

IG-00-045

**REVIEW
REPORT**

**NASA'S INDEPENDENT COST ESTIMATING
CAPABILITY**

September 20, 2000



National Aeronautics
and
Space Administration

OFFICE OF INSPECTOR GENERAL

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Acronyms

CFO	Chief Financial Officer
GAO	General Accounting Office
GS	General Schedule
IPAO	Independent Program Assessment Office
NPG	NASA Procedures and Guidelines
OMB	Office of Management and Budget
PMC	Program Management Council
SMO	Systems Management Office

W

September 20, 2000

TO: A/Administrator

FROM: W/Inspector General

SUBJECT: INFORMATION: NASA's Independent Cost Estimating Capability
Report Number IG-00-045 Redacted Report*

The NASA Office of Inspector General has completed a review of NASA's Independent Cost Estimating Capability. We found that NASA is taking steps to improve the Agency's independent cost estimating capability by establishing a System's Management Office (SMO)¹ at each Center and adding cost estimators in the Independent Program Assessment Office (IPAO)² at Langley Research Center (Langley). However, we found that NASA has not identified the cost estimating and cost analysis function as a discipline with a specific job series, has not established career development plans for its cost estimators, and does not have a requirement to develop independent cost estimates at all major reviews. Further, we question whether the Agency's reporting and funding structures provide assurance that the cost estimates are independent in fact and/or appearance.

Background

A December 1990 report from the Advisory Committee on the Future of the U.S. Space Program expressed concern with NASA's ability to provide realistic, nonadvocate cost reviews of major programs and projects. The report noted that initial estimates of required resources too often have been understated. In a September 1991 briefing to the Advisory Committee on actions taken, NASA stated that it was enhancing the cost analysis capability of the Cost and

*We have redacted portions of this report under authority of exemption (b) (5) of the Freedom of Information Act. The redacted portions of this report do not affect the validity of the report or management's response.

¹ The SMO provides (1) support and independent evaluations of projects and programs for compliance with and implementation of NASA guidelines; (2) leadership, consultation services, and technical expertise on system engineering processes; and (3) support in forecasting costs for advanced program/project planning initiatives.

² The IPAO serves as Agency lead for the independent technical and programmatic assessment of advanced systems concepts and programs to provide Agency senior management with the information needed to make sound decisions. Assessments may include the development of an independent cost estimate for the program.

Economic Analysis Branch within the Office of the Comptroller. However, a November 1992 evaluation from the General Accounting Office (GAO) found that NASA's actions to implement an independent cost estimating function did not meet the intent of the Advisory Committee's recommendation.

On September 7, 1993, the National Performance Review³ team issued its report, which recommended that NASA continue to pursue and develop an independent cost estimating capability. However, budget cuts and downsizing affected this effort. The subsequent downsizing and relocation of the Cost and Economic Analysis Branch to the IPAO at Langley in 1996 left the Branch's cost estimators/analysts at Headquarters. During the time of the IPAO move to Langley, my office performed an assessment⁴ of the IPAO's relocation to Langley. The assessment concluded that the placement of the function at or under Enterprise or Center management places the IPAO's independence and impartiality at risk. Further, the assessment noted that each NASA Center, including Langley, receives funding from some Enterprise source and that in such a fiscal environment, true independence and impartiality require that the function reside with officials who have no stake in the competition for finite and dwindling program funding.

On September 30, 1996, NASA management informed us that it planned to supplement the Langley staff with experienced cost estimators. We agreed with this plan and concurred with management's commitment to develop Langley's staff capabilities to include analyses during all procurement phases in order to assure a comprehensive understanding of life-cycle program and cost management. However, since 1996, a gradual attrition of the remaining cost estimators has led to the loss of an independent cost estimating function within NASA.

In 1999, the Agency initiated plans to add eight full-time cost estimators to the IPAO to oversee and validate SMO independent cost estimates. In October, the Agency reinstated the cost estimating capability by directing each Center to establish an SMO with an independent cost estimating capability.

The review my office recently completed is a follow-up effort to monitor the status of NASA's implementation of an independent cost estimating capability. Our recommendations and evaluation of management's response are discussed in the following paragraphs.

Recommendations

We recommended that the Chief Financial Officer direct the IPAO and SMO to submit a summary of all independent cost estimates directly to the Administrator or other approving

³ The National Performance Review was an intensive 6-month study of an interagency task force requested by the President. The study provided a plan to fundamentally change the way the Federal Government works and create a Government that works better and costs less.

⁴ The NASA Office of Inspector General Inspections and Assessments Office issued "Assessment of the Relocation of NASA Independent Program Evaluation & Assessment Activities to LaRC [Langley]," July 8, 1996.

official for the program or project and establish an independent funding source for all independent cost estimating activities. We also recommended that the Chief Engineer's Office revise Agency policy to require that an independent cost estimate be performed at all major reviews for comparison with the life-cycle cost estimate, identify a general schedule job series for the professional cost estimator/analyst, and identify and develop core training requirements for cost estimators Agencywide.

Management Response and OIG Evaluation

Management proposes to institute a requirement for an independent cost estimate after the Critical Design Review and has established an inter-Center Cost Estimating Steering Group with plans to address training requirements in the near future. We consider these two actions responsive to the intent of the related recommendations.

Management partially nonconcurred with the recommendations related to establishing direct reporting and independent funding for the IPAO and SMO's. With regard to reporting, management stated that the independent cost estimates are transmitted to all NASA senior management through the Internet and the Program Management Council (PMC) and believes that this process assures the Administrator is provided with a complete disclosure of the IPAO's independent cost estimate. However, it is unrealistic to expect the Administrator to review all the estimates available through the Internet. Management comments reflect that only the PMC minutes are forwarded to the Administrator. Therefore, we believe the independent cost estimate, or a thorough summary of the estimate, should be part of the minutes package, a key document upon which acquisition decisions are made.

Regarding independent funding, management stated that an independent funding source is in place for the IPAO and that the Center Director is responsible for ensuring that the SMO budget is sufficient. The Center Directors have the authority to transfer up to 10 percent of Center funds among programs without notifying Headquarters. Because we believe that the IPAO independent cost estimating mission could be adversely affected by this authority, management should, as a minimum, require Headquarters approval prior to any adjustment to the IPAO budget. Otherwise, the IPAO could be influenced by budgetary issues in making their conclusions.

Further, we maintain that an independent funding source is needed for the SMO. We believe that delegating responsibility to the Center Director for ensuring SMO budget sufficiency without establishing minimum requirements provides Center Directors with a wide latitude in the priority placed on funding for the independent cost estimating function. This approach could result in an inconsistent capability among the Centers.

Management did not agree to identify one job series for cost estimators/analysts. Management stated that there was little merit to limiting the pool of potential candidates through narrowly defining the job series and that using several job series allows NASA to select the best-qualified candidates from the widest pool possible. Management's position contradicts the IPAO's position presented at a November 18, 1999, briefing when it stated that one of its objectives as

a lead center for cost estimating was to establish cost estimating as a professional career discipline at NASA and to overcome NASA's current culture of the nonprofessional "journeyman" cost analyst. NASA currently uses the aerospace technologist and program analyst series for cost estimating and analysis positions. We maintain that aerospace technologists and program analysts do not enter the cost estimating/analysis positions possessing all the skills necessary to be a competent cost estimator or analyst. They acquire those skills over time through on-the-job experience or through training. To become a highly skilled cost estimator/analyst requires years of experience and commitment to the cost estimating/analysis profession. Stability in the cost estimating/analysis workforce is essential to overcoming NASA's current culture of the nonprofessional "journeyman" cost analyst. Using various job series enables personnel to easily enter and leave the cost estimating/analysis arena and go on to other positions. We believe that a specific job series is essential to slowing the current attrition rate of the cost estimating staff, establishing a stable and increasingly experienced workforce of cost estimators, and recognizing cost estimating as a serious professional discipline.

A summary of the status of all the recommendations is in the finding section of the report.

[Original signed by]

Roberta L. Gross

Enclosure

Final Report on the Review of NASA's Independent Cost Estimating Capability

**FINAL REPORT
REVIEW OF NASA'S INDEPENDENT COST
ESTIMATING CAPABILITY**

W

September 20, 2000

TO: AE/Chief Engineer
B/Chief Financial Officer

FROM: W/Assistant Inspector General for Auditing

SUBJECT: Final Report on the Review of NASA's Independent Cost Estimating Capability
Assignment Number A0001600
Report Number IG-00-045

The subject final report is provided for your use and comments. Please refer to the Executive Summary for the overall review results. Our evaluation of your response is incorporated into the body of the report. Management's corrective actions planned for recommendations 3 and 5 are responsive. These recommendations will remain open for reporting purposes until agreed-to-corrective actions are completed and/or verified. With regard to recommendations 1, 2 and 4, we request that management submit additional comments by November 20, 2000. Also, please notify us when actions have been completed on those recommendations. All recommendations will remain open for reporting purposes.

If you have questions concerning the report or would like to schedule an exit conference, please contact Mr. Daniel J. Samoviski, Program Director for the NASA Earth/Space Science Audits, at (301) 286-6890, or Ms. Betty G. Weber, Evaluator, at (202) 358-2597. We appreciate the courtesies extended to the review staff. See Appendix F for the final report distribution.

[Original signed by]

Russell A. Rau

Enclosure

cc:

B/Comptroller

BF/Director, Financial Management Division

G/General Counsel

JM/Acting Director, Management Assessment Division

M/Director, Independent Program Assessment Office

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NASA Office of Inspector General

IG-00-045
A0001600

September 20, 2000

A Review of NASA's Independent Cost Estimating Capability

Executive Summary

Background. Historically, program advocates have provided optimistic estimates of the likely cost of their program when seeking management approval for resources. Higher acquisition costs, project delays, and cancellation of major projects can occur when decisions are made about funding programs without a clear understanding of the total cost of the acquisition. Independent cost estimates, free of advocacy bias, are essential to obtaining a more realistic understanding of the program's likely life-cycle costs and are becoming increasingly more important to NASA as it continues to face shrinking budgets. The Office of Management and Budget (OMB) requires that agencies tailor an acquisition strategy for each program and use independent cost estimates, where feasible, for purposes of comparison with the program advocates' cost estimates.

Objectives. Our overall review objective was to assess NASA's current and planned ability to develop independent cost estimates in support of the Agency's program and project management process. Specifically, we determined the adequacy of the Agency's qualification requirements and career development plans and organizational structure for the cost estimating function. Appendix A contains further details on our objectives, scope, and methodology.

Results of Review. The planned organizational structures for the independent cost estimating function at the IPAO and SMO's may not provide for independent reporting of findings directly to the approving official unless the report is specifically requested by the approving official. Also, the IPAO and SMO's are funded through the Centers--a process that may hinder the offices' independence. Consequently, the Agency has no assurance that the opinions, conclusions, and recommendations made to the Administrator on acquisitions for Agency programs and projects are independent in fact and appearance (Finding A).

Agency policy requires independent cost estimates only for program new starts, while life-cycle cost estimates are required at each major review. Because life-cycle cost estimates are not subjected to independent cost estimate comparisons, NASA has no assurance that the program life-cycle cost estimates, established at each review, are realistic (Finding B).

The Agency has not identified the cost estimating and cost analysis function as a discipline requiring a specific job series and has not established career development plans for its cost analysts and cost estimators. As a result, the quality of cost estimating and cost analysis support available at each Center is inconsistent (Finding C).

Recommendations. To ensure that requirements for independence are met, NASA should ensure that copies of independent cost estimates are submitted directly to the Administrator or

other approving official and establish an independent funding source for the IPAO and SMO's. Also, we recommended that management revise Agency policy to require that an independent cost estimate be developed at all major reviews of major programs. Further, NASA management should establish the cost estimating and cost analysis function as a specific position and develop corresponding standards and career development training requirements and plans.

Management's Response. Management partially nonconcurred with the two recommendations to establish independent funding and reporting structures for independent cost estimating activities. Management believes that the current reporting and funding structures assure independence of the IPAO and SMO's. Management concurred with the recommendation to require an independent cost estimate at major reviews and agreed to institute a requirement for an independent cost estimate after the Critical Design Review. Management nonconcurred with the recommendation to identify a specific job series for cost estimators/analysts, stating that there is little merit to establishing a specific job series for cost estimators but concurred with the recommendation to develop career development training requirements and plans. Management stated that the Agency has established an inter-Center Cost estimating Steering Group to identify and develop core training requirements for cost estimators Agencywide.

The complete text of the response is in Appendix E.

Evaluation of Management's Response. Management's plan to develop an independent cost estimate after the Critical Design Review and to develop core training requirements for cost estimators is responsive to two of the recommendations. However, management's position on the reporting and funding process for the IPAO and SMO's is not fully responsive to ensuring independence for the cost estimating function at those activities. Management's comments reflect that, at the Agency level, only the PMC minutes are forwarded directly to the Administrator. Therefore, we believe that the IPAO independent cost estimate, or a thorough summary, should be part of those minutes. Further we believe that Headquarters' approval is needed prior to adjusting the IPAO budget. In relation to the SMO's, the current practice of making the Center Directors responsible for ensuring SMO budget sufficiency without establishing minimum requirements gives the Directors wide latitude in the priority they place on funding the SMO function. Therefore, we believe that an independent funding source is need for the SMO's. Regarding the identification of a single job series for cost estimators, management did not address our concerns regarding credibility and professionalism in the cost community. Therefore, we request that management further review its position on these matters and provide additional comments in response to the final report.

Introduction

A December 1990 report from the Advisory Committee on the Future of the U.S. Space Program to the Administrator of NASA expressed concern with NASA's organizational structure and its ability to provide NASA with realistic, nonadvocate cost reviews and assessments of major programs and projects. The report states that NASA is oversubscribed in terms of the projects it is pursuing and that one of the reasons for this situation was because initial estimates of required resources too often have been understated, particularly with regard to cost. The report states:

NASA ... has been embarrassed ... by less than accurate estimates of projects costs. The causes are well understood, and include program initiation before enabling technology is proven, overselling on the part of program advocates, both in government and industry, and failure to include all costs when evaluating a program. With programs becoming ever more costly and complex, it now appears to be an appropriate time for the Administrator to have access to a highly skilled and independent cost estimating and analysis capability. ... In short we suggest ... That an independent cost analysis group be formed to serve the Administrator and the Administrator's staff. This group should be charged with the responsibility of providing to the Administrator a recommendation on all significant cost estimates provided to the Congress or to the Office of Management and Budget.

NASA's response to the report recommendations consisted of establishing a Program Management Council (PMC), chaired by the Deputy Administrator. To aid the PMC in nonadvocate reviews, the Agency established the Systems and Cost Analysis Division within the Office of the Chief Financial Officer (CFO) at NASA Headquarters. When Headquarters downsized in 1996, the Division's program evaluation function transitioned to Langley Research Center and the IPAO was established without a cost estimating capability. Although the cost estimating and analysis function remained at Headquarters, over time personnel in these positions left, and the Office of the CFO also lost its capability to perform cost estimates. NASA's current cost estimating and cost analysis community consists of approximately 20-24 aerospace technologists and program analysts at NASA Centers who provide cost estimating support to Center program and project offices and Center management. Because those personnel are within the chain of program advocacy, their cost estimates do not meet the requirements of an independent cost estimate.

Recently, NASA reaffirmed the need for independent cost estimating when the Administrator directed that the Centers establish an SMO with an independent cost estimating capability to support Center programs and projects (see Appendix B). Establishment of Center SMO's began in October 1999. The SMO's will provide consulting and advisory services to Center program and project managers on formulation and implementation processes and best practices and will report results of independent assessments to the Center Governing Program Management Council. SMO's will also serve as the Executive Secretary or Member of the Center Council. The SMO may also serve as a member of the Program/Project Management Council Working Group.

To oversee and validate the independent cost estimates developed by the Centers, management plans to add eight cost estimating positions to the IPAO. In September

1999, the NASA Chief Engineer directed that the IPAO become NASA's lead cost estimating office. To implement the capability, a draft Memorandum of Understanding, establishing the eight full-time cost estimators in the IPAO, was developed for the review and approval of management. The eight cost estimators will assist the Center SMO's in developing independent cost estimates and will report to the Chief Financial Officer (CFO) at Headquarters.

At the time of our review, the draft Memorandum of Understanding had not yet been approved. However, the IPAO has three people assigned to cost estimating duties and is actively seeking cost estimators or cost analysts to fill the remaining billets.

Finding A. Requirements for Independence of Cost Estimates

The proposed organizational structure for the independent cost estimating function will not result in the independence required by Federal and Agency policies. The proposed reporting structure does not provide for IPAO control over the final reporting of its findings to the Administrator. In addition, the major responsibility for the independent cost estimating function is being delegated to the SMO's that are funded by and report to the Centers where they are located. As a result, NASA will have no assurance that the opinions, conclusions, and recommendations made to the Administrator or other approving official are independent in fact and appearance.

Organizational Independence for Independent Cost Estimates

OMB Circular A-109, "Major Systems Acquisition," April 1976, states that the acquisition strategy should maintain a capability to (1) estimate life-cycle costs during system design concept evaluation and selection, full-scale development, facility conversion, and production and to (2) use independent cost estimates, where feasible, for comparison purposes.

NASA Procedures and Guidelines (NPG) 7120.5A, "NASA Programs and Project Management Processes and Requirements," April 1998, states that for proposed new program and project starts, the NASA Chief Engineer is responsible for providing independent cost estimates conducted by a team from organizations outside the advocacy chain of the program or project.

A clear, strong organizational structure is critical to ensuring an independent cost estimating function. The General Accounting Office's "Standards for Internal Control in the Federal Government," Report GAO/AIMD-00-21.3.1, dated November 1999, states:

A positive control environment is the foundation for all other standards ... [A] factor affecting the environment is the agency's organizational structure. It provides management's framework for planning, directing, and controlling operations to achieve agency objectives. Good internal control requires that the agency's

organizational structure clearly define key areas of authority and responsibility and establishes appropriate lines of reporting.

The General Accounting Office issued Report GAO/NSIAD-93-73 "NASA's Independent Cost Estimate," November 1992. The report states:

Estimates and advice provided to the Administrator by the cost analysis group need to be independent in fact and appearance so that the group's opinions, conclusions, and recommendations will be impartial and viewed as impartial by third parties.

Reporting Structure for Independent Cost Estimating Activities

The draft Memorandum of Understanding to provide a cost estimating capability in the IPAO requires the cost estimating function to report to the Office of the CFO. The IPAO cost estimating team will receive its cost estimation and analysis assignments primarily from the Office of the Administrator and the Office of the CFO. For those assignments, the cost estimators will report directly to those offices. Estimates and analyses requested by Centers and Enterprises will be reported to the requesting Center or Enterprise. The diagram in Appendix C demonstrates how IPAO information may pass through one or more levels of management before reaching the Administrator. This reporting process makes it possible for misinterpretations of IPAO issues or positions to occur prior to submission to the Administrator. Further, because Centers/Enterprises are advocates for their programs/projects, their positions and recommendations on the status of a program/project could be viewed as biased. The Administrator could, therefore, make a decision based on incomplete or inaccurate information. To ensure the integrity of IPAO positions, a summary of each IPAO independent cost estimate report should be sent directly to the Administrator or other approving official for the program or project.

Each Center will develop most independent cost estimates for the programs/projects at their Center. The IPAO, as the lead cost estimating office, will assist and support the SMO's. The SMO independent cost estimate may pass through and gain input from as many as four groups before it reaches the Administrator or the approving authority for Center programs or projects. As a result of the organizational structure, the SMO's cost estimates may not meet the requirements for independence. Appendix C shows a summary of the reporting structure for the SMO independent cost estimate.

Resource Structure for Independent Cost Estimating Activities

The draft Memorandum of Understanding states that the IPAO will submit cost estimating budget requirements to the Office of the CFO through the Institutional Program Office in response to the annual budget call from the Office of Aerospace Technology. The budget for the IPAO role as cost estimator will come from the Office of the CFO, with the exception of funds budgeted for travel, personnel, and other miscellaneous costs. This funding arrangement may be an impediment to independence for IPAO staff and activities. Enterprises and Centers compete for scarce resources. Funding the IPAO staffing, travel, and other costs through the Office of Aerospace Technology and Langley may be viewed as an impairment to organizational

independence because the IPAO could be viewed as an advocate for the Office of Aerospace Technology or Langley programs and projects. To avoid the appearance of advocacy, the IPAO should be funded under a separate line item in the budget, independent of Langley and the Office of Aerospace Technology.

Each SMO is located at and receives resources from the Center where they are located. This organizational structure creates a barrier to the independence of the SMO's cost estimates submitted to management because the Center SMO can be viewed as an advocate for its respective Center's programs and projects. To meet requirements for independence, the SMO should also be independently funded.

Conclusion

Although the proposed addition of a cost estimating capability for the IPAO and the establishment of the SMO's are positive steps toward correcting a serious shortfall in the independent cost estimating capability within NASA, we question whether these organizations, as structured, will meet the requirements for independent cost estimates that are free of influence from program advocates. In our opinion, the planned IPAO and SMO independent cost estimate reporting and funding structure does not provide for independent reporting. The IPAO cost estimate will not meet the requirements of independence because the IPAO has no control over the final information reported to the Administrator and will be funded through the Office of Aerospace Technology and Langley. Further, the SMO's will not meet the requirements for independence because they may not be reporting directly to the Administrator or the delegated approving official and will be funded by the Centers.

Recommendations, Management's Response, and Evaluation of Response

The NASA CFO should:

- 1. Direct that, for NASA programs governed by NPG 7120.5A, the IPAO and SMO submit a summary of each independent cost estimate directly to the Administrator or other approving official for the program or project.**

Management's Response. Partially nonconcur. Management stated that the SMO's reporting process is a function of each Center's procedures and in general, their independent cost positions are presented to the approval official at the Centers. Management stated that independent estimates are transmitted to the Administrator through the Internet and that the Administrator receives the minutes of the PMC. Management further stated that this Agency-level reporting process provides the Administrator a complete and accurate record of the IPAO's independent cost estimate.

The complete text of management's comments is in Appendix E.

Evaluation of Management's Response. Management's comments are not fully responsive. Delegating the SMO's reporting process to the Centers without providing guidance or requirements provides no assurance that the SMO's independent cost positions are presented directly to the approving official at the Centers. Further, although we recognize that the IPAO reporting process provides visibility of the IPAO independent cost estimates on the Internet, management's comments reflect that only the PMC minutes are forwarded to the Administrator for information prior to making acquisition decisions. Because the IPAO does not review the final PMC minutes prior to publication, and because it is unrealistic to expect the Administrator to review the independent cost estimates on the Internet, we believe that the independent cost estimate, or a thorough summary of the estimate, should be part of the PMC minutes forwarded to the Administrator. Therefore, we request that management reconsider its position and provide additional comments that specifically address the assurance of independence in current IPAO and SMO reporting processes.

2. Establish an independent funding source for all independent cost estimating activities by the IPAO and the SMO's.

Management's Response. Partially nonconcur. Management stated that, in the case of the IPAO, such an independent funding source is in place because the Headquarter's budget provides funds for the IPAO. With respect to the SMO's, the Center Director is responsible for ensuring that the SMO budget is sufficient.

The complete text of management's comments is in Appendix E.

Evaluation of Management's Response. Management's comments are not fully responsive. Regarding the IPAO budget, we understand that the Centers have authority to transfer up to 10 percent of Center funds among programs without notifying Headquarters and that Headquarters may be unaware of these transfers until the end of the fiscal year. Because this situation has the potential to adversely affect the IPAO's ability to fulfill its mission, we believe that management should, as a minimum, require approval by the Chief Engineer's Office prior to any adjustment to the IPAO budget by the Centers. Such an action would satisfy the intent of the recommendation.

Further, delegating responsibility to the Center Director for ensuring SMO budget sufficiency without establishing minimum requirements provides Center Directors with a wide latitude in the priority placed on funding for the independent cost estimating function. This approach could result in an inconsistent capability among the Centers. Therefore, we maintain that an independent funding source is needed for the SMO's and request that management further review its position and provide additional comments in response to the final report.

Finding B. Independent Cost Estimates at Major Reviews

Management does not use independent cost estimates in the decisionmaking process at each major review of a program. Agency policy requires an independent cost estimate only for new starts while requiring life-cycle cost estimates at each major review. As a result, NASA has no assurance that the program life-cycle cost estimates, established at each major review, are realistic.

Life-Cycle Cost Estimates and Independent Cost Estimates for Major Acquisitions

OMB Circular A-109 requires an acquisition strategy for major system acquisitions. The Circular states that each agency acquiring major systems should estimate life-cycle costs at each major milestone and use independent cost estimates, where feasible, for comparison purposes. Summaries of this and other related regulations are in Appendix D.

NPG 7120.5A states that the NASA Chief Engineer is responsible for providing independent cost estimates for proposed new starts but also states that life-cycle cost management and accounting requires the program manager to develop life-cycle cost estimates in support of major reviews and budgetary submissions.

Independent Cost Estimates at Major Reviews

Successful program and project management requires accurate cost estimates. Management decisions regarding program approval and a program's requirements and configuration are heavily influenced by the expected cost of the program. However, early in the program, the requirements may not be well defined, and cost estimates may be based on technical generalizations and historical cost data that do not adequately capture the technology and potential cost of the proposed system.

As time passes, a program's technical definition will become more refined, and actual program cost data will become available. With this knowledge, the estimator can formulate more accurate cost estimates. For this reason, frequent updates of life-cycle cost estimates become important tools for management decisions. Because life-cycle cost estimates are prepared by the program office, independent cost estimates are essential for comparison to the life-cycle cost estimate so that management can determine whether the life-cycle cost estimates are realistic. A revision of NPG 7120.5A is necessary to ensure the development of independent cost estimates at each major review for comparison with the life-cycle cost estimates that are developed by the program office.

Conclusion

A major internal control for a life-cycle cost estimate or program office estimate is an independent cost estimate. The independent cost estimate serves as a check and balance and is unconstrained by the assumptions, methodologies, or biases inherent in program

office, life-cycle cost estimates. By comparing the program's estimated life-cycle cost estimate with the independent cost estimate, NASA management can determine whether the program or project life-cycle cost estimate is realistic.

Recommendations, Management's Response, and Evaluation of Response

3. The Chief Engineer's Office should revise NPG 7120.5A to require that an independent cost estimate be performed at all major reviews for programs and be compared with the life-cycle cost estimate developed at each major review.

Management's Response. Concur, with modifications. Management stated that NASA conducts cost assessments annually as part of the Independent Annual Review process. In addition, independent cost estimates are done during a nonadvocate review or independent assessment. Management also stated that it will institute a requirement for another independent cost estimate after the Critical Design Review.

The complete text of management's comments is in Appendix E.

Evaluation of Management's Response. The action planned by management is responsive to the recommendation. The recommendation is resolved but will remain undispositioned and open until agreed-to corrective actions are completed.

Finding C. NASA-Wide Cost Estimating Capability

The Agency has not established standardized skills and competencies for its cost analysts/estimators or Agency-wide processes and procedures for cost estimating and analysis. Management has not followed Federal guidelines to establish the cost estimating and analysis function as a specific general schedule⁵ (GS) job series⁶ with a clear definition of professional competencies. Further, management has no career development plans for NASA cost estimators/analysts. As a result, the quality of cost estimating and cost analysis support available to program/project offices is inconsistent among NASA Centers.

⁵ The general schedule is the broadest subdivision of the classification system covered by Title 5, U.S. Code. The general schedule includes a range of levels of difficulty and responsibility for positions for grades GS-1 to GS-15. "GS" designates the general schedule for supervisory and nonsupervisory positions at all of those grade levels.

⁶ A series is a subdivision of an occupational group consisting of positions similar as to a specialized line of work and qualification requirements. A title and number such as the Accounting Series, GS-510; the Secretary Series, GS-318; and the Microbiology Series, GS-403, designate series.

Federal and Agency Guidance

Title 5, U.S. Code, Sections 5105-5107, state that positions shall be classified based on the duties and responsibilities assigned and the qualifications required to do the work.

Title 5, U.S. Code, Section 4103, states that each agency shall establish, operate, maintain, and evaluate a program or programs and a plan or plans for the training of employees to assist in improving employee and organizational performance.

The GAO states in report GAO/GGD-99-179, "Human Capital, A Self-Assessment Checklist for Agency Leaders," that a high-performance organization demands a dynamic, results-oriented workforce ... must match the right people to the right jobs and ... talent must be continuously developed through education, training, and opportunities for continued growth.

Job Series Structure and Career Development Plans for NASA Cost Estimators

Identification of a specific job series and career development plans for cost estimators/analysts are essential for establishing a highly proficient cost estimating community within NASA.

- **Job Series.** The Agency has used several general schedule job series to identify its cost estimators and analysts. For example, the Agency has used the (1) GS 800: Engineering and Architecture series; (2) GS 300: General Administrative, Clerical, and Office Services series; and (3) GS 1500: Mathematics and Statistics series. While each of the position's descriptions provides some of the required skills and training, none fully addresses the requirements of a professional cost estimator or analyst. The result is a cost community whose entry-level members lack the full complement of skills and training needed to become competent cost estimators or analysts.

Currently, the IPAO is staffed with aerospace technologists and program analysts who manage and coordinate the activities of the independent annual review,⁷ independent assessment,⁸ and nonadvocate review⁹ teams. The planned cost estimating positions will fulfill a new function that is not being performed by the IPAO. The cost estimators will be developing independent cost estimates; providing advice and support to the Center SMO's; and providing economic analyses, cost-benefit studies, and full-cost accounting expertise and other services. Management needs to identify a single job series for the cost estimator/analyst positions. In our opinion, NASA's current practice of using more than one job series to identify cost estimators/analysts impedes the cost community from achieving the credibility and professional stature necessary to acquire recognition for their professionalism and unique value to NASA management.

⁷ An independent annual review informs the PMC of the status and performance of the programs and projects over which it has responsibility

⁸ An independent assessment provides the PMC with an in-depth, independent validation of the advanced concepts, program requirements, design integrity, realism of schedule, life-cycle, etc.

⁹ A nonadvocate review provides the NASA PMC an independent verification and evaluation of a new program or selected project's readiness to proceed prior to program approval.

- **Career Development Plans** . The Agency has no career development program or career progression plan for cost estimators and analysts. NASA cost estimators generally learn required skills they lack during on-the-job training. This could restrict new ideas and implementation of the most recent concepts and methodologies being researched and developed by the general cost community.

When the draft Memorandum of Understanding is approved, the IPAO plans to establish, as part of its expanded mission, Agency-wide quality control through the establishment of a career development plan and training for cost estimators. Plans are to identify requirements for courses and skills that will result in a professional cost community with a full complement of skills required for all cost estimators and cost analysts in NASA. The IPAO also plans to develop a standardized catalog of tools and to identify common skills for all cost estimators with the goal of increasing Agency efficiency through the elimination of duplication of efforts and competition among the Centers. As of the time of our review, plans were not sufficiently complete for us to determine whether all critical job skills and training requirements will be included in the career development plans.

Because of the diversity of skills needed by cost estimators and analysts, it is essential that the career development plans be sufficiently comprehensive to meet the needs of a diverse workforce of cost estimators and analysts. A well-qualified cost estimator must have skills and training in a variety of areas including, accounting, budgeting, engineering, statistics, mathematics, economics, program management, acquisition, and modeling. The GS 300, GS 800, or the GS 1500 job series do not provide candidates that have training or sufficient experience to meet all of these requirements. Using the GS 800 job series would provide candidates with expertise and background in mathematics, physics, and engineering. However, the GS 800 positions do not require training or background in program management, accounting, economics, statistics, acquisition, and/or the Government budgeting process. Cost estimators under the GS 1500 series, while having background and training in statistics, mathematics, and modeling, may not have the required training in the areas of finance or engineering. On the other hand, the GS 300 series would provide personnel with a background or training in budgeting and perhaps accounting, and other financial areas, but no training or experience in statistics, mathematics, and/or with the technical sciences.

Conclusion

Regardless of the job series the Agency identifies for cost estimators/analysts, the wide range of skills required for the cost estimating/analysis discipline will make it difficult for NASA to find individuals with all the desired characteristics. Hiring cost estimators who only partially meet the requirements means that they must learn the other required skills on-the-job or through a formal training program. For this reason, comprehensive and well-planned career development programs are crucial for the upgrading and improvement of skills for NASA's cost community. The planners need to include skills related to environmental costs, accounting, budgeting,

procurement, economics, program management, regression analysis¹⁰ and cost risk, as well as the technical, engineering, mathematical, and modeling skills, in career development plans.

Recommendations, Management's Response, and Evaluation of Response

The Chief Engineer should direct the Director of the Independent Program Assessment Office to:

4. Identify a general schedule job series that most closely provides the unique skills and training required for a professional cost estimator/analyst.

Management's Response. Nonconcur. Management stated that NASA's current practice of using more than one job series allows NASA to select the best-qualified candidates from the widest pool possible and that narrowing the pool to a specific job series would significantly reduce potential candidates.

5. Identify and develop core training requirements consisting of all the skills and training required for cost estimators Agency-wide.

Management's Response. Concur. Management stated that an inter-Center Cost Estimating Steering Group has been established to address this recommendation in the near future.

The complete text of management's comments is in Appendix E.

Evaluation of Management's Response. We do not agree with NASA's position regarding the use of more than one job series for cost estimators and maintain that there is a legitimate need to identify a specific series so that, once skills are learned, they are more likely to be retained in the cost community. In a November 18, 1999, briefing to management on its proposed role as lead center for cost estimating/analysis, the IPAO (1) noted that NASA's cost estimating staff had experienced more than a 40-percent attrition rate since the Headquarters Systems and Cost Analysis Division was first established; (2) stated that one objective of the lead center would be to establish cost estimating as a serious professional career discipline at NASA; and (3) observed that NASA's current culture in cost estimating and analysis is the "non-professional 'journeyman' cost analyst."

We maintain that to achieve the IPAO's stated objective and overcome the noted challenges, a specific job series for cost estimators is essential. Aerospace technologists and program analysts do not enter cost estimating/analysis positions possessing all the skills necessary to be a competent cost estimator or analyst. Rather, they acquire those skills over time through on-the-job experience or training. To become a highly skilled cost estimator/analyst requires years of experience and commitment to the cost estimating/analysis profession. Using various job series enables personnel to easily enter and leave the cost estimating/analyst arena and go on to other

¹⁰ Regression analysis is the part of statistics that deals with investigation of the relationship between two or more variables whose relationship may be expressed as a mathematical equation.

(aerospace technologist and program analyst) positions. As a result, the skills that they have acquired as cost estimators are lost to the Agency's cost community. This cross-over flexibility that currently exists makes it more difficult for management to establish a stable cost estimating community whose members remain in the cost estimating/analysis arena long enough to mature as cost analysts and to become increasingly more competent. Stability in the cost estimating/analysis workforce is essential to overcoming NASA's current culture of the nonprofessional journeyman cost analyst, lowering the attrition rate, and establishing cost estimating and analysis as a professional career discipline.

Further, we maintain that if basic skills are identified and a job series is selected based on the basic skills required, personnel in other job series, such as the 343 or 801 series, could qualify for the job if they possessed the basic skills.

A stable, committed, and increasingly experienced workforce of cost estimators is required if NASA wants to view and establish cost estimating as a serious professional discipline. Therefore, we consider management's comments unresponsive and the recommendation as unresolved and undispositioned. We request that management further review its position on recommendation 4 and provide additional comments on the final report.

Management's planned action in relation to the established inter-Center Cost Estimating Steering Group is responsive to recommendation 5. The recommendation is resolved but will remain undispositioned and open until agreed-to corrective actions are completed.

Appendix A. Objectives, Scope, and Methodology

Objectives

Our overall objective was to assess NASA's current and planned processes for preparation and use of independent cost estimates. Specifically, we evaluated:

- planned staffing to support NASA's independent cost estimating function,
- the qualification requirements for cost estimators/analysts,
- career development program and training planned for the cost analysts/estimators, and
- adequacy of planned independent cost estimating support for NASA decision-makers.

Scope and Methodology

To accomplish our objectives, we obtained an overall understanding of the mission, processes, and procedures in place for the function of the IPAO. We also reviewed IPAO workload, fiscal year 2000 schedule, and ongoing plans to enhance the IPAO cost estimating capability. We performed interviews of:

- personnel in the Independent Program Assessment Office at Langley Research Center and
- Headquarters CFO personnel.

We identified and reviewed the following relevant Federal and NASA regulations on independent cost estimating, personnel management and training, and internal controls:

- OMB Circular A-11, "Preparing and Submitting Budget Estimates," July 1999.
- Supplement to OMB Circular A-11, Part III, "Planning, Budgeting, and Acquisition of Capital Assets," July 1999.
- OMB Circular A-109, "Major System Acquisition," April 1976.
- OMB Circular A-123, "Management Accountability and Control," June 1995.
- Office of Personnel Management Operating Manual, undated.
- Title 5, U.S. Code, Chapter 41, "Training," January 1999.
- NPG 7120.5A, "NASA Program and Project Management Processes and Requirements," 1998.

We reviewed prior related studies, assessments, and audits.

- GAO/AIMD-97-20, "Air Traffic Control," 1997.
- GAO/AIMD-00-21.3.1, "Standards for Internal Control in the Government," 2000.
- GAO/GGD-00-28, "Human Capital," 2000.
- "Report of the Advisory Committee on the Future of the U.S. Space Program," December 1990.
- NASA OIG, "Assessment of the Relocation of NASA Independent Program Evaluation and Assessment Activities to Langley," July 1996.

Appendix A

Management Controls Reviewed

We reviewed the following management controls relative to NASA oversight of the cost estimating function:

- NPG 7120.5A, "NASA Program and Project Management Processes and Requirements," April 3, 1998
- NASA Policy Directive 1000.1a, "NASA Strategic Plan," 1998.
- NASA Performance Plans for Fiscal Year 2000.
- NASA Strategic Management Handbook (NPG 1000.2), February 2000

Field Work

We conducted field work from December 1999 through April 2000 at NASA Headquarters and Langley.

Prior Audit Coverage

General Accounting office

"NASA's Independent Cost Estimate," November 1992. GAO issued this report in response to a congressional request for the GAO to determine whether NASA had implemented an advisory committee's recommendation to strengthen NASA's independent cost estimating capability because Congress and the executive branch need accurate cost estimates in deciding whether to undertake or continue space programs. The GAO found that NASA's actions to implement an independent cost estimating function did not meet the intent of the Advisory Committee's recommendation because:

- results of formal cost reviews were reported to program officials rather than directly to the Administrator,
- advice provided to the Administrator on cost estimates was informal and undocumented,
- cost estimates were reviewed only at the start of new initiatives and not at all major decision points over a program's life, and
- the cost analysis group did not have adequate staff to perform independent estimates at all major decision points.

Appendix B. Centers' Proposed Independent Cost Capability

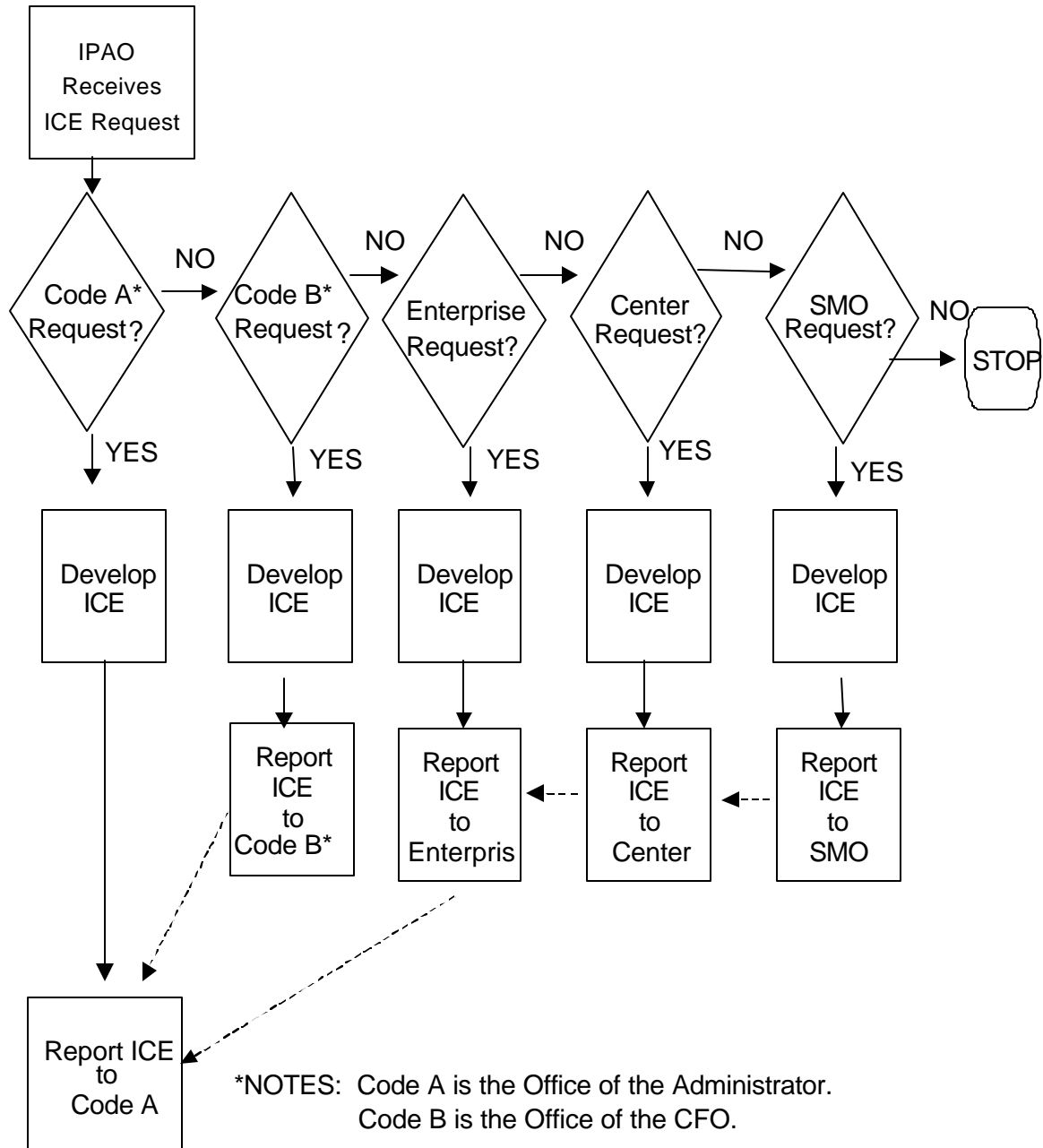
** Information omitted under authority of exemption (b) (5) of the Freedom of Information Act.**

Appendix B

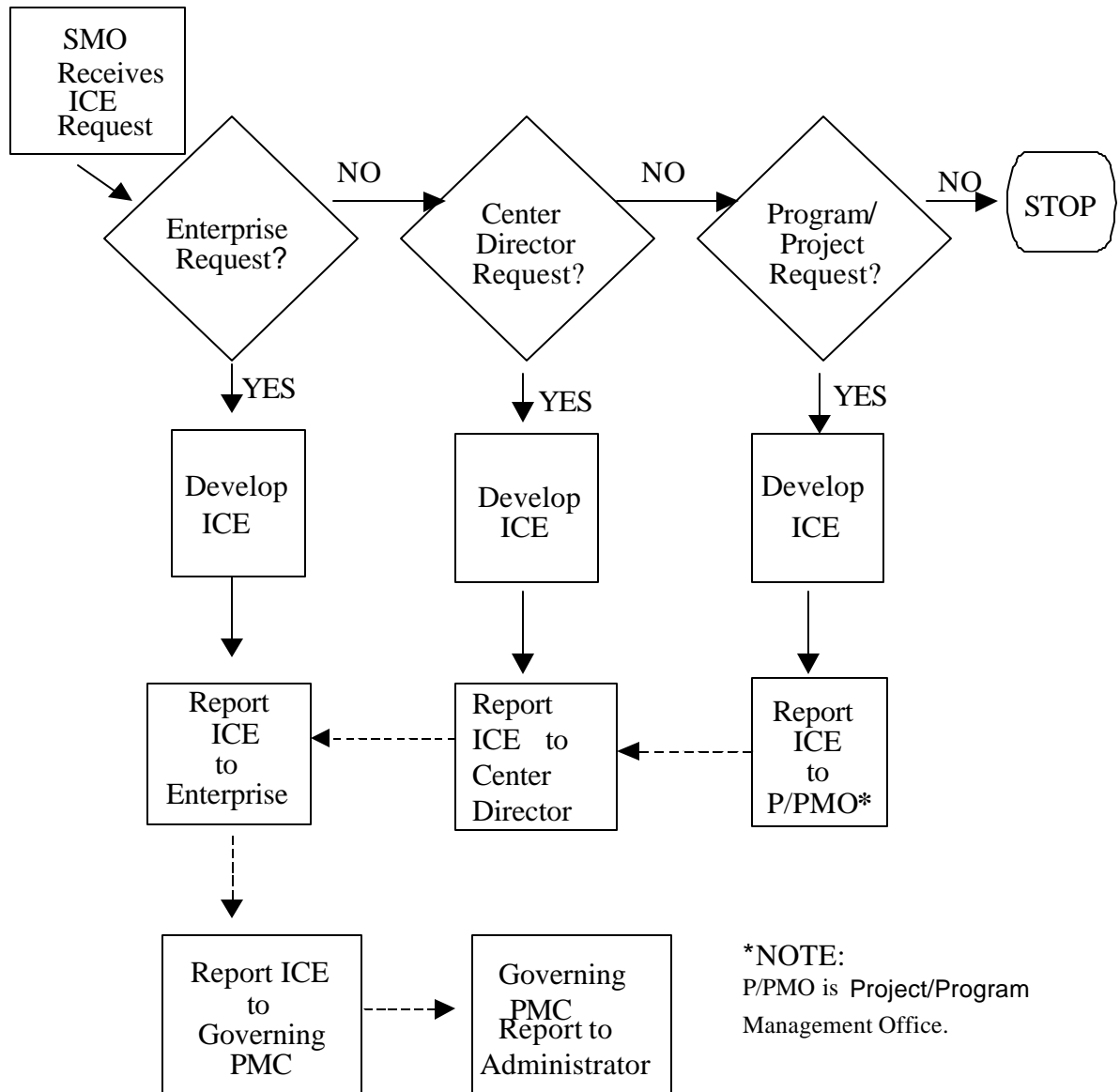
****Information omitted under authority of exemption (b) (5) of the Freedom of Information Act.****

Appendix C. Reporting Structure for Independent Cost Estimates

Reporting Structure for IPAO Independent Cost Estimate (ICE)



Reporting Structure for SMO Independent Cost Estimate (ICE)



Appendix D. Related Requirements Documents

A. OMB Circular A-11, Part III, "Planning, Budgeting, and Acquisition of Capital Assets," July 1999.

Page 535, paragraph 300.4 (d)(1), states:

Cost and Schedule goals.—The baseline cost and schedule goals should be realistic projections, developed through the capital planning process, of the total cost and total time to complete the project and include interim cost and schedule goals.

Page 537, paragraph 300.5 (a), states:

Background. Good budgeting requires that appropriations for the full costs of asset acquisition be enacted in advance to help ensure that all costs and benefits are fully taken into account when decisions are made about providing resources. For most spending on acquisitions, this rule is followed throughout the Government. When capital assets are funded in increments, without certainty if or when future funding will be available, it can and occasionally does result in poor planning, acquisition of assets not fully justified, higher acquisition costs, project delays, the cancellation of major projects, the loss of sunk costs, or inadequate funding to maintain and operate the assets.

Page 538, paragraph 300.7. Criteria and coverage of exhibit 300B: "Capital Asset Plan and Justification," states:

- (a) *Criteria.* Exhibit 300B covers major acquisitions, which are those requiring special management attention because of their (1) importance to the agency's mission; (2) high development, operating, or maintenance costs; (3) high risk; (4) high return; or (5) their significant role in the administration of agency programs, finances, property, or other resources.
- (b) *Coverage for this year.* Report on all major acquisitions, including major acquisitions of financial management systems and other information technology.
- (c) *Future years.* You should develop capital plans for all acquisitions, not just the major acquisitions covered by the criteria in (a).

Page 539, paragraph 300.8. Information required: explanation of exhibit 300B: "Capital Asset Plan and Justification," states:

For each asset identified pursuant to section 300.7 (b), you are required to include with your initial budget submission the information on capital assets shown in exhibit 300B: "Capital Asset plan and Justification."

Pages 540-542, paragraph 300.8, Exhibit 300B, Part II, identifies the justification and other information required:

- A. Justification
- B. Program management

Appendix D

- C. Acquisition strategy
- D. Financial basis for selecting the project
- E. Adherence to architecture and infrastructure standards (IT projects only)

Pages 542-544, paragraph 300.8, Exhibit 300B, Part III, identifies the required information for the program's cost, schedule, and performance goals:

Your Agency's plans must have cost, schedule, and performance goals for all proposed and ongoing acquisitions. The establishment and analysis of these goals should include a risk assessment that discusses the probability of achieving them. Once established, current baseline will be used to determine whether the acquisition is meeting Congressional policy to achieve at least 90 percent of cost, schedule, and performance goals.

Your planning process is expected to produce acquisition plans that have a high probability of successfully achieving goals. You should establish appropriate controls to ensure that capital asset acquisitions that are underway are within baseline cost, on schedule, and expected to meet the baseline performance levels.

Complete the following information, entries (A) through (F), for each contract that comprises the acquisition.

- A. Description of performance-based system
- B. Original baseline
- C. Current baseline
- D. Variance from current baseline
- E. Latest Revised estimate
- F. Corrective Actions

B. OMB Circular A-109

Page 5, paragraph 7, Major system acquisition management objectives include:

- f. Tailor an acquisition strategy for each program. ...The strategy could typically include: ...
 - Methods for projecting life cycle costs...
 - Methods for analyzing and evaluating contractor and Government risks.
- g. Maintain a capability to:
 - Predict, review, assess, negotiate and monitor costs for system development, engineering, design, demonstration, test, production, operation and support (i.e., life cycle costs).
 - Assess acquisition cost, schedule and performance experience against predictions, and provide such assessments for consideration by the agency head at key decision points.
 - Make new assessments where significant costs, schedule or performance variances occur.
 - Estimate life cycle costs during system design concept evaluation and selection, full-scale development, facility conversion, and production, to ensure appropriate trade-offs among investment costs, ownership costs, schedules, and performance.
 - Use independent cost estimates, where feasible, for comparison purposes.

C. NPG 7120.5A

Page 88, Appendix D, "Responsibilities for Program and Project Management," paragraph D.1 (e), states:

The NASA Chief Engineer is responsible for the following:

- (1) Serving as the process owner for the PAPAC process, including development and maintenance of this document.
- (2) Providing ICE's [Independent Cost Estimates] for proposed new starts.
- (3) Providing for the IAR's [Independent Annual Reviews], NAR's [Non-Advocate Reviews], and IA's [Independent Assessments].

Page 59, Chapter 4, "Program/Project Management System Requirements," paragraph 4.1.2.2, states:

[Life Cycle Cost] LCC estimates shall be prepared in support of the following:

- (1) The development of program commitment
- (2) Major reviews
- (3) Budgetary submissions.

D. NHB 1101.3, "The NASA Organization."

Paragraph 4.2.2, "Responsibilities."

The CFO is responsible for the following:

- 4.2.2.3 Performs economic and cost analyses for Agency assessments of program alternatives.

Appendix E. Management's Response

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



Report # A0001600

B

AUG 14 2007

TO: W/Assistant Inspector General of Auditing

FROM: B/Chief Financial Officer

SUBJECT: NASA Response to Office of Inspector General Report A0001600
on NASA's Independent Cost Estimating Capability

Thank you for providing the Agency with an opportunity to respond to your review report on NASA's independent cost estimating capability. Several of the points made in your report have been a concern to NASA for some time. The NASA lead office for cost estimating and analysis, recently established within the Independent Program Assessment Office (IPAO) at the Langley Research Center (LaRC), was specifically created to address these, as well as other cost estimating issues. An Agencywide steering group is now functioning to ensure that Agency positions (some of which address the same concerns as in your report) are discussed, communicated and consistently enacted at all NASA Centers. This steering group will consider such issues as enhancing the professionalism of cost estimators, developing career paths, establishing training criteria and opportunities, as well as the expected issues surrounding model and database development.

We disagree with the premise that the independence of the results of cost estimates may be less assured because the budgets for the independent review organizations are included within the Center budgets. We also take issue with the concern that the findings could be tainted because the Center and Associate Administrator level management are briefed on the findings and given an opportunity to comment. These managers are accountable to the NASA Administrator, and the defined reporting structures should not be bypassed. This does not imply that the accountable officials have the latitude to suppress the findings of independent review teams. Nor are any suggested changes to the findings tolerated unless the review team determines they are meritorious. We know of no instances where this has occurred. And, we can assure you that any attempts in this direction would be a very serious matter.

We would also note, that the decision to provide for an increase in FTEs for the cost estimating function located at LaRC was independently determined by this office in consultation with the Administrator. The Director of LaRC does not have the latitude to

reallocate these FTEs for any other purpose. We believe this meets the intent to assure independence of this function.

With regard to the timing of the independent cost estimates, we believe an annual review process on all major programs in the Agency is an appropriate arrangement. However, we will consider the OIG recommendation to generate an independent cost estimate after major milestones. We believe there are two milestones – the preliminary design review and the critical design review – where an independent cost estimate requirement would be meritorious. This would enable the design changes to the program/project baseline configuration to be taken into account. We already require an independent cost estimate to be presented to the Agency Program Management Council (PMC) for all programs seeking the PMC's approval to move from their formulation to implementation phase. This authority to proceed is based on successful completion of the NAR or IAR, generally shortly after the preliminary design review. Performing life cycle parametric cost estimates after the critical design review would be conducted, only if there is a major rebaselining of the content of the program.

Inspector General for NASA Recommendations for Corrective Action:

Recommendation 1. The NASA CFO should direct that, for NASA programs governed by NPG 7120.5A, the IPAO and SMO submit a summary of each independent cost estimate directly to the Administrator or other approving official for the program or project.

Partially Non-concur: The SMO's have a Center level review function. Their reporting process is a function of each Center's procedures. In general, at the NASA Center approval level, independent cost positions are presented to the approval official at the Center. Agency level reviews are the purview of the IPAO, which reports to the Office of the Administrator through the Agency Program Management Council (PMC) chaired by the Associate Deputy Administrator. This is a multistep activity as defined in the IPAO ISO process.

- 1) Independent estimates are transmitted to all NASA senior management including the Administrator via LIVELINK on the Internet. Two key offices reporting directly to the Administrator, namely the Chief Engineer and the CFO, review these estimates. As such, the IPAO independent estimates are directly and readily available to the Administrator.
- 2) At PMC meetings, the IPAO report is presented to NASA senior management including the Associate Deputy Administrator.
- 3) The Associate Deputy Administrator approves and signs the minutes of PMC meeting that go forward to the Administrator.

The process assures the Administrator is provided with a complete and accurate record of the PMC proceedings, including disclosure of the IPAO's independent cost estimate.

Recommendation 2. The NASA CFO should establish an independent funding source for all independent cost estimating activities by the IPAO and the SMO's.

Partially Non-concur: In the case of the IPAO, such an independent funding source is in place. The Headquarters budget provides funds for the IPAO. The IPAO does not compete with Langley Research Center programs and functions for resource, nor does it compete within the Code R Enterprise for resources.

With respect to the SMO's, we would note that the creation of the SMO's was directed by the NASA Administrator. Each SMO is to provide the Center Director with an independent assessment capability. The Center Director is responsible for ensuring that SMO budget is sufficient.

Recommendation 3: The Chief Engineer's Office should revise NPG 7120.5A to require that an independent cost estimate be performed at all major reviews for programs, and be compared with the life cycle cost estimate developed at each major review.

Concur, with modifications: NASA conducts cost assessments annually as part of the Independent Annual Review (IAR) process. The Provide Aerospace Products And Capabilities (PAPAC) process for the management of NASA programs and projects, also requires that the Independent Cost Estimate (ICE) be done during a NonAdvocate Review (NAR) or Independent Assessment (IA). The result of the ICE is presented to the PMC at the Approval Review when a program proposes moving from the Formulation Phase to the Implementation Phase. In response to the recommendation, we will institute a requirement for another ICE after the Critical Design Review.

Recommendation 4: The Chief Engineer should direct the Director of the Independent Program Assessment Office to identify a general schedule job series that most closely provides the unique skills and training required for a professional cost estimator/analyst.


Non-concur: The report's conclusion that "The result (of multiple job series) is a cost community whose members lack the full complement of skills and training needed to be highly competent cost estimators and analysts" has no basis in fact. Because an estimator is in one specific job series does not preclude the estimator from acquiring, or having acquired, the skills needed to be a well rounded, competent estimator. There is little merit to limiting the pool of potential candidates through narrowly defining the job series other than a small gain through simplified training planning. The OIG assertion that the NASA's current practice of using more than one job series impedes the cost community is in fact just the opposite. It allows NASA to select the best-qualified candidates from the widest pool possible. Such a narrowing would significantly reduce

potential candidates. If NASA selected an AST job series, all nontechnical degreed persons would be excluded, regardless of their qualifications and experience. If we selected a nontechnical degree series, then AST's would be hesitant to apply because of the loss of their AST rating and subsequent loss of ability to apply for AST positions without getting requalified in the future.


Recommendation 5: The Chief Engineer should direct the Director of the Independent Program Assessment Office to identify, and develop core training requirements consisting of all the skills and training required for cost estimators Agencywide.

Concur: An inter-Center Cost Estimating Steering Group has been established with representation from the Centers. The steering group plans to address this recommendation in the near future. In addition, the inter-Governmental Agency Consortium on Space Technology Estimating and Research (CoSTER) is also planning to examine this issue, but encompassing concerns of NASA, DoD (USAF, USN and USA), CIA and NRO as well.

Concurrence:


W. Brian Keegan _____
Chief Engineer Date

Approval:


Arnold G. Holz _____
Chief Financial Officer Date

Appendix F. Report Distribution

National Aeronautics and Space Administration (NASA) Headquarters

A/Administrator
AI/Associate Deputy Administrator
AE/Chief Engineer
B/Chief Financial Officer
B/Comptroller
BF/Director, Financial Management Division
G/General Counsel
H/Associate Administrator for Procurement
HK/Director, Contract Management Division
HS/Director, Program Operations Division
J/Associate Administrator for Management Systems
JM/Acting Director, Management Assessment Division
L/Associate Administrator for Legislative Affairs
M/Associate Administrator for Space Flight
R/Associate Administrator for Aerospace Technology
S/Associate Administrator for Space Science
Y/Associate Administrator for Earth Science

NASA Centers

Director, Ames Research Center
Director, Dryden Flight Research Center
Director, John H. Glenn Research Center at Lewis Field
Director, Goddard Space Flight Center
Director, Jet Propulsion Laboratory
Director, Lyndon B. Johnson Space Center
Director, John F. Kennedy Space Center
Director, Langley Research Center
Director, George C. Marshall Space Flight Center
Director, John C. Stennis Space Center
Chief Counsel, Kennedy Space Center

Non-NASA Federal Organizations and Individuals

Assistant to the President for Science and Technology Policy
Deputy Associate Director, Energy and Science Division, Office of Management and Budget

Appendix F

Non-NASA Federal Organizations and Individuals (Cont.)

Branch Chief, Science and Space Programs Branch, Energy and Science Division, Office of Management and Budget

Associate Director, National Security and International Affairs Division, Defense Acquisitions Issues, General Accounting Office

Professional Assistant, Senate Subcommittee on Science, Technology, and Space

Chairman and Ranking Minority Member – Congressional Committees and Subcommittees

Senate Committee on Appropriations

Senate Subcommittee on VA, HUD, and Independent Agencies

Senate Committee on Commerce, Science, and Transportation

Senate Subcommittee on Science, Technology, and Space

Senate Committee on Governmental Affairs

House Committee on Appropriations

House Subcommittee on VA, HUD, and Independent Agencies

House Committee on Government Reform

House Subcommittee on Government Management, Information, and Technology

House Subcommittee on National Security, Veterans Affairs, and International Relations

House Committee on Science

House Subcommittee on Space and Aeronautics

Congressional Member

Honorable Pete Sessions, U.S. House of Representatives

NASA Assistant Inspector General for Auditing Reader Survey

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Report Title: Review of NASA's Independent Cost Estimating Capability

Report Number: _____ **Report Date:** _____

Circle the appropriate rating for the following statements.

	Strongly Agree	Agree	Neutra l	Disagre e	Strongl y Disagre e	N/A
1. The report was clear, readable, and logically organized.	5	4	3	2	1	N/A
2. The report was concise and to the point.	5	4	3	2	1	N/A
3. We effectively communicated the audit objectives, scope, and methodology.	5	4	3	2	1	N/A
4. The report contained sufficient information to support the finding(s) in a balanced and objective manner.	5	4	3	2	1	N/A

Overall, how would you rate the report?

Excellent Fair
 Very Good Poor
 Good

If you have any additional comments or wish to elaborate on any of the above responses, please write them here. Use additional paper if necessary. _____

How did you use the report? _____

How could we improve our report? _____

How would you identify yourself? (Select one)

Congressional Staff	Media
NASA Employee	Public Interest
Private Citizen	Other: _____
Government: _____	Federal: _____ State: _____ Local: _____

May we contact you about your comments?

Yes: _____ **No:** _____
Name: _____
Telephone: _____

Thank you for your cooperation in completing this survey.

Major Contributors to the Report

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