Logistics Management Institute

Meeting Customer Service Standards Under Executive Order 12862

NASA's Space Science Grant Process

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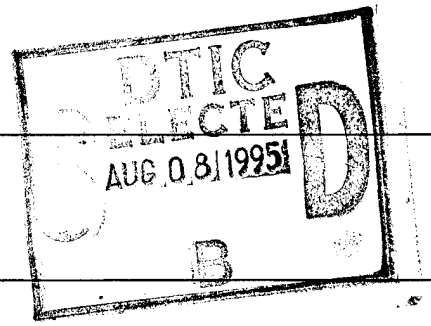

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The Executive Order 12862, *Setting Customer Service Standards*, requires that the National Aeronautics and Space Administration (NASA) undertake customer satisfaction surveys to obtain customer feedback for improving its products and services. The Office of Space Science, in coordination with a Headquarters steering group, identified its science grant process as one such focal point.

The Logistics Management Institute was engaged to design, conduct, and analyze customer satisfaction surveys for both the proposal writers and peer review panelists in this science grant process. In response to a request for generic survey clearance, the Office of Management and Budget approved our survey methods. We used the "total design method" to obtain sound statistical results: 75 percent response rates and 5-percentage point sampling errors.

In coordination with the National Performance Review, we developed quality indexes for gauging overall grant process performance and for targeting areas most in need of improvement. We provided NASA with new customer standards for processing its space science grants. Also, we discussed new procedures, processes, and technologies that NASA could use to make its space science grant process "faster, better, and cheaper."

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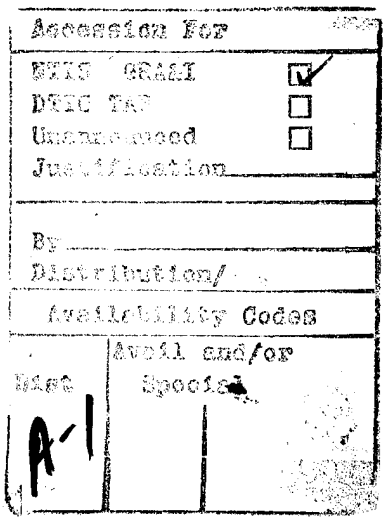

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Meeting Customer Service Standards
Under Executive Order 12862:
NASA's Space Science Grant Process

Executive Summary

Executive Order 12862, *Setting Customer Service Standards*, requires that agencies take customer surveys periodically to gauge the level of satisfaction with government services and to improve the delivery of those services, as necessary. The National Aeronautics and Space Administration (NASA) identified the grant selection process used by its Office of Space Science as an area requiring assessment under the Executive order. That process has two customers: scientists who submit proposals in response to NASA Research Announcements and their peers who hold panel meetings to review the merits of the proposals. The Office of Space Science asked the Logistics Management Institute to seek the opinions of the proposal writers and peer review panelists concerning the effectiveness and efficiency of NASA's science grant process and to suggest improvements. Our survey methods were approved by the Office of Management and Budget.

We found that, on average, survey respondents are moderately satisfied with the overall science grant process and with the resultant quality of the research. Specifically, the peer review panelists are quite satisfied with the support — facilities, lodging, and supplies — that NASA provides for panel meetings. They also are reasonably satisfied with the time that NASA allocates for reviewing the proposals before the panel meetings convene. The proposal writers are quite satisfied with NASA's guidelines on the content and preparation of the proposals. They also believe that three months is an adequate period for preparing and submitting the proposals.

On the other hand, both proposal writers and peer review panelists believe that the current science grant system is less effective and less efficient than it was just a few years ago. Proposal writers said that they must write five or more proposals in the hope of receiving a single grant. To accommodate the increased number of proposals being written, lead/secondary peer reviewers indicated that they now critique an average of seven proposals for each panel meeting — a workload that has reduced the effectiveness of their proposal reviews. The entire grant process now averages more than 13 months from the time NASA calls for research proposals in a NASA Research Announcement (NRA) to the time it disburses funds to those awarded grants.

We believe that the Office of Space Science should reduce the time for processing its space science grants. Survey respondents suggested that NASA establish a nine-month time standard for processing grants. The nine-month time

standard would maintain proposal preparation time at three months, reduce evaluation feedback and notification time (now more than six months) to four months, and reduce the time it takes to disburse funds (now more than four months) to less than two months.

To meet the stricter time standards, we believe that the Office of Space Science should take the following steps:

- *Revise program scope in NRAs to specify research priorities and associated maximum funding levels.* Because the current program scope does not provide enough information, proposal writers prepare and submit proposals for review that have little or no chance of receiving funding. By including more information on priorities and maximum funding levels in program scope, NASA could significantly reduce proposal and review workloads without adversely affecting the quality of its grant research program.

- *Employ independent mail-in reviews before peer panel reviews.* Peer review panelists must spend too much time on proposals that are obviously unacceptable for funding. As a result, they have insufficient time to evaluate carefully the many fine proposals that are submitted. Peer review panelists could spend their time more effectively if NASA added a step to the review process: independent mail-in reviews to cull the proposals that are unacceptable for funding. If NASA adopted such an approach, peer review panelists could focus their attention on only those proposals that are acceptable for funding. Moreover, a two-step process would reduce workloads and raise review effectiveness without increasing overall processing costs.

- *Consider applying information technologies to parts of the science grant process.* Of the survey respondents, 80 to 90 percent approve of using information technologies for preparing proposals, 66 to 76 percent approve of submitting proposals via information technologies, and 70 to 80 percent approve of notifying proposal writers of evaluation results. NASA should further review and apply computer automation, Internet, and electronic data interchange to its science grant process, as appropriate.

Collectively, these and other actions specified in this report can enhance the effectiveness and efficiency of the science grant process. Some of these actions can be implemented quickly, but others may take considerable time, perhaps until the end of FY96. Consistent with Executive Order 12862, NASA should conduct additional science grant customer surveys after these changes have been fully implemented.

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CHAPTER 1

Introduction

Executive Order 12862, *Setting Customer Service Standards,* directs the executive branch to take customer satisfaction surveys periodically to determine what customers think of the government services they receive and to improve the delivery of those services, as necessary. The Executive order, which is shown in its entirety in Appendix A, defines a customer as an external "individual or entity who is directly served by a department or agency."

In addressing the requirements of the President's Executive order, the National Aeronautics and Space Administration (NASA) identified the grant selection process directed by the Office of Space Science as an important area that serves external customers. Those customers are proposal writers and peer review panel members. Scientists submit proposals in response to periodic NASA Research Announcements (NRAs), and their peers rate the worthiness of those proposals. NASA management then awards grants after considering the panel proposal ratings in the context of NASA missions, budgets, and other considerations. To comply with the requirements of Executive Order 12862, NASA engaged the Logistics Management Institute (LMI) to develop customer satisfaction surveys for both proposal writers and peer review panelists as well as to conduct those surveys and analyze the results.

The following subsections briefly describe NASA's science grant process and discuss our approach to surveying the customers of that process.

SPACE SCIENCE GRANT PROCESS

The NASA science grant process is depicted in Figure 1-1. The process begins with the determination of research needs that are suitable for the grant program. Those research needs are defined, in part, by Congress and, in part, by NASA officials. NASA officials also obtain input from various science advisory panels.

To inform the research community of those areas in which NASA has special research interests, NASA uses the NRA — a form of "broad agency announcement" described in 6.102(d)(2) and 35.016 of the Federal Acquisition Regulation. The NRA permits the competitive selection of basic research projects in the form of grants.

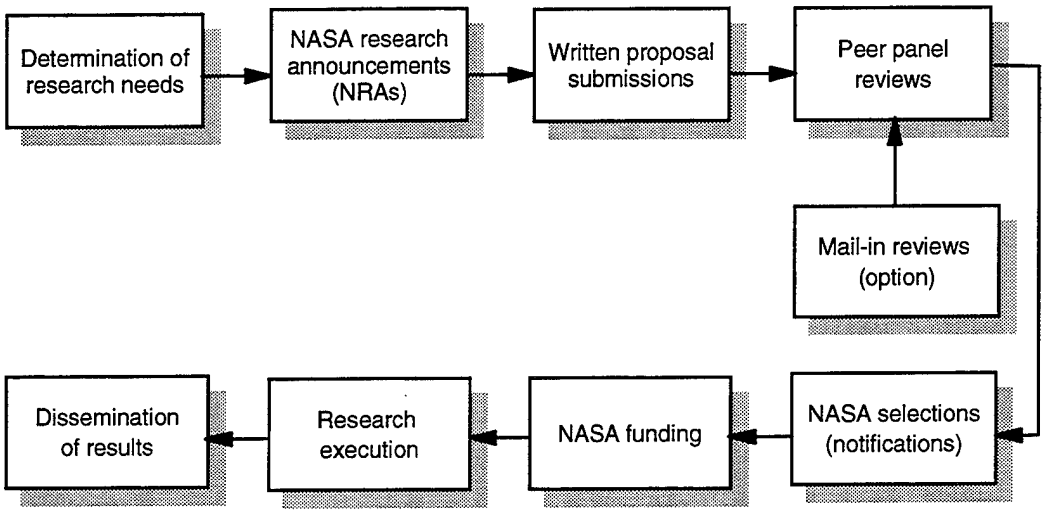

Figure 1-1.
Science Grant Process

In accordance with NRA instructions, proposal writers prepare grant proposals for conducting research. The proposal writers not only discuss the content of the research, but also provide costing and scheduling information in their proposals. Proposal writers are permitted up to three months to respond to an NRA.

Peer review panels meet periodically in different parts of the country to evaluate proposal writers' responses to the NRAs. Subpanels, or working groups, are formed to evaluate the scientific worthiness of the proposals. Typically, a primary and one or more secondary reviewers are assigned to each proposal for documenting its strengths and weaknesses, for providing merit ratings, and for presenting these findings to the entire subpanel. Some panels also use independent mail-in reviews to supplement their views. The subpanel then develops a consensus rating for the proposal.

A full, cross-discipline panel reviews all of the subpanel results. The full panel examines each evaluation and merit rating, normalizes the subpanel proposal ratings for differences in rating systems, and judges each proposal in terms of established rating categories. The established rating categories are as follows:

- *Category I* — well-conceived and scientifically and technically sound investigations that are pertinent to the goals of the program and the announced objectives
- *Category II* — well-conceived and scientifically or technically sound investigations that are recommended for acceptance, but at a lower priority than Category I

- *Category III* — scientifically or technically sound investigations that require further development and may be reconsidered at a later time for the same or other opportunities

- *Category IV* — proposed investigations that are rejected for the particular opportunity under consideration, whatever the reason.

These rating categories represent the final input of external scientists to the selection process. The time standard set by NASA for reviewing and providing feedback on the evaluation of proposals is six months.

The Program Office at NASA Headquarters examines the peer review ratings and recommends the program of research that will optimize total mission return — considering scheduling, engineering, and budgetary constraints. A Steering Committee reviews the recommendations of the Program Office, the category ratings of the peer review panels, general compliance with procedures, and adequacy of documentation. That Steering Committee then prepares an assessment for the appropriate selection official, such as the Associate Administrator. The selection official notifies the proposal writer about research grant awards.

Once proposal writers have been awarded grants, NASA provides the funding. It has no time standard for disbursing the funds after it has notified a proposal writer of a grant award for conducting the proposed research.

The researchers are responsible for communicating their progress and for accounting for their expenses. NASA reviews these communications and assesses grant compliance and research continuity. The researchers also are responsible for disseminating the research results at scientific conferences and in research journals. However, some of NASA's science advisory panels may request briefings of research results for some major grants.

STUDY APPROACH

Government Performance Measures

A key feature of the Executive order is the establishment of customer standards with which to target performance improvements. LMI has developed a comprehensive measurement system for gauging government performance.[1] Specifically, we define government performance in terms of cost, output levels, and quality:

- Cost reflects operating outlays, appropriate allocations of general and administrative expenditures, and depreciation charges for use of capital items.

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[1] LMI Report NS302R1, *National Aeronautics and Space Administration: An Approach for Meeting Customer Standards Under Executive Order 12862*, Lawrence Schwartz and Brian Mansir, May 1994.

- Output levels can be measured by the number of units produced or serviced.

- Quality includes product or service characteristics, schedule, and timeliness.

By our framework, government performance can be improved by introducing new processes that have positive effects on cost, output levels, quality, or a combination of the three. Adopting a new process that reduces costs, without degrading quality or reducing output capability, clearly is an improvement in government performance. Also, adopting a new process that enhances quality, without slowing output and raising costs, improves government performance. In addition, adopting a new process that expands output capability, without hurting quality or raising costs, is a benefit to performance. Moreover, processes that simplify operations often simultaneously reduce costs, enhance quality, and increase output capabilities, thereby, yielding major improvements in government performance. Therefore, NASA should evaluate any process change in terms of its effects on cost, output, and quality — total performance.

In our surveys of proposal writers and peer review panelists, we focused on measuring the components of quality. We also covered costs and outputs to some extent, but NASA should supplement this survey information, as necessary, to complete its measurement of total performance. In this way, NASA will be prepared to consider changes to the science grant process in terms of their full effects on quality, costs, and output.

Key Survey Plans

When 10 or more external customers participate in a government survey, the *Paperwork Reduction Act* requires that the agency submit a survey plan to the Office of Management and Budget (OMB) for approval. Under Executive Order 12862, OMB can grant a generic survey clearance to an agency that permits it to take customer satisfaction surveys without prior survey approval.[2] OMB approved NASA's generic survey clearance request. It describes, among other things, NASA's approach to identifying areas of improvement, selecting customers to be surveyed, developing survey methods and collection procedures, minimizing the burden on survey respondents, and reporting survey results. Appendix B shows NASA's generic survey clearance request.

The OMB approved NASA's generic survey clearance request for one year, through Oct. 31, 1995 (see Appendix C). NASA may renew the clearance by keeping OMB informed of the surveys taken during the year and of plans for future surveys.

Our approach for surveying proposal writers and peer review panelists complies with OMB's requirements as well as follows good statistical practices. First, OMB recommends assessing different ways to contact respondents. We

[2]See Statistical Policy Office, Office of Management and Budget, Executive Office of the President, *Resource Manual for Customer Surveys*, October 1993.

decided to use mail surveys. In-person interviews are considerably more costly for obtaining the type of grant information required, and telephone survey interviews would require respondents to listen intensely for too long a period, probably 20 minutes, jeopardizing the receipt of high-quality data.

Second, OMB requires that a mail questionnaire be answerable within 15 minutes. This OMB time limitation means that the survey must be designed with multiple choice or close-ended questions — rather than essay or open-ended questions — and yet the science grant process must be comprehensively covered. It also means that the survey should be pretested (preferably in focus groups of less than 15 participants) to determine actual time burdens, to rephrase questions that are difficult to comprehend, to delete questions that are inappropriate, and to add questions that are of interest to the survey participants.[3]

Third, OMB requires that everything possible be done to minimize survey nonresponses. Nonresponses bias the survey results to the extent that the opinions of the nonrespondents are different from those of respondents.[4] Because it is difficult to determine if opinions differ, it is prudent to adopt a series of procedures for minimizing survey nonresponses in the first place. Two procedures are particularly noteworthy for mail surveys: small survey instruments and multiple contacts. Survey research reveals that a bulky survey instrument (for example, 8½″ × 11″ sheets stapled together) invites nonresponses; to overcome that common objection, we used a booklet. Survey research also reveals that nonresponse rates tend to be high unless would-be respondents are contacted several times; to ensure high response rates, we planned four contacts.[5]

Fourth, while OMB permits sampling to save costs, it requires that the sample be planned carefully to minimize error introduced by sampling. To bound the sampling error, we used the following statistical criterion: select a sample size that provides accurate survey answers within plus or minus 3 percentage points at the 95 percent confidence level. We selected our samples from the populations of proposal writers and peer review panelists accordingly. Considering nonresponses, we accepted a margin of error of plus or minus 5 percentage points.

Fifth, OMB stresses the importance of planning for the analysis of the survey data. Because quality has so many dimensions, we planned to use the survey data to develop a quality index that would enable us to prioritize improvement goals. That index also can be used as the basis for tracking customer satisfaction

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[3]The pretest is part of the total design method developed by Don A. Dillman, *Mail and Telephone Surveys: The Total Design Method*, New York: John Wiley & Sons, 1978.

[4]See Office of Management and Budget, *The Customer Survey Series: How to Evaluate Alternative Sample Designs for Customer Surveys*, March 15 – 16, 1994.

[5]Survey research, such as with the total design method, has shown that response rates of about 75 percent have often been achieved with multiple contacts.

gains resulting from the implementation of those quality improvement goals.[6] Our analytical approach also included the use of graphical displays to summarize responses to each question, identification of statistical relationships among the answers to different survey questions, and determination of whether responses to a question are universal or whether they are dependent on the backgrounds of the survey respondents.

ORGANIZATION OF REPORT

This report is organized for different types of readers. NASA officials will be most interested in Chapter 2, which highlights the survey results, discusses the implications of those results, and suggests targets to improve the science grant process.

Readers interested in somewhat more detail on survey methods, results, and their implications should read Chapters 3, 4, and 5. Chapter 3 discusses the design of the surveys for both the peer review panelists and the proposal writers, as well as the procedures we used for conducting the surveys. Appendices D and E contain the surveys, and Appendix F contains the post cards and letters sent to would-be respondents to minimize nonresponses.

Chapters 4 and 5 present the key results of the surveys, along with suggested improvement targets and implementation strategies for enhancing customer satisfaction with the science grant process. Appendices G through J present the survey results in detail. Appendices G and I show the survey questions and the distribution of responses made by the peer review panelists and proposal writers, respectively, and Appendices H and J contain comments and suggestions made by the survey respondents.

[6] See National Performance Review, Vice President Al Gore, *Creating A Government That Works Better & Costs Less*, Sept. 7, 1993. The quality index is derived by taking each quality measure of customer satisfaction as a percentage of its corresponding customer standard. The result is a series of customer satisfaction-to-standard percentages. Each customer satisfaction-to-standard percentage is weighted by the relative degree of importance that customers attach to it.

CHAPTER 2

Survey Highlights and Implications

In this chapter, we outline the highlights of the survey results for both the peer review panelists and proposal writers. We also discuss the implications of those survey results and suggest targets for improving the science grant process.

HIGHLIGHTS

Peer review panelists are fairly satisfied with the quality of the research that results from the current science grant process. The scores averaged 3.1 on a scale of 1 to 5, with 1 meaning "not satisfied" and 5 meaning "extremely satisfied." Figure 2-1 presents the percentage distribution of survey responses concerning satisfaction with the quality of the research.[1] The responses on the quality of research were universal. That is, the differences in satisfaction levels reported by peer review panelists in different disciplines (e.g., astrophysics, space physics, or solar system exploration), with different amounts of work experience (e.g., 2 years versus 10 years), or different levels of participation on NASA review panels (e.g., 2 to 4 times versus 8 to 10 times) are not statistically significant.[2]

Peer review panelists also are fairly satisfied with the overall science grant process; the scores averaged 3.2 on the 1-to-5 satisfaction scale. Moreover, the differences among panelists from different disciplines or with different experience levels were not statistically significant.

In contrast, proposal writers are somewhat less satisfied with the overall science grant process. Their scores averaged 2.7, between slightly satisfied and fairly satisfied.

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[1] The 3.1 score on the quality of research was derived as a weighted average of each of the different levels of satisfaction with the percentages of respondents for each satisfaction level serving as the weights. The calculation is as follows: $3.05 = 1 \times 0.0881 + 2 \times 0.1503 + 3 \times 0.4093 + 4 \times 0.3264 + 5 \times 0.0269$.

[2] We used regression analysis to formally test whether satisfaction with the overall grant process varies consistently with the background of the peer review panelists. Each peer review panelist's satisfaction score on the overall grant process was regressed against categorical "dummy" factors to take account of the discipline of the peer review panelist, the panelist's years of experience in those disciplines, and the reviewer's years of participation on peer panels. None of these background factors was statistically significant at the upper 1 percent of the F distribution.

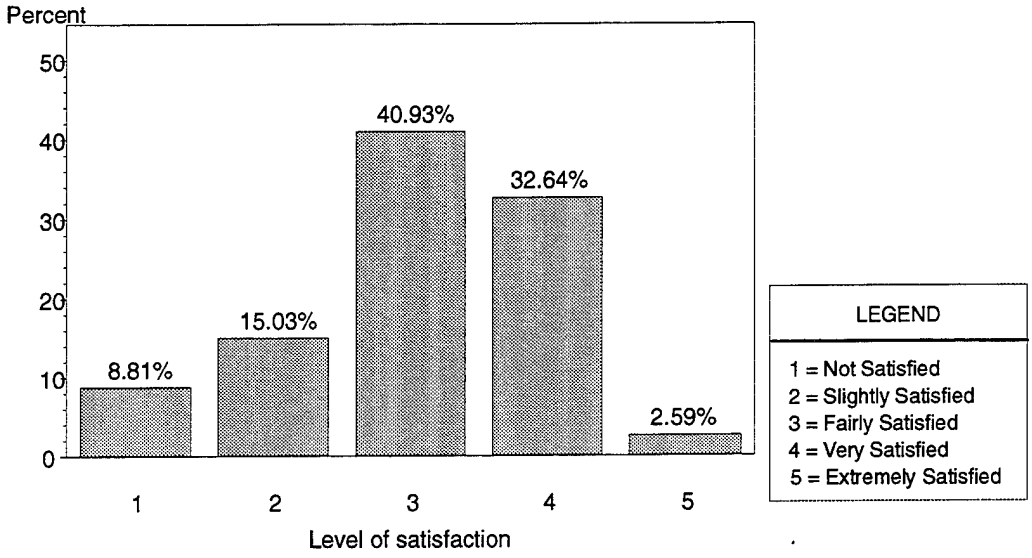

Figure 2-1.
Level of Satisfaction That Grant Process Results in Best Research

Figure 2-2 compares the levels of satisfaction with the overall science grant process reported by the peer review panelists with those reported by the proposal writers. On average, the satisfaction level of proposal writers was half a grade lower than that of peer review panelists — 2.7 versus 3.2 on the 1-to-5 satisfaction scale. However, the satisfaction level of proposal writers who were relatively successful in obtaining grants was about the same as that of the peer review panelists; successful writers scored an average of 3.0, indicating that they are fairly satisfied. In contrast, proposal writers who were less successful than the average in obtaining grants registered a satisfaction level of only 2.4. The difference based on success in receiving grant awards is statistically significant. (The average survey respondent had a 40 percent success rate in obtaining awards.)

Satisfaction levels with the overall grant process are explained by the quantitative answers to more detailed survey questions and by almost 70 pages of comments and suggestions provided by the survey respondents. Both the proposal writers and the peer review panelists suggested that the current science grant process worked better when grant funding was considerably higher than it is now. They also suggested that the current science grant process has problems and needs to be changed accordingly.

The behavior of proposal writers and peer review panelists helps explain why they want changes to the current science grant process. In general, the number of proposals being written and requiring review has increased as science grant funding has dropped. Many researchers stated that they have been writing more proposals to improve their chances of receiving a grant award. They believe that they must write five or more proposals to ensure the receipt of a single

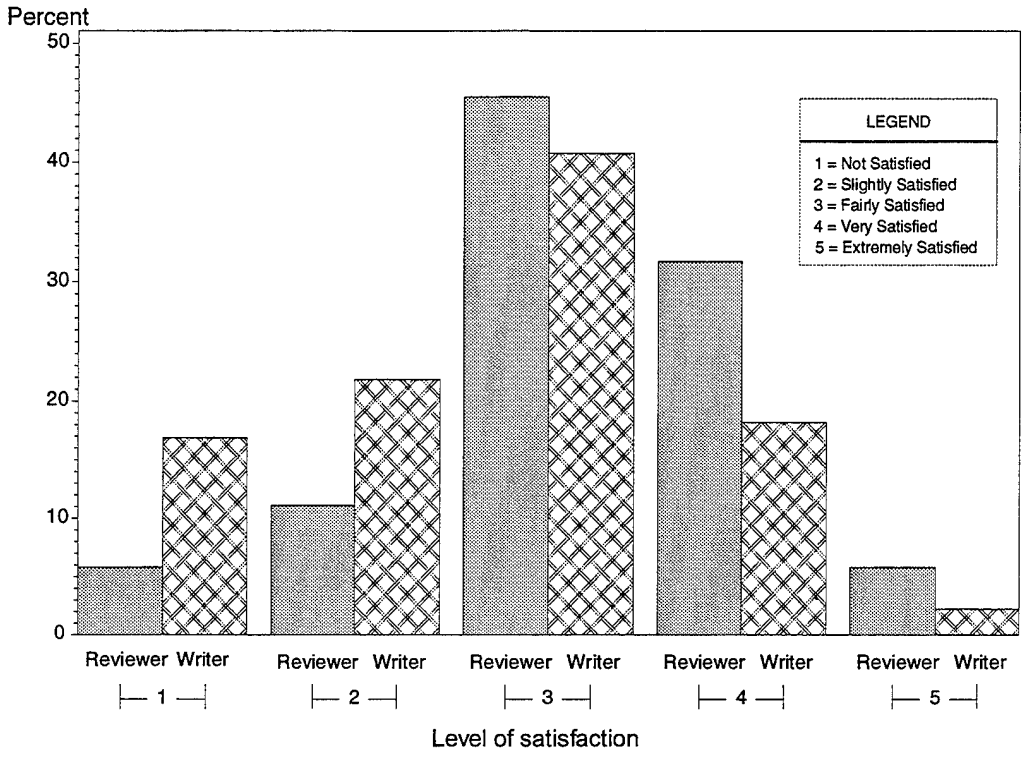

Figure 2-2.
Comparison of Levels of Satisfaction with the Overall Grant Process

grant award from NASA. Moreover, they commented that the amount of time they must spend writing proposals consumes substantial amounts of their productive research time.

Likewise, peer review panelists indicated that they are overloaded with proposals for review both as lead/secondary panelists and as regular panel members. The survey shows that, on average, each lead/secondary reviewer is required to critique seven proposals at a panel meeting. Many lead/secondary panel reviewers believe that their effectiveness is hampered when faced with more than five critiques at a panel meeting.

NASA is also feeling the strains of the large numbers of proposals that must be processed. It now takes an average of more than 13 months from the time NASA issues an NRA to the time it disburses the funds to the grantee: 3 months for preparation time, 6.5 months for evaluation feedback time and notification, and 4 or more months to receive the funding from NASA and the grantee's university. Earlier, when grant funding levels were considerably higher, processing times were considerably lower and more manageable.

Qualitatively, both the peer review panelists and proposal writers believe that the large numbers of proposals being written and reviewed have jeopardized the fairness of the current science grant process. Peer review panelists indicated that they are fairly satisfied with the fairness of the peer panel review

process; their scores averaged 3.2 on the 1-to-5 satisfaction scale. At the same time, because of the increases in the volume of proposal reviews, many peer review panelists indicated that they no longer have the time to fully read and digest all of the proposals before panel meetings. They suggested that the lead/secondary reviewer often has considerably more weight than is desirable in recommending grant awards, especially when the panel has not relied on mail-in reviews to obtain additional independent views.

Also, many peer review panelists believe that the evaluation methods need to be refined to enable them to rate the quality of the proposals more easily. They indicated that the current peer review process for categorizing proposals is suitable for identifying the very good from the very bad proposals but not very suitable for shedding light on the majority of proposals that are neither very good nor very bad in quality. As a result, peer review panelists said that panels spend a great deal of their time justifying why they do not recommend certain proposals for funding.

Proposal writers were even less satisfied with the fairness of the science grant process; their scores averaged 2.7 on the 1-to-5 satisfaction scale. It is understandable that proposal writers who are not frequent recipients of grants might think the process was not fair. However, many proposal writers (even those who have been very successful in receiving NASA grants) suggested that the science grant process favors proposals that come from well-known principal investigators at the larger, more distinguished universities. Proposal writers also mentioned other concerns, such as the inability of overworked panelists to do a full and complete review; lack of emphasis on using mail-in reviews to obtain additional independent views; and incomplete feedback on scientific merit, budget, mission, and other award considerations.

Improvement Targets

The survey results indicate that NASA should adopt new procedures, processes, and technologies for reducing unnecessary proposal writing, for lowering review burdens, and for enhancing the fairness of the science grant process. Some of these changes can be made quickly, but others may take a year or more to complete.

One change that NASA can make quickly is to update its time standards for processing grants. Currently, the science grant process takes about 13 months. The proposal writers have suggested that the grant processing time be reduced to no more than 9 months: 3 months for proposal preparation; 4 months for evaluation feedback and notification; and no more than 2 months to disburse the funding to the grantee. These standards should be reported to the National Performance Review and published in each NRA.

It is one thing to develop stricter time standards and disseminate them, it is another thing to meet those tougher requirements consistent with the National

Performance Review and NASA's strategy of "faster, better, and cheaper."[3] That strategy means that the science grant process will have to propose, review, and fund grants more quickly; to judge proposals more fairly; and to process them more efficiently. Survey respondents provided NASA with many sensible suggestions for improving the science grant process and meeting the objective of "faster, better, and cheaper."

To reduce workload, NASA could begin by reviewing the program scope in its research announcements. The program scope in the NRAs now provides only broad statements about what is included in the overall research program of the announced area. It apparently does not provide enough guidance to would-be proposal writers about NASA's research priorities and the share of funding assigned to those areas. As a result, proposal writers seem to be preparing and submitting proposals in areas that are not justified by NASA's funding levels in those areas, and peer review panelists seem to be allocating valuable time for reviewing some proposals that are unlikely to receive funding. As is done for many other Federal grant programs, NASA should be specific when stating the scope of a research program; the NRA scope should include the research priorities in the announced area and specify the maximum funding levels for each of those priority areas. If NASA were to include a more fully developed program scope in its research announcements, proposal writers could be more selective when deciding whether to respond to a particular NRA, and with fewer proposals to review, peer review panelists could be more effective. Moreover, the reduction in unnecessary proposal writing and peer panel reviewing would not affect the quality of NASA's grant research program.

NASA can also reduce its review workloads, lower costs, and enhance fairness by modifying its peer review process slightly. The current science grant process essentially subjects all proposals to peer review panels, but that process has resulted in too many proposals for an effective panel review. NASA can improve the peer review process by instituting a two-step science grant process:

- Subject all proposals to three or more independent and anonymous mail-in reviews to identify the proposals that are technically not acceptable for funding. Management cost plans would not be needed to accomplish this initial technical review.

- Submit the remaining proposals that are acceptable for funding (with management cost plans) to peer panelists for further review and recommendation. The remaining parts of the process would remain the same.

The two-step review process has a number of advantages. It could reduce the workloads of peer review panelists, perhaps by 30 percent, thereby allowing them to spend the necessary time to more effectively review and recommend deserving proposals for funding. Also, it could broaden the participation of others in the peer review process and enhance the reality and perception of fairness.

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[3] NASA, *Federal Laboratory Review*, February 1995.

NASA can also reduce the burdens on proposal writers and peer review panelists by using information technologies in the science grant process. The survey respondents strongly supported the idea of using information technologies to prepare proposals (80 to 90 percent gave their approval), submit proposals (66 to 76 percent gave their approval), and notify proposal writers of the results (70 to 80 percent gave their approval). The peer review panelists also indicated that they needed more personal computers at panel meetings. NASA should review, study, and apply automation, Internet, and electronic data interchange to its science grant process, as appropriate. (Other agencies have recently begun efforts to introduce information technologies to their grant processes, but no consensus on the most desirable approach has been reached as yet.)

NASA should also consider three other steps for improving the science grant process. First, a number of survey respondents indicated that fairness would be improved substantially if proposals were reviewed without the identification of the investigators and their institutions. Such blind reviews would help dispel the belief that established investigators and institutions are favored by the current process.

Second, to improve fairness and reduce workload, a number of survey respondents believe that each proposal should be scored and ranked by the peer panel reviews. To accomplish this, each evaluation criterion could be scored from 0 to 10 and summed to obtain an overall score for each proposal, and then proposals could be ranked by numerical scores. A formal scoring methodology would enable the peer review panelists to rank the various proposals. Automation would undoubtedly be helpful in implementing such a scoring methodology.

Third, NASA should consider providing proposal writers with more complete evaluation feedback. Other agencies provide detailed information about specific proposal weaknesses or deficiencies as part of their evaluation feedback, and some offer a face-to-face debriefing upon written request. Not only do proposal writers want detailed reviews, they also want to be informed of all factors that are involved in award decisions, including scientific merit, programmatic considerations, budget limitations, and other relevant factors. Such additional information could help to enhance the perception of fairness as well as to improve future proposals submitted to NASA.

CHAPTER 3

Survey Conduct

To conduct the surveys of the proposal writers and peer review panelists, LMI selected the mail as the most appropriate medium. Like any type of survey, mail surveys have both advantages and disadvantages.[1] However, in the case of the science grant surveys, we considered the mail to be the only practical, and the least costly, medium, because the would-be respondents reside throughout the United States and in foreign countries. Another advantage of a mail survey is that it can be accompanied by a cover letter, which can enhance credibility and trust.

Conducting a survey by mail requires careful design of the questionnaire to ensure that the correct questions are asked and that the wording is clear. In addition, this type of survey requires follow-up post cards and letters to ensure a high response rate. This chapter discusses the design of surveys, as well as selection of the samples, administration of the surveys, and response rates.

SURVEY DESIGN

Separate questionnaires were needed for proposal writers and peer review panelists in the NASA science grant process. Although proposal writers and peer review panelists are both scientists and direct external customers of the NASA science grant process, their perspectives differ greatly. For example, proposal writers are concerned about the time they have for preparing the proposals and for obtaining feedback, while peer review panelists are concerned about the time they have for evaluating the proposals and for presenting their findings. Also, the guidelines for preparing and submitting the proposals are entirely different from the guidelines for evaluating and rating the proposals. Because of these wide differences, we developed separate questionnaires for the peer review panelists and proposal writers.

We used a variety of inputs for designing these science grant surveys. First, we held numerous discussions with, and received much documentation from, the Office of Space Science. Second, we independently observed the NASA space science peer review process to obtain first-hand knowledge of how it operates. Third, during three separate survey pretests, we had discussions with peer review panelists and proposal writers about their grant process concerns. Fourth, we followed various design principles in developing the survey. These survey design principles included presenting the survey in a 7″× 8½″ booklet to avoid

[1]See, for example, Louis M. Rea and Richard A. Parker, *Designing and Conducting Survey Research: A Comprehensive Guide*, San Francisco: Jossey-Bass Publishers, 1992. It discusses the use of the mail, telephone, and in-person interviews to conduct a survey.

giving the impression that the survey is difficult and time-consuming to complete; reserving the front and back booklet covers to state the purpose of the survey and to elicit interest; constructing close-ended, multiple choice questions, rather than open-ended questions, to minimize the time for survey completion; grouping the questions under topic headings to maintain respondent interest; and putting the easy and more interesting questions ahead of the more difficult and less interesting questions, also to maintain interest.

Questionnaires

The proposal writer survey contains 15 basic questions that seek to measure satisfaction levels, customer service standards, and the relative importance that customers attach to grant-process quality factors. Appendix D contains the proposal writer survey. Some questions focus on the time for preparing grant proposals, obtaining proposal feedback, and executing research, and others focus on NASA's guidelines for responding to NRAs and other guidance. In addition, the survey asks some general questions relating, for example, to the relative importance that the proposal writers attach to feedback, fairness, and processing time, as well as to the background of the respondents. Finally, a comment section asks for suggestions that the proposal writers might have for improving NASA's science grant process.

The questionnaire for peer review panelists contains 18 basic questions and, like the proposal writer survey, seeks to measure customer satisfaction levels, customer service standards, and the relative importance that customers attach to grant-process quality factors. Appendix E displays the peer review panelist survey. Its questions focus on the time and workload for reviewing grant proposals; on NASA's guidelines for evaluating and rating proposals; and on NASA's support of the peer review process, including expense reimbursement and use of information technology. Other, more general questions concern the qualifications of fellow panel members, procedures for avoiding conflicts of interest, and importance that peer review panelists attach to various quality factors. The survey also asks about the background of the peer review panelists and has a comment section for the respondents to make suggestions for improving NASA's science grant process.

Pretests

We held three separate survey pretests of the survey instruments, one in Houston, Texas, and two in Washington, D.C. As a result of discussions with the peer review panelists and proposal writers who participated in the pretests, we changed the wording of a few questions, dropped one question entirely, and added a couple of questions to the survey instruments. Also, we verified that the respondents could answer the questionnaires within 10 minutes, well within the 15-minute limitation established by OMB.

In addition to testing the questionnaires in the pretests, we verified that the response rates would be relatively low, under 30 percent, if we contacted respondents only once. Hence, we concluded that we would need to contact the would-be respondents several times to obtain satisfactory response rates.

Post Cards and Letters

To explain the purpose of the surveys and to elicit cooperation from would-be respondents, we developed two post cards and two letters that could be sent to both the proposal writers and the peer review panelists. Using generic post cards and letters helped minimize the survey costs. Appendix F contains these four communications:

1. Post card used to alert the selected participants that the survey would be coming in about a week, that cooperation is needed for completing the survey, and that each opinion matters.

2. Cover letter that accompanied the surveys to explain the importance of the effort, to underscore the need for participation for obtaining a representative sample of views, to guarantee confidentiality, and to offer a summary of survey results to each participant.

3. Post card sent one week later to thank those who had already responded as well as to remind those who had not yet responded to do so and to offer them another copy of the questionnaire that they could obtain by placing a telephone call.

4. Final letter, and another copy of the questionnaire, sent only to nonrespondents about two weeks later. The purpose of the letter was to inform nonrespondents that that their questionnaires had not been received and to reiterate the importance of the survey, stress the urgency of receiving all completed surveys to ensure that the community's opinions are accurately represented, and the offer of a summary of survey results.

The close timing between the post card and letter mailings was chosen because survey research has found that survey participants usually respond within a few days of receipt of a questionnaire or a letter concerning the questionnaire. Hence, waiting longer periods between mailings does not improve response rates but merely wastes time.

SAMPLE SELECTION

The Office of Space Science provided FY93 mailing lists of the peer review panelists and proposal writers for selecting samples. LMI drew samples from these mailing lists to bound sampling error within plus or minus 3 percentage points at the 95 percent confidence limit. We stratified the sample only when

there was reason to believe that the survey questions might be answered differently by different strata in the population. We used systematic random sampling (selecting every nth one) of alphabetized name listings to select the samples.[2]

Selection of peer review panelists to participate in the survey was straightforward. The FY93 mailing list showed a population of 540 peer review panelists. Working with the hypergeometric distribution, as required to draw a sample from such a small population, we took a 50 percent systematic random sample. The resulting sample of 270 peer review panelists would provide a margin of error of plus or minus 3 percentage points at the 95 percent confidence limit.[3] Stratified sampling was not necessary for peer review panelists.

The selection process was somewhat more difficult for the proposal writers. NASA's FY93 mailing list showed a population of 1,316 proposal writers, but NASA had reason to believe that proposal writers who had been consistently denied grant awards during FY93 might provide different answers to some questions than those who had received one or more grant awards during that period. Therefore, we stratified the proposal writer sample accordingly. Table 3-1 summarizes the population and stratified sampling information for the proposal writers.

Table 3-1.
Selection of Proposal Writer Sample

FY93 award experience	Population		Sample	
	Number	Percentage	Number	Percentage
Grants awarded	562	42.7	281	42.7
No grants awarded	754	57.3	377	57.3
Total	1,316	100.0	658	100.0

As shown in Table 3-1, we divided the 1,316 proposal writers into two groups: 562 who had been awarded at least one grant and 754 who had not been awarded any grants during FY93. With the same statistical concepts and sampling procedures used for selecting the peer review panelists to participate in the survey, we drew 281 proposal writers who had been awarded one or more grants (50 percent of 562) and 377 who had not been awarded a grant (50 percent of 754). As a result, the 658 proposal writers in the sample are representative of the proposal writers in the population who had received one or more grants (42.7 percent of both the population and the sample) and of the proposal writers

[2] If a 50 percent sample was needed, we drew every other name on the alphabetized list. However, in this case, we first randomly picked whether to start the drawing of the sample with the first or second name on the mailing list.

[3] If we achieve a 75 percent response rate, the sampling error would be bounded between plus or minus 5 percentage points, still an acceptable margin of sampling error for this survey effort.

who had not been awarded any grants in FY93 (57.3 percent of both the population and the sample).

In total, we selected 928 individuals to participate in the NASA science grant surveys: 270 peer review panelists and 658 proposal writers. Of the 928 individuals in the samples, 34, or 3.7 percent, were selected to receive both the proposal writer and the peer review panelist surveys.

SURVEY ADMINISTRATION

As required by Federal printing regulations, NASA produced the 7"× 8½" survey booklets as well as the post cards and letters. LMI provided camera-ready versions of the questionnaires and electronic versions (ASCII and WordPerfect 6.0 for Windows) of the draft texts for the post cards and letters. NASA revised the post card and letter texts slightly and added the NASA logo to those communications. NASA also mailed all of the questionnaires, post cards, and letters, and it established a special mailbox for receipt of survey returns.

So that survey responses could be tracked, NASA assigned a three-digit code to each individual selected to participate in the surveys. That code was placed on the survey instrument, the cover letter, and the mailing labels. The codes were used only for tracking responses; they were *not* used for identifying the respondents with particular answers to questions. NASA prepared each would-be survey respondent's coded survey instrument in duplicate for a possible follow-up.

NASA mailed all survey instruments and communications on Wednesdays because it is a relatively light mailing day. It mailed the alert post card on Jan. 25, 1995. On Feb. 1, 1995, it mailed the survey instrument, the cover letter, and a self-addressed meter-postage return envelope — all contained in a standard Number 10 envelope. NASA mailed the thank-you/reminder post cards to the 928 individuals in the samples on Feb. 8, 1995. On Feb. 24, 1995, NASA mailed the final appeal to any individuals who had not responded. However, those who had telephoned for a second questionnaire in response to the reminder card were not sent a final appeal letter because they had demonstrated their interest in the survey and would most likely complete the questionnaire.

After the final appeal letter was mailed, we waited four weeks — until Mar. 22, 1995 — before "closing the books" on the period for receiving the data.

The survey data were entered into separate DBase (.dbf) files on PC diskettes. To facilitate data entry, we assigned numerical codes for each category of response on the questionnaire. (Those codes did not appear on the survey instruments that were sent to the respondents.) Our data entry staff verified the accuracy of the data entries by repunching 25 percent of the surveys and checking for errors. If an error was found anywhere, they repunched another 25 percent of the surveys and checked for errors in this new batch. The process

continued until an error-free batch was found or until all surveys were completely verified.

For analyzing the survey data, we chose the Statistical Analysis System (SAS). SAS creates data sets from the DBase files and is very good for providing tabulations and graphics of results, for determining the statistical relationships among various question answers, and for evaluating whether answers to questions are universal or depend upon the background of the survey respondents.

Response Rates

We achieved a 73 percent response rate overall on the science grant surveys through Mar. 22, 1995.[4] For the peer review panelists, we attained a 76 percent survey response rate (192 questionnaires completed out of 252 mailed and received by the survey participants). We recorded a slightly lower survey response rate on the two proposal writer survey strata: 74 percent for those who were awarded grants in FY93 (203 completed out of 273 mailed and received by the respondents) and 70 percent for those who had not been awarded a grant in FY93 (250 completed out of 358 mailed and received by the respondents). Table 3-2 provides details about the mailings and response rates achieved in the science grant surveys.

Table 3-2.
Mailings and Response Rates for Science Grant Surveys

Survey strata	Surveys mailed to respondents			Surveys completed	Response rate (%)[a]
	Targeted	Not received	Received		
Peer review	270	18	252	192	76
Proposal writer *with* FY93 grant	281	8	273	203	74
Proposal writer *without* FY93 grant	377	19	358	250	70
Total	928	45	883	645	73

[a]The response rate is calculated as the number of surveys completed relative to the number of surveys mailed and received by the survey participants.

The response rates have implications for sampling error and nonresponse bias. A 73 percent response rate is considered very good by statisticians for limiting bias in survey answers. A 50 to 60 percent response rate is often considered

[4]After our Mar. 22, 1995, closing date for recording survey returns, we received some 20 additional returns, mostly for proposal writers, and that raised the overall response rate to 75 percent. Although we did not formally include these additional returns in our data base, we did analyze their inputs.

satisfactory for the purposes of analysis and reporting of findings. In terms of sampling error, the margin of error is plus or minus 5 percentage points at the 95 percent confidence limit for the number of surveys completed in each strata. Thus, if 75 percent of the peer review survey respondents answered "yes" to a survey question, we can be sure that 70 to 80 percent of *all* of the peer review panelists in the population would answer that way (95 percent of the time).

The multiple contacts with the survey respondents played an important part in achieving these response rates. A regression analysis of 21 response rates reflecting three different types of survey respondents and seven weekly returns — i.e., peer review panelists, proposal writers with FY93 grants, and proposal writers without FY93 grants, each tracked over seven weeks — revealed a "spiked" time pattern for the responses. The spiked time pattern explains 95 percent of the variation in response rates, with no statistically significant differences shown between the types of respondents. Figure 3-1 displays the estimated overall time pattern of response rates.

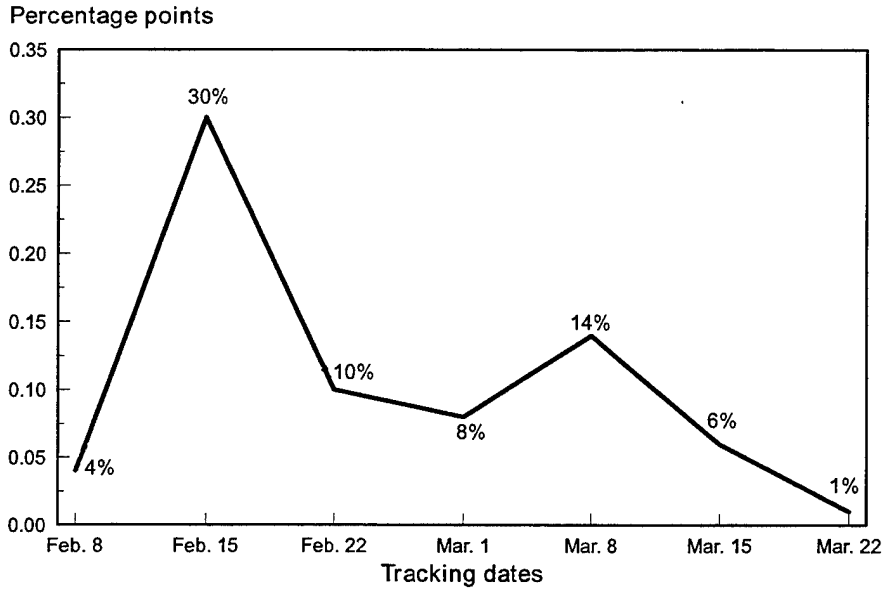

Figure 3-1.
Effect of Respondent Contacts on Response Rates

The spiked time pattern of response rates occurred twice during the conduct of the surveys. First, between Jan. 25 and Feb. 8, we mailed an alert post card, the survey instrument, and a thank-you/reminder post card to the respondents. These three contacts were responsible for the first spiked time pattern: a 4 percent response rate on Feb. 8, peaking at 30 percent on Feb. 15, and declining to 10 percent on Feb. 22 and to 8 percent on Mar. 1 — a cumulative 52 percentage point response rate. Second, after we mailed a final appeal letter and second survey instrument on Feb. 22, the response rate rose to 14 percent on Mar. 8 then declined to 6 percent on Mar. 15 and 1 percent on Mar. 22 — an additional

21 percentage point response rate. Although the earlier contacts may have had some lingering effect on the additional response achieved in the second time spike, it seems likely that most of that increase was due to the final appeal contact.

CHAPTER 4

Key Survey Results: Peer Review Panelists

In this chapter, we discuss the key results from our survey of peer review panelists. We summarize the overall quality of the science grant process from the perspective of peer review panelists, present their responses to key survey questions, and discuss the implications of those responses for improving the science grant process. Appendix G shows the distribution of responses for each survey question, and Appendix H provides the comments made by the respondents.

QUALITY INDEX

From the survey results, we computed a quality index to show how well the quality standards of peer review panelists have been met and to identify those components of the science grant process that need improvement. We calculated that the peer review panelists rated the overall quality of the science grant process at 71 percent, on a 0 to 100 percent scale. That is, on average, they believe that 71 percent of their quality standards have been fully met. Table 4-1 shows the construction of the quality index for peer review panelists.

The satisfaction scores on the quality components for peer review panelists ranged from approximately 62 to 88 percent. We targeted quality components for improvement if they received an average score of less than 70 percent. On the 1-to-5 satisfaction scale, an average score of under 3.5 would signal the need for improvement. Using the 70 percent rule, we believe that improvements are most needed for mail-in reviews, review fairness, and guidelines. However, this does not necessarily rule out the need for improvements in certain aspects of other quality components. We now provide the highlights for the quality components in the order in which they appear in Table 4-1.

Table 4-1.
Peer Review Quality Index

Quality component	Percentage of standard[b] (1)	Weight[c] (2)	Contribution to total (3) = (1) × (2)
Time/workload	0.883	0.141	0.124
Panel support	0.745	0.123	0.091
Panel qualifications	0.730	0.163	0.119
Ethical issues[a]	0.697	0.138	0.096
Guidelines	0.659	0.127	0.084
Review fairness	0.647	0.167	0.108
Mail-in reviews	0.618	0.141	0.087
Total	—	1.000	0.709

[a] Ethical issues refer to avoiding conflicts of interest and protecting proprietary ideas.

[b] Percentage of standard is computed by taking the average actual peer review scores for the answers to questions that fall under each quality component — scores that range from 1, or "not satisfied," to a maximum possible score of 5, or "extremely satisfied" — relative to the maximum 5 score — the standard of excellence.

[c] Respondents used 1-to-5 scores to register the degree of importance that they attach to each quality component. We calculated a weight for each quality component by taking its total importance scores relative to the grand total of all quality component scores.

TIME AND WORKLOAD

Peer review panelists indicated that the time allocated to them for proposal reviews, both before and during panel meetings, was reasonably satisfactory. On average, they received about 87 percent of the time needed for prepanel study and 90 percent of the time needed for panel deliberations. However, many respondents indicated that the amount of time has been decreasing because their review workloads have been increasing.

Figure 4-1 shows the distribution of lead/secondary panelist workloads. On average, half of the lead/secondary panelists have been critiquing 7 or more proposals for a panel meeting. About 42 percent of the lead/secondary panelists have had workloads of 4 to 5 proposals, while 25 percent of them have had workloads of 10 or more proposals. Of all the disciplines, astrophysicists tend to have the largest lead/secondary workloads.[1]

Peer review panelists believed that their ability to review proposals effectively was hampered by these high workload levels. Some suggested that, to

[1] We used regression analysis to formally test whether workload levels varied consistently with the background of the peer review panelists. Categorical "dummy" variables were used to represent the discipline of the peer review panelists, the panelists' years of experience, and their participation on peer panels. Regressing those background factors on the workloads, we found that the discipline of the peer review panelists was highly statistically significant for explaining differences in workloads.

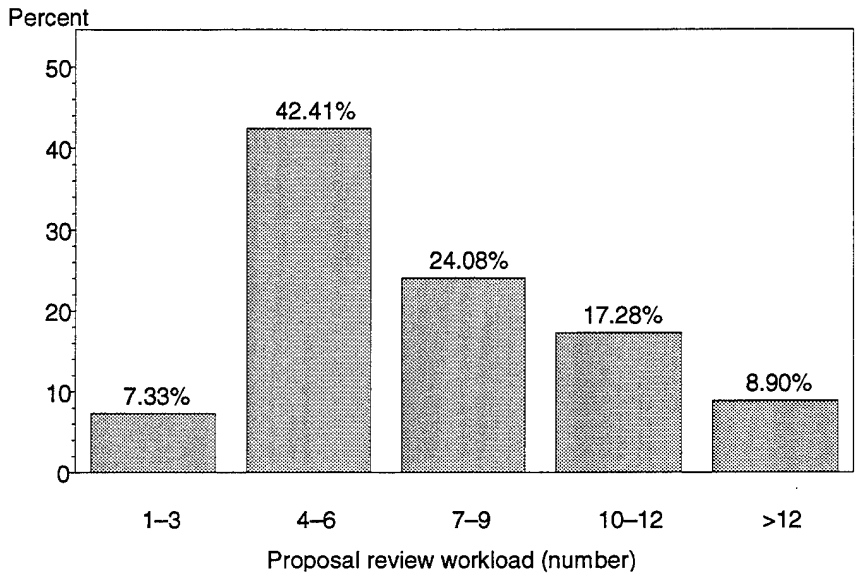

Figure 4-1.
Lead/Secondary Panelist Workload

ensure an effective review, lead/secondary panelist workloads should not exceed five proposals. With more reasonable workload levels, they felt that they could both do the lead/secondary critiques well and be adequately prepared for other reviews as regular panel members.

PANEL SUPPORT

Figure 4-2 shows the average levels of peer review panelists' satisfaction with the various items that support their panel sessions. The scores for these items of support are clustered into five groupings. First, peer review panelists gave the highest scores for meeting facilities, an average of 4.1 or slightly more than very satisfied. Second, lodging, supplies, and travel each received a 3.9 average rating, slightly less than very satisfied. Third, clerical support, coordination help, and telephone and fax facilities were scored with a 3.8 average, also quite close to a rating of very satisfied. Fourth, meals and per diem received a 3.6 average score, also close to a very good score. Fifth, personal computer support received the lowest rating with an average score of 3.0 — fairly satisfied.

On the basis of our 70 percent rule (below 3.5 on the 1-to-5 satisfaction scale), we recommend that NASA improve the personal computer support it provides at peer review panel meetings. Specifically, NASA should make personal computers more widely available at panel meeting deliberations. The survey respondents did not provide details on the types of personal computers desired.

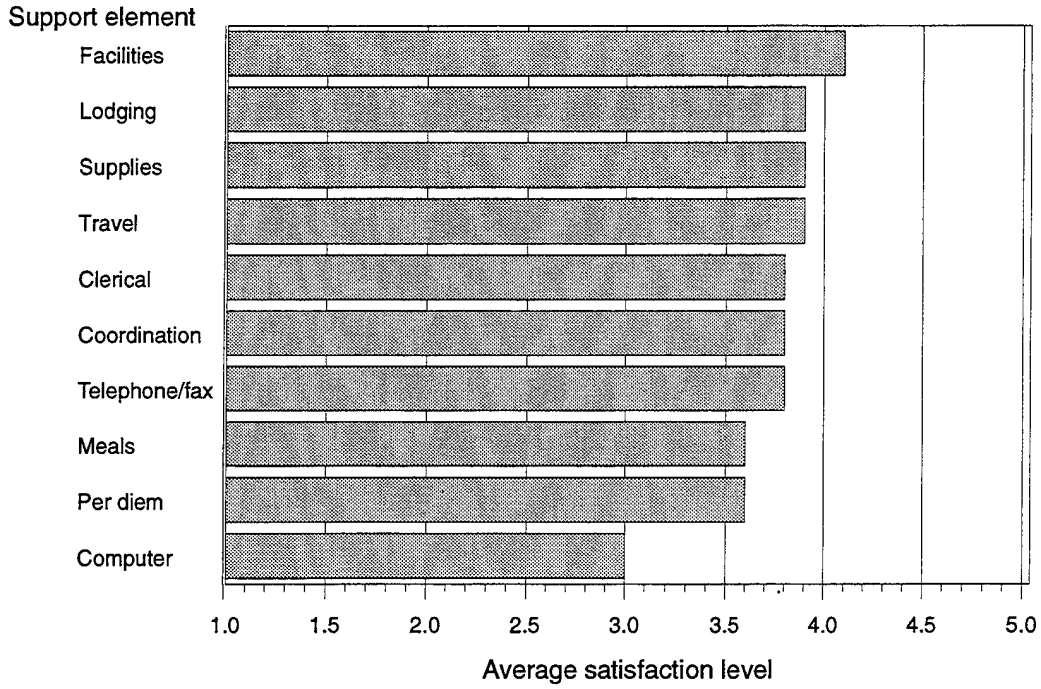

Figure 4-2.
Satisfaction with Peer Review Panel Support

Peer review panelists strongly support the use of information technologies for various elements of the science grant process. As shown in Table 4-2, NASA received strong support for using information technologies in proposal preparation (80 to 90 percent approved), notification (70 to 80 percent approved), and submission (66 percent to 76 percent approved). Less support was shown for applying information technologies to proposal evaluation and grant awards for the science grant process.

Table 4-2.
Support for Using Information Technologies in the Science Grant Process (percentage)

Process element	Yes	No
Preparation	85	15
Notification	75	25
Submission	71	29
Award	69	31
Evaluation	64	36
Overall	75	25

Note: Margin of error is plus or minus 5 percentage points.

We believe that NASA should consider the use of computer automation, Internet, and electronic data interchange as may be appropriate to its science grant process. Other Federal agencies — especially the National Science Foundation, National Institutes of Health, and Department of Energy — have been exploring the use of these information technologies for their grant processes but have not reached a consensus on the best technological approach for processing grants. NASA should appoint a task group to review these ongoing developments and to determine the efficiency and effectiveness of the different approaches.

Ethical Issues

Peer review panelists did not believe that ethical issues — avoiding conflicts of interest or protecting proprietary ideas — were serious problems. On the 1-to-5 satisfaction scale, both ethical issues received a rating of 3.5 — a score quite close to being very satisfied.

In their comments, peer review panelists focused on the issue of avoiding conflicts of interest. Appendix H includes a full set of those comments, but we quote only three of them here:

> "Concerns about conflict of interest from individuals from the same institution are given too much weight — interfere with giving proposals a balanced review by a full panel . . . ."

> "I felt that there was some strong bias on at least one committee members part against proposals competing with those from that member's institution, and that this greatly affected the outcome of this review."

> "No panel is ever free from all conflicts of interest — the fields are too small."

The peer review panelists did not comment at all on protecting proprietary ideas.

Guidelines

Peer review panelists were not very satisfied with NASA guidelines for reviewing proposals. Figure 4-3 presents the average satisfaction levels for guidelines on evaluation criteria, methods, and ratings. Each guideline received an average rating below 70 percent of the standard of excellence (under 3.5 on the 1-to-5 satisfaction scale).

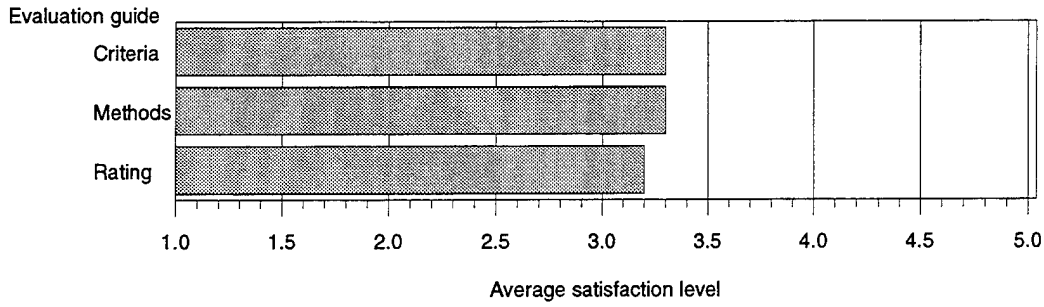

Figure 4-3.
Satisfaction with Evaluation Guidelines

Peer review survey respondents made many useful comments and suggestions for improving the guidelines for evaluating proposals. Appendix H contains the full set of those comments; we quote five of them here:

> "The evaluation process, particularly guidelines, has improved greatly over the years."
>
> "There are no uniform standards across programs. There should be."
>
> "Proposal rating could be improved by asking for ratings on each criterion and NASA using them to arrive at an overall rating."
>
> "I feel a fair amount of time is actually more or less wasted going through a formal review of those proposals that are obviously not going to be accepted. A two-stage process would probably be more efficient. Stage 1, [with independent mail-in reviews or whatever]: weed out the proposals that will not be serious competitors. Stage 2, convene a (smaller) panel to deal with the [remaining] proposals .... [This two-stage procedure] would probably save 30% of the actual time spent on reviews."

We believe that these suggestions and others provided by the peer review panelists will help to improve the review process substantially. If NASA standardized its guidelines, peer review panelists could serve on different panels more easily. If they had a scoring methodology for each criterion, panelists could more easily justify their selection of winning proposals among the many fine proposals that they receive for review. Finally, having a prepanel stage in the review process would substantially reduce the burdens on peer panelists; they could therefore review the proposals more effectively and ensure that their recommendations on funding are well justified.

REVIEW FAIRNESS

On average, peer review panelists were moderately satisfied with the fairness of the science grant process. The average score was 3.2, or just above fairly satisfied on the 1-to-5 satisfaction scale. Figure 4-4 shows the full distribution of responses for satisfaction with the review process. It is understandable numerically why the average score on review fairness is just above fairly satisfied. The majority of the peer review panelists — 45 percent — said they were fairly satisfied (and virtually established the average), and 37 percent said they were either very satisfied or extremely satisfied. Only 17 percent of the peer review panelists said they were either not satisfied or only slightly satisfied, pulling down the average.

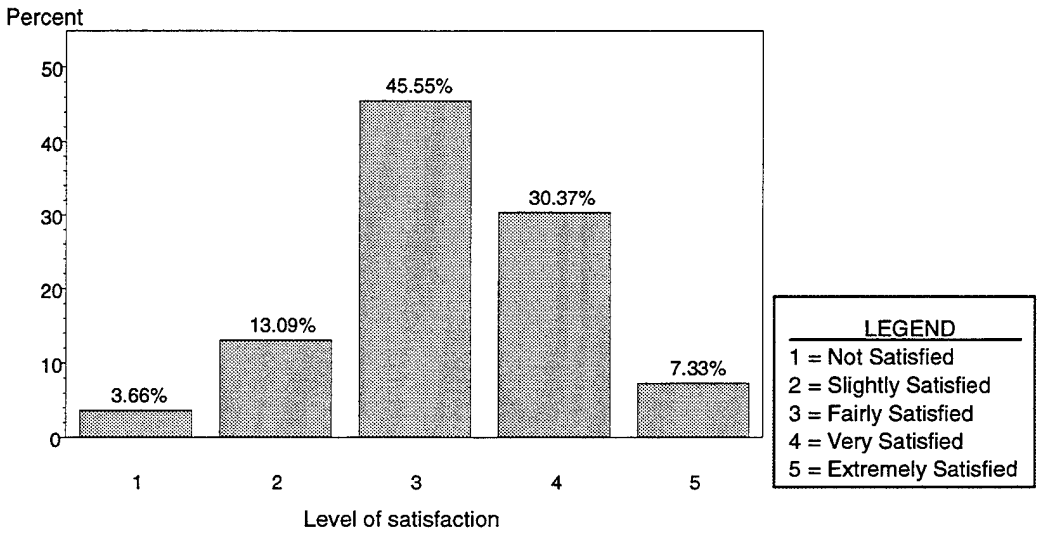

Figure 4-4.
Satisfaction with Review Fairness: Peer Review Panelists

The peer review panelists offered comments on and suggestions for improving the fairness of the review process (see Appendix H). We quote six comments here:

> "I believe [the process] is fair and the reviewers [are] largely free of personal bias in their assessments."

> "The last panel I served on had several proposals with no mail-in reviews. This puts the panel in a position of having to review proposals for which there may be no expertise on the panel. "

> "Make sure that there is an adequate number of external mail-in reviews (approximately four), so that no single reviewer carries too much weight."

"Too much favoritism towards established investigators. "

"[Use] blind reviews."

"In some cases, the proposal rating was only determined (voted) by the primary and secondary reviewers rather than the entire panel. To ensure fairness, the rating of every proposal should be voted on by all the panel members, who also [should] read the proposal."

While most peer review panelists were fairly satisfied with the fairness of the grant review process, they believe that there is room for improvement. Many believe that independent mail-in reviews should be mandatory and should play a larger role in the review process. Also, many believe that well-known principal investigators and larger institutions are favored; they suggested that identifications be removed from the proposals before they are given to reviewers. (As discussed in Chapter 5, proposal writers had similar concerns.)

Also, we believe that the fairness of the grant process has been adversely affected by the large number of proposals that must be reviewed. Lead/secondary reviewers commented that they have difficulty finding the time to critique seven proposals for a panel meeting, let alone finding the time to read other proposals that they must assess as regular members of other panels. Regular panel members have indicated that they have recently been overwhelmed with review workloads, thereby hampering the quality of their deliberations. Those who have served as independent mail-in reviewers also have complained that they cannot undertake so many proposal reviews because they are so busy with their own research and the ever-growing need to write proposals. Thus, the fairness of the process will be helped by reducing proposal workloads.

Mail-In Reviews

The peer review panelists were only fairly satisfied with the mail-in review process. They gave the mail-in reviews a numerical score of 3.1 on the 1-to-5 satisfaction scale. As indicated in our discussion of peer review fairness, many believe that NASA should require mail-in reviews as part of the grant process. On the other hand, many indicated that the quality of the mail-in reviews is uneven.

Peer review panelists thought that NASA could do a number of things to improve the quality of mail-in reviews. First, many indicated that NASA could strengthen the quality of independent mail-in reviews by making them an official requirement rather than optional and by attaching more importance to them (at present, the community believes that mail-in reviews are not considered very important). Second, some suggested that the quality of the mail-in reviews could be made uniformly higher if the mail-in participants knew that they would be included in the evaluation feedback provided to proposal writers. Currently, the mail-in reviews are not published; they are merely summarized by NASA. Third, many suggested that mail-in reviews would be better if proposal writing and

reviewing workloads were reduced, thereby giving mail-in reviewers more time to devote to these evaluations.

CHAPTER 5

Key Survey Results: Proposal Writers

In this chapter, we discuss the key results from our survey of proposal writers. We summarize the overall quality of the science grant process from the point of view of proposal writers, present their responses to key survey questions, and discuss the implications of those responses for improving the science grant process. Appendix I shows the distribution of responses for each survey question, and Appendix J provides the comments made by the respondents.

QUALITY INDEX

From the survey results, we computed a quality index to show how well proposal writers' quality standards have been met and to identify those components of quality that need improvement. We calculated that proposal writers gave a 56 percent average rating, on a 0 percent to 100 percent scale, for the overall quality of the science grant process. That is, proposal writers indicated that 56 percent of their standards were met with the current science grant process. Table 5-1 shows the construction of the proposal writer quality index.

The satisfaction scores on all four quality components for proposal writers — proposal guidance, processing time, fairness, and feedback — are relatively low, ranging from approximately 48 to 66 percent. We believe that any

Table 5-1.
Proposal Writer Quality Index

Quality component	Percentage of standard[a] (1)	Weight[b] (2)	Contribution to total (3) = (1) × (2)
Proposal guidance	0.655	0.217	0.142
Processing time	0.596	0.221	0.132
Fairness	0.540	0.296	0.160
Feedback	0.478	0.266	0.127
Total	—	1.000	0.561

[a] Percentage of standard is computed by taking the average actual proposal writer scores for the answers to questions that fall under each quality component — scores that range from 1, "not satisfied," to a maximum possible score of 5, or "extremely satisfied" — relative to the maximum of a 5 score, the standard of excellence.

[b] Respondents used 1-to-5 scores to register the degree of importance that they attached to each quality component. We calculated a weight for each quality component by taking its total importance scores relative to the grand total of all quality component scores.

quality component with a satisfaction score under 70 percent is a target for improvement. We now provide the highlights for each of the quality components in the order in which they appear in Table 5-1.

PROPOSAL GUIDANCE

Proposal writers gave relatively good marks to the guidance they received on proposal contents and on preparation and submission, but somewhat lower marks to the guidance on program scope, costing, and evaluation criteria. Figure 5-1 shows the average satisfaction scores for each of these elements of proposal guidance. Specifically, proposal writers gave proposal contents and preparation and submission average scores of 3.5, indicating that NASA had achieved 70 percent of the quality standards — reasonably good results. However, the average scores for the other elements of guidance fell below the 70 percent level, or below 3.5 on the 1-to-5 satisfaction scale. Program scope received a 3.3 score; costing, a 3.1 score; and evaluation factors, a 3.0 score — all at or slightly more than fairly satisfied.[1] Thus, NASA should strengthen its overall proposal guidance by improving the guidance it provides on program scope, costing, and evaluation criteria.

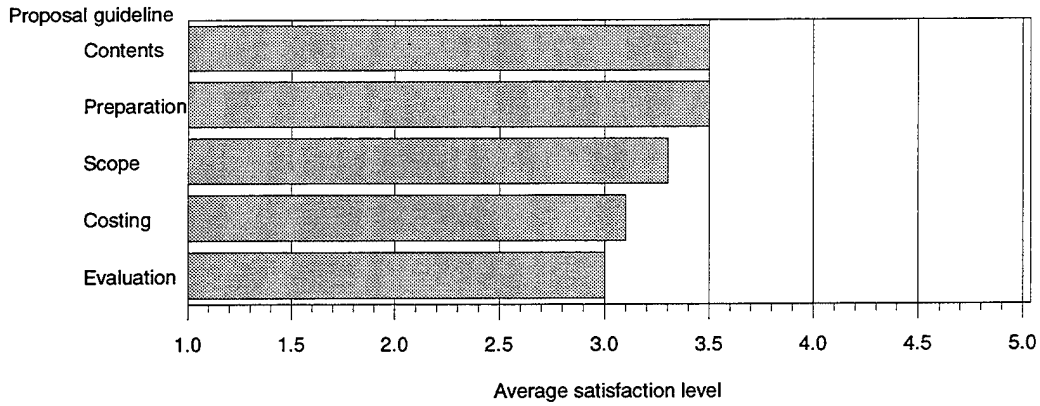

Figure 5-1.
Satisfaction with Proposal Writing Guidance

[1] We stratified the sample of proposal writers by those who were successful and those who were less successful in receiving grants to ensure that the survey statistics for proposal guidance (and other factors) were sound. Such stratification was necessary because the satisfaction statistics tend to be higher for the successful proposal writers in most categories of proposal guidance (except preparation and submission, where there was no effect of the degree of proposal success on satisfaction levels whatsoever). So, with our stratified sampling procedures, the average statistics reported are an accurate reflection of the views of the population of proposal writers on proposal guidance (and other factors).

Proposal writers made many comments on, and suggestions for, improving proposal guidance. (See Appendix J.) We provide some of them here, categorized by proposal guidance element:

- *Contents and Preparation*

  "The NRA is poorly organized — one does not know where to look for certain pieces of information."

  "To understand all of the requirements one needs to flip back and forth between the general instructions in the Appendices and the specific instructions in the body of the [announcement]."

  "The format of the proposals themselves could be streamlined. Eliminate the redundant and pedantic "Budget Summary" pages. Obtain a single annual copy of the drug-free workplace [and other forms] from each university instead of the wasteful duplication of putting them in every proposal. The forms are signed by a representative of the whole university . . ."

  "Send out self-contained NRAs that contain *all* the necessary forms . . ."

  "Give a sample submission . . ."

  "A summary sheet of requirements would speed the preparation."

- *Program Scope*

  "The true [program] scope is difficult to see. Talking to NASA sometimes clarifies things quite a lot."

  "Program scope described in NRAs is often not consistent with what proposals are actually invited or funded."

  "The areas of interest should be clearly stated and prioritized."

- *Costing*

  "NASA (the government) must abandon the requirement that funds must be used within [the] year [of funding]. Costs can often be reduced if expenses can be postponed."

  "Writing a cost management plan is difficult for most research efforts, in which it is difficult to gauge direction more than a few weeks at a time. This may be best reserved for large project team proposals."

  "NASA should cap allowable indirect costs to: 40% on salaries and wages and benefits; 15% on supplies, travel, publication costs, etc.; 0% on equipment, student stipends and tuition."

- *Evaluation Criteria*

  "Clear evaluation criteria [are needed]."

"I do not like the nebulous programmatic factors."

"'Relevance' is an almost worthless evaluation factor, and I bet that most of the community feels that way."

"I would like to see an evaluation option for each of the specific evaluation factors, not just [for] the factors [taken] together."

We believe that NASA can easily adjust its proposal guidelines to improve proposal writer satisfaction with them. Guidelines on contents and preparation could be streamlined, organized better, and simplified. Program scope could be more specific in terms of priorities and maximum funding levels, thereby helping to avoid unnecessary proposal writing and reviewing. The policies and procedures for both costing and evaluation criteria could be better explained and revised, as may be necessary.

Processing Time

The proposal writers are satisfied with the current standards for preparation time and did not suggest changing them. However, they are not nearly as satisfied with the amount of time for obtaining feedback and funding. Table 5-2 shows the time standards (both current and desired) for processing proposals, as well as the actual times. All times are expressed in months.

Table 5-2.
Proposal Processing Times (months)

Processing element	Time standard		Actual time
	Current	Desired	
Preparation	3	3	3
Feedback	6	4	6
Funding	—[a]	2	4
Total	—	9	13

[a] NASA has no time standard for disbursing funds.

Proposal writers were not very satisfied with the time for obtaining feedback after submitting their proposals. Although NASA has met its current six-month feedback standard most of the time, proposal writers would like NASA to establish a more ambitious time standard.

NASA has no time standard for issuing funds after it has awarded a grant, but the time has averaged about four months. Proposal writers were very disturbed about such delays. They would like to see a two-month (maximum)

standard adopted for receiving funding after they have been notified of receiving the grant award.

The following comments on this issue are a sample of those provided in Appendix J:

> "Once an award is made, the delay in actually getting the money to an institution has crept up to an additional 2 – 3 months."
>
> "A recurrent problem has been the length of time between notification of review results and actual funding (ranging from 4 to 6 months)."
>
> ". . . the response time [for receiving funds] is often 6 – 9 months."
>
> "Numerous phone calls from us are required in order to receive payment. We are often told that the grant papers are 'lost' in huge stacks of paperwork on various individual desks."

We believe that NASA should tighten its processing times to a total of nine months from the point of proposal preparation to receipt of funding. These standards should be provided to the National Performance Review and published in NASA's Research Announcements. Process improvements, especially with the time for issuing funding after notification of award, will be needed to reach these stricter standards. The Office of Space Science should make the necessary improvements to meet these new standards.[2]

FAIRNESS

Proposal writers were not too satisfied with the fairness of the evaluations of their proposals. They gave an average score of 2.7 or slightly to fairly satisfied on the 1-to-5 satisfaction scale. Figure 5-2 shows the distribution of proposal writers' responses on this question. Whereas 30 percent of the survey respondents were fairly satisfied (gave a 3 score) and 27 percent were more than fairly satisfied (gave either a 4 or 5 score), 42 percent were less than fairly satisfied (gave either a 1 or 2 score). We found no statistically significant differences in proposal writers' assessments of review fairness according to either their scientific discipline or years of experience in submitting proposals. However, the differences in assessment of review fairness according to proposal success were statistically significant; successful proposal writers tended to view the process as fair, while less successful proposal writers were less satisfied that the process is fair.

[2] This office should also benchmark other Federal grant processes and make further improvements as necessary.

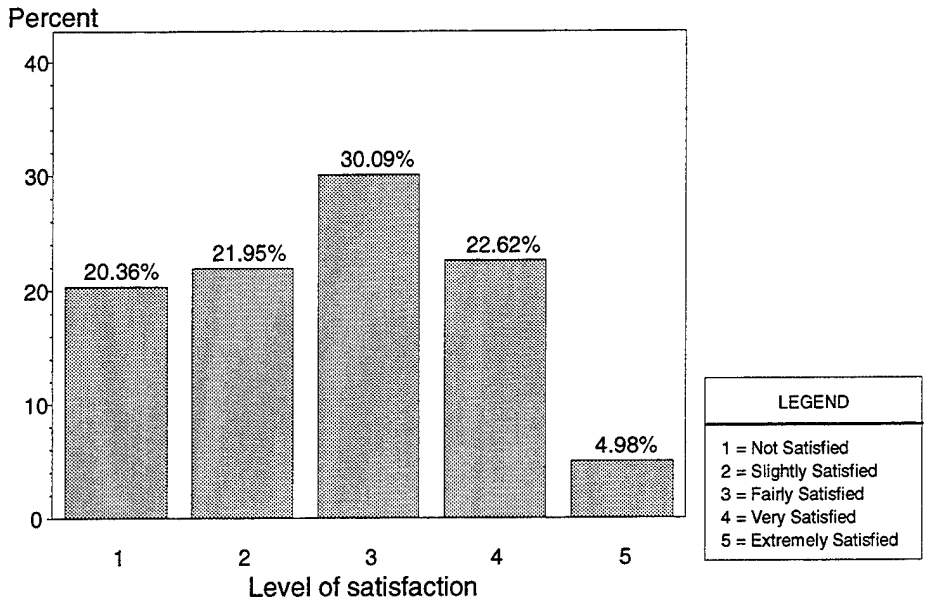

Figure 5-2.
Satisfaction with Review Fairness: Proposal Writers

Many of the proposal writers' comments and suggestions on the fairness of proposal evaluations are similar to those of the peer review panelists. Some of the proposal writers' comments (from Appendix J) are quoted here:

> "When reviewing proposals for scientific merit, do not include the investigators' names or institutions. I do believe that there is a great bias towards those from well-known institutions. I have experienced this when I moved from an institution more well-known than where I am now. My science efforts have not changed, but I have noticed an increase in difficulty in being awarded grants."

> "I very strongly support the panel review process which NASA currently uses to evaluate proposals. [This] process is much fairer (and therefore more effective) than the reliance on remote peer-reviewers . . ."

> "Prefer independent individual reviews over panel [reviews]. Panel [is] subject to politicking by one dominant [panel] member."

> "Its generally a good process, but at times it appears exceedingly difficult for new research ideas and people to break into an area."

> "It is simply not possible to have a fair and thoughtful review if a panelist is assigned 60 to 70 proposals, and if the formal meetings are limited to at best 2 days."

We believe that NASA should improve the fairness of the evaluation process as perceived by proposal writers. NASA could make mail-in reviews a mandatory part of the review process in order to broaden the evaluation inputs. NASA

could further bolster the perception of fairness by sending proposals to the review panel and independent reviewers without the identification of the investigators or their institutional affiliations. Also, NASA could provide further explanations of final selections after panel reviews. Finally, by reducing workloads, NASA will also help to improve the thoroughness and fairness of the review process.

FEEDBACK

Proposal writers felt that the feedback they received on their proposals was only slightly to fairly adequate. On the 1-to-5 satisfaction scale, they gave an average score of 2.4 on this question. Figure 5-3 shows the distribution of their responses on the adequacy of evaluation feedback. The answers to this question were universal: We found no statistically significantly differences in evaluation feedback by scientific discipline of the proposal writers, by years of experience for submitting proposals, or by success in receiving grants. Clearly, the proposal writers as a whole view feedback as a serious problem.

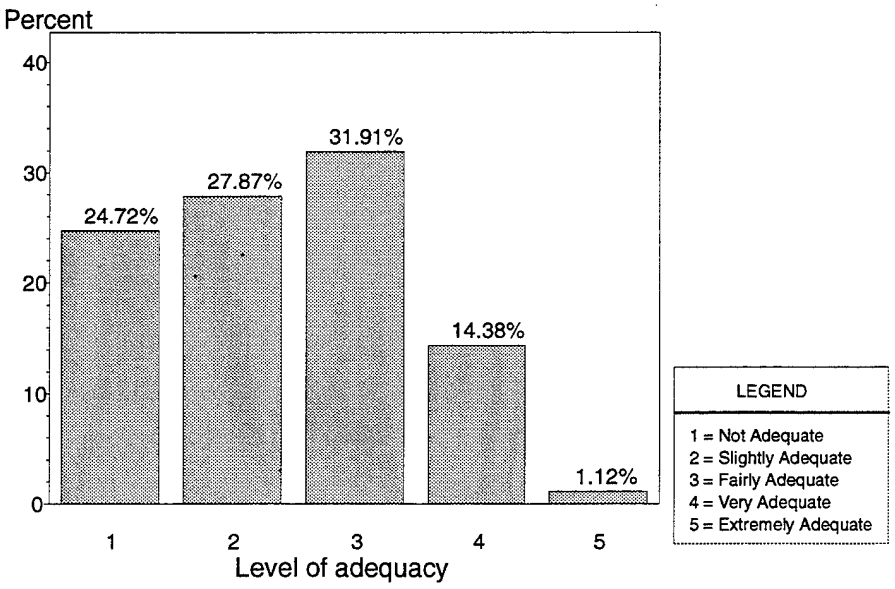

Figure 5-3.
Satisfaction with Evaluation Feedback

Proposal writers provided many comments and suggestions for improving evaluation feedback (see Appendix J). We quote of a few of their concerns here:

"Generally, more openness on the part of NASA is needed."

"Specific written comments justifying the denial of a proposal by the NASA administrator for selection are essential feedback . . . The step between the review panel and final selection seems very mystical!"

"Too often the final reviews are watered down and do not reflect the full range of issues which were brought up in the panel sessions. [Investigators should receive] a more detailed panel report (which should be closer to a discussion summary than a "consensus"), . . . complete mail-in reviews, as well as initial reports of the principal and secondary reviewers."

"In the past 2 to 3 years, NASA Program Managers have not been providing extensive review comments on proposals. This is a major method of improving one's science, since these comments are often valuable."

We believe that NASA should strike a better balance between preparing a general summary of evaluation results and providing proposal writers with more detailed evaluation information. Evaluation summaries are useful for justifying funding decisions, while more detailed evaluations may help proposal writers to prepare higher quality grant proposals. We do not believe that these two requirements are incompatible.

NASA should consider three alternatives for improving the feedback on the evaluation of proposals. One alternative is to provide a written list of significant proposal weaknesses or deficiencies along with the current summary of evaluation factors. A second alternative is to offer a face-to-face debriefing of those weaknesses or deficiencies, upon written request, without revealing either the technical standing of competitors, evaluation scores, or information that is not releasable under the Freedom of Information Act, such as proprietary ideas. The third alternative incorporates both of these two alternatives: Provide a written list of areas of weakness or deficiency and offer a debriefing on this material.[3]

[3] Each of these approaches have been used in the management of Federal grants. For example, the Public Health Service's grants policy includes both written comments on proposal deficiencies as well as an offer to debrief proposal writers.

APPENDIX A

Executive Order 12862, *Setting Customer Service Standards*

Executive Order 12862, *Setting Customer Service Standards*

Executive Order 12862 was issued in two phases. Phase I, issued on Sept. 11, 1993, focuses on the requirement to establish customer service standards, to conduct customer satisfaction surveys, and to develop customer service plans. Phase II, issued on March 22, 1995, provides further directions to agencies for improving customer service. Both documents are shown in their entirety in this appendix.

Executive Order 12862
Phase I — September 11, 1993

Putting people first means ensuring that the Federal Government provides the highest quality service possible to the American people. Public officials must embark upon a revolution within the Federal Government to change the way it does business. This will require continual reform of the executive branch's management practices and operations to provide service to the public that matches or exceeds the best service available in the private sector.

Now, therefore, to establish and implement customer service standards to guide the operations of the executive branch, and by the authority vested in me as President by the Constitution and the laws of the United States, it is hereby ordered:

Section 1. ***Customer Service Standards.*** In order to carry out the principles of the National Performance Review, the Federal Government must be customer-driven. The standard of quality for services provided to the public shall be: Customer service equal to the best in business. For the purposes of this order, "customer" shall mean an individual or entity who is directly served by a department or agency. "Best in business" shall mean the highest quality of service delivered to customers by private organizations providing a comparable or analogous service.

All executive departments and agencies (hereinafter referred to collectively as "agency" or "agencies") that provide significant services directly to the public shall provide those services in a manner that seeks to meet the customer service standard established herein and shall take the following actions:

(a) identify the customers who are, or should be, served by the agency;

(b) survey customers to determine the kind and quality of services they want and their level of satisfaction with existing services;

(c) post service standards and measure results against them;

(d) benchmark customer service performance against the best in business;

(e) survey front-line employees on barriers to, and ideas for, matching the best in business;

(f) provide customers with choices in both the sources of service and the means of delivery;

(g) make information, services, and complaint systems easily accessible; and

(h) provide means to address customer complaints.

Section 2. ***Report on Customer Service Surveys.*** By March 8, 1994, each agency subject to this order shall report on its customer surveys to the President. As information about customer satisfaction becomes available, each agency shall use

that information in judging the performance of agency management and in making resource allocations.

Section 3. ***Customer Service Plans.*** By September 8, 1994, each agency subject to this order shall publish a customer service plan that can be readily understood by its customers. The plan shall include customer service standards and describe future plans for customer surveys. It also shall identify the private- and public-sector standards that the agency used to benchmark its performance against the best in business. In connection with the plan, each agency is encouraged to provide training resources for programs needed by employees who directly serve customers and by managers making use of customer survey information to promote the principles and objectives contained herein.

Section 4. ***Independent Agencies.*** Independent agencies are requested to adhere to this order.

Section 5. ***Judicial Review.*** This order is for the internal management of the executive branch and does not create any right or benefit, substantive or procedural, enforceable by a party against the United States, its agencies or instrumentalities, its officers or employees, or any other person.

WILLIAM J. CLINTON

THE WHITE HOUSE
September 11, 1993

Executive Order 12862
Phase II — March 22, 1995

THE WHITE HOUSE

WASHINGTON

March 22, 1995

MEMORANDUM FOR HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

SUBJECT: Improving Customer Service

In the first phase of this Administration's reinventing government initiative, I established the principle that government must be customer-driven. Executive Order No. 12862, "Setting Customer Service Standards," called for a revolution within the Federal Government to change the way it does business. The initial agency responses to that order, including the service standards published in September 1994, have begun the process of establishing a more customer-focused government. For the first time, the Federal Government's customers have been told what they have a right to expect when they ask for service.

In the second phase of reinventing government ("Phase II"), this effort should be continued and integrated with other restructuring activities. The first question agency restructuring teams should ask is whether a program or function is critical to the agency's missions based on "customer" input. To carry out this Phase II effort and assure that government puts the customer first, I am now directing the additional steps set forth in this memorandum.

Actions. The agencies covered by Executive Order No. 12862 are directed as follows:

1. In order to continue customer service reform, agencies shall treat the requirements of Executive Order No. 12862 as continuing requirements. The actions the order prescribes, such as surveying customers, surveying employees, and benchmarking, shall be continuing agency activities. The purpose of these actions will remain as indicated in Executive Order No. 12862 -- the establishment and implementation of customer service standards to guide the operations of the executive branch.

2. Agencies shall, by September 1, 1995, complete the publication of customer service standards, in a form readily available to customers, for all operations that deliver significant services directly to the public. This shall include services that are delivered in partnership with State and local governments, services delivered by small agencies and regulatory agencies, and customer services of enforcement agencies.

3. Agencies shall, on an ongoing basis, measure results achieved against the customer service standards and report those results to customers at least annually. Reports should be in terms readily understood by individual customers. Public reports shall be made beginning no later than September 15, 1995. Measurement systems should include objective measures wherever possible, but should also include customer satisfaction as a measure. Customer views should be obtained to determine whether standards have been set on what matters most to the customer. Agencies should publish replacement standards if needed to reflect these views.

4. Development and tracking of customer service measures, standards, and performance should be integrated with other performance initiatives, including Phase II restructuring. Customer service standards also should be related to legislative activities, including strategic planning and performance measurement under the Government Performance and Results Act of 1993, reporting on financial and program performance under the Chief Financial Officers Act of 1990, and the Government Management and Reform Act of 1994. Operating plans, regulations and guidelines, training programs, and personnel classification and evaluation systems should be aligned with a customer focus.

5. Agencies shall continue to survey employees on ideas to improve customer service, take action to motivate and recognize employees for meeting or exceeding customer service standards, and for promoting customer service. Without satisfied employees, we cannot have satisfied customers.

6. Agencies should initiate and support actions that cut across agency lines to serve shared customer groups. Agencies should take steps to develop cross-agency, one-stop service to customer groups, so their customers do not needlessly go from one agency to another. Where possible, these steps should take advantage of new information technology tools to achieve results.

The standard of quality we seek from these actions and the Executive order is customer service for the American people that is equal to the best in business.

Independent Agencies. Independent agencies are requested to adhere to this directive.

Judicial Review. This directive is for the internal management of the executive branch and does not create any right or benefit, substantive or procedural, enforceable by a party against the United States, its agencies or instrumentalities, its officers or employees, or any other person.

William J. Clinton

APPENDIX B

NASA Request for Generic Survey Clearance Under Executive Order 12862, August 1994

NASA Request for Generic Survey Clearance Under Executive Order 12862, August 1994

INTRODUCTION

The National Aeronautics and Space Administration (NASA) requests that the Office of Management and Budget (OMB) grant it a generic clearance to undertake customer satisfaction surveys as required by Executive Order 12862, *Setting Customer Service Standards* (the EO). To undertake these customer satisfaction surveys properly, we have carefully reviewed the EO and its requirements, have regularly sought EO clarification from the staff of the National Performance Review (NPR), where necessary, and have thoroughly examined OMB's *Resource Manual for Customer Surveys.* To help design, conduct, and analyze the customer satisfaction surveys, we have also retained professional statistical personnel who have attended the 1994 OMB-sponsored course, *Joint Program in Survey Methodology,* to review OMB statistical survey requirements. We believe that NASA is in compliance with all EO requirements.

For purposes of this generic clearance, NASA requests approval to take periodic EO customer satisfaction surveys of its nongovernmental direct customers. Specific examples of NASA's nongovernmental direct customers include university scientists who apply for NASA science grants; industrial firms that utilize NASA wind tunnels to conduct aeronautical research; educational institutions that utilize NASA scientific materials to further the educational process; and U.S. industry and academic institutions that utilize engineering and technology information disseminated by NASA to facilitate private innovation. Current customers, not potential ones, will be surveyed for the EO. They will be surveyed annually but only on a voluntary basis, and they will be asked both quantitative and qualitative questions.

The EO customer surveys will provide NASA with customer satisfaction information that it does not now possess. No sensitive information will be collected.

The total survey burden on NASA's non-governmental direct customers will be minimal because there are relatively few such customers in each area (generally the population is 1,000 or less for each). We anticipate conducting 10 mail surveys, 20 focus groups, and 10 comment-card efforts per year for each of the next three years. The mail surveys will have a customer burden of about 1,250 hours per year (fifteen minutes per customer respondent × 500 (sample

size) respondents per mail survey × 10 mail surveys). Also on an annual basis, focus group burdens will approximate 2,400 hours (8 hours per focus group member × 15 members per focus group × 20 focus groups), and customer burdens for comment cards will be about 1,250 hours (quarter of an hour per comment card respondent × 500 (sample size) respondents per comment card effort × 10 comment card efforts). For the combined mail surveys, focus groups, and comment cards, customer burdens will not exceed 4,900 hours for each of the next three years.

NASA agrees to provide OMB with mail surveys, comment cards, and focus group scripts as they are conducted, and with an annual progress report that explains the survey activities during the year, their results, and respondent burdens.

This request for generic clearance is organized into three parts: Approach to EO, Surveying Customers, and Terms of Generic Clearance. Also, we attach the "Supporting Statement" required for OMB approval under the Paperwork Reduction Act and 5 CFR 1320.

APPROACH TO EO

EO 12862 requires that NASA take customer satisfaction surveys to obtain customer feedback for improving its products and services. It also requires NASA to search worldwide for best industry and public-sector methods and incorporate them into current practices as may be appropriate. Finally the EO requires that front-line employees be surveyed on barriers to, and ideas for, matching the best in industry or in the public sector. We will first focus our attention on taking a customer satisfaction survey in each area. This will give NASA an opportunity to better understand its customers and evaluate quality standards, a necessary first step before incorporation of best industry or public-sector standards in NASA practices.

Customer satisfaction surveys will be designed to address the following steps in order to implement the EO properly:

1. *Quality Standards:* Customers evaluate standards for key quality dimensions of NASA's products or services. For many quality dimensions, NASA has already expressed or may be able to express customer standards in quantitative terms. However, in some cases, a quality dimension may be purely qualitative in nature and customer responses will help determine the standard for that type of dimension. In any case, customers will be given the opportunity to express their feelings about customer standards using a five-point scale in the survey.

2. *Performance Feedback:* Customers provide feedback on the extent to which customer standards are actually met. Customer satisfaction scores will be provided in the survey to gauge the extent to which customers are satisfied with delivery quality.

3. *Performance Gaps:* An evaluation is made of the gaps between NASA product/service standards and actual delivery levels. Such an evaluation will be made by comparing results from steps (1) and (2).

4. *Importance of Quality Dimensions:* The relative importance that customers attach to each quality dimension of NASA's products or services. Customer importance scores will be obtained from the survey and used to make this determination.

5. *Overall Quality Performance:* An assessment is made of NASA's overall quality performance. Such an assessment will be based upon the construction of an overall quality index, derivable from steps (1) through (4) above. The overall quality index summarizes the extent to which NASA has been satisfying its customers, on the average.

6. *Implementation Plan:* An implementation plan is drawn up to prioritize the areas most in need of improvement. The components of the quality index can be used to show the effect that closing each delivery-standard gap would have on NASA's overall quality performance. With such information, NASA can target the most fruitful avenues for improving processes and enhancing performance.

After taking the surveys and going through steps (1) through (6), NASA will then utilize its overall continual improvement program — including benchmarking and front-line employee surveys — to overcome performance deficiencies.

SURVEYING CUSTOMERS

In OMB's *Resource Manual for Customer Surveys,* various principles are delineated to design, conduct, and analyze customer satisfaction surveys.

NASA has established a Headquarters steering group on customer satisfaction to operate as an independent review group. That steering group will review the scope of the measurement program, identify factors and characteristics that contribute to customer satisfaction, target customer populations for study, develop information on how to contact the targeted customers, and establish procedures for avoiding survey duplication effort. Through the steering group, NASA has already identified services and products, described customers served, developed candidate areas for customer standards, and compiled a list of potential customers to be contacted. Working with professional statistical personnel, the steering group has also developed a performance measurement framework for consistently undertaking and gauging improvement initiatives under the EO and related programs. The steering group has also facilitated Agency compliance with the EO requirements for reporting to the President: the March 8 *Customer Service Status Report* and the September 8 *Customer Service Plan.* Finally, the steering group will examine each survey to be conducted, to prevent internal duplication and unnecessary burdens on customers.

For mail surveys, we have adopted the Total Design Method to balance survey costs against the need for adequate response rates. Survey research has shown that a mail survey, by itself, is often not sufficient for obtaining an adequate customer satisfaction survey response rate, usually considered to be at least 50 percent. Initial mail surveys are relatively inexpensive but they often achieve response rates considerably below 50 percent. We plan to number the questionnaires to keep track of survey responses. To increase the response rate, we have established procedures to undertake additional customer contacts: a post card alerting would-be respondents of the upcoming survey, a special post card reminding would-be respondents to respond to the survey, and a final appeal letter and additional questionnaire to urge response, as necessary. Also, we plan to design each mail questionnaire according to the latest survey research results to facilitate as high a mail response rate as possible: Include cover letter; make questionnaire answerable within 15 minutes; guarantee confidentiality; permit anonymous responses; avoid open-ended questions; group questions by category; and present the questions in survey booklet form. NASA is committed to obtaining high response rates, and we will designate a period of seven full weeks to accomplish the Total Design Method for each survey effort.

NASA has developed three surveys that are in the process of being pretested at this time. Working with statistical personnel, NASA has designed and is pretesting questionnaires concerning scientists who apply for science grants, industry that utilizes NASA wind tunnels, and educational institutions that avail themselves of NASA science programs. We anticipate that these surveys will be fully pretested and conducted beginning in the fall of 1994. Other mail survey plans, focus groups, and comment cards have not as yet been made final, so we cannot report on them at this time.

Each of NASA's direct customer populations generally is considerably below 6,000. According to the hypergeometric distribution, a sample of 500 or a 50 percent sample will be taken for populations of 1,000 or less to achieve precision of plus or minus 3 percent at the 95 percent confidence limit; and according to the normal distribution, maximum samples of 1,000 for larger populations. Stratified sampling will not be necessary most of the time. These sampling plans are consistent for NASA to attain a high response rate.

We plan to enter the data into a computer and double-check their accuracy. We intend to utilize the Statistical Analysis System (SAS) to manage the data base, tabulate the data, and develop special tables and charts. We also plan to perform multivariate statistical analyses with SAS to assess whether differences in respondent backgrounds help explain differences in responses to a question or whether responses to different questions are related to one another.

TERMS OF GENERIC CLEARANCE

NASA is requesting generic approval to conduct a number of customer satisfaction surveys from FY94 through FY97. Specifically, this generic request covers surveys of NASA's non-governmental direct customers, including pre-

tests. Customer burdens will be about 4,900 hours for each of three years — consisting of 1,250 hours from mail surveys, 2,400 hours from focus groups, and 1,250 hours from comment cards. This request for generic clearance does not include any industry benchmarking, employee surveys, or indirect customer surveys that NASA may take in connection with the EO. A separate request would follow for such surveys.

NASA agrees to follow OMB's *Resource Manual for Customer Surveys* in designing, conducting and analyzing customer surveys. Also, NASA agrees to follow policies and procedures in the 1994 OMB-sponsored course, *Joint Program in Survey Methodology.*

NASA further agrees to submit a copy of each survey instrument or focus group script to OMB at the time they are conducted. In addition, NASA agrees to submit annual progress reports to OMB at the end of each year starting in 1994 and ending in 1997, as required by the *Resource Manual for Customer Surveys.* These reports will include the survey instruments and focus group scripts utilized during the year, a summary of their intent, respondent burdens, and the results achieved. At the time of the annual progress reports, any revisions to this generic clearance that might be necessary will also be submitted for approval.

SUPPORTING STATEMENT UNDER THE PAPERWORK REDUCTION ACT AND 5 CFR 1320

Justification

1. *Information Necessary:* Executive Order 12862, *Setting Customer Service Standards,* requires that NASA systematically survey its customers "to determine the kind and quality of services they want and their level of satisfaction with existing services..." NASA plans to conduct mail surveys, focus group sessions, and comment card inquiries in order to meet the requirements of the Executive order. The use of these instruments is the only means we have for understanding if our services meet the needs of our customers.

2. *Purposes and Consequences:* Customer information will be used by all of NASA to help improve customer services. Without this information, we will have limited knowledge of the customer services that may need improvement, of the priorities our customers place on potential improvement efforts, and of appropriate service improvement plans for raising customer satisfaction levels.

3. *Improved Information Technology:* NASA is unaware of any current information technology that can improve or replace the use of these survey efforts.

4. *Duplication:* NASA has established a Headquarters steering group to review all customer satisfaction survey efforts and avoid duplication. As a result, there will be no duplication.

5. *Other Information Sources:* We do not have similar information from other sources.

6. *Minimize Burden:* The survey instruments and focus group scripts will be brief with only very basic information requested to measure customer satisfaction. To minimize mail respondent burdens, we have formulated questions simply and directly, used closed-ended questions (not open-ended questions), made the questionnaire answerable within 15 minutes, grouped questions into categories for ease of customer response, and pretested the questionnaires to ensure minimal burdens.

7. *Collection Frequency:* A less than annual data collection frequency would seriously jeopardize NASA's efforts to enhance customer satisfaction. NASA requires annual data collection to obtain timely customer feedback, to address customer concerns promptly, and to encourage continuous improvement efforts.

8. *Following Guidelines:* We see no reason to deviate from 5 CFR 1320.6 guidelines.

9. *Outside Consultation:* NASA has been in close contact with industry, educational institutions, and the scientific community to obtain their views on the availability, disclosure, and reporting of customer satisfaction information. Also, we have been thoroughly pretesting survey instruments with potential respondents to ensure that specific data requests are clear, reasonable, and free of undue burdens.

10. *Confidentiality:* We have assured survey respondents that their individual responses would not be reported. Response aggregates are adequate for complying with the Executive order and only they will be reported.

11. *Sensitive Information:* Not applicable

12. *Annual Costs:* The full NASA cost for 10 mail questionnaires, 20 focus groups, and 10 comment card efforts is estimated to be $1.8 million.

13. *Respondent Burdens:* We estimate that the annual respondent burden is 4,900 hours from all sources: mail surveys, focus groups, and comment card efforts. The mail surveys will have a respondent burden of 1,250 hours (15 minutes per respondent × 500 respondents per survey × 10 mail surveys); focus groups will have 2,400 hours (8 hours per focus group member × 15 members per focus group × 20 focus groups); and comment cards will have 1,250 hours (quarter of an hour per respondent × 500 respondents per comment card effort × 10 comment card efforts).

14. *Burden Changes:* Not applicable

15. *Publishing:* Aggregate survey information will be published to meet the requirements of the Executive order. A series of reports will be issued from FY95 through FY97 as survey efforts are designed, conducted, and analyzed.

Collection of Information Employing Statistical Methods

1. *Sampling:* NASA will survey approximately 10 industry, 25 science, and 5 educational direct customer areas. Each of these areas has a population of no more than 6,000. NASA will take a sample of no more than 1,000 to achieve plus or minus 3 percent precision at the 95 percent confidence level. Stratified sampling will normally not be necessary. We will work with the Total Design Method to achieve a high percent response rate, targeted at 75 percent.

2. *Collection Procedures:* NASA will use systematic random sampling (selecting every nth one from the population) to obtain representative survey respondents. Stratified sampling normally would not be necessary. These procedures will be repeated each year. And we do not anticipate that these survey procedures will present any unusual problems or respondent burdens.

3. *Maximize Response Rates:* We have taken two basic steps to help obtain high response rates. First, we have designed the mail survey instrument in such a way as to encourage high response rates: include cover letter, answerable within 15 minutes, guarantee confidentiality, avoid open-ended questions, group questions by category, and present the questions and questionnaire in an appealing survey booklet form. Second, we have adopted the Total Design Method to ensure high response rates: send alert post cards in advance of the questionnaire; send mail surveys with cover letters, send special reminder cards to non-respondents, follow-up with a final appeal letter and additional questionnaire, as necessary. We have designated a full seven weeks to accomplish the Total Design Method.

4. *Tests:* We will pretest each survey instrument or focus group script to eliminate material that is long, awkwardly worded, ambiguous, redundant, or may offend or sound foolish to respondents. Also, we will use the pre-tests to add material that the representative respondents feel strongly should be included.

5. *Consulting Advice:* We have used the services of the Logistics Management Institute (LMI) to help design, conduct, and analyze various customer satisfaction surveys; LMI points of contact are Larry Schwartz and Brian Mansir, (703) 917-9800.

APPENDIX C

OMB Generic Survey Clearance Approval

NOTICE OF OFFICE OF MANAGEMENT AND BUDGET ACTION

TO: SHIRLEY PEIGARE
NATIONAL AERONAUTICS AND SPACE ADM.
CODE NTD-1 - NASA HEADQUARTERS
WASHINGTON, DC 20546
National Aeronautics and Space Administration

ACTION DATE
10/12/94

ON 08/15/94, YOU REQUESTED APPROVAL OF THE FOLLOWING INFORMATION COLLECTION:
TITLE: NASA CUSTOMER SATISFACTION SURVEYS UNDER E.O. 12862
AGENCY FORM NOS.:

IN ACCORDANCE WITH THE PAPERWORK REDUCTION ACT, WE HAVE TAKEN THE FOLLOWING ACTION ON THIS INFORMATION COLLECTION:

APPROVED FOR USE THROUGH 10/31/95. OMB NO. 2700-0084.
THE OFFICE OF MANAGEMENT AND BUDGET CONTROL NUMBER MUST BE DISPLAYED IN ACCORDANCE WITH 5 CFR 1320. UNLESS OTHERWISE PROVIDED IN "REMARKS," XPIRATION DATES MUST ALSO BE DISPLAYED AS REQUIRED BY 5 CFR 1320.

EFFECT ON BURDEN:	RESPONSES	REPORTING HOURS
PREVIOUS STATUS	0	0
NEW STATUS	1,000	250
DIFFERENCE	1,000	250
EXPLANATION OF DIFFERENCE:		
ADJUSTMENTS		
CORRECTION-ERROR	0	0
CORRECTION-REESTIMATE	0	0
CHANGE IN USE	0	0
PROGRAM CHANGES		
INCREASE	1,000	250
DECREASE	0	0

REMARKS:

Approved for one year. Renewed contingent upon:
(1) report of how many surveys performed in the first year
(2) plans for future surveys

OMB NO. 2700-0084

ABSTRACT:
"CUSTOMER SATISFACTION SURVEY, CUSTOMER STANDARDS"
INFORMATION COLLECTION IS REQUIRED TO CONDUCT CUSTOMER SATISFACTION SURVEYS AS REQUIRED BY E.O. 12862 "SETTING CUSTOMER STANDARDS." THE SPECIFIC NUMBER OF SURVEYS HAVE NOT BEEN DETERMINED.

ALLOWANCE LETTER: NO FUNCTION:
ON PLAN: NO EXCEED BUDGET: NO 3504(H): NPRM
NO. OF FORMS: 1 USE: PUBLIC REQUEST: NEW
RESPONDENTS: 1,000 RESPONSES: 1,000 HOURS: 250
AFFECTED PUBLIC: IND/HHLD & BUS/INST & NON-PROFIT INST & SMALL BUS/ORG
SMALL BUSINESS: YES ACTIVITY TYPE:
PURPOSE: REG/COMP
FREQUENCY: OCCAS
COLLECTION METHOD: MAIL S/A
RETENTION: COLLECTION AGENT: RQSTNG DPT/AGCY CONFIDENTIALITY: NO
COMPULSORY STATUS: VOLUNTARY
FEDERAL COST: PUBLIC COST:
REVIEWER: Peter N. Weiss

ACTION APPROVED BY:	AUTHORIZING OFFICIAL /S/JAMES B. MACRAE FOR	TITLE: DEPUTY ADMINISTRATOR OFFICE OF INFORMATION AND REGULATORY AFFAIRS	DATE 10/12/94

IMPORTANT: BECAUSE THIS INFORMATION COLLECTION HAS BEEN APPROVED, PLEASE SEND TO THE O.M.B. AS SOON AS AVAILABLE: ONE COPY OF THE FINAL PRINTED (OR OTHERWISE REPRODUCED) REPORT FORM, OR REPORTING OR RECORDKEEPING REQUIREMENT, TRANSMITTAL LETTER, INSTRUCTIONS, AND ANY DOCUMENT BEING SENT TO EACH RESRONDENT.

APPENDIX D

NASA Science Grant Customer Survey: Proposal Writers

NASA SCIENCE GRANT CUSTOMER SURVEY

Complying with Executive Order 12862

This survey is the first of many we will conduct to better understand how proposal writers feel about NASA's science grant process. Your support will help NASA improve its grant process. Please answer all of our questions. If you wish to comment on any questions or qualify your answers, please feel free to use the space in the margins. Your comments will be read and taken into account.

Thank you for your help.

Proposal Writers

National Aeronautics and Space Administration
Office of Space Science
Code S-1
Washington, D.C. 20546-0001

TIME

Q-1 How satisfied are you with the 3-month period allotted for preparing grant proposals?

Circle the number of your answer.

1 Not Satisfied
2 Slightly Satisfied
3 Fairly Satisfied
4 Very Satisfied
5 Extremely Satisfied

Q-2 How satisfied are you with NASA's 6-month standard for providing proposal feedback?

Circle the number of your answer.

1 Not Satisfied
2 Slightly Satisfied
3 Fairly Satisfied
4 Very Satisfied
5 Extremely Satisfied

Q-3 What time standard should NASA use for providing proposal feedback?

Indicate number of months. _____ Months

Q-4 What has been your actual time, on the average, for receiving proposal feedback?

Circle the number of your answer.

1 Less than 4 Months
2 4 - 5 Months
3 6 - 7 Months
4 8 - 9 Months
5 More than 9 Months

Q-5 How satisfied are you with the length of the grant period for executing research?

Circle the number of your answer.

1 Not Satisfied
2 Slightly Satisfied
3 Fairly Satisfied
4 Very Satisfied
5 Extremely Satisfied

Q-6 What period of time would you like to see for executing research?
Circle the number of your answer.

1 One Year
2 Two Years
3 Three Years
4 Four Years
5 Five Years or More

GUIDELINES

Q-7 How satisfied are you with the overall clarity, simplicity, and completeness of the NASA Research Announcement (NRA)?
Circle the number of your answer.

1 Not Satisfied
2 Slightly Satisfied
3 Fairly Satisfied
4 Very Satisfied
5 Extremely Satisfied

Q-8 How satisfied are you with key instructions covered in the NRA?
Circle the number of your answer for each instruction.

Instruction	Not Satisfied	Slightly Satisfied	Fairly Satisfied	Very Satisfied	Extremely Satisfied
Program Scope	1	2	3	4	5
Proposal Contents	1	2	3	4	5
Preparation & Submission	1	2	3	4	5
Evaluation Factors	1	2	3	4	5
Costing	1	2	3	4	5

GENERAL

Q-9 How adequate is NASA feedback on your proposals?
Circle the number of your answer.

1 Not Adequate
2 Slightly Adequate
3 Fairly Adequate
4 Very Adequate
5 Extremely Adequate

Q-10 How satisfied are you that NASA fairly evaluates your research proposals?
Circle the number of your answer.

1 Not Satisfied
2 Slightly Satisfied
3 Fairly Satisfied
4 Very Satisfied
5 Extremely Satisfied

Q-11 Adequate feedback, fairness, processing time, and process guidance are essential elements of the NASA science grant program. How important to you is NASA's feedback, fairness, processing time, or process guidance?
Circle the number of your answer for each process element.

Process Element	Not Important	Slightly Important	Fairly Important	Very Important	Extremely Important
Feedback	1	2	3	4	5
Fairness	1	2	3	4	5
Processing Time	1	2	3	4	5
Process Guidance	1	2	3	4	5

Q-12 How satisfied are you with the overall NASA science grant process?
Circle the number of your answer.

1 Not Satisfied
2 Slightly Satisfied
3 Fairly Satisfied
4 Very Satisfied
5 Extremely Satisfied

BACKGROUND

Q-13 What is your general area of scientific concern?
Circle the number of your answer.

1 Solar System Exploration
2 Astrophysics
3 Space Physics
4 Other _____

Please specify your subdiscipline _____

Q-14 How many years have you submitted NASA grant proposals?
Circle the number of your answer.

1 1 Year
2 2 - 4 Years
3 5 - 7 Years
4 8 - 10 Years
5 More than 10 Years

Q-15 What percentage of your proposal submissions have been selected?
Circle the number of your answer.

1 Less than 20 Percent
2 21 - 40 Percent
3 41 - 60 Percent
4 61 - 80 Percent
5 More than 80 Percent

COMMENTS

Would you like to suggest any specific changes that would improve NASA's science grant process? If so, please use this space for that purpose. Also, any comments that you may have for improving future survey efforts to understand how you feel about the NASA grant process will be appreciated, either in this space or in a separate letter.

Your contribution to this survey is greatly appreciated. If you would like a summary of results, please print your name and address on the back of the return envelope provided (*not* on this questionnaire). We will see that you get it.

OMB No. 2700-0084/Expiration Date: 10/31/95

APPENDIX E

NASA Science Grant Customer Survey: Peer Review Panelists

NASA SCIENCE GRANT CUSTOMER SURVEY

Complying with Executive Order 12862

This survey is the first of many we will conduct to better understand how peer review panelists feel about NASA's science grant process. Your support will help NASA improve its grant process. Please answer all of our questions. If you wish to comment on any questions or qualify your answers, please feel free to use the space in the margins. Your comments will be read and taken into account.

Thank you for your help.

Peer Review Panelists

National Aeronautics and Space Administration
Office of Space Science
Code S-1
Washington, D.C. 20546-0001

TIME or WORKLOAD

Q-1 How suitable is the time allotted to you for reviewing grant proposals before panel meetings?

Circle the number of your answer.

1 Much Too Short
2 Slightly Too Short
3 Just Right
4 Slightly Too Long
5 Much Too Long

Q-2 How appropriate is the time allotted to panel meetings for reviewing grant proposals?

Circle the number of your answer.

1 Much Too Short
2 Slightly Too Short
3 Just Right
4 Slightly Too Long
5 Much Too Long

Q-3 Each proposal is reviewed by a lead and one or more secondary reviewers. Those reviewers explain and critique the proposal to the entire work group or subpanel. Have you served as a lead or secondary proposal reviewer since 1990?

Circle the number of your answer.

1 Yes ☞ Go to question 4
2 No ☞ Go to question 5

Q-4 When you last served as a lead or secondary reviewer, how many proposals were you responsible for reviewing?

Circle the number of your answer

1 1 - 3
2 4 - 6
3 7 - 9
4 10 - 12
5 More than 12

GUIDELINES

Q-5 How satisfied are you with NASA's rules and instructions on evaluation criteria, evaluation methods, or proposal rating categories?

Circle the number of your answer for each rule.

Rule	Not Satisfied	Slightly Satisfied	Fairly Satisfied	Very Satisfied	Extremely Satisfied
Evaluation Criteria	1	2	3	4	5
Evaluation Methods	1	2	3	4	5
Proposal Rating	1	2	3	4	5

SUPPORT

Q-6 How satisfied are you with NASA's support for the peer review process?

Circle the number of your answer for each support element.

Support Element	Not Satisfied	Slightly Satisfied	Fairly Satisfied	Very Satisfied	Extremely Satisfied
Coordination	1	2	3	4	5
Meeting Facilities	1	2	3	4	5
Travel Arrangements	1	2	3	4	5
Meals Supplied	1	2	3	4	5
Supplies	1	2	3	4	5
Telephone/ Fax	1	2	3	4	5
Personal Computers	1	2	3	4	5
Clerical	1	2	3	4	5

Q-7 Are you typically reimbursed for per diem, travel, or lodging expenses?
Circle the number of your answer.

1 Yes ☞ Go to question 8
2 No ☞ Go to question 9

Q-8 How satisfied are you with NASA's expense reimbursements?
Circle the number of your answer for each expense item.

Expense Item	Not Satisfied	Slightly Satisfied	Fairly Satisfied	Very Satisfied	Extremely Satisfied
Per Diem	1	2	3	4	5
Travel	1	2	3	4	5
Lodging	1	2	3	4	5

Q-9 Should NASA consider using information technology for its science grant process?
Circle the number of your answer for each element of the process.

Process Element	Yes	No
Preparation	1	2
Submission	1	2
Evaluation	1	2
Award	1	2
Notification	1	2

GENERAL

Q-10 How satisfied are you with the qualifications of fellow panel members or the quality of mail-in reviews?

Circle the number of your answer for each quality issue.

Quality Issue	Not Satisfied	Slightly Satisfied	Fairly Satisfied	Very Satisfied	Extremely Satisfied
Quality of Mail-in Reviews	1	2	3	4	5
Panel Qualifications	1	2	3	4	5

Q-11 How satisfied are you that the NASA grant process fairly evaluates each proposal?

Circle the number of your answer.

1 Not Satisfied
2 Slightly Satisfied
3 Fairly Satisfied
4 Very Satisfied
5 Extremely Satisfied

Q-12 How satisfied are you with NASA's procedures for avoiding conflicts of interest or protecting proprietary ideas?

Circle the number of your answer for each ethical issue.

Ethical Issue	Not Satisfied	Slightly Satisfied	Fairly Satisfied	Very Satisfied	Extremely Satisfied
Conflict of Interest	1	2	3	4	5
Proprietary Ideas	1	2	3	4	5

Q-13 Are you satisfied that NASA's science grant process results in the selection of the best research projects?

Circle the number of your answer.

1 Not Satisfied
2 Slightly Satisfied
3 Fairly Satisfied
4 Very Satisfied
5 Extremely Satisfied

Q-14 Selection of the best research projects and overall satisfaction with NASA's science grant process are outcomes that depend upon a number of process elements. How important to those outcomes are the following NASA process elements?

Process Element	Not Important	Slightly Important	Fairly Important	Very Important	Extremely Important
Time/Workload	1	2	3	4	5
Guidelines	1	2	3	4	5
Panel Support	1	2	3	4	5
Panel Qualifications	1	2	3	4	5
Quality of Mail-in Reviews	1	2	3	4	5
Review Fairness	1	2	3	4	5
Ethical Issues	1	2	3	4	5

Q-15 How satisfied are you with the overall NASA science grant process?

Circle the number of your answer.

1 Not Satisfied
2 Slightly Satisfied
3 Fairly Satisfied
4 Very Satisfied
5 Extremely Satisfied

BACKGROUND

Q-16 What is your general area of scientific concern?

Circle the number of your answer.

1 Solar System Exploration
2 Astrophysics
3 Space Physics
4 Other _____

Please specify your subdiscipline _____

Q-17 How long have you worked in this area?

Indicate number of years. _____Years

Q-18 How many times have you ever participated on NASA review panels?

Circle the number of your answer.

1 Once
2 2 - 4 Times
3 5 - 7 Times
4 8 - 10 Times
5 More than 10 Times

COMMENTS

Would you like to suggest any specific changes that would improve NASA's science grant process? If so, please use this space for that purpose. Also, any comments that you may have for improving future survey efforts to understand how you feel about the NASA grant process will be appreciated, either in this space or in a separate letter.

Your contribution to this survey is greatly appreciated. If you would like a summary of results, please print your name and address on the back of the return envelope provided (*not* on this questionnaire). We will see that you get it.

OMB No. 2700-0084/Expiration Date: 10/31/95

APPENDIX F

Survey Letters and Post Cards

Survey Letters and Post Cards

Appendix F contains the letters and post cards that were sent to the peer review panelists and proposal writers in the survey sample:

- *Figure F-1. Post Card.* Alerted survey participants that they would receive a questionnaire in about a week; sent Jan. 25, 1995.
- *Figure F-2. Cover Letter.* Accompanied first mailing of surveys; sent Feb. 1, 1995.
- *Figure F-3. Thank You and Reminder Post Card.* Thanked those who had responded and reminded those who had not done so that a response was essential; sent Feb. 8, 1995.
- *Figure F-4. Follow-up Letter.* Accompanied second survey instrument and made a final appeal for survey responses; sent Feb. 24, 1995.

S-1

Dear Colleague:

NASA's Office of Space Science is conducting a survey to help improve its science grant process. As a member of the science community, your opinions on these matters are critical to the success of this effort. In about a week, you will receive a questionnaire to record your inputs. Thank you in advance for your cooperation.

Carrie L. Sorrels
Chief of Staff for
Space Science

Figure F-1.
Post Card

National Aeronautics and
Space Administration

Headquarters
Washington, DC 20546-0001

Reply to Attn of: S1

Dear Colleague:

The NASA Office of Space Science is currently evaluating the effectiveness of its grant process. A high quality grant process is important for discovering new knowledge and for advancing technology in space science. The President's Executive Order 12862, which requires such a review, recognizes that soliciting the opinions of scientists like yourself is the key to evaluating improving the grant process.

As a member of the NASA science community, you are one of a small number of people being asked to give opinions on these matters. Your name was drawn in a random sample of community members who participated in the space science program in 1993. You may be assured of complete confidentiality. The questionnaire has an identification number for mailing purposes only. In order that the results truly represent the space science community, it is important that each questionnaire be completed and returned promptly.

The general results of this research will be made available to Government officials, members of Congress and interested scientists and citizens. You may receive those results by writing "copy of results requested" on the back of the return envelope and printing your name and address below it. Please do not put this information on the questionnaire itself.

I would be most happy to answer any of your questions on the evaluation of the space science grant process. Please feel free to contact me, at (fax) 202/358-3095, or (telephone) 202/358-0846.

Thank you for your assistance.

Sincerely,

Carrie L. Sorrels
Chief of Staff

Figure F-2.
Cover Letter

S-1

Dear Colleague:

Last week, we sent you a questionnaire to receive your opinion about the NASA Office of Space Science grant process. If you have already completed and returned the questionnaire to us, please accept our sincere thanks. If not, please do so today. Because the questionnaire has been sent to a small but representative sample of the NASA science grant community, your input is essential for accurate results.

If by some chance you did not receive the questionnaire, or you misplaced it, please call me at (202) 358-0846 right now, and I will mail another one to you today.

Carrie L. Sorrels
Chief of Staff for
Space Science

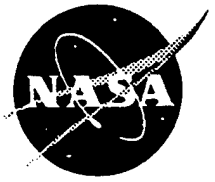

Figure F-3.
Thank You and Reminder Post Card

National Aeronautics and
Space Administration
Headquarters
Washington, DC 20546-0001

Reply to Attn of: S1

Dear Colleague:

About 3 weeks ago by way of mail, I asked for your opinion on the NASA grant process for the Office of Space Science (OSS). As of today, we have not received your completed questionnaire.

The views of the NASA science community are essential for improving the grant process. We value your opinions for evaluating the current process, for identifying problem areas, and for suggesting specific improvements.

I am writing you again because each questionnaire is extremely important for obtaining sound survey results. Your name was drawn through a scientific sampling in which everyone who participated in the OSS grant process in fiscal year 1993 had an equal chance of participating in the survey. For our survey results to be truly representative of all community opinions, it is necessary that each person in the sample complete the questionnaire.

I will be happy to send you a copy of the results. Place your name, address, and "copy of results requested" on the back of the return envelope. We expect to have the results ready this summer.

In the event that your questionnaire has been misplaced, I have enclosed a replacement. Your contribution to this survey will be greatly appreciated. Please contact me if you have any questions. I can be reached via (fax) 202/358-3095 or (telephone) 358-0846.

Sincerely,

Carrie L. Sorrels
Chief of Staff

Figure F-4.
Follow-up Letter

APPENDIX G

Survey Questions and Responses: Peer Review Panelists

Survey Questions and Responses: Peer Review Panelists

TIME OR WORKLOAD

Q-1 How suitable is the time allotted to you for reviewing grant proposals before panel meetings?

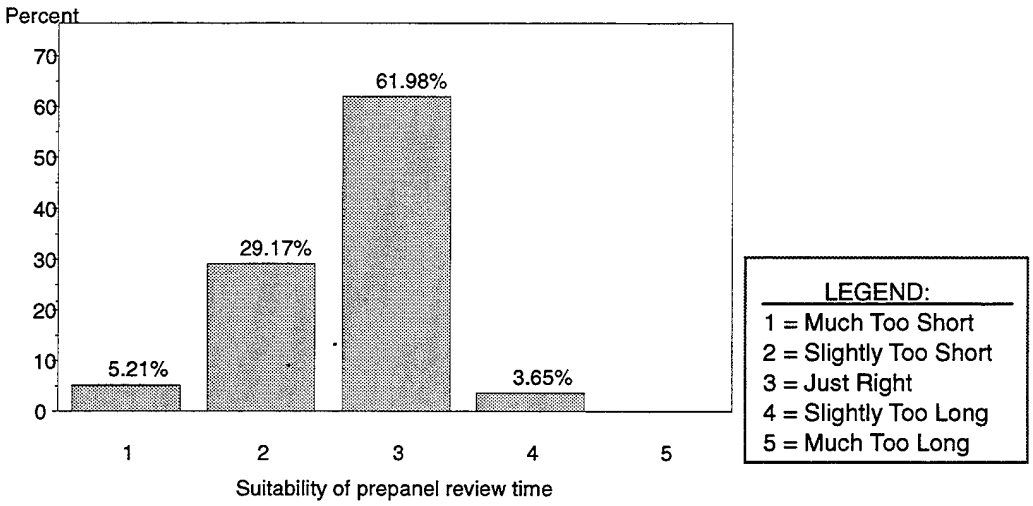

Figure G-1.
Suitability of Time Allotted for Prepanel Review

Q-2 How appropriate is the time allotted to panel meetings for reviewing grant proposals?

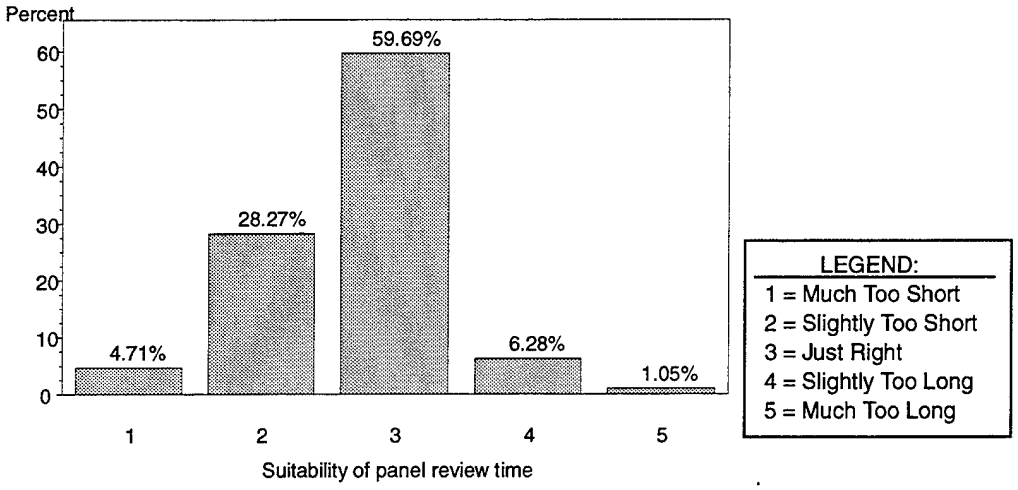

Figure G-2.
Suitability of Time Allotted for Panel Review

Q-3 Each proposal is reviewed by a lead and one or more secondary reviewers. Those reviewers explain and critique the proposal to the entire work group or subpanel. Have you served as a lead or secondary proposal reviewer since 1990?

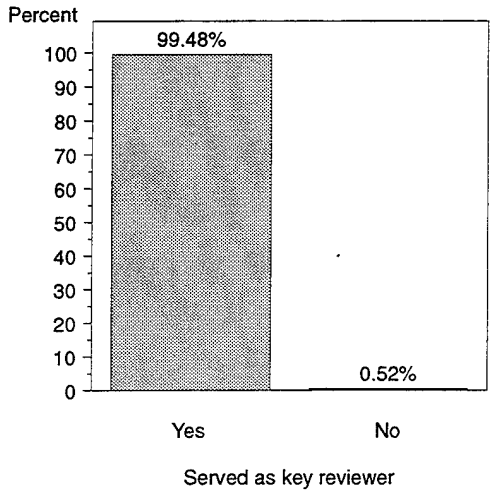

Figure G-3.
Service as Lead/Secondary Reviewer

Q-4 When you last served as a lead or secondary reviewer, how many proposals were you responsible for reviewing?

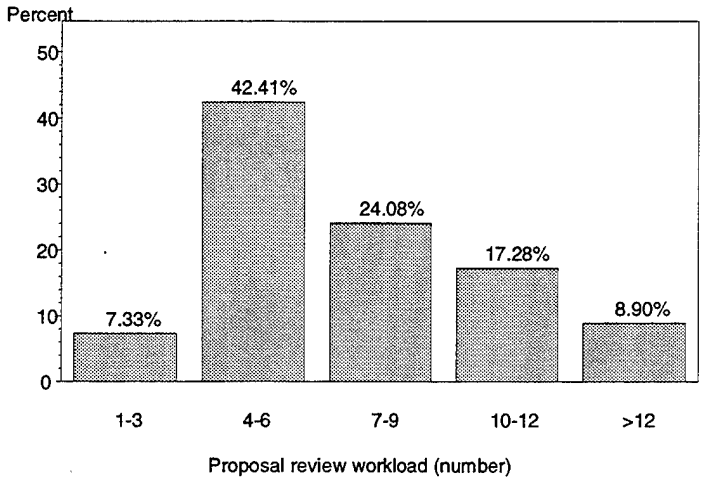

Figure G-4.
Lead/Secondary Review Workload

GUIDELINES

Q-5 How satisfied are you with NASA's rules and instructions on evaluation criteria, evaluation methods, or proposal rating categories?

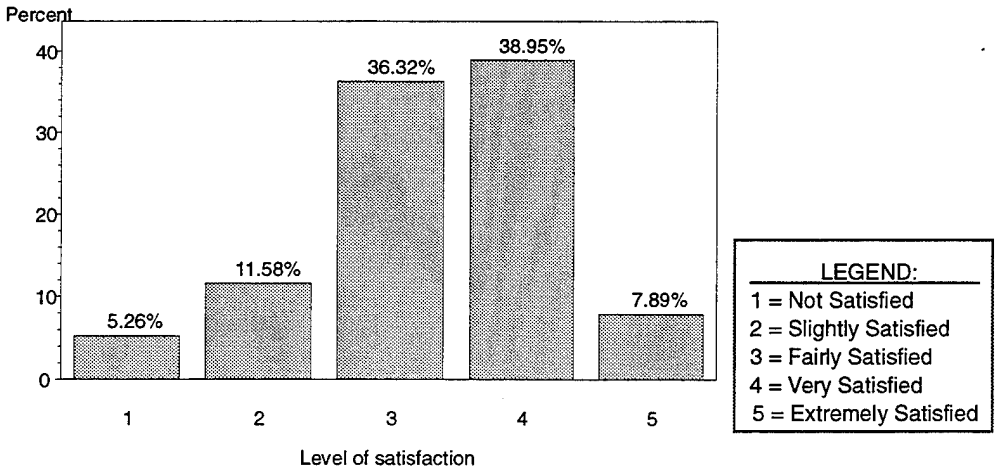

Figure G-5.
Satisfaction with Evaluation Criteria

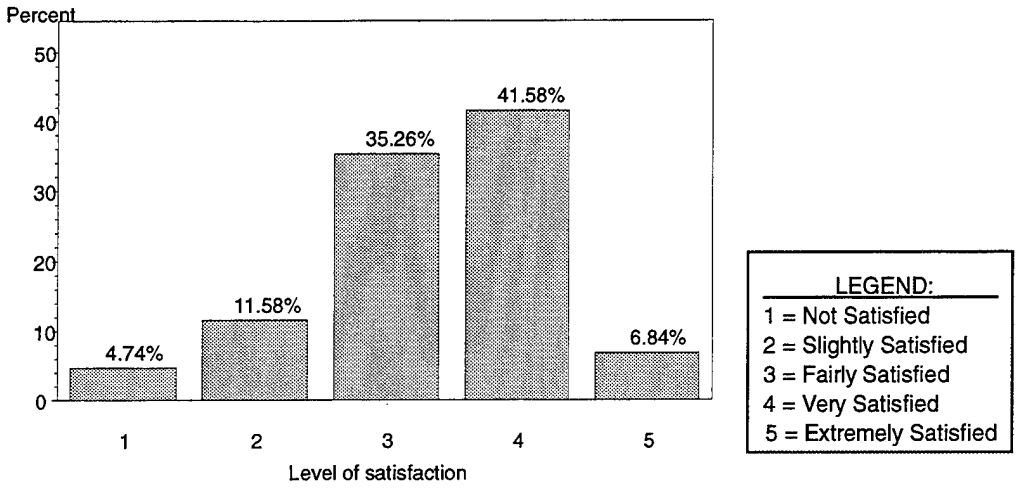

Figure G-6.
Satisfaction with Evaluation Methods

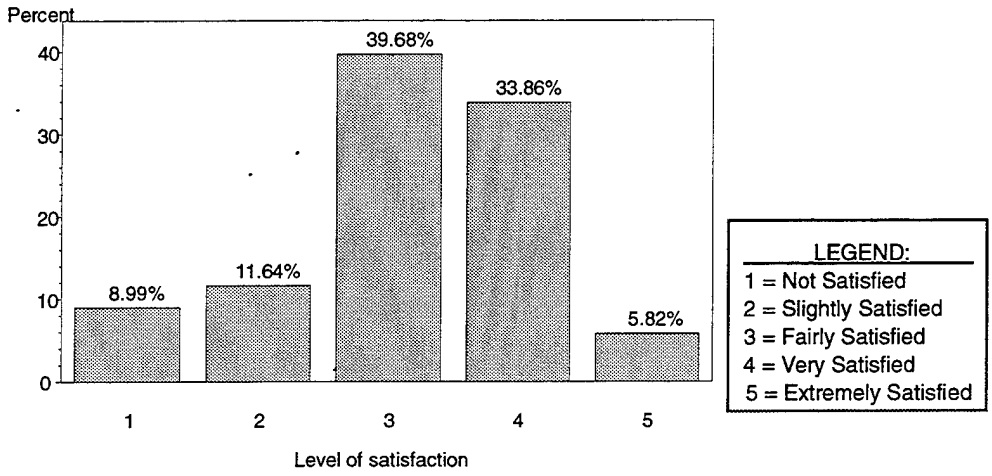

Figure G-7.
Satisfaction with Proposal Rating

SUPPORT

Q-6 How satisfied are you with NASA's support for the peer review process?

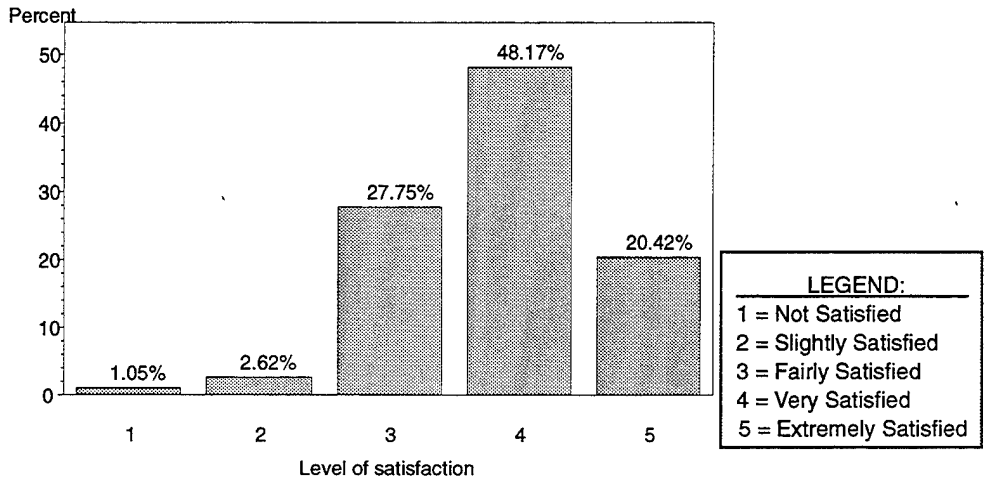

Figure G-8.
Satisfaction with Coordination

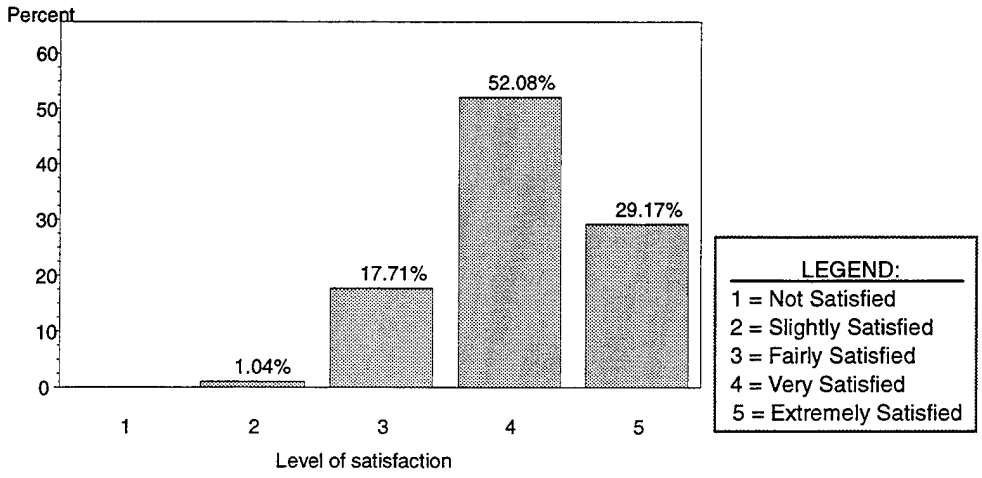

Figure G-9.
Satisfaction with Meeting Facilities

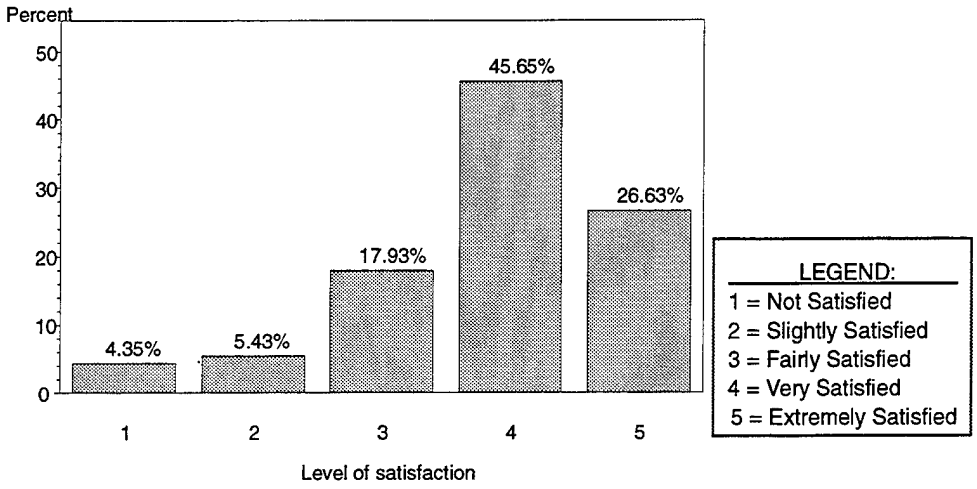

Figure G-10.
Satisfaction with Travel Arrangements

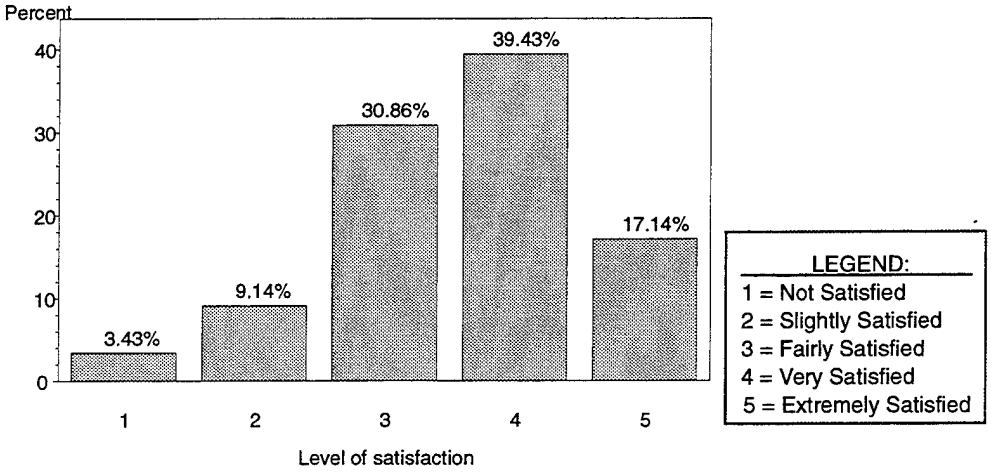

Figure G-11.
Satisfaction with Meals Supplied

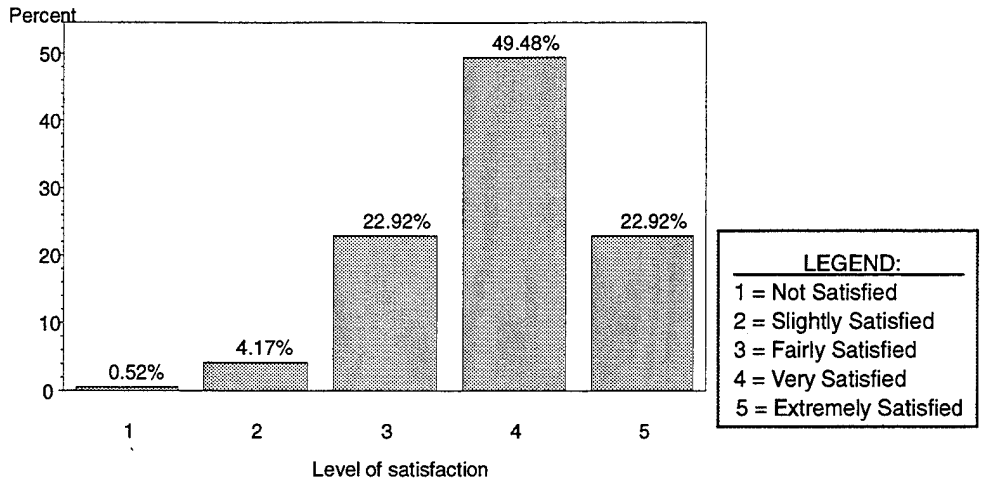

Figure G-12.
Satisfaction with Supplies

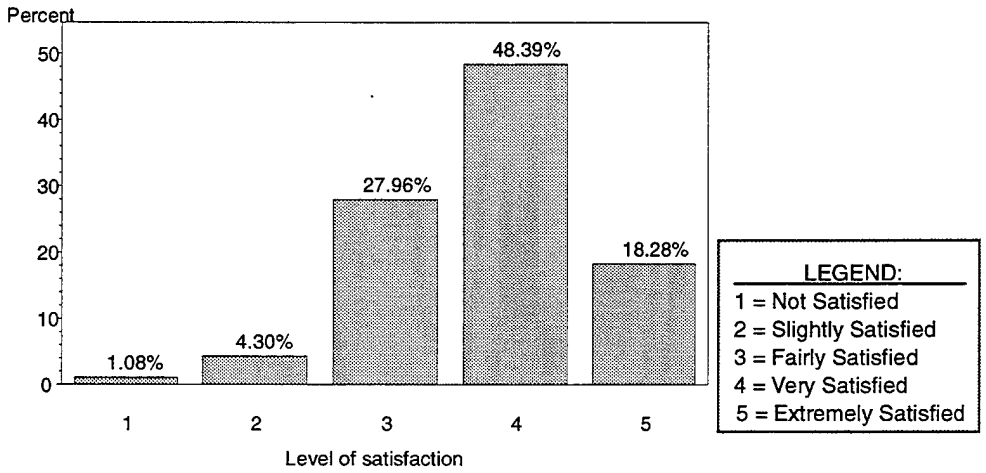

Figure G-13.
Satisfaction with Telephone/Fax

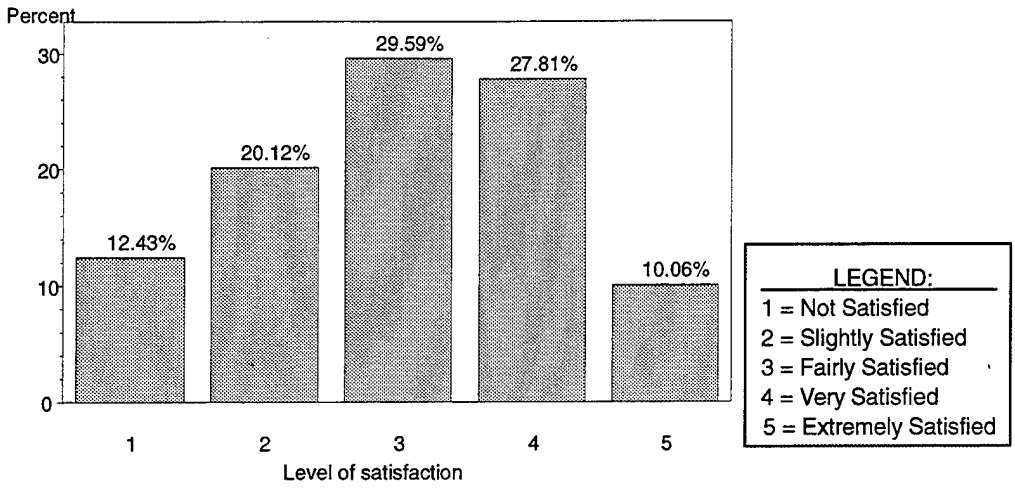

Figure G-14.
Satisfaction with Personal Computers

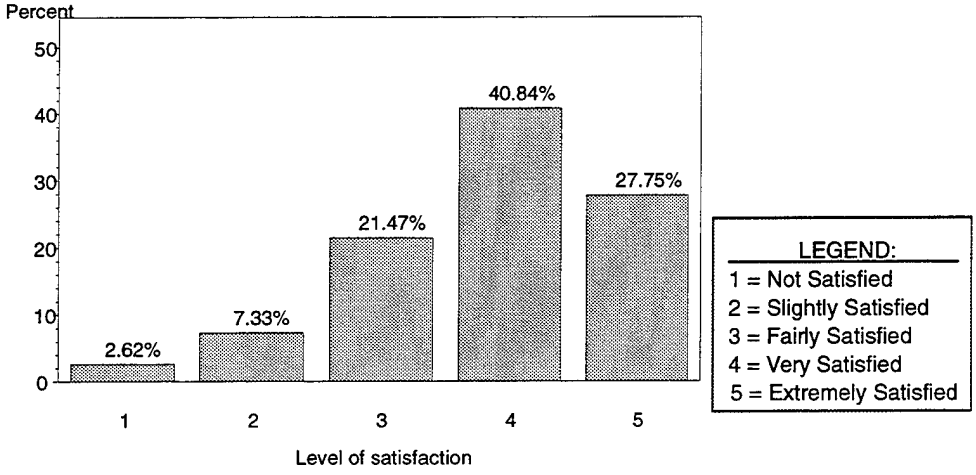

Figure G-15.
Satisfaction with Clerical Support

Q-7 Are you typically reimbursed for per diem, travel, or lodging expenses?

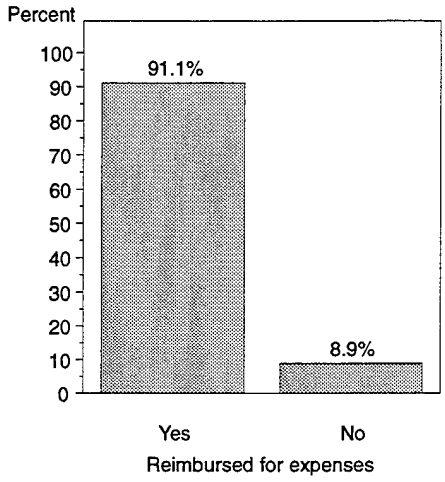

Figure G-16.
Reimbursement for Expenses

Q-8 How satisfied are you with NASA's expense reimbursement?

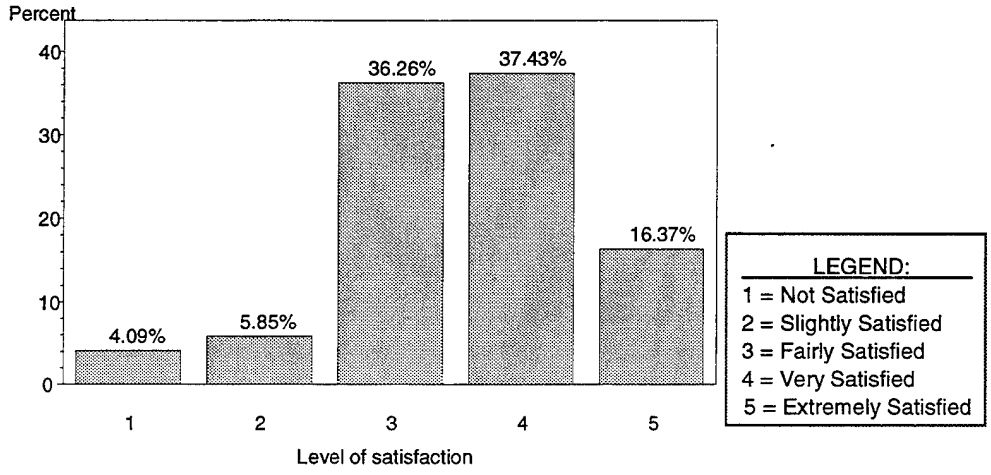

Figure G-17.
Satisfaction with Per Diem

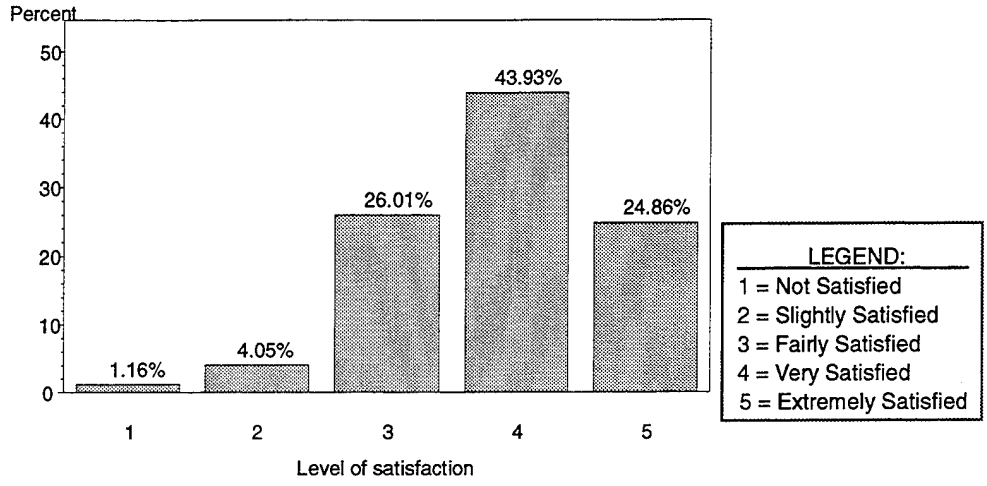

Figure G-18.
Satisfaction with Travel Reimbursement

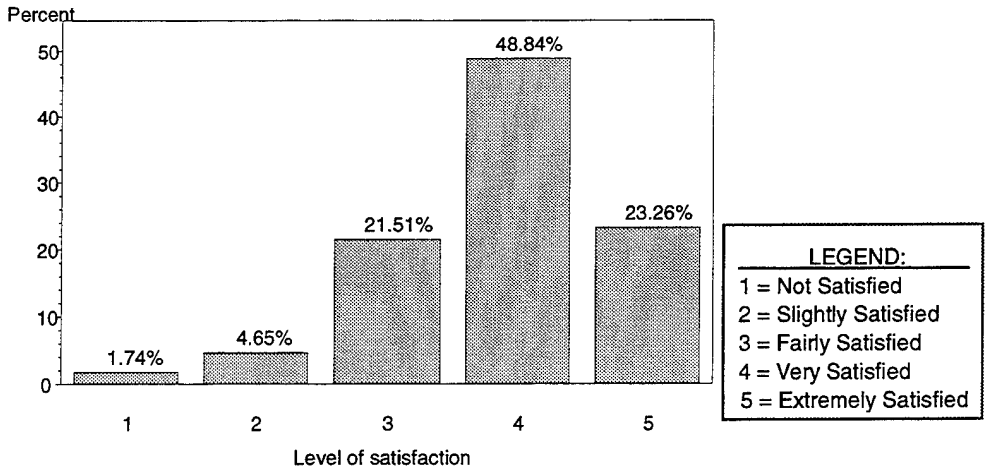

Figure G-19.
Satisfaction with Lodging Reimbursement

Q-9 Should NASA consider using information technology for its science grant process?

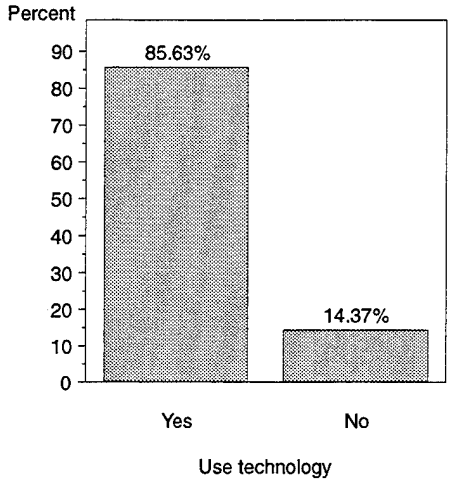

Figure G-20.
Use of Information Technology for Proposal Preparation

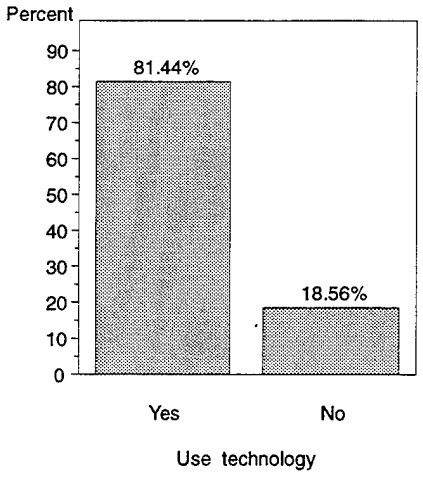

Figure G-21.
Use of Information Technology for Proposal Submission

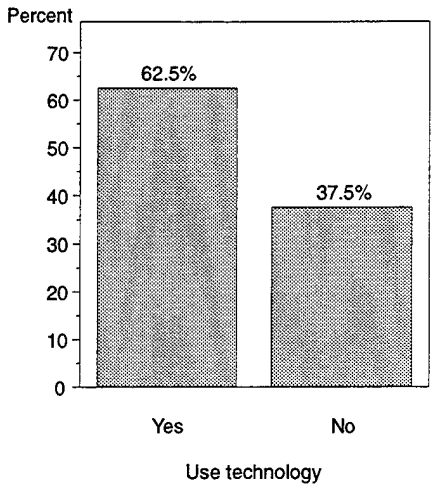

Figure G-22.
Use of Information Technology for Proposal Evaluation

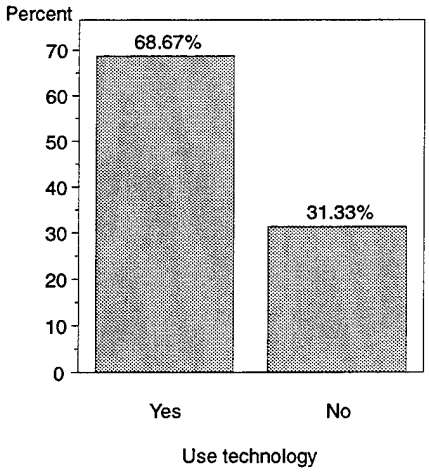

Figure G-23.
Use of Information Technology for Grant Award

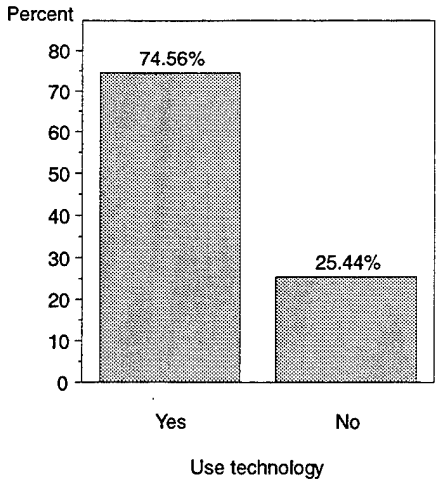

Figure G-24.
Use of Information Technology for Evaluation Notification

GENERAL

Q-10 How satisfied are you with the qualifications of fellow panel members or the quality of mail-in reviews?

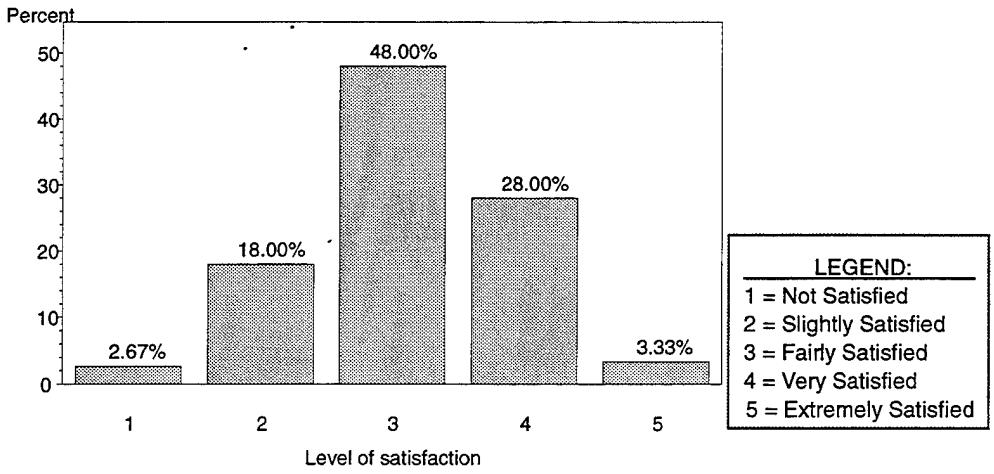

Figure G-25.
Satisfaction with Quality of Mail-In Reviews

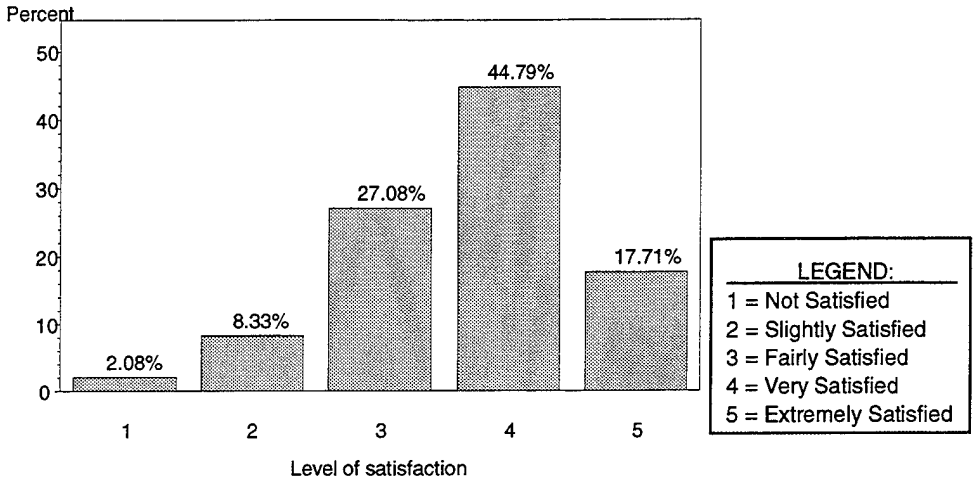

Figure G-26.
Satisfaction with Panel Qualifications

Q-11 How satisfied are you that the NASA grant process fairly evaluates each proposal?

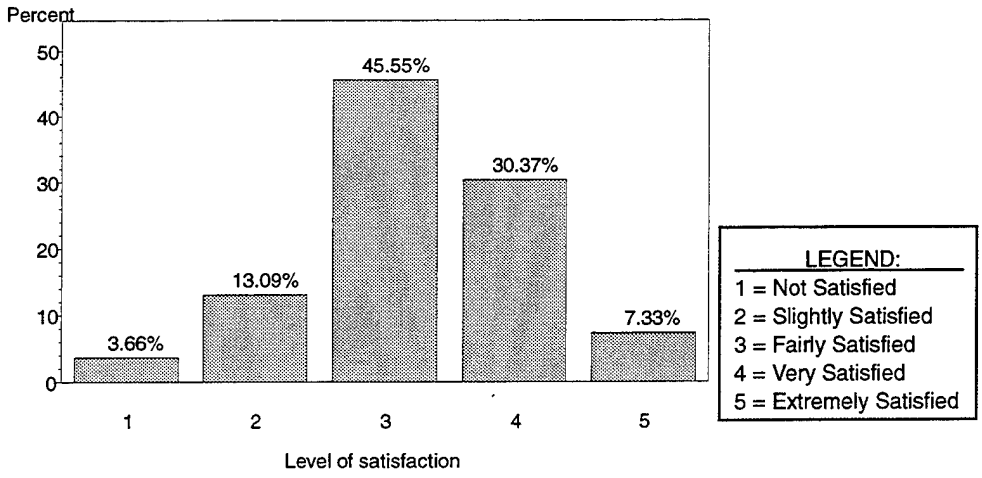

Figure G-27.
Satisfaction with Evaluation Fairness

Q-12 How satisfied are you with NASA's procedures for avoiding conflicts of interest or protecting proprietary ideas?

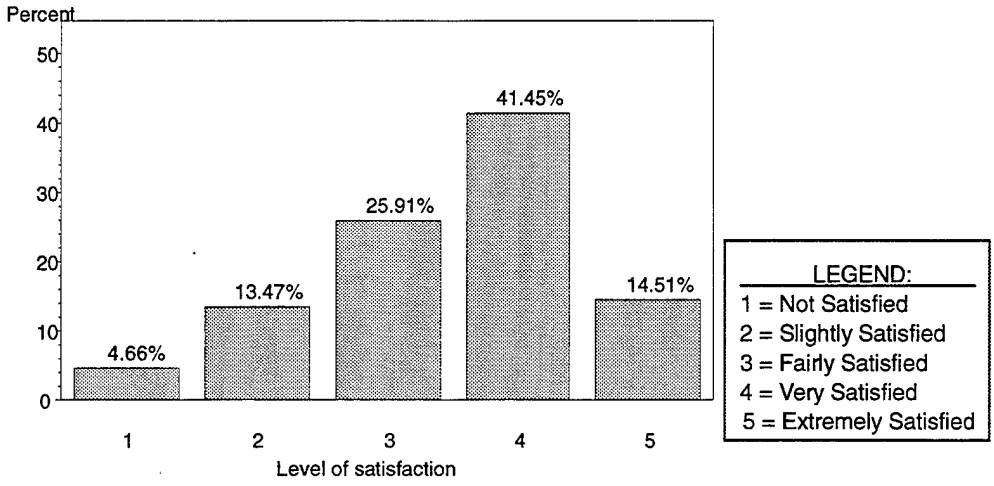

Figure G-28.
Satisfaction with Avoidance of Conflict of Interest

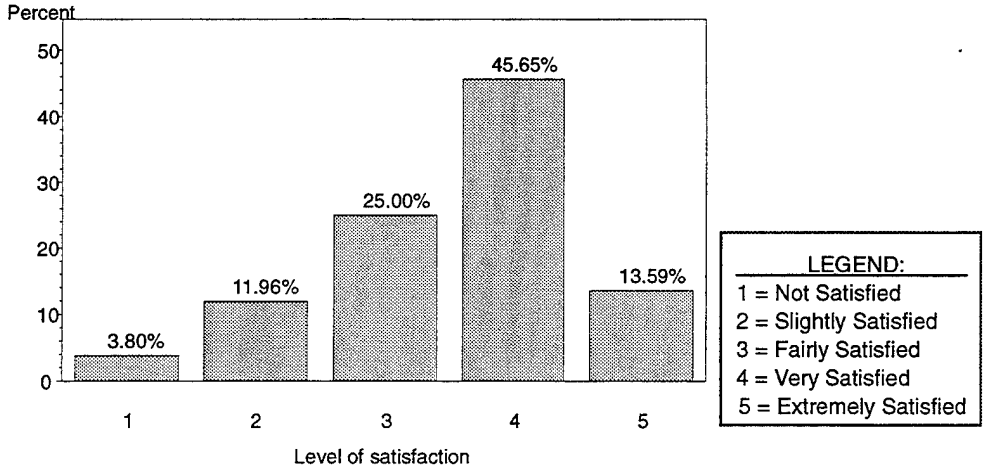

Figure G-29.
Satisfaction with Protecting Proprietary Ideas

Q-13 Are you satisfied that NASA's science grant process results in the selection of the best research projects?

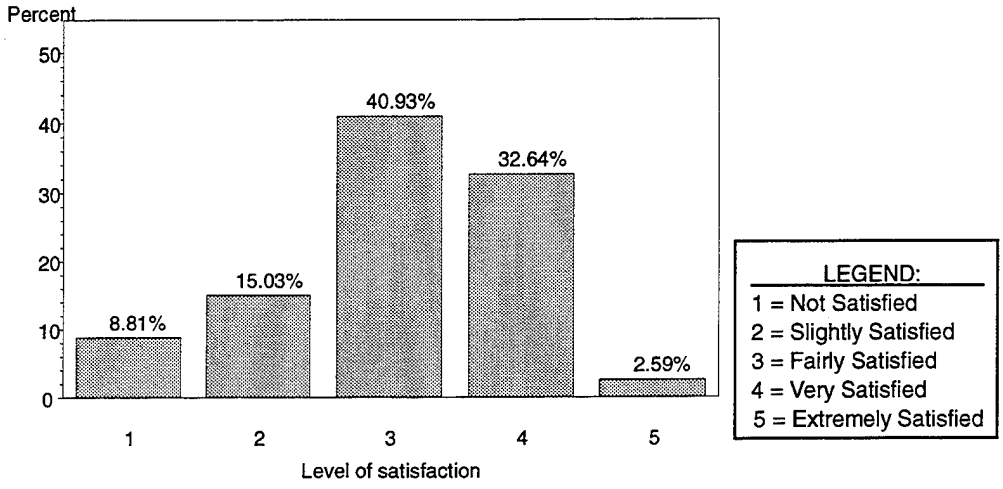

Figure G-30.
Satisfaction that Process Yields Best Research

Q-14 Selection of the best research projects and overall satisfaction with NASA's science grant process are outcomes that depend upon a number of process elements. How important to those outcomes are the following NASA process elements?

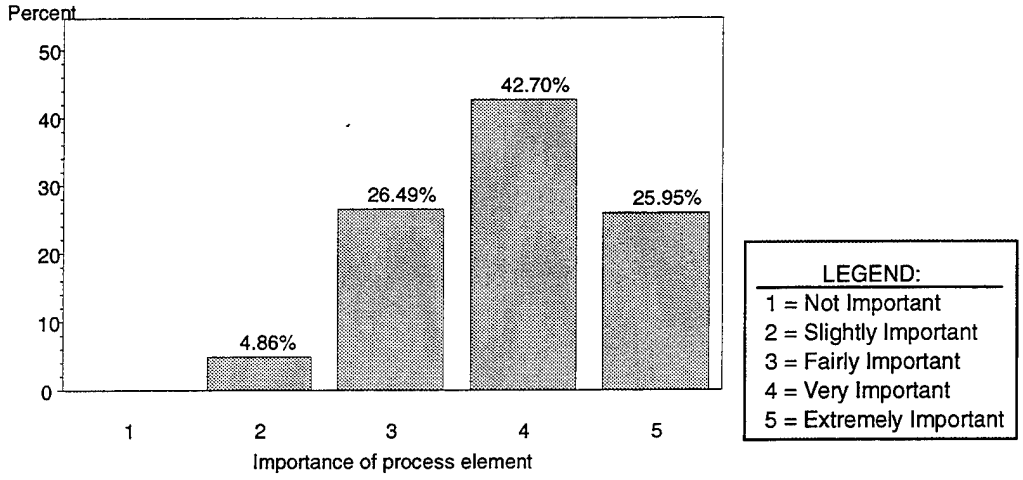

Figure G-31.
Importance of Time/Workload

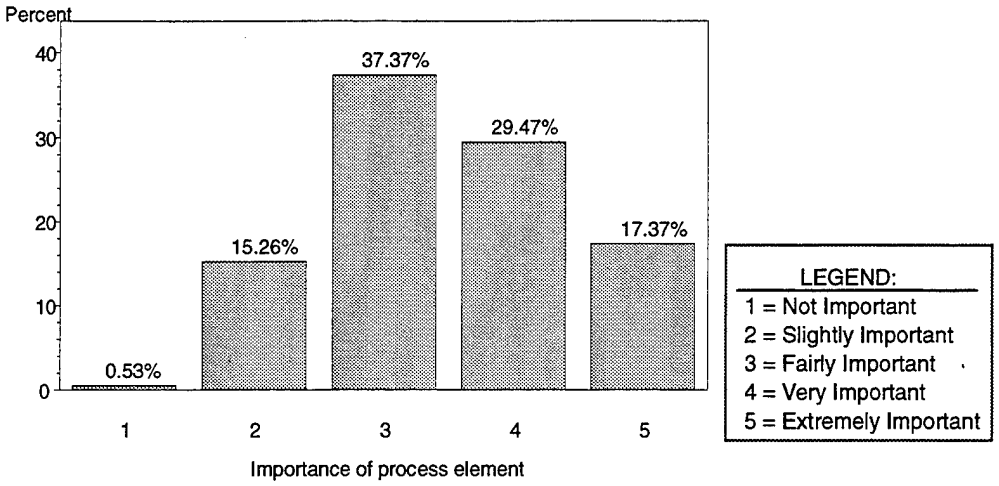

Figure G-32.
Importance of Evaluation Guidelines

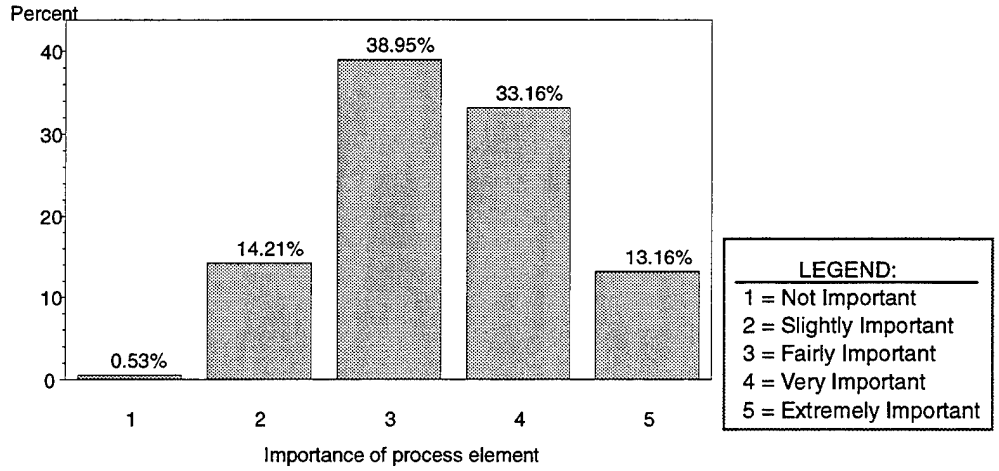

Figure G-33.
Importance of Panel Support

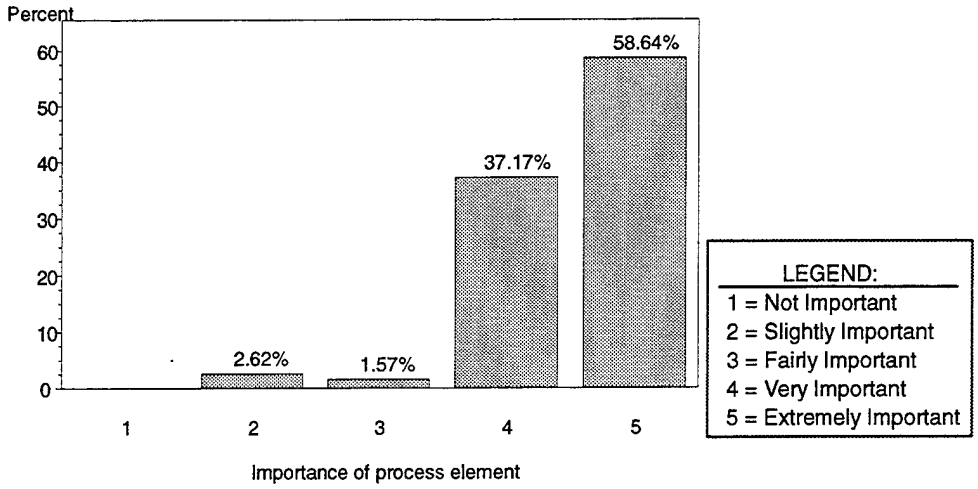

Figure G-34.
Importance of Panel Qualifications

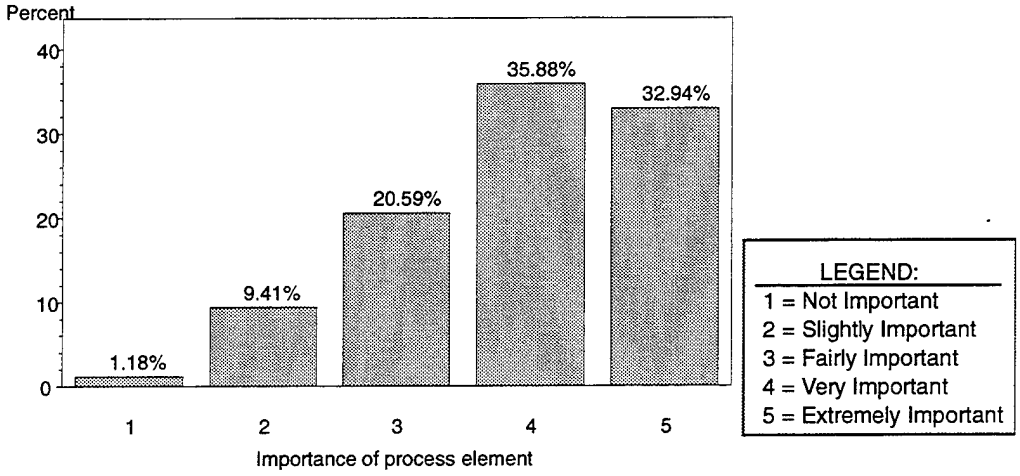

Figure G-35.
Importance of Quality of Mail-In Reviews

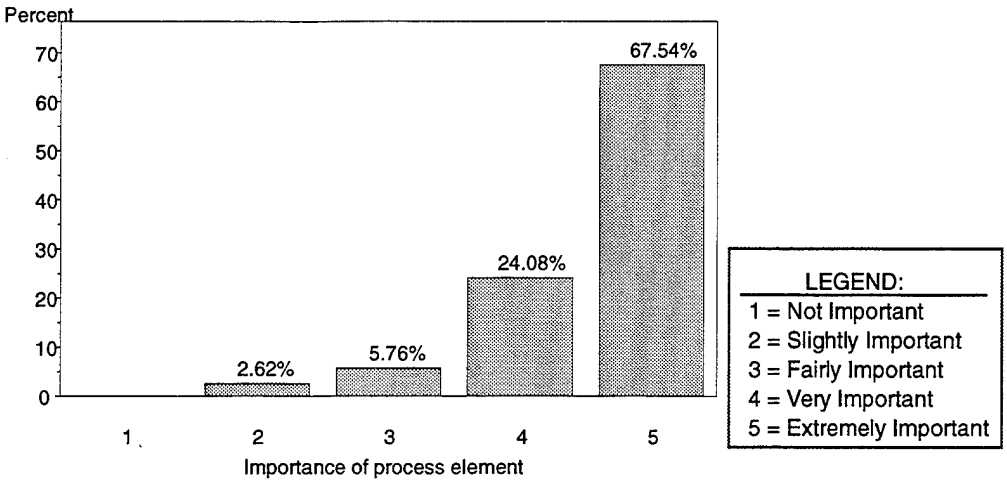

Figure G-36.
Importance of Review Fairness

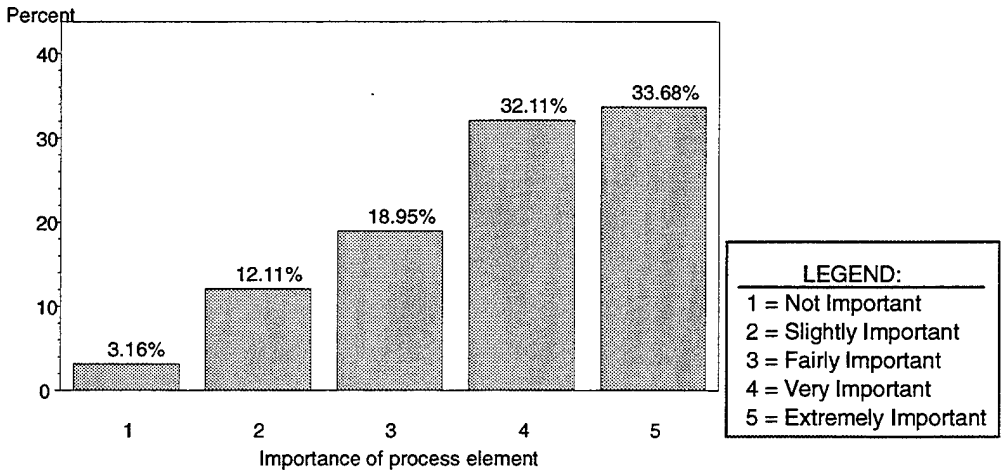

Figure G-37.
Importance of Ethical Issues

Q-15 How satisfied are you with the overall NASA science grant process?

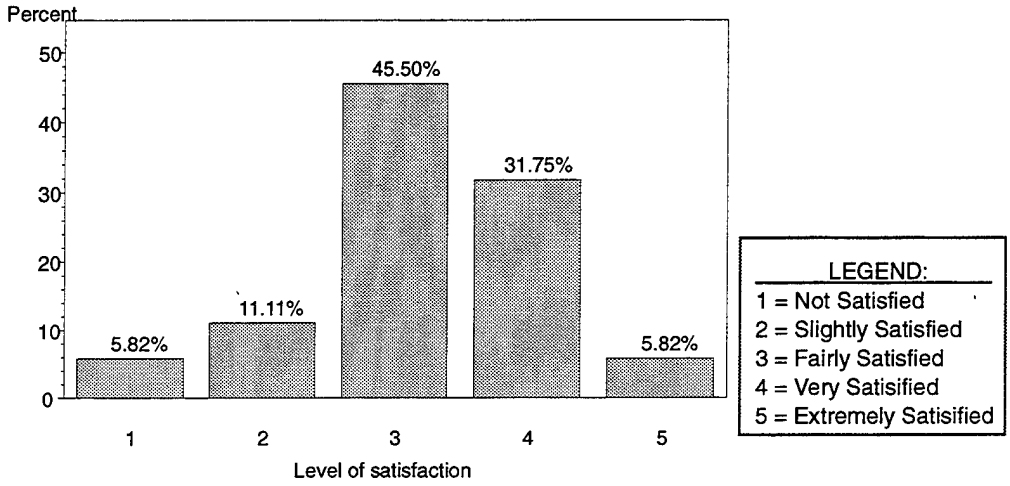

Figure G-38.
Satisfaction with Overall Grant Process

BACKGROUND

Q-16 What is your general area of scientific concern?

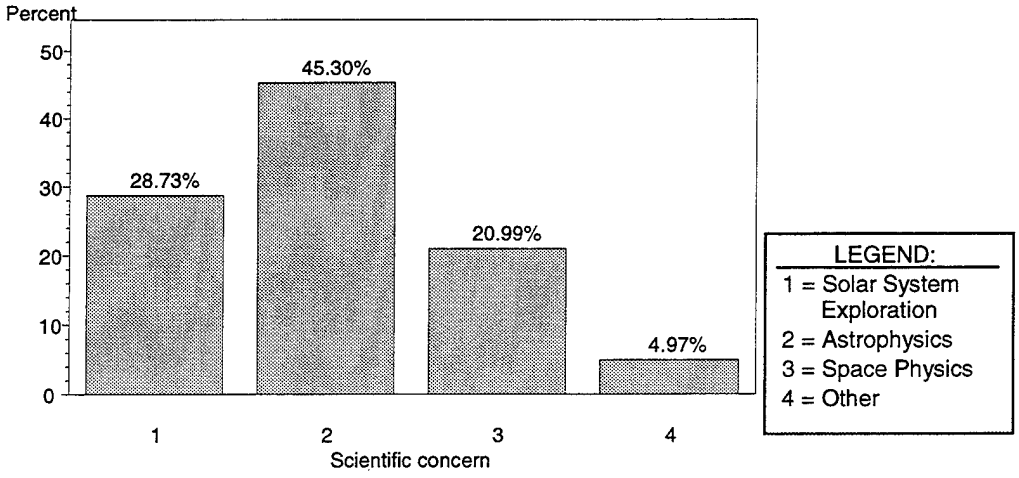

Figure G-39.
Disciplines

Table G-1.
Other Disciplines

Category	Frequency	Percentage
Atmospheric chemicals	3	27.20
Biochemistry	1	9.10
Geochemistry	1	9.10
Geophysics	1	9.10
Laboratory astrophysics	2	18.20
Planetary material	1	9.10
Spectral lasers	1	9.10
Technology	1	9.10
Total	11	100.00

Table G-2.
Subdisciplines

Category	Frequency	Percentage
Astronomy	4	2.60
Atmospheres	2	1.30
Atomic and molecular	2	1.30
Chemical physics	1	0.60
Cosmology	5	3.30
CVS, LMXRBS	1	0.60
Energy	1	0.60
Exobiology	4	2.60
Extragalactic	8	5.30
Galactic astronomy	2	1.30
Gamma ray astronomy	2	1.30
Geochemistry	2	1.30
Geology	2	1.30
Geophysics	6	4.00
Geoscience	1	0.60
Giant planets	1	0.60
High energy	13	8.50
Infrared observation	2	1.30
Instrumentation	2	1.30
Interstellar	2	1.30
Ionosphere	3	2.00

Table G-2.
Subdisciplines (Continued)

Category	Frequency	Percentage
IR	1	0.60
ISM/OB STARS	1	0.60
Isotope	1	0.60
Late-type stars	1	0.60
Magnetohydrodyna.	1	0.60
Magnetosphere	8	5.30
Mars, Venus	1	0.60
Molecular ISM	1	0.60
Multiwavelength	1	0.60
Night vision	1	0.60
Observational	2	1.30
Optical/infrared	3	2.00
Origin of solar	1	0.60
Outer planets	1	0.60
PGG	1	0.60
Planetary astronomy	5	3.30
Planetary atmosphere	5	3.30
Planetary dynamics	1	0.60
Planetary geology	2	1.30
Planetary material	3	2.00
Planetary science	2	1.30
Quasar	1	0.60
Radio astronomy	2	1.30
Radio Galactic	1	0.60
Radio science	1	0.60
Remote sensing	3	2.00
Small bodies	3	2.00
Small bodies	1	0.60
Solar and interplanetary	3	2.00
Solar physics	11	7.10
Solar system dynamics	3	2.00
Star formation	2	1.30
Stars	2	1.30
Stellar atmosphere	1	0.60
Theoretical astronomy	1	0.60
Theory and high energy	1	0.60
Theory, extragalactic	1	0.60
Upper atmosphere	1	0.60

Table G-2.
Subdisciplines (Continued)

Category	Frequency	Percentage
UV and X-ray	1	0.60
X-ray astronomy	4	2.60
X-ray and radio	1	0.60
X-ray astrophysic	1	0.60
X-ray observation	1	0.60
Total	155	100.00

Q-17 How long have you worked in this area?

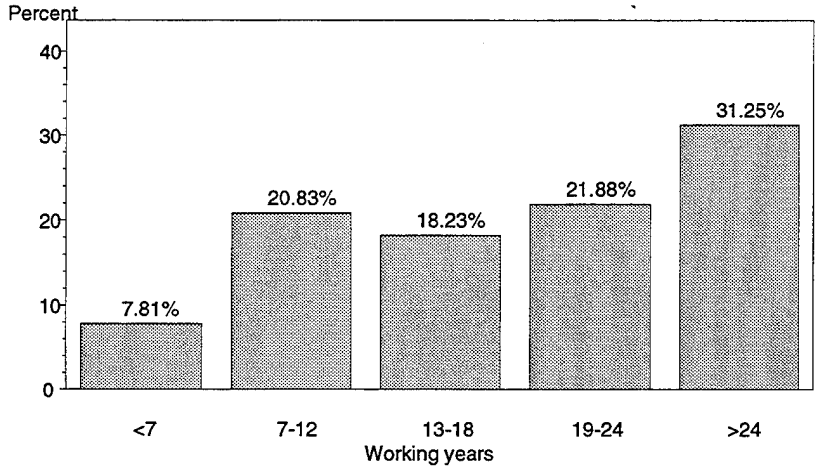

Figure G-40.
Years in Scientific Concern

Q-18 How many times have you ever participated on NASA review panels?

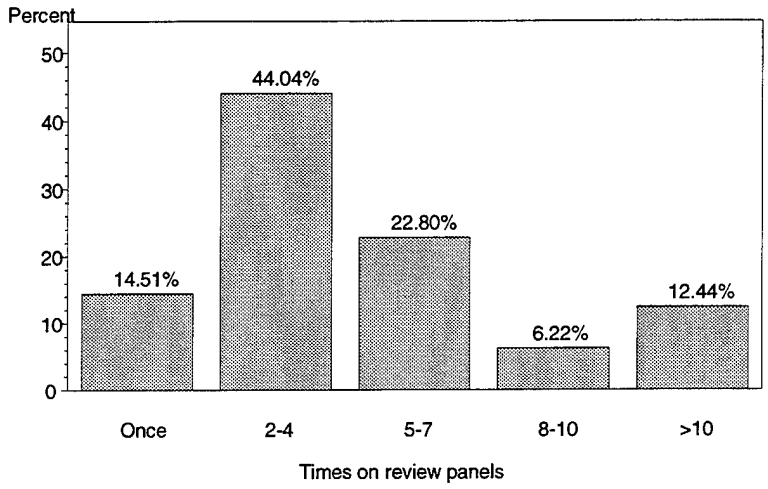

Figure G-41.
Panel Participation

APPENDIX H

Survey Comments: Peer Review Panelists

Survey Comments: Peer Review Panelists

In this appendix, we quote the comments made by the peer review panelists on the science grant survey. (The comments have been edited slightly for clarity, brevity; and grammar.) We have organized the comments according to the subsections in the survey:

Subsection	Page
Time or Workload	H-3
Guidelines	H-5
Support	H-9
General	H-11

TIME OR WORKLOAD

- The time allocated both for the pre-meeting review and the review process itself needs to be increased. The reviewers are extremely rushed during all aspects of the process.

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- Not enough time is allotted for panel discussion of the proposals.

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- Speed up turnaround time from submission to notification of outcome.

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- More lead-time [needed] for proposal reviews by panel members.

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- There should be more time at panel meetings devoted to plenary sessions, less time devoted to writing justifications. At plenary sessions, every panel member should have read the abstract of every proposal. Use established techniques for reaching consensus within a group.

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- During the peer review process there should be sufficient time allocated so that the panel members do not work under time pressure.

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- On some reviews, estimation of available observing time is inaccurate, leading to major revisions of the panel results by the chairs after the meeting; this is unacceptable.

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- Panel workloads are too high. Things happen much too quickly and one individual's judgment (or ax to grind) can sway the rest of the group under the pressure of "the need to move on." Yet, I understand that (1) resources are limited, (2) individual reviewers and panel members have only so much time, and (3) the number of proposals keeps increasing every year.

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- The main problem is that there are too many proposals per panel. In my last panel, we were promised a maximum of 20 proposals for 4 panelists. We actually were given over 30! This meant having to be [the] lead or secondary reviewer on more than 15 proposals! That is just *too much*! Suggest *maximum* [of] 5 proposals per panelist.

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- The number of proposals to be reviewed [has] *increased*. It was already too high for the size of the panel and the panelist would now have to write the final summary reviews (too much work). Also, the honorarium was dropped. The bottom line is that NASA greatly increased the workload for the panelist and cut the pay simultaneously.

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- The most significant improvement would be to *reduce the number of proposals per panel*. On the panels I've served, we would typically have only 10 minutes per proposal — this is insufficient time for careful consideration and unfair to proposers who may have invested a great deal of effort in the proposal. Electronic participation in the review would also be quite helpful. It may be impractical to conduct the entire review via telecom, but e-mail dialog on each proposal for, say, 2 weeks prior to the panel session would help ensure that all proposals get careful consideration.

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- It's a catch-22 situation: The load is too heavy, the time too short. But adding more panels impacts uniformity and overall balance, while measuring

the length of reviews gets into the area of diminishing returns! One can be effective on this only for so long.

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- Get the proposals to the reviewers sooner, and give the panel more time to reconsider early gradings.

GUIDELINES

- "Technical Review" data should be fed back verbatim to the proposal writers (technical reviewers may not be correct, and sometimes overstep the boundaries of technical matters).

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- Proposal rating could be improved by asking for ratings on each criterion and NASA using those to arrive at an overall rating.

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- I feel a fair amount of time is actually more or less wasted going through a formal review of those proposals that are obviously not going to be accepted. I know it would be difficult to formalize such an approach. (make it legal, I suppose), but some two-stage process would probably be much more efficient. Stage 1, by e-mail, phone, teleconference, or whatever: weed out the proposals that will not be serious competitors. Stage 2, convene a (smaller) panel to deal with the better half of the proposals. It's amazing how much agreement there usually is. [This two-stage procedure] would probably save 30% of the actual time spent on reviews.

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- There are too many proposals and too little time to evaluate them. Institute a 2 step process: 1) Mail-in reviews are used to weed out proposals with less than very good or excellent ratings. 2) The very good and excellent proposals are evaluated by the review panels. This process will cut the time needed for the review panels to consider inferior proposals and will allow more consideration of the best proposals.

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- I very much appreciated a new approach which placed strong reliance on expert mail-in reviews, leaving the main function of the panel to adjudicate these reviews.

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- [Use] more subdiscipline panels as opposed to "catch-all" panels.

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- Feedback from program to proposers is still sluggish and limited. The way costs are evaluated is awful. A good project with an inflated budget is still a good project. It should not get a lower rating, just less [funding]. Panels should be allowed to evaluate costs more objectively. Instructions, should be rewritten in a more understandable way. I never understood what the evaluation element "relevance to NASA programs" meant. Most reviewers are only familiar with 1 or 2 programs at best, not all of NASA's programs and missions. This should be changed to "relevance to this program."

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- I think more redundant reviewing by independent parties (e.g., double-blind reviews) would be beneficial, with at least some of the review steps being taken with no knowledge of the proposers' names. As an example: Use mail-in reviews (at least 3 per proposal), with no principal investigator or co-investigator (PI/CI) names available to the reviewers; Do the typical panel reviews: Step 1: with no PI/CI names available to the reviewers — independent of the mail-in reviews. Step 2: Combine grades; discuss grade inconsistencies — all still without knowledge of PI/CI names. Step 3: If important, consider the names of PI/CI. There is too much of the "good old boy" network operating in the Astronomy review process.

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- In the peer review process, eliminate costs as a consideration. Panel members are not always knowledgeable about geographical and institutional cost differences. These matters should be evaluated by program managers.

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- Reviews should not comment on unfamiliar areas. Outdated methods are often still supported although it has been long shown that they don't work. There is often prejudice against new methods even if they have shown promise. Young investigators should be given a fair chance but still have to demonstrated expertise, ability to conduct/organize work, attain relevant new results.

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- The process is pretty well refined and reasonably apolitical and objective. Panel reviews would be more efficient if the step-by-step process were laid out explicitly before the meeting.

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- Rephrase rating categories so that they make sense to someone familiar with everyday English.

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- My biggest concern about the NASA proposal review process is that too many people are writing too many proposals, and too many other people are reviewing them. In many cases, various proposals, often overlapping, are submitted to any NASA office that will accept them. And there is no shortage of offices willing to accept them. I think that the proposal solicitation procedures should be re-evaluated. I suggest standard dates for submissions of proposals, and that key personnel should be tracked nation-wide for duplication of effort and over-commitment of time. I believe that the pressure upon researchers to raise money to support themselves and their activities leads to their spending too much creative time [on proposals]. Further, with so many proposals to review, the review process itself is overloaded, and this detracts from the quality of the review work itself. Everything would be better if NASA and like agencies, including NSF, DoD, NOAA, DOE, etc., coordinated their efforts. It would not be a hardship if people could only write a finite number of proposals, with enough funds requested to cover the true cost of the research. In fact, it would be a blessing.

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- If NASA were to suggest that some areas were currently more important to their programs than others (more likely to be funded), this might reduce proposal writing and time wasted. NASA should be "up-front" with its agenda. I feel that with decreasing research funds, there will be emphasis placed on some fields while others are de-emphasized or dropped. Such decisions should be made known.

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- In my experience there is a tension between in-house NASA proposals versus outside, university-based groups. Typically the panel is told to rate proposals by scientific merit only. Often, however, the very best proposals are submitted by a university-based group, which may be eligible for NSF funding. If the panel selects this proposal, it may be cutting off funding for an in-house NASA group which apparently is not eligible for NSF funding. I hesitate to suggest that the in-house proposals should be reviewed separately, but it appears that some mechanism should be found to keep these groups going.

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- The evaluation process, particularly guidelines, has improved greatly over the years.

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- The confidentiality of panel members is not strictly kept by all panel members.

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- Panel meetings only make *recommendations* to NASA. In some cases [NASA] scientists have *FAR* less expertise than the panel, and their decisions reflect politics rather than the best science. I would like to see panel recommendations made either *binding*, or at least that the NASA selecting official explain in *writing* why he/she did not follow panel recommendations.

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- [NASA] should allow for diversity in the selection process — e.g., accept a few proposals that are more speculative in terms of their science return. The NASA process no doubt selects the best, say, 30% of the science and "throws away" the worst 30%; but the 40% in the middle depends too much on the chance make-up of a given panel in a given year. NASA should enforce its criteria, to prevent hedging on the rules. In particular, proposals which overrun page limits typically are not penalized.

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- I noticed considerable variation in how a proposal fared based on how it was prepared. Many proposals did not break up research tasks, for instance, whereas some had several discrete tasks. In our group, if several tasks were delineated, we often voted on the merits of each individually. We often recommended partial funding to support the individual tasks but excluded others. In other words, the panel rewrote the proposal in certain cases. Those proposals that contained only one task [received a single] pass/fail. If we are to invoke the policy of evaluating proposals by task, that should be spelled out in the instructions for proposal preparation in the NRA.

  No graduate students should be supported through research proposals. Instead, establish a graduate student program wherein students at universities entering into their thesis years compete for educational funds to complete their thesis in planetary studies (or better yet to integrate planetary studies with other disciplines). This promotes excellence in the student not the thesis advisor, and gives NASA control over the number of graduate students required to ensure continuation of the planetary "brain trust." I would recommend that, for the next few years, very few, if any, graduate students be supported by NASA. We have a serious overpopulation problem. Consider imposing constraints on overhead rates.

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- There are two areas that would improve the review process. First, proposal grades have been inflated so we are deciding the fates of grants based on

tiny grade differentials where one bad or inaccurate review can cause a proposal to fail. Change the grades to a 0 – 10 numeric system on each evaluation criterion. Second, we come to a meeting completely "cold" on our proposals. Increase the information flow *before* the meeting. Get primary secondary reviewers to submit their reviews at the same time as the external [reviews.] Send the complete set of results to the primary and secondary panel reviewer, so they can check the "controversial ones." They can then come to the meeting informed and even draft the evaluations where there is essential agreement.

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- A summary of decision ratings at end of panel would be good. After winners and losers are notified the results should be made public.

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- There are no uniform standards across programs. There should be.

SUPPORT

- Currently, at [a federal laboratory], we must take leave without pay to attend panel reviews. In addition, we are not allowed to collect any compensation (via an "honorarium") for our time spent on the panel review. This causes a large financial hardship for panel members, particularly those who must hire a day-care center or baby-sitter to take care of their kids while they are out of town. Because of this, we simply can no longer afford to attend panel reviews.

  In addition, we are often required to review large numbers of proposals (for write-in reviews) in addition to those that we judge as primary or secondary reviewers. A careful review of [so] many proposals often takes more time than our tasks are funded for during the fiscal year. Special accounts are needed to pay for this review process. We can no longer absorb this in our ever-shrinking research and analysis activities.

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- [Need] more flexibility in travel arrangements.

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- NASA should pay a consulting fee, in addition to per diem, travel, etc., to its panel members.

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- The most important consideration, in my view, is to get the best people possible [as] reviewers. Even if there are lots of conflicts, I would still recommend getting the best reviewers. How about modest honoria, say $1,000?

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- In the panel review, reimbursements should be handled separately from actual compensation (payments) to simplify tax preparation.

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- My main complaint about participating on panels is that I am spending a substantial amount of time when I am being paid by someone else to do something different. I don't think [charging to another grant] should support NASA activities. NASA should pay my salary for my time on [NASA work].

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- Try video conferencing to reduce travel.

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- The system for reimbursing travel makes it difficult for civil service scientist to participate, because of artificial restrictions on Center travel budgets. This can be relieved if HQ were to retain travel dollars for this purpose.

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- It seems to me that there is some waste in the arrangement of meeting expenses. For example, whenever I come to serve on a panel I can purchase my ticket 50% cheaper than what is offered to me by the official travel office.

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- NASA should provide monetary reimbursement for extra review work. Kitt Peak National Observatory pays its committee members for this; NASA should be able to do this also.

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- Reviews run by Goddard x-ray community are excellent. Superb arrangements, panels, tech support, etc.

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- I believe the process works well and would not successfully be replaced by a mail-in process only. To keep cost down, I suggest that it may be advantageous to organize the reviews over weekends, which would reduce airfares

by two-thirds. Mixed panels are good from the point of view of fairness, but they sometimes result in too little expertise in a given panel or for a given proposal.

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- Travel reimbursement is too slow. The hotel bill should be directly billed to NASA.

GENERAL

- I have an impression there is a great deal of allocation/denial of funds for "programmatic" reasons which could include strong personal biases of the HQ staff. This point should be open to the panel's scrutiny. The process is too expensive; when scientists are struggling to get a month's salary or funds to support a student, it is preposterous to be spending the equivalent of several research grants on panel meetings.

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- The problem with the NASA grant program has nothing to do with procedure!!! There is simply too little money to fund the many excellent proposals. Therefore, good proposals are unfunded, and inevitably people are unhappy. Given the current level of funding, no procedure is satisfactory — all one can hope for is to avoid blatant unfairness, which I think is done.

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- The quality and experience of the panel is really quite important. In general, NASA does a careful job in selections, but was well below the mark (as well as appearing very disorganized), during the ATP peer review in the summer of 1994. I hope and believe that this was anomalous.

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- My experience on *several* occasions has been that the review panel meets in Washington and does, for the most part, a very careful and competent job of weighting the various issues, criteria, and arriving at a ranking of the proposals that is a fair and accurate assessment of their scientific merit. We leave and I later meet a colleague at other meetings to discover to my dismay that top-ranked proposals were *not* funded while others further down the list *were* funded! I can only conclude that the Administrators make awards based on considerations other than the findings of the panel review. This leaves many of us frustrated with the system. I hope this survey may prompt some reform, as the top-quality proposals are *not* being funded. Thank you.

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- One basic problem is structural: a differentiation between "new starts" and "continuing" investigators who are proposing a new (3 year, normally) increment of NASA funding. The external reviewers don't know of this distinction; the proposers (many of them) also do not know, but it is on this issue that NASA's programmatic stamp *often overrides* scientific merit. NASA should instead adopt a model more akin to NSF's: Banish "no new starts" from program manager vocabularies. Stop protecting the "established" investigators and their agendas. This is harmful to the science!

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- Every effort must be taken to ensure ethical behavior of reviewers. No panel is ever free from all conflicts of interest — the fields are too small. Panel chairs and NASA representatives must always be aware of potential conflicts.

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- Conflict of interest has become extreme both on the part of the "outside" reviews and the NASA representatives. The conflict [between] employees of NASA centers is particularly severe. As funding shrinks the committees stress "reliable" projects, "killing" innovation. Also, there are inadequate funds being distributed to many grants.

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- In some cases, the proposal rating was only determined (voted) by the primary and secondary reviewers rather than the entire panel. To ensure fairness, the rating of every proposal should be voted on by all the panel members, who also [should] read the proposal (but may not as carefully as the primary and secondary reviewers). Such instructions should be given to the chairs before the review starts. Scientific merit should always be the highest priority in the review evaluation criteria. The current situation that junior researchers [have difficulty in obtaining] long-term grants, is partially due to the fact that panel members are not real experts in the field and they are more likely to [select] senior people. So, they give awards to the "big names." I suggest that the panel members consist of both senior and junior scientists. A junior expert is more likely to make a fair judgment than a senior [expert]. A survey should be conducted after *every* review process, i.e., a survey sheet is given to every panel member at the end of the meeting. This may help to reveal and solve potential problems on a timely basis.

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- NASA relies too much on the panel reviews, with very little emphasis on the written review process. I think NSF has a much better grant review process, because they rely much more on written reviews. NASA panel reviews do not allow one to obtain the best possible expertise for each proposal, due to the limited number of panel members. Often, there are 2 or fewer written

reviews (as compared to 6 for NSF) for each proposal in a NASA review (often because the requests for written reviews are treated as an afterthought rather than of primary importance in the NASA review process). Panel reviews lead to one reviewer (the primary) having more than 90% weight in the treatment of a proposal.

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- Peer review panels do not work! The old system (like that employed at NSF), with mail-in reviews and management decisions made at the program director level is far superior to the panel system. By this, I refer generally to the Rand A programs. Missions selection works a bit better under the panel review system. My experience is that the best few proposals rise to the top and get funded. However, in a competitive world, any objective sorting of most of the proposals is not accomplished. I would guess that the top half of the proposals which are funded deserves to be funded, but the bottom half is easily interchangeable with at least an equal number of the best of the unfunded. This large uncertainty is decided finally by the particular prejudices, knowledge, and sub-disciplines of the particular panel assembled.

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- I think the process of grant selection is as good as it can realistically be but of course [is] not perfect. Of more concern is the monetary amount associated with each awarded grant. On panels I've served, the typical grant is on the order of $10 – 20K which is generally not enough to ensure that the data analysis effort is adequately supported.

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- The NSF review process appears to be more efficient. NASA should investigate ways to reduce the percentage of available funds required to manage programs and evaluate proposals.

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- I believe that the NASA program office should try harder to stay on course and not be jostled about by every wind of fashion that comes along. It should also try to be more consistent in its announcement of opportunities. Several times I have spent considerable effort in writing proposals, following a NASA announcement, only to be told that there was no money for this program and my proposal simply wouldn't be reviewed. It makes NASA headquarters appear, rightly or wrongly, as if they are extremely uncertain what course they are following.

  I believe there could be a stronger effort towards communication with and oversight of planetary science community once the funds have been awarded. There are some groups that would rather work 12 hours a day to make sure that they comply with the commitment to the proposal. On the

other hand, there are others who look upon successful proposals as some kind of a game with only a minimal effort required to carry out the requisite work. At present I get the feeling that NASA headquarters isn't aware of this or perhaps doesn't care.

Parenthetically this problem was much better addressed under the older system, where the program administrator reviewed the proposals himself. He was thus entirely responsible for the choices he made. He made trips to visit various groups, discussed their needs and saw how they were doing. He grudgingly even admitted some praise for work done, while the present outlook seems to concentrate mainly on cutting the budget and making investigators continue the same level of work for less funding. The older system worked well because the administrator of the program was extremely dedicated and capable. It would not work well if there was a less capable person at the helm, and, because of this possibility, I do not want to suggest abolishing the present scientific advisory committees which are extremely important.

If there is more of an oversight function and more involvement by the program administrator, the actual work that is done becomes more important. Thus, the proposals themselves could be made shorter, cutting their present size roughly in half, the review committee could also be cut roughly in half and more emphasis could be given to overall performance of the proposing individuals and groups.

Large spacecraft proposals, such as the Discovery program, should be handled more elaborately. I have seen a number of occasions where [such] proposals were given a low rating because of some misunderstanding by the committee of some technical details, which were actually correct. It is my suggestion that the principal investigator for these proposals be invited to give a short 20 minute presentation about his project and his philosophy in front of the panel. This is followed by a 30 minute question and answer session. The panel then gets a chance to ask questions about specific items of the proposal which had been flagged, and the [proposal writers] get a chance to defend their approach and display the science and its technical feasibility. While it may seem that this extra step is an added burden, I feel it would make the selection procedure fairer and result in better projects for NASA.

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- Rejection is often based on technical aspects of proposal preparation (e.g., did not address how project fit into NASA goals; no detailed work plan). Such proposals are dropped immediately by panels, irrespective of merit. Too much emphasis on proposal formalism!

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- I have been impressed with the quality of the evaluation panels I have participated in for the astrophysics branch. The panel results have always been fairly based on scientific merit and utility. I can't say how closely the final selection and funding had adhered to the panel recommendation, but I have heard little complaint from the astrophysics community. However, I have heard complaints from planetary colleges concerning the fairness of their reviews.

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- In a few cases, principal investigators who have not been productive are automatically continued on the basis of outdated reputations! This should be discouraged. Residence time required in Houston is too long: more electronic communications among panels, in advance, could shorten process in Houston to 3 days; the current 8 days is unacceptable for people who have real lives and other responsibilities.

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- Modified, or not, conflict of interest regulations are imperative: the current legislative mumbo-jumbo prevents many reviewers with no real conflict from participating and, at the same time, allows the participation of reviewers with serious conflicts of interest. Electronic submission and circulation (to reviewers) of proposals should be adopted immediately. Electronic peer review should be investigated [to reduce] travel-time and costs.

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- The most serious flaw in the evaluation program may be in assessing the "quality vs. quantity" issue. I have always gone the route of producing a few high-quality papers each year instead of an abundance of mediocre papers. But, reviewers often only have time to look over the bulk of publications a proposer has published rather than the quality of those works.

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- The process is incredibly laborious and — therefore — costly. A very large [proportion] of the money available for research is spent in the process of deciding who will get grants. I implore NASA to investigate ways to fairly [select] proposals more cheaply.

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- At present there is too much good science chasing too few dollars. This introduces a random component in the funding process, and too many good projects lose out. The response is to keep trying, and as a result, we are drowning in proposals — both writing them and reading them. Drastic revisions in the process are needed. Maybe the time has come for term limitations. A strict limit on the number of proposals that any investigator may

submit to an government agency in a given year; and a strict limit on the number of continuous years that any investigator may be funded in a given program.

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- The review process has become so competitive that vast resources are spent in both preparing and reviewing proposals, 75% of which are not funded. Thus we have reached a point of diminishing returns. Furthermore, the process favors "safe research," projects where the outcome is fairly predictable and well defined. Innovative research with new ideas becomes too risky to fund.

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- I think the process works as well as can be expected. I believe it is fair and the reviewers [are] largely free of personal bias in their assessments. Some clarification of the "conflict of interest" rules is needed. It seems to go to awkward lengths at times (indeed to the extent of eliminating the majority of the panel) with little justification. I have found the mail-in reviews to be very [uneven] in quality. I believe the process could be improved but I'm not sure how (shorter guidelines?). The panel reviews are the real determinant and the primary reviewer has the main voice in the outcome.

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- The process is *perfect if* there is money. For the last five years, it has been a *waste* of time and money. Stop it until you can [improve it]. *Until then* use outside reviews and contract monitors. I trust the contract monitors.

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- Our panel was very disturbed at the small amount of funds to be distributed to a very large number of *outstanding* proposals. It didn't seem worth the travel money and time to assemble all of us to debate giving out so little money.

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- In continuing programs, it would be useful to have: 1) A list of previously funded proposals sorted by PI and also by subject. 2) [A list of] PIs who have previously [received] awards, a list of these awards and relevant progress reports.

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- Chief reviewers should be given names and e-mail addresses of mail-in reviewers for their proposals, and it should be their responsibility to call and make sure mail-in reviews are in on time. The last panel I served on had

several proposals with no mail-in reviews. This puts the panel in a position of having to review proposals for which there may be no expertise on the panel, and it is very unfair to the potential [principal investigator]. A small pool of money should be made available to new PIs, or at least consideration should be given so that all money does not go to ongoing projects all the time, even if these are highly rated by the existing community (who have an interest in the status quo). It seems difficult to protect proprietary ideas except to use sanctions against persons who abuse privilege.

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- My main concern is with fairness and preparation of the panel members. Both times I sat on panels there were few if any mail-in reviews. This leaves too much to the panel members. If one member doesn't conscientiously do his or her job, then proposal [evaluations] suffer. Panel members should also be forewarned/admonished that they must come prepared. I have seen terribly under-prepared panel members and it severely compromises the process.

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- Panels should be divided more into subcategories like the NSF panel review, so that cross-discipline bias is removed.

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- More people would be available for panel service if we didn't have to write so many separate proposals. Maybe there should be more tolerance for multiple-task (not closely related) proposals. It would give NASA more "bang for the buck."

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- Peer review panels do not work! The old system (like that employed at NSF), with mail reviews and management decisions made at the program director level, is far superior to the panel system. By this I refer generally to the Rand A programs. Mission selection works a bit better under the panel review system. My experience is that the best few proposals rise to the top and get funded. However, in a competitive world, any objective sorting of most of the proposals is not accomplished. I would guess that the top half of the proposals which are funded deserve to be funded, but the bottom half are easily interchangeable with at least an equal number of the best of the unfunded. This large uncertainty is decided finally by the particular prejudices, knowledge, and subdisciplines of the particular panel assembled.

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- Funding Process: Increase grant sizes to reduce overhead in writing and reviewing process. Increase grant length for selected proposals/areas. Don't

support just for social reasons; should be at most secondary consideration, as long as money is extremely tight.

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- The most difficult challenge is controlling subjective, personal, "conflict of interest" factors injected by a small minority of panelists. I have the highest respect for the effectiveness of the public officials I have encountered who are charged with conducting these reviews.

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- In multi-discipline, multi-mission program reviews there is often an implicit "quota" of how [much] money will be divided up according to discipline or mission depending on the composition and relative "weights" of the panels. Hence, it may help the proposers to gain insights into their chances, independent of the quality of the proposal. This is a very important issue since most of the "unfairness" complaints originate from such types of reviews. The more narrowly focused, mission-oriented reviews are usually considered fair by most colleagues.

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- The big problem is that there are now so many deadlines, proposals and reviews, that the relatively small astrophysics community is in some danger of becoming gridlocked. It would be tragic for NASA if people end up spending more time talking and debating about what they *are going to do* than actually doing it! NASA has been doing some good things to check this dangerous trend: much more streamlined and shorter proposals and reviews have been a huge help without any resulting sacrifice of scientific quality. More might be done, along the lines of shorter proposals and fewer, bigger reviews (i.e., for longer time periods). Keep panel size *as small as possible*!

- I have mainly been involved in reviews which awarded amounts on the order of a few $100K or so and I am generally satisfied with the process. My main concern is with larger awards. It seems to me that the multi-hundred million dollar awards are not given proportionally more scrutiny. I think a more open review process, would be appropriate.

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- Concerns about conflict of interest from individuals from the same institution are given too much weight — interfere with giving proposals a balanced review by a full panel. In my experience, bias arises when a panelist is a collaborator of the proposer (often not at the same institution), but only very rarely do institutional loyalties surface.

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- NASA does a very good, thorough job of reviewing proposals compared, say, to NSF which gives too little time for evaluation. The main threats to peer reviews are congressional interference and the possibility that the reviews (and reviewers names) might become accessible to the proposers.

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- The peer review process works well when permitted to operate at all; too often, though, the process is circumvented.

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- I have witnessed some pretty sloppy reviewing and unfair, uniformed decisions. In one case a proposal of one of my colleagues was rejected for cited reasons of omission of [facts] that were precisely those addressed explicitly in the proposal. The proposal had obviously not been read carefully perhaps because my colleague was a first time proposer — not one of the "old boys"! I believe the panel does not solicit outside reviews, and, as a result, each panel member may have too great a workload. The outside reviews are vital for obtaining expertise that may be missing on the panel.

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- The cost (in both time and money) to the space physics community of the entire grant process (preparation of proposals and their subsequent evaluation) is unconscionably high relative to the amount of money that is available to be awarded. With an acceptance rate of only 12 – 15%, the system simply cannot continue in its present form.

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- Considering the relatively small amount of money available for the science grant program would it not make sense to issue fewer announcements. Most grants run for two or three years anyway.

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- My [main] concern is with the fairness. The personal preferences and prejudices of some panel members can have a strong effect on the review. It would help if panel members were provided (beforehand) not only with the proposals, but also with reports from anonymous mail-in reviewers.

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- The one thing needed is to have career program managers. We have a new [program manager] detailed every two or three years (sometimes more often) and this spoils the continuity of policy, program, and program manager expertise. NASA also appears to be reaching "deeper into the barrel" as time goes by.

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- Too much favoritism towards established investigators. A PI, at an established center has a tremendous advantage over a new researcher because of the existing facilities and his/her "track record." Consequently, even if the proposed research is brilliant, the new guy will have two strikes against him or her. But, in addition to this natural advantage, there is the policy that once a PI is funded, he/she just has to write renewals, which are not evaluated in the same way as new proposals. This amounts to lifetime tenure for investigators once they get their foot in the door, leaving little money for new investigators.

  Too much control during panel evaluation by the Chief Reviewer (CR), who synthesizes each project he/she is in charge of and provides a running [account]. Other panel members too often defer to the opinion of the CR because they do not have the time to study the proposal themselves. Consequently, the evaluation a proposal receives typically hinges on the opinion of one individual, who can extract the phrase from various reviews to support his/her viewpoint. This has to be remedied.

  [There is] too much variation in scoring from group to group. I suspect that each group has a different view of what constitutes good scores and that probably is reflected in the "threshold" for acceptance. For groups encompassing many different disciplines, there is less consensus among the panelists, partly due to lack of expertise, partly due to other biases (some approaches were just unpopular, some proposals didn't have much of a chance). I know from the group I sat on there were some fields that the group seemed to be more favorably inclined towards than others. This suggests that the fate of a particular proposal could hinge upon which group the proposal is evaluated by. I also know from my experience as an associate reviewer (involvement with another group) that groups have fundamentally different views on assigning numerical scores to evaluations.

  Too much emphasis is placed on the number of publications authored by the investigator rather than the significance or quality of the publications. The principal effect of this is that the community is encouraged to practice "safe science," i.e., they go for modest, sometimes trivial, incremental advances in the fields rather than the bold significant studies.

  Eliminate the bias toward established PIs. All proposals should be treated identically. Encourage projects of 3 – 5 year length, where appropriate, but when that time is over, the PI has to write a full proposal and is treated exactly like a new investigator.

  Do not allow professors to "buy out of teaching." Place limits on the amount of summer salary a faculty member can propose for.

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- [I] have participated in some reviews where the proposal was poorly written and not responsive. We rejected or put the proposal last on the priority list. The proposal was chosen by NASA (the name was well known) and in one case the person was even made team leader! This does not leave a good impression with new, young members of the panel. Its the "good old boys" problem — NASA needs to *continually* work on this; its an "ethical issue"!!!

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- The panel process works well for large proposals, where the number of proposals is small; but, [it] is flawed for small proposals, where the number is larger and the diversity is far greater. Results are subject to the whims of opinionated, primary reviewer panel members, and when there are many proposals under review, there is little time or energy for a critical panel evaluation. In such a situation, I would prefer to see a mail-in review, where there would be reports from several experts on each proposal.

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- More information on who is currently supported to do what, should be available to the panel to aid in assessing program balance. Also, reports from previous reviews of similar proposals by the same principal investigator should be available to aid consistency.

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- Better feedback to proposers, especially unsuccessful proposers, is needed. Use of a system modeled after the Kitt Peak National Observatory telescope committee would be a good place to start.

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- I think NASA should more actively solicit and listen to reviews of the management plans for large, complex projects from the peer reviewers. Many peer reviewers have been PIs or project scientists and have very valuable experience to bring to the review of management plans. I was on one review committee where the management volumes were shown.

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- I would like to see NASA officially recognize both a scientific PI and an administrative PI on all proposals. This would help the reviewers in their evaluation (since often the actual PI does not write the proposal) and it would also encourage better scientific competition and hence higher quality research. Today, many young, talented scientists face discouragement when writing proposals because their institution allows them no financial responsibility, hence they gain no true recognition from NASA throughout the grant award process. If NASA began recognizing scientific PIs, we

would see our tax money funding a higher overall level of research in the community.

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- Have panel chairs meet just before plenary sessions to make sure science coverage is optimal. Presently, chairs tend to meet too early to determine how things will "shake out," then too late to correct oversights. I strongly discourage panel members getting together with other panel members to influence outcomes. I have witnessed this sort of behavior. Make technical reviewers accountable for their assessments by citing technical reviewers' comments verbatim in proposal reports (person can remain anonymous).

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- My primary concern with the grant proposal process is with conflicts of interest. I felt that there was some strong bias on at least one committee members part against proposals competing with those from that member's institution, and that this greatly affected the outcome of the review.

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- Because of tight funding, there is a tendency to fund "safe" projects. This results in PIs proposing mostly safe ideas, a dangerous development because it leads to the decline of truly new and innovative research.

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- Make sure that there is an adequate number of external mail-in reviews (approximately four), so that no single reviewer carries too much weight. The community must continue to guard against being too in-bred. In selection of external reviewers, a broad representation of people with expertise in various aspects of a given proposal must be chosen. The importance of a program manager with a clear and broad vision for the program is essential. Fortunately, we have a good one!

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APPENDIX I

Survey Questions and Responses: Proposal Writers

Survey Questions and Responses: Proposal Writers

TIME

Q-1 How satisfied are you with the 3-month period allotted for preparing grant proposals?

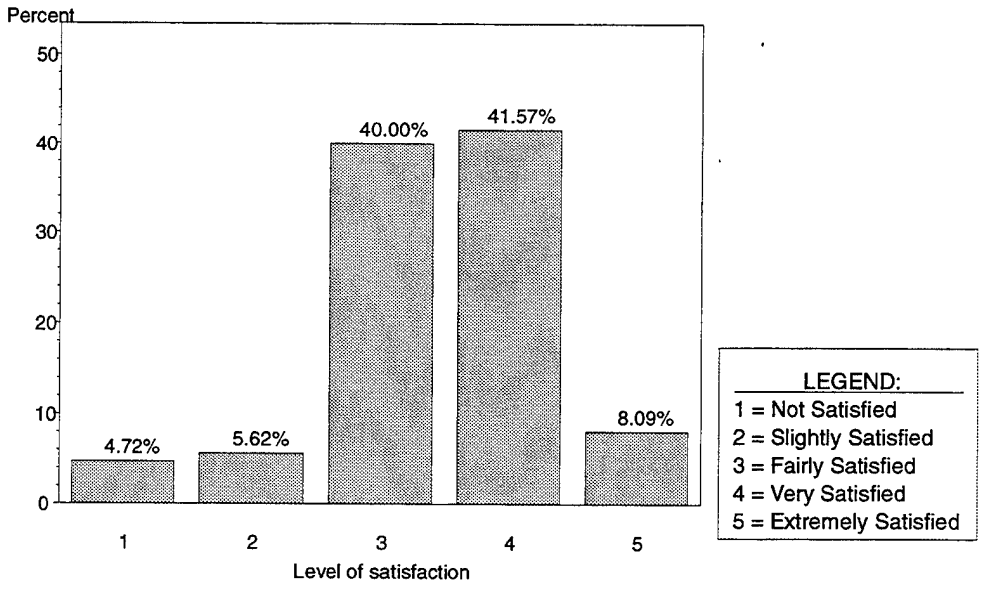

Figure I-1.
Satisfaction with Proposal Preparation Time

Q-2 How satisfied are you with NASA's 6-month standard for providing proposal feedback?

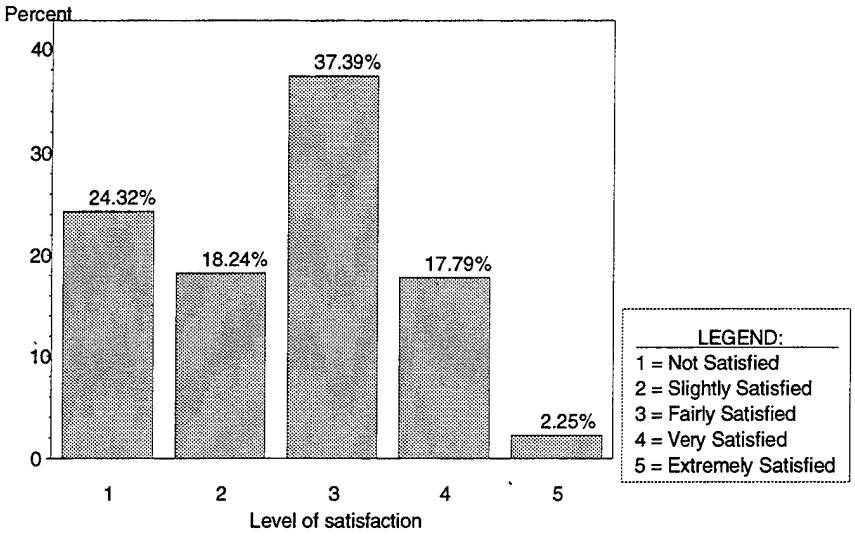

Figure I-2.
Satisfaction with Proposal Feedback Time

Q-3 What time standard should NASA use for providing proposal feedback?

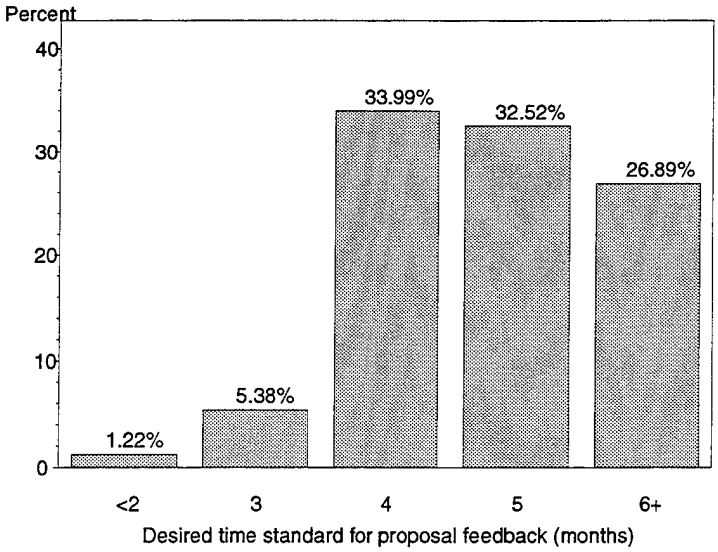

Figure I-3.
Desired Feedback Time

Q-4 What has been your actual time, on the average, for receiving proposal feedback?

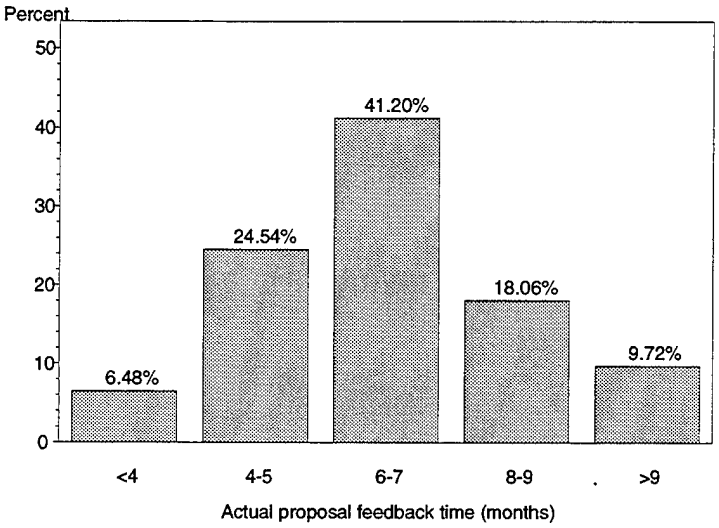

Figure I-4.
Actual Feedback Time

Q-5 How satisfied are you with length of the grant period for executing research?

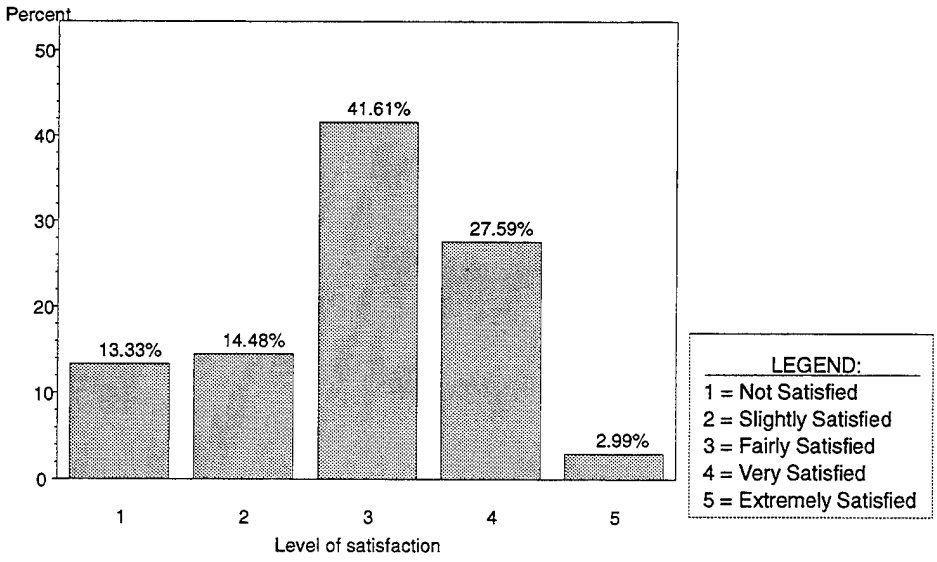

Figure I-5.
Satisfaction with Length of Grant Period

Q-6 What period of time would you like to see for executing research?

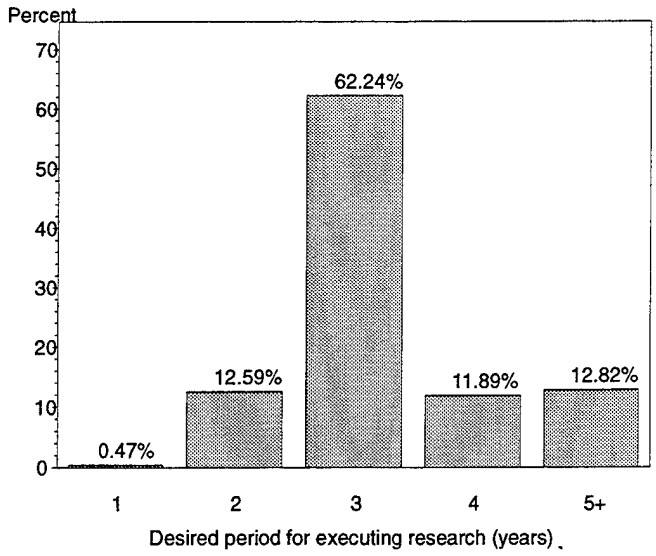

Figure I-6.
Desired Grant Period

GUIDELINES

Q-7 How satisfied are you with the overall clarity, simplicity, and completeness of the NASA Research Announcement (NRA)?

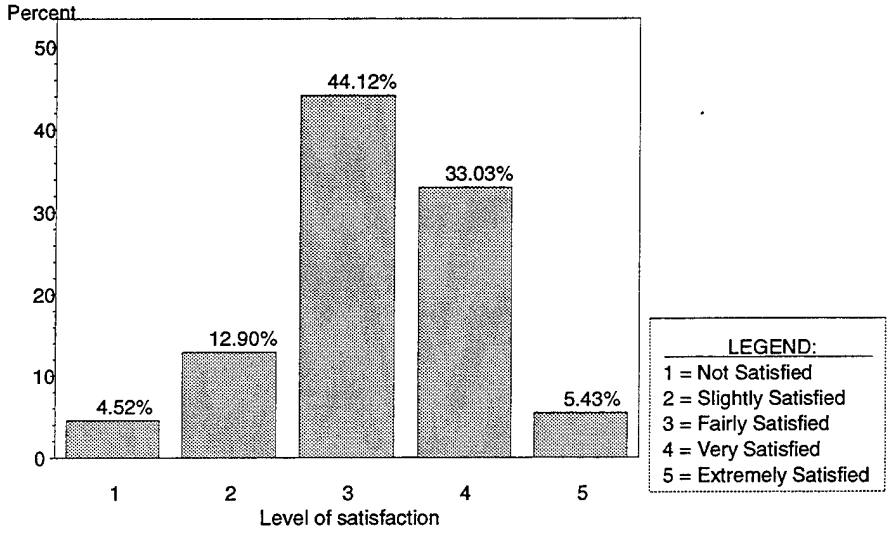

Figure I-7.
Satisfaction with NRAs

Q-8 How satisfied are you with key instructions covered in the NRA?

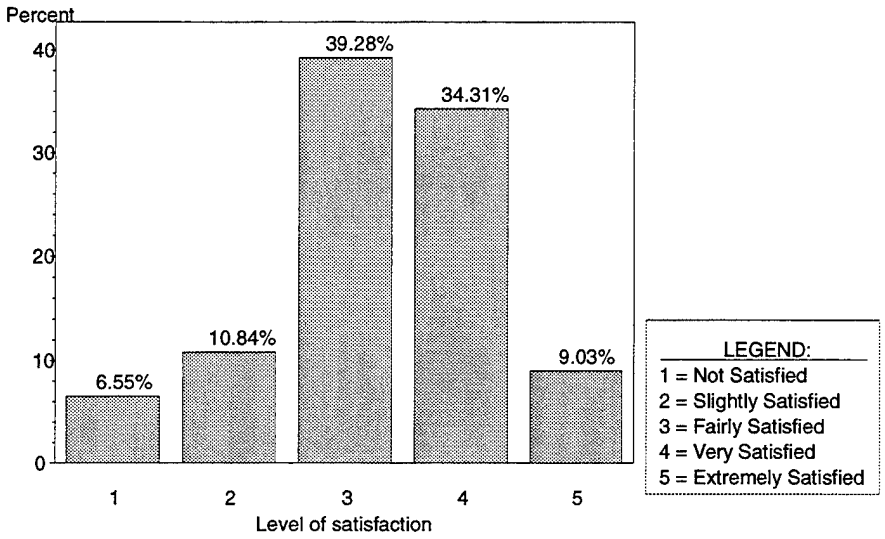

Figure I-8.
Satisfaction with Instructions — Program Scope

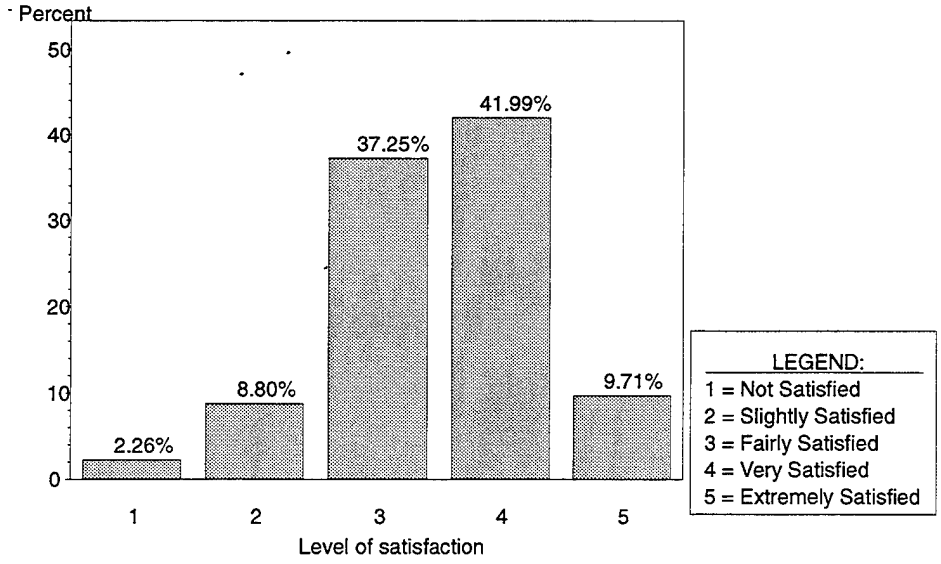

Figure I-9.
Satisfaction with Instructions — Proposal Contents

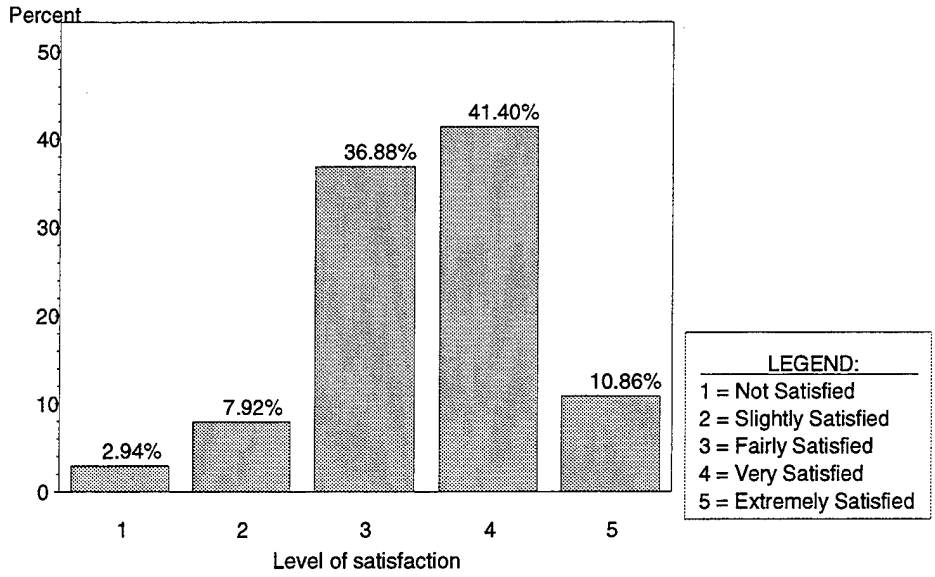

Figure I-10.
Satisfaction with Instructions — Preparation and Submission

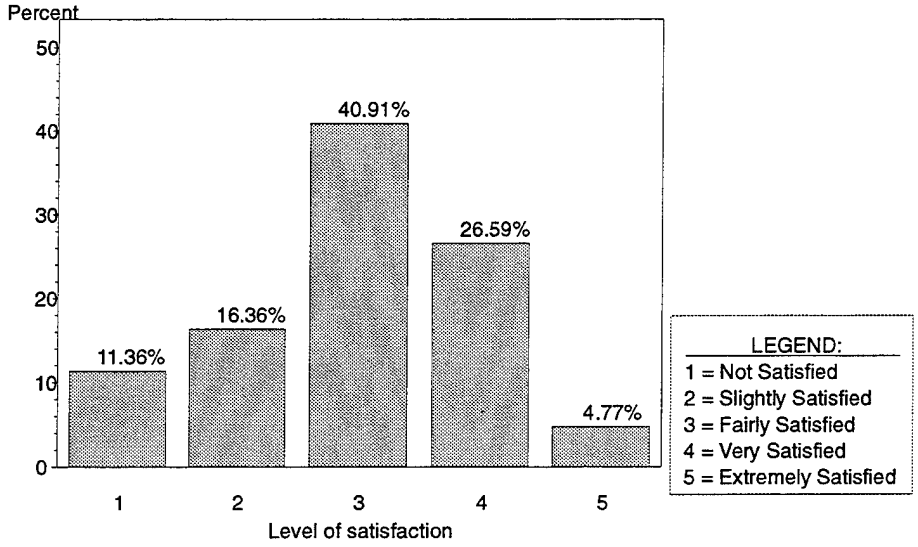

Figure I-11.
Satisfaction with Instructions — Evaluation Factors

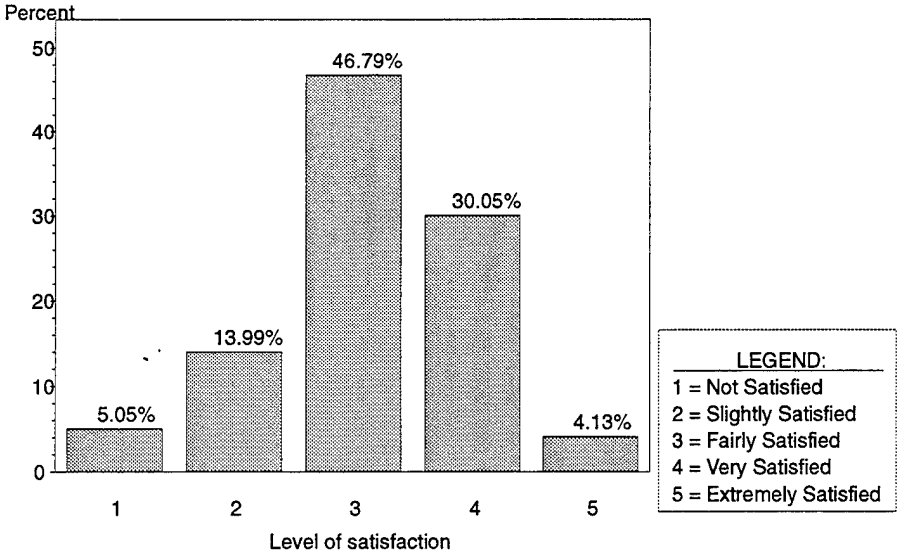

Figure I-12.
Satisfaction with Instructions — Costing

GENERAL

Q-9 How adequate is NASA feedback on your proposals?

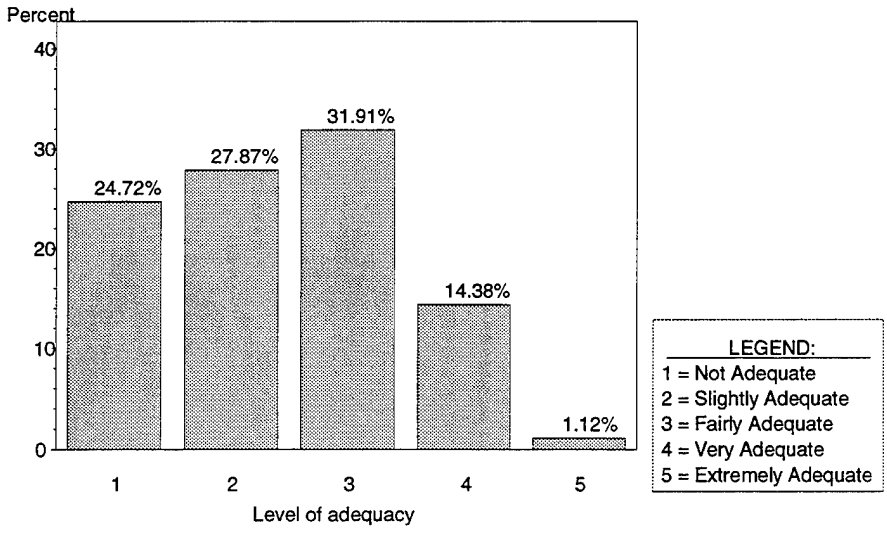

Figure I-13.
Adequacy of Feedback

Q-10 How satisfied are you that NASA fairly evaluates your research proposals?

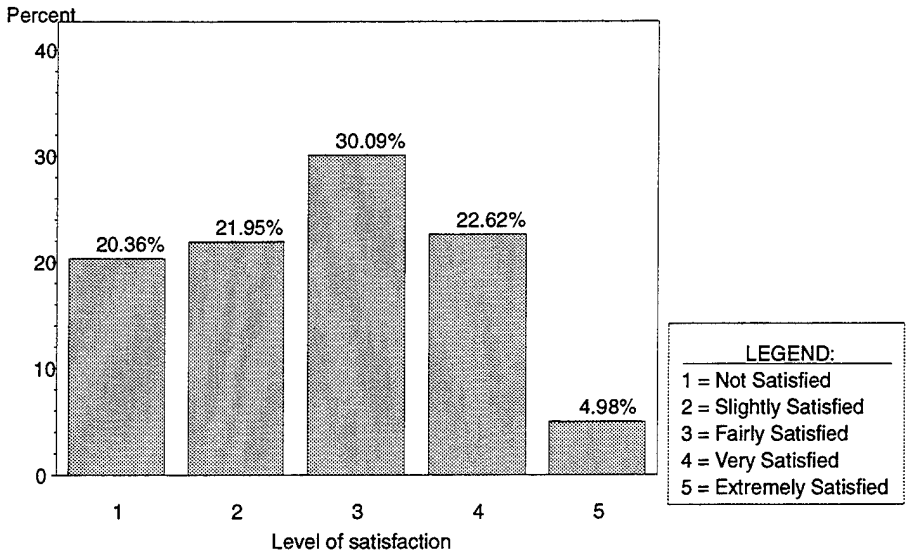

Figure I-14.
Satisfaction with Evaluation Fairness

Q-11 Adequate feedback, fairness, processing time, and processing guidance are essential elements of the NASA science grant program. How important to you is NASA's feedback, fairness, processing time, or process guidance?

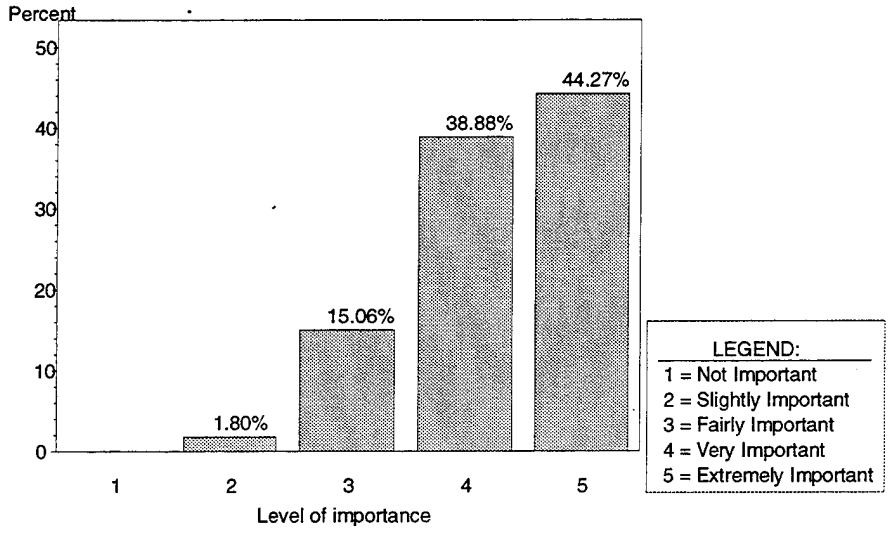

Figure I-15.
Importance of Proposal Feedback

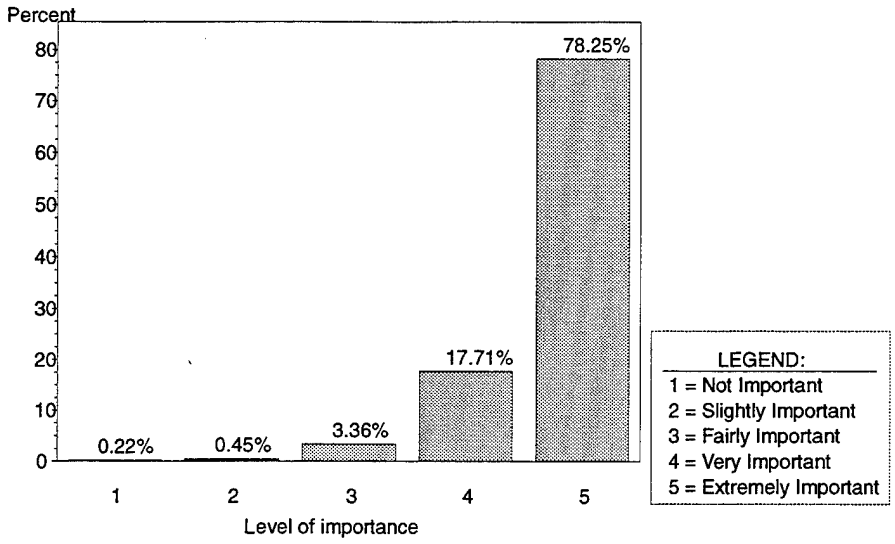

Figure I-16.
Importance of Evaluation Fairness

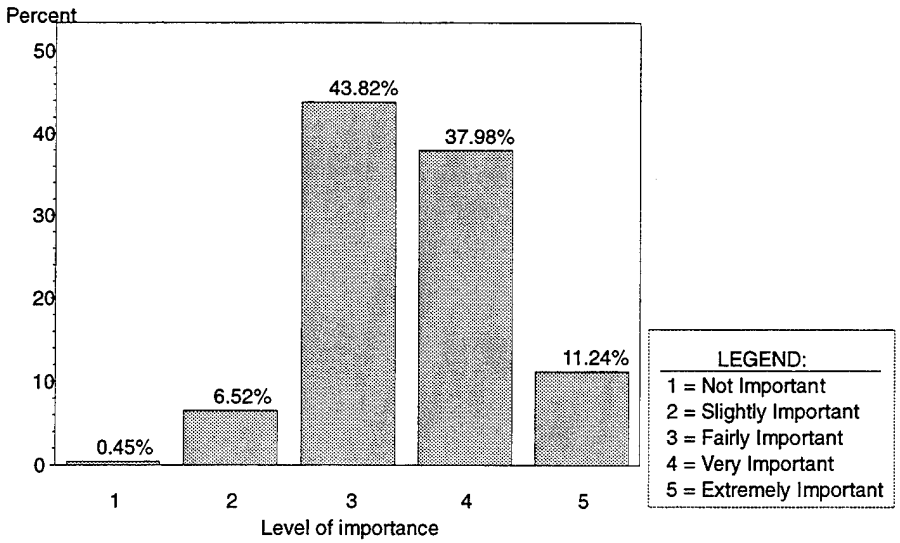

Figure I-17.
Importance of Processing Time

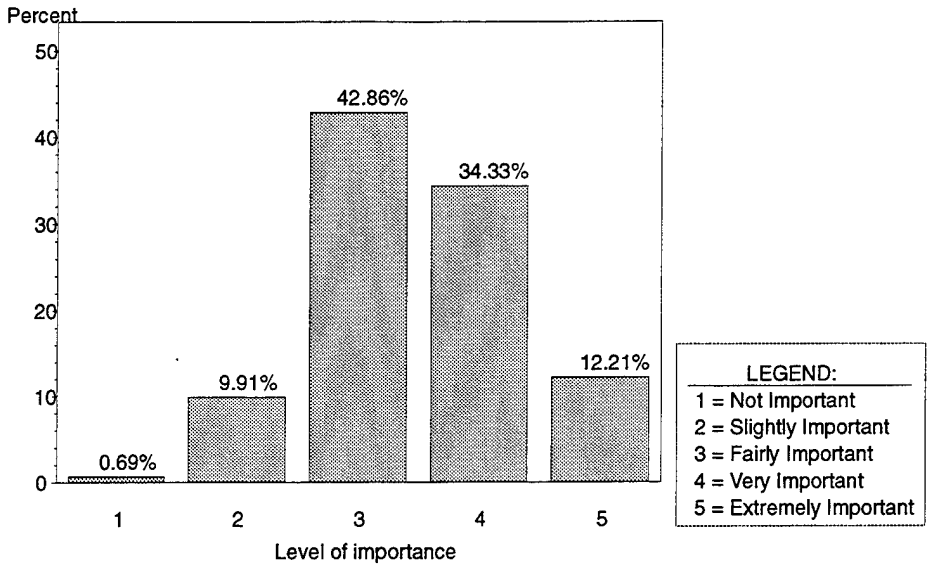

Figure I-18.
Importance of Process Guidance

Q-12 How satisfied are you with the overall NASA science grant process?

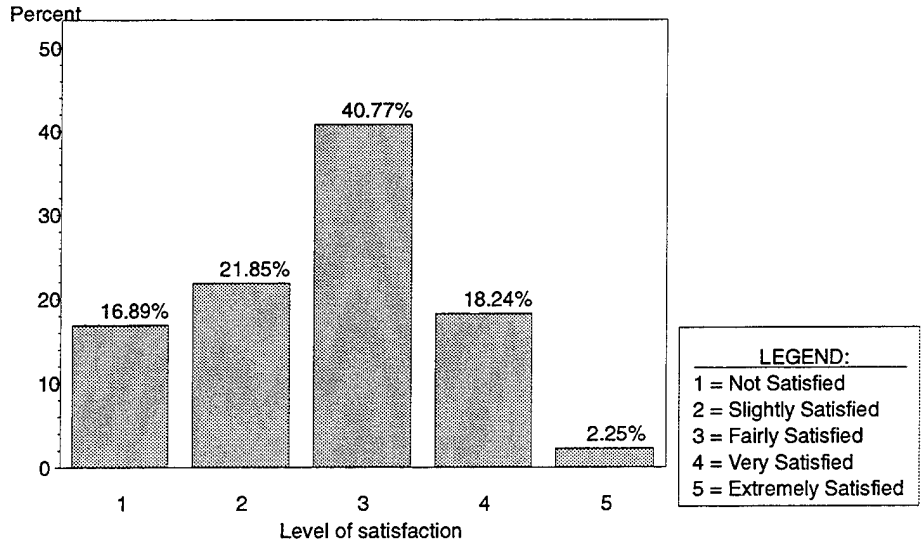

Figure I-19.
Satisfaction with Overall Grant Process

Q-13 What is your general area of scientific concern?

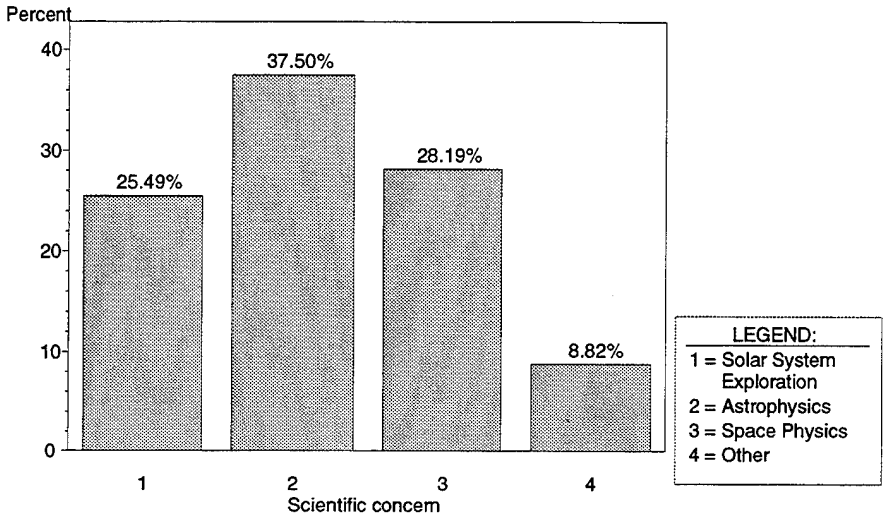

Figure I-20.
Disciplines

Table I-1.
Other Disciplines

Category	Frequency	Percentage
Astropartiue physics	1	2.20
Atmospheres	1	2.20
Atmospheric science	1	2.20
Biology	2	4.30
Computer science	1	2.20
Cosmology	4	8.80
Exobiology	1	2.20
Fluid mechanics	1	2.20
Geochemistry	1	2.20
Geodynamics	1	2.20
Geology	1	2.20
Geophysics	1	2.20
Geoscience	1	2.20
Gravitation	1	2.20
Human factors	1	2.20

Table I-1.
Other Disciplines (Continued)

Category	Frequency	Percentage
Impact	1	2.20
Laboratory astrophics	1	2.20
Laboratory	1	2.20
Lasers, atmosphere	1	2.20
Life sciences	1	2.20
Mathematics	1	2.20
Meteorite impact	1	2.20
Meteorites	1	2.20
Meteoritics	1	2.20
Physical chemistry	1	2.20
Planetary	1	2.20
Planetary atmosphere	3	6.50
Planetary geology	1	2.20
Planetary material	3	6.50
Planetary science	1	2.20
Quantum devices	1	2.20
Remote scusing	1	2.20
Solar physics	2	4.30
Solar terrestrial	1	2.20
Space chemistry	1	2.20
Terrestrial plan	2	4.30
Total	46	100.00

Table I-2.
Subdisciplines

Category	Frequency	Percentage
Active galaxies	1	0.35
Aeronomy	2	0.70
X-Ray	1	0.35
Applied mathematics	1	0.35
Artificial intelligence	1	0.35
Asteroids	1	0.35
Astronomy	2	0.70
Astrophysics	1	0.35
Atmospheres	5	1.80
Atomic and molecular	5	1.80
Bioengineering	1	0.35
Suborbita	1	0.35
Chemistry	2	0.70
Chromospheric	1	0.35
Close binary	1	0.35
Cometary research	2	0.70
Compact objects	1	0.35
Computational	1	0.35
Cosmic heliosphere	1	0.35
Cosmic rays	1	0.35
Cosmochemistry	5	1.80
Data analysis	2	0.70
Detectors	1	0.35
Dynamics and galaxy	3	1.10
Dynamos	1	0.35
Early evolution	1	0.35
Electrical engine	1	0.35
Engineering science	1	0.35
Euv astronomy	1	0.35
Exobiology	4	1.40
Experimental geology	1	0.35
Extragalactic	3	1.10
Extrasolar	1	0.35
Extraterrestrial	1	0.35
Formation of proteins	1	0.40
Galactic structures	2	0.70

Table I-2.
Subdisciplines (Continued)

Category	Frequency	Percentage
Gamma ray bursts	1	0.35
General relativity	1	0.35
Geochemistry	2	0.70
Geology	5	1.80
Geophysics	2	0.70
Geophysics (solid)	1	0.35
Geophysics (plane)	1	0.35
Heliospheric	2	0.70
High energy	6	2.20
Hot stars	1	0.35
Impact geophysics	1	0.35
Infrared/Star formation	1	0.35
Instrumentation	2	0.70
Iterstellar	8	2.90
Ion-molecule	8	2.85
Ionosphere	4	1.40
Spectroscope	1	0.35
Laboratory	5	1.80
Lidar	1	0.35
Lunar dynamics	1	0.35
Magnetic fields	2	0.70
Magnetosphere	24	8.55
Massive star formations	1	0.35
Materials	2	0.70
Mesosphere	2	0.70
Meteritics	1	0.35
Molecular evolution	1	0.35
Molecular spectrum	2	0.70
Nuclear planetary	1	0.35
Observational	2	1.70
Old stellar system	1	0.35
Origins	2	0.70
Particle cosmology	1	0.35
Particle precipitation	1	0.35
Petrology	1	0.35
Physics	1	0.35
Planetary astronomy	7	2.50
Planetary atmosphere	6	2.10

Table I-2.
Subdisciplines (Continued)

Category	Frequency	Percentage
Planetary geology	12	4.30
Planetary material	12	4.30
Planetary physics	2	0.70
Planetary science	1	0.35
Planetary surface	3	1.10
Plasma astrophysics	1	0.35
Quasars	1	0.35
Radio and X-ray	2	0.70
Relativity	1	0.35
Remote sensing	1	0.35
Software development	1	0.35
Solar physics	18	6.40
Solar wind	2	0.70
Space physics	3	1.10
Spectroscopy	2	0.70
Star dust	1	0.35
Star formation	1	0.35
Stars and galactics	2	0.70
Stellar research	7	2.50
Stratospheric	1	0.35
Submillimeter	1	0.35
Sububatal	1	0.35
Supernova	2	0.70
The verticale	1	0.35
Theoretical astronomy	5	1.80
Theory	6	2.10
Theory — high energy	2	0.70
Theory and space	2	0.70
Thermosphere/ion	1	0.35
Unspecified	1	0.35
Upper atmosphere	1	0.35
UV and X-ray	1	0.35
UV astronomy	1	0.35
UV astrophysics	1	0.35
UV from space	1	0.35
Uvoir	1	0.35
Volcanism	1	0.35
Wave phenomena	1	0.35

Table I-2.
Subdisciplines (Continued)

Category	Frequency	Percentage
X-ray astronomy	1	0.35
X-ray pulsars	1	0.35
Total	279	100.00

Q-14 How many years have you submitted NASA grant proposals?

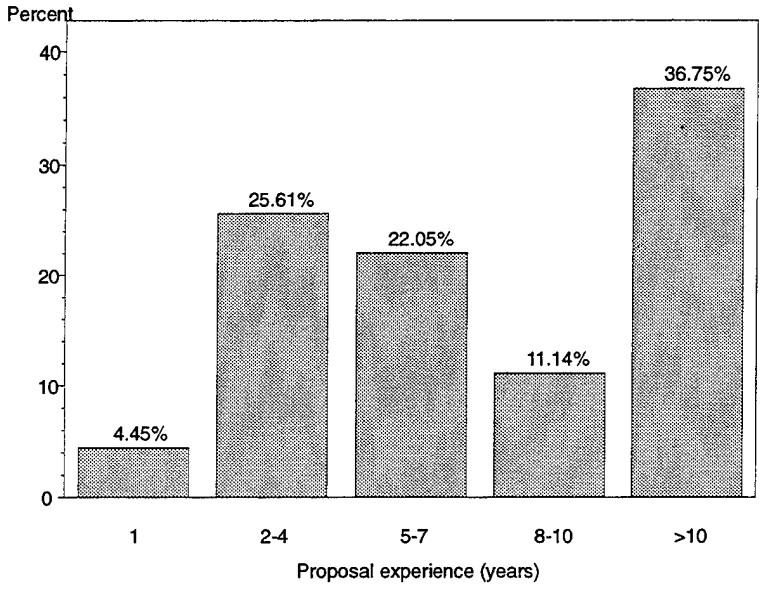

Figure I-21.
Years of Proposal Submissions

Q-15 What percentage of your proposal submissions have been selected?

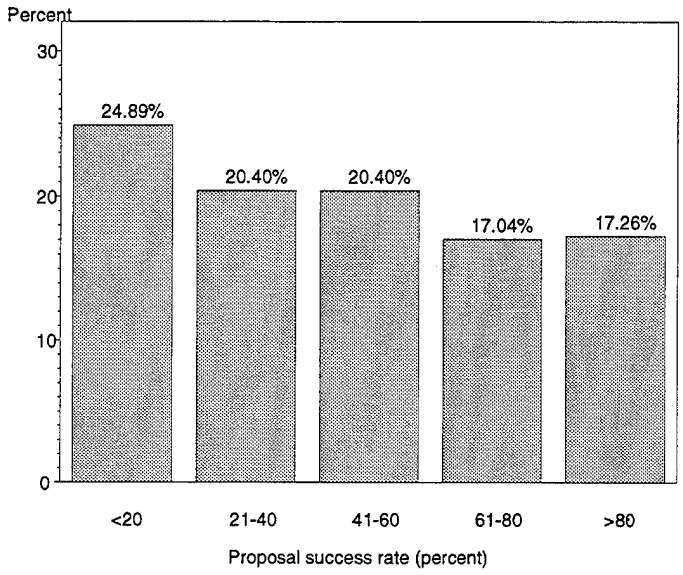

Figure I-22.
Percentage of Proposals Selected

APPENDIX J

Survey Comments: Proposal Writers

Survey Comments: Proposal Writers

In this appendix, we quote the comments made by the proposal writers on the science grant survey. (The comments have been edited slightly for clarity, brevity, and grammar.) We have organized the comments according to the subsections in the survey:

Subsection	Page
Time	J-3
Guidelines	J-11
General	J-20

TIME

- Speed up evaluation.

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- I have always felt left in the dark about whether or not my grant will be funded because I have never received any information in six months. It takes several inquiries on my part to get an answer and further pestering by our business office to actually secure the funds. This is annoying.

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- Reviews occur in November, yet no results are known until late January or early February. This is presumably due to budget decisions. Otherwise one would assume that the decisions could be made immediately after the panel reviews. If there is always going to be this wait, due to budget decisions, why not move the proposal writing process to a later time so that the two would be better synchronized?

  Once an award is made, the delay in actually getting the money to an institution has crept up to an additional 2 – 3 months. If you take 3 months for proposal writing, 6 months for decisions and 2 – 3 months to get the money, this process lasts an entire year. This is too long!

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- [Make] prompt decisions (six months or less) regarding funding.

  The following comments are designed to reduce the amount of time spent preparing proposals:

  - Establish principal investigators (PIs) (and perhaps others, although they might not wish to risk it) [who have] the option of doing performance-based proposals, much as is done by NIH.

  - Longer grant periods than the current three years should be possible.

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- Less delay in [receiving] funding, i.e., once a commitment is made, the start should be as fast as possible.

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- Right now perhaps the biggest problem is the delay between positive notification of a grant award and the time the money reaches the researcher's institution. The current situation is unacceptable!

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- The [time] standards themselves are reasonable, but the actual [times] are *much* longer for NASA HQ.

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- In view of the effort required, a grant period of a minimum of 2 years would permit more *science* and less paperwork to be completed.

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- The key areas are a more timely announcement schedule [and] a more timely schedule for evaluation and feedback. If deadlines slip on feedback, the grantee should not be penalized by having to do a three-year project in less [time].

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- My only complaint is the relative delay in actually starting the grant. In my case, I had to contact the headquarters 6 weeks past the starting date to get things going.

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- Feedback and communication need much improvement! Proposers need to know (1) when their proposal has been received, (2) when the reviews will

be completed, and (3) when they will be notified one way or the other if they will be funded. Program scientists need to be more easily accessible to answer questions. But again, the most important improvement would be better, faster, cheaper, feedback and communication.

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- Decisions on proposal selection should be communicated to proposer *by the start of the fiscal year!!* 4 to 5 months *should be sufficient* for the reviewing process!

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- Fund proposals for 3 years.

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- Allow for longer term automatic data processing (ADP) grants. Right now there are the extremes of either 1 year ADP or 5 year LTSA and nothing in between. 3 year grants would be very useful, particularly for hiring post-doctorate researchers.

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- [Provide] longer grant periods. Shorten times for proposal feedback.

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- I submitted a proposal in December 1992. In December 1993, I got the "congratulations" (acceptance) letter. During the spring of 1994 I was harassed twice to provide information which NASA already had. In January 1995 (!!!!) the funds could be spent. Total grant money [was] about $7,500.00

  Conclusion: create a category of "trial" grants, funding less than $10,000, one year at the time, with *very fast* turnaround time (from submission to activation — in six months) An investigator can have only *one* such grant.

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- The main problem I have had with the process is *after* approval — it usually takes 6 months or more to get the funding going, and in one recent [case] it was over a year from [time of] approval to the start of funding!

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- The [announcement] should be released earlier with 2 months allowed for proposal preparation. This would enable NASA to announce winners by the end of November and complete the grants early in the [calendar year].

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- When proposals seem well thought out to sequence of study, fund for the full period (2 – 5 years) without requiring annual [reviews].

  Don't put out announcements for things that are not almost certain to be funded!!!

  Do reviews and make decisions in < 2 months. Have review panels in place by the time proposals are due.

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- My chief concern is the time allotted for preparing a proposal. At universities our time commitments vary widely during the year depending on when we teach. If the 3-month proposal preparation period overlaps a teaching commitment, we are at a disadvantage. Just increasing the 3-month period to 4 months would be a great improvement.

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- Although proposals are nominally funded for three years, in fact the amount of time to actually perform research based on those funds is somewhat shorter due to inherent time delays in the system. Frequently one has to start writing a renewal proposal well before the current proposal has expired. This is particularly taxing when trying to initiate a new line of research. One possible alternative would be to fund proposals for three years with two one-year renewals that are granted on the basis of successful progress as evidenced by short progress reports. The project could be terminated at the end of the third or fourth year, if progress is not satisfactory, but a full renewal proposal would not be required until the end of the fifth year.

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- A recurrent problem has been the length of time between notification of review results and actual funding (ranging from 4 to 6 months). If funding must be delayed, then the start-up date should be corrected to match reality!

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- Appear to get comments back on proposals in reasonable time but sometimes [it takes] more than a year from proposal submission to when money comes. This varies by [a factor of 2 to 3] depending on the year.

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- A major problem is the time required to actually obtain funds. This is the largest "bottleneck" in the system. It took 1.5 years for me to obtain funds for my most recent award: 6 months for the review and 1 year for the contracts office to actually award the funds.

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- Make decisions [as soon as possible] after review panels meet, and promptly inform PIs.

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- The present low probability of success (approximately 20 percent) for proposals requires PIs to submit new proposals essentially every year in order to maintain funding continuity. If one were to wait until the year a funded proposal is to expire, one would have a very high probability of being unfunded for at least [a] year. As a result, PIs write many more proposals than are necessary, thus consuming much time and effort for both the PI and the reviewers. I recommend that proposals be funded for longer periods and be more easily renewed, if good progress is being made. In return, the PI should be restricted from applying for more funds during the period for which the PI is funded.

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- The time between proposal submission and funding should be rigorously restricted to under 7 months.

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- [Provide] more rapid feedback on proposals.

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- The overriding priority should be to speed up the process of actually sending money *after* the award letter. In some cases that has taken as long as 9 months, which means 15 – 16 months after the submission of a proposal. It is unfair to universities to expect them to "backstop" all of a PI's research expenses for that long on the basis of a nonbinding number.

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- *Full* proposals consume too much time in a professional career — especially when the outcome is unknown. Perhaps it would be better to have *brief* (4 page) pre-proposals submitted that the Program Manager can filter and say "go ahead, provide a full proposal," or "this is not appropriate — don't waste any more time on it." Combine this with a rapid review process (1 month), and it would enormously streamline the system for applicants, - managers, and reviewers alike.

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- Government laboratory budgets are centered around the fiscal year. Even university budgets for laboratories may run on a semester schedule. Our lab (government) is making financial commitments beginning in October and operations would be a lot smoother *if* results from early summer proposal

submission were known. If it really takes 6 months from submission to notification then why not move submission dates back into March or April?

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- In my experience it takes too long after a grant has been approved by the review panel for the funds to be actually received.

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- Time line is too long — one proposal took 14 months before I [received] the first feedback. This was in spite of numerous attempts to contact the director for information. A second proposal was evaluated in 4 months, but it is now [an additional] 5 months and I have not heard anything concerning the actual funding level.

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- Fund for *at least* 2 years at a time rather than every year.

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- The funding process beyond HQ can only be described as ludicrous and absurd. [Six to nine] months to [receive] the funding is inefficient.

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- Some proposals have taken more than a year (years!) to get a response.

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- The time it takes between announcement of an award and the award is excessive, even with continuation awards. Most of the delay seems to be in the grants office. Often the time between the NASA research announcement (NRA) and the deadline is too short.

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- The grant period should be for three years. While three years is allowed as a grant period, I hesitate to write grants for that period because the description of research covering the period must necessarily be vague, and vague descriptions do not get good reviews. It would be nice if this perception could somehow be removed from the proposal process.

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- [The] proposal process needs to be run in a more timely fashion, so that awarded funds are available at [the] beginning of [the] financial year and everyone can work to a common timetable.

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- Funding periods need to be long enough so that there is time to do research, and not just proposal writing.

  There is a serious problem also in that NASA has created a highly skilled group of professional scientists in soft-money positions who do much of NASA's science, yet are highly vulnerable to fluctuations in the grant process. Rapid review of proposals — and rapid funding of approved proposals — is vital to the survival of this group of scientists.

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- The NRA process for major programs usually provides an excellent opportunity, but with too little time allowed for preparation and subsequent delay in carrying out the successful proposals (if they ever do get carried out).

  The least successful aspect of the grants process is the mechanism for providing funds (the Grants office). This is incredibly slow and unresponsive.

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- The worst delays are at NASA HQ, where decisions take much too long for many programs. Getting funds to PIs is getting better, although delays, [resulting from] revised budgets, have meant that funds arrive almost a year after a proposal was submitted.

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- A major problem is the long and unpredictable delay between notification of a successful proposal and receipt of the money. This can make planning and executing a research program very difficult.

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- My biggest concern is the lack of year-round proposal and funding opportunities. There should be at least some program under which investigators can apply for modest funding at any time and have, if successful, some funds within 4 to 6 months of submission.

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- The single [grant] processing problem is the enormous length of time between submitting a proposal and finally getting funding. I get a fairly rapid response, [less than] 6 months, but then the waiting begins — typically 12 months or more between a positive response and the arrival of funding. Meanwhile, I have to scramble to cover salaries, etc. This is an enormous source of frustration with the NASA system, against which all others pale in comparison.

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- Probably the two most important items to improve on (in my mind) are:

  - Quicker response to evaluation results

  - Longer grant periods viewed more acceptably

  Both would allow better planning on the part of investigators. As things stand now, many of us have no clue what we will be able to do in the next 6 – 12 months. This is especially true if funding is sought to support the research, graduate students, etc.

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- Allow flexibility (e.g., 5-year grants; 3-year grants; 1-year grants; small/short grants).

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- New starts are very difficult. By the time I got the first money (approximately 1 year later) it was time to submit a new proposal.

  I had one proposal that stayed in limbo for 2 years because of program cuts and delays. Try not to let this happen.

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- The review process takes too long. I have waited more than a year for a response to a proposal, during which time the Program Manager did not return my phone calls or E-mail messages.

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- I have no complaints about the *proposal* process, but I do have about the *grant* process, i.e., after the proposal is awarded. In my case, grant monies invariably arrive after the date I have been told to expect them. In the last go-around the money I was to have received on April 1, 1994, did not arrive until January 15, 1995! And the money that was to have arrived on October 1, 1994, has not arrived yet. This is grossly unfair since it is very difficult to plan this way. The university has been generous in loaning me the promised funds and NASA actually delivers, but this is of course not cost free to them either. Why does the grant administration have to be so "messed up"?

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- The feedback on results is OK, but the response time [for receiving funds] is often 6 – 9 months!

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- The major problems occur after the grant award. Delays in funding cause major cash flow dislocations. Sometimes funding is delayed for 6-12 months in the middle of a multi-year grant. Beside making appointments uncertain, this delays funding into the one-time no cost extension period. After the mid-grant delays this forces rapid and possibly inefficient disbursement of funds to meet the hard deadline. If funding is delayed by NASA, the grant anniversary dates should be adjusted to leave some flexibility in disbursement.

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- *Of course* it would be great if NASA could process and award grants in less than 6 months. However, given current funding and personnel limitations at NASA, they are lucky to meet the 6 month guideline.

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- The major concern that I have with NASA's science grant process is that too often the evaluations indicate that the peer review panel did not understand the proposal very well. This is acceptable when the proposal is poorly written, but too often well-written proposals are not properly evaluated because the panel is given too many proposals to review. I know of panels consisting of 8 to 10 people which are given 100 or more proposals to evaluate. In this case, each person on the panel may be primary or secondary reviewer for about 20 proposals, which requires more time than most of us have. Many panel members then do not have the time to read carefully the remaining 80 or so proposals that they are asked to vote on. As a result, panel members often do not understand the proposals in sufficient detail and the ranking and evaluation suffers accordingly.

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- We all spend an awful lot of time writing and reviewing so many proposals. Perhaps a move towards fewer, larger grants is in order. The reviewing/ processing overhead perhaps outweighs the flexibility we have for funding one person for a month or two per year.

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GUIDELINES

- Sometimes I find the instructions confusing because to understand all the requirements one needs to flip back and forth between the general instructions in the Appendices and specific instructions in the body of the announcements.

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- NASA grants have requirements which are not known to Discipline Scientists (DS) in Washington. I do what the DS says and it is often contradictory to the official document. The most flagrant sample is that NASA grants require *reports* whereas the DS considers the progress report section of the *next* proposal as *the Report.*

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- For accepted proposals, funding decisions based on project needs rather than mindless formulas based on the previous year's budget (and possible COLAs, when the PI is fortunate)

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- All reviews should be returned to proposers rather than summaries prepared by HQ employees.

  Proposers should have an opportunity to respond to review comments and this information should be available to panel review teams.

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- Rely on written reviews more.

  Emphasize results rather than NASA programmatic issues.

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- All the programs should let people know through the NRA what supplemental material is available to help the proposal writers evaluate whether their research is relevant to the program. I have received reports of working groups, study groups, etc., as supplemental material.

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- Greater clarity as to whether specific topics are, or are not, appropriate to operate NRAs.

  [Provide] more realistic evaluation sheets: if a proposal is rejected yet the number of "pros" exceeds the number of "cons" and the "cons" seem arbitrary or irrelevant, it is hard to understand the inherent message.

  The measure of the adequacy of the review process is best manifest in the skill exercised in designing an evaluation sheet especially when a proposal has been rejected. Often evaluation sheets are terse or cryptic. How can one learn if not through these words?

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- Perhaps an early feedback on the proposal would allow any gross misunderstandings to be corrected before final selection.

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- Adopt and publicize a reasonable set of guidelines for conflict of interest and follow them.

  The last NRA to which I responded had conflicting requirements in different portions of the document. Please simplify it, and get it straight.

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- [Establish] clear evaluation criteria.

  Open access to results so proposers would know what proposals are selected.

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- Oftentimes not even all of the straight "excellent" proposals are funded. Conveys a sense of capriciousness to the entire process. This puts pressure on the PIs to stagger their proposals, submitting a small proposal every year rather than a larger one every two-three years, in the hopes of getting at least partial support. This puts further pressure on the programs and aggravates the problem.

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- The NRAs can be *very* turgid — a summary sheet of requirements (in the form of a check-off list perhaps) would speed the preparation as would an index and clear presentation of the sections. At the moment it seems that NRAs are in transition from "all paper" to electronic, and putting all the paperwork together takes a great deal of time and [effort].

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- NASA should publish a list of successful proposals for every competition.

  I don't like the nebulous "programmatic factors" NASA uses to make selections. In too many cases, it seems the review panel's recommendations are ignored — weaker proposals are funded while excellent proposals are not. I'd like to see *science* be the determining factor.

  I dislike rules imposed after the fact. [In] some years, decisions were made during the review process not to fund anyone who already had support. What a waste of time and effort for those who [prepared] proposals and were summarily dismissed!

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- Program scope described in NRAs is often not consistent with what proposals are actually invited or funded.

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- Send out self-contained NRAs that contain *all* the necessary forms; (now we have to [go through] many different files *and* piece together research information).

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- The scope of research described in the NRA is not always accurate. Talking to NASA sometimes clarifies things quite a lot.

  Unfortunately, there is not always a *scientist* to speak to, and the true scope is difficult to see.

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- Colleagues, within and outside NASA, often complain that the program scope as stated in the NRAs changes after the proposals are submitted, making some of the submitted proposals irrelevant to the program, a very wasteful situation. Program directors should be given the authority to decide such cases, consistent with the fact that they are scientists who are competent in the program discipline and aware of the NASA needs.

  Writing a cost management plan is difficult for most research efforts, in which it is difficult to gauge direction more than a few weeks at a time. This may be best reserved for large project team proposals.

  The three month period given to respond to an NRA rules out the participation [of] scientists not currently in the information loop. Such scientists and NASA may be missing great opportunities.

  NASA (the government) must abandon the requirement that funds be used within one year for each funded year. Costs can often be reduced if expenses can be postponed. Moreover, a grantee should not be penalized if he/she finds a way of doing the same project with less funds than originally proposed. The grantee should be allowed to set aside remaining funds to be used the following year.

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- The NRA is poorly organized — one does not know where to look for certain pieces of information. In places it repeats itself partially. The reader then doesn't know if the statement he just read is the most accurate version of the statement in the NRA.

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- Remove graduate student participation as a selection criteria.

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- [The] call for proposals and [the] instructions are not bad — they are nearly in English! Could be clearer.

- The program scope is often ill defined, especially for NRAs that are not part of a series, such as the ADP series. In particular, the line between paper studies and hardware development is often left unclear in the NRA. Repeated calls to HQ result in wildly different interpretations. Since hardware development often drives mission concept and design, it should be given a more prominent place within NASA's grant program, and given a clearer demarcation within individual NRAs.

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- The PI should be given the opportunity to respond to comments before a final decision is made, especially for borderline cases.

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- I would prefer that the proposals for a given NRA be divided among a larger number of peer review panels, so that each panel is given a smaller number of proposals to review. These smaller panels will have less expertise, but with fewer proposals to review, the smaller panels can be more focused on the science topic and do a better job. Merging the relative rankings of a larger number of panels for the allocation of scarce funding is probably best done by just selecting the highest ranked proposals in each panel. The usual technique of asking the panel chairs to compare the rankings of each panel is often flawed, because comparisons are often done in haste without the panel chairs having the opportunity (or in some cases the expertise) to read and understand the proposals reviewed by the other panels.

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- More uniformity should be enforced on current and pending support statements *OR* they should be eliminated.

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- The proposer should have an opportunity for rebuttal before a final decision is reached.

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- The format of the proposals themselves could be streamlined. Eliminate the redundant and pedantic "Budget Summary" pages. Obtain a single annual copy of the drug-free workplace, etc., forms from each university instead of the wasteful duplication of putting them in every proposal. The forms are

signed by a representative of the whole university, not the PI: either the university is in compliance or it isn't; there's no need to repeat that statement in every proposal.

Improvements can be made in the area of grant administration. "Nitpicky" challenges to budget items from the grants office should stop. It is ridiculous to require travel destinations, airfare and hotel costs, and which journal page charges refer to, when these items are a tiny fraction of a budget, and the budget had to be prepared more than a year in advance, typically, of when the money finally reaches the university. The long lead time between budget preparation and receipt of money also makes it impossible to predict the exact costs of high technology items such as computers. You know that all the universities have federally acceptable procurement procedures. When the time comes to actually order equipment, we get the best current price through competitive bids.

Increase the amount that can be spent on an item of capital equipment that was not listed in the original proposal from $2,500 to $5,000.

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- Stronger commitment by NASA to fund at levels indicated in the NRA.

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- I also would suggest that page limits be increased slightly to allow more figures, that is, specifically and exclusively figures. I do not believe that the length of text should be increased, because review panels already have a lot to read. However, an additional page or two of figures does not usually represent nearly as much work to read as a page of text, and figures are important in clarifying the proposal and in supporting its points.

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- The description of appropriate research should include the goals and initiatives [that] NASA sees [for] the program. For example, if NASA would like to see studies emphasizing the interaction between different magnetospheric regions, this should be stated.

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- A system should be introduced to pre-sort the competition. Perhaps an expanded letter of intent (say 4 pages) of pre-proposal material should be invited, evaluated, and then full proposals invited from the top 30 – 40% only.

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- Make the NRA instructions less bureaucratic and [more] accurate. In one NRA last year, manned space flight opportunities were listed as a possibility

in the NRA, but NASA/HQ personnel said that was wrong. Must we interrogate HQ to verify every statement in an NRA?

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- Limit text of proposal to 10 pages.

  Reduce forms to simple cover page. Why collect certifications up front? Why not submit them only upon acceptance?

  Likewise, until proposal [is] actually accepted, why not limit budget to single page with minimum "stats" only?

  Isn't there some why to determine dollars actually available at the time the announcement is made?

  If less than 5 – 10 proposals can be awarded in any one round, dispense with panel.

  Requiring separate proposals from co-investigators at other institutions is wasteful. Could do that paperwork *after* acceptance.

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- The playing field should be level for all proposers. Proposals from NASA centers should show full cost of research, including salaries and burdens. At present, NASA proposals show an artificially low cost. Although this is not supposed to be a factor in selection, it is.

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- Grant requirements are spread all over [the] document. Unify [them] in one place.

  Give a sample submission (even though you say you don't like required forms).

  The boiler-plate part is getting awfully hard to read.

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- I would suggest that the science grant review process should include a step which allowed proposers to address objections raised by reviewers before grant selection was made. That is, proposers should receive a copy of reviewers comments before the review panel meets and should be allowed to provide written responses for consideration by the panel. This is similar to the review process for journal publication, and the entire process could still be accomplished within a 3-month period.

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- The NRAs should be more specific for each solicitation and less generic. The current format is not straightforward enough. I find myself constantly re-reading each section to make certain that the particular proposal I am writing will not violate some obscure limitation in one section or another of the NRA. I think the current page limits should *exclude* figures since too much time is spent reducing them in size and number to fit within the current page limits. I agree to limits on text length, but the inclusion of graphics and text in the overall length of the Technical Description portion of the proposal has meant that each proposal is now like a camera-ready manuscript for a volume of conference proceedings. Too much time is spent trying to meet the restrictions. Even as a reviewer of many proposals, I would rather see more of what the proposers have accomplished and what they plan to do than the current restrictions allow. Perhaps allow renewal proposals to include less repetitive "boilerplate" bios, publications, facilities, etc. would allow those proposals to be shortened. Allow 5-year grants to cut down on frequency of proposals.

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- NASA should pay even more attention to the broad recommendations of its expert review panels.

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- I am troubled by the growing set of "certifications" that must be added to a proposal ("lobbying," etc.). That should be curtailed or eliminated — institutions should be able to acknowledge Federal rules once a year in a single letter.

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- Panel reviews were given poor instructions on how to select proposals. In one recent case, the panel chair violated the direct NRA instructions, and the contractor running the meeting didn't correct this.

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- Suggestions: (1) Electronic forms for proposals as the instructions now are quite involved. (2) It would be a great improvement if more outside reviewers were used and if they were encouraged to be fair and look at the larger picture. It appears to me that programmatic and personal/institution connections are playing much too large a role in some very larger and significant decisions.

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- In the proposal announcements, the areas of interest should be clearly stated and prioritized.

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- The NRAs are often hard to understand.

The scope of NRA 94-055-14 was changed by a "Dear Colleague Letter" dated 2 weeks before the proposal was due. I received this letter *one day* before the due date. Although this change did not affect my proposal, the timing of this announcement indicates a lack of seriousness on the part of the Program, and a lack of respect for the proposers.

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- Some programs are closed to outsiders. Please fix this: Astrophysics Theory; KAO; High Energy (GRO, etc.).

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- Standardize budget forms and proposal formats/cover pages, etc.

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- Set up jointly funded programs with other agencies (e.g., NSF, NOAA, etc.) whereby the use of NASA mission data to solve problems relevant to these agencies could be investigated — i.e., set aside funding to expand the utility of NASA data and products to other agencies.

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- Rules such as only 50% of the grant being allowed for equipment (in some programs) should be eliminated or waived in specific cases.

  Above all, NASA should cap allowable indirect costs to: 40% on salaries and wages and benefits; 15% on supplies, travel, publication costs, etc.; 0% on equipment, student stipends and tuition.

  Also in the case of the PI and co-investigators (CIs) being at different institutions, a mechanism is needed to prevent unnecessary indirect costs being levied on transfer of funds to the CI's institution.

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- Use a [grant] system closer to that of Canada.

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- A process of appeal for unfair reviews would be a great help.

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- NASA should be clearer what "NASA related" means for theoretical proposers — both to the proposer and to evaluation committees.

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- Why the need for detailed budgets on a grant proposal, when 90% of the time, if selected, a new budget is required (*always*, less money than proposed).

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- I would like to see an evaluation option for each of the specific evaluation factors, not just the factors all together. In particular, "Relevance" is an almost worthless evaluation factor, and I bet most of the community feels that way.

GENERAL

- Make sure that proposals are evaluated in an even-handed way.

  - ► In the past NASA has played favorites and caved into political pressure to change awards.

  - ► There have also been occasions when technical objectives changed while proposals were in evaluation.

  Some of these factors have improved of late. Keep it up.

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- Consider [submitting] the proposals anonymously to the reviewers, so they are judged entirely on the proposal merits rather than on the reputation of the PI.

  Obtain reviews of proposals from professionals who (a) have time to do a thorough review and (b) understand the specific subfield. Many of my negative reviews come from people who obviously have no idea of the type of work I am proposing and who spend little time reading the proposal itself.

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- I am particularly troubled [by the following:] Of primary concern in evaluation and fund allocation is whether the applicant is an "astronomer" — not whether the problem of substantial interest to astronomy merits support. I have been advised to arrange collaboration with persons in our astronomy department prior to submitting a proposal.

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- Feedback must be [logical.] Lately, the comments (when rejected) appear to reflect a desire to cull proposals for suspect reasons rather than the result of a considered judgment.

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- There are artificial "walls" between *Planetary Astronomy* and Planetary Geology and Geophyics. Sometimes there are projects that can shift in emphasis from one program to the other on a time-scale [of] approximately 3 years. At present, each "shift" puts the proposal into the category of a "new PI" making the chances for success much lower, even for an outstanding proposal. Work of this type is infeasible given the present funding system.

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- Provide unedited copies of reviews to PIs (the way NSF does); if that is unacceptable to NASA, then at least provide PIs fuller information regarding the reviews.

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- Evaluation is extremely flawed. Emphasis is on data processing, [but] not much thought is given to work which could be of long-range value. Very disappointing at the present.

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- Grants are often funded at reduced level [which is] inadequate for [meeting] project goals.

  Fund grants fully, even if it means fewer total grants.

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- Some of my proposals have gotten great feedback and reviews, some only a few paragraphs, and some nothing at all. The few in which I have gotten no feedback were principally instrument upgrade proposals for which I heard later that no funding was available, but it would still be nice to get some comments.

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- Some statistical data from previous calls for proposals (e.g., # proposals, # accepted) would help me to decide whether it's worth responding to a particular NRA.

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- Specific written comments justifying the denial of a proposal by the NASA administrator responsible for selection are essential feedback to guarantee fairness in the grant process. The step between review panel and final selection seems very mystical!

  More information concerning those proposals such as, making them publicly available since they have now become public contracts, would be

valuable to the entire community and would lead to improved NASA programs in the long run.

Generally, more openness on the part of NASA is needed.

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- Far too much effort and cost are spent on the reference process for only a 10 – 20% rate of funding. A lottery would be more efficient and just as fair.

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- I have participated on both sides of the grant review process — having submitted proposals for review and serving on NASA grant review panels. I strongly believe that the panel review process as currently structured is inadequate. My foremost concern is that a large number of proposals are not exposed to a sufficient number of reviewers who have the necessary expertise in the specific field of inquiry. Very often, the panels are too small, especially in some programs which have a tremendous scope (e.g., Astrophysics Theory). In addition, I feel that more use of mail-in reviews should be made. I am aware, for example, of some reviews in which NO outside reviews were solicited. Furthermore, in many instances when mail-in reviews were used, the vast majority (if not all) of reviews are from persons submitting concurrent proposals. While this should not necessarily disqualify a reviewer, the emphasis should be to select mail-in reviewers on the basis of competence and expertise in the area. In short, a carefully selected mail-in panel is necessary to counter possible deficiencies in the general panel.

  NASA feedback in the form of a panel "consensus" is, at best, inadequate . . . Too often, the final reviews are watered down and do not reflect the full range of issues which were brought up in the panel discussions. I believe that in addition to a more detailed panel report (which should be closer to a discussion summary than a "consensus"), the investigators should be sent the complete mail-in reviews, as well as the initial reports of the principal and secondary reviewers.

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- By and large, I think NASA does a good job of evaluating and handling grant proposals in a timely manner. Evaluation by a small committee is superior to evaluation by isolated individuals.

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- NASA is one of the best agencies in handling, evaluating, and granting proposals. Although I think things could be better, NASA is "light years" ahead of agencies like the USGS, EPA, DOE and others.

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- The comments returned from review are totally inadequate. Often they are terse. They generally look like they were just put there to match [the] decision on that particular grant.

  Breaking into a new program is difficult.

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- Peer review panels should be eliminated. If panels are "here to stay" then the proposer should have an opportunity to respond to the mail-in reviews before the panel meets.

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- Please make sure that your program managers are qualified to judge the topics proposed! A Ph.D. should be a requirement for ALL program managers. (Shows dedication to research and scientific understanding.)

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- The *process* is important, but the main problem is that there is too little money in the programs to meet the needs. Also, the individual grants are too small in many cases, forcing one individual to write 3 to 5 proposals to support a single program.

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- I think proposers should automatically receive *all* "frontside copies" of *all* external and panel reviews. This is very valuable feedback. It would also force reviewers to be more careful and responsible. I sometimes suspect that some external reviewers are overly hasty, possibly petty, etc. This can be filtered out in the panel. However, often useful detailed feedback by genuine experts is also filtered out and lost in the "summary" reviews. Very often this is the only way truly honest critiques and feedback are obtained.

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- When reviewing proposals for scientific merit, do not include the investigators' names or institutions. I do believe that there is a great bias towards those from more well-known institutions. I have experienced this when I moved from an institution more well-known than where I am now. My science efforts have not changed, but I have noticed an increase in difficulty in being awarded grants.

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- [Hire] more competent NASA program officers.

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- Generally, I think the system works well and almost as fairly as is possible when using the peer-review process. Better feedback, especially more constructive criticism, would help with rejected proposals.

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- I would like to see the name of the proposer kept anonymous to *all* the reviewers.

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- I disagree with the idea of asking proposers to review proposals. I believe this is an obvious conflict of interest which benefits no one.

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- Send postcards acknowledging receipt of proposals within 2 weeks. Send "blind" copies of reviewers comments to PIs, NOT summaries by discipline scientist!

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- In many cases it was obvious from the (limited) feedback that proposal reviewing was not done properly. In many cases, it was obvious that the peer review was actively looking for "excuses" not to fund the proposal.

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- Although I have been rather successful in my dealings with NASA, I do not feel that the proposal selection process is strictly fair. The selection process should be re-examined for objectivity. Reviewers should have absolutely no vested interest in the outcome of the review process.

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- The entire process, from drafting the NRA to making the final decision on which grants to fund, takes about a year. By the time the panels convene and the director makes the final decisions, a significant part of the scientific/programmatic priorities set forth in the NRA have undergone at least one, if not more revisions. Since we cannot possibly ask the panel reviewers and/or the program director to make choices against the current scientific/programmatic priorities for the sole purpose of sticking to the NRA, the best solution is to shorten the length of the process, preferably to under six months (from *drafting* the NRA to the final decision). That way most of the information on the NRA will still be relevant by the time the final decision is made. It is very frustrating to make painstaking efforts to keep one's proposal within the programmatic priorities set in the NRA, only to discover that the reviewers rated as scientifically more relevant methods

and/or lines of investigation that were left out of the proposal because they were not mentioned in the NRA.

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- I very strongly support the panel review process which NASA currently uses to evaluate proposals. In my opinion, this process is much fairer (and therefore more effective) than the reliance on remote peer-reviewers used by NSF, for example. The simultaneous review of a group of proposals, and the discussions among reviewers, lead to better decisions. Keep up the good work!

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- You need to *infiltrate* as many college campuses as you can, as many departments as you can, if you want to develop more of a collegial "atmosphere." It's almost as if "government science" is different than "academic science." Give a lot of little grants to graduate students through faculty members. It would have a potential impact on the space knowledge base.

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- My dissatisfaction is mainly driven by a problem that is beyond NASA's direct control: the current proposal system is an enormous waste of time. It simply defies *all* logic to imagine that time and money are being used efficiently when one must submit 5 – 10 proposals for each one granted.

  I have received "negative comments" on proposals I have submitted: (a) for not citing papers that were not yet published when the proposal was submitted, and (b) that demonstrated explicit ignorance of the work in the field by the referees. I am fully aware that proposal refereeing is both difficult and tedious. That does excuse either the referee *nor* NASA for shoddy work.

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- Maintain a healthier theory program. Don't overload it by stripping *all* theory elements out of other programs.

  Provide support for small-scale (i.e., individual investigator) grants. It's unhealthy to have a few, very big groups get all the funding in this area.

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- The very system of proposal writing should be drastically changed. Too many scientists are wasting their precious time to write too many proposals every year — and, in most cases, cannot cover even their own salary, let alone hiring an assistant, even if funds are granted in full. Other scientists have to read/review a lot of proposals which, in turn, takes a toll on their

time and productivity.

Also, NASA's science grant process leaves too little or no chance at all for young scientists to get into any program. Competition is high and the absence of just one right "keyword" gives a low score to the whole proposal. Newcomers are at disadvantage when they compete with old experienced PIs.

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- The most serious issue regards the lack of coherence in the grant process in the space physics community.

  In the distant past, a research grant was awarded for many years and for support of many researchers located at one institution working coherently on a project. Many researchers, including graduate students, were funded under the auspices of this grant, and with the coherent effort, NASA was getting a lot of scientific "bang for the buck." Specifically, ideas spawned within the group made for thesis topics and papers for the younger scientists. The "think tank" atmosphere of the group allowed for free thought and an uninterrupted development of ideas. At HQ, the disbursement of funds was much easier. One large proposal justifying the existence of the group was required, rather than a large set of small proposals to justify individual, specific topics. The most important factor is that the worthiness of the individual topics were decided at the institution level and not at HQ level. Thus, large HQ review committees and the like were not really required to verify topic-worthiness. It was all transparent to HQ.

  Unfortunately, not every institution could obtain a large multi-year, group proposal.

  In the mid-80s, an effort was made to create some parity. In the process, the coherent groups were disassociated. Research grants were given on a topic-by-topic basis, which gave money based on ideas rather than on the institution. In theory this concept seems correct. In reality, researchers are now writing as many as 5 proposals a year to piecemeal their funding. The large, coherent "think tanks" are gone. What little money is left is dispersed, but no one is talking. HQ has to sponsor these elaborate review committees to study each proposal, which is now written on a topic-by-topic basis. The loss of coherency means that NASA is not getting the most for its dollar. And individual researchers (particularly on soft money) now spend all their time writing proposals rather than doing research. The system is now fair and honest, but not very efficient.

  The solution: Set up a hybrid process. Identify specific institutions as "think tank" centers and guarantee funding based on the worthiness of the group. However, save some money for individual topics that can be reviewed by the mail-in process. Eliminate the review by committee system.

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- Some way should be found to reduce the review costs and use those savings to fund more grants. It is my opinion that any method used will not be both cost-effective and fair until the number of grants is [approximately] 30 – 35 percent of the number of proposals. The proposed solution is idealized because I realize that it is not simple to use proposal review money from one NASA money pot for grants that come from another NASA money pot. However, the unfairness in the selection process can be eliminated only by instituting a new review process and increasing the funding of the overall program.

  My specific changes are: (1) Scrap the review panel process (it is much too costly). (2) Obtain the services of a small group of individuals who will extract meaningful write-in reviews from the community. (This is a difficult task given that many in the community do not take the time to review proposals, but it is certainly more cost effective than the current system.) (3) Convene a small panel of scientists to sift through those proposals that fall within the top 30 to 40 percent of the write-in reviews and get their recommendation on ONLY these proposals.

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- The key is having a knowledgeable, proactive Discipline Scientist for each program. Unfortunately, NASA HQ has filled the DS functions by cycling inexperienced people through such positions at 2 – 3 year intervals. The result has been insufficient continuity and oversight.

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- NASA should adopt the NSF mode of operation. Proposals may be solicited or unsolicited but should be taken throughout the year. The once a year deadline and the expensive yearly panel review process should be abolished. The money saved should be diverted to research activities. This will also reduce the peak load once a year and make the contractor service redundant, leading to further savings which can be used for research. The program manager should be given more authority to judge the proposal on scientific merits and programmatic needs. Mail-in review may be used for guidance but should not be binding. A procedure to rebut and resubmit proposals should be instituted. This will reduce conflict of interest problems and give the proposer a fair opportunity to establish the validity of his/her ideas.

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- Prefer independent individual reviews over panel [reviews]. Panel [is] subject to politicking by one dominant member.

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- I am very satisfied with the overall aspects of grant submission, review, and feedback.

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- *Programmatic considerations must be made open;* otherwise the process gives advantage to some groups.

  A division director should *personally* debrief a PI if a proposal is rated as "excellent" but does not receive funding.

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- After the grant is awarded and the appropriate documents are transferred from the technical monitor's office to the office which handles financial matters, the grant invariably gets "lost." Numerous phone calls from us are required in order to receive payment. We are often told that the grant papers are "lost" in huge stacks of paperwork on various individual's desks. Once the initial payment is received, it can take multiple faxes to receive later payments. Why can't this be handled over the Internet? NSF has developed an excellent system in this regard and it is quite efficient.

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- In the "Science" subgroups of NASA funding, the review process becomes too much of a "good-old-boys" process, with little chance of outsider entry. A critical review of the allocations by some educated outside group, about every 5 years, would be very beneficial.

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- If would be helpful to receive copies of the reviewers'/panel members comments on the proposal. Also, it is very difficult to reach people at the program director level to discuss ideas for proposal research and receive guidance.

  The bureaucracy governing NASA funding appears to be immense, and it's not at all clear what role scientific merit plays in the selection of successful proposals.

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- My chief complaint is that funding for analysis of specific data sets often comes in increments that are small (in time and dollars). This makes it quite difficult to use this money effectively to support graduate student or even post-doctorate [researchers]. It is much more efficient to fund in amounts and over time intervals that allow [continuous] support [of the] research program. Overall, more funding of programs is desirable (even at the expense of more specific "mission-oriented" funding).

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- A greater effort should be made to see to it that all proposals are referred by at least 3 *independent* referees. All referee comments should be sent to the investigators, not just a committee summary. Referees should be asked to, whenever possible, suggest ways that the investigators could improve their proposals. When evaluation and selection programs, including the names of the investigators, research topic, period of funding and level of funding should be sent to everyone who submitted a proposal. Proposal abstracts should also be readily available. The process should, in general, be more open.

  The Discipline Scientist at NASA Headquarters should be familiar and comfortable with all areas of the discipline. He or she should also be familiar with all submitted proposals (and should have sufficient time to do this). The DS should have significant input into the selection process (based upon scientific merit and relevance to NASA projects) and should not simply determine, based upon a point system, where the funding cutoff will be.

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- I think the method of evaluating proposals in review committee/panels has some weaknesses, but the advantage of having it done in such a timely fashion is a strong advantage. I support continued use of review panels to keep the feedback time short.

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- I recommend that oversubscribed NASA proposals for theory and modeling be awarded on a lottery basis. For the sake of argument, my definition of oversubscribed is that less than 20% of submitted proposals will be funded. Under the present system, NASA must evaluate and rank all proposals. The methods used are mail-in reviews, panel discussions, and a combination of the two. I would estimate that 80% of all proposals submitted are worthy investigations and would be funded if resources were available. The evaluation and ranking process is therefore a difficult one. Although the present methods appear fair and reasonable, they are more of a facade than a meaningful discriminator. It is not that peer reviewers are incompetent but that their job is too difficult. Relatively minor details are being used to differentiate proposals; this is not valid for a scientific research project. PIs are given a wide latitude in conducting basic research, often following unforeseen paths that develop as new research results are obtain. They cannot be held accountable for every minor aspect of a proposal. After all, NASA does not have program reviews in which PIs are required to demonstrate that they are carrying out research objectives exactly as specified in their proposal. Thus, it seems fairer to simply have a lottery system. NASA can cull out the truly bad proposals using mail-in reviews and programmatic judgment. The remaining proposals "go into a hat" and the winners are pulled out. Aside from being fairer, this method would save NASA the money spent on the present review process; this money could be used to fund additional programs.

Proposal costs should only be evaluated by NASA and not scientific reviewers. The costs associated with the government, universities, and private companies are different (e.g., overhead) and comparing them with each other is comparing "apples to oranges." NASA management is in a better position to make the evaluation since it is familiar with the various cost differences; in general, individual research scientists are not in such a position. Also, detailed travel cost information (e.g., plane fare, hotel costs, etc.) is not needed. First, it is a waste of time for a scientist to busy him/herself with such minutiae, and second does NASA ever follow up and check to see how research funds are spent on travel?

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- One [criticism] is the lack of feedback in research areas that are hardware-oriented. By this I mean, groups or investigators whose hardware is generally unsuccessful apparently suffer no penalties when proposing for new programs. New missions and studies seem to be awarded to whomever puts together the most sweeping claims for new science investigations, and although NASA's programs should certainly be science-driven, technical merit — as evidenced by successful hardware operations — should also be rewarded. Review panels should be made fully aware of each proposer's track record, as it were, and this information given reasonable weighting in allocating resources. This is a difficult task. In a small community, many of the most knowledgeable potential reviewers may be unable to serve on the panel, as they are likely to submit their own proposals. Furthermore, there is a tendency for errors and omissions to be swept under the rug, perhaps to avoid embarrassing the group or NASA more generally.

  The second [criticism] is NASA's schizophrenia about "pre-selecting" missions or supporting missions in study phases. A successful proposal for a mission of any significant scope (UNEX, SMEX, MIDEX, etc.) requires an enormous amount of resources. NASA may provide only a few months between announcements and proposal due date, but the old-fashioned notion that a professor and a student or two can sit down and write a successful proposal in the "spare time" available during the few month period is hopelessly outdated. Many science investigators are often required, and, more importantly, a large investment of resources — good old fashioned money — is needed. Engineers must be paid, junior scientists must carry out detailed simulations, schedules and budgets must be developed by managers. All of this involves travel, time, and MONEY. An investigator who, for whatever reason, has current resources at his/her disposal, has an enormous advantage over another investigator who does not.

  Sometimes these resources are provided by his/her academic or industrial institution. This of course is fine; institutions that support proposal preparation merit an advantage for their "investment." More often, though, the resources are not provided by the institution, but are borrowed, by "hook or by crook," from existing NASA projects. There is no way to stop this from happening.

To address this instability, one would hope that NASA could find ways to distribute funding to promising investigators to enable them to prepare competitive proposals, to level the playing field. But herein is the schizophrenia. Funding officials react in (mock) horror to such a suggestion. "You want NASA to pre-select missions before proposals are formally due? What would the lawyers say!" The irony, of course, is that NASA, currently, pre-selects proposals form well-funded groups, with no scientific peer review whatsoever.

The solution is to structure certain announcements explicitly to provide funding for mission studies. The recent "Mission Concepts" announcements is a step in the right direction. However, the announcements was flawed for several reasons. First, only those instruments which are not currently technically feasible would seem to fall in this category. Second, despite a clear statement in the announcements that missions of a variety of scopes were solicited, rumor subsequently emerged that only very large, multi-investigator, multi-hundred-million-dollar missions were truly desired.

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- More emphasis on science quality with lesser emphasis on programmatic aspects would improve the impact and quality of research in the long run.

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- There is only one thing to improve. NASA usually has little money for *new* proposals in each period. Therefore: (a) lengthen period; (b) simplify reviewing process (too many reviewers; too much worry about fairness; it's o.k. if NASA has lots of money to give out). Rely more on contract monitors and outside reviews — "kill" the expensive panels.

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- Feedback is extremely important. However, for legal reasons NASA currently limits the proposer to a panel summary statement. It would be *most* helpful to be given the front pages of the actual reviews. Less would be lost in the translation. It is also important to have knowledgeable and experienced discipline scientists. This is not always the case.

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- All my comments are based on what NASA HQ does with the resources available. Like many scientists of late, I have received marks of excellent and very good on proposals that could not be funded because of resource limitations. That is, of course, a different problem from managing fairly with constrained resources. There I think HQ is doing well.

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- I am very concerned that there is a tendency to keep as many researchers as possible alive in an epoch of decreasing budgets. The method of spreading the pain often has an adverse impact on research productivity. Development efforts take significant sums of money over long periods of time. When the funding level falls below critical levels, many investigators do little more than mark time and put the best face they can on their limited progress. Others find themselves in a mode of writing numerous proposals to maintain economies of scale. Researchers often write proposals that request a level of funding they think can be awarded rather than an amount they actually think they need. Then these researchers have to contend with funding officers restricting their budgets further. The end result is: the fraction of time spent on proposal-writing activities is too large compared to the research returned.

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- The problem with the system is that it makes us devote our effort to preparing high-ranked proposals, rather than doing good science. New ideas are usually badly rated because they have not been proven to work; doing old ideas over again a little better is necessary to be funded. We are all forced to play "musical chairs" for grant support, instead of trying to do good science (risky — it sometimes fails).

  Solutions: 1. Spread the money thinly enough that every productive scientist has a little (at least enough to go to a meeting, perhaps even summer salary), and can stop worrying about his next proposal and start thinking about science again. This continual worry! What will I propose next? Will it succeed? Drains our creative and productive energy.

  2. Restrict each PI to *one* government grant at a time. Once you've got one, it's time to think about science, not proposals! This would also encourage institutions to give young people independence (so they can be PIs). It would reduce the number of proposals written (which NASA must review) by a large factor.

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- By and large there is no problem with the system for evaluating proposals. The problem is the shortage of money for distribution. There are dozens of proposals that are rated excellent, scoring 1 on a 1 to 5 scale, and are declined funding.

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- The proposal process should be greatly simplified, with much greater emphasis placed on the PI's track record. Ideally, the process should resemble what I understand has been the Canadian system, whereby the proposal consists only of a general outline of proposed research and is judged to a large extent on past and ongoing performance. A related simplification

would be achieved with guaranteed funding in each cycle for 5 years or so subject to periodic performance review.

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- I believe that the number of excellent proposals greatly exceeds the number that can be funded, and that the process of selecting those which are funded therefore involves subjective judgments, [which can] be quite arbitrary. I suggest that all proposals which exceed some objective selection threshold be treated equally and selected by lottery. External reviews should suffice for ranking the proposals, and review panels will not be needed. I believe that such a system would be simpler and more fair. Proposers should have an opportunity to respond to unfair reviews.

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- I suggest that the review process have two phases, with the first phase sending comments and criticism to the proposer, who could then respond in the second phase. It often happens that a review committee is misinformed, and this would correct that problem.

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- It is important that NASA seriously consider supporting qualified investigators from schools other than the "big name" schools. Those investigators have fresh ideas and new technologies. They are eager to [contribute to] the knowledge sought by NASA. They cost less and [in] a lot of cases [are] better equipped.

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- The grant *process* is *very* fair and democratic, it just needs more funding to keep American Space Science alive.

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- Comments from [the] review panel should be more specific and detailed.

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- The scientists who review a proposal should not be those whose research interests are in competition (or even the rivals of) the proposed research.

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- Average award sizes must be increased, even if this means fewer awards. Small awards force PIs to submit multiple proposals, which is generating excessive work throughout the entire process.

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- The research programs that NASA has set up, and the way those programs are run and proposals reviewed, are *excellent*. *But*, most programs are underfunded, and the NASA infrastructure to handle these programs is dwindling to the point that unconscionable delays in review/feedback/funding are now occurring. The whole system is sinking under its own weight.

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- Panel review should be eliminated.

  Great care should be taken in the selection of reviewers to ensure competence and minimize conflict of interest. Suggestions for potential reviewers from proposers should be encouraged.

  Full disclosure of all reviews and reasons for funding or not funding should be automatically provided with the notification of outcome.

  There is too much emphasis on "guaranteed results" projects. More attention should be directed to new "risky" science.

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- In the past 2 to 3 years, NASA Program Managers have not been providing extensive review comments on proposals. This is a major method of improving one's science, since those comments are often valuable. I suggest that if proposers sign a waiver stating their intention not to sue NASA they should be shown anonymous review comments.

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- I wonder why I rank the review process highly but am not as satisfied with the overall science grant process? That's because I have to write too many proposals to raise enough money to continue my research. This is a tough field to be in. The survey also makes me realize that I'm not as bad off as I thought and also that things have changed in the past years. Proposal announcements *are* better than they used to be; I still hate costing.

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- More complete feedback.

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- Discourage excessive advisory committees. They waste funds on travel and tend to be populated by persons who either stand to gain directly from the advice given, or are "professional" committee members whose own research has languished. NASA would benefit from a complete dismantling of the entire subculture of advisory boards and committees. Program directors and discipline scientists should take more responsibility for leadership.

There are also too many NRAs. Each one gets wide distribution, creating a blizzard of proposals from people who try to put a spin on their own ongoing research so that it fits the NRA. Such proposals tend to be either redundant or half-baked, putting an unnecessary burden on review panels and tending to reduce average grant size.

The peer review process is generally conscientious and ethical, much improved from 14 years ago when I started proposing to NASA. There are two weaknesses: too small a pool of mail-in reviewers, and not enough instrumentalists among mail-ins or panels. The excuse given for the small number of mail-in reviewers is that every reviewer must have signed a non-disclosure form before receiving a proposal. I would fix that by simply not accepting proposals containing proprietary information.

It is not fair for NASA centers to compete directly with universities; the centers should be encouraged to complement rather than duplicate university research.

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- Be more supportive of ground-based research when it impacts the results of space missions. Provide more detailed feedback on why a proposal is rejected.

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- [Provide] more elaborate feedback on proposals *not* approved.

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- The NASA peer-review process, with panels evaluating many proposals simultaneously, seems excellent to me; well worth the cost.

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- The one aspect of the proposal process with which I am most dissatisfied is that it sometimes appears that the reviewer(s) did not read the proposal carefully enough. It is one thing when a reviewer does not agree with an argument in the proposal; it is another matter when a reviewer erroneously claims that a subject or problem was not addressed at all. This problem is no doubt due to the large number of proposals which must be reviewed. I urge that NASA increase the size of review panels so that proposals can receive more careful scrutiny.

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- Evaluation process too heavily biased in favor of experimenters in receipt of existing funds. New operators find it difficult to "break-in" to this "grants for the boys" type of situation.

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- More consistency in feedback [is needed]. Sometimes it comes, sometimes it doesn't. Sometimes it is objective, sometimes it isn't.

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- I have found the feedback, i.e., review and critique of proposals, to be uninformative. The lack of adequate feedback as to what was good and bad about a proposal is very disturbing. [Inadequate feedback has been] repeated on every proposal I have submitted, both those that have been funded as well as those that have not been funded.

  I suggested that the process used by the National Science Foundation be used. When a proposer receives the letter stating that the proposal will or will not be funded, the actual written comments of the individual reviewers are included in addition to the panel review summary.

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- Remove the "old boy" network that is pervasive throughout NASA's grant funding process. Not that all NASA funded science is laughable, but NASA should, through the *program director (NOT* the committee selected to evaluate proposals), keep a tighter control in the quality of science being funded. This requires qualified and experienced people to be program directors. In my experience, this is not the case!

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- There seems [to be] no legitimate reason for HQ to return only a summary of proposal reviewers comments. Return [of] all reviewer comments would expedite the feedback process.

  I am worried about the proposal review panel composition in terms of conflict of interest and the ability of some colleagues to be objective in their judgment.

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- Many announcements are without funding and just seem to disappear.

  A common opinion exists in the community that the "old boys" network is alive and well, and most grants are "hard wired" or at least heavily biased to present researchers — perceived as hard to break in, even with *good* ideas.

Selected individuals (old boys?) seem to know more of the specifics, not broadly known.

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- More effort needed to ensure impartial review panels.

  More effort needed to ensure competing proposals are evaluated to a common standard.

  Since so few proposals are currently being funded, some effort needs to be made to identify priority areas *in the announcements*. To reduce the number of man-hours wasted on proposals that have little chance of success programmatically (i.e., some programmatic decisions should be made ahead of time).

  Encourage the American people/congress to provide for a stable budget so that long term plans can be made *and kept to*.

  Discourage use of funds to support students (and post-doctorate researchers?) until such time as the downsizing of the community enforced by current budgetary constraints has been achieved.

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- Reinvent the NRA process so that everybody is assumed to get $0K at the start of their proposal period. If they submit a poor proposal, they get $0K, if they submit a good proposal, they get what they ask for. This will remove the significant advantage that incumbent proposers now enjoy, and reduce the stagnation and waste.

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- [Reduce the number of] blanket NRAs. More specific calls would keep people from submitting proposals to every NRA reminiscent of their research area.

  Startup grants for new researchers is basically absent from NASA grants.

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- The approach taken of rotating a large number of investigators through the panels ensures as fair a process as possible. It should be continued.

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- The NASA division staff is excellent, works very hard and is sensible in its decisions. The problem is that they are understaffed and unable to keep up with the many programs they have to manage.

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- (1) The major improvements in the science grant process should be: a.) support of the fundamental science, methods for theoretical analyses; b.) fair evaluation: concrete discussion of the reasons for rejecting a proposal and supporting a proposal; a possibility to give a rebuttal in the case when the reasons for rejecting a proposal are wrong. c.) a feedback from NASA which indicates clearly whether NASA is satisfied with the research of the Principal Investigator or not, and by what reasons. d.) at the end of the research period (grant period) there should be a final evaluation of the research completed, and a detailed discussion of the strong and weak points in the completed research. Good work should be explicitly recognized as well as a bad [work.] (2) A toll-free number for communication with NASA should be available.

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- The Peer Review panels generally are good, although I have seen some indication of the "good old boys" network trying to "kill" some fields or prevent newcomers from getting grants.

  Some grants have become entitlements with PIs getting big sums even after their contributions have decreased. This is bad [because] a fairly small fraction of the PIs get a large fraction of the funds.

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- Its generally a good process, but at times it appears exceedingly difficult for new research ideas and people to break into an area.

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- I have served as an outside peer reviewer of NASA proposals in 3 different programs and I have served on the panel of scientists which reviews proposals in the light of outside reviews. I think this process is extremely fair and objective especially in contrast to other agencies with which I am familiar.

- Make more use of electronic media (WWW). Make statistics available on how program money is spent (administrative cost, review panel cost, etc.).

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- More money [is] spent writing proposals than was distributed. This is idiocy beyond words. NASA is in deep trouble in its grants program. It has become a real lottery. The merit system is DEAD in the grants program!

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- Money should be earmarked to fund grants for a post-doctural researcher at non-government labs (i.e., a counterpart to the NRC fellowship program).

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- The general problem that I perceive is a gradual deterioration, over the past decade or more, in the adequacy of the funding level to complete a given program. The effect of this is to drive the researcher into producing more proposals to maintain a coherent program and to spend more [time writing proposals than doing the research]. The effect of this is to increase the Headquarters overhead in dealing with an increasing flood of proposals, reducing the efficiency of the overall program.

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- Provide modest funding for the review teams, and — if NASA is too busy to handle this paperwork themselves — make the *teams* responsible for providing (at least) the scientific feedback to proposers.

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- The most important thing I would like to see improved is better feedback. The summary of strengths and weaknesses from a proposal evaluation are given in a form so terse as [to] be almost useless. Comments sometime almost seem contradictory. A few sentences would be more helpful than 3 or 4 two word phases.

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- I realize that, with today's budgets, the majority of NRA proposals are going to lose, but as someone who has participated in an NRA review committee meeting, it seems that an enormous amount of money is spent just in the review process alone. If NRAs were processed perhaps every other year (or every third year) would this not help reduce this cost? I am sure you are thinking of ways to streamline this process and the sooner this is done (if it is possible) the better! I know it is a difficult job and you are doing the best you can. Most of the Space Scientists I know are also doing the best they can. Hopefully we can all work together in the future and make space exploration and space science exciting and important.

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- In some areas NASA relies on a relatively small number of experts which leads to a "skewed" review process. The "Old Boys" network should be avoided. I also should add that the person responsible for feedback should be more forthcoming. Also "one liner" reports should be avoided. After all, one spends a lot of time submitting a proposal. One is therefore entitled to a decent, extensive report.

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- The NASA feedback on the proposals seem to vary across the different divisions and subdisciplines. In Space Physics and Astrophysics divisions the panel consensus reports are provided along with the NASA decision on the

proposal. In the past the Planetary Atmospheres Program of the Solar System Exploration Division provided the reports only over the telephone, which is a tedious process. NASA should adopt uniform procedures for providing its feedback.

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- Panel reviews have had a lot of variations in their quality. Some were hastily chosen and were staffed with people 10 years "out of date" in their research familiarity.

  What to do? Longer lead times in selecting panelists, more care in selecting high-quality *active* researchers to serve on the panels. With active recusal policies for individuals with conflicts of interest, the panels might be able to be improved in quality by using people more familiar with the spacecraft and fields of research.

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- [It should be] mandatory that NRAs contain enough information to let us know what the scope and capabilities of the mission are all about. It takes a lot of time to get documents over the network and print them out, just to see if the announcement is of any interest. If you want to make such information available over the WWW, that's fine too.

  May I point out that in the old days the paper NRAs served a very useful purpose? They made sure that you people at HQ and out at the centers were *organized*: all of the user/proposer information had to be ready for the printers. Now, with electronic distribution of the NRAs, the information in the files is often incomplete or even wrong! You cannot expect to be changing this documentation two weeks before the proposal deadline, as has happened recently. This just makes the process too chaotic and too time-consuming, and it also jeopardizes the *legality* of the whole review. Someone, someday, may become disgruntled enough to challenge the whole electronic process unless you take care to ensure it is done as orderly as if it had been done "on paper" the way NASA did it in years past.

  In peer review, NASA is starting to look real bad, if you ask me. There was a time when the peer reviews were done astonishingly well. Now the panels tend to be too small to have sufficient expertise to cover the broad areas of research they've been assigned, and the members of the panels are given too heavy a load of proposals to review. It is simply not possible to have a fair and thoughtful review if a panelist is assigned 60 to 70 proposals, and if the formal meetings are limited to at best 2 days. I have been told that at the last ASCA review, many panelists had not even read the proposals when they met. Where's the fairness in that?

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- [Overall] the process is reasonably good and, more importantly, fair. However, I do believe there are areas [in need of] improvement.

  (1) Be specific about the areas for funding.

  (2) 2-phase process (similar to NIH). 1st stage: short 2 page summary of proposed work etc. Only have full proposals for final stage. This saves PIs *time* and *money*.

  (3) Be more specific in debriefings. Help the PIs to produce better proposals next time. Again, NIH provides feedback to encourage proposers who did well (but not funded) for the next round.

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- Discipline program managers [should] not stay in their offices for more than a 3-year term.

  Panel review system is sometimes quite unfair and should be replaced by a mail-in peer review process.

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- Individual researcher and small group efforts are vitally important for getting the science out. I hope NASA will continue to support them as well as they have.

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- Don't change the selection rules from those of the NRA. If there is to be social engineering, announce it, so people don't waste their lives.

  Encourage reviewers to accept some longer proposals.

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- I feel the proposal evaluations have been uninformed and capricious. I think I would prefer the mail-in review, as in the NSF ATM program — even though it may take longer. The panel process outcome seems to depend on the judgment of one person, who may not be informed.

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- Established programs should make sure that some money is allocated to new starts. Otherwise, the process becomes closed and resistant to new ideas. It is difficult enough as it is to justify a new idea compared with ongoing established research programs.

  Writing a full proposal every year to fund a $30K grant is not a productive use of NASA's grant money. I could be doing research instead!

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- I strongly recommend changing the review process to that followed by *NSF* — with mail-in reviews rather than committee reviews.

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- I suggest strongly that junior colleagues, with lack of experience of refereeing business, *NOT* be asked to serve in the peer review panels. They are simply *NOT* PEERS! They do not do that in other countries, England, Japan, Germany, etc.

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- (1) Written feedback suggests that proposals are sometimes not understood or not read carefully (or at all). I have also seen a poor level of preparation for proposal review meetings. (2) NASA is using too many junior reviewers, or people with a poor overall understanding. It is not correct to use "post-docs" to review proposals: they have inadequate experience and breadth. (3) I believe that proposal review is "fair" — in the sense that science is the main criterion. (4) Remove "current and pending" page from proposals sent out for review. Many reviewers are envious of those with other well funded programs. (5) I think that NASA is wrong to earmark specific amounts of money for junior investigators (e.g., LTSA program — 2/3 money for juniors). We already have too many astronomers and this practice will exacerbate personnel problems. There are not enough good juniors to justify such generous funding. (6) Drastically reduce number of small and short-term grants and increase funding to LTSA. The short/small programs are extremely inefficient of everyone's time. The same people are applying for both small and LTSA programs.

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- Please continue to keep the budgeting simple!

  While project officers do a very good job, after the process goes beyond their control it bogs down in terms of the amount of time between arrival of the award letter and the eventual arrival of the contract/check. In one case it took 16 months!

  Keep communication lines (such as this questionnaire) open!

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- Return copies of all review comments to proposers. Do so promptly upon completion of reviews. Have formal appeal process for bad reviews. Have appeal process for inadequate funding. Provide more checks [to ensure] that [the] review process is fair and unbiased.

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- My experience has been that an "outsider" has little or no chance of having a research proposal funded by NASA.

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- I have been involved with Space Physics as a proposer, PI and member of review panels. Review panel process needs improvement. Not all panel members see the proposal. Too often, a proposal rating is pushed up or down by only one or two panel members. Sometimes, personal bias seems to play a role, especially with dominant, senior people on that panel. Feedback to proposers could be expanded — currently only a few terse lines. I think that NASA (Space Physics) is really trying to be fair and objective. It is an overwhelming job.

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- I applaud (in general) the panel review process. However, I believe that the process is biased *against* innovative research. This is based on personal experience as a proposer and as a panel member.

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- Since 75% of grant money goes to only a few institutions, why not just give 5-year block grants and let the lesser institutions fight for the remaining 25% funds via the NRA's. Top institutions could be peer reviewed every 5 years. This would save a huge amount of time and effort in proposal writing.

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- In many cases those who organize and run the review committees are also the same people who run the actual (data center satellite) and, naturally, write a significant number of proposals. This inevitably leads to conflicts of interest which have, on occasion, led to heavily biased proposal selections.

  1.) *I strongly urge that procedures be changed to avoid such conflicts of interest.* A separate, neutral organization should deal with the complete review process from committee selection to running the review to distributing the reports. An excellent example here is running of the NASA ADP program review process.

  2.) Strict rules of decorum should be applied during the process. For example, technical people should be available for consultation but *not* present in the committee room(s) at any other time.

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- NASA's successes have been truly outstanding. So, there must be many good qualities in its science grant process. However, I have two problems with NASA's science grant process:

  (1) I feel the process is a camaraderie system, at least in part. What do I mean by that? It is inevitable that during periods of austerity and re-assessment such as NASA is currently going through that Agency personnel who are making programmatic decisions need help. What must they do when they do not have the funds to pay for scientific expertise? They "borrow" it by inviting scientists from the universities and research laboratories to form working groups and so forth. The said university scientist gains from this symbiosis by having an advantage when RFPs or NRAs go out. The problem is that as human beings, there is a natural tendency for the peer-reviewer (specifically, the Headquarters Division involved) to feel that "something" (grants, funds, or money) is owed back to these people who helped. Inevitably, peer review creates a clique of "you-cite-me-and-I- will-cite-you" mentality, with reviewers no longer "at arms length" from the reviewed as they should be.

  (2) Presently, NASA's system is sort of a "blind bid" system for the proposer (unless the PI is "in" the camaraderie group). This is backwards and is inequitable. What do I mean? If you are "in" the system, you can get the grant. If you fail, the only feedback you get is a cryptic critique. So, you are basically "blind" to what it takes to win the grant and to what is going on (what NASA "wants"). How do you do something about this? (2a) Provide a fair and equitable feedback system wherein the total results of the grant process are made public knowledge to all proposers, including the losers. This would at least include titles of the successful proposals and what the size of the grant was. (2b) A better feedback process will necessarily improve the quality of subsequent grants from the losers — and *by definition* that is what the feedback should be: Whatever improves the quality of the NASA science grant system. (2c) What is the correlation between NASA's lofty research goals and research actually funded to pursue those goals? *Publish* this correlation in the acceptance/rejection cycle. (2d) Is NASA on a kite-flying exercise? If you do not want speculative proposals, then NASA should not be speculating about the origin of the Universe. (2e) Draw a line in the sand between NSF research and NASA research, because one of the oldest tricks in the book is to tell a new investigator that his/her proposal should [go] to the NSF and not NASA. (2f) Stop advertising goals if and when you have no intention of funding them. Otherwise, you create a credibility problem with the science community when you invite the naive PI into a response.

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- Having participated in all aspects of the NASA grant process over the years, I believe that many problems as perceived by the community at this time rest in the general inadequacy of funding. Many highly meritorious proposals end up not funded. The peer review process is very good in separating

meritorious from non-meritorious proposals, but it is much less successful in distinguishing between similarly meritorious proposals other than on the basis of minor, mostly irrelevant factors. This gives rise to a great amount of frustration among proposers. Any amount of efficiency in managing the process is not going to change that.

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- Feedback [is] generally not very informative. I believe it is important for the review panels to provide meaningful comments for the deficiencies of a proposal. So the proposer, especially if he/she is a junior scientist, can receive useful guidance on how to improve their proposal(s) in the future. Also, the length of time between the announcement of proposal acceptance and funding start should be shortened.

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- The basic problem is fairness. 1) The squeeze put on research funds has probably doubled the number of proposals for any given call. One way to decrease the number is to be much more specific in the call as to total money available, total number of grants and size of grants and an explicit breakdown to the areas of research expected to be funded and percent of monies which will support that work. This will inject a little bit of realism into the process and scientist's expectations. 2) The review committee's make-up has introduced potential for bias. Relevance to the research needs of committee members appears to be the dominant factor affecting scores, not merit.

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