consultant in the fields of government organization, budgeting, and financial management. Former Budget Officer, Department of Housing and Urban Development. Immediate Past-President, American Association for Budget and Program Analysis.

* Academy Fellow