

**SCIENCE AERONAUTICS AND TECHNOLOGY**

**FISCAL YEAR 2002 ESTIMATES**

**BUDGET SUMMARY**

**ACADEMIC PROGRAMS**

**EDUCATION PROGRAMS**

**SUMMARY OF RESOURCES REQUIREMENTS**

	FY 2000 OPLAN <u>REVISED</u>	FY 2001 OPLAN <u>REVISED</u>	FY 2002 PRES <u>BUDGET</u>	Page Number
		(Thousands of Dollars)		
Student support programs .....	10,200	7,300	20,900	SAT 7.1-6
Teacher/faculty preparation and enhancement programs .....	8,700	8,400	9,600	SAT 7.1-8
Support for systemic improvement of education .....	35,800	35,830	30,400	SAT 7.1-10
Educational technology.....	28,800	23,700	9,100	SAT 7.1-14
Evaluation.....	<u>1,500</u>	<u>1,600</u>	<u>1,600</u>	SAT 7.1-17
Total.....	<u>85,000</u>	<u>76,830</u>	<u>71,600</u>	
Enterprise Program Funding * .....		<u>[7,484]</u>	<u>0</u>	
Total Program Funding .....	<u>85,000</u>	<u>84,314</u>	<u>71,600</u>	
 <u>Distribution of Program Amount by Installation</u>				
Johnson Space Center.....	4,946	998	1,000	
Kennedy Space Center.....	523	599	600	
Marshall Space Flight Center.....	1,319	1,996	2,000	
Stennis Space Center.....	1,523	998	1,000	
Ames Research Center.....	3,478	2,694	2,700	
Langley Research Center.....	1,121	1,197	1,200	
Glenn Research Center.....	2,772	998	1,000	
Dryden Flight Research Center.....	326	499	500	
Goddard Space Flight Center.....	56,539	54,380	49,100	
Jet Propulsion Laboratory.....	492	499	500	
Headquarters.....	<u>11,961</u>	<u>11,974</u>	<u>12,000</u>	
Total.....	<u>85,000</u>	<u>76,830</u>	<u>71,600</u>	

\*Note: \$7,500 of the increase requested in FY 2002 represents encumbered funding previously included in the Enterprise budgets

## **PROGRAM GOALS**

NASA's direction for education is set forth in the NASA Strategic Plan through the 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 captivate 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 its research as participants and partners. NASA provides the opportunity for a diverse group of educators and students 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.

## **NASA Implementation Plan for Education**

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.
- Describes the roles and responsibilities of the various organizational entities that carry out the NASA Education Program.

This plan provides guidance for agency-wide education programs 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. During FY 2000, NASA has further refined and implemented 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 measures 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 qualitative evaluation data.

## **ACCOMPLISHMENTS AND PROPOSED RESULTS**

### **FY 2000 Achievements**

In FY 2000, 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 by the educational customer of NASA's performance. The following data were collected:

Participant ratings of excellence (score: 5=excellent to 1=very poor; total participants reporting: 13,473 participants responding; not all participants are asked all 4 questions; 112 programs reporting)

- 4.70 Recommend to others
- 4.71 Rate staff
- 4.57 Expect to apply what was learned
- 4.67 Valuable experience
- Overall average for excellence: 4.66

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: 3,248,191
- Total involvement in NASA Education activities: 37,478,958 ( 164 programs reporting)
- Participants identified by type:
  - Students: 53%
  - Teachers/faculty: 20%
  - Administrators, civic, parents, etc.: 27%
- Types of K-12 schools represented (4,579 participants reporting)
  - 32% urban; 31% suburban; 37% rural

### Partnerships

- 9,030 instances of alliances
- higher education institutions; industry; contractors; other NASA facilities; Educator Resource Center Network; non-profits; 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 2001.

### **FY 2002 Plans**

In FY 2002, NASA's Education Program funding request of \$71.6M 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, two major challenges confront the Education Program: 1) how to strengthen the competitiveness and the stability of the core university program; and 2) how to responsibly manage Congressionally directed programs in ways that both meet the intent of Congress and fit within the framework of NASA's Education Program.

**BASIS OF FY 2002 FUNDING REQUIREMENT**

**STUDENT SUPPORT PROGRAMS**

	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>
		(Thousands of Dollars)	
Elementary and secondary.....	3,800	3,800	4,300
Higher education.....	<u>6,400</u>	<u>3,500</u>	<u>16,600</u>
Total.....	<u>10,200</u>	<u>7,300</u>	<u>20,900</u>

**PROGRAM GOALS**

The goal of the Student Support Program is 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, 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 under represented in science, mathematics, 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) and the Shuttle Amateur Radio Experiment (SAREX) 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 or to communicate directly with astronauts via amateur radio. 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.

## **ACCOMPLISHMENTS AND PROPOSED RESULTS**

In FY 2000, 1,098,826 students participated in NASA education activities. Elementary/secondary students comprised almost 96% of that number, in a variety of programs, projects, and activities.

In FY 2000, NASA developed the Undergraduate Student Research Program, a coordinated, agency-wide, research opportunity for undergraduate students. This program was 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. The pilot program was announced in early 2001 and is scheduled to commence with a group of 80-100 students in May 2001.

FY 2001 and FY 2002 also bring, with the staffing of the International Space Station, the opportunity to integrate ISS into many of our existing student support activities, especially at the K-12 level.

In FY 2002, funding for Student Programs has been increased due to the planned development and implementation of a NASA Scholarship Program in Science and Engineering. These competitive scholarships will be awarded only for study in disciplines critical to NASA's future needs. NASA will be seeking authority to establish a service requirement as a condition for receiving these scholarships, to ensure that their investment will provide an important source for bringing the best and brightest into NASA. There will be a significant mentoring component to ensure student retention as well as opportunities for students to participate in internships at NASA Centers. Planning is currently underway for students beginning the fall 2002 academic year. Additional funding has also been provided for a nominal increase in stipends for graduate fellowships and an increase in participant opportunities for undergraduate research. In addition, the FY 2002 request represents encumbered funding for graduate fellowships previously included in the Enterprise budgets.

An area of challenge that continues to confront the higher education programs, is graduate fellowship opportunities. Therefore stipends must be raised even higher in order to remain competitive with similar Federal fellowship programs.

**BASIS OF FY 2002 FUNDING REQUIREMENT**

**TEACHER/FACULTY PREPARATION AND ENHANCEMENT PROGRAMS**

	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>
		(Thousands of Dollars)	
Elementary and secondary.....	3,700	3,700	4,200
Higher education.....	<u>5,000</u>	<u>4,700</u>	<u>5,400</u>
Total.....	<u>8,700</u>	<u>8,400</u>	<u>9,600</u>

**PROGRAM GOALS**

The goal of the Teacher/Faculty Preparation and Enhancement Programs is to use the NASA mission, facilities, human resources, and programs to provide exposure and experiences to educators and faculty, to support the enhancement of knowledge and skills, and 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 Community Enrichment Program (UCEP) 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 under represented 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 Summer Faculty Fellowship

Program (SFFP) provide research experiences for faculty at NASA field centers to further their professional knowledge in the engineering and science disciplines, and to ultimately enhance the undergraduate/graduate curriculum.

### **ACCOMPLISHMENTS AND PROPOSED RESULTS**

In FY 2000, 395,136 educators and faculty participated in NASA education activities. K-12 educators comprised approximately 67% of that number.

General plans for teacher/faculty preparation/enhancement programs in FY 2001 and FY 2002 include plans to expand 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; provide education experiences for educators in the effective application of educational technologies; and define and execute activities that target preservice education programs. FY 2001/2002 also bring, 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 Summer Faculty Program. This program is currently undergoing changes that will provide for greater follow-on research opportunities for participating faculty and better linkages with the undergraduate curriculum.

In FY 2002, funding for Teacher/Faculty Preparation/Enhancement Programs will be maintained at the same approximate level as in FY 2000 and 2001. Changes in funding reflect some internal programmatic requirements and priorities. Presuming stable funding, participation levels for K-12 activities should also remain at similar levels. A slight increase has been added at the higher education level in order to provide a nominal increase in stipends for faculty fellowships.

However, challenges continue to confront the higher education program, such as summer faculty opportunities since stipends must be raised even higher in order to remain competitive with similar Federal faculty programs.

**BASIS OF FY 2002 FUNDING REQUIREMENT**

**SUPPORT FOR SYSTEMIC IMPROVEMENT OF EDUCATION**

	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>
	(Thousands of Dollars)		
Aerospace Education Services Program (AESP).....	6,200	6,230	6,200
National Space Grant College and Fellowship Program.....	19,100	19,100	19,100
Experimental Program to Stimulate Competitive Research.....	10,000	10,000	4,600
Innovative Reform Initiatives.....	<u>500</u>	<u>500</u>	<u>500</u>
Total .....	<u>35,800</u>	<u>35,830</u>	<u>30,400</u>

**PROGRAM GOALS**

The goal of the Support for Systemic Improvement of Education Program is to use NASA's unique assets to support local, state, regional, and national science, mathematics, technology, engineering, and geography education improvements through collaboration with internal and external stakeholders.

Systemic improvement encompasses the process whereby an entire system is re-engineered toward achieving a new goal. NASA is committed to supporting systemic 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.

**STRATEGY FOR ACHIEVING GOALS**

Systemic improvement activities are designed to: (1) coordinate planning among NASA education initiatives to ensure alignment with and support of standards-led systemic 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 systemic 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, regional and national mathematics, science, and technology education efforts through collaboration of internal and external stakeholders in high impact reform activities.

Systemic Improvement 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 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 700 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 seed funding that will enable 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, and space research and technology programs. This capability will, in turn, contribute to the state's economic viability. In August 2000, NASA EPSCoR was redesigned with the highest priority being to better align the research funded by EPSCoR with the Enterprises.

Systemic improvement at both the pre-college and higher education levels is captured in NASA's Innovative Reform Initiatives program which is supportive of standards-based systemic improvement efforts, and focuses on science, mathematics and technology education. A means of supporting systemic 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, being a participant, or acting as a facilitator 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).

### **ACCOMPLISHMENTS AND PROPOSED RESULTS**

Performance in this area is measured in a variety of ways, including partnerships/alliances, supplemental funding, and standards. In FY 2000, NASA documented 9,030 alliances with a variety of partners (note, a program may be involved in multiple alliances):

4% NASA Contractors; 6% Other Industry; 1% Local Community; 2 % Museums/Planetariums; 4% Non Profit; 3% Federal Agencies; 42% higher Education Institutions; 7% Other NASA; 13% K-12 Schools; 3% K-12 School Districts; 6% NASA HQ Program Office; 2% State Government; 5% Education Resource Centers. Partners included schools (K-12 and higher education), industry, and non-profit organizations.

More than \$88M was secured in supplemental funding, of which 15% came from other Federal agencies, 6% from state agencies, 45% from Educational Organizations and Institutions; 1% from industry/business, and local organizations.

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

### **Space Grant (FY 1999 data)**

- 52 University-based Consortia
- Space Grant involves 761 affiliates which include:
  - 500 colleges and universities
  - 63 business/industry
  - 34 State and local government agencies
  - 164 other affiliates (science museums, not for profits, etc.)
- \$53.6M in matching funds (32% university; 24% other Federal, 13% industry; 21% other; 10% local/state government)
- 2,182 fellowships and scholarships (75% undergraduate; 22% under represented groups; 43% women)
- 573 research programs; \$6.5M funded proposals; 384 publications
- 1,048 education programs; \$14.2M funded proposals
- 399 public service programs; 4.9M people served

### **EPSCoR**

- Awards to twenty states
- Alabama, Arkansas, Kentucky, Louisiana, Montana, Puerto Rico, Kansas, Nebraska, Oklahoma, South Carolina – original grants and prep grants
- Idaho, Kentucky, Louisiana, Maine, Mississippi, Nebraska, Nevada, South Dakota, Vermont, West Virginia – prep grants
- Participants: **(FY 1998 data)**
  - Institutions: 88
  - Research clusters: 42
  - Faculty: 252
  - Post doctoral fellowships: 56
  - Graduate students: 317
  - Undergraduates: 242
- \$68.2M proposals funded
- 276 publications, refereed papers
- 1 patents; 12 patent applications; 3 invention disclosure

General plans for Systemic Improvement activities in FY 2001 and FY 2002 include providing professional development on standards-based education initiatives to NASA's internal education community; reviewing existing NASA education initiatives to ensure their alignment with the vision and philosophy for state-based systemic reform; 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; leveraging 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 2001 for the NASA EPSCoR Program increased the funding for this program to \$10.0M. This has enabled NASA to conduct a selection process for a revamped EPSCoR program that better aligns with the research mission of the NASA Enterprises. Awards are expected to be announced in Spring 2001. 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. While the FY 2002 request reduces program funding to 4.6M, we anticipate reducing rather than eliminating funding for those states selected in this process.

In FY 2002, funding and therefore, participation levels, for other Systemic Improvement activities will be maintained at approximately the same level as in FY 2001.

**BASIS OF FY 2002 FUNDING REQUIREMENT**

**EDUCATIONAL TECHNOLOGY**

	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>
		(Thousands of Dollars)	
Learning tools.....	3,800	3,242	3,300
Demonstrations.....	2,000	1,996	2,000
Learning Technologies Project.....	4,000	0	3,800
Franklin Institute	1,400	--	
Jason XI.....	2,100	2,495	
Sagan Discovery.....	900	998	
Texas Learning.....	3,700	--	
Space Science Museum.....	3,600	--	
Ohio View.....	1,800	--	
Completion of Science Learning Center in Kenai, AK .....	900	998	
Lewis & Clark – Re-discover Web Tech	1,800	1,996	
Univ. of San Diego for Sci & Ed Tech	500	998	
City of Ontario CA for Sci & Ed Tech	500		
Univ. of Redlands, Academic Infrastructure	1,800	2,993	
Science Facilities Initiative, Heidelberg College, OH	--	998	
Univ. of Wisconsin-Milwaukee, Initiative for Math, Science, Tech.	--	1,996	
NASA Glenn “Gateway to the Future: Ohio Pilot”	--	998	
Santa Ana College Space Education Center, CA	--	1,497	
Univ. of North Carolina, Chapel Hill – Science Education Facility	--	499	
Science Learning Center, Hammond, IN	--	998	
Environmental Science Learning Center, Los Angeles, CA	--	998	
 Total .....	 <u>28,800</u>	 <u>23,700</u>	 <u>9,100</u>

\* - FY 00 and FY 01 totals reflect Congressional interest projects added as part of the Congressional appropriation process.

**PROGRAM GOALS**

The goal of the Educational Technology program is to research and develop products and services that 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.

## **ACCOMPLISHMENTS AND PROPOSED RESULTS**

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): 815M; Data Transfer Volume (GB): 11.7B; Unique IP Addresses: 1.4B
- CD ROMS provided for Curriculum Support: 20,359; NASA materials distributed: 1M; NASA materials demonstrated: 31.7K
- 51% of Teachers responding integrate NASA materials into their curriculum
- 154,000 Visits to NASA Educational Resource Centers

- Programs supporting standards: 66% Science; 49% Math; 39% Technology; 25% Geography; 41% State Frameworks; 20% Local Frameworks
- Distance Education: 112K “Open Mike Interactive” Students/Teachers”; 34.5M Anonymous Students/Teachers; 106M TV/Radio Audiences
- Programs using NASA facilities: 51% Laboratories; 39% Teleconferencing; 25% Aircraft; 50% Computer Labs; 25% Hangers; 21% Mockup Facilities; 25% Spacecraft Displays’ 19% Wind Tunnels; 21% Clean Rooms.
- 39% of Programs brief educators on acquiring excess computers for their schools.

FY 2002 requested funding for Educational Technology demonstrations, tools, and the Learning Technology Program is similar to the FY 2001 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 2002. 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 2000 include funding for the following activities directed by Congress in the Conference Report accompanying the VA-HUD-Independent Agencies Appropriation Act: the Franklin Institute, Jason XI, Sagan Discovery, Texas Learning, Space Science Museum, Ohio View, Completion of Science Learning Center in Kenai, AK, Lewis & Clark, University of San Diego for Science & Education Center, City of Ontario California for Science & Education Center, University of Maryland Advanced Information Technology Center, University of Redlands Academic Infrastructure, and Residential Aerospace Education Center at the Glenn Research Center.

Educational Technology activities in FY 2001 include funding for the following: 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).

**BASIS OF FY 2002 FUNDING REQUIREMENT**

**EVALUATION**

	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>
		(Thousands of Dollars)	
Evaluation.....	1,500	1,600	1,600

**PROGRAM GOALS**

The goal of the evaluation program is: to provide a substantive accounting and evaluation of the performance of NASA's educational 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 programs 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.

**ACCOMPLISHMENTS AND PROPOSED RESULTS**

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.

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.