NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

PART ASSESSMENTS[1]

[1]This document contains details of the most recent program assessments as of the date the 2005 Budget was published (February 2004). Programs originally assessed for the 2004 Budget were reassessed only where evidence showed an agency's rating was likely to change. Programs not reassessed are presented in this document in the form of reprints of the original worksheets and are footnoted "FY 2004 Budget".

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Program Assessment Rating Tool (PART)

Program: Biological Sciences Research
Agency: National Aeronautics and Space Administration
Bureau: Office of Biological and Physical Research
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	82%	100%	47%	

1.1 Is the program purpose clear? Answer: YES Question Weight: 20%

Explanation: The Biological Sciences Research program (BSR) has a well-defined and focused purpose that is tied directly to NASA's vision and mission and the Biological and Physical Research strategy. The goals and objectives are clear and unambiguous to all stakeholders (Congress, the public and the Administration).

Evidence: The research conducted by NASA's Biological Sciences contributes to NASA's overall efforts to explore the Universe and Search for Life. The key goals of the OBPR Research Strategy are to provide the research necessary to answer the questions: How can we assure the survival of humans traveling far from Earth?; What must we know about how space changes life forms so that mankind will flourish?; and What technology must we create to enable the next explorers to go beyond where we have been? The OBPR Research Plan is available at: spaceresearch.nasa.gov/common/docs/OBPR_Research_Plan.pdf.

1.2 Does the program address a specific and existing problem, interest or need? Answer: YES Question Weight: 20%

Explanation: In order to explore the universe with human crewmembers, a decision to proceed must be based on the assessment of risks. In order to assess and mitigate these risks, basic and applied research is needed. Today, we only have a limited understanding of gravity's effect on life at the molecular, cellular systems, and behavioral level. Scientists can now begin to extend this research at all levels of biological complexity to provide critical knowledge underlying the known human heath risks of space flight. Other critical research within BSR addresses the technology needs that are associated with humans: life support, environmental monitoring and human factors.

Evidence: Without substantial progress in these areas, new missions with people will not be possible. In 2003, the Research Maximization and Prioritization Task Force (ReMAP) reviewed the content and rationale of the research being done by OBPR, and recommended priorities for ISS research. The report identifies two overarching programmatic goals: research enabling human exploration of space and basic research of intrinsic scientific interest. BSR elements were identified as essential to these goals. The ReMAP Final Report is available at: www.spaceresearch.nasa.gov/common/docs/remap/remap_final_report.pdf.

1.3 Is the program designed so that it is not redundant or duplicative of any other Federal, state, local or private effort? Answer: YES Question Weight: 20%

Explanation: BSR is a one of a kind program with long-term strategic goals that are not funded or managed by any other programs at the federal, state or local government levels, or by private industry. BSR has the unique responsibilities of providing critical knowledge underlying the known human heath risks of space flight, developing the biological knowledge to assure that mankind will flourish, and developing the critical technologies for human exploration.

Evidence: BSR is the only comprehensive program in the U.S. designed to understand the impact of the space environment on biological systems and to develop countermeasures to these effects. The ReMAP report concluded that the program is "unique". NASA's BSR is the leader of scientific coordination with the other space agencies of the world engaged in this scientific endeavor. In order to leverage national resources, BSR actively seeks to collaborate with other Federal agencies and Institutes who may offer specialized expertise or have overlapping needs such that co-funding is appropriate. OBPR currently has 65 agreements with 35 Federal agencies/institutes.

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1.4 Is the program design free of major flaws that would limit the program's effectiveness or efficiency? Answer: YES Question Weight: 20%

Explanation: NASA's BSR science strategy and technical approach are the product of a broad community (NASA and other Federal agencies, universities, industry, and International Partners). The program design is reviewed periodically by the National Academy and regularly by the NASA Advisory Committee. BSR program effectiveness and efficiency is further assured through competitions that fund independently peer reviewed research proposals by individual investigators.

Evidence: NASA's BSR science strategy and technical approach are reviewed by the National Academies of Science and NASA advisory groups. The NRC report " Review of NASA's Biomedical Research Program" ,2000 examined the agency's entire biomedical program in order to assess the extent to which the program is consistent with previous NRC recommendations . Ongoing programmatic changes responding to REMAP (e.g., the OBPR Research Plan) are still being vetted. The feedback of the community as expressed by the Biological and Physical Research Advisory Committee, is that the program architecture is well designed. Full text of the NRC report is available at: http://www.nap.edu/books/0309071267/html/

1.5 Is the program effectively targeted, so that resources will reach intended beneficiaries and/or otherwise address the program's purpose directly? Answer: YES Question Weight: 20%

Explanation: BSR provides a targeted program to supply research products to agency customers (e.g., Office of Space Flight, NASA Chief Medical Officer). In addition, BSR selects research that is best aligned to meet the program goals. The program goals are vetted with the community (universities, civil service researchers, industry and international partners). All proposals are independently peer reviewed for scientific merit and analyzed for program relevance prior to funding. Additionally, NASA BSR coordinates with international space agencies to recommend new research needs.

Evidence: Prior to funding, all proposals relevant to the solicitation are subject to competitive peer review. Proposal success rates were 23% in FY02, indicative of selectivity in awards. Additionally, NASA BSR coordinates with other international space agencies to hold international workshops that review the current state of knowledge in specific scientific areas of interest and recommend research needs. Over time these international workshops have covered the scientific disciplines covered by BSR. These workshops were used as an input to NASA Research Announcements already released this year.

2.1 Does the program have a limited number of specific long-term performance measures that focus on outcomes and meaningfully reflect the purpose of the program? Answer: YES Question Weight: 9%

Explanation: The new OBPR strategy contains a set of specific long-term performance measures that are based on OBPR's critical path roadmap and the OBPR research plan. The measures were derived from the OBPR 10 year Enterprise strategy, which was published earlier this year, and are reflected in the measures tab. Outcomes need to continue to be refined in following years to ensure that, to the extent possible, they can be measured and evaluated over time.

Evidence: To fulfill its primary role in the Agency's strategic plan for enabling Goal 9, extend the duration and boundaries of human space flight to create new opportunities for exploration and discovery, BSR has employed the Critical Path Roadmap (http://criticalpath.jsc.nasa.gov/) to identify and prioritize risks (55 in all) and to measure the change in risk probability and consequence. While some of the long term goals can be found in the FY04 President's Budget Submit, the newer, more outcome focused measures stem from the OBPR Research Plan (http://spaceresearch.nasa.gov/common/docs/OBPR_Research_Plan.pdf).

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2.2 Does the program have ambitious targets and timeframes for its long-term measures? Answer: YES Question Weight: 9%

Explanation: A key goal of the program is to conduct research on biological and physical processes to enable future missions of exploration. This goal must be accomplished before the end of ISS useful life. BSR has identified multiple ambitious 5 and 10 year targets for each performance goal in the OBPR Research Plan.

Evidence: The challenges to this goal are: limited access to space and the small number of research subjects. While the presence of a permanently orbiting Station crew represents unprecedented research opportunities, there is a substantial challenge in maximizing understanding from a small sample. The OBPR section of the NASA strategic plan, including specific targets and timeframes, will be published this fall. Development of these target roadmaps can be tracked at: http://bioroadmap.arc.nasa.gov/roadmap.cfm

2.3 Does the program have a limited number of specific annual performance measures that can demonstrate progress toward achieving the program's long-term goals? Answer: NO Question Weight: 9%

Explanation: After the OBPR strategy is released this fall, the annual measures in NASA's Integrated Budget and Performance Document (IBPD) will be further revised to better reflect progress towards the long-term measures and goals.

Evidence: Current annual measures do not reflect quantified targets that support BSR's long-term outcomes. BSR is developing annual measures that adhere to their new strategy and are expected to have proper measures in place for FY 2005.

2.4 Does the program have baselines and ambitious targets for its annual measures? Answer: NO Question Weight: 9%

Explanation: After the OBPR strategy is released this fall, IBPD annual measures will be further revised to better reflect progress towards the long-term measures and goals. At present, it is difficult to gauge the ambitiousness of the BSR program annual research targets that reduce the probability and consequence of critical risks.

Evidence: The 2005 IBPD will include targets in all areas with quantifiable baselines that align with our new enterprise strategy and long term goals.

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2.5 **Do all partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) commit to and work toward the annual and/or long-term goals of the program?**

Answer: YES Question Weight: 9%

Explanation: Partners (NASA centers, contractors, private industry, private organizations, universities and international partners) are directly involved in planning and development of BSR long-term goals. As a result, they fully support and are committed to the achievement of these goals of the program. In addition, program grant solicitations explicitly include the program goals. Investigations are selected based on their relevance to long term goals and the investigators are required to submit annual progress reports, which program managers use to assess performance. They are also required to present their research in progress in workshops (e.g. The Biennial Bioastronautics Investigator Workshop).

Evidence: Partner support is demonstrated by Memoranda of Understanding (MOU) and interagency agreements with other federal agencies (NIH, NSF, DOE, DOD, etc), task level agreements with NASA centers, contracts and grants with industry and universities, and broad interest in research solicitations. NASA's Office of Space Flight and the Chief Medical Officer have signed the Bioastronautics Strategy which engenders the long term goals of the program. OBPR's Physical Science Research is a managing partner in the goals of the Space Radiation Health Program. Representatives from NASA centers, contractors, private industry and grantees are also involved in the development of the new enterprise strategy and long term goals of BSR, and are committed to achieving these goals. OBPR Space Act Agreements with Domestic Partners and International Partner Agreements are available from NASA Code U upon request.

2.6 **Are independent evaluations of sufficient scope and quality conducted on a regular basis or as needed to support program improvements and evaluate effectiveness and relevance to the problem, interest, or need?**

Answer: YES Question Weight: 9%

Explanation: NASA's BSR is regularly reviewed by independent groups (National Academy of Sciences, NASA advisory committees), which recommend the scientific strategy and provide evaluation on a regular basis. Feedback is provided on program effectiveness at addressing the research needs. Recommendations are used for program planning purposes, for grant solicitation and for goal setting.

Evidence: National Academies of Science reports include "A Strategy for Research in Space Biology and Medicine in the New Century" (1998) and "Safe Passage"(2001). NASAs advisory committee structure, the NRC, and a standing subcommittee the Biological and Physical Research Advisory Committee, provides recommendations three times a year on program direction. In 2003, the Research Maximization and Prioritization Task Force (ReMAP) reviewed the content and rationale of the research being done by OBPR, and recommended priorities for ISS research. The report identifies two overarching programmatic goals: research enabling human exploration of space and basic research of intrinsic scientific interest. BSR elements were identified as essential to these goals. The ReMAP Final Report is available at: www.spaceresearch.nasa.gov/common/docs/remap/remap_final_report.pdf

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2.7 **Are Budget requests explicitly tied to accomplishment of the annual and long-term performance goals, and are the resource needs presented in a complete and transparent manner in the program's budget?** Answer: YES Question Weight: 9%

Explanation: Budget and Performance planning processes are integrated for the BSR theme. The FY04 President's Budget Submit (PBS) includes all direct and indirect full cost elements from FY04-08; execution of funds is conducted in full cost starting in FY04. It is expected that as BSR revises its strategy, any improved performance measures will track closely to budget requests.

Evidence: FY04 Integrated Budget and Performance Document (IBPD) for BSR theme can be found at http://www.nasa.gov/pdf/1963main-bpr.pdf For breakdown of full cost budget elements by BSR sub-component (Development/Operations/Research) by Center, see NASA Budget System Process 430 (FY04 PBS)

2.8 **Has the program taken meaningful steps to correct its strategic planning deficiencies?** Answer: YES Question Weight: 9%

Explanation: The BSR is currently revising its strategy to include roadmaps with a limited number of specific, ambitious long-term performance goals and measurable outcomes. Annual performance goals are being written that will enable BSR to quantify progress toward achieving these long-term goals. External stakeholders have been involved extensively in this planning. The program used the recommendations of the ReMAP report to prioritize program goals within the strategy.

Evidence: The REMAP task force was created in response to OMB direction that NASA's Biological and Physical Reserach Enterprise "will conduct a rigorous prioritization exercise during the spring and summer of 2002 to prioritize the research questions being pursued. This prioritization will help focus resources on priority questions, increasing the speed and likelihood that they will be answered." ReMAP recommendations and prioritization can be found at: http://spaceresearch.nasa.gov/general_info/remap.html Draft versions of BSR enterprise strategy documents can be found at: http://bioroadmap.arc.nasa.gov/roadmap.cfm.

2.CA1 **Has the agency/program conducted a recent, meaningful, credible analysis of alternatives that includes trade-offs between cost, schedule, risk, and performance goals and used the results to guide the resulting activity?** Answer: YES Question Weight: 9%

Explanation: Due to REMAP recommendations to continue development of the Plant Research Unit (PRU) and the Advanced Animal Habitat (AAH), science requirements are currently being analyzed for each, prior to renegotiation of their contracts. In response to Boeing cost growth for design and build of the Habitat Holding Racks, an independent review of the project was made, and various management actions were taken. Due to cuts in SSBRP budget in recent years, hardware development options were assessed using a bottoms-up review approach; an independent cost assessment of all major hardware was conducted, including parametric cost estimation.

Evidence: "Review of PRU Science Requirements" dated 14May03; "Review of AAH Science Requirements" dated 21 May 03; "Fundamental Biology International Space Station Replan: 60 Day Report" dated 6Feb02; "Space Station Biological Research Project (SSBRP) Independent Cost Assessment" dated 10Jan02; "Habitat Holding Racks Cost Assessment" dated Nov01; "Fundamental Biology SSBRP Budget Review Synopsis" dated 31May01.

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2.RD1 **If applicable, does the program assess and compare the potential benefits of efforts within the program to other efforts that have similar goals?** Answer: YES Question Weight: 9%

Explanation: In order to evaluate potential shortcomings, OBPR conducts reviews, trade studies, and cost benefit analyses to identify and/or validate program approaches and potential benefits. These studies may be conducted either within the Agency, or by external independent organizations. BSR regularly sponsors competing approaches to specific problems, e.g. different types of countermeasures, or different organizational structures to optimize the utilization of the International Space Station. It is expected that in the future BSR will be able to better justify the cost/benefits between ground based and space based research, particularly in fundamental biology. BSR should also work towards evaluating their research productivity against NIH and NSF where applicable.

Evidence: An example is the study and determination of the best approach to optimize the utilization of the International Space Station. The following sequence of studies and reviews culminated in the decision to release a Request for Proposals for an ISS Research Institute.* October 1999 - Options for Managing Space Station Utilization, Swales Aerospace; * December 1999 - Institutional Arrangements for Space Station Research, National Research Council - report on NAS website; * August 2000 - International Space Station Operations Architecture Study, Computer Sciences Corporation; * June 2001 - NASA Internal Study; * February 2002 - International Space Station Payload Operations Concept and Architecture Assessment Study (POCAAS), Computer Sciences Corporation; * March 2003 - Utilization Management Concept Development Study - Final report and associated materials at the OBPR website.

2.RD2 **Does the program use a prioritization process to guide budget requests and funding decisions?** Answer: YES Question Weight: 9%

Explanation: BSR uses a risk management approach to guide budget requests and funding decisions related to the critical path roadmap. The recent prioritization developed by NASA in response to ReMAP task force guides budget requests and grant solicitation decisions. Grant funding decisions are guided by the peer review process which provides a scientific merit priority.

Evidence: The risk management prioritization process is documented in www.criticalpath.jsc.nasa.gov. ReMAP identified 8 areas of high priority research within BSR. The program has focused budget requests and funding on these priority areas. The high priority areas are: radiation health; behavior and performance; physiology; clinical/operational medicine; advanced environmental monitoring and control; advanced life support; cell and molecular biology; and organismal and comparative biology. http://spaceresearch.nasa.gov/general_info/remap.html

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3.1 Does the agency regularly collect timely and credible performance information, including information from key program partners, and use it to manage the program and improve performance?

Answer: YES Question Weight: 8%

Explanation: Performance data are collected and evaluated on a monthly and quarterly basis from program elements to assess actual performance against plan. During monthly reviews with the Associate Administrator, the BSR theme Division Directors review these data, explaining any major variances and discuss the current status of all ISSRC hardware development associated with Cost, Schedule, and Technical performance areas using a "stoplight" chart with quantitative metrics associated with each color on the stoplight. Quarterly, there are detailed performance reviews with performing centers, and the Agency's Program Management Council. Bi-monthly meetings are held with our International Partners to monitor experiment development and implementation.

Evidence: Financial and Contract Status (FACS) Report, as well as the BRIO reporting system, provides monthly Obligations/Costing status; Quarterly performance reviews are held with implementing centers; Quarterly Program Management Council (PMC) meetings; OBPR Obligations/Cost Phase Plan (Initial plan is updated at Mid-Year); OBPR Monthly Reviews; OBPR weekly BOD (Board of Directors -AA, DAAs, DDs) meeting; Bi-weekly meetings with division scientists, program analysts, and representatives from External Relations and Office of Space Flight; Minutes of 27May03 Bi-monthly International Partner teleconference (Bioastronautics Research) per JSC letter (ISLSWG-03-MB-14) distributed by 5Jun03 e-mail; Minutes of 5May03 Bi-monthly International Partner teleconference (Fundamental Space Biology) per ESA fax dated 8May03; Open door policy for interaction with all levels of OBPR management.

3.2 Are Federal managers and program partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) held accountable for cost, schedule and performance results?

Answer: YES Question Weight: 8%

Explanation: The BSR theme's Division Directors, OBPR Deputy Associate Administrators, and OBPR Associate Administrator are held responsible for achieving key program results. Grantees are required to submit an annual progress report, which is reviewed by the technical officer at the respective grant implementing center. All Contracting activity is done in accordance with the FAR, which requires standard mechanisms to assure contract performance. Agreements with domestic partners (NIH, DOD, DOE, ACSM, AFAF, NCID-CDC, NOAA, USDA, and USGS - EDC) define responsibility for accountability. Implementing agreements with International Partners signed at the project level define roles & responsibilities, technical requirements, schedules, and regular reporting requirements (includes periodic reviews). Bi-monthly meetings are held with our International Partners to monitor experiment development and implementation.

Evidence: Performance Standards for OBPR DDs, DAAs, and AA; Grantees annual progress reports are included in OBPR task book, http://research.hq.nasa.gov/taskbook.cfm; Grant Proposal Evaluation Forms (ARC form is identified as "JAC 884", JSC form does not have a specific identifier) are filed at the Center Grants Office; Grants management process is in accordance with NPG 5800.1, "Grant & Cooperative Agreement Handbook"; See Boeing Contract (HHR) NAS8-50000, STAR Enterprises, Inc. Contract (AAH) NAS2-98024, PSI, Inc. Contract (CCU) NAS2-9600, and Orbitech Contract (PRU) NAS2-00080 for examples of cost, schedule, performance accountability within major hardware contracts; OBPR Space Act Agreements with Domestic Partners and International Partner Agreements are available from NASA Code U upon request; ; Minutes of 27May03 Bi-monthly International Partner teleconference (Bioastronautics Research) per JSC letter (ISLSWG-03-MB-14) distributed by 5Jun03 e:mail; Minutes of 5May03 Bi-monthly International Partner teleconference (Fundamental Space Biology) per ESA fax dated 8May03.

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3.3 Are funds (Federal and partners') obligated in a timely manner and spent for the intended purpose? Answer: YES Question Weight: 8%

Explanation: The BSR theme's annual appropriation is available for obligation for a two year time period during which they are fully obligated. At the beginning of the fiscal year obligation and cost monthly phasing plans are developed and used as the basis for tracking actual obligations and cost. Midway during the fiscal year these phasing plans are updated to include any replanning that may have occurred. During the monthly Associate Administrator's Program Reviews actual obligations and cost are reported against the plans and discussed. OBPR's goal is to have all funds obligated by the end of February of the second year. Funds not obligated are subject to reprogramming at the Associate Administrator's discretion. Exceptions are granted for problem procurement actions and minor funds cleanup. Unobligated balances are also considered when determining where to make cuts to fund Agency or Enterprise contingencies.

Evidence: 99.5% of PY02 funds were obligated by 4/30/03 and 48.1% of PY 2003 funds were obligated during the same time period. NASA Monthly FACS Report; Contractor monthly & quarterly reports (533's); SF-133 Report on Budget Execution and Budgetary Resources; FMS2108 Year-End Closing Statement; Annual NASA Accountability Report

3.4 Does the program have procedures (e.g. competitive sourcing/cost comparisons, IT improvements, appropriate incentives) to measure and achieve efficiencies and cost effectiveness in program execution? Answer: YES Question Weight: 8%

Explanation: Performance against timing targets related to the Grant selection & award process is submitted on an annual basis to Code H (NASA Procurement). BSR uses contracting policies that require competitive sourcing and cost comparisons. OBPR is implementing Program and Project management processes consistent with NPG 7120.5B, NASA Program and Project Management Processes and Requirements. This implementation standardizes and streamlines program and project management processes across all OBPR divisions, including implementation of independent engineering and cost evaluations periodically throughout the life of a project. Improved efficiencies and cost improvements are sought through process improvement. (e.g., BRIC-C.elegans experiment that flew on STS-107)

Evidence: OBPR's Annual Report to Code H dated October 2002 regarding Grant selection & award process; Acqusition Strategy for Bioastronautics Consolidated Contract (Contract No.NAS9-02078) documents a 7% estimated savings. In FY04, this will amount to approximately $560K cost savings (additional administrative cost savings are also expected); Customer Agreement No. KCA-1683 with State of Florida (for SERPL) - This new facility for pre and post flight biological sample processing at KSC (SERPL) was built in partnership between KSC and the State of Florida at a greatly reduced cost to BSR; For the BRIC-C.elegans experiment that flew on STS-107, the manifesting/certification time was reduced from 1.5 yrs to approx 1 month. This considerable acceleration from the usual flight process can be applied for future payloads to decrease costs. BRIC-C.Elegans experiment Flight manifesting/certification process for STS-107 followed the guidelines in "NSTS 21000 SIP-MDK, "Shuttle/Payload Standard Integration Plan for Middeck-Type Payloads".

3.5 Does the program collaborate and coordinate effectively with related programs? Answer: YES Question Weight: 8%

Explanation: The BSR program actively seeks to collaborate with other Federal agencies and institutions with related programs. Currently, BSR collaborates in accordance with Space Act Agreement partnerships with NIH, DOD, DOE, ACSM, AFAF, NCID-CDC, NOAA, USDA, and USGS - EDC.

Evidence: NPD 1050.1F "Authority to Enter into Space Act Agreements"; OBPR Space Act Agreements with Domestic Partners are available from NASA Code U upon request.

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3.6 Does the program use strong financial management practices? Answer: YES Question Weight: 8%

Explanation: OBPR uses effective financial management practices in administering program funds. NASA is in the process of implementing the Integrated Financial Management (IFM) system and the Management Information System (MIS) to ensure stronger financial management practices.

Evidence: NASA Monthly FACS Report; Contractor monthly & quarterly reports (533's); SF-133 Report on Budget Execution and Budgetary Resources; FMS2108 Year-End Closing Statement; Annual NASA Accountability Report.

3.7 Has the program taken meaningful steps to address its management deficiencies? Answer: YES Question Weight: 8%

Explanation: OBPR has taken positive steps to create a balanced portfolio of program management positions and select personnel through competitive processes. Also, the Agency brought ISS research management to OBPR and established the ISS Program Scientist position. Hardware development management within the BSR theme includes a process of corrective action. For example, in response to Boeing cost growth for design and build of the Habitat Holding Racks, an independent review of the project was made, and various management actions were taken, including improvements to contract management & oversight.

Evidence: The recommendation for science leadership within the ISS Program was included in the IMCE report dated Nov 1, 2001. Direction to bring ISS research management within Code U was included in FY02 Appropriations Bill (HR2620). Reports on the Habitat Holding Rack are: "Fundamental Biology International Space Station Replan: 60 Day Report" dated 6Feb02; Space Station Biological Research Project (SSBRP) Independent Cost Assessment dated 10Jan02; "Habitat Holding Racks Cost Assessment" dated Nov01;and "Fundamental Biology SSBRP Budget Review Synopsis" dated 31May01.

3.CA1 Is the program managed by maintaining clearly defined deliverables, capability/performance characteristics, and appropriate, credible cost and schedule goals? Answer: YES Question Weight: 8%

Explanation: BSR's Capital Assets are the Habitat Holding Racks (HHR) and the Human Research Facility (HRF) Racks. The BSR theme's annual Integrated Budget and Performance Document (IBPD) clearly identifies budget, performance, and schedule information needed to manage these Capital Assets. This document will be updated to reflect changes approved through the FY05 Budget Cycle and Agency Operating Plans.

Evidence: FY04 Integrated Budget and Performance Document (IBPD) for BSR theme can be found at "http://www.nasa.gov/pdf/1963main-bpr.pdf", see "Development" sections for HHR and HRF (pages SAE11-9 through SAE11-12); Agency Operating Plans.

3.CO1 Are grants awarded based on a clear competitive process that includes a qualified assessment of merit? Answer: YES Question Weight: 8%

Explanation: Grants are awarded in accordance with a clearly defined process which solicits via competition and ensures the quality of the BSR theme's research. Proposals are peer reviewed for scientific merit and analyzed for program relevance prior to funding. It should be noted that around 6% of program funds are earmarked for specific purposes.

Evidence: NPG 5800.1, "Grant & Cooperative Agreement Handbook"

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3.CO2 **Does the program have oversight practices that provide sufficient knowledge of grantee activities?** Answer: YES Question Weight: 8%

Explanation: Grantees are required to submit an annual progress report, which is reviewed by the technical officer at the respective grant implementing center. If the report shows that satisfactory progress is being made, and the objectives of the grant proposal are being met, the grant would then be eligible for renewal.

Evidence: Grant Proposal Evaluation Forms (ARC form is identified as "JAC 884", JSC form does not have a specific identifier) are filed at the Center Grants Office; Grants management process is in accordance with NPG 5800.1, "Grant & Cooperative Agreement Handbook"

3.CO3 **Does the program collect grantee performance data on an annual basis and make it available to the public in a transparent and meaningful manner?** Answer: YES Question Weight: 8%

Explanation: Grantees annual progress reports are included in OBPR task book, which is available to the public.

Evidence: The OBPR task book contains project identification (with search capability) task abstract/ description, progress, and Earth benefits. OBPR task book, http://research.hq.nasa.gov/taskbook.cfm

3.RD1 **For R&D programs other than competitive grants programs, does the program allocate funds and use management processes that maintain program quality?** Answer: YES Question Weight: 8%

Explanation: BSR established an appropriate external review process for all R&D activities that do not use competitive grants, such as congressional earmarks, research conducted in clinical programs, or directed research projects managed by NASA. It is OBPR policy that recipients of congressionally directed funding for equipment or construction prepare a proposal for acceptance by OBPR. Directed research projects are reviewed through the Non-advocate review process.

Evidence: OBPR letter dated 1 April, 2003, subj:"Processing Congressionally Directed Funding"; LSPD 00-01 Non-Advocate Review Process for Clinical and Operational Research Activities April 21,2000

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4.1 Has the program demonstrated adequate progress in achieving its long-term performance goals? Answer: SMALL EXTENT Question Weight: 20%

Explanation: Given the recent revisions to the strategic direction of the program, progress towards these goals is difficult to ascertain. In addition, progress is significantly hampered by the current status of the Space Shuttle and Space Station. It will be difficult to make adequate progress until these issues are resolved and flight opportunities are available. However, BSR is has made some progress towards reducing the probability and consequence of risk as defined by the Critical Path Roadmap in FY03. Advances were made toward reducing spacecraft resupply logistics and major new enabling facilities were opened that are prerequisites for essential future research. Significant progress was made in the availability of hardware and capability for ISS flight research as well.

Evidence: Although marked progress has not been demonstrated, specific results from FY03 include testing of promising drugs that reduces bone loss and prevent kidney stones, experiments that examine bone loading during spaceflight, and a published review of data that examines the occurrence of heart arrhythmias in astronauts. New facilities include the NASA Space Radiation Research Laboratory (in partnership with the Dept of Energy) and a Bedrest facility (in partnership with NIH). The Advanced Life Support research has annual targets in the GPRA and publishes annual metrics(http://advlifesupport.jsc.nasa.gov/). These metrics show a year to year improvement in equivalent system mass (over ISS technology) that reaches a factor of 1.67 reported in FY02.

4.2 Does the program (including program partners) achieve its annual performance goals? Answer: NO Question Weight: 20%

Explanation: Given the lack of adequate annual performance measures, progress is impossible to evaluate.

Evidence:

4.3 Does the program demonstrate improved efficiencies or cost effectiveness in achieving program goals each year? Answer: LARGE EXTENT Question Weight: 20%

Explanation: The program has improved its efficiencies by using the ReMAP report to prioritize research and to terminate low priority programs. Resources are strictly allocated to high priority programs. BSR adheres to NASA's procurement policies that enable increases in efficiency, such as the use of consolidated contracts to reduce management overhead costs. In addition, BSR's practices lead to continuous improvement in efficiency by examining processes and revising them to increase research throughput. For instance, to maximize utilization of ISS resources and generate the greatest science return from each flight opportunity, BSR has adopted a model specimen approach based on previously successful biospecimen sharing projects.

Evidence: One major efficiency achieved this year was in the Bioastronautics Consolidated Contract. The estimated savings over the previous contract is 7% of the technical content ($560K in FY 04) as documented in the acquisition strategy. Additional administrative savings are also expected. The model specimen approach reduces the time from experiment selection to flight by 50%, which result in a proportionate cost savings. Details on the biospecimen program can be found at http://research.hq.nasa.gov/code_u/nra/current/AN-01-OBPR-04/index.html. The Remap Final Report is available at: www.spaceresearch.nasa.gov/common/docs/remap/remap_final_report.pdf.

Program: Biological Sciences Research
Agency: National Aeronautics and Space Administration
Bureau: Office of Biological and Physical Research
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	
100%	82%	100%	47%	Results Not Demonstrated

4.4 Does the performance of this program compare favorably to other programs, including government, private, etc., with similar purpose and goals?

Answer: NA Question Weight: 0%

Explanation: While there are no programs that are directly comparable, other National space agencies (including those from Russia, Japan, Germany, and France) have goals that partially overlap or are similar to NASA's goals. BSR meets regularly (semi-annually) with these agencies in multilateral and bilateral working groups to compare approaches and strategies. Lessons learned and best practices are applied within the context of the program. In addition, BSR needs to begin assessing their performance with other science based agencies such as NIH and NSF where appropriate. There remains a need to establish that the fundamental research projects yield highly regarded results and that the benefits are commensurate with the costs.

Evidence:

4.5 Do independent evaluations of sufficient scope and quality indicate that the program is effective and achieving results?

Answer: SMALL EXTENT Question Weight: 20%

Explanation: Regular independent evaluations conducted by the National Academies of Science (NAS) confirm the importance and appropriateness of the BSR research agenda. However, the reviews tend not to focus on the effectiveness or results of BSR's program.

Evidence: The National Academies of Science through the Space Studies Board, National Research Council and the Institute of Medicine provides scientific guidance including "A Strategy for Research in Space Biology and Medicine in the New Century", 1998. and "Safe Passage",2001.The NRC review of NASA's Biomedical Research Program (2000) provided evaluations in each of a number of BSR research areas. In general, the report commended the program direction, scope and research agenda. Full text of the report can be found at: http://www.nap.edu/. NASA's advisory committee structure, the NAC, and its standing subcommittee, the Biological and Physical Research Advisory Committee, provide recommendations three times a year on directions of the program.

4.CA1 Were program goals achieved within budgeted costs and established schedules?

Answer: YES Question Weight: 20%

Explanation: BSR's Capital Assets are the Habitat Holding Racks (HHR) and the Human Research Facility (HRF) Racks. Program goals for development of these Capital Assets were met within the budgeted costs (including the established reserve levels) and schedules; funds have been costed as planned.

Evidence: FY04 Integrated Budget and Performance Document (IBPD) for BSR theme can be found at http://www.nasa.gov/pdf/1963main-bpr.pdf; NASA Budget System Process 430 (FY04 PBS); Obs/Cost performance against plan, monthly review; Certification of Flight Readiness for HRF1(Oct00) & HRF2 (Aug02). Qualification test of HHR was completed 3/03 - ahead of schedule.

PART Performance Measurements

Program: Biological Sciences Research

Agency: National Aeronautics and Space Administration

Bureau: Office of Biological and Physical Research

Measure: For defined classes of space flight, produce research results that reduce the probability and consequences of the 55 (prioritized) risks to human health and safety from the current risk baseline.

Additional Information: Understand human physiological reactions to reduced gravity and develop countermeasures by 2016 to assure survival of humans traveling far from Earth.

Year	Target	Actual	**Measure Term:**	Long-term
2016	55			

Measure: Reduce the projected mass of a life support flight system compared to the system baseline for the International Space Station. (New measure in FY 2004)

Additional Information: Measure tracks increased efficiency for low Earth orbit spacecraft logistics that enable exploration spacecraft design.

Year	Target	Actual	**Measure Term:**	Annual
2004	50%			

Program Assessment Rating Tool (PART)

Program: Earth Science Applications
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	90%	64%	45%	

1.1 Is the program purpose clear? Answer: YES Question Weight: 20%

Explanation: The Earth Science Applications program has a well-defined and focused purpose that ties directly to the NASA vision and mission, and the Earth Science Enterprise (ESE) strategic plan.

Evidence: The Earth Science Applications mission is "to expand and accelerate the realization of societal and economic benefits from Earth science, information, and technology." ESE works jointly with its national and international partners to develop this scientific understanding by employing space-based, airborne and in-situ data. The core of these data sets consist of products from ESE's 18 orbital missions containing approximately 80 instruments to develop solutions to applications of national importance.

1.2 Does the program address a specific and existing problem, interest or need? Answer: YES Question Weight: 20%

Explanation: The Earth Science Applications program bridges the gap between Earth science research results and the use of observations and prediction capabilities in national and international decision support tools associated with weather, climate and natural hazards. The program also addresses the need for Earth science education.

Evidence: The following documents reinforce the benefits of using Earth system science results to serve society: (a) Review of NASA's Earth Science Enterprise Applications Program Plan (National Research Council); (b) The Science of Regional and Global Change: Putting Knowledge to Work (National Research Council); and (c) Blueprint for Change: Report from the National Conference on the Revolution in Earth and Space Science Education (National Science Foundation). National and international needs for Earth science education are outlined in the report "Revolution in Earth and Space Science Education".

1.3 Is the program designed so that it is not redundant or duplicative of any other Federal, state, local or private effort? Answer: YES Question Weight: 20%

Explanation: The Earth Science Applications program is the Nation's only program designed to systematically benchmark uses of NASA's remote sensing data and research results into decision support systems designed to support operational agencies and organizations.

Evidence: Memoranda of Agreement are executed with partners to ensure that duplication of efforts does not occur. Partnering organizations include federal agencies (FAA, USDA, USGS, DHS, FEMA, EPA, CDC, NIH, DOE, DOD, DOI), state organizations (NSGIC, ASA, AAGS) and other national and international organizations. A detailed listing and status of Earth Science Applications Program Memoranda of Agreement (MOAs) are maintained by ESE. (http://www.earth.nasa.gov/eseapps/).

1.4 Is the program design free of major flaws that would limit the program's effectiveness or efficiency? Answer: YES Question Weight: 20%

Explanation: The Earth Science Applications program architecture and plan have been vetted with a broad stakeholder community (including representatives of the public, private, policy, academic, international, aerospace, and science sectors) over the past two years.

Evidence: The National Academy of Sciences and NASA ESE's Earth System Science and Applications Advisory Committee reviewed and endorsed the program design presented in the Earth Science Applications Strategy. Several external and NASA studies on socio-economic benefits resulting from the Earth Science Applications projects estimate potential annual benefits totaling approximately $20 billion. Specific studies include: (a) "An Estimate of NASA/ESE Power Program Benefits to the U.S. from 2002 through 2017; and (b) The Socio-economic Benefits of Earth Science and Applications Research: Reducing the Risks and Costs of Natural Disasters in the United States.

Program: Earth Science Applications
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	90%	64%	45%	

1.5 Is the program effectively targeted, so that resources will reach intended beneficiaries and/or otherwise address the program's purpose directly? Answer: YES Question Weight: 20%

Explanation: The Earth Science Applications architecture and plan have identified twelve national applications (each with a partner federal agency) that can benefit from NASA science and technology.

Evidence: MOAs with partnering organizations effectively target the use of resources aimed at the benchmarking and improvement of the decision support tools owned by those organizations. Partnering organizations that further the use of Earth Science Applications program products include federal agencies (FAA, USDA, USGS, DHS, FEMA, EPA, CDC, NIH, DOE, DOD, DOI), state organizations (NSGIC, ASA, AAGS) and other national and international organizations. Unintended subsidies are avoided by clarifying roles and responsibilities in Memoranda of Agreement with partners. A detailed listing and status of Earth Science Applications Memoranda of Agreement (MOAs) are maintained by ESE. (http://www.earth.nasa.gov/eseapps/).

2.1 Does the program have a limited number of specific long-term performance measures that focus on outcomes and meaningfully reflect the purpose of the program? Answer: YES Question Weight: 10%

Explanation: Outcomes reflect NASA's responsibility for ensuring that NASA data and research is fully utilized and is translated into measurable improvement to existing products and programs. Once NASA data has been incorporated in decision support systems of national priority, outcomes that demonstrate direct benefit to society (including measures such as lives saved due to improved hurricane forecasting and economic benefits associated with improved agricultural efficiency) are typically the responsibility of partner agencies. As the program matures, NASA needs to continue to improve measures to addresses the value added of incorporating NASA data (i.e., measure quality of products versus quantity). NASA also needs to develop metrics that better encompass outcomes resulting from the education and outreach portions of the program.

Evidence: Three long-term performance measures are presented in the Measures tab.

2.2 Does the program have ambitious targets and timeframes for its long-term measures? Answer: YES Question Weight: 10%

Explanation: Each of the Earth Science Applications program's 12 National Applications (e.g., air quality, public health) has developed or is developing a specific roadmap that lay out plans through 2012 supporting the outcome performance measures. The "ambitiousness" of the targets should be more readily apparent as the program matures and can assess the time and effort necessary to develop products.

Evidence: Each roadmap has discrete, mid-term performance goals. The goals include specific, quantifiable targets and timeframes. For example, in aviation safety, the present WX Visualization System is a discrete, stand-alone weather product, with little satellite sounding data or imagery. The 2012 performance measure is for a WX Visualization System that is fully integrated with SVS, WARP, and ITWS in-cockpit graphical WX displays featuring real-time weather information with global coverage. Roadmaps have been completed for most of the applications and are available from the Applications program office. Once finalized, they will be available through the program website.

2.3 Does the program have a limited number of specific annual performance measures that can demonstrate progress toward achieving the program's long-term goals? Answer: YES Question Weight: 10%

Explanation: Specific annual performance measures demonstrate progress towards achieving the long-term goals and measures. As the program matures, NASA needs to develop measures to addresses efficiency and the value added of incorporating NASA data (i.e., measure quality of products versus quantity). NASA also needs to develop metrics that better encompass outcomes resulting from the education and outreach portions of the program.

Evidence: Specific annual performance measures directly supporting the long-term goals are included in the Measures tab.

Program Assessment Rating Tool (PART)

Program: Earth Science Applications
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	90%	64%	45%	

2.4 Does the program have baselines and ambitious targets for its annual measures? Answer: YES Question Weight: 10%

Explanation: Annual performance goals are designed to demonstrate progress against the baselines in the roadmaps by meeting specific targets. The "ambitiousness" of the targets should be more readily apparent as the program matures and can assess the time and effort necessary to develop products.

Evidence: Baselines and targets are specified in the program's roadmaps. The systems engineering approach being used in the evaluation of decision support systems for each of the national applications contains a fundamental concept of decision support system (DSS) baselining from which to measure improvement. The baselines consist of the respective DSS State 1's (current) shown in the Roadmaps. The Roadmaps also show the necessary steps to progress from the State 1 to State 2 (benchmarked/improved) of the DSSs with the infusion of earth science and technology research results.

2.5 Do all partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) commit to and work toward the annual and/or long-term goals of the program? Answer: NO Question Weight: 10%

Explanation: The Earth Science Applications program partners (Federal agencies, NASA Centers, private sector, universities, international organizations, and others) are directly involved in planning and establishing the program's goals and objectives, and design and implement programs of work supporting our common objectives. However, the large percentage of earmarked funds (over 25 percent) indicate that NASA has little control over a substantial number of partners. In addition, while grants may be focused on the priority applications, it is not clear how grantee performance ties back into NASA's performance measures.

Evidence: In NASA's FY 2003 Operating Plan, nearly $20M of ESA funds of a $78M total budget are Congressionally directed grants and transfers.

2.6 Are independent evaluations of sufficient scope and quality conducted on a regular basis or as needed to support program improvements and evaluate effectiveness and relevance to the problem, interest, or need? Answer: YES Question Weight: 10%

Explanation: Earth Science Applications program plans and activities are evaluated on a regular basis by the National Academy of Sciences and the Earth System Science and Applications Advisory Committee to ensure effectiveness and relevance to needs. Results of these reviews are the basis for revision and update of all Earth Science Applications program activities and plans.

Evidence: Scientific and programmatic progress and performance for the Earth Science Applications program is presented to the ESSAAC and the National Academy of Sciences on a periodic basis (Review of NASA's Earth Science Enterprise Applications Program Plan). An NRC review of NASA's Aviation Safety Program is underway assessing how NASA and the FAA collaborate to leverage R&D into operations. In addition, an integral part of the Program is the evaluation and measurement of DSS improvements by the partner agency. Following the completion of the benchmarking process, the enhanced/upgraded DSS i.e., State 2 is evaluated against the State 1 (i.e., original state) of the same DSS to measure the enhanced operational status. This type of evaluation will be conducted in the context of each National Applications once benchmarking is completed.

Program: Earth Science Applications
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	
100%	90%	64%	45%	Results Not Demonstrated

2.7 **Are Budget requests explicitly tied to accomplishment of the annual and long-term performance goals, and are the resource needs presented in a complete and transparent manner in the program's budget?** Answer: YES Question Weight: 10%

Explanation: NASA's IBPD provides the budget request and performance targets on a full-cost basis. Detailed budgets are being developed for each application of national priority to identify critical elements leading to measurable success. Once these are completed, NASA should fully integrate these into the budget requests.

Evidence: The IBPD can be found at www.nasa.gov/about/budget/. Detailed budgets have been developed for most of the National Applications.

2.8 **Has the program taken meaningful steps to correct its strategic planning deficiencies?** Answer: YES Question Weight: 10%

Explanation: NASA's Earth Science Enterprise, which manages the Earth Science Applications program, updates its Strategic Plan every three years. This process is presently under way as the Program and Enterprise align with the new NASA Vision and Mission. The Earth Science Applications program reviews and updates its program strategic plan on an annual basis. Any strategic planning deficiencies are identified and corrected as part of the update process.

Evidence: The National Academy of Sciences has reviewed Earth Science Applications program strategic planning, and identified areas for improvement (Review of NASA's Earth Science Enterprise Applications Program Plan). Management action was taken to improve the areas identified in the NAS Report. These can be seen through the development of the road maps and program plans.

2.CA1 **Has the agency/program conducted a recent, meaningful, credible analysis of alternatives that includes trade-offs between cost, schedule, risk, and performance goals and used the results to guide the resulting activity?** Answer: NA Question Weight: 0%

Explanation: The Earth Science Applications program does not fund acquisition of capital assets.

Evidence:

2.RD1 **If applicable, does the program assess and compare the potential benefits of efforts within the program to other efforts that have similar goals?** Answer: YES Question Weight: 10%

Explanation: The Earth Science Applications program continually evaluates its efforts with respect to the relative potential benefits of alternatives in identifying opportunities for enhancing partners operations.

Evidence: Alternative approaches to enhancement of partnering agencies systems are evaluated as part of the joint project design process in each National Application area. In addition, alternative approaches to accomplishing the partner's goals are normally evaluated during the conduct of socio-economic benefits studies such as the those referenced in the answer to 2.1 (NASA/ESE Power Program Benefits and Reducing the Risks and Costs of Natural Disasters in the United States). In addition, the joint National Applications Projects with partner agencies inherently compare alternative approaches to enhancing the DSS.

Program: Earth Science Applications
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	90%	64%	45%	

2.RD2 **Does the program use a prioritization process to guide budget requests and funding decisions?** Answer: YES Question Weight: 10%

Explanation: The Earth Science Applications program uses a prioritization process that draws on internal and external reviews to guide budget requests and funding decisions.

Evidence: Overall program priorities (e.g., selection of the 12 National Applications), criteria for selection, and programmatic direction are presented in the Earth Science Applications Strategy. The NAS endorsed this prioritization in their review of the program strategy. The more detailed priorities reflected in the roadmaps and program plans are determined jointly with the partner organization and become the basis for solicitations. There are three Strategies (Earth Science Applications, Education, and Outreach), 12 roadmaps for the national applications and 18 Program Plans.

3.1 **Does the agency regularly collect timely and credible performance information, including information from key program partners, and use it to manage the program and improve performance?** Answer: YES Question Weight: 9%

Explanation: The Earth Science Applications program routinely collects relevant technical and programmatic performance information. As the program matures, in order to demonstrate results through the process of baselining and benchmarking, NASA will rely on the collection of extensive performance data.

Evidence: The Earth Science Applications program continually monitors progress against the national applications roadmaps and annual performance goals. Progress is also reviewed in Enterprise-level "Focus Area Reviews." In those areas where NASA has started to demonstrate results (e.g. hurricane forecasting and wildland fire management), extensive performance data has been collected (see http://www.esad.ssc.nasa.gov/background_documents.asp)

3.2 **Are Federal managers and program partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) held accountable for cost, schedule and performance results?** Answer: YES Question Weight: 9%

Explanation: Federal managers and partners are required to meet annual performance standards.

Evidence: Performance standards are included in personnel performance evaluation criteria (example: Individual Performance Plans) and in contracts with outside sources. For example, Cooperative Agreements have defined milestones that must be met by the Principal Investigators (PI's) in order for the PI's to receive payment. These milestones are measured against performance metrics that are part of the Cooperative Agreements and approved by the NASA Program Managers in order to release further funding. Similarly, contracts have deliverables that must be approved by the Contracting Technical Officer (COTR) before payment is released to the organization.

3.3 **Are funds (Federal and partners') obligated in a timely manner and spent for the intended purpose?** Answer: YES Question Weight: 9%

Explanation: The Earth Science Applications program obligates its funding in a timely manner and spends it for the purpose as appropriated by Congress.

Evidence: On average, the Earth Science Applications program obligates approximately 85% of its authorized annual budget within the fiscal year for which funds are provided. One hundred percent of funds are obligated over the two years available for obligation. Enterprise and Agency-wide controls ensure that funds are spent for the intended purpose.

Program: Earth Science Applications
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	90%	64%	45%	

3.4 Does the program have procedures (e.g. competitive sourcing/cost comparisons, IT improvements, appropriate incentives) to measure and achieve efficiencies and cost effectiveness in program execution?
Answer: NO Question Weight: 9%

Explanation: The Earth Science Applications program does not have adequate efficiency measures that aptly demonstrate efficiencies and cost effectiveness in program execution. However, they are moving forward on emphasizing competitive sourcing to achieve program goals and are expected to demonstrate efficiency improvements as a result in future years. The Earth Science Applications program goal for competitive sourcing is 80%.

Evidence:

3.5 Does the program collaborate and coordinate effectively with related programs?
Answer: YES Question Weight: 9%

Explanation: The Earth Science Applications program strategy is based on engaging in partnerships to contribute systems solutions to national priorities.

Evidence: The Earth Science Applications program is an integral component of Administration and interagency collaborations including the Climate Change Science Program, the Climate Change Technology Program, National Blueprint for Aviation, National Agenda on Disaster Management, Geospatial One Stop and the Blueprint for Revolution in Earth and Space Science. The Program Plans, National Application Success Stories and 2002 Year in Review are evidence of success that have come out of collaboration with other organizations.

3.6 Does the program use strong financial management practices?
Answer: YES Question Weight: 9%

Explanation: The Earth Science Applications program uses the Agency's financial management practices in administering program funds, and is free from material internal control weaknesses.

Evidence: Sound financial performance is evidenced by the Agency's unqualified audit opinion on our FY 2002 financial statements. The integration of budget and performance is defined through the IBPD as the basis for planning. As previously stated in Block 3.4, the Business Division also reviews and presents the Program/Financial Status to ESE Management on a Monthly basis.

3.7 Has the program taken meaningful steps to address its management deficiencies?
Answer: YES Question Weight: 9%

Explanation: Program management is evaluated on the basis of the ability of the program to meet its performance objectives with the resources available. Deficiencies in performance are corrected through adjustments in management strategy.

Evidence: The Earth Science Applications program addressed management deficiencies through a restructuring in 2002 that led to the Science for Society architecture and the development of a structured budget aligned with Enterprise and Agency goals. That restructuring marked a shift in focus of the program that resulted in new top level management and a revised strategic plan.

3.CA1 Is the program managed by maintaining clearly defined deliverables, capability/performance characteristics, and appropriate, credible cost and schedule goals?
Answer: NA Question Weight: 0%

Explanation: The Earth Science Applications program does not fund acquisition of capital assets.

Evidence:

Program Assessment Rating Tool (PART)

Program: Earth Science Applications
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	
100%	90%	64%	45%	Results Not Demonstrated

3.CO1 **Are grants awarded based on a clear competitive process that includes a qualified assessment of merit?** Answer: NO Question Weight: 9%

Explanation: Substantially less than 95% of funds are awarded on a clear competitive process both due to Congressional direction and other sole source activity.

Evidence: As indicated previously, over 25% of ESA funding is Congressionally directed.

3.CO2 **Does the program have oversight practices that provide sufficient knowledge of grantee activities?** Answer: YES Question Weight: 9%

Explanation: Program managers have a sufficient understanding of grantees use of funds.

Evidence: Close contact with funding recipients is maintained through site visits, required reports, Principal Investigator meetings, and discipline-oriented meetings. Also, major meetings of professional societies provide the opportunity to hear results as presented to the community, and place them in the context of work done by others under a broad range of sponsorship. Each center conducts Project Level Reviews to ensure that performance by the grantee meet expectations.

3.CO3 **Does the program collect grantee performance data on an annual basis and make it available to the public in a transparent and meaningful manner?** Answer: NO Question Weight: 9%

Explanation: While the program collects grantee performance data through annual reports, there is no comprehensive system that is both easily accessible to the public and meaningful on both the individual grantee and program-wide scale.

Evidence:

3.RD1 **For R&D programs other than competitive grants programs, does the program allocate funds and use management processes that maintain program quality?** Answer: NO Question Weight: 9%

Explanation: The Earth Science Applications program allocates funding using a broadly competitive peer review process and employs sole-source procurements only on the basis of a demonstrated unique expertise or capability. However, over 25% of program funds are earmarked for specific purposes and not subject to any review.

Evidence: In NASA's FY 2003 Operating Plan, nearly $20M of ESA funds of a $78M total budget are Congressionally directed grants and transfers. Within the remaining funds, competitive solicitations include the Research, Education and Applications Solutions Network (REASoN) and GLOBE Cooperative Agreement Notices (CANs); the Solid Earth and Natural Hazards (SENH), New Investigators Program (NIP) and Graduate Fellowship Program (GFP) NASA Research Announcements (NRAs); and NASA Center Contractor Support.

Program Assessment Rating Tool (PART)

Program: Earth Science Applications
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	
100%	90%	64%	45%	Results Not Demonstrated

4.1 Has the program demonstrated adequate progress in achieving its long-term performance goals? Answer: LARGE EXTENT Question Weight: 34%

Explanation: The restructured Earth Science Applications Program is on track to achieve its long-term goals, however, the program is only been in its current iteration since January 2002 and to date has focused primarily on establishing the framework necessary to achieve the long-term goals.

Evidence: The Earth Science Applications program has signed MOUs with key Federal partners that have defined steps toward assimilating NASA Earth science research results into decision support tools owned and operated by the partners. Successful projects in disaster management (wildfire tracking with the USFS and hurricane prediction with NOAA) and aviation safety (volcanic ash plume tracking with the FAA and NOAA) are representative contributions of the Earth Science Applications program. (http://www.earth.nasa.gov/eseapps/)

4.2 Does the program (including program partners) achieve its annual performance goals? Answer: LARGE EXTENT Question Weight: 33%

Explanation: The program is making progress on the annual targets listed. It should be noted, however, that the program has recently revised its strategic direction of the program as well as created more meaningful annual performance measures. The program did achieve most of their performance goals identified through GPRA.

Evidence: Successful projects in disaster management (wildfire tracking with the USFS and hurricane prediction with NOAA) and aviation safety (volcanic ash plume tracking with the FAA and NOAA) are representative contributions of the Earth Science Applications program. The Earth Science program (of which Earth Science Applications is a part) achieved 29 of 31 2002 performance goals for a 94% success rate (reference 2002 Performance and Accountability Report).

4.3 Does the program demonstrate improved efficiencies or cost effectiveness in achieving program goals each year? Answer: NO Question Weight: 33%

Explanation: There are no indicators to suggest that the program has demonstrated improved efficiency or cost-effectiveness over the prior year.

Evidence:

4.4 Does the performance of this program compare favorably to other programs, including government, private, etc., with similar purpose and goals? Answer: NA Question Weight: 0%

Explanation: There are no other programs that which provide a good basis for comparison. Programs including NOAA's National Centers of Environmental Prediction (NCEP); DoE Laboratories e.g., Pacific Northwest Research Center and Oakridge; EPA Office of Research; and on the international level, the Global Monitoring Environmental System (GMES) are all being looked at as a source of "lessons learned".

Evidence:

Program Assessment Rating Tool (PART)

Program: Earth Science Applications
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	
100%	90%	64%	45%	Results Not Demonstrated

4.5 **Do independent evaluations of sufficient scope and quality indicate that the program is effective and achieving results?** Answer: NA Question Weight: 0%

Explanation: An independent evaluation conducted by the National Academies of Science confirmed the effectiveness of the program strategy. However, due to the programs relatively recent origin, there have been limited independent evaluations documenting results.

Evidence:

4.CA1 **Were program goals achieved within budgeted costs and established schedules?** Answer: NA Question Weight: 0%

Explanation: The Earth Science Applications program does not fund acquisition of capital assets.

Evidence:

PART Performance Measurements

Program: Earth Science Applications

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Benchmark improved performance from the assimilation of observations and predictions resulting from NASA Earth Science research in 12 decision support systems serving national priorities and the missions of Federal agencies.

Additional Information: Incorporation of NASA data into a wide range of existing systems and the resulting benefits (demonstrated through baselining the performance of the existing system and benchmarking improved performance).

Year	Target	Actual	**Measure Term:** Long-term
2012	12		

Measure: Benchmark improved performance to at least 2 national decision support systems using NASA results, including the Air Quality Index provided by EPA and USDA's reservoir monitoring tools. (New measure in FY 2004)

Additional Information: EPA and USDA decision support tools will be baselined and the benefits of incorporating NASA data demonstrated through benchmarking the improved performance.

Year	Target	Actual	**Measure Term:** Annual
2004	2		

Measure: Benchmark improved performance from the use of predictions from 2 NASA Earth system science models in the President's initiative of illegal logging within the CARPE program and maritime use of ocean predictions with the Navy. (New measure in FY 2004)

Additional Information: Navy and CARPE program support tools will be baselined and the benefits of incorporating NASA predictive models demonstrated through benchmarking the improved performance.

Year	Target	Actual	**Measure Term:** Annual
2004	2		

Program Assessment Rating Tool (PART)

Program: Mars Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

1.1 Is the program purpose clear? Answer: YES Question Weight: 20%

Explanation: The Mars Exploration Program (MEP) has a well-defined and focused purpose that ties directly to the NASA vision and mission, and the Space Science Enterprise strategic plan. The goals and objectives are clear and unambiguous to all interested parties (Congress, the Administration, and the public).

Evidence: MEP's purpose can be found in the Solar System Exploration Roadmap, which describes the activities of both the Mars and Solar System Exploration themes. The Roadmap describes the programs goals and objectives and their linkages to both Enterprise and Agency Strategic Plans. The MEP exploration strategy is defined by three program Objectives: (1) Understand the current state and evolution of the atmosphere, surface, and interior of Mars; (2) Determine if life exists or have ever existed on Mars; and (3) Develop an understanding of Mars in support of possible future human exploration. Each objective is the subject of several Research Focus Areas, representing key areas of scientific emphasis. Identified within each of these Research Focus Areas are investigations that indicate the specific near-and mid-term scientific advances to be pursued. Finally, the specific missions that collect data for the investigations are identified.

1.2 Does the program address a specific and existing problem, interest or need? Answer: YES Question Weight: 20%

Explanation: Mars likely possessed a climate conducive to the development of life at some point in its past and may have habitable zones capable of supporting primitive life forms (e.g., bacteria) to this day. As such, Mars represents a leading target in the scientific search for life beyond Earth. The scientific and technical approaches utilized by the MEP represent the science and the technical communities best strategy in the search for life at Mars. The approaches also relate directly to understanding and predicting the environmental evolution and habitability of planet Earth and to future educational needs, especially inspiring in the American public a spirit of excitement about scientific exploration. The importance and specific interest that MEP addresses is endorsed by the National Research Council as documented in "New Frontiers in the Solar System Survey: An Integrated Exploration Strategy."

Evidence: The National Academy of Sciences reviewed the MEP as part of its Decadal Survey to help NASA prioritize the missions and science objectives for the next ten years. The SSE Roadmap, of which MEP is a part, was created to achieve the vision set out by the Decadal Survey and reaffirmed that the MEP's investigation of whether Mars ever harbored any kind of life contributes to NASA's overall efforts to explore the universe and search for life.

1.3 Is the program designed so that it is not redundant or duplicative of any other Federal, state, local or private effort? Answer: YES Question Weight: 20%

Explanation: MEP is a unique and one-of-a-kind program with a long-term science goal that is not being funded or managed by anyone other entity (i.e., Federal, state, or local government; private industry).

Evidence: The MEP is the world's only comprehensive program designed to collect and interpret such a broad panoply of scientific knowledge concerning another planet, while setting the context to answer whether life exists beyond Earth. There is no committed International Mars Program after the European Space Agency's (ESA) Mars Express, and ESA's Mars program (Aurora), which includes the French and Italian space agencies, is still in a very early stage and is geared toward the eventual human exploration of Mars. NASA is participating in Japan's Nozomi mission, which will arrive at Mars in January 2004. However, Japan has not committed to Mars missions beyond Nozomi. Also, there is no redundancy between the National Science Foundation's (NSF) astronomical science objectives and the MEP science objectives. NSF science objectives focus on ground-based planetary astronomy, while MEP/NASA Space Science Enterprise science objectives are generally pursued via space-based investigations.

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100%	100%	100%	74%	

1.4 Is the program design free of major flaws that would limit the program's effectiveness or efficiency? Answer: YES Question Weight: 20%

Explanation: MEP's science strategy and technical approach are the product of a broad community (NASA and other Federal agencies, universities, industry, and international partners) that has been intimately involved for several years. The products have been reviewed by the National Academy of Sciences and NASA advisory committees. It is the consensus of the community that the program architecture is optimally designed to answer the key questions consistent with NASA and the Space Science Enterprise strategic plans. It should be noted that MEP does not have sufficient funding (within its approved baseline budget, the FY 2004 President's Budget) to completely answer its approved science objectives.

Evidence: Reviewers believe MEP has achieved scientific/infrastructure/programmatic resiliency/efficiencies. Contingencies ensure critical paths are unobstructed. MEP doesnt rely on international partners to achieve objectives. France's cancellation of a program through which NASA anticipated testing future Mars technologies will not prevent NASA from meeting these objectives. One technology (search and rendezvous) will be demonstrated on the Mars Telecomm Orbiter; the other technology (network science) will be included in the next decade Mars program through partnership with ESA or competed opportunities. MEP is risk attentive (measurements lost in mission failure would be recovered by future missions) and will be responsive to discoveries. Scout missions can augment/complement program objectives and recover key measurements. MEP also shares lessons between missions and validates critical technologies on precursor missions. Strategic plan/roadmap/program plan/Program Commitment Agreement provide basic structure, contingency plans, decision points, and resource requirements for effective/efficient program implementation.

1.5 Is the program effectively targeted, so that resources will reach intended beneficiaries and/or otherwise address the program's purpose directly? Answer: YES Question Weight: 20%

Explanation: The rigor with which MEP is designed, structured, managed and funded ensures that resources reach only the intended beneficiaries and will address the program's purpose directly. The three science objectives for MEP as outlined in the SSE Roadmap guide the activities of the MEP and provide the context through which specific research objectives are formulated, science investigations are defined, and missions that address them are planned. Missions are broken down into discrete work breakdown structure-style activities, and funds are issued at the mission level and below. These funds may not be spent on anything other than the purpose for which they were issued.

Evidence: The scientific purpose of each mission is well documented and is linked to specific Enterprise and Agency goals and objectives (as documented in MEP Integrated Budget and Performance Document [IBPD], the Solar System Exploration Roadmap, and the Enterprise Strategic Plan). Funds are issued to the appropriate entity at the mission level or below. Above a certain level, Federal law prohibits the redirection of resources issued for one program to another program without express Congressional approval. In addition, NASA has adopted a full cost management system, which instills additional rigor in properly targeting and managing its funds. Finally, a revised financial system and a new computer tracking system (Integrated Financial Management [IFM]) will enable all Agency programs to ensure that each program dollar is properly directed and expended.

2.1 Does the program have a limited number of specific long-term performance measures that focus on outcomes and meaningfully reflect the purpose of the program? Answer: YES Question Weight: 10%

Explanation: MEP long-term PART measures focus on outcomes and meaningfully reflect the program's purpose.

Evidence: MEP has six specific long-term performance measures. Four are outcome measures, one of which addresses program management while the other three address scientific outcomes, the purpose of MEP. Two of the performance measures are outputs, and they address accomplishment of key project milestones and technological activities.

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2.2 Does the program have ambitious targets and timeframes for its long-term measures? Answer: YES Question Weight: 10%

Explanation: MEP has ambitious targets and timeframes for its long-term measures.

Evidence: MEP's scientific measures aim for an annual rating of "green," signifying excellent progress, by an external advisory committee. These measures will be assessed for the program's duration. MEP's program management long-term measure aims for 100% compliance with NASA's management guidelines and will also be assessed for the program's duration. The development and technology milestone measures include a series of annual targets the program is expected to meet each year.

2.3 Does the program have a limited number of specific annual performance measures that can demonstrate progress toward achieving the program's long-term goals? Answer: YES Question Weight: 10%

Explanation: MEP has specfic annual performance measures that demonstrate progress toward achieving the program's long-term goals.

Evidence: MEP's annual performance measures support and indicate progress toward addressing its six long-term measures. Each of the long-term science measures is supported by annual measures that address various facets of the scientific questions encapsulated in the long-term measures. The program management long-term measure is supported by three annual measures that serve as indicators of effective program management: adherence to baseline cost, baseline schedule, and a competitive awards regime.

2.4 Does the program have baselines and ambitious targets for its annual measures? Answer: YES Question Weight: 10%

Explanation: MEP has baselines and ambitious targets for its annual measures.

Evidence: The program management annual measures have targets intended to note whether costs and schedule are followed closely and the majority of project funds are competed. The scientific annual measures all aim for ratings of "green," signifying excellent progress, by an external advisory committee.

2.5 Do all partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) commit to and work toward the annual and/or long-term goals of the program? Answer: YES Question Weight: 10%

Explanation: The MEP partners (NASA Centers, JPL, contractors and other private organizations, universities, international organizations, and other Federal agencies) are directly involved in planning and establishing the program's goals and objectives. As a result of this process, they fully support and are committed to the achievement of both the annual and long-term goals of the program.

Evidence: MEP goals/objectives were developed by the Mars Exploration Payload Analysis Group & include contributions by NASA Centers, JPL, contractors, universities, international organizations, & other Federal agencies. Goals/objectives are reviewed/updated every 2-3 years to reflect new data & knowledge. MEP enforces mutual understanding of goals/objectives by using Letters of Agreement & Memoranda of Understanding with international partners/Federal agencies, contracts/grants with industry/universities, & task-level agreements w/JPL. Each mission includes a Program Plan/Level 1 Agreement between NASA HQ & NASA centers (JPL included) to document technical deliverables/science requirements. MEP conducts award fee/mid-year performance/ad hoc reviews to determine & verify partners sustained commitment. Independent review boards conduct contract and program reviews with some frequency. The Space Science Strategic Plan/Solar System Roadmap are distributed to all partners to ensure familiarity w/long-term science goals. Regular interactions among partners in meetings fora, teleconferences & reviews ensure partners understand/work toward MEP goals.

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2.6 Are independent evaluations of sufficient scope and quality conducted on a regular basis or as needed to support program improvements and evaluate effectiveness and relevance to the problem, interest, or need?

Answer: YES Question Weight: 10%

Explanation: The MEP is in the early implementation stages of the new (post-1999 failures) Mars exploration architecture and has been reviewed by independent groups (National Academy of Sciences, NASA advisory committees, National Research Council), which concurred with the scientific strategy and implementation approach. Evaluation of program performance will be accomplished by integrating inputs from several groups, each with varying degrees of independence and differing emphases.

Evidence: The Mars Exploration Program Advisory Group (MEPAG), a body of world expert scientists and technologists who provided the scientific analysis and basis for the goals and objectives of the MEP, is also a critical forum for assessment of MEP progress towards achieving these goals. Scientific and programmatic progress and issues related to the MEP are presented to the FACA-chartered Space Science Advisory Board on a quarterly basis (via the Solar System Exploration Subcommittee). Scientific and programmatic results are measured against the GPRA metrics on an annual basis. In addition, the MEP director has chartered a senior group of technical, scientific, and management experts who meet twice a year to discuss strategies, progress and technical plans. Additionally, in 2000-01 the NAS Committee on Planetary and Lunar Exploration (COMPLEX) conducted an independent scope and quality evaluation of the program up through the 2005 Mars Reconnaissance Orbiter. The COMPLEX report, together with the SSE Decadal Survey, influenced Mars program planning and implementation for this decade, and particularly the Mars Next Decade program (beyond 2009) missions.

2.7 Are Budget requests explicitly tied to accomplishment of the annual and long-term performance goals, and are the resource needs presented in a complete and transparent manner in the program's budget?

Answer: YES Question Weight: 10%

Explanation: MEP long-term performance goals, or outcomes, reflect the cumulative effect of annual activities. The degree to which these outcomes are realized is dependent upon the degree to which the annual performance goals are achieved. This assessment is validated by external reviews. MEP goals and objectives are directly linked to specific missions. Budget requests for each mission are dependent upon the successful completion of the current year's planned activities and the future requirements. The life-cycle cost requirements for each mission, now stated in full cost mode, are included in the Integrated Budget and Performance Document. The budget requests are directly tied to near and long term performance goals in terms of specific missions to be launched on specific launch opportunities through the decade from 2001 to 2009. The budget includes other elements such as technology, research and analysis, and education and program outreach necessary to support the objectives of the program.

Evidence: MEP long-term performance goals are directly linked to both Enterprise and Agency strategic goals and objectives (see Space Sciences Strategic Plan and Agency Strategic Plan). In addition, the SSE Roadmap tracks objectives down to specific missions. Budget requests for each mission are derived from assessments of annual performance and estimates of resources required to complete the mission. The resource requirements are clearly stated and are now stated in full cost mode. The Integrated Budget and Performance Document displays important status data for each mission, lists the budget requirements for life cycle cost, and identifies the specific long-term outcomes and annual performance goals supported by each mission. To be consistent with scientific investigation and programmatic options for the next decade, planning for technology investments to support MEP missions beyond this decade is still in progress. Options for the next decade of MEP missions are to be completed and finalized for the FY06 budget process.

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2.8 **Has the program taken meaningful steps to correct its strategic planning deficiencies?** Answer: YES Question Weight: 10%

Explanation: MEP has a system for identifying and correcting deficiencies in its strategic planning process.

Evidence: Experts involved with MEP for many years periodically review MEP's progress & offer advice/counsel. This process leads to update/revision of the Space Science Enterprise Strategic Plan, which is then reviewed by the NAS. This update occurs every 3 years. The Solar System Exploration Subcommittee reviews MEP strategies, missions, & objectives. Deficiencies or corrective actions to strategic planning activities are incorporated into the Solar System Exploration Roadmap & ultimately the Integrated Budget & Performance Document. In 2001, NAS's Committee on Planetary and Lunar Exploration (COMPLEX) assessed the restructured MEP and found that NASA's previous strategic plan wasnt adequately addressing the "life" question. The present strategic plan & mission priorities addresses those concerns. Also, COMPLEX & the Solar System Exploration Decadal Survey recommended a more aggressive approach to sample return & long-lived network science, both of which are addressed in next-decade plans. The program plan has definitive dates for all missions this decade & decision points/contingencies for the pathways/missions of next decade.

2.CA1 **Has the agency/program conducted a recent, meaningful, credible analysis of alternatives that includes trade-offs between cost, schedule, risk, and performance goals and used the results to guide the resulting activity?** Answer: YES Question Weight: 10%

Explanation: The MEP regularly conducts analyses of alternatives including tradeoffs between cost, schedule, risk, and performance goals. Independent review teams examine missions throughout their life cycles to evaluate their ability to satisfy requirements and meet commitments. The analyses of alternatives substantiate reviewers recommendations for proceeding with, modifying or terminating the program or project, or for enhancing overall technnical and programmatic performance.

Evidence: Approval of management documents used to plan and control programs/projects depends on successful completion and independent review of tradeoffs. A Governing Program Management Council has primary responsibility for evaluating the cost, schedule and technical content of the program/project to assure that NASA is meeting its key commitments. Actions or changes to the program/project resulting from these independent reviews and evaluations will be incorporated into these documents. Examples of tradeoffs made within MEP in 2002-03 include: (1) assessment of cost benefits for the Mars Global Surveyor mission extensions; (2) assessment of multiple design approaches to validate target costs for missions such as the 2009 Mars Telesat Orbiter and Mars Science Laboratory; and (3) re-alignment within MEP following cancellation of international components and development of plans for recovery of the science.

2.RD1 **If applicable, does the program assess and compare the potential benefits of efforts within the program to other efforts that have similar goals?** Answer: NA Question Weight: 0%

Explanation: MEP is a basic research program; therefore, this question is not applicable to MEP.

Evidence:

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2.RD2 **Does the program use a prioritization process to guide budget requests and funding decisions?** Answer: YES Question Weight: 10%

Explanation: MEP is completely integrated with the Agency and Enterprise goals and objectives. Independent outside organizations review the program and help set scientific priorities in line with these goals and objectives. These scientific priorities are then assigned to missions and are used to guide the budget requests and funding decisions. Repeated management and scientific peer reviews ensure that each mission provides data in a cost effective manner.

Evidence: The NAS reviewed MEP in its Decadal Survey to help NASA prioritize missions and science objectives for the next ten years. Independently, COMPLEX assessed the restructured MEP during the 2000-01 timeframe, providing feedback to MEP management. The SSE/MEP Roadmap was created to achieve the vision set out by the Decadal Survey. This roadmap links objectives to Research Focus Areas (RFA), RFAs to scientific investigations, and investigations to specific missions. MEP's strategy is defined by 3 program objectives: (1) Understand the current state/evolution of the atmosphere, surface, and interior of Mars; (2) Determine if life exists/has ever existed on Mars; (3) Develop an understanding of Mars in support of possible future human exploration. All existing and future MEP missions will support one/two/all MEP strategic objectives, which are consistent with NAS recommendations. Mission life cycle costs are the basis for budget requests and funding decisions. Frequent reviews of these science outcomes by outside independent bodies (such as the NAS and the NAC) as well as NASA staff ensure that priorities are reflected in budget requests and funding decisions.

3.1 **Does the agency regularly collect timely and credible performance information, including information from key program partners, and use it to manage the program and improve performance?** Answer: YES Question Weight: 8%

Explanation: On a monthly basis MEP collects relevant technical and programmatic performance data from key performance partners. Information is used to assess progress, develop risk mitigation strategies where needed, and to adjust priorities, make resource allocations, or take other appropriate management actions.

Evidence: The Space Science Enterprise reviews performance data monthly. Programs over a certain $ value must exercise a contractor-owned, Agency-approved earned value system; NASA financial analysts study results. NAC subcommittees annually review MEP's progress toward achieving long-range outcomes. NAS inputs, including Decadal Surveys/targeted reviews, are integrated into roadmaps & Enterprise Strategy. NASA has initiated full cost mgmt & an integrated financial mgmt system for completeness & greater insight into its finances. Data collected monthly from key program partners include technical, schedule, & financial status. Such data showed the 2003 Mars rovers had significant technical & mass risks. Schedule/mass/cost were traded to keep the rovers on track for launch in summer 2003. Lander structures were built of composites to save mass, deviating from Pathfinder heritage & requiring significant qualification. The aggressive schedule & resource management proved essential to preserving technical & schedule viability. A potential flaw in the composite-wound propellant tanks was discovered late, but this control allowed a switch to titanium tanks & maintain schedule.

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3.2 Are Federal managers and program partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) held accountable for cost, schedule and performance results?

Answer: YES Question Weight: 8%

Explanation: All MEP Federal managers and program partners (contractors, subcontractors, PIs, universities) are held accountable for their cost, schedule, and performance results.

Evidence: Every manager is required to develop a formal personal performance plan with his or her supervisor. This plan consists entirely of critical elements, at least one of which must be linked to the Agency's Strategic Plan or the organization's operating plan or goals. Although the program's performance may be evaluated on a more frequent basis, the program manager's performance is formally evaluated twice yearly. Bonuses and promotions are dependent upon the manager making positive progress toward meeting the goals of the program. JPL is held accountable for the successful implementation of the program. JPL's subcontractors (Ball Aerospace, Lockheed Martin, universities, and others) are held accountable for the timely delivery and quality of products. NASA uses award fees to incentivize JPL performance, and JPL also uses such fees to incentivize its contractors. Partners, including JPL, who fail to perform as required may likewise find their participation reduced or terminated.

3.3 Are funds (Federal and partners') obligated in a timely manner and spent for the intended purpose?

Answer: YES Question Weight: 8%

Explanation: MEP obligates its funding in a timely manner and ensures that they are spent for their intended purpose as appropriated by Congress.

Evidence: Annual NASA R&D funds are available for obligation for two years and are fully obligated by the end of the period. Operating plans for the program year are submitted to Congress and revised as needed over the two-year time period. Internally, obligation and cost plans are developed, compared to actual spending, and reviewed monthly by all levels of the program. The NASA Procurement Management System is the primary system used to provide monthly reporting of all obligations and costs. These are tracked against unique project numbers (UPNs) traceable to contractor and institutional source documents. Contractor and government accounting systems are audited periodically to ensure compliance with government standards. On average, MEP has been obligating about 97% of its authorized annual budget. For further details, please see: NASA's monthly FACS report, contractor monthly & quarterly reports (533s), SF133 (report on budget execution and budgetary resources), FMS2108 year-end closing statement, and NASA's annual Performance and Accountability Report.

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3.4 **Does the program have procedures (e.g. competitive sourcing/cost comparisons, IT improvements, appropriate incentives) to measure and achieve efficiencies and cost effectiveness in program execution?** Answer: YES Question Weight: 8%

Explanation: MEP has effective management procedures in place to ensure the efficient use of dollars spent on program execution.

Evidence: MEP has policies to incentivize competitive outsourcing, best value procurement practices, and employee performance and productivity improvements. Information Technology is used extensively. Efficiency/effectiveness are generally measured in the timely delivery of scientific products addressing the Strategic Plan and are consistent with Level 1 requirements and agreements. Competitive selection and process is imposed throughout MEP, and MEP uses this competitive process to promote cost efficiencies and effectiveness. NASA Research Announcements for MEP base and focused technologies have been released in a timely fashion. Incentive and award fee evaluation is used to motivate contractors (JPL/others) to achieve cost and efficiencies effectiveness in program execution. MEP uses the following NASA uniform efficiency metrics to measure efficiencies and cost effectiveness: (1) Each development project will complete its current phase within 10% of total life-cycle cost; (2) Each research project will allocate 75% of funding competitively; (3) MEP will complete all missions within 10% of baseline schedule.

3.5 **Does the program collaborate and coordinate effectively with related programs?** Answer: YES Question Weight: 8%

Explanation: The MEP collaborates and cooperates, where reasonable and practicable, with other NASA programs and/or Federal agencies where shared or similar goals and objectives might permit a more efficient use of resources while increasing the scientific and/or technological return. MEP also continues to seek science collaboration with international partners where it is possible and beneficial to the U.S. taxpayer.

Evidence: MEP coordinates and collaborates with NASA's Aerospace Technology Enterprise to facilitate enabling and enhancing technology maturation and infusion. MEP continues to work closely with the Space Flight Enterprise to ensure the availability of launch services and with the Biological and Physical Research Enterprise for "Safe on Mars" measurements. MEP maintains an ongoing collaborative relationship with its international partners at the program and project level for planning and coordination. MEP has a new collaborative effort with the MIT/Lincoln Laser Optical Communciation Technology demo to fly on the 2009 Mars Telesat Orbiter. MEP will team with Project Prometheus and the Dept. of Energy to develop the Multi-Mission radioisotope thermal generator that will be included in the 2009 Mars Science Laboratory. Currently MEP is partnered with Italy for the Sharad instrument to fly on the Mars Reconnaissance Orbiter.

3.6 **Does the program use strong financial management practices?** Answer: YES Question Weight: 8%

Explanation: NASA will be operating in full cost accounting starting in FY04 and is implementing an Integrated Financial Management System (IFMS). JPL, the primary manager of MEP, has been operating in full cost mode since its early years.

Evidence: Since JPL manages approximately 90% of the MEP, most of the MEP has been operating in a full cost management mode rather than what has traditionally been referred to as "business as usual." Under full cost, service pool and G&A costs will be managed and allocated in appropriate amounts to the direct costs of the programs they support. This assures that the full cost, not just the direct costs, of a program is actively managed. In addition, a very powerful computer-based tool now supports the Integrated Financial Management System (FMS), greatly enhancing its ability to track, integrate, and account for all costs and financial resources.

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3.7 Has the program taken meaningful steps to address its management deficiencies? Answer: YES Question Weight: 8%

Explanation: NASA has many means of noting management deficiencies, and any deficiencies that are uncovered are subsequently remedied.The Space Science Enterprise, which manages MEP, has a well-structured process in place to conduct monthly and annual performance reviews. MEP is evaluated and management deficiencies are noted through budget formulation and execution processes. The MEP director has frequent contact with directors of implementing organizations for MEP projects to discuss and mitigate any management deficiencies. In addition, there is a long tradition of inviting independent bodies to review programs for various deficiencies, including management and propose solutions to any problems. Lessons-learned workshops are conducted to alert management to the kinds of mistakes that have been made under similar circumstances in the past so as to avoid repeating them in the future.

Evidence: MEP has addressed the deficiencies/imparted all the recommendations identified by the Mars Program Independent Assessment Team (MPIAT) after the 99 Mars failures. Recommendations included establishing: (1) a dedicated, single interface at NASA HQ for MEP responsible for all requirements, decisions, & budgets, which reports to the AA for Space Science; (2) a program office at JPL w/stature reporting directly to the JPL director; (3) a Flight Project Directorate, where Mars and other major flight projects get attention by the institution; and (4) a policy to provide telemetry during critical events. Intimate institutional involvement, open communication, & peer reviews determined that the 2003 rovers could not be completed on schedule w/o exceeding approved baseline budget. Technical/budget reviews resulted in programmatic changes to ensure mission success. Budget analysts and planners were added to provide early problem detection, metrics were added to monitor workforce health/safety, and incompressible test lists were generated to ensure the integrity of products. These lessons learned are being implemented in the 2005 mission.

3.CA1 Is the program managed by maintaining clearly defined deliverables, capability/performance characteristics, and appropriate, credible cost and schedule goals? Answer: YES Question Weight: 8%

Explanation: During the more traditional phases of MEP programs, the hardware development and launch, a program will develop and maintain a clearly defined list of deliverables, along with the required performance characteristics, costs and schedule goals. Progress is measured by traditional methods such as earned value, schedule accomplishment, independent assessments, etc., in order to determine whether the limited window for launch can be met and whether the cost is exceeding predetermined limits. The results of these assessments and reviews impact program management decisions.

Evidence: Opportunities to send missions to Mars exist about every 26 months. In order to meet the tight launch windows, a clearly defined list of hardware and software deliverables, along with required performance characteristics and costs and schedule must be developed, documented, maintained and followed. These documentations are found in the Program Commitment Agreement, the Program Plans and the Project Plans. The program manages carefully to the information contained within these documents; allowing requirements creep and schedule slip might prove disastrous to a mission's ability to launch. There is also usually a hardware delete list in case the program has been spending too much money or has been losing schedule and must take action to get back on schedule and budget. Any indications that the program may exceed total life cycle costs by 15% are automatic grounds for cancellation consideration.

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3.CO1 **Are grants awarded based on a clear competitive process that includes a qualified assessment of merit?** Answer: YES Question Weight: 8%

Explanation: NASA, including MEP, awards 100% of its grants according to a rigorous and well-defined system of competition and reviews that ensures that only the most meritorious proposals are selected for award.

Evidence: All grants selected for funding by NASA are broadly competed through the NASA Research Announcement process. Grant proposals must relate directly to both Agency and Enterprise goals and objectives. All proposals are peer-reviewed by experts comprising a mix of scientific disciplines and are selected on merit. NASA also utilizes an electronic mailing list as part of its outreach efforts. This mailing list includes virtually the entire population of those who might wish to participate in the grant process.

3.CO2 **Does the program have oversight practices that provide sufficient knowledge of grantee activities?** Answer: YES Question Weight: 8%

Explanation: NASA, including MEP, has an oversight practice that provides sufficient insight into and knowledge of grantee activities.

Evidence: NASA has an oversight practice that provides sufficient insight into and knowledge of the grantee's activities. Discipline scientists take the results of the grant peer reviews and make selections as to whom grants will be awarded. These scientists then monitor the progress of the grant toward meeting its stated goals for the duration. Formal annual reports are provided by grantees, and expenditures are tracked at a cumulative level. The discipline scientists have sufficient insight into the performance of the grantees to understand what the grantees do with the resources that are allocated to them. Officially, the grantees are required to submit annual progress report before the next increment of funding is released to them.

3.CO3 **Does the program collect grantee performance data on an annual basis and make it available to the public in a transparent and meaningful manner?** Answer: YES Question Weight: 8%

Explanation: NASA, including MEP, collects grantee performance data and makes them available to the public in a manner that is both useful and meaningful.

Evidence: Formal progress reports, which are a required output of each research and analysis activity funded under the MEP, are submitted on an annual basis. The NASA lead scientist, together with appropriate discipline scientists review the progress reports before recommending continuation of the research activity or not to the procurement officers before funding is released to the grantees. The results of grants-based research are broadly disseminated to the public through the use of science forums, publications, NASA press releases and news conferences, museum displays, educational materials, and NASA's web site. NASA is currently working to develop an evolving database that will post grantees annual reports on the Internet. The database is scheduled to become available to the public by calendar year 2004. In addition, some of the highlights from the grantee annual reports are published in the "Space Science: Supporting Research and Technology (SR&T) Program Highlight" brochure.

3.RD1 **For R&D programs other than competitive grants programs, does the program allocate funds and use management processes that maintain program quality?** Answer: YES Question Weight: 8%

Explanation: MEP allocates funding using a broadly competitive process and will only sole-source projects on the basis of a demonstrated unique expertise or capability.

Evidence: MEP advocates full and open competition at all levels to the greatest extent possible. Sole-sourcing of any major mission component can only be exercised on the basis of a demonstrated unique expertise or capability. MEP competes at least 75% of its budget through full and open competition. Detailed explanations/breakdown on competition among the MEP elements can be found in the MEP Integrated Budget and Performance Document.

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4.1 Has the program demonstrated adequate progress in achieving its long-term performance goals? Answer: YES Question Weight: 20%

Explanation: The majority of MEP's long-term PART measures are new this year; moreover, most of them will be works in progress for the duration of the program's existence. Nonetheless, MEP has made significant progress towards addressing its long-term scientific, program management, development and technology goals.

Evidence: MEP has made significant progress towards addressing its long-term goals. NASA's FY02 Performance and Accountability Report indicates that the Space Science Enterprise, of which the MEP is a significant part, achieved 100% of its GPRA annual performance goals. The MEP's long-term performance goals or outcomes are linked to those of the Enterprise and contribute considerably to their achievement. Since the long-term performance goals reflect the cumulative effect of annual activities, and the degree to which long-term performance measures are being achieved is determined by the degree to which annual performance goals are being met, the MEP can be said to have demonstrated significant progress toward achieving its long-term performance goals. Mars Global Surveyor completed its 1st extended science mission successfully and started its second extension. Odyssey has returned more high quality mapping data than anticipated. The Mars Exploration Rovers launched in summer 2003.

4.2 Does the program (including program partners) achieve its annual performance goals? Answer: LARGE EXTENT Question Weight: 20%

Explanation: The program has achieved its performance goals consistent with its annual performance goals.

Evidence: MEP has achieved its annual performance goals to a large extent. NASA's FY02 Performance and Accountability Report indicates the Space Science Enterprise, of which MEP is part, achieved 100% of its GPRA annual performance goals. MEP annual performance goals are linked to the Enterprise's strategic goals and objectives and contribute significantly to their achievement. The Enterprise's 100% achievement of annual performance goals includes MEP's achievement of its annual performance goals. MEP projects in development are averaging a 12% cumulative and 4% FY2003 overrun over basline life cycle cost. 75% of the MEP FY03 budget will be allocated through open peer-reviewed competition. Both MGS and Odyssey have produced outstanding scientific results.

4.3 Does the program demonstrate improved efficiencies or cost effectiveness in achieving program goals each year? Answer: LARGE EXTENT Question Weight: 20%

Explanation: Implementation of the restructured program has just started with a successful Mars Odyssey mission. All key elements are in place for future missions to continue returning science data with increased efficiencies and cost effectiveness.

Evidence: Consistent with NASA uniform efficiency measures (projects will complete current phase within 10% of total life-cycle cost; projects will allocate 75% of funding competitively; and all missions will be completed within 10% of baseline schedule), MEP has continued to demonstrate improved efficiencies and cost effectiveness in achieving its program goal. Missions in operation to date are demonstrating better than one order of magnitude improvement in capability in Mars orbit. The program has and will continue to demonstrate better mechanisms for cost estimation, continuous cost monitoring, control, and risk mitigation strategies. A cost efficiency for Mars Global Surveyor and Mars Odyssey combined operations is about 25%; this cost efficiency is achieved through sharing of the flight operation team. Mars Odyssey's returned data volume is twice the amount planned: 127Gbyte verses 155Gbyte planned for the entire prime mission, and it has only completed 48% of prime mission.

Program: Mars Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

4.4 Does the performance of this program compare favorably to other programs, including government, private, etc., with similar purpose and goals?
Answer: NA
Question Weight: 0%

Explanation: The MEP is the world's only comprehensive Mars exploration program; therefore, its performance cannot be compared with any other programs.

Evidence: See explanation.

4.5 Do independent evaluations of sufficient scope and quality indicate that the program is effective and achieving results?
Answer: LARGE EXTENT
Question Weight: 20%

Explanation: Independent evaluations conducted by the National Academy of Sciences for the purpose of assisting the Space Science Enterprise with strategic plans confirm the effectiveness and quality of the program. Advisory committees to the Agency also confirm program effectiveness.

Evidence: The National Academy of Sciences and NASA advisory committees have reviewed the MEP. Consensus is that MEP has achieved significant scientific, infrastructure, and programmatic resiliency and efficiencies within available resources. See the National Academy of Sciences Solar System Exploration Decadal Survey for detailed information. In addition, the Mars Program Independent Analysis Team chaired by T. Young reviewed the MEP at the Space Science Enterprise's request for technical resiliency and to make sure that all their concerns had been addressed. The committee agreed that MEP had incorporated all its recommendations and had adequate technical and scientific resiliency. Observations were presented to NASA's Governing Program Management Council on June 26, 2001.

4.CA1 Were program goals achieved within budgeted costs and established schedules?
Answer: LARGE EXTENT
Question Weight: 20%

Explanation: Under the restructured Mars Exploration Program approved in 2000, MEP goals have generally been achieved within budget costs and established schedules. The exception is the 2003 Mars Exploration Rovers.

Evidence: The 2003 Mars Exploration Rovers (MER) experienced schedule difficulty that led to a cost overrun of 17% of initial life cycle cost. All other MEP missions (Mars Global Surveyor, 2001 Mars Odyssey, Mars Express, Mars Reconnaissance Orbiter) are either within budget or underrunning their initial baseline cost and schedule. Two MEP international missions to be launched in 2007 were terminated due to lack of commitments from the international partners.

PART Performance Measurements

Program: Mars Exploration

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Compliance with NASA Procedures and Guidelines (NPG) 7120.5B

Additional Information: This measure tracks NASA's performance in managing MEP in accordance with Agency implementing strategies.

Year	Target	Actual	**Measure Term:**	Long-term	(Efficiency Measure)
Ongoing	1				

Measure: Cumulative and annual percentage schedule slip on spacecraft under development

Additional Information: On average, MEP projects in development will not slip from their baseline schedules by more than 10% cumulatively or 5% annually.

Year	Target	Actual	**Measure Term:**	Annual	(Efficiency Measure)
2003	<10%, <5%	0%, 0%			
2004	<10%, <5%				

Measure: Progress in determining the characteristics and dynamics of the interior of Mars

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green			

Measure: Progress in determining whether life exists or has ever existed on Mars

Additional Information:

Year	Target	Actual	**Measure Term:**	Long-term
Ongoing	Green			

Measure: Progress in investigating the character and extent of prebiotic chemistry on Mars

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green			

PART Performance Measurements

Program: Mars Exploration

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Progress in searching for chemical and biological signatures of past and present life on Mars

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green			

Measure: Progress in understanding Mars in support of possible future human exploration

Additional Information:

Year	Target	Actual	**Measure Term:**	Long-term
Ongoing	Green			

Measure: Progress in identifying and studying the hazards that the Martian environment will present to human explorers

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green			

Measure: Progress in inventorying and characterizing Martian resources of potential benefit to human exploration of Mars

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green			

Measure: Accomplishment of key development activities: Successfully land at least one MER; Complete MER Level 1 Requirements; Complete 2005 Mars Reconnaissance Orbiter Assembly, Test, and Launch Operations Readiness Review (* NASA will successfully accomplish these activities.)

Additional Information: * Successfully land at least one Mars Exploration Rover (MER); Successfully complete Level One Requirements for the MER mission; Successfully complete the 2005 Mars Reconnaissance Orbiter Assembly, Test, and Launch Operations Readiness Review

Year	Target	Actual	**Measure Term:**	Long-term
2004	Achieve *			

PART Performance Measurements

Program: Mars Exploration

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Accomplishment of key technology activities in support of Mars exploration

Additional Information: **** Complete laser communication demonstration concept review; Release instrument Announcement of Opportunity (AO) for the 2009 Mars Science Laboratory

Year	Target	Actual	**Measure Term:**	Long-term
2004	****			

Measure: Progress in understanding the current state and evolution of the atmosphere, surface, and interior of Mars

Additional Information:

Year	Target	Actual	**Measure Term:**	Long-term
Ongoing	Green			

Measure: Progress in characterizing the present climate of Mars and determining how it has evolved over time (** NASA's external advisory committee will rate NASA's performance against this measure as "green" [on a green-yellow-red "stoplight" scale], signifying NASA's successful achievement of this goal.)

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green**			

Measure: Cumulative and annual percentage baseline cost overrun on spacecraft under development (*** On average, MEP projects in development will not exceed their baseline costs by more than 10% cumulatively or 5% annually.)

Additional Information: On average, MEP projects in development will not exceed their baseline costs by more than 10% cumulatively or 5% annually.

Year	Target	Actual	**Measure Term:**	Annual	(Efficiency Measure)
2003	<10%, <5%***	12%, 4%			
2004	<10%, <5%***				

PART Performance Measurements

Program: Mars Exploration

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Percentage of budget allocated through open, peer-reviewed competition

Additional Information: On average, MEP will allocate the target level of funding competitively.

Year	Target	Actual
2003	>75%	66%
2004	>75%	

Measure Term: Annual (Efficiency Measure)

Program Assessment Rating Tool (PART)

Program: Mission and Science Measurement Technology
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	
100%	91%	83%	54%	Moderately Effective

1.1 Is the program purpose clear? Answer: YES Question Weight: 20%

Explanation: The Mission and Science Measurement Technology (MSM) Theme addresses Goal 10 in the NASA Strategic Plan, which is to "Enable revolutionary capabilities through new technology." The objectives of the MSM Theme are to improve the capability to accurately assess and manage risk in the synthesis of complex systems, to create system concepts and demonstrate technologies that enable new scientific measurements, and to develop breakthrough information and communications systems to increase our understanding of scientific data and phenomena. The primary customers of the MSM Theme are the NASA Enterprises, which depend on MSM to develop crosscutting technologies for their future missions.

Evidence: MSM Theme objectives are described in the NASA Strategic Plan, and in the MSM Theme Integrated Budget and Performance Document (IBPD)

1.2 Does the program address a specific and existing problem, interest or need? Answer: YES Question Weight: 20%

Explanation: The MSM Theme fills the critical role of identifying basic research products, developing and integrating these products into mission-oriented technologies, validating them against mission needs, and then infusing them into NASA missions and processes, resulting in lower risk and greater science return.

Evidence: The MSM role in identifying , developing, and transitioning technology products for NASA's future mission needs is clearly defined in the MSM IBPD, and the IBPD's of the three programs that make up the MSM Theme: the Computing, Information, and Communications Technologies (CICT) Program develops breakthrough computing, information, and communication systems to increase our understanding of scientific data and phenomena; the Engineering for Complex Systems (ECS) Program develops the capabilities to assess and manage risk in the synthesis of complex systems; the Enabling Concepts and Technologies (ECT) Program defines new system concepts and develops new technologies to enable new science measurements.

1.3 Is the program designed so that it is not redundant or duplicative of any other Federal, state, local or private effort? Answer: YES Question Weight: 20%

Explanation: The MSM Theme develops technologies that focus on first-of-a-kind and few-of-a-kind NASA mission applications across multiple classes of missions and Enterprises. This type of wide ranging effort to develop advanced technology can only be managed and funded by the government. Next year's PART will assess whether the MSM program has reduced overlaps reported by the NRC (e.g., in MEMS/ nanotechnology) and clarified relationships with technology development programs in other enterprises.

Evidence: The MSM Theme coordinates its research programs with DoD by participating in the Space Technology Alliance, and by partnering with other government agencies such as the Air Force, the Defense Advanced Research Projects Agency, and the National Oceanic and Atmospheric Administration to jointly develop and leverage new technologies. The MSM Theme involves external peer reviewers from other government agencies, universities, and academia to periodically review its research activities to insure that duplication of effort is minimized.

Program: Mission and Science Measurement Technology
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Moderately Effective
100%	91%	83%	54%	

1.4 Is the program design free of major flaws that would limit the program's effectiveness or efficiency? Answer: YES Question Weight: 20%

Explanation: MSM Programs have been effective in developing advanced technologies and inserting them into NASA missions. To increase the success rate of technology infusion, MSM has actively engaged the NASA Enterprises to help in program formulation and management. This will insure that the program remains effective and relevant to customer needs.

Evidence: The implementation process for MSM programs has been redesigned in the past year to provide a closer working relationship with the NASA Enterprises. The MSM Theme established a Technology Executive Board (TEB), which consists of representatives from the Enterprise customers. The TEB provides guidance on overall program content and direction. MSM will co-fund the transition of mature technologies to the Enterprises to insure that these technologies will be used in NASA missions.

1.5 Is the program effectively targeted, so that resources will reach intended beneficiaries and/or otherwise address the program's purpose directly? Answer: YES Question Weight: 20%

Explanation: The MSM Programs consist of well-defined projects that target the development of specific technologies to meet specific objectives. The NASA Enterprises, who are the beneficiaries of MSM technologies, provide guidance on the formulation of these projects, and on the allocation of resources.

Evidence: The IBPD's of the MSM programs outline the objectives, long-range performance goals, and resource allocations to the projects. Each project has an annual Project Plan that defines the organization, technical approach, milestones, and resource allocation to performing organizations.

2.1 Does the program have a limited number of specific long-term performance measures that focus on outcomes and meaningfully reflect the purpose of the program? Answer: YES Question Weight: 9%

Explanation: Each program in the MSM Theme has specific long-range performance goals that focus on definite outcomes.

Evidence: The long-range performance goals and associated outcomes are documented in the Technical Commitment section of the IBPD and in the PART.

2.2 Does the program have ambitious targets and timeframes for its long-term measures? Answer: YES Question Weight: 9%

Explanation: Performance targets are revolutionary capabilities for enabling currently unachievable missions and order-of-magnitude improvements in system performance. Each project has near-term technical milestones that demonstrate progress toward achieving long-range program objectives.

Evidence: Annual technical milestones for assessing progress over the next 5 years are defined in project plans. The technical milestones are tied to long-range performance objectives in the IBPDs of the MSM programs. The IBPDs show a schedule for maturing major technology products to specific Technology Readiness Levels (TRLs).

2.3 Does the program have a limited number of specific annual performance measures that can demonstrate progress toward achieving the program's long-term goals? Answer: YES Question Weight: 9%

Explanation: The MSM Theme has Annual Performance Measures that are used to assess progress towards achieving the long-range performance goals.

Evidence: The Annual Performance Measures are documented in the Performance Measures section of the IBPD, as GPRA indicators in the NASA Performance Plan, and in the PART

Program: Mission and Science Measurement Technology
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	
100%	91%	83%	54%	Moderately Effective

2.4 Does the program have baselines and ambitious targets for its annual measures? Answer: YES Question Weight: 9%

Explanation: Performance goals have a target and a minimum success criteria relative to an initial baseline .

Evidence: Technology Readiness Levels (TRLs) are used to assess the progress of technology development. Baseline TRLs for major technology products are established in the program IBPDs to indicate the current state of maturity.

2.5 Do all partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) commit to and work toward the annual and/or long-term goals of the program? Answer: YES Question Weight: 9%

Explanation: MSM performing organizations include NASA Centers, performance-based industry contractors, university grantees, and occasionally personnel from other government agencies. Each of these participants have specific documented roles in achieving the program goals, and participate in annual planning efforts by sub-projects of the program.

Evidence: Roles of performing organizations are documented in Project Plans. MSM NASA Research Announcements have Research Focus Areas that proposers must include in their proposals to show linkage to long-term program goals.

2.6 Are independent evaluations of sufficient scope and quality conducted on a regular basis or as needed to support program improvements and evaluate effectiveness and relevance to the problem, interest, or need? Answer: YES Question Weight: 9%

Explanation: The MSM Theme is reviewed for technical quality by the National Research Council (NRC), for program relevance by the Aerospace Technology Advisory Council (ATAC), and for program performance by the NASA Independent Program Assessment Office (IPAO). Reviews are held every year, with the reviews rotating among Quality, Relevance, and Performance every 3 years.

Evidence: The last NRC review was conducted from June, 2002 through April, 2003. The last ATAC review was conducted in May, 2003. The ATAC reports their findings to the Associate Administrator for Aerospace Technology. The IPAO conducted a Non-Advocate Review of ECS Program in April, 2003. Performance reviews of the ECT and CICT Programs are planned.

2.7 Are Budget requests explicitly tied to accomplishment of the annual and long-term performance goals, and are the resource needs presented in a complete and transparent manner in the program's budget? Answer: YES Question Weight: 9%

Explanation: The MSM Theme submits an Integrated Budget Performance Document (IBPD) with each year's budget request that defines annual and long-term performance goals and the resources required to achieve these goals. However, it is not clear that the MSM program provides adequate insight into why MSM's performance/resource mix is appropriate, particularly in terms of why each of the MSM programs gets the percentage of funding it receives and what the taxpayer can expect to get for that funding. Next year's PART will review this area to determine whether progress has been made.

Evidence: The linkage of performance goals to annual budget requests are documented in the MSM IBPD.

Program: Mission and Science Measurement Technology
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	
100%	91%	83%	54%	Moderately Effective

2.8 Has the program taken meaningful steps to correct its strategic planning deficiencies? Answer: YES Question Weight: 9%

Explanation: The MSM Theme has established a Technology Executive Board that consists of representatives from the NASA Enterprises who provide guidance on strategic technology needs, which is used for program planning. The MSM Theme has also initiated several efforts to ensure that MSM projects better support NASA needs, to increase the percentage of MSM work that undergoes external peer review, and to enhance transition of technologies into the NASA enterprises.

Evidence: Strategic technology needs provided by the NASA Enterprises are used for annual program planning. Long-range and annual performance goals are formulated to address these strategic technology needs. The performance goals are documented in the MSM IBPD.

2.CA1 Has the agency/program conducted a recent, meaningful, credible analysis of alternatives that includes trade-offs between cost, schedule, risk, and performance goals and used the results to guide the resulting activity? Answer: NO Question Weight: 9%

Explanation: No analyses have been done at the Theme level on tradeoffs across the programs involving cost, schedule, risk, and performance. Each program internally evaluates a wide range of alternative technologies and approaches for achieving long-term objectives.

Evidence: The NRC has reviewed the technical approaches and analyses of the MSM programs. The NRC made recommendations for changes that the programs are implementing. The NRC findings and recommendations are documented in their interim report.

2.RD1 If applicable, does the program assess and compare the potential benefits of efforts within the program to other efforts that have similar goals? Answer: YES Question Weight: 9%

Explanation: MSM evaluates a wide range of alternative technologies and approaches and compares these to other government and industry programs with similar goals.

Evidence: Many MSM activities involve collaborative research with DoD, NSF, other government agencies, and industry. These partnerships allow comparison and assessment of alternative approaches that maximize potential benefits.

2.RD2 Does the program use a prioritization process to guide budget requests and funding decisions? Answer: YES Question Weight: 9%

Explanation: The MSM Theme has a technology assessment process to identify and prioritize mission-enabling technologies and guide program investment decisions. The Technology Executive Board has identified high-priority technology areas for the MSM Theme to address, and the MSM Theme has used these priorities to select topics for new research announcements.

Evidence: The TEB has identified high-priority technology areas for the MSM Theme to address. These high-priority areas were used to formulate new projects in FY05, and to select the topics for NRAs issued in FY04.

Program Assessment Rating Tool (PART)

Program: Mission and Science Measurement Technology
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	
100%	91%	83%	54%	Moderately Effective

3.1 **Does the agency regularly collect timely and credible performance information, including information from key program partners, and use it to manage the program and improve performance?** Answer: YES Question Weight: 8%

Explanation: MSM programs collect technical accomplishments, schedule status, and financial status every month from key program partners. The programs use this information to develop risk mitigation strategies, adjust priorities, make resource allocations, or take other appropriate management actions.

Evidence: MSM projects report status quarterly to their respective NASA Center Program Management Councils. MSM Program Managers report monthly to the MSM Theme Director. The MSM Theme Director reports quarterly to the NASA Program Management Council. Monthly program status is tracked with the NASA ERASMUS database.

3.2 **Are Federal managers and program partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) held accountable for cost, schedule and performance results?** Answer: YES Question Weight: 8%

Explanation: All MSM program managers and partners (contractors, subcontractors, universities) are held accountable for their performance

Evidence: MSM programs are managed by NASA Headquarters. The program managers designate NASA Centers to manage projects within each program. The project managers are held accountable for the success of their respective projects. Project plans signed by the program manager, the project manager, and the director of the performing NASA Center are required every year. MSM programs conduct annual reviews of all tasks. Cost, schedule, and performance evaluations are used by program management to determine whether tasks are continued, modified, or terminated.

3.3 **Are funds (Federal and partners') obligated in a timely manner and spent for the intended purpose?** Answer: YES Question Weight: 8%

Explanation: MSM obligates its funding in a timely manner, and spends it for the purpose as appropriated by Congress.

Evidence: MSM has financial metrics imposed and enforced by NASA's Aerospace Technology Enterprise, which it routinely meets. These metrics are 100% Obligation by the end of the Fiscal Year, and 83% Costing by the end of the Fiscal Year. In addition, The Aerospace Technology Enterprise requires 100% costing by the end of each Calendar Year. Programs in non-compliance are adjusted downward during the next fiscal year to compensate. 100% of the MSM budget appropriated and authorized by the U. S. Congress is spent for its intended purpose. Agency-wide controls ensure that funds are spent for the intended purpose.

3.4 **Does the program have procedures (e.g. competitive sourcing/cost comparisons, IT improvements, appropriate incentives) to measure and achieve efficiencies and cost effectiveness in program execution?** Answer: NO Question Weight: 8%

Explanation: Although MSM has effective management procedures in place to ensure the efficient use of dollars spent on program execution, it does not track any overall efficiency metrics.

Evidence: MSM competes the majority of its work through two primary mechanisms. The first mechanism uses competitve NASA Research Announcements (NRAs) on a periodic basis to award research tasks in a highly competitve manner which includes cost and performance as metrics. The second mechanism uses competitve industry outsourcing contracts that provide performance-based onsite contractors to the various NASA Centers. These performance-based contracts are periodically recompeted in order to ensure cost effectiveness in performing the required work.

Program Assessment Rating Tool (PART)

Program: Mission and Science Measurement Technology
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	
100%	91%	83%	54%	Moderately Effective

3.5 Does the program collaborate and coordinate effectively with related programs? Answer: YES Question Weight: 8%

Explanation: MSM initiates the development of high-payoff crosscutting technologies and matures them to the laboratory proof-of-concept stage. The technologies are then transitioned into the focused technology development and validation programs of the NASA Enterprises for mission insertion. MSM works closely with these other NASA programs to insure that new technologies will be picked up and used by the Enterprises. Next year's PART will assess MSM's response to NRC recommendations that it improve the connectivity of its research with other research efforts within and outside of NASA.

Evidence: The Technology Executive Board (TEB) coordinates MSM programs with programs in other NASA Enterprises. MSM partners with Enterprise technology programs such as the Astrobiology Science and Technology Exploration Program, the Mars Technology Program, the In-Space Propulsion Program, the New Millennium Program, and the Instrument Incubator Program.

3.6 Does the program use strong financial management practices? Answer: YES Question Weight: 8%

Explanation: MSM uses effective financial management practices in administering program funds. MSM programs track monthly obligations and cost status against spending plans, and financial status is reported in monthly reviews to the NASA Program Management Council.

Evidence: NASA is in the process of installing an Integrated Financial Management (IFM) system to ensure strong financial management practices by all programs. Most of the NASA Centers, along with NASA HQ, have transitioned to the IFM System.

3.7 Has the program taken meaningful steps to address its management deficiencies? Answer: YES Question Weight: 8%

Explanation: MSM programs are responding to recommendations from a 2002-2003 review by the National Research Council (NRC). The NRC review identified areas in which MSM could improve its management practices and MSM has taken numerous steps to implement recommended improvements.

Evidence: To address the NRC recommendations, MSM is increasing external peer review of its programs, establishing clear metrics for each technology development task, implementing a technology assessment process to prioritize and guide investment decisions, increasing the percentage of high risk revolutionary technologies in its portfolio, and providing greater stability and continuity in its programs. The status of these recommended changes was reported to the NRC at a follow-up review in April 2003.

3.CA1 Is the program managed by maintaining clearly defined deliverables, capability/performance characteristics, and appropriate, credible cost and schedule goals? Answer: YES Question Weight: 8%

Explanation: MSM has clearly defined deliverables in terms of performance milestones with cost and schedule goals. Performance against these milestones is used to actively manage the program.

Evidence: The MSM IBPD establishes Theme and program-level deliverables, performance milestones, and cost and schedule goals. Project-level goals are established in the project plans. Performance against these milestones and goals are reported monthly, and records are maintained in the NASA ERASMUS database.

Program Assessment Rating Tool (PART)

Program: Mission and Science Measurement Technology
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	
100%	91%	83%	54%	Moderately Effective

3.CO1 **Are grants awarded based on a clear competitive process that includes a qualified assessment of merit?** Answer: YES Question Weight: 8%

Explanation: MSM programs allocate funding for exploratory research activities using broadly competitive solicitations that select performers based on an assessment of technical merit.

Evidence: MSM competes the majority of its work through two primary mechanisms. The first mechanism uses competitve NASA Research Announcements (NRAs) on a periodic basis to award research tasks in a highly competitve manner which includes cost, performance, and technical excellence as metrics. Approximately 50% of total funding is awarded through openly-competed peer-reviewed solicitations. The second mechanism uses competitve industry outsourcing contracts which provide performance-based onsite contractors to the various NASA Centers. These performance-based contracts are periodically recompeted in order to ensure cost effectiveness in performing the required work.

3.CO2 **Does the program have oversight practices that provide sufficient knowledge of grantee activities?** Answer: YES Question Weight: 8%

Explanation: MSM provides significant oversight of its grantees in order to track progress and to ensure continued relevance to program objectives.

Evidence: MSM selects external grants through competitive NASA Research Announcements (NRAs). Grantees are partnered with a NASA Center to provide oversight and to ensure that the work will be successfully infused into NASA applications. Annual status reviews and periodic site visits are conducted of grantee activities. Continued funding of multi-year activities is contingent upon good performance.

3.CO3 **Does the program collect grantee performance data on an annual basis and make it available to the public in a transparent and meaningful manner?** Answer: YES Question Weight: 8%

Explanation: MSM collects grantee performance data during annual reviews and makes that information available to the public through program research portfolio web sites.

Evidence: Performance data measured against proposed task plans are collected at least annually during sub-project workshops, and made available to the public through research portfolio web sites (e.g., http://is.arc.nasa.gov)

3.RD1 **For R&D programs other than competitive grants programs, does the program allocate funds and use management processes that maintain program quality?** Answer: NO Question Weight: 8%

Explanation: MSM's funding that is directed to NASA Centers is not generally allocated using a broadly competitive process based on merit and the program has no compelling justification for using other means to allocate the funding. MSM does conduct internal progress reviews and is externally reviewed by high-level expert groups. The MSM program is working to increase the percentage of research activities awarded through external peer review.

Evidence: MSM is externally reviewed for quality by the National Research Council (NRC), and the Aerospace Technology Advisory Committee (ATAC). Annual status reviews are conducted on all research activities. If adequate progress has not been demonstrated after 3 years, unpromising avenues of research are terminated and funding is reinvested in new activities. MSM programs are implementing NRC recommendations to make greater use of external peer review of research at NASA Centers.

Program Assessment Rating Tool (PART)

Program: Mission and Science Measurement Technology
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	
100%	91%	83%	54%	Moderately Effective

4.1 Has the program demonstrated adequate progress in achieving its long-term performance goals? Answer: LARGE EXTENT Question Weight: 20%

Explanation: MSM programs are on track to meet most of their long-range performance goals. Some goals may not be accomplished within the planned schedule due to unexpected technical difficulties that occaisionally arise in the course of pursuing the development of high-risk technologies.

Evidence: Progress toward achieving long-range goals is measured by accomplishment of Annual Performance Goals (APGs). MSM successfully achieves greater than 80 percent of its APGs.

4.2 Does the program (including program partners) achieve its annual performance goals? Answer: LARGE EXTENT Question Weight: 20%

Explanation: MSM successfully achieves greater than 80 percent of its annual performance goals. This is a high level of accomplishment for development of new high-risk technologies.

Evidence: MSM successfully achieved 21 of 25 GPRA indicators in FY02, or 84%. These results are documented in the 2002 NASA Performance Report.

4.3 Does the program demonstrate improved efficiencies or cost effectiveness in achieving program goals each year? Answer: NO Question Weight: 20%

Explanation: The MSM Program does not track any overall efficiency metrics.

Evidence:

4.4 Does the performance of this program compare favorably to other programs, including government, private, etc., with similar purpose and goals? Answer: NA Question Weight: 0%

Explanation: No comparable programs exist within NASA. Comparison with other government long-term technology development programs in the Department of Defense and the Department of Energy proved infeasible because of the differences in the program goals and structure.

Evidence:

4.5 Do independent evaluations of sufficient scope and quality indicate that the program is effective and achieving results? Answer: LARGE EXTENT Question Weight: 20%

Explanation: MSM programs are evaluated by the National Research Council (NRC) every 3 years, and by the Aerospace Technology Advisory Council (ATAC) every 6 months.

Evidence: Both the NRC and ATAC reviews indicated that MSM programs were effective, and made recommendations for improvement. These recommendations are being implemented, and status is reported back to the reviewing bodies. The interim report of the NRC review panel gave the MSM programs an overall grade of "B" for technical merit and effectiveness. This report is publicly available.

Program ID: 10001143

Program Assessment Rating Tool (PART)

Program: Mission and Science Measurement Technology
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	
100%	91%	83%	54%	Moderately Effective

4.CA1 **Were program goals achieved within budgeted costs and established schedules?** Answer: LARGE EXTENT Question Weight: 20%

Explanation: MSM achieves its program goals within budgeted costs and schedules to an extent that is appropriate for exploratory research and development of new ideas that may not always result in useful technology products.

Evidence: MSM typically successfully completes greater than 80 percent of its annual performance goals as documented in the NASA Performance Report. There are no cost overruns for MSM programs because unpromising avenues of research are terminated after 3 years if no progress has been demonstrated and the funding is reinvested in new activities.

PART Performance Measurements

Program: Mission and Science Measurement Technology

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Number of missions that use tools developed by Mission and Science Measurement Technology to understand and manage risk throughout their life cycle.

Additional Information: Risk profiles will serve as a starting point for generating risk exposure baselines for agency missions and support more sophisticated and comprehensive measures as they become feasible and mature

Year	Target	Actual	**Measure Term:**	Long-term
2010	2			

Measure: Number of distributed or collaborative applications impacting NASA Enterprises implemented on heteregenous computing and communications architectures.

Additional Information: Measure is cumulative.

Year	Target	Actual	**Measure Term:**	Annual
2004	1			
2005	3			

Measure: Number of key/new risk factors addressed in the conceptual designs of new Enterprise missions that to date have either been completely ommitted (such as organizational risk) or poorly represented (such as software risks).

Additional Information: Key risk factors are (1) human and organizational; (2) software; (3) system interfaces; (4) appropriate trade-space coverage; (5) seamless access to historical risk data

Year	Target	Actual	**Measure Term:**	Annual
2006	3			

Measure: Number of technologies co-funded by other NASA Enterprises for insertion into missions, or transitioned into Enterprise technology programs.[New measure]

Additional Information: Intent of this measure is to demonstrate program effectiveness

Year	Target	Actual	**Measure Term:**	Annual
2004	8			
2005	10			
2006	12			

PART Performance Measurements

Program: Mission and Science Measurement Technology

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Number of technologies co-funded by other NASA Enterprises for insertion into missions, or transitioned into Enterprise technology programs.[New measure]

Additional Information: Intent of this measure is to demonstrate program effectiveness

Year	Target	Actual	**Measure Term:**	Annual
2008	16			

Measure: Percentage of research funding subject to external peer review prior to award [New measure]

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual	(Efficiency Measure)
2004	45				
2005	50				
2006	55				

Measure: Number of technology assessments performed on Enterprise mission concepts

Additional Information: Technology assessments are used to identify and prioritize mission-enabling technologies, to establish system-level performance goals for each technology, and to guide program investment decisions. Measure is cumulative.

Year	Target	Actual	**Measure Term:**	Annual
2004	4			
2005	6			
2006	8			
2007	10			

PART Performance Measurements

Program: Mission and Science Measurement Technology

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Number of new scientific measurement capabilities demonstrated in a laboratory environment or test that have not been previously reported in peer-reviewed technical literature.

Additional Information: New measurement capabilities are scientific observations that are not currently achievable with state-of-the-art technologies. Measure is cumulative.

Year	Target	Actual	**Measure Term:** Annual
2004	3		
2005	4		
2006	5		
2007	6		

Measure: Number of automated reasoning, intelligent data understanding, or human centered computing technologies demonstrated in a test environment that is representative of an Enterprise mission application.

Additional Information: Demonstrations will be conducted in coordination with a customer Enterprise. Measure is cumulative.

Year	Target	Actual	**Measure Term:** Annual
2004	4		
2005	6		

Measure: Increased spacecraft data rate return for NASA missions.

Additional Information: Measure is maximum data rate demonstrated ready for flight applications. Demonstrations will be conducted in coordination with a customer Enterprise. In measures, G=Gbps, M=Mbps, E=near Earth, L = Lagrange points, D = Deep space (5 astronomical units).

Year	Target	Actual	**Measure Term:** Long-term
2004	1G @E; 1M @D		
2006	1 G @ L; 3 M @D		
2009	10 M @D		

PART Performance Measurements

Program: Mission and Science Measurement Technology

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Number of new bio, nano, or information technologies demonstrated in a test environment that is representative of an Enterprise mission application.

Additional Information: Demonstrations will be conducted in coordination with a customer Enterprise. Measure is cumulative.

Year	Target	Actual
2004	1	
2005	3	
2006	5	

Measure Term: Annual

Program Assessment Rating Tool (PART)

Program: Solar System Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

1.1 Is the program purpose clear? Answer: YES Question Weight: 20%

Explanation: The Solar System Exploration Program (SSE) has a discretely defined purpose that relates directly to the NASA vision and mission statements. Its goals and objectives are clear and unambiguous to all interested parties (Congress, the Administration and the public), and are linked to specific elements of both the Space Science Enterprise and the NASA Strategic Plans.

Evidence: SSE developed a Roadmap which describes the program's goals and objectives and their linkages to both Enterprise and Agency Strategic Plans. The SSE exploration strategy is defined by five program objectives. Each objective is the subject of several Research Focus Areas, representing key areas of scientific emphasis. Identified within each of these research focus areas are investigations that indicate the specific near-and mid-term scientific advances to be pursued. Finally, the specific missions that collect data for the investigations are identified. The Integrated Budget and Performance Document (IBPD) and the Space Science Enterprise Strategic Plan also provide clear rationales for the program.

1.2 Does the program address a specific and existing problem, interest or need? Answer: YES Question Weight: 20%

Explanation: SSE is a quest to explore the formation and evolution of our solar system and the Earth within it, seek the origins of life and its existence beyond Earth, and chart our destiny within the solar system. The SSE program will examine potentially habitable environments, search for life, and attempt to understand how solar system processes affect the future of Earth and humanity.

Evidence: The National Academy of Sciences reviewed the SSE Program as part of its Decadal Survey to help NASA prioritize solar system missions and science objectives for the next ten years. The SSE Roadmap was created to achieve the vision set out by the Decadal survey and reaffirmed the importance that the SSE has in understanding the formation and evolution of the Earth and its inhabitants as well as in the search for life beyond the confines of this planet. The Solar System Exploration Survey prepared by the Space Studies Board of the National Research Council further validates the need for an integrated solar system exploration strategy.

1.3 Is the program designed so that it is not redundant or duplicative of any other Federal, state, local or private effort? Answer: YES Question Weight: 20%

Explanation: While the National Science Foundation conducts astronomical studies of the solar system, its work is conducted from ground-based assets. Some universities also conduct limited studies of the solar system, including studies funded in part or in total by NASA. There are no other efforts by any federal, state, local or private entity in the U.S. of the magnitude and scope of NASA's SSE program. SSE is a unique, one-of-a-kind program that seeks to achieve both near and long-term science goals by studying solar system objects and phenomena in situ.

Evidence: The SSE program utilizes multiple space missions to collect a broad spectrum of scientific data. SSE also pursues and develops both enabling and enhancing technologies to provide new capabilities to collect data and achieve unique scientific advances. No other program directed at solar system exploration supports such a broad panoply of published goals and objectives.

Program: Solar System Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

1.4 Is the program design free of major flaws that would limit the program's effectiveness or efficiency? Answer: YES Question Weight: 20%

Explanation: The scientific design of the SSE program and its ability to effectively and efficiently achieve its goals has been optimized by considering and incorporating the advice and counsel of a broad community of experts who have been intimately involved for a number of years. These experts are from NASA and other federal agencies, universities, industry and our International partners. SSE strategies, missions and objectives are also reviewed and prioritized by the National Academy of Sciences, NASA advisory committees, and the Solar System Exploration Subcommittee. The hardware/ software development part of the program is subjected to a series of formal design reviews to ensure that the "design-to," "build-to," and "as-built" baseline requirements are properly established and met. In addition, lessons-learned workshops are conducted to prevent any previous mistakes from being repeated.

Evidence: The SSE Roadmap, which lays out direction for ten years, results from optimization to ensure the program's optimal design. The science community advises to ensure use of efficient and effective approaches to achieve program goals. The Roadmap is updated to reflect discoveries, lessons learned, or changes in the Space Science Enterprise Strategic Plan. Incorporated into hardware/software development are Preliminary Design Review (PDR), Critical Design Review (CDR) & Design Certification Review (DCR). Contractor & NASA personnel verify the "design-to" baseline meets requirements, the detailed design is suitable, the "build-to" baseline is established, and each "as-built" system satisfies final performance requirements. Confirmation review is conducted between PDR and CDR & identifies schedule & cost risk, determines their manageability w/in limits of program reserves, & informs commitment to continue program funding. This review ensures the most effective management approach is used. The PI approach--preferable for simple, low-cost missions--isnt used for expensive, extended-development programs.

1.5 Is the program effectively targeted, so that resources will reach intended beneficiaries and/or otherwise address the program's purpose directly? Answer: YES Question Weight: 20%

Explanation: The rigor with which the SSE program is designed, structured, managed and funded ensures that resources will reach only the intended beneficiaries and will address the program's purpose directly. The five science objectives outlined in the SSE Roadmap guide the activities of the SSE and provide the context through which specific research objectives are formulated, science investigations are defined, and missions that address them are planned. Missions are broken down into discrete work breakdown structure-style activities, and funds are issued at the mission level and below. These funds may not be spent on anything other than the purpose for which they were issued.

Evidence: The scientific purpose of each mission is well documented (see the IBPD and the Strategic Plan) and is linked to specific Enterprise and Agency goals and objectives. Funds are issued to the appropriate entity at the mission level or below. Above a certain level, Federal law prohibits the redirection of resources issued for one program to another program without express Congressional approval. In addition, the Agency has adopted a full cost management system, which instills addtional rigor in properly targeting and managing its funds. Finally, a revised financial system and a new computer tracking system will enable all Agency programs to ensure that each program dollar is properly directed and expended.

2.1 Does the program have a limited number of specific long-term performance measures that focus on outcomes and meaningfully reflect the purpose of the program? Answer: YES Question Weight: 10%

Explanation: SSE long-term PART measures focus on outcomes and meaningfully reflect the program's purpose.

Evidence: SSE has seven specific long-term performance measures. Five are outcome measures, one of which addresses program management while the other four address scientific outcomes, the purpose of SSE. Two of the performance measures are outputs, and they address accomplishment of key project milestones and technological activities.

Program: Solar System Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

2.2 Does the program have ambitious targets and timeframes for its long-term measures? Answer: YES Question Weight: 10%

Explanation: SSE has ambitious targets and timeframes for its long-term measures.

Evidence: SSE's scientific measures aim for an annual rating of "green," signifying excellent progress, by an external advisory committee. These measures will be assessed for the program's duration. SSE's program management long-term measure aims for 100% compliance with NASA's management guidelines and will also be assessed for the program's duration. The development and technology milestone measures include a series of annual targets the program is expected to meet each year.

2.3 Does the program have a limited number of specific annual performance measures that can demonstrate progress toward achieving the program's long-term goals? Answer: YES Question Weight: 10%

Explanation: SSE has specfic annual performance measures that demonstrate progress toward achieving the program's long-term goals.

Evidence: SSE's annual performance measures support and indicate progress toward addressing its seven long-term measures. Each of the long-term science measures is supported by annual measures that address various facets of the scientific questions encapsulated in the long-term measures. The program management long-term measure is supported by three annual measures that serve as indicators of effective program management: adherence to baseline cost, baseline schedule, and a competitive awards regime.

2.4 Does the program have baselines and ambitious targets for its annual measures? Answer: YES Question Weight: 10%

Explanation: SSE has baselines and ambitious targets for its annual measures.

Evidence: The program management annual measures have targets intended to note whether costs and schedule are followed closely and the majority of project funds are competed. The scientific annual measures all aim for ratings of "green," signifying excellent progress, by an external advisory committee.

2.5 Do all partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) commit to and work toward the annual and/or long-term goals of the program? Answer: YES Question Weight: 10%

Explanation: SSE partners (NASA Centers, JPL, contractors, universities, International organizations and other Federal agencies) are directly involved in planning and establishing the program's goals and objectives. Consequently, they fully support and are committed to the achievement of both the annual and the long-term goals of the program. Both regularly scheduled and ad hoc reviews provide management insight into whether SSE partners are adhering to and supporting the program's goals and objectives. Partners who fail to exhibit proper support can be terminated from the program.

Evidence: SSE goals are made clear to partners. Partners are involved in establishing goals and objectives and therefore understand them from the start. SSE missions document their goals, objectives, technical deliverables and data drops in program plans and commitments, signed agreements between NASA HQ and the lead NASA center. These documents are available to all partners. SSE uses instruments available to government agencies to enter agreements with other entities to obtain commitments to working toward and reporting on progress in achieving the annual and/or long-term goals of the program. Letters of Agreement and Memoranda of Understanding have been signed with major international partners and other Federal agencies. Contracts and grants with industry and universities have been signed, and task-level agreements between SSE and JPL and other NASA centers have also been reached. SSE conducts award fee reviews, mid-year performance reviews and ad hoc reviews to determine and verify partner commitment. Independent contract and programmatic reviews are conducted routinely.

Program Assessment Rating Tool (PART)

Program: Solar System Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

2.6 **Are independent evaluations of sufficient scope and quality conducted on a regular basis or as needed to support program improvements and evaluate effectiveness and relevance to the problem, interest, or need?**

Answer: YES Question Weight: 10%

Explanation: The SSE's effectiveness and program relevance are subjected to regular reviews and evaluations by the National Academy of Sciences, NASA advisory committees and the Solar System Exploration Subcommittee. Annual performance toward achieving stated outcomes is both determined and validated by annual external reviews. In addition, every three years, a broad community of experts from NASA, other federal agencies, universities, industry and international partners evaluates SSE and offers strategic advice and counsel that leads to a revision of the Space Science Enterprise Strategic Plan.

Evidence: The National Academy of Sciences reviewed the SSE Program as part of its Decadal Survey to help NASA prioritize missions and science objectives for the next ten years. The SSE Roadmap was created to lay out an effective path to achieve the vision set forth in the Decadal Survey. Independent external reviews by the NASA Advisory Council (NAC) are conducted annually to evaluate progress toward meeting scientific outcomes. The latest findings are found in the FY2002 Performance and Accountability Report. In addition, the NAC, the SScAC and the SSE Subcommittee meet three times per year to conduct reviews of science and program implementation strategies. Finally, every three years, the major reviews and contributions by a broad community of experts lead to the revision and publication of the Space Science Enterprise Strategic Plan. This plan incorporates any and all SSE program improvements, enhancements and changes in strategy.

2.7 **Are Budget requests explicitly tied to accomplishment of the annual and long-term performance goals, and are the resource needs presented in a complete and transparent manner in the program's budget?**

Answer: YES Question Weight: 10%

Explanation: SSE long-term performance goals reflect the cumulative effect of annual activities. The degree to which these outcomes are realized is dependent upon the degree to which the annual performance goals are achieved. This assessment is validated by external reviews. SSE goals and objectives are directly linked to specific missions. Budget requests for each mission are dependent upon the successful completion of the current year's planned activities and the future requirements. The life-cycle cost requirements for each mission, now stated in full cost mode, are included in an integrated budget and performance document.

Evidence: SSE long-term performance goals are directly linked to both Enterprise and Agency strategic goals and objectives (see Space Science Enterprise and Agency Strategic Plans). In addition, the SSE Roadmap tracks objectives down to specific missions. Budget requests for each mission are derived from assessments of annual performance and estimates of resources required to complete the mission. The resource requirements are clearly stated, and are now stated in full cost mode. The Integrated Budget and Performance Document displays important status data for each mission, lists the budget requirements for life-cycle cost, and identifies the specific long-term outcomes and annual performance goals supported by that mission.

Program: Solar System Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

2.8 Has the program taken meaningful steps to correct its strategic planning deficiencies? Answer: YES Question Weight: 10%

Explanation: The SSE program regularly reviews its strategic planning and utilizes a number of different mechanisms to determine and correct any deficiencies.

Evidence: Experts review SSE's progress, leading to revision every three years of the Space Science Enterprise Strategic Plan, which the National Academy of Sciences then reviews. SSE strategies, missions, and objectives are also reviewed by the Space Science Advisory Committee and SSE Subcommittee. Changes in strategic planning are incorporated into the SSE Roadmap and Integrated Budget and Performance Document. Recently, the Space Science Enterprise, including SSE, reviewed risk mitigation and cost reduction strategies to determine whether and where to make strategic changes. It was decided to extend mission phases A & B to retire technical risk. By allowing long-pole technology to mature before incorporating it into a project, risk is reduced and cost growth avoided. Extension of phase A allows a project to carry multiple contractors for longer, resulting in a clear design winner among competitors or more mature design options. A cancellation review of Deep Impact led to a requirement that all projects have unencumbered reserves at least equal to 25% of estimated phase C/D costs before being implemented.

2.CA1 Has the agency/program conducted a recent, meaningful, credible analysis of alternatives that includes trade-offs between cost, schedule, risk, and performance goals and used the results to guide the resulting activity? Answer: YES Question Weight: 10%

Explanation: When a program/project is formulated, its concepts, technology requirements, operations concepts, internal management controls, budget and institutional requirements are evaluated by independent bodies. During this period of formulation, design trade studies are conducted in order to reconcile trade-offs between competing performance factors. Programs/projects are subjected to independent reviews throughout their life-cycle to evaluate their ability to meet commitments. Included in these reviews are recommendations for proceeding with, modifying or terminating the program or project, or for enhancing overall technical and programmatic performance.

Evidence: On October 10, 2002, the Deep Impact Termination Review was conducted (see NASA Office of Space Science report of same name) because the approved cost cap was going to be violated. Project cost, schedule, technical, risk and performance goals were examined. On November 13, 2002, the Deep Impact Project Report to OSS was presented. Continuation of the project would be based on project performance and completion of the following changes: a new JPL Deep Impact Project Manager; a realistic project schedule and budget leading to a launch that meets all science objectives within the cost cap; a weekly review board to evaluate problems and progress; a review of manpower and accomplishments; and the renegotiation of the Ball award fee agreement with, at a minimum, a letter of intent signed by the management at the University of Maryland, Ball and JPL. Since some issues had not been completely addressed and some new ones arose, a follow-up termination review was held February 21, 2003 (see Deep Impact Project Delayed Launch Plan Presentation to NASA HQ). The result was a one-year delay and numerous changes.

2.RD1 If applicable, does the program assess and compare the potential benefits of efforts within the program to other efforts that have similar goals? Answer: NA Question Weight: 0%

Explanation: This question is not applicable for basic research programs.

Evidence:

Program Assessment Rating Tool (PART)

Program: Solar System Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

2.RD2 **Does the program use a prioritization process to guide budget requests and funding decisions?** Answer: YES Question Weight: 10%

Explanation: The SSE program is completely integrated with the Agency and Enterprise goals and objectives. Independent outside organizations review the program and help set scientific priorities in line with these goals and objectives. These scientific priorities are then matched to research focus areas, which represent key areas of scientific emphasis. Within each research focus area are investigations that indicate the specific scientific advances to be pursued in the near- and mid-term. The investigations form the framework for identification of specific missions. Estimates of the costs of these missions are then used to guide budget requests and funding decisions. Repeated management and scientific peer reviews ensure that each mission provides data in a cost effective manner.

Evidence: The National Academy of Sciences reviewed SSE as part of its Decadal Study to help NASA prioritize missions and science objectives for the next ten years. The SSE Roadmap links objectives to specific missions. Mission life cycle costs form the basis for budget requests and funding decisions. Independent and NASA reviews of prioritized science outcomes ensure priorities are assigned to budget requests and funding decisions. The May 29, 2003, Space Studies Board (SSB) letter review of the 2003 Space Science Enterprise Strategy discusses responses to previous SSB advice by indicating that for SSE, the linkage between proposed programs and SSB recommendations was clear. In order to enable future outer planet exploration, SSE's Project Prometheus is following SSB's recommendations by reinvigorating the radioisotope thermal generator program and developing advanced nuclear electric power and propulsion. Comporting with the Decadal Survey, overall SSE R&A funding is near 25% of the overall flight mission budget and is projected to stay at this level for the next several years.

3.1 **Does the agency regularly collect timely and credible performance information, including information from key program partners, and use it to manage the program and improve performance?** Answer: YES Question Weight: 8%

Explanation: The SSE program collects relevant technical and programmatic performance data on a monthly basis. This information is used to assess monthly progress, annual progress toward meeting long-range outcomes, and can be used to develop risk mitigation strategies, adjust priorities, or make additional resource allocations.

Evidence: The Space Science Enterprise conducts monthly reviews to gather performance data. All programs over a certain monetary size are required to employ a contractor-owned, Agency-approved earned value system; NASA analysts study the results. Independent groups annually review SSE's progress toward achieving long-range performance outcomes. NASA has initiated full cost management and an integrated financial management system to conduct financial affairs with a greater degree of precision and performance. Performance data collected on Deep Impact indicated the project was going to exceed the cost cap. Two termination reviews were held. SSE and the Space Science Enterprise learned a lesson that led to a new requirement for future missions: Deep Impact had been confirmed for implementation in May 2001 with inadequate unencumbered reserves. OSS will not repeat that mistake in future mission selections nor will any mission now in the study phase without significant unencumbered reserves totaling 25% of Phase C/D be confirmed for implementation.

Program: Solar System Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

3.2 Are Federal managers and program partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) held accountable for cost, schedule and performance results?

Answer: YES Question Weight: 8%

Explanation: Federal managers and program partners are held accountable for cost, schedule and performance results through a series of formal procedures and requirements. Federal managers who fail to demonstrate the required level of performance are subject to a variety of disciplinary actions, including reassignment or termination. Partners who likewise fail to demonstrate the required level of performance may find their level of participation in the program either diminished or terminated.

Evidence: Every manager is required to develop a formal personal performance plan with his or her supervisor. This plan consists entirely of critical elements, at least one of which must be linked to the Agency's Strategic Plan or the organization's operating plan or goals. Although the program's performance may be evaluated on a more frequent basis, the program manager's performance is formally evaluated twice yearly. Bonuses and promotions are dependent upon the manager making positive progress toward meeting the goals of the program. Should he or she fail to do so, corrective actions ranging from counseling, reassignment or, in extreme cases, termination may result. Partners who fail to perform as required may likewise find their participation reduced or terminated.

3.3 Are funds (Federal and partners') obligated in a timely manner and spent for the intended purpose?

Answer: YES Question Weight: 8%

Explanation: Annual NASA R&D funds are available for obligation for two years and are fully obligated by the end of the period. Operating plans for the program year are submitted to Congress and revised as needed over the two year time period. Internally, obligation and cost plans are developed, compared to actual spending, and reviewed monthly by all levels of the program. The NASA Procurement Management System is the primary system used to provide monthly reporting of all obligations and costs. These are tracked against unique project numbers (UPNs) traceable to contractor and institutional source documents. Contractor and government accounting systems are audited periodically to ensure compliance with government standards.

Evidence: The percent of FY02 SSE funds obligated by the end of FY02 varies by UPN, but ranges from a high of 99.7% to a low of 71.3%. Most UPNs are in the mid to upper 90% range. Only three UPNs have obligation rates in the 70% range, and these are primarily grants-related UPNs. Grants programs typically maintain a larger uncosted and/or unobligated carryover into the next year in order to guard against the likelihood of a continuing resolution. Federal laws prohibit the expenditure of funds for any purpose other than that intended and authorized. Specific reports that record and track the obligation and expenditure of program funds are as follows: NASA monthly FACS report, contractor monthly and quarterly 533 reports, SF133 reports on budget execution and budgetary resources, FMS2108 year-end closing statement, and the annual Performance and Accountability Report.

Program: Solar System Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

3.4 **Does the program have procedures (e.g. competitive sourcing/cost comparisons, IT improvements, appropriate incentives) to measure and achieve efficiencies and cost effectiveness in program execution?** Answer: YES Question Weight: 8%

Explanation: The SSE program has adopted effective management procedures to ensure that the program is executed in a cost effective and efficient manner. Failure to do so can lead to significant consequences.

Evidence: SSE follows Agency and Enterprise policies that incentivize competitive outsourcing, use best value procurement practices, and employ performance and productivity improvements. IT and improvements are used to improve data flow and make information more accessible. Full cost management will provide SSE with a better understanding of overhead costs. These actions focus on maximizing cost effectiveness of SSE's design and execution. Contractors are motivated to achieve cost effectiveness and efficiency via fee review. Panels review contractor performance progress and assign it a grade, which determines how much fee the contractor will earn for that review period. A projected cost growth of 15%+ triggers automatic review by senior management. Outcomes of past reviews have been program delay, redirection, or cancellation. All SSE projects must meet uniform efficiency measures: each SSE development project must complete its current phase within 10% of total life-cycle cost; each SSE research project must allocate 75% of funding competitively; all missions must be completed w/in 10% of baseline schedule.

3.5 **Does the program collaborate and coordinate effectively with related programs?** Answer: YES Question Weight: 8%

Explanation: The SSE collaborates and cooperates, where reasonable and practicable, with other NASA programs and/or Federal agencies where shared or similar goals and objectives might permit a more efficient use of resources while increasing the scientific and/or technological return. In addition, NASA maintains a willingness to collaborate with other nations in exploring the solar system where there is evidence of a genuine intersection of interests.

Evidence: SSE coordinates and collaborates with NASA's Aerospace Technology Enterprise to facilitate enabling and enhancing technology maturation and infusion. SSE continues to work closely with the Office of Space Flight to ensure the availability of launch services. SSE also maintains an ongoing collaborative relationship with various international partners at the program and project level for planning and coordination. SSE has a new collaborative effort with the Department of Energy and the Glenn Research Center in support of Project Prometheus. The two primary near-term objectives of Prometheus are the development of a new, more efficient radioisotope power system to provide spacecraft power for both surface and deep space missions, and the development of a compact fission reactor to provide up to 100 KW of power to support nuclear electric propulsion. The Jupiter Icy Moons Orbiter (JIMO) will be the first flight mission to utilize Project Prometheus nuclear power and electric propulsion technologies.

3.6 **Does the program use strong financial management practices?** Answer: YES Question Weight: 8%

Explanation: Most of the SSE program has historically operated under a full cost management philosophy. The remainder of the program, along with the rest of NASA, is now making the transition to full cost. Under full cost, service pool and G&A costs are managed and allocated in appropriate amounts to the direct costs of the programs they support. This assures that the full cost of a program is actively managed, rather than just the direct costs. SSE is also now utilizing some very powerful computer-based tools, as part of the Integrated Financial Management System, to enhance its financial management practices.

Evidence: Since JPL manages approximately two-thirds of the SSE programs (historically, as much as 80%), most of the SSE has already been operating in a full cost management mode. The remainder of the program is transitioning to full cost management. In addition, a very powerful computer-based tool now supports the Integrated Financial Management System, greatly enhancing its ability to track, integrate and account for all costs and financial resources.

Program: Solar System Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

3.7 Has the program taken meaningful steps to address its management deficiencies? Answer: YES Question Weight: 8%

Explanation: The Space Science Enterprise, under which the SSE is managed, has a well-structured process in place to conduct both monthly and annual performance reviews. Any management deficiences that are uncovered during these reviews are noted and subsequently remedied. In addition, lessons learned workshops are conducted in order to prevent the recurrence of errors in the program. The SSE Director also has frequent contact with directors of implementing organizations for SSE projects to discuss and mitigate any management deficiencies. Finally, there is a long tradition of inviting independent bodies to come in and review programs for various deficiencies, including management, and propose solutions to any problems that may have been detected.

Evidence: Routine program reviews led to the determination that the Deep Impact Project could not complete its mission on schedule without exceeding the approved cost cap (see 2CA1 and 3.1 for more details). Two termination reviews were held, resulting in a number of programmatic changes. A significant number of management changes also resulted. A new JPL Project Manager was selected and appointed, and a new business manager was brought in. The project manager was inserted as the Contract Technical Manager for the contractor, and a JPL technical representative was made resident at the contractor. A weekly review board was established, some reorganization occurred, and personnel changes were made. The contractor's award fee agreement was re-negotiated and criteria were revised. Finally, a new requirement regarding the amount of unencumbered reserves all projects must have (25% of Phase C/D) before being confirmed for implementation was established.

3.CA1 Is the program managed by maintaining clearly defined deliverables, capability/performance characteristics, and appropriate, credible cost and schedule goals? Answer: YES Question Weight: 8%

Explanation: The SSE science community defines and prioritizes science objectives for a new project, and these objectives form the basis for a NASA Announcement of Opportunity for science investigations for the missions. Investigations are selected that correspond to the technology readiness, cost, schedule and prioritized science for the mission. During the more traditional hardware development and launch phases, an SSE program will develop and maintain a clearly defined list of deliverables, along with the required performance characteristics, costs and schedule goals. Progress is measured by traditional methods such as earned value, schedule accomplishment and independent assessment in order to determine whether the limited window for launch can be met, and whether the cost is exceeding predetermined limits.

Evidence: The SSE program often has very limited launch windows, or windows that may not reappear for years, if at all. In order to meet those launch windows, a clearly defined list of hardware and software deliverables, along with required performance characteristics and costs and schedule must be developed, documented, maintained and managed. Documentation includes the PCA (Program Commitment Agreement), the program plans, and the project plans. The program manages carefully to the information contained within these documents, because allowing requirements creep and schedule slip might prove disasterous to the program's ability to launch. There is also usually a hardware delete list in case the program has been spending too much money or has been losing schedule and must take an action to get back on schedule and budget. Any indications that the program may exceed total life cycle costs by 15% is automatic grounds for cancellation consideration.

Program Assessment Rating Tool (PART)

Program: Solar System Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

3.CO1 **Are grants awarded based on a clear competitive process that includes a qualified assessment of merit?** Answer: YES Question Weight: 8%

Explanation: NASA awards 100% of its grants according to a rigorous and well-defined system of competition and reviews that ensures that only the most meritorious proposals are selected for award.

Evidence: All grants selected for funding by the Space Science Enterprise, including the SSE theme, are broadly competed through the NASA Research Announcement process. Grant proposals must relate directly to both Agency and Enterprise goals and objectives. All proposals are peer-reviewed by a mix of scentific disciplines and are selected on merit. NASA also utilizes an electronic mailing list as part of its outreach efforts. This mailing list includes virtually the entire population of those who might wish to participate in the grant process.

3.CO2 **Does the program have oversight practices that provide sufficient knowledge of grantee activities?** Answer: YES Question Weight: 8%

Explanation: NASA has an oversight practice that provides sufficient insight into and knowledge of grantees activities.

Evidence: Discipline scientists take the results of the grant peer reviews and make selections as to whom grants are awarded. These scientists then monitor the progress of the grant toward meeting its stated goals for the duration. Formal annual reports are provided by the grantee, and expenditures are tracked at a cumulative level. This gives the discipline scientists who work with the project sufficient insight into the performance of the grantee to understand what the grantees do with the resources that are allocated to them. The formal annual reports are the primary method through which oversight and management control are exerted on the grantees. There are simply too many grants and too few monitors to permit in-depth reviews at more frequent intervals. However, because of the relative paucity of grant money when compared to the number of potential grantees, there is little reluctance to cancel a grant because of poor performance and subsequently award the money to someone else.

3.CO3 **Does the program collect grantee performance data on an annual basis and make it available to the public in a transparent and meaningful manner?** Answer: YES Question Weight: 8%

Explanation: NASA collects grantee performance data and makes it available to the public in a manner that is both useful and meaningful.

Evidence: Formal progress reports, which are a required output of each research and analysis activity funded under the SSE, are submitted on an annual basis. The NASA lead scientist, together with appropriate discipline scientists review the progress reports before recommending continuation of the research activity or not to the procurement officers before funding is released to the grantees. The results of grants-based research are broadly disseminated to the public through the use of science forums, publications, NASA press releases and news conferences, museum displays, educational materials, and NASA's web site. NASA is currently working to develop an evolving database that will post grantees annual reports on the Internet. The database is scheduled to become available to the public by calendar year 2004. In addition, some of the highlights from the grantee annual reports are published in the "Space Science: Supporting Research and Technology (SR&T) Program Highlight" brochure.

Program Assessment Rating Tool (PART)

Program: Solar System Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

3.RD1 **For R&D programs other than competitive grants programs, does the program allocate funds and use management processes that maintain program quality?** Answer: YES Question Weight: 8%

Explanation: The current SSE missions, either planned or ongoing, are competed and peer reviewed. In addition, the Space Science Enterprise, under which the SSE is managed, has made a major philosophical change in the manner in which the early stages of its R&D programs are both structured and funded. This change was made in order to eliminate a great deal of technology-related risk before proceeding with development. This results in a higher quality program and avoids extra costs related to late detection of design defects, or the costs related to a failed mission. The program is managed as per NPG 7120.5B, NASA Program and Project Management Processes and Requirements. Included in the development process are a series of reviews which serve to demonstrate that the "design-to," "build-to" and "as-built" baseline requirements are properly established and met. Verification methods include test, analysis, demonstration and inspection.

Evidence: The Discovery Projects, the major source of planned or ongoing mid-sized SSE missions, begin as announcements of opportunity and are 100% competed and peer-reviewed. Once these projects are awarded and begin definition, they are subjected to extended Phase A and B stages in order to retire technical risk and ensure program quality before going into full development. Long-pole technology is allowed to mature off-line before being incorporated. Extending a program at its earlier stages in order to reduce technological risk results in higher program quality and keeps costs down by keeping immature (risky) hardware out of final integration. Design defects are less costly to correct if detected during the early design phase. During development, review boards comprising contractor and NASA personnel conduct Preliminary Design Review (PDR), Critical Design Review (CDR), and Design Certification Review (DCR). This verifies that the "design-to" baseline is established and meets requirements, the detailed design is suitable and the "build-to" baseline is established, and each "as-built" system satisfies the final performance requirements.

4.1 **Has the program demonstrated adequate progress in achieving its long-term performance goals?** Answer: YES Question Weight: 20%

Explanation: The majority of SSE's long-term PART measures are new this year; moreover, most of them will be works in progress for the duration of the program's existence. Nonetheless, SSE has made significant progress towards addressing its long-term scientific, program management, development and technology goals.

Evidence: SSE has made significant progress towards addressing its long-term goals. NASA's FY02 Performance and Accountability Report indicates that the Space Science Enterprise, of which the SSE is a significant part, achieved 100% of its GPRA annual performance goals. The SSE's long-term performance goals or outcomes are linked to those of the Enterprise and contribute considerably to their achievement. Since the long-term performance goals reflect the cumulative effect of annual activities, and the degree to which long-term performance measures are being achieved is determined by the degree to which annual performance goals are being met, the SSE can be said to have demonstrated significant progress toward achieving its long-term performance goals. SSE missions have produced outstanding scientific results.

Program Assessment Rating Tool (PART)

Program: Solar System Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

4.2 Does the program (including program partners) achieve its annual performance goals? Answer: LARGE EXTENT Question Weight: 20%

Explanation: The program has achieved its performance goals consistent with its annual performance goals.

Evidence: SSE has achieved its annual performance goals to a large extent. NASA's FY02 Performance and Accountability Report indicates the Space Science Enterprise, of which SSE is part, achieved 100% of its GPRA annual performance goals. SSE annual performance goals are linked to the Enterprise's strategic goals and objectives and contribute significantly to their achievement. The Enterprise's 100% achievement of annual performance goals includes SSE's achievement of its annual performance goals. SSE projects in development are averaging a 9% cumulative and 0% FY2003 overrun over basline life cycle cost. SSE missions have produced outstanding scientific results.

4.3 Does the program demonstrate improved efficiencies or cost effectiveness in achieving program goals each year? Answer: LARGE EXTENT Question Weight: 20%

Explanation: The SSE does demonstrate, to a large extent, improved efficiencies or cost effectiveness in achieving program goals each year. However, there are practical limits to what can be achieved.

Evidence: The SSE program does not engage in repetitive activities. Most potential savings are in the mission development phase, as opposed to mission operations. Each development program is unique, as are the supported space science investigations. Our merit-based peer reviews consider the amount of "science per dollar" that proposals offer. We might make selections based on "bang for the buck." However, there may be a proposal that is very costly, but because of the particular science it offers, is likewise selected for development. SSE tries to restrain unwarranted growth in cost and schedule by additional testing, extending initial Phase A and B development, and maturing critical technology off-line until it reaches a mission-acceptable level. This might cost more up front, but it saves the expenditure of larger amounts later on in the development cycle. All SSE projects are required to meet some uniform efficiency measures: each SSE development project should complete its current phase within 10% of the total life-cycle cost and 10% of baseline schedule, while SSE research projects are to allocate 75% of their funding competitively.

4.4 Does the performance of this program compare favorably to other programs, including government, private, etc., with similar purpose and goals? Answer: NA Question Weight: 0%

Explanation: There are no other programs, either government or private, with similar purpose and goals and of similar size and scope, with which to compare the SSE program.

Evidence:

Program Assessment Rating Tool (PART)

Program: Solar System Exploration
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Research and Development

Section Scores				Overall Rating
1	2	3	4	Effective
100%	100%	100%	74%	

4.5 **Do independent evaluations of sufficient scope and quality indicate that the program is effective and achieving results?** Answer: LARGE EXTENT Question Weight: 20%

Explanation: Independent evaluations of the SSE program conducted by the National Academy of Sciences and the NASA Advisory Council confirm that the program is being managed effectively and is achieving anticipated results.

Evidence: The National Academy of Sciences (NAS), as part of its decadal survey, reviewed the SSE program, evaluated progress to date, and helped NASA prioritize missions and science objectives for the next ten years. Subsequently, the SSE Roadmap was created to achieve the vision set out by the decadal survey. NAS reviews and strategic advice were also incorporated into the latest Space Science Enterprise Strategic Plan. The NASA Advisory Council (NAC) conducted independent reviews of the annual performance goals and confirmed that the Space Science Enterprise, of which the SSE program is a major constituent, achieved 100% of its annual performance goals. The NAC, the SScAC and the SSE subcommittee are each scheduled to review SSE science and program implementation strategy three times per year. With SScAC's annual review of the GPRA report, NAS input into Strategic Plan revisions every three years, the NAC's review of annual performance, and ad hoc reviews by other independent bodies, the effectiveness of every aspect of the SSE program is regularly reviewed.

4.CA1 **Were program goals achieved within budgeted costs and established schedules?** Answer: LARGE EXTENT Question Weight: 20%

Explanation: SSE program goals were largely achieved within budget costs and established schedules. One U.S. mission experienced some difficulty which led to a schedule slip. Several International missions for which the U.S. is a contributor rather than responsible for development were either slipped or cancelled due to problems not under our control or origin.

Evidence: The SSE program was successful to a large extent in staying within its budget and established schedules. Due to unforeseen technical problems, the launch of the Deep Impact mission was delayed approximately one year. The other SSE missions were essentially on budget and on schedule. There are a number of international missions for which we provide either instruments or science support but do not have developmental responsibility. Of these, Muses-C (Japan) experienced a later than planned launch, Rosetta (ESA) was indefinitely delayed, and Netlander (France) was cancelled. The data that the SSE would normally collect from these international missions goes primarily to science teams and guest investigators. The failure to collect these data due to a cancelled or delayed mission will not materially effect the ability of the SSE program to attain either its annual performance goals or its long-term outcomes.

PART Performance Measurements

Program: Solar System Exploration

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Compliance with NASA Procedures and Guidelines (NPG) 7120.5B

Additional Information: This measure tracks NASA's performance in managing SSE in accordance with Agency implementing strategies.

Year	Target	Actual	**Measure Term:**	Long-term	(Efficiency Measure)
Ongoing	1				

Measure: Progress in understanding why the terrestrial planets are so different from one another

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green			

Measure: Cumulative and annual percentage baseline cost overrun on spacecraft under development (*** On average, SSE projects in development will not exceed their baseline costs by more than 10% cumulatively or 5% annually.)

Additional Information: On average, SSE projects in development will not exceed their baseline costs by more than 10% cumulatively or 5% annually.

Year	Target	Actual	**Measure Term:**	Annual	(Efficiency Measure)
2003	<10%, <5%***	9%, 0%			
2004	<10%, <5%***				

Measure: Percentage of budget allocated through open, peer-reviewed competition

Additional Information: On average, SSE will allocate the targeted level of funding competitively.

Year	Target	Actual	**Measure Term:**	Annual	(Efficiency Measure)
2003	>75%	0.73			
2004	>75%				

PART Performance Measurements

Program: Solar System Exploration

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Cumulative and annual percentage schedule slip on spacecraft under development

Additional Information: On average, SSE projects in development will not slip from their baseline schedules by more than 10% cumulatively or 5% annually.

Year	Target	Actual	**Measure Term:**	Annual	(Efficiency Measure)
2003	<10%, <5%	16%, 0%			
2004	<10%, <5%				

Measure: Progress in learning what our solar system can tell us about extra-solar planetary systems

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green			

Measure: Progress in determining the characteristics of the solar system that led to the origin of life

Additional Information:

Year	Target	Actual	**Measure Term:**	Long-term
Ongoing	Green			

Measure: Progress in determining the nature, history and distribution of volatile and organic compounds in the solar system

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green			

Measure: Progress in identifying the habitable zones in the solar system

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green			

PART Performance Measurements

Program: Solar System Exploration

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Progress in understanding how life begins and evolves

Additional Information:

Year	Target	Actual	**Measure Term:**	Long-term
Ongoing	Green			

Measure: Progress in identifying the sources of simple chemicals that contribute to prebiotic evolution and the emergence of life

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green			

Measure: Accomplishment of key development activities: Successfully launch MESSENGER; Deliver the Deep Impact spacecraft for environmental testing; Successfully complete the New Horizons/Pluto Critical Design Review (* NASA will successfully accomplish the stated activities.)

Additional Information: * Successfully launch MESSENGER; Deliver the Deep Impact spacecraft for environmental testing; Successfully complete the New Horizons/Pluto Critical Design Review

Year	Target	Actual	**Measure Term:**	Long-term
2004	Achieve *			

Measure: Progress in studying Earth's geologic and biologic records to determine the historical relationship between Earth and its biosphere

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green			

Measure: Accomplishment of key technology activities in support of solar system exploration.

Additional Information: **** Define Level One science goals for the Jupiter Icy Moons Orbiter (JIMO) mission; Release a NASA Research Announcement (NRA) for high-capability instruments useful on the JIMO mission and as follow-on Project Prometheus payloads; Release an NRA for the next New Frontiers mission.

Year	Target	Actual	**Measure Term:**	Long-term
2004	****			

PART Performance Measurements

Program: Solar System Exploration

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Progress in understanding potential impact hazards to Earth from space

Additional Information:

Year	Target	Actual	**Measure Term:**	Long-term
Ongoing	Green			

Measure: Progress in understanding the initial stages of planet and satellite formation (** NASA's external advisory committee will rate NASA's performance against this measure as "green" [on a green-yellow-red "stoplight" scale], signifying NASA's successful achievement of this goal.)

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green**			

Measure: Progress in determining the inventory and dynamics of bodies that may pose an impact hazard to Earth

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green			

Measure: Progress in determining the physical characteristics of comets and asteroids relevant to any threat they may pose to Earth

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	Green			

Measure: Progress in determining how the solar system originated and evolved to its current diverse state

Additional Information:

Year	Target	Actual	**Measure Term:**	Long-term
Ongoing	Green			

PART Performance Measurements

Program: Solar System Exploration

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Progress in studying the processes that determine the characteristics of bodies in our solar system and how these processes operate and interact

Additional Information:

Year	Target	Actual
2004	Green	

Measure Term: Annual

Program Assessment Rating Tool (PART)

Program: Space Shuttle
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
80%	44%	88%	7%	

1.1 Is the program purpose clear? Answer: YES Question Weight: 20%

Explanation: The mission of the Space Station Program is to provide safe, reliable, and efficient human access to low Earth orbit and the International Space Station, optimizing scientific research, demonstrating advances in technology, and stimulating national interest in education and exploration. Our goals are to fly safely, meet the manifest, impove supportability, and improve the system.

Evidence: The Space Shuttle transports people, materials, and equipment to low Earth orbit and the Space Station. See Shuttle Program Annual report 2002 at http://spaceflight.nasa.gov/shuttle

1.2 Does the program address a specific and existing problem, interest or need? Answer: YES Question Weight: 20%

Explanation: The Space Shuttle provides the only current U.S. capability for accessing the International Space Station.

Evidence: The Space Shuttle is the only existing U.S. vehicle capable of transporting people, materials, and equipment to the Space Station.

1.3 Is the program designed so that it is not redundant or duplicative of any other Federal, state, local or private effort? Answer: YES Question Weight: 20%

Explanation: The Space Shuttle provides the only current U.S. capability for accessing the International Space Station.

Evidence: The Space Shuttle is the only existing, U.S. vehicle capable of transporting people, materials, and equipment to the Space Station.

1.4 Is the program design free of major flaws that would limit the program's effectiveness or efficiency? Answer: NO Question Weight: 20%

Explanation: The Space Shuttle was designed in the 1970s to serve numerous roles, including launching NASA, commercial and military satellites, serving as a space laboratory, and building and servicing a future space station. The Space Shuttle's operating cost has been significantly reduced over time, but it is still likely to require more than $4 billion per year for the rest of its service life There is no demand for the Shuttle to conduct most of its original missions, and the Shuttle typically flies no more than 6 times per year, resulting in a very high cost per flight. Although NASA has taken many steps to ensure safety, the Shuttle has a historical catastrophic failure rate of 1 in 56.5.

Evidence: Historical NASA budget data. The Space Shuttle Decision: NASA's Search for a Reusable Space Vehicle (NASA SP-4221) by T.A. Heppenheimer The Flights of the Space Shuttle:http://www.spaceflight.nasa.gov/shuttle/archives/

1.5 Is the program effectively targeted, so that resources will reach intended beneficiaries and/or otherwise address the program's purpose directly? Answer: YES Question Weight: 20%

Explanation: The Space Shuttle is used almost exclusively to support assembly and logistics flights for the International Space Station. For at least the near-term, Space Shuttle flights will be used primarily to support human space flight missions. Through educational outreach, commercialization, and technology transfer the Shuttle Program attempts to reach other beneficiaries.

Evidence: See Annual Performance and Accountability ReportFY2002 report located at http://ifmp.nasa.gov/codeb/docs/fy02p_ar.pdf

Program Assessment Rating Tool (PART)

Program: Space Shuttle
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
80%	44%	88%	7%	

2.1 **Does the program have a limited number of specific long-term performance measures that focus on outcomes and meaningfully reflect the purpose of the program?** Answer: NO Question Weight: 11%

Explanation: The Shuttle program has developed some long term performance goals, but the measures provided in the PART are not measurable and do not directly and meaningfully support the program's purpose.

Evidence: Goals are listed in the Shuttle Integrated Budget and Performance Document (IBPD). The FY04 IBPD is located at www.nasa.gov/pdf/1975main_shuttle.pdf pages 2, 4, and 5. Measures are also located in measures section of the PART

2.2 **Does the program have ambitious targets and timeframes for its long-term measures?** Answer: NO Question Weight: 11%

Explanation: No timeframes or targets (except an undefined "green") are provided

Evidence: Measures are located in the measures section of the PART

2.3 **Does the program have a limited number of specific annual performance measures that can demonstrate progress toward achieving the program's long-term goals?** Answer: NO Question Weight: 11%

Explanation: The program has a limited number of specific annual performance measures. However, last year's PART said that the answer to this question was "No" beacuse "While NASA's annual performance plan includes a number of key metrics for measuring Space Shuttle operations, performance metrics for Space Shuttle supportability upgrades, safety investments, and facilities investments either do not exist or merely measure inputs, not outputs or outcomes." This has not changed.

Evidence: All annual performance goals (APGs) are listed with the associated outcome goal in the Shuttle IBPD. The FY04 IBPD is located at www.nasa.gov/pdf/1975main_shuttle.pdf pages 2, 4, and 5. Measures are also located in the measures section of the PART

2.4 **Does the program have baselines and ambitious targets for its annual measures?** Answer: NO Question Weight: 11%

Explanation: Most of the measures reflect specific targets, e.g. achieve 100% mission success, achieve zero type A and B mishaps, and execute programs within 10% of cost and schedule. The targets in use for the Shuttle program are ambitious, but are unchanging and do not drive performance improvement. For next year's PART, NASA should add ambitious targets that drive performance improvement.

Evidence: All APGs are listed with the associated outcome goal in the Shuttle IBPD. The FY04 IBPD is located at www.nasa.gov/pdf/1975main_shuttle.pdf pages 2, 4, and 5. Measures are also located in the measures section of the PART

Program: Space Shuttle
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
80%	44%	88%	7%	

2.5 **Do all partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) commit to and work toward the annual and/or long-term goals of the program?** Answer: NO Question Weight: 11%

Explanation: Shuttle program contractors were an integral part of the Service Life Extension Program (SLEP) summit process which framed the program's long-term investment strategy. Space Shuttle contractors were an important part of the Shuttle upgrades work in the late 1990s and are currently an integral part of not only the SLEP process, but also the return-to-flight planning and redesign efforts. The contractors are as technically capable and as equally valued as the government for planning, designing and executing program directed changes. Contractor lobbying for upgrades the program does not want has not been disruptive to the program during the past year. Since the program does not yet have good annual or long-term performance goals, however, partners cannot commit to these goals.

Evidence: The contractors provide either monthly, quarterly, and semi annual metrics data that support the Shuttle plan and the GPRA APGs.

2.6 **Are independent evaluations of sufficient scope and quality conducted on a regular basis or as needed to support program improvements and evaluate effectiveness and relevance to the problem, interest, or need?** Answer: YES Question Weight: 11%

Explanation: Numerous independent reviews are conducted on the Space Shuttle program to help ensure flight safety, assess programmatics, and evaluate performance.

Evidence: Aerospace Safety Advisory Panel, Space Flight Advisory Council, and Rand review, GAO Audits, and Non-Advocacy reviews. Most recently the program was reviewed by the Columbia Accident Investigation Board.

2.7 **Are Budget requests explicitly tied to accomplishment of the annual and long-term performance goals, and are the resource needs presented in a complete and transparent manner in the program's budget?** Answer: YES Question Weight: 11%

Explanation: The IBPD provides, for every budget line item, an associated performance measure and strategic objective. Last year's PART noted a concern about the lack of visibility into the effect of funds spent on Shuttle safety investments, supportability upgrades, and facilities revitalization. The Shuttle program has begun a service life extension program (SLEP) process that is intended to make improved tradeoffs among potential safety investments. The SLEP process is new and the program will need to work to improve its transparency, metrics for choosing investments, and traceability to requirements. Next year's PART will examine how well the SLEP is achieving these goals.

Evidence: The Shuttle IBPD is located at www.nasa.gov/pdf/1975main_shuttle.pdf The SLEP summit summary CD (available from NASA) provides additional information on the SLEP summit and SLEP process

2.8 **Has the program taken meaningful steps to correct its strategic planning deficiencies?** Answer: YES Question Weight: 11%

Explanation: NASA's Integrated Space Transportation Plan (ISTP) lays out a plan for NASA's key space transportation capabilities over the next decades. The Space Shuttle's SLEP program addresses the critical requirements for the Space Shuttle to safely and effectively meet the mission needs called for in the ISTP.

Evidence: NASA 2003 Strategic Plan describes the ISTP. The Plan is located at ifmp.nasa.gov/codeb/docs/2003_Strategic_Plan.pdf

Program Assessment Rating Tool (PART)

Program: Space Shuttle
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
80%	44%	88%	7%	

2.CA1 **Has the agency/program conducted a recent, meaningful, credible analysis of alternatives that includes trade-offs between cost, schedule, risk, and performance goals and used the results to guide the resulting activity?** Answer: YES Question Weight: 11%

Explanation: The SLEP process is a step towards weighing and evaluating the investment direction for projects in the areas of safety, sustainability, infrastructure, resources, operations, and performance. NASA is currently considering alternatives to the current Shuttle configuration for supplying the ISS with cargo and crew.

Evidence: The SLEP Summit Briefing Charts CD is available from NASA

3.1 **Does the agency regularly collect timely and credible performance information, including information from key program partners, and use it to manage the program and improve performance?** Answer: YES Question Weight: 12%

Explanation: The Agency and Enterprise collect data monthly and quarterly in which performance, cost, and schedule information relating to key goals and objectives are utilized to make key management decisions.

Evidence: The Agency and Space Flight Enterprise hold Program Management Councils in which timely and credible performance information is reviewed periodically. An electronic system assists in providing an easily accessible collection of key performcance, cost, and schedule information (http://nasa-mis.nasa.gov/nasa_mis)

3.2 **Are Federal managers and program partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) held accountable for cost, schedule and performance results?** Answer: YES Question Weight: 12%

Explanation: The Shuttle Program has various contract incentives tied to cost, schedule and performance. Each contract has surveillance plans that each technical manager uses to monitor performance. Federal managers performance plans have key factors that deal with cost/schedule/performance and SES bonuses are tied to performance metrics. Following the Columbia accident, managers were reassigned and contractors did not receive a variety of incentive fees.

Evidence: A Requirements and Procedures for Certification of Flight Readiness document is in place that establishes responsibility for key government and contractor managers who are accountable for every Shuttle launch. Schedule and costs are controlled through the Program Requirements Control Board. The Space Shuttle Program will receive flight rate credit from United Space Alliance (USA) for the flights not flown in 2003. The flight rate credit from not flying is being used to partially offset the Columbia investigation and recovery effort.

3.3 **Are funds (Federal and partners') obligated in a timely manner and spent for the intended purpose?** Answer: YES Question Weight: 12%

Explanation: The Space Shuttle program tracks all funds. Next year's PART assessment will review this area in more detail.

Evidence: The Space Shuttle utilizes the NASA accounting system and complies with all financial management rules and regulations.

Program Assessment Rating Tool (PART)

Program: Space Shuttle
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
80%	44%	88%	7%	

3.4 **Does the program have procedures (e.g. competitive sourcing/cost comparisons, IT improvements, appropriate incentives) to measure and achieve efficiencies and cost effectiveness in program execution?** Answer: YES Question Weight: 12%

Explanation: The program does implement IT improvements and has contract incentitves that encourage and reward the contractor for safe, high quality, cost effective performance in fulfilling the contract requirements in alignment with Shuttle program goals..

Evidence: One particular IT improvement was the implementation of the NASA Management Information System web inferface (located at http://nasa-mis.nasa.gov/nasa_mis) that gives management insight into the status of key program performance indicators. The Space Shuttle prime contracts are perfomance based with award fee, cost incentives, and performance-based measurements on specific elements.

3.5 **Does the program collaborate and coordinate effectively with related programs?** Answer: YES Question Weight: 12%

Explanation: Through SLEP panels, NASA had the appropriate forum to collaborate to determine the appropriate investment direction for projects in the areas of safety, sustainability, infrastructure, resources, operations, performance, and industry. The Space Shuttle program collaborates with several federal agencies.

Evidence: The Space Shuttle program and Department of Defense collaborate in the scheduling of payload manifesting and the use of range facilities at Cape Canaveral. Several agencies, including the Departments of Transportation and Defense, are represented on the Space Shuttle program's Mishap Investigation Board. NASA has worked with many federal and state agencies in the Columbia Recovery effort (including police departments, the Forest Service, the Coast Guard, the Environmental Protection Agency, the Department of Homeland Security, the National Guard, and the Park Service)

3.6 **Does the program use strong financial management practices?** Answer: YES Question Weight: 12%

Explanation: The Space Shuttle program adheres to financial management practices such as full cost accounting and IBPD. NASA's FY 2001 and 2002 financial statement audits noted a material weakness in the Agency's accounting for contractor-held property. The Space Shuttle Program is responsible for a considerable amount of this property. If the contractor-held property issue for the Space Shuttle Program is not resolved by next year's PART, the answer to this question may become "No."

Evidence: The Space Shuttle program complies with all Agency policies and guidance, General Accounting Office practices, OMB Circulars, Federal Budget Publications, Executive Orders, etc.

3.7 **Has the program taken meaningful steps to address its management deficiencies?** Answer: NO Question Weight: 12%

Explanation: The report of the Columbia Accident Investigation Board identified significant management deficiencies that contributed to the loss of the Space Shuttle Columbia. The next PART assessment will review whether the program has adequately addressed these deficiencies.

Evidence: The report of the Columbia Accident Investigation Board is online at www.caib.us

Program Assessment Rating Tool (PART)

Program: Space Shuttle
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
80%	44%	88%	7%	

3.CA1 **Is the program managed by maintaining clearly defined deliverables, capability/performance characteristics, and appropriate, credible cost and schedule goals?** Answer: YES Question Weight: 12%

Explanation: The Space Shuttle program and the International Space Station program work together to define Space Station support needs. Requirements are fully documented. These requirements are matched against available Shuttle resources (technical and budget) and established flight production templates to derive launch schedules. The Deputy Associate Administrator for Shuttle and Space Station reviews cost, schedule, and performance through the NASA management information system.

Evidence: The Space Shuttle deliverables include customer agreements, supplier agreements, prime contractor documentation requirements, and the Space Shuttle program plan.

4.1 **Has the program demonstrated adequate progress in achieving its long-term performance goals?** Answer: NO Question Weight: 20%

Explanation: Up until the loss of Space Shuttle Columbia, the program was achieving its goals. Currently the program is focusing on safely returning to flight.

Evidence:

4.2 **Does the program (including program partners) achieve its annual performance goals?** Answer: NO Question Weight: 20%

Explanation: Because of the loss of Columbia, essentially none of the program's outcome metrics were met.

Evidence:

4.3 **Does the program demonstrate improved efficiencies or cost effectiveness in achieving program goals each year?** Answer: NO Question Weight: 20%

Explanation: Because of the loss of Columbia many measures were not met this year.

Evidence:

4.4 **Does the performance of this program compare favorably to other programs, including government, private, etc., with similar purpose and goals?** Answer: NA Question Weight: 0%

Explanation: The Space Shuttle is the only human rated reusable space vehicle in the world. There is no other vehicle capable of providing assembly support for the ISS or carrying crews to rendezvous and service the Hubble Space Telescope.

Evidence:

Program Assessment Rating Tool (PART)

Program: Space Shuttle
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
80%	44%	88%	7%	

4.5 **Do independent evaluations of sufficient scope and quality indicate that the program is effective and achieving results?** Answer: SMALL EXTENT Question Weight: 20%

Explanation: The Shuttle program has undergone several independent and quality evaluations that show the program has achieved some minor positive results this year. However, the report of the Columbia Accident Investigation Board was critical of many program practices.

Evidence: Aerospace Safety Advisory Panel, Space Flight Advisory Council, Rand review, GAO Audits, Independent Progam Assessment Office non-advocacy reviews, and the Columbia Accident Investigation Board report (online at www.caib.us)

4.CA1 **Were program goals achieved within budgeted costs and established schedules?** Answer: NO Question Weight: 20%

Explanation: Because of the loss of Columbia, program goals were not achieved within budgeted costs and established schedules

Evidence:

PART Performance Measurements

Program: Space Shuttle

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Mishaps causing death, damage to property of more than $250 thousand, or permanent disability or hospitalization of three or more people

Additional Information:

Year	Target	Actual	**Measure Term:** Annual
2001	0	0	
2002	0	0	
2003	0	2	
2004	0		
2005	0		

Measure: Average number of in flight anomalies per flight

Additional Information:

Year	Target	Actual	**Measure Term:** Annual
2001	<8	4.6	
2002	<8	6	
2003	<8	5.3	
2004	<8		
2005	<8		

Measure: On-orbit mission success

Additional Information: Mission success criteria are those provided to the Space Shuttle prime contractor for purposes of determining successful accomplishment of the performance incentive fees in the contract.

Year	Target	Actual	**Measure Term:** Annual
2001	1	100%	

PART Performance Measurements

Program: Space Shuttle

Agency: National Aeronautics and Space Administration

Bureau:

Measure: On-orbit mission success

Additional Information: Mission success criteria are those provided to the Space Shuttle prime contractor for purposes of determining successful accomplishment of the performance incentive fees in the contract.

Year	Target	Actual	**Measure Term:**	Annual
2002	1	100%		
2003	1	89%		
2004	1			
2005	1			

Measure: Implement necessary modifications to the Space Shuttle system for return-to-flight in FY04.

Additional Information: This is a new measure

Year	Target	Actual	**Measure Term:**	Annual
2004	All			

Measure: Extend the operational life of the Space Shuttle.

Additional Information: This is a new measure

Year	Target	Actual	**Measure Term:**	Long-term
2004	Green			
2005	Green			

Measure: Critical Review of Shuttle Service Life Extension

Additional Information: This is a new measure

Year	Target	Actual	**Measure Term:**	Annual
2004	1			
2005	1			

PART Performance Measurements

Program: Space Shuttle

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Conduct a well managed program in accordance with Agency implemetning strategies

Additional Information: This is a new measure

Year	Target	Actual	**Measure Term:**	Long-term
2004	Green			

Measure: Program execution cost

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	within 10%			
2005	within 10%			

Measure: Program execution baseline schedules

Additional Information:

Year	Target	Actual	**Measure Term:**	Annual
2004	within 10%			
2005	within 10%			

Program Assessment Rating Tool (PART)

Program: Space Station
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	78%	100%	26%	

1.1 Is the program purpose clear? Answer: Yes Question Weight: 20%

Explanation: The mission of the International Space Station (ISS), as stated in NASA's FY2004 budget submit to Congress, is to support scientific research and other activities requiring the unique attributes of humans in space.

Evidence: FY 04 Budget ISS IBPD, p. SFC 2-2http://www.nasa.gov/pdf/1977main_iss.pdf

1.2 Does the program address a specific and existing problem, interest or need? Answer: Yes Question Weight: 20%

Explanation: The ISS addresses a specific need to enable humans to live and work permanently in space for the purpose of research in the unique environment of space. ISS enables basic and applied research in biological and physical sciences that cannot be conducted on Earth, research to enable human exploration of space, and commercial and applied research and development that could not be effectively pursued on Earth.

Evidence: 2003 NASA Strategic Plan

1.3 Is the program designed so that it is not redundant or duplicative of any other Federal, state, local or private effort? Answer: Yes Question Weight: 20%

Explanation: The ISS is the only existing platform for supporting prolonged human research activity in space. During its preliminary report to the NASA Advisory Council (NAC), the Research Maximization and Prioritization (REMAP) Task Force of the NAC reported as follows: In several areas of biological and physical research, solutions of very large, important questions require microgravity. ISS provides a unique environment for attacking these problems as only NASA can.

Evidence: ReMAP Report to NAC, http://SpaceResearch.nasa.gov/general_info/remap.html; 2003 NASA Strategic Plan

1.4 Is the program design free of major flaws that would limit the program's effectiveness or efficiency? Answer: YES Question Weight: 20%

Explanation: The program has implemented the recommendations of the ISS Mgmt. and Cost Eval. (IMCE) and ReMAP task forces of the NAC, resolving or partially resolving some major flaws in the program. Two potential major flaws remain: (1) limited ability to conduct research on the ISS, and (2) problems with logistics and resupply. The ISS's limited ability to conduct research during the assembly phase is well recognized. In the near-term, the ISS program is working to produce the maximum research return consistent with the available capabilities. The ISS program is taking various steps to attempt to resolve this issue. The ISS's dependence on a limited number of launch vehicles and supply options is another potential flaw that was highlighted following the Columbia tragedy. NASA is also taking steps to reconsider this issue, and potentially to attempt to resolve it. OMB considers both of these potential flaws to be areas of continued interest for next year's PART. Evidence next year should include continued progress at resolving both issues, including cost/benefit analyses of ISS resupply alternatives.

Evidence: ReMAP Report to NAC, http://SpaceResearch.nasa.gov/general_info/remap.html; FY 2004 President's Budget Request; ISS Program Action Plan for Selection of an ISS Configuration, December 6, 2002 Heads of Agencies Meeting

Program Assessment Rating Tool (PART)

Program: Space Station
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	78%	100%	26%	

1.5 **Is the program effectively targeted, so that resources will reach intended beneficiaries and/or otherwise address the program's purpose directly?** Answer: YES Question Weight: 20%

Explanation: Baseline program content is defined in the ISS Cost Analysis Requirements Description (CARD) and organized through an integrated, approved work breakdown structure (WBS). The corresponding cost breakdown structure is reflected in the Agency's Integrated Financial Management System, through which resource commitments, obligations, and costs are rigorously controlled. Scientific research planned for the ISS passes through a rigorous peer review process that ensures that research selected for flight could not be conducted on Earth. While the Office of Space Flight provides the platform and on-orbit resources, ISS research is funded through the Office of Biological and Physical Research (OBPR), and specific experiments selected for ISS are screened to ensure that space flight is required.

Evidence: ISS CARD, version 3/28/03; NASA Integrated Financial Management System; Reports of the National Research Council have consistently identified significant research issues that require the capabilities of the ISS. http://spaceresearch.nasa.gov/general_info/adv.html; National Academy of Science reports on biomedical, microgravity, materials science, radiation hazards, biological and biotechnology research http://www.nas.edu/ssb/bib1.html. OBPR Research Plan; http://spaceresearch.nasa.gov/common/docs/OBPR_Research_Plan.pdf

2.1 **Does the program have a limited number of specific long-term performance measures that focus on outcomes and meaningfully reflect the purpose of the program?** Answer: NO Question Weight: 11%

Explanation: NASA and ISS have developed program goals through a variety of efforts, but have not developed specific outcome measures that directly and meaningfully support the program's purpose.

Evidence: 2003 NASA Strategic Plan; FY 04 Budget ISS IBPD, p. SFC 2-2, SFC 2-5 (http://www.nasa.gov/pdf/1977main_iss.pdf); NASA FY 2002 Performance and Accountability Report; OBPR April 2003 Research Plan, (http://SpaceResearch.nasa.gov/research_projects/resplans.html); ReMAP Report to NAC, http://SpaceResearch.nasa.gov/general_info/remap.html;

2.2 **Does the program have ambitious targets and timeframes for its long-term measures?** Answer: NO Question Weight: 11%

Explanation: ISS has adopted long-term goals, but not performance measures. A yes answer requires that "specific quantified targets have been developed for most long-term measures." ISS's goals lack specific quantified targets.

Evidence: 2003 NASA Strategic Plan

2.3 **Does the program have a limited number of specific annual performance measures that can demonstrate progress toward achieving the program's long-term goals?** Answer: YES Question Weight: 11%

Explanation: The ISS program has made good progress in developing measurable annual performance measures. The ISS program has identified twelve annual outcome and output oriented performance goals as documented in the NASA 2004 Congressional Budget submission and the Integrated Budget and Performance Document (IBPD). Each of these annual performance metrics is designed to support the program's long-term mission and purpose, guide program management and demonstrate progress toward achieving the multi-tiered NASA Strategic Plan, Vision and Mission. The performance goals focus on meeting utilization requirements; operating safely, efficiently and effectively; meeting commitments to International Partners; and performing within cost and schedule baselines. Progress against these discrete, quantifiable and measurable performance goals will be impacted by the Columbia accident and reported in the 2004 Performance and Accountability Report.

Evidence: Performance goals in ISS IBPD http://www.nasa.gov/pdf/1977main_iss.pdf

Program Assessment Rating Tool (PART)

Program: Space Station
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	78%	100%	26%	

2.4 **Does the program have baselines and ambitious targets for its annual measures?** Answer: YES Question Weight: 11%

Explanation: The ISS program has made good progress in developing ambitious targets for its annual performance measures. In addition, the ISS program negotiated a set of Success Criteria for 2002/2003 with the OMB to restore customer, partner and stakeholder confidence in the program and to achieve the outcome intended from the program over the long-term.

Evidence: Performance goals in ISS IBPD p. SFC 2-5 (http://www.nasa.gov/pdf/1977main_iss.pdf); FY 2004 President's Budget Request; ISS Success Criteria

2.5 **Do all partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) commit to and work toward the annual and/or long-term goals of the program?** Answer: Yes Question Weight: 11%

Explanation: Signed ISS Intergovernmental Agreements (IGAs) and Memoranda of Understanding (MOU) create a framework for integrated program implementation that align with the NASA ISS Program goals and validate the International Partners commitment to strategic and tactical planning. Multi-lateral control boards, working groups, and technical interchange meetings provide a forum for measuring progress and addressing cost, schedule, and/or technical concerns.For contracted U.S requirements, Contract Performance/Award Fee Evaluation processes are in place to encourage and reward the contractor for safe, high quality, cost effective performance in fulfilling the contract requirements in alignment with ISS Program goals. The evaluation process provides objective and subjective assessments by the Government, which allows percentages of the potential fee to be based on the contractor's performance measured against performance criteria in areas of safety, technical, management, customer satisfaction, cost control, and socioeconomic considerations. This process allows the Government to award or penalize the contractor's performance.Planned ISS contract consolidations will include performance visibility and measurement tools such as earned value.

Evidence: SSP50200-01, Station Program Implementation Plan, Volume 1, Preface; IGAs; International MOUs; Multi-lateral Coordination Board Charters, Agendas, and Action Summaries; ISS Signed Protocols; ISS Prime and Non-Prime Contracts

2.6 **Are independent evaluations of sufficient scope and quality conducted on a regular basis or as needed to support program improvements and evaluate effectiveness and relevance to the problem, interest, or need?** Answer: Yes Question Weight: 11%

Explanation: Currently, 19 independent/quality evaluations are conducted by external entities on a mission, daily, monthly, quarterly, semi-annually, annually, and as-required basis depending on their charter. The ISS uses these advisory groups to obtain external input to its strategies and performance planning and evaluation activities. Examples include:· Aerospace Safety Advisory Panel (ASAP): Focus on Safety (Quarterly)· General Accounting Office (GAO): Focus on overall Program (Quarterly)· Space Flight Advisory Committee (SFAC): Focus on overall Program (Quarterly)· Program Management Councils (Agency, Enterprise level): Program (Quarterly)· Office of Inspector General (OIG): Focus on Program (Quarterly)

Evidence: See ISS Program Plan, Section 17.0. Examples: INCE Report: August 2002; IMCE Report: Nov. 2001; IMCE Progress Review: Nov 2002; ReMAP July 2002; ASAP Report: March 2002; GAO draft Report: July 2002; IG Report: Barter audit draft report 5/24/02; Congressional Staffers: 03/2001; HAC audit: Nov. 2001

Program Assessment Rating Tool (PART)

Program: Space Station
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	78%	100%	26%	

2.7 **Are Budget requests explicitly tied to accomplishment of the annual and long-term performance goals, and are the resource needs presented in a complete and transparent manner in the program's budget?** Answer: Yes Question Weight: 11%

Explanation: Task requirements tied to program goals and objectives are captured in the program Cost Analysis Requirements Document (CARD). A corresponding cost breakdown structure is captured in the Agency Integrated Financial Management (IFM) System, brought on-line in FY03. Annual Program Operating Plan submissions can be traced to the approved work breakdown structure reflected in the CARD.

Evidence: ISS CARD (http://iss-www.jsc.nasa.gov/ss/issapt/cmo/CARD/); ISS FY 04 Budget Submission

2.8 **Has the program taken meaningful steps to correct its strategic planning deficiencies?** Answer: Yes Question Weight: 11%

Explanation: NASA has introduced a new management team to the ISS Program, and revised the basic chain of authority for the program, moving strategic control from the lead center to Headquarters. The new managers have tightened control of program content and spending, improving program reporting and cost analysis at all levels, gained better control of program requirements and reserves, and are building a automated management information system to provide management the opportunity to correct problems before they expand beyond the Agency's control. The Program has restructured their cost management strategy and is implementing new program control standards. A formal WBS was implemented for FY03 and 12 cost account managers (CAMs) were delegated authority for 100% of the ISS budget. A life-cycle cost estimate (i.e., through FY16) was developed by the 12 CAMs with data from their performing organizations and contractors. NASA has requested formal approval from OMB to end the program's 2-year probationary period.

Evidence: NASA response to the IMCE Report; NASA Management Information Systems (https://extranet.sef.hq.nasa.gov/nasa_mis/index.htm); ISS Success Criteria

2.CA1 **Has the agency/program conducted a recent, meaningful, credible analysis of alternatives that includes trade-offs between cost, schedule, risk, and performance goals and used the results to guide the resulting activity?** Answer: Yes Question Weight: 11%

Explanation: As a result of the Columbia accident, NASA is reassessing its Integrated Space Transportation Plan (ISTP). The ISS program is a participant in the trade studies. Next year's evidence will include further evidence of consideration of ISS resupply alternatives to the shuttle. Alternative options have been investigated to improve program research capabilities. Efforts to determine the final ISS configuration have been delayed by the Columbia accident, but the option evaluations have been completed and are being readied for review within the international partnership.

Evidence: ReMAP Report; EDO Analysis conducted by the Space Shuttle Program; Summaries of Agreements and Actions of the ISS Multilateral Coordination Board; Proceedings of the December 6, 2002 Heads of Agency (HOA) Meeting; M1 Memorandum Transmittal: Information for Use in ISTP Option Studies, dated May 22, 2003

Program Assessment Rating Tool (PART)

Program: Space Station
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	78%	100%	26%	

3.1 Does the agency regularly collect timely and credible performance information, including information from key program partners, and use it to manage the program and improve performance?

Answer: YES Question Weight: 12%

Explanation: Program cost, schedule, and technical performance information is routinely collected and analyzed through the One NASA Management Information System (NMIS), and the Agency Integrated Financial Management (IFM) System. A performance measurement system is in place using both traditional earned-value techniques for industrial contracts and modified earned-value techniques for operations activities. An early warning system has been in operation since mid-2002, and monthly assessments are provided to NASA managers all at levels. The ISS Program monitors contractor and International Partner progress, technical performance, actions, risk, cost, and schedule through regularly schedule unilateral and multi-lateral reviews, audits, technical interchange meetings, boards, and panels. The Office of Biological and Physical Research's peer review research process collects data from grantees on publications as well as abstracts of research progress. Feedback from this peer-reviewed science process influences scoring on new grant proposals.

Evidence: FY2003 Performance Plan (http://ifmp.nasa.gov/codeb/budget2003/31-HEDS_Enterprise.pdf); NASA Management Information Systems (https://extranet.sef.hq.nasa.gov/nasa_mis/index.htm);ISS Program Calendar (http://iss-www.jsc.nasa.gov/ss/issapt/boards.html); Monthly Early Warning System Reports; NASA FY 2002 Performance and Accountability Report

3.2 Are Federal managers and program partners (including grantees, sub-grantees, contractors, cost-sharing partners, and other government partners) held accountable for cost, schedule and performance results?

Answer: Yes Question Weight: 12%

Explanation: Federal managers are held accountable for ISS Program performance as evident by the recent management changes within the program and NASA Headquarters. Performance measures have been included in key management position performance criteria. In coordination with OMB, performance measures have been developed and documented in the ISS Success Criteria requested in the FY2004 Pass Back. Contractors are held accountable for their performance through various contract incentives. In addition, to the contract incentives surrounding hardware delivers, program management, and business management, the ISS Prime contract also built in ISS on-orbit incentives.

Evidence: OSF and ISS Program restructure and new organization charts; Performance Evaluation Board for the multiple ISS contractors; NASA FY 2002 Performance and Accountability Report

Program: Space Station
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	78%	100%	26%	

3.3 Are funds (Federal and partners') obligated in a timely manner and spent for the intended purpose? Answer: Yes Question Weight: 12%

Explanation: Annual NASA R&D funds are available for obligation for two years, and fully obligated by the end of the period. Operating plans for the program year are submitted to Congress and revised as needed over the two year time period. Internally, obligation and cost plans are developed, compared to actual spending, and reviewed monthly by all levels of the program. The NASA Procurement Management System is the primary system used to provide monthly reporting of all obligations and costs. These are tracked against station unique project numbers (UPNs) traceable to contractor and institutional source documents. Contractor and government accounting systems are audited periodically to ensure compliance with government standards. As an example, 98% of ISS PY 2000 funds were obligated by 9/30/00, 100% by 9/30/01. 95% of PY 2001 funds were obligated by 9/30/01, 100% by 9/30/02. 91% of PY 2002 funds were obligated by 9/30/02. OMB will monitor this trend in next year's PART.

Evidence: NASA Monthly FACS Report; Contractor monthly and quarterly reports (533s); SF133 Report on Budget Execution and Budgetary Resources; FMS2108 Year-End Closing Statement; Annual NASA Accountability Report

3.4 Does the program have procedures (e.g. competitive sourcing/cost comparisons, IT improvements, appropriate incentives) to measure and achieve efficiencies and cost effectiveness in program execution? Answer: YES Question Weight: 12%

Explanation: Contract Performance/Award Fee evaluation processes are in place to encourage and reward the contractor for safe, high-quality, cost-effective performance in fulfilling the contract requirements in alignment with ISS Program goals. The ISS Program competitive sourcing strategy approved in December, 2002 reduced ISS direct contracts from 28 to approximately six. Nine of the 28 contracts were competitively sourced and most of the 6 new consolidation contracts will be competitively sourced. Four RFPs have been released. The strategy addresses ISS operational needs and sustaining functions as well as the mission integration and infrastructure requirements. It is based on a set of goals that effectively minimize duplication of specialized expertise and redundant infrastructure in multiple contracts; provide for focused accountability for a deliverable to the ISS; minimize formal product development, management and deliveries between contracts; maximize competition; requires contracts to have performance measures; and encourages cost savings through requirements management and infrastructure reduction. NASA is also making progress toward a competitive procurement for a non-government organization to manage research utilization of the ISS. NASA plans for the non-profit research institute to perform leadership functions for ISS scientific, technology and commercial research. This effort is managed by the Office of Biological and Physical Research which plans to award a contract in FY 2005.

Evidence: Contract PEB data; ISS Program Plan: Acquisition Strategy, Section 10.0.; Contract Strategy: RFI's: released 3/2002; RFP's released 3/2003; Contract selection: 10/2003; Period of performance to begin January 2004; NGO website: http://SpaceResearch.nasa.gov/research_projects/ngo.html; NGO Congressional Report web site: http://SpaceResearch.nasa.gov/research_projects/ngocdt.html

Program Assessment Rating Tool (PART)

Program: Space Station
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	78%	100%	26%	

3.5 **Does the program collaborate and coordinate effectively with related programs?** Answer: YES Question Weight: 12%

Explanation: NASA ground and ISS on-orbit research capabilities are available to researchers across the country in industry, academia and the public sector. Competition for research grants and allocation of ISS resources is open, vigorous and competitive. NASA is cooperating with several government agencies, including NIH, NSF, DOE, and DOD.The ISS program has established pricing policy for potential commercial users of ISS resources and maintains a network of Commercial Space Centers that facilitate access to space for commercial projects. In addition, NASA has sought out partner agencies to leverage return from the unique capabilities of the ISS. Most recent are discussions with the DoD on the development of an unpressurized pallet. The ISS Program has clear planning and operational links to the Space Shuttle program for launch services, and to the Office of Biological and Physical Research for science payload manifesting, ground processing, and on-orbit resource scheduling.

Evidence: SS IGAs and MOUs; 18 active agreements with NIH; Commercial Space Center Annual Reports; ISS Pricing Policy

3.6 **Does the program use strong financial management practices?** Answer: YES Question Weight: 12%

Explanation: NASA and the ISS program have made improvements in its financial management practices. Given the extent of the former problems and the number of issues still in the process of resolution, this will remain an area of heightened focus in next year's review. Additional evidence of progress in dealing with contractor-held property (a material weakness in NASA's financial statement audit) should be presented next year. The Agency's new Integrated Financial Management (IFM) System has been activated; the One NASA MIS is on-line and routinely updated with program performance and budget reserve status information; the NASA Inspector General downgraded its assessment of ISS cost management controls from a material weakness to an "other weakness."

Evidence: NASA IFM System; NASA Management Information Systemshttps://extranet.sef.hq.nasa.gov/nasa_mis/index.htm ; Minutes of the NASA ICC Meeting of 5/21/03

3.7 **Has the program taken meaningful steps to address its management deficiencies?** Answer: YES Question Weight: 12%

Explanation: NASA has introduced a new management team to the ISS Program, and revised the basic chain of authority for the program. The new managers have tightened control of program content and spending, improved program reporting and cost analysis at all levels, gained better control of program requirements and reserves, and are building an automated management information system to provide management the opportunity to correct problems before they expand beyond the Agency's control. NASA and the ISS Program use several systems to identify and correct program management deficiencies. These include program management councils at the agency, enterprise, and program level and the NASA Management Information System (MIS). The ISS Program Office also conducts daily, weekly, monthly, and quarterly, and special reviews of all program elements, which are routinely monitored by the station and shuttle headquarters staff.

Evidence: NASA response to the IMCE Report; NASA Management Information Systems (https://extranet.sef.hq.nasa.gov/nasa_mis/index.htm); IMCE Report; CAIG Report

3.CA1 **Is the program managed by maintaining clearly defined deliverables, capability/performance characteristics, and appropriate, credible cost and schedule goals?** Answer: YES Question Weight: 12%

Explanation: Yes. Space Station program management has developed clearly defined deliverables and credible cost and schedule goals and uses them to manage the program.

Evidence: Monthly On-Orbit Research Status; Planned vs Actual Launch Dates; Status of ISS Launch Packages; Monthly Operational Availability Report

Program Assessment Rating Tool (PART)

Program: Space Station
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	78%	100%	26%	

4.1 Has the program demonstrated adequate progress in achieving its long-term performance goals? Answer: NO Question Weight: 20%

Explanation: Without quantitative long-term performance measures it is difficult to measure the ISS's progress towards its goals. This will continue to be a problem in ISS performance assessments until the ISS program adopts new long-term quantitative performance measures. Although the lack of good long-term performance measures makes determining the ISS program's progress towards its long-term goals difficult, it is possible to determine that the Agency has made indeed made some progress towards its long-term goals. In particular, the ISS program has improved its management processes in the last year. However, the Columbia accident resulted in the ISS program making slower than anticipated progress towards its assembly and research goals.

Evidence: Final truss segment (S6) delivered to NASA in Dec 02; final U.S. Core element (Node 2) delivered in June 03; Actual vs planned launch dates for assembly elements provided during monthly OMB status briefs; On-orbit research progress data provided during monthly OMB status briefs; NASA FY 2002 Performance and Accountability Report; http://spaceflight.nasa.gov/station/

4.2 Does the program (including program partners) achieve its annual performance goals? Answer: SMALL EXTENT Question Weight: 20%

Explanation: The ISS program deserves significant credit for improvements in efficiency and project and financial management. Unfortunatelly, the Columbia accident has prevented it from achieving many of its goals (e.g., assembly, logistics) in FY 2003. The ISS Program has met all of its pre-Columbia FY2002 Performance Goals. Cost performance for FY 2001, FY 2002 and the first half of FY 2003 has been on target with controls in place to estimate work carryover, accurately account for reserves, manage risk, and assess threats to future performance. All U.S.-provided assembly elements have been delivered, assembly and research flights through FY02 and into early FY03 were successful and were launched within days/weeks of planned flight dates. Research expeditions 5, 6 & 7 were successfully deployed in spite of the Columbia accident, ensuring continuous on-orbit human presence and continuous research through FY 2003. Japan delivered its experiment module (JEM) in June 03, and Node 2 was also delivered in June by Alenia. Had the Columbia accident not occurred, the ISS program was poised to complete all scheduled missions, and to expand research capabilities as planned for FY 2003, and within its approved budget.

Evidence: Monthly ISS Status Briefs to OMB; One NASA MIS; NASA FY 2002 Performance and Accountability Report

4.3 Does the program demonstrate improved efficiencies or cost effectiveness in achieving program goals each year? Answer: SMALL EXTENT Question Weight: 20%

Explanation: NASA has taken steps to improve the Space Station's reserves standing through cost efficiencies, but given the Station's long history of cost growth, it remains to be seen whether NASA will be successful.

Evidence: Hardware delivery & launch scheds; IMCE Report; DoD CAIG Report;FY 2002 Reserve Reconciliation Review;FY 2003 Program Reserve Status (One NASA MIS)

4.4 Does the performance of this program compare favorably to other programs, including government, private, etc., with similar purpose and goals? Answer: NA Question Weight: 0%

Explanation: There is no comparable program with similar purpose or goals.

Evidence:

Program ID: 10000348

Program Assessment Rating Tool (PART)

Program: Space Station
Agency: National Aeronautics and Space Administration
Bureau:
Type(s): Capital Assets and Service Acquisitio

Section Scores				Overall Rating
1	2	3	4	Results Not Demonstrated
100%	78%	100%	26%	

4.5 **Do independent evaluations of sufficient scope and quality indicate that the program is effective and achieving results?**

Answer: Small Extent

Question Weight: 20%

Explanation: As the Space Station enters its operational phase, research results will become more clear, but it is too early to declare the Space Station program effective. The ISS Program does have independent quality evaluations that do reflect that the program is achieving results. For example, the November 2001 IMCE Task Force report stated that ISS performance to date is an outstanding technical accomplishment and the July 2002, NASA REMAP Task Force stated that ISS is unprecedented as a laboratory and is the only available vehicle for human tended research on long-duration effects of microgravity. Two independent cost estimation teams completed their evaluations of the ISS Program budget and cost projections through the program's baseline service life. They declared the NASA cost estimates credible. The teams recommendations have been incorporated into the President's FY 2004 Budget request.

Evidence: IMCE Report; ReMAP Report; DoD CAIG Report; FY 2004 President's Budget Request

4.CA1 **Were program goals achieved within budgeted costs and established schedules?**

Answer: SMALL EXTENT

Question Weight: 20%

Explanation: The ISS program was largely unable to achieve its goals within established schedules due to the Columbia disaster and subsequent grounding of the space shuttle fleet. Prior to the Columbia accident, ISS assembly missions for the previous year were launched on or near planned dates; all U.S contractor-provide flight hardware was delivered to the launch site for integration, test, and flight processing; the next four launch packages have been completed and placed in protective storage pending the Shuttle's return to flight. Planned launches of key research hardware and science experiments have also proceeded on or near schedule. Actual program costs were accrued under plan for the last 2 years, with reserve levels steady or increasing.

Evidence: ISS Assembly Flight Planned vs Actual Launch Dates; ISS Research Payload Deployments and Cumulative Science Investigations; FY 2004 President's Budget Request; Actual FY 2002 and FY 2003 Budget Reserve Trends (One NASA MIS)

PART Performance Measurements

Program: Space Station

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Provide nadir-viewing optical research window for Earth observations (FY04 target: return to flight; FY05 target: launch and activate WORF)

Additional Information: Outcome (1.1.2) "Expand Earth science research opportunities by providing Space Flight services for space access" supports strategic objective 1.1 to: "Understand how the Earth is changing, better predict change, and understand the consequences for life on Earth".

Year	Target	Actual	**Measure Term:** Annual
2004	RTF		
2005	Activate WORF		

Measure: Number of crew sustained on the Space Station

Additional Information: Outcome (9.4.1) "Demonstrate sustainable operation of the ISS." supports strategic objective 9.4 to "Demonstrate the ability to support a permanent human presence in low Earth orbit as a stepping stone to human presence beyond".

Year	Target	Actual	**Measure Term:** Annual
2003	2	2	
2004	3		
2005	3		
2006	3		

Measure: Respond to long term research resource requirements and priorities (FY04 target: international partnership approval of final ISS configuration; FY05 target: baseline technical requirements, schedule, and budget for the final configuration).

Additional Information: Outcome (9.4.1) "Demonstrate sustainable operation of the ISS." supports strategic objective 9.4 to "Demonstrate the ability to support a permanent human presence in low Earth orbit as a stepping stone to human presence beyond".

Year	Target	Actual	**Measure Term:** Annual
2004	approve config		
2005	develop baseline		

PART Performance Measurements

Program: Space Station

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Provide accommodations for 24 external payload site equivalents on the ISS truss (FY04 target: complete ground processing of all remaining ISS truss elements; FY05 target: launch and assemble truss segments P3/P4 and P5; FY08 target: allocate first external payload sites to Space, Earth, and technology science payloads and add 7 external sites).

Additional Information: Outcome (1.1.2) "Expand Earth science research opportunities by providing Space Flight services for space access" supports strategic objective 1.1 to: "Understand how the Earth is changing, better predict change, and understand the consequences for life on Earth".

Year	Target	Actual	**Measure Term:** Annual
2004	1		
2005	1		

Measure: Days of minimal disturbance to the space station's low-gravity research environment (for periods greater than 30 days)

Additional Information: Outcome (4.1.2) "Expand biological and physical research opportunities by providing Space Flight services for space access" supports strategic objective 4.1 to: "Understand how life responds to gravity and the space environment".

Year	Target	Actual	**Measure Term:** Long-term
2009	180		

Measure: Provide a 2.6 meter centrifuge to support life sciences research in low Earth orbit (FY05 target: complete CAM and rotor CDR's, FY07 target: CAM O/D KSC; FY08 target: launch and on-orbit assembly of CAM).

Additional Information: Outcome (4.1.2) "Expand biological and physical research opportunities by providing Space Flight services for space access" supports strategic objective 4.1 to: "Understand how life responds to gravity and the space environment".

Year	Target	Actual	**Measure Term:** Annual
2004			
2005	CAM & CDRs		
2006			
2007	CAM O/D		

Measure: Mishaps causing death, damage to property of more than $250 thousand, or permanent disability or hospitalization of three or more people.

Additional Information: Outcome (8.4.1) "Provide a safe, reliable, and well-managed on-orbit research facility" supports strategic objective 8.4 to "Assure capabilties for world-class research on a laboratory in low Earth orbit".

Year	Target	Actual	**Measure Term:** Annual
2003	0	0	

PART Performance Measurements

Program: Space Station

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Mishaps causing death, damage to property of more than $250 thousand, or permanent disability or hospitalization of three or more people.

Additional Information: Outcome (8.4.1) "Provide a safe, reliable, and well-managed on-orbit research facility" supports strategic objective 8.4 to "Assure capabilties for world-class research on a laboratory in low Earth orbit".

Year	Target	Actual	**Measure Term:** Annual
2004	0		
2005	0		
2006	0		

Measure: Based on Shuttle return to flight, establish a revised basline for ISS assembly and research support to include: 27 accommodations for U.S. research racks; 24 external payload site equivalents on the ISS truss; 5 external sites on the JEM-EF; 2 external sites on the Columbus module; 80 Kw of power for operations and research; and 1.5-2.46 Terabits of ave daily Ku-Band downlink.

Additional Information: Outcome (8.4.1) "Provide a safe, reliable, and well-managed on-orbit research facility" supports strategic objective 8.4 to "Assure capabilties for world-class research on a laboratory in low Earth orbit".

Year	Target	Actual	**Measure Term:** Annual
2004	1		
2005	1		

Measure: Percentage of planned up-mass, volume and crew time available for research through International Partner Core Complete.

Additional Information: Outcome (8.4.1) "Provide a safe, reliable, and well-managed on-orbit research facility" supports strategic objective 8.4 to "Assure capabilties for world-class research on a laboratory in low Earth orbit".

Year	Target	Actual	**Measure Term:** Annual
2003	80%		
2004	80%		
2005	80%		
2006	80%		

PART Performance Measurements

Program: Space Station

Agency: National Aeronautics and Space Administration

Bureau:

Measure: Obtain agreement among the International Partners on the final ISS configuration in FY 2004.

Additional Information: Outcome (8.4.2) "Expand ISS crew size to accommodate U.S. and IP research requirements" supports strategic objective 8.4 to "Assure capabilties for world-class research on a laboratory in low Earth orbit".

Year	Target	Actual	**Measure Term:**	Annual
2004	Yes			

Measure: Support a service life of 15 years after deployment of the U.S. Laboratory.

Additional Information: Outcome (9.4.1) "Demonstrate sustainable operation of the ISS." supports strategic objective 9.4 to "Demonstrate the ability to support a permanent human presence in low Earth orbit as a stepping stone to human presence beyond".

Year	Target	Actual	**Measure Term:**	Long-term
2004	Yes			