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Committee on Science, Space, and
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CIVIL SPACE

NASA's Strategic Planning Process



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National Security and
International Affairs Division

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The Honorable Robert A. Roe
Chairman, Committee on Science,
Space, and Technology
House of Representatives

Dear Mr. Chairman:

You asked us to review the National Aeronautics and Space Administration's (NASA) strategic planning process. On September 21, 1988, we briefed representatives of the Subcommittee on Space Science and Applications on the results of our work. This report summarizes and updates the information we provided in that briefing.

Strategic planning is a structured, ongoing process that systematically identifies an organization's mission and establishes the goals and objectives that need to be achieved to accomplish that mission. When done properly, strategic planning enables organizations to establish their vision of the future, set goals and objectives that will achieve that vision, assess alternative ways of accomplishing goals and objectives, and identify and resolve any significant problems.

During the past few years, several study groups identified planning as an area that needs to be improved at NASA, and even though progress has been made, we found that strategic planning has not yet been fully implemented throughout the agency. Strategic planning processes and plans were generally well established at the NASA field centers we visited. However, most of the program offices at NASA headquarters do not yet have strategic plans, although all had strategic planning efforts underway. Also, NASA has not yet developed an agencywide strategic plan, but it intends to do so.

We believe that it is advantageous for NASA to develop such a plan. For example, the plan would help focus attention on the fundamental questions of what NASA should be doing and how best to accomplish it, encourage longer-term and more

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realistic multiyear financial planning of an appropriate mix and pace of programs, and help ensure that NASA's overall efforts are affordable and balanced, given civil space priorities.

NASA management needs to follow through and provide continuous attention to the full implementation of strategic planning and the development of an agencywide strategic plan. NASA management could emphasize the importance of strategic planning by setting a timetable for completing the implementation of the process throughout the agency and for preparing the initial overall plan.

A more detailed discussion of the results of our work appears in the appendixes. NASA officials reviewed a draft of this report, and their comments have been incorporated as appropriate. As requested, we did not obtain formal agency comments. Our objectives, scope, and methodology are described in appendix I.

As arranged with your Office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 5 days after its issue date. At that time we will send copies to the Chairmen, House and Senate Committees on Appropriations and Senate Committee on Commerce, Science, and Transportation; the Administrator, National Aeronautics and Space Administration; and other interested parties upon request.

The major contributors to this briefing report are listed in appendix IV.

Sincerely yours,



Harry R. Finley
Senior Associate Director

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ABBREVIATIONS

NASA	National Aeronautics and Space Administration
OSSA	Office of Space Science and Applications

BACKGROUND

Planning is generally recognized as an important management process. However, several recent reports have identified planning as an area that needs to be improved at the National Aeronautics and Space Administration (NASA). In 1985 NASA introduced strategic planning at its headquarters to provide a framework for integrating the agency's goals, objectives, and resources and established a Strategic Planning Council to oversee the process.

IMPORTANCE OF PLANNING

Planning is the initial phase of a sound management process. In addition, at NASA it sets the overall program direction as well as the direction for the agency. Planning allows NASA to look beyond the next budget cycle to evaluate and select long-term goals and priorities and then to analyze and choose cost-effective alternatives for achieving them.

In our February 1985 report, Managing The Cost of Government, Building An Effective Financial Management Structure (GAO/AFMD-85-35), we describe an effective planning process as one that contains the major elements and derives the benefits listed below.

<u>Major elements</u>	<u>Major benefits</u>
A mechanism to identify, evaluate, and select realistic goals and strategies for addressing major issues.	Helps focus on the fundamental questions of what the agency should be doing and how best to accomplish it.
A multiyear view for those programs in which sound choices cannot be made using the 1-year budget horizon.	Encourages longer-term thinking and permits more realistic multiyear financial planning.
A means to aggregate program costs by major activity area, as well as agencywide program cost.	Helps ensure that programs are affordable and balanced, given national priorities.
Feedback mechanisms that reliably, consistently, and systematically develop and provide useful program performance information and analyses to those who need it.	Enables officials to learn about the results of past decisions and apply this knowledge more effectively when future program decisions are made.

STRATEGIC PLANNING COMPONENTS

Our review of NASA's strategic planning documents and other sources of information on the planning process showed that strategic planning should be a process that is

- proactive, involving anticipation of the future and actions to influence the outcome;
- comprehensive, involving all parts of the organization and an integration of their activities; and
- flexible, permitting smooth adjustment to changing conditions through periodic reviewing and updating of the strategic plan.

This process also has to have the active involvement of, and commitment from, senior operating management and be fully integrated with other management processes and procedures to ensure that strategic planning is conducted continually and in a coordinated manner.

The strategic plan should have most, if not all, of the following elements:

- A vision statement, which describes what the agency and its programs ultimately intend to achieve.
- Goals, which are the results or outcomes to be achieved over the long term if the agency fulfills its mission. They provide the context for developing shorter-term objectives.
- Objectives, which are specific, measurable actions to be achieved in the nearer term.
- Alternatives, which are analyzed to determine the potential risks and rewards. The alternative selected should be the one that best fulfills the agency's objectives, goals, and vision.
- An assessment, which evaluates the organization's capabilities, deficiencies, and performance. The organization should periodically assess its strengths and weaknesses and its capacity to carry out plans to achieve approved objectives.

NEED FOR BETTER PLANNING HIGHLIGHTED

On December 16, 1986, a NASA management study group recommended that NASA strengthen its ability to carry out its programs and acquire capabilities needed for future programs, missions, and operations by

- establishing a formal process for strategic and long-range planning,
- unifying the several categories of plans that were being developed separately and relating them to a strategic plan for the agency, and
- establishing a policy and planning staff to support strategic planning for future requirements and to integrate institutional planning with agency long-range/strategic planning.

In March 1987 the American Institute of Aeronautics and Astronautics issued a report entitled U.S. Civil Space Program: An AIAA Assessment. It discussed both near-to-mid-term and selected long-term issues affecting the civil space program and noted, "It is necessary to begin now the planning process to resolve both near-term and far-term civil space program issues." The National Research Council's Committee on Advanced Space Technology also reported in 1987 that NASA's preoccupation with short-term goals had left the agency with an inadequate technology base for supporting advanced space missions. The committee stated that there was little attention given to technology development for missions more than 5 years in the future and that a more balanced program, if properly planned, would have important benefits to the military and civilian space industry.

Dr. Sally Ridel¹ presented an August 1987 report entitled Leadership and America's Future in Space to the NASA Administrator. This report was the product of a study conducted by Dr. Ride's task force, which was responsible for defining potential U.S. space initiatives and evaluating them in light of the Nation's current space program and its desire to regain and retain space leadership. The objectives of the study were to (1) promote a discussion of the long-range goals of the civilian space program and (2) begin an investigation of overall strategies that would direct the space program to a position of leadership. The report indicated that the space program needed long-range direction and fundamental capabilities that would enable it to move toward that direction. The report also stated that for NASA to achieve and maintain a position of leadership it must have a clear strategy in place, with future goals defined and developed. In addition, the report indicated that NASA could contribute to this process by

¹Dr. Sally Ride is a former astronaut and former Acting Assistant Administrator, Office of Exploration, NASA.

- establishing a vision and goals that are consistent with national space interest,
- developing and recommending objectives and programs that support these goals, and
- effectively executing approved programs.

Finally, in its May 1986 report entitled Pioneering the Space Frontier, the National Commission on Space, appointed by the President and directed by the Congress to formulate a bold agenda to carry America's civilian space enterprise into the 21st century, recommended 20-year civilian space program planning and 5-year budget planning to establish long-range goals and develop budgets for review and approval by the administration and the Congress. Furthermore, the Commission recommended that the President and the Congress direct the Administrator of NASA to review the Commission's findings and recommend a long-range implementation plan, including a specific agenda for the next 5 years. The Administrator, however, opted not to do so. In a February 18, 1988, letter to the Chairman of the Subcommittee on Space Science and Applications, House Committee on Science, Space, and Technology, the Administrator said that he was not ready to recommend a long-range implementation plan for the agency. However, he had already created the Office of Exploration and assigned it the responsibility of preparing long-range plans for exploration activities.

For several years NASA has been working on the development of a strategic planning process that could be used to prepare an overall strategic plan, which would express a future direction for the agency. In 1985 NASA introduced strategic planning to provide a framework for integrating the agency's goals, objectives, and resources and established a Strategic Planning Council to oversee the process. The process and its implementation, which is still evolving throughout NASA, is summarized in appendix II.

In more recent actions affecting the planning process, the Office of Policy and Planning was created in 1987, and in April 1988 it was split into the Office of Policy and the Office of Planning. The Director of the Office of Planning told us that developing an overall NASA strategic plan is one of his responsibilities. His office has been formally assigned the responsibility of

- developing, monitoring, and coordinating the agency's planning processes and
- coordinating the agency's integrated long-range program plan.

It is also responsible for providing administrative and technical support to the activities of NASA advisory groups.

OBJECTIVES, SCOPE, AND METHODOLOGY

Our objectives were to identify (1) the strategic planning process used by NASA to provide visibility and direction to the civil space program and (2) any opportunities to improve the process.

We conducted our review at NASA headquarters, Washington, D.C., and at five NASA field centers that have a variety of programmatic responsibilities, namely, Goddard Space Flight Center, Greenbelt, Maryland; Johnson Space Center, Houston, Texas; Kennedy Space Center, Florida; Lewis Research Center, Cleveland, Ohio; and Marshall Space Flight Center, Huntsville, Alabama. We discussed NASA planning and related matters with officials at the Office of Management and Budget, the Congressional Research Service, the Congressional Budget Office, and the National Security Council's Senior Interagency Group for Space.

We reviewed the processes NASA uses to set, evaluate, and update its overall direction; establish goals and objectives; and prepare upcoming fiscal year budgets. We examined NASA's strategic planning documents, including the minutes of strategic planning meetings. We interviewed NASA's planning officials in the Offices of the Administrator, Space Science and Applications, Exploration, Space Operations, Aeronautics and Space Technology, Space Station, Space Flight, and Commercial Programs. We attended a strategic planning session at the program office level and a NASA Advisory Council meeting where planning activities were discussed.

We did not review the processes and techniques NASA uses to manage specific projects and programs nor the process the field centers use to develop their strategic plans. Because the strategic planning process and most of the procedures are carried out without extensive documentation, we relied on discussions with agency officials to substantiate that NASA follows the process described in this report, and we corroborated our discussions to the extent that documentation was available. We conducted our review from November 1987 through October 1988 in accordance with generally accepted government auditing standards.

NASA'S STRATEGIC PLANS AND THE PLANNING PROCESS

All of NASA's program offices and field centers that we visited were doing strategic planning and had developed, or were in the process of developing, strategic plans. However, NASA has not developed an agencywide strategic plan, although, according to NASA officials, it plans to do so.

CURRENT STATUS OF STRATEGIC PLAN DEVELOPMENT

NASA defines strategic planning as a process for describing its vision of the future, the goals and objectives it needs to achieve to attain that vision, and the programs that will satisfy those goals and objectives. It is also used by management to focus on those factors that influence what the agency does and how the agency does it.

NASA's current strategic planning process starts with a vision statement, from which goals and objectives are developed by the agency, program offices, and field centers for both their long-range and near-term programs and projects. With guidance from the administration and the Congress, the agency's plans and budgets are then developed for specific programs and projects that contribute to achieving the goals and objectives. Although an overall strategic plan for the agency could result from this process, one has not yet been developed.

Of seven NASA program offices, only the Office of Space Science and Applications (OSSA) has developed a strategic plan outlining its vision, goals, objectives, and overall strategy. OSSA's strategic approach involves

- establishing a set of programmatic themes,
- establishing a set of decision rules,
- establishing a set of priorities for missions and programs within each theme,
- demonstrating that the strategy can yield a viable program, and
- checking the strategy for technology readiness and for consistency with resource constraints, such as budget, staffing, and launch vehicle availability.

These five actions allow OSSA to plan its activities and allocate its resources. The themes set the direction of, and provide balance to, the overall program. The decision rules guide the

selection of efforts among and within each theme. The list of priorities determines the order in which the missions and programs within each theme will be pursued.

The Director, Office of Planning, said that he plans to develop an agencywide strategic plan that will be very similar to OSSA's, except that specific program priorities will probably not be listed.

NASA's other program offices were in the process of developing similar plans. For example, the Office of Space Flight had drafted its vision statement, goals, and objectives, and officials said they expected to publish a strategic plan in 1989. The Office of Exploration had begun its strategic planning efforts and was using Dr. Ride's report, Leadership and America's Future in Space, as the basis for establishing its vision, goals, and objectives; officials plan to publish a strategic plan by the end of 1988. The Office of Aeronautics and Space Technology was also in the process of developing its strategic plan, and an official expects it to be published in the next several months. The Office of Space Operations, which had drafted its vision, goals, and objectives, intends to publish a plan in 1989. The Office of Commercial Programs and the Office of Space Station, which are relatively new organizations, were just beginning their strategic planning efforts.

In addition, each of the five field centers we visited had implemented a strategic planning process and had developed a strategic plan.

PLANNING CYCLE

The Senior Management Group² is the top-level forum responsible for ensuring that major issues facing NASA receive integrated consideration from both headquarters and the field centers and that the Administrator and other key decisionmakers are provided with the information they need to make the best possible decisions. For major planning issues, the primary mechanism for conveying this information is the annual planning cycle. The Group is chaired by the Administrator, and its members include the Deputy Administrator, the Associate Deputy Administrator, the Assistant Deputy Administrator, Associate Administrators,

²In mid-1988 the Strategic Planning Council was replaced by NASA's Senior Management Group. The Assistant Administrator for Equal Opportunity Programs and the Assistant Administrator for Procurement, who were not on the Council, are on the Senior Management Group.

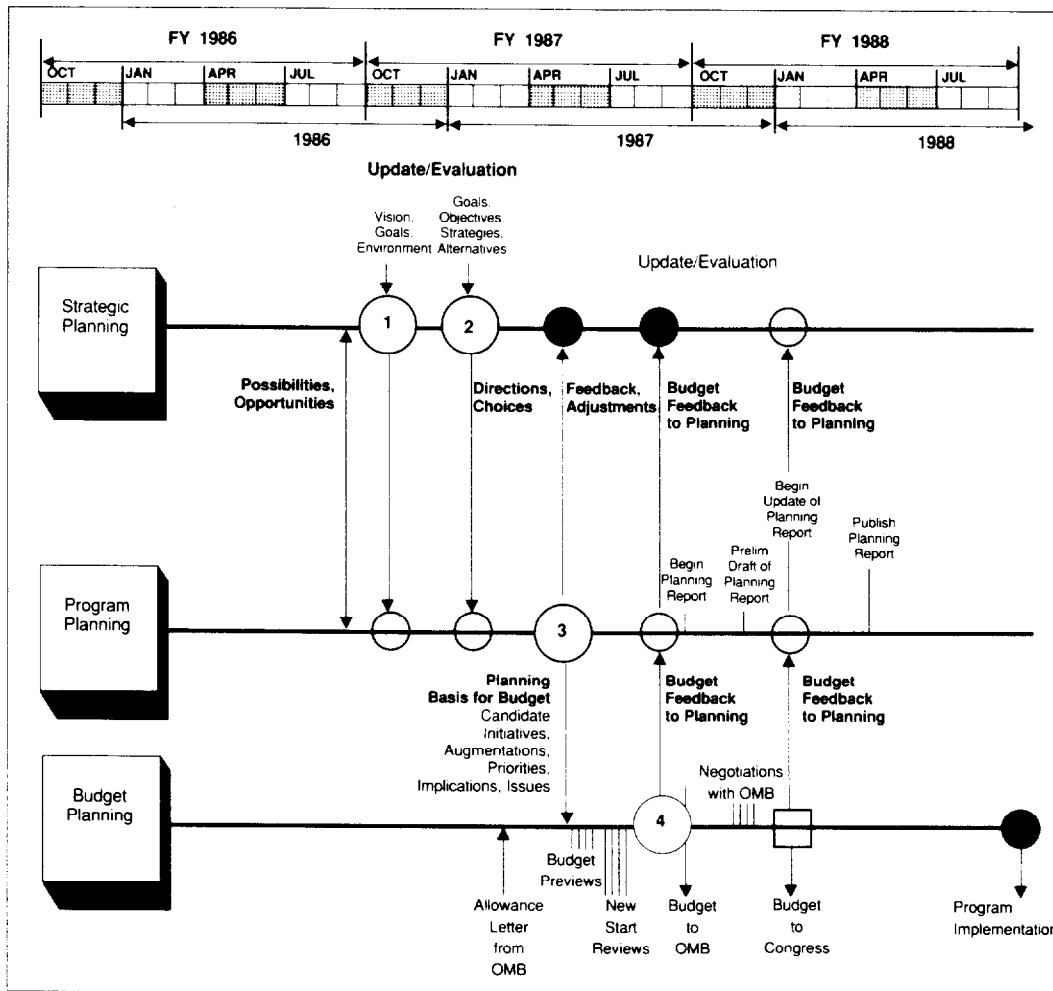
Assistant Administrators, the General Counsel, the Comptroller, and Field Center Directors.

The four sequential periods that NASA's annual planning cycle generally follows are listed below.

- Evaluation and update (September through November)
- Strategy development (December through January)
- Near-term planning (January through May)
- Budget development (June through August)

Figure II.1 illustrates how the strategic planning process is integrated with NASA's budget cycle for fiscal years 1986 through 1988.

Figure II.1: NASA's Planning/Budgeting Cycle



During the evaluation and update and strategy development periods, the Senior Management Group meets to evaluate previous strategic planning results. During the near-term planning period, the Group establishes the planning framework, which forms the basis for considering the programs underlying the annual budget submission to the administration and the Congress. During the budget development period, the final budget proposal is developed based upon the previously defined specific objectives.

Evaluation and Update

The evaluation and update period begins with the Group's evaluation of whether NASA's accomplishments during the previous year were consistent with its vision, goals, and objectives statements. The Group then considers whether any of these statements should be changed. Because the vision statement sets the overall future direction for NASA, few, if any, changes are expected on a year-to-year basis. If modifications are needed, alternative vision statements and/or suggested changes are discussed. Once the vision statement is complete, the Administrator formally approves it and communicates it throughout NASA.

NASA's current vision statement, which was still in effect at the time we completed our review "...is to be at the forefront of advancements in aeronautics, space science, and exploration. To set our course into the 21st Century and bring this vision to reality, NASA will pursue major goals which represent its aspirations in aviation and space."

A strategic plan should start with a vision statement that presents a clear image of what an organization wants to be, which then helps organize efforts toward that image. NASA's vision statement of being "at the forefront of advancements in aeronautics, space science, and exploration," is general and, as a result, can be subject to a variety of interpretations. Thus, the goals and objectives selected to support this vision may be less precise than they should be.

At the time of our review, the Senior Management Group was considering revising the current vision statement. However, NASA officials did not know if the statement would be revised or, if so, whether the new statement would be more specifically focused.

After establishing a vision, the Group develops goals and objectives, using the prior year's goals and objectives as a starting point. The Group considers such matters as changes in technology or changes in the relationships with other agencies

and the Congress to adjust, revise, or redefine NASA's goals and objectives.

At the time of our review, NASA had the following major goals:

- advance scientific knowledge of Earth, the solar system, and the universe beyond;
- expand human presence beyond Earth into the solar system; and
- strengthen aeronautics research and develop technology toward promoting U.S. leadership in civil and military aviation.

According to NASA, successful pursuit of these major goals requires commitment to the following supporting goals:

- return the space shuttle to flight status and develop advanced space transportation capabilities and
- develop facilities and pursue science and technology needed for the Nation's space program.

In addition, NASA stated it would

- promote domestic application of aerospace technologies to improve the quality of life on Earth and extend human enterprise beyond Earth and
- conduct cooperative activities with other countries when such cooperation is consistent with our national space goals.

During this period the Group also identifies and analyzes key external and internal environmental forces (also called "situation analysis" by NASA) that may affect the agency's ability to achieve its goals and objectives.

Internal environmental forces consist of such variables as the quality and motivation of the work force and the quality of plant, facilities, and equipment. External environmental forces consist of such variables as the state of the national economy, deficit reduction efforts, availability of resources, and international space competition/cooperation.

The Group also considers the influences of others involved in the space program, for example, the aerospace industry, colleges and universities, those in the research community who are critically dependent on NASA to develop technology and support space science research, and other government agencies such as the Departments of Defense, Transportation, and Commerce.

Strategy Development

Evaluation and update continues into this period as new information on the programs proposed to the administration and the Congress is used to refine goals and objectives. More detailed objectives for activities in the next 5 to 10 years are then established, and alternative strategies to be used to accomplish these activities are identified and assessed. The Senior Management Group meets in January to define specific objectives and strategies for developing the next year's program plan and identify the key issues that must be addressed and resolved. During this meeting the Group also reviews Presidential budget decisions and their impact on strategic and program plans.

The NASA Advisory Council³ aids the Group in developing alternative approaches for accomplishing the agency's goals. The Group critiques or evaluates each alternative by addressing the following questions.

- What basic assumptions are being made about the unknown as identified in the environment assessment?
- What are the strengths and weaknesses of each alternative with respect to achieving the desired result and with respect to the results of the situation analyses?

This assessment of alternatives is an attempt to ensure that the limited resources available are spent on productive programs and projects. NASA then selects a preferred course of action after considering the following additional questions.

- What are the decision criteria?
- How is this approach superior to others considered?
- What are the major obstacles to overcome?

Near-Term Planning

Based upon the specific objectives established during the strategy development period, the program offices develop their plans for the next budget year and the next 5 to 10 years. The

³The Council consults with the NASA Administrator on plans, work in progress, and accomplishments of NASA's aeronautics and space programs. The Council consists mostly of personnel from universities and industry, along with NASA's Chief Scientist.

plans include candidate initiatives, priorities, additional planning issues, and the implications of proposed plans or alternatives. The Group meets in May, before the presentation of program office budgets to the NASA Administrator, to review the program plans. During this meeting the Group examines the entire NASA program, its likely interactions and potential conflicts, and related planning issues.

Budget Development

This period involves the development of NASA's official budget proposal. Proposing officials base their budget presentations to top management on prior planning, assessments of identified issues and guidance from the Group, and outside inputs (advisory groups). The Group meets in August to review the tentative budget decisions by the NASA Administrator just before the budget proposal is submitted to the administration. This meeting serves as a last opportunity to identify any unaddressed problems resulting from those decisions. The meeting is also an opportunity to review key planning issues not addressed and resolved in the budget decision process.

The principal results of this period are the budget, budget-related decisions, and issues that will be considered during the next evaluation and update period.

CONCLUSIONS

NASA has established a structured strategic planning process, and progress is being made in its implementation. When fully implemented, the process will have the potential to be proactive, comprehensive, and flexible, and it should culminate in an agencywide, continuously updated strategic plan. However, a considerable amount of work remains to be done to realize that potential, and the key to the eventual success or failure of this planning process depends on the full participation and consistent support of NASA's top management. Such participation and support starts with setting a clear vision of what the agency ultimately intends to achieve. In addition, NASA's program offices that have not yet implemented a strategic planning process or developed strategic plans should do so, and NASA should use the strategic planning process it has established to develop an agencywide strategic plan.

NASA officials told us that an agencywide strategic plan will be developed. We support this effort because such a plan could help focus attention on the fundamental questions of what NASA should be doing and how best to accomplish it. It could also encourage longer-term and more realistic multiyear financial planning of an appropriate mix and pace of programs and help ensure that NASA's overall efforts are affordable and balanced, given civil space priorities.

NASA's new Office of Planning could speed full implementation of strategic planning and improve the management of the process by providing continuous oversight and attention to it, furnishing staff support to the Senior Management Group, and providing for better linkage between goals and objectives and the budget. However, NASA management needs to follow through and provide continuous attention to the full implementation of strategic planning and the development of an agencywide strategic plan. NASA management could emphasize the importance of strategic planning by setting a timetable for completing the implementation of the process throughout the agency and for preparing the initial overall plan.

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