

SCIENCE, AERONAUTICS AND TECHNOLOGY

FISCAL YEAR 2003 ESTIMATES

BUDGET SUMMARY

ACADEMIC PROGRAMS

EDUCATION PROGRAMS

SUMMARY OF RESOURCE REQUIREMENTS

	FY 2001 OP PLAN <u>REVISED</u>	FY 2002 INITIAL <u>OP PLAN</u>	FY 2003 PRES <u>BUDGET</u>	Page <u>Number</u>
		(Millions of Dollars)		
Student support programs	7.3	20.9	11.3	SAT 6.1-6
Teacher/faculty preparation and enhancement programs	8.4	9.6	9.2	SAT 6.1-8
State-based support of education**	35.8	40.8	30.4	SAT 6.1-10
Educational technology.....	23.7	69.7	9.1	SAT 6.1-14
Evaluation.....	<u>1.6</u>	<u>1.6</u>	<u>1.6</u>	SAT 6.1-18
Total.....	<u>76.8</u>	<u>142.6</u>	<u>61.6</u>	
Enterprise Program Funding *	<u>{7.5}</u>			
Total Program Funding	<u>84.3</u>	<u>142.6</u>	<u>61.6</u>	
 <u>Distribution of Program Amount by Installation</u>				
Johnson Space Center.....	1.0	1.7	1.0	
Kennedy Space Center.....	0.6	0.6	0.6	
Marshall Space Flight Center.....	2.0	5.0	2.0	
Stennis Space Center.....	1.0	1.0	1.0	
Ames Research Center.....	2.7	5.7	2.7	
Langley Research Center.....	1.2	1.2	1.2	
Glenn Research Center.....	1.0	3.9	1.0	
Dryden Flight Research Center.....	0.5	0.5	0.5	
Goddard Space Flight Center.....	54.4	118.1	46.7	
Jet Propulsion Laboratory.....	0.5	0.5	0.5	
Headquarters.....	<u>11.9</u>	<u>4.4</u>	<u>4.4</u>	
Total.....	<u>84.3</u>	<u>142.6</u>	<u>61.6</u>	

*Note: \$7.5M of the increase received in FY 2002 represents encumbered funding previously included in the Enterprise budgets.

**Renamed "Support for Systemic Improvement of Education" category.

PROGRAM GOALS

NASA's direction for education is set forth in the NASA Strategic Plan through the Agency's Communicate Knowledge crosscutting process objective to support the Nation's education goals:

Educational Excellence. *We involve the educational community in our endeavors to inspire America's students, create learning opportunities, and enlighten inquisitive minds.*

This objective is accomplished through implementation of a full range of NASA education programs and activities that contribute to the various efforts and activities of those involved with and in the education community, and benefit the participants as well as advance the mission of the Agency. Progress towards this goal is measured in two ways:

- **Excellence:** NASA seeks to be judged by its customer, the education community, as providing excellent and valuable educational programs and services. Therefore we will attempt to maintain an "excellence" rating ranging between 4.3 and 5.0 (on a 5.0 scale) as rated by our customers.
- **Involvement:** NASA strives to involve the educational community in our endeavors. Therefore, at the proposed funding level, we seek to maintain a current level of participant involvement of approximately 3 million with the education community, including teachers, faculty and students.

STRATEGY FOR ACHIEVING GOALS

In carrying out its Education Program, NASA is particularly cognizant of the powerful attraction the NASA mission holds for students and educators. The unique character of NASA's exploration, scientific, and technical activities has the ability to capture the imagination and excitement of students, teachers, and faculty, and channel this into education endeavors which support local, state, and national educational priorities. In fulfilling its role to support excellence in education as set forth in the NASA Strategic Plan, the NASA Education Program brings students and educators into its missions and research as participants and partners. NASA provides the opportunity for a diverse group of students and educators to experience first hand involvement with NASA's scientists and engineers, facilities, and research and development activities. The participants benefit from the opportunity to become involved in research and development endeavors, gain an understanding of the breadth of NASA's activities, and return to the classroom with enhanced knowledge and skills to share with the education community.

The NASA Implementation Plan for Education provides general guidance for the implementation and continual improvement of the NASA Education Program for fiscal years 1999-2003. Specifically, the plan

- Identifies three leadership strategies to improve and guide the NASA Education Program: (1) contribute to educational excellence; (2) develop alliances; and (3) involve the education community.
- Outlines the education agenda for this period through seven improvement initiatives: (1) focus and coordinate state-based efforts; (2) enhance instructional products and dissemination; (3) improve education program integration and coordination;

(4) facilitate NASA research in the higher education community; (5) support preservice education; (6) target informal education; and (7) implement NASA's comprehensive data collection and evaluation system.

- Delineates the operating principles integral to the conduct of all NASA education activities: customer focus; collaboration; diversity; and evaluation.
- Defines the NASA Education Program and Evaluation Framework, the basis from which our agency-wide and center-based programs are organized, implemented, and evaluated. This framework includes student support, teacher/faculty preparation/enhancement, systemic improvement of education, and educational technology program categories, as further described in this narrative.
- Describes the roles and responsibilities of the various organizational entities that carry out the NASA Education Program.

This plan provides guidance for an agency-wide Education Program as administered by the Office of Human Resources and Education as well as programs and activities carried out by the NASA Enterprise Offices, the Office of Equal Opportunity Programs and the NASA Field Centers.

Program Evaluation

The NASA Education Program and Evaluation Framework was established to serve as a model to guide the implementation and evaluation of NASA's Education Program. NASA continues to further refine and implement the framework and the evaluation system that was first pilot tested in FY 1996. Three levels of performance measures have been developed. At the top level, all programs have measurements that relate to the Program's primary metrics: excellence and involvement. Data showing progress towards these metrics are provided below. At the second level, each implementation approach has specific measures that all programs in a particular category are measured against, such as career goals, program value and overall quality, curriculum integration/use, standards awareness and utilization, partnerships/alliances, service quality, and usage. At the third level, each program, in addition to the applicable second level measures, has program specific measures that show progress as well as participant written feedback that provides quality evaluation data.

ACCOMPLISHMENTS AND PROPOSED RESULTS

FY 2001 Achievements

In FY 2001, the NASA evaluation system was able to collect data on the agency-wide education programs, and many center- or Enterprise-specific programs and activities. The data below summarize the top-level measures that relate to the Education Program's two metrics - - excellence and involvement.

- **Excellence:** NASA seeks to be judged by its customer, the education community, as providing excellent and valuable educational programs and services. Therefore we will attempt to maintain an "Excellence" rating ranging between 4.3 and 5.0 (on a 5.0 scale) as rated by our customers.

Progress towards this metric is measured by a quality rating of NASA's performance by the educational customer. The following data were collected:

Participant ratings of excellence (score: 5=excellent to 1=very poor; total participants reporting: 8,741 to 18,269 participants responding; not all participants are asked all 4 questions; 134 programs reporting)

- 4.63 Recommend to others
- 4.66 Rate staff
- 4.56 Expect to apply what was learned
- 4.62 Valuable experience
- Overall average for excellence: 4.62

Based on this information, the NASA Education Program continues to meet its metric of excellence, as defined by the level of satisfaction expressed by our customers.

- **Involvement:** NASA strives to involve the educational community in our endeavors. Therefore, at the proposed funding level, we seek to maintain a current level of participant involvement of approximately 3 million with the education community, including teachers, faculty, and students.

Progress towards this metric is measured in two ways: (1) total number of participants, including students/teachers/faculty/administrators involved in NASA education programs; and (2) number of partnerships/collaborations. The following data were collected:

Participants

- Total in-person involvement in NASA Education activities: 3,654,916
- Participants identified by type:
 - o Students: 28%
 - o Teachers/faculty: 35%
 - o Administrators, civic, parents, etc.: 37%
- Types of K-12 schools represented (4,097 participants reporting)
 - o 29% urban; 31% suburban; 40% rural

Partnerships

- 7,094 instances of alliances (133 programs)
- higher education institutions; industry; contractors; other NASA facilities; Educator Resource Center Network; nonprofits; local community; school districts

It is clear from the numbers provided above that the NASA Education Program continues to exceed the metric of involving 3 million direct participants in our programs, and we anticipate continuing to do so in FY 2002.

FY 2003 PLANS

In FY 2003, NASA's Education Program funding request of \$61.6M provides for continued maintenance of a broad, comprehensive education program. This request provides core funding for agency-wide student support, teacher/faculty preparation/enhancement, support for systemic improvement, educational technology, and evaluation programs, as outlined in the following sections. Under this funding scenario, three major challenges continue to confront the Education Program: 1) how to strengthen the competitiveness and the stability of the core university program; 2) how to responsibly manage Congressionally directed programs in ways that meet the intent of Congress, represent responsible use of funds, and fit within the framework of NASA's Education Program; and 3) how to implement the NASA Science and Technology Scholarship Program.

BASIS OF FY 2003 FUNDING REQUIREMENT

STUDENT SUPPORT PROGRAMS

	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
		(Millions of Dollars)	
Elementary and secondary.....	3.8	4.3	3.9
Higher education.....	<u>3.5</u>	<u>16.6</u>	<u>7.4</u>
Total.....	<u>7.3</u>	<u>20.9</u>	<u>11.3</u>

PROGRAM GOALS

To use the NASA mission, facilities, human resources, and programs to provide information, experiences, and research opportunities for students at all levels to support the enhancement of knowledge and skills in the areas of science, mathematics, engineering, and technology.

STRATEGY FOR ACHIEVING GOALS

Student support activities: (1) provide NASA mission experiences and information that are designed to promote students' interest and achievement in science, mathematics, engineering, technology, and geography; (2) provide exposure to NASA research and/or research experiences and activities to promote science, mathematics, technology, engineering, and geography career awareness; (3) provide support to the science and technology workforce pipeline by including greater participation of individuals who are underrepresented in science, mathematics, engineering, technology, and geography in NASA student programs; and (4) increase the number of NASA student support opportunities through partnerships and interagency cooperation and collaboration. Examples of how these objectives are put into practice are provided below.

Activities such as the NASA Student Involvement Program (NSIP) provide general exposure to NASA's mission and stimulate interest in mathematics, science, and technology subject matter by providing opportunities for students to develop experiments to be tested in or on a NASA research facility. Additional activities such as the Summer High School Apprenticeship Research Program (SHARP), demonstrate the applications of mathematics, science and technology by providing research experiences for students who traditionally have not been represented in mathematics, science and engineering fields. These experiences take place at NASA field centers or at university laboratories. At the higher education level, activities such as the Graduate Student Researchers Program (GSRP) provide support to train students in NASA-related disciplines at both the master's and doctoral levels, again providing actual field center experience when applicable.

MAJOR RESULTS IN THE PAST YEAR

In FY 2001, 1,034,701 students participated in NASA education activities. Elementary/secondary students comprised almost 93% of that number, in a variety of programs, projects, and activities. Also in FY 2001, NASA completed the pilot year of the Undergraduate Student Research Program, a coordinated, agency-wide, research opportunity for undergraduate students. This program is designed to increase diversity in the pipeline for NASA and to fill a gap in programs at the undergraduate level, providing a bridge from our high school programs to our graduate programs. For the pilot year, we received over 1100 applications, selecting 107 students. The demographics of this group included: 52 women, 44 minorities; 62 “rising” seniors and 45 juniors; “Class” GPA: 3.65. Applications were received from all states; students placed were from 30 states, plus Puerto Rico.

PROGRAM PLANS FOR FY 2003

In FY 2002, funding for Student Programs has been increased due to the planned development and implementation of a NASA Science and Technology Scholarship Program. These competitive scholarships will be awarded only for study in disciplines critical to NASA’s future needs. NASA is seeking authority to establish a service requirement as a condition for receiving these scholarships, to ensure that our investment will provide an important source for bringing the best and brightest into NASA. Additional funding in FY 2002 was provided for an increase in stipends for graduate fellowships and an increase in participant opportunities for undergraduate research. Pending the “for-service” authority, a critical element of the program, no further funding has been requested for this program in FY 2003 and program implementation plans are currently on hold.

BASIS OF FY 2003 FUNDING REQUIREMENT

TEACHER/FACULTY PREPARATION AND ENHANCEMENT PROGRAMS

	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
		(Millions of Dollars)	
Elementary and secondary.....	3.7	4.2	4.2
Higher education.....	<u>4.7</u>	<u>5.4</u>	<u>5.0</u>
Total.....	<u>8.4</u>	<u>9.6</u>	<u>9.2</u>

PROGRAM GOALS

To use the NASA mission, facilities, human resources, and programs:

- (1) to provide exposure and experiences to educators and faculty;
- (2) to support the enhancement of knowledge and skills; and
- (3) to provide access to NASA information in science, mathematics, technology, engineering, and geography.

STRATEGY FOR ACHIEVING GOALS

At the elementary and secondary level, preparation and enhancement activities are designed to (1) provide NASA mission-based programs that introduce the application of science, mathematics, geography, engineering, and technology for use in student learning activities; (2) provide educators with a wider range of alternatives using scientific inquiry, based on the NASA mission; (3) encourage a “multiplier” effect to expand the benefits of the in service program beyond participants to include additional educators; (4) provide access to and promote utilization of NASA related materials and information resources; (5) increase the participation of under-served and under-utilized individuals and groups; and (6) facilitate collaborations between the faculty of teacher preparation departments and the faculty of scientific and technical departments to develop innovative approaches to teacher preparation. Examples of how these objectives are put into practice are provided below.

Pre-service programs such as Project NOVA, and in-service programs such as the NASA Education Workshops (NEW) and the Urban and Rural Community Enrichment Program (URCEP) are designed to enhance and improve the teaching of mathematics, science, and technology by demonstrating their applications in aeronautics and space through workshops around the country, in school districts and at NASA field centers. The Teaching from Space Program continues to provide instructional products that help support these preparation and enhancement workshops, drawing from in-flight experiences of Space Shuttle and International Space Station crews.

At the higher education level, activities are designed to enhance faculty research skills and content knowledge; balance participation so that a cross-section of colleges and universities is represented (i.e., community colleges, four year institutions, institutions that serve significant numbers of underrepresented groups, under funded institutions); and provide opportunities for curriculum

expansion/revision that aligns with the mission needs of NASA and universities. Activities such as the NASA Faculty Fellowship Program (NFFP) provide research experiences for faculty at ASA field centers to further their professional knowledge in the engineering and science disciplines, and to ultimately enhance the undergraduate/ graduate curriculum.

MAJOR RESULTS IN THE PAST YEAR

In FY 2001, 1,286,887 educators and faculty participated in NASA education activities. K-12 educators comprised approximately 97% of that number.

In FY 2001 teacher/faculty preparation/enhancement programs expanded the scope of educator enhancement programs to include workshops at each center for institutions in their region that serve informal education and urban/rural systemic efforts; provided education experiences for educators in the effective application of educational technologies; and defined and executed activities that targeted preservice education programs. The year also brought, with the staffing of the International Space Station, the opportunity to integrate ISS into many of our existing teacher workshop activities.

In FY 2002, we will begin the redesign of our center-based NASA Education Workshop (NEW) program, in an effort to better meet the needs of today's educators, and to broaden the reach of the program.

FY 2002 will also mark the first year of the redesigned NASA Faculty Fellowship Program (NFFP). A combination of the Summer Faculty Fellowship Program and the JOVE Program, the NFFP has been redesigned to provide for greater follow-on research opportunities for participating faculty and better linkages with the undergraduate curriculum.

PROGRAM PLANS FOR FY 2003

In FY 2003, funding for Teacher/Faculty Preparation/Enhancement Programs will be maintained at the same approximate level as in FY 2002. Changes in funding reflect some internal programmatic requirements and priorities. Based on the requested funding level, participation levels for K-12 activities should also remain at similar levels. However, challenges such as faculty stipends continue to confront the higher education program.

BASIS OF FY 2003 FUNDING REQUIREMENT

STATE-BASED SUPPORT OF EDUCATION

	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
		(Millions of Dollars)	
Aerospace Education Services Program (AESP).....	6.2	6.2	--
National Space Grant College and Fellowship Program.....	19.1	24.1	19.1
Experimental Program to Stimulate Competitive Research.....	10.0	10.0	4.6
Innovative Reform Initiatives.....	0.5	0.5	--
State-based programs.....	--	--	<u>6.7</u>
Total.....	<u>35.8</u>	<u>40.8</u>	<u>30.4</u>

PROGRAM GOALS

To use NASA’s unique assets to support local, state, regional science, mathematics, technology, engineering, and geography education improvements through collaboration with internal and external stakeholders.

STRATEGY FOR ACHIEVING GOALS

NASA is committed to supporting state-based initiatives in the areas of science and mathematics education, and its activities vary depending on the needs of the institution, school system, and/or state. Thus, the activities supported by programs included in this category seek to provide a range of support in response to the needs of the customer community.

State-based activities are designed to: (1) coordinate planning among NASA education initiatives to ensure alignment with and support of standards-led improvement initiatives of the states; (2) redirect existing education programs, and ensure new initiatives address state needs and tie together unique education and economic development efforts; (3) support standards-based science, mathematics, technology, and geography education change by aligning NASA educational programs and products with the national/state standards; and (4) expand interactions with external stakeholders involved in the improvement of education at all levels.

A major program at the elementary and secondary education level is the Aerospace Education Services Program (AESP). The AESP’s primary focus is teacher enhancement with emphasis on and support for local, state, and regional mathematics, science, and technology education efforts through collaboration of internal and external stakeholders in high impact reform activities.

State-based activities at the higher education level use partnerships, linkages, and collaborations to provide activities and experiences designed to enhance research and educational capabilities, and enhance the collaborative capabilities of a diverse set of academic institutions. Programs such as Space Grant and the Experimental Program to Stimulate Competitive Research (EPSCoR) play a major role in NASA's contribution towards these efforts.

The Space Grant Program, authorized by Congress in 1987, increases the understanding, assessment, development, and use of aeronautics and space resources. All 50 states, Puerto Rico, and the District of Columbia have Space Grant Consortium programs in which more than 790 affiliates participate. These consortia form a network of colleges and universities, industry, state/local governments, and nonprofit organizations with interests in aerospace research, training, and education.

The NASA EPSCoR Program provides research funding that enables eligible states to develop an academic research enterprise directed toward long-term, self-sustaining, nationally competitive capabilities in space and Earth science and applications, aeronautical research and technology, biological and physical research and applications, and space research and technology programs. This capability will, in turn, contribute to the state's economic viability. In FY 2001, the NASA EPSCoR program went through a redesign process to better align the research opportunities funded by the program with the research priorities of the Enterprises. Proposers were required to establish linkages with NASA Centers to ensure that the proposed research was relevant to NASA as well as contributed to the state's research infrastructure.

Systemic improvement at both the pre-college and higher education levels is captured in NASA's Innovative Initiatives program which is supportive of standards-based systemic improvement efforts, and focuses on science, mathematics and technology education. A means of supporting improvement is through partnerships with professional education associations, national aerospace education associations, industries, other Federal agencies, and state and local groups. When NASA becomes a partner with these groups, its role may be one of leadership, participation or facilitation to empower and enable wide reaching educational reform that is systemic in nature. An example of these partnerships is NASA's work with the National Alliance of State Science and Math Coalitions (NASSMC).

MAJOR RESULTS IN THE PAST YEAR

Performance in this area is measured in a variety of ways, including partnerships/alliances, supplemental funding, and standards. In FY 2001, NASA documented 7,094 alliances with a variety of partners (note, a program may be involved in multiple alliances), as measured below:

4% NASA Contractors; 5% Other Industry; 6% Local Community; 2 % Museums/Planetariums; 3% Non Profit; 2% Federal Agencies; 28% Higher Education Institutions; 7% Other NASA; 18% K-12 Schools; 11% K-12 School Districts; 7% NASA HQ Program Office; 1% State Government; 4% Educator Resource Centers. Partners included schools (K-12 and higher education), industry, and nonprofit organizations.

More than \$72M was secured in supplemental funding, of which 25% came from other Federal agencies, 11% from state agencies, 28% from educational organizations and institutions; 2% from industry/business, and local organizations.

The data below provide examples of accomplishments of the two largest programs—Space Grant and EPSCoR:

Space Grant (FY 2000 data)

- □ 52 University-based Consortia
- Space Grant involves 792 affiliates which include:
 - 513 colleges and universities
 - 69 business/industry
 - 41 State and local government agencies
 - 169 other affiliates (science museums, not for profits, etc.)
- \$55M in matching funds (31% university; 29% other Federal, 10% industry; 19% other; 11% local/state government)
- 2,249 fellowships and scholarships (75% undergraduate; 22% under represented groups; 42% women)

- □ 557 research programs; \$6M funded proposals; 307 publications
 - 1,160 education programs; \$5M funded proposals
- 408 public service programs; 3.0M people served

EPSCoR

- Program grant awards to 20 states
 - Alabama, Arkansas, Connecticut, Idaho, Kansas, Kentucky, Louisiana, Maine, Mississippi, Montana, Nebraska, Nevada, North Dakota, Oklahoma, Puerto Rico, South Carolina, South Dakota, Vermont, West Virginia, Wyoming
- 35 Research awards to 19 states
 - Alabama, Arkansas, Connecticut, Idaho, Kansas, Kentucky, Louisiana, Maine, Mississippi, Montana, Nebraska, Nevada, Oklahoma, Puerto Rico, South Carolina, South Dakota, Vermont, West Virginia, Wyoming
- Research awards by Enterprise
 - Aerospace Technology – 6
 - Earth Science – 11
 - HEDS – 4
 - Biological and Physical Research – 6
 - Space Science – 8

PROGRAM PLANS FOR FY 2003

General plans for State-based activities in FY 2002 and FY 2003 include providing professional development to NASA's internal education community; reviewing existing NASA education initiatives to ensure their alignment with the vision and philosophy for state-based activities; designing new programs or redesigning existing programs to ensure that all NASA efforts align with the science, mathematics, technology, and geography education standards and supporting the needs of those engaged in the implementation of standards-based education at the state and local levels; continuing to leverage the use of NASA programs and

resources by expanding NASA interactions and cooperation with all stakeholders involved in national and state systemic initiatives; and implementing a plan through the field centers that supports the needs of individual states.

Congressional direction in FY 2002 increased the funding for the Space Grant Program to \$24.1M. This additional funding will be used to run a competition enabling eligible consortia to become a “designated” Space Grant Consortium and receive the highest level of funding, and to offer competitive awards focused on workforce development to all 52 consortia to improve the NASA workforce pipeline and strengthen the relationships between the Space Grant consortia and the NASA Centers. In FY 2002 the Space Grant Program funding was augmented by Congressional direction. The FY 2003 request returns the program funding to its base level of \$19.1M.

Congressional direction in FY 2002 also increased the funding for the NASA EPSCoR Program to \$10.0M. This will enable NASA to continue the funding commitments made in the FY 2001 program. One of our challenges with this program is how, under the current funding structure, to both broaden and strengthen the reach of the NASA EPSCoR Program. In FY 2002 the EPSCoR Program funding was augmented by Congressional direction. The FY 2003 request returns the program funding to its base level of \$4.6M.

In FY 2003, funding and therefore, participation levels, for other Systemic Improvement activities will be maintained at approximately the same level as in FY 2002.

BASIS OF FY 2003 FUNDING REQUIREMENT

EDUCATIONAL TECHNOLOGY

	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
	<u>(Million of Dollars)</u>		
Learning tools.....	3.2	3.3	3.3
Demonstrations.....	2.0	2.0	2.0
Learning Technologies Project.....	--	3.8	3.8
Jason XI.....	2.5	2.4	--
Sagan Discovery.....	1.0	0.9	--
Ohio View.....	--	0.9	--
Completion of Science Learning Center in Kenai, AK	1.0	3.0	--
Lewis & Clark – Re-discover Web Tech.....	2.0	--	--
Univ of San Diego for Science and Education Technology	1.0	--	--
Univ. of Redlands, Academic Infrastructure.....	3.0	--	--
Science Facilities Initiative, Heidelberg College, OH	1.0	--	--
Univ. of Wisconsin-Milwaukee, Initiative for Math, Science, Tech.....	2.0	1.5	--
NASA Glenn “Gateway to the Future: Ohio Pilot”.....	1.0	1.9	--
Santa Ana College Space Education Center, CA	1.5	--	--
Univ. of North Carolina, Chapel Hill – Science Education Facility.....	0.5	1.5	--
Science Learning Center, Hammond, IN.....	1.0	--	--
Environmental Science Learning Center, Los Angeles, CA	1.0	--	--
NASA Educator Resource Center, South East Missouri State Univ...	--	0.5	--
American Museum of Natural History	--	3.5	--
Sci-Port Discovery Center at Shreveport, LA	--	0.9	--
Challenger Learning Center of Kansas	--	0.5	--
Challenger Learning Center of Illinois	--	0.5	--
Challenger Learning Center at Wheeling Jesuit College	--	0.5	--
Alan Shepard Discovery Center, NH.....	--	1.9	--
US Space & Rocket Center for Educational Training Center	--	3.0	--
Von Braun Scholarship Program	--	1.9	--
Alabama Math, Sci & Tech Initiative.....	--	3.0	--
Sci-Quest Hands-on Sci Center	--	2.9	--
Alabama Supercomputer Educational Outreach Program	--	1.6	--
Educational Advancement Alliance.....	--	1.9	--
Enhance K-12 sci education thru program @ Middle Tennessee State Univ	--	0.3	--

	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
	<u>(Million of Dollars)</u>		
Planetarium for Clay Center of Arts & Sciences, Charleston, WV	--	5.0	--
Chabot Observatory & Sci Center, CA	--	1.0	--
Des Moines Sci Center, Des Moines, Iowa	--	0.8	--
Infrastructure needs, Mauna Kea Astronomy Ed Center, U HI	--	4.0	--
NASA/Bishop Museum partnership, Honolulu HI	--	1.0	--
Construction of life sciences facility, Brown U	--	3.0	--
Instrumentation & lab development, Rowan U, NJ	--	2.0	--
Infrastructure improvements, Sch of Sci & Math, College of Charleston, SC	--	5.0	--
Muhlenberg Coll, Lehigh Co. PA, to dev natl model for using NASA data ...	--	1.5	--
TX Engineering Experiment Center, TX A&M Univ.	--	0.8	--
Southeast Missouri State U's NASA Educator Resource Center	--	0.5	--
Challenger Learning Center, Ferguson/Florissant, Missouri	--	<u>1.0</u>	--
Total	<u>23.7</u>	<u>69.7</u>	<u>9.1</u>

* FY 01 and FY 02 totals reflect Congressional interest projects added as part of the Congressional appropriation process.

PROGRAM GOALS

To research and develop products and services which facilitate the application of technology to enhance the educational process for formal and informal education and lifelong learning.

STRATEGY FOR ACHIEVING GOALS

The Educational Technology program (1) produces technology-based teaching tools and strategies that are grounded in or derived from the NASA mission; (2) uses emerging technologies for, and applies existing technologies to, educational programs; (3) utilizes technology to facilitate communication within the educational community; (4) involves educators in NASA missions through innovative uses of technologies; and (5) conducts research into new teaching and learning practices that are made possible through NASA mission-derived technology.

The NASA Classroom of the Future (COTF) continues to be a major component of the educational technology program, demonstrating how NASA technologies and research results can be translated into learning tools, demonstrations, and teacher enhancement programs that support standards-based education reform.

Specific learning tools such as NASA CONNECT, an instructional television and web-based series, demonstrating work place math, science, and technology as collaborative processes, and NASA Spacelink, an electronic resource specifically developed for the educational community, provide additional resources for educators to use in and out of the classroom.

The Learning Technologies Project provides demonstration projects and on-line systems dedicated to bringing NASA science to teachers and students in the classroom using examples from NASA's unique missions. The goal of this program is to accelerate the implementation of a national information infrastructure through NASA science, engineering, and technology contributions and to facilitate the use of technologies within the K-12 education systems.

MAJOR RESULTS IN THE PAST YEAR

Performance in this area is measured in a variety of ways, including overall quality, type/number of users; standards application; internet hits; data transferred; searchable pages; and unique IP addresses.

General plans for this program area include providing technology training and support for the persons involved in the operation of the Educator Resource Center Network and the Space Grant program; implementation of a coordinated electronic dissemination system that ensures that all NASA education activities and products are available through appropriate networking technologies; demonstrate NASA's educational technology resources at professional development conferences; develop innovative learning tools and technologies that are integrated with curriculum support and teacher enhancement activities ; develop, implement, and evaluate distance education and virtual mentoring projects; and support distribution of excess NASA equipment to schools and institutions of higher education.

Examples of accomplishments include:

- WWW Requests (Hits): 198M; Data Transfer Volume (GB): 8.5B; Unique IP Addresses: 4.4B
- CD ROMS provided for Curriculum Support: 24,124; NASA materials distributed: 1.6M; NASA materials demonstrated: 29.2K
- 36% of Teachers responding integrate NASA materials into their curriculum
- 116,922 Visits to NASA Educational Resource Centers
- Programs supporting standards: 63% Science; 34% Math; 23% Technology; 15% Geography; 29% State Frameworks; 13% Local Frameworks
- Distance Education: 1,016K "Open Mike Interactive" Students/Teachers"; 56.7M Anonymous Students/Teachers; 234M TV/Radio Audiences
- Programs using NASA facilities: 36% Laboratories; 6% Teleconferencing; 5% Aircraft; 13% Computer Labs; 5% Hangers; 5% Mockup Facilities 7% Spacecraft Displays; 9% Wind Tunnels; 21% Clean Rooms.

PROGRAM PLANS FOR FY 2003

FY 2003 requested funding for Educational Technology demonstrations, tools, and the Learning Technology Program is similar to the FY 2002 level and no major program changes are expected. (Note: in FY 2001, funding for the Learning Technologies Program was provided by the Enterprises. This funding has now been incorporated into the Education Program budget for FY 2003. The

effect of this transfer in funding was “seamless” to the program as oversight continues to be provided by the Education Division, Office of Human Resources and Education).

Educational Technology activities in FY 2001 included funding for the following activities directed by Congress in the Conference Report accompanying the VA-HUD-Independent Agencies Appropriation Act: continuing funding for Jason XI; Sagan Discovery Center, Science Learning Center in Kenai, AK, Lewis & Clark web tech program, University of San Diego for a science/ educational technology program, and the University of Redlands. New programs include: Science Facilities Initiative at Heidelberg College (OH), Initiative for Math, Science, Technology at the University of Wisconsin-Milwaukee, NASA Glenn Gateway to the Future project, Space Education Center at Santa Ana College (CA), Science Education Facility at the University of North Carolina in Chapel Hill (NC), Science Learning Center in Hammond (IN), and an Environmental Science Learning Center in Los Angeles (CA).

Educational Technology activities in FY 2002 include funding for the following: Continuing funding for Jason XI; Sagan Discovery Center (NY); Completion of Science Learning Center in Kenai, AK; Univ. of Wisconsin-Milwaukee, Initiative for Math, Science, Technology; NASA Glenn “Gateway to the Future: Ohio Pilot”. New programs include: Ohio View; NASA Educator Resource Center, South East Missouri State University (MO); American Museum of Natural History (NY); Sci-Port Discovery Center at Shreveport, LA; Challenger Learning Center of Kansas; Challenger Learning Center of Illinois; Challenger Learning Center at Wheeling Jesuit College; Alan Shepard Discovery Center, NH; US Space & Rocket Center for Educational Training Center (AL); Von Braun Scholarship program (AL); Alabama Math, Science and Technology Initiative; Sci-Quest Hands-on Science Center (AL); Alabama Supercomputer Educational Outreach Program; Educational Advancement Alliance; Enhance K-12 science education through program at Middle Tennessee State University; Planetarium for Clay Center of Arts and Sciences, Charleston, WV; Science Discovery Outreach Center, University of North Carolina, Chapel Hill, NC; Chabot Observatory and Science Center, CA; Des Moines Science Center, Des Moines, Iowa; Infrastructure needs, Mauna Kea Astronomy Education Center, University of Hawaii; NASA/Bishop Museum partnership, Honolulu, HI; Construction of life sciences facility, Brown University (RI); Instrumentation and lab development, Rowan University (NJ); Infrastructure improvements, School of Science and Math, College of Charleston, SC; Muhlenberg College, Lehigh Co. PA to develop national model for using NASA data; TX Engineering Experiment Center, Texas A&M University; Southeast Missouri State University's NASA Educator Resource Center; and the Challenger Learning Center, Ferguson/Florissant, Missouri.

BASIS OF FY 2003 FUNDING REQUIREMENT

EVALUATION

	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>
Evaluation	1.6	1.6	1.6

(Millions of Dollars)

PROGRAM GOALS

To provide a substantive accounting and evaluation of the performance of NASA’s Education Program, with its associated projects and activities, in the implementation of its goals by developing and maintaining a systematic strategy for collecting, aggregating, and reporting evaluation indicator data.

STRATEGY FOR ACHIEVING GOALS

NASA has undertaken a comprehensive effort to evaluate its Education Program in order to demonstrate the accomplishment of achievable and measurable goals and objectives. A set of standard, agency-wide indicators, metrics, and evaluation instruments has been developed for agency-wide use. The data are collected on-line in a single database capable of providing correlation and report generation capability. External, third-party education evaluation experts provide additional guidelines and criteria for the analysis of qualitative and quantitative data facilitating in-depth evaluations of various programs.

MAJOR RESULTS IN THE PAST YEAR

NASA continues to refine a comprehensive system to evaluate its Education Program in order to demonstrate the accomplishment of achievable and measurable goals and objectives. Based on recommendations provided by a study of the NASA Education Program by the National Research Council (NRC), NASA established program goals and defined a comprehensive Education Framework that captures the elements of NASA’s Education Program. This framework is detailed in NASA’s *Implementation Plan for Education*, and supported by implementation plans developed by the Enterprises and NASA field installations between FY 1995 and the present. NASA utilizes an Internet-based system, for the collection, analysis, evaluation and reporting of standard and program unique data and program outcomes for all NASA education programs.

PROGRAM PLANS FOR FY 2003

NASA’s Education Data Collection and Evaluation System (EDCATS), continues to add programs incrementally until all NASA education programs are included. As programs compile a firm set of baseline data, selected annual program targets will be established or reviewed, as needed or required. By FY 2002 the system will be fully operational, tracking data and evaluation metrics for the entire NASA Education Program.

In FY 2001 NASA chartered a review of its education program by a panel of external experts. The NASA Education Program Evaluation Review (NEPER) Panel addressed five key questions regarding the NASA Education Program. The NEPER Panel endorsed NASA's role in education and affirmatively answered each of the five questions defined for the review. The Panel recommended that NASA (a) develop an action plan to address all recommendations in the report; (b) institute a standing external review process; and (c) continue to conduct credible, objective program evaluations for major, national programs. NASA will continue to implement these recommendations during FY 2003, while also responding to the NEPER Panel's specific recommendation to collect long-term, longitudinal data.