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

OCT 3 1996

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TO: AD/Acting Deputy Administrator

FROM: W/Inspector General

SUBJECT: NASA System Analysis/Program Evaluation and Independent Assessment Program

I received a briefing on the planned restructuring of the subject function on September 30, 1996. Dr. Daniel Mulville, Chief Engineer, Mr. Keith Hudkins, Senior Engineer, Office of Space Flight, and Mr. William Piland, Chief Engineer, Langley Research Center (LaRC), presented the current status of planning and discussed the proposed implementation of changes within the Chief Engineer's office and at LaRC.

We agree with the current plans to supplement the Langley staff which has a strong foundation in Pre-Phase A and Phase A assessment and evaluation, with experienced cost estimation professionals and by team members from other NASA Centers. We also concur with the commitment to develop Langley's staff capabilities to include Phase B and Phase C/D analyses in order to assure comprehensive understanding of life cycle program and cost management.

We still have two main areas of concern. First, we remain convinced that the lead NASA official resident at LaRC who is responsible for independent assessments and program evaluations should report directly to the Program Management Council (PMC) and the NASA Chief Engineer and not through the LaRC Director and LaRC Chief Engineer. That official should be designated a Headquarters employee, resident at LaRC. Steps should be taken to make this reporting and accountability channel clear (including employees performance evaluation).

Second, we recommend that you as Chairman of the PMC maintain at Headquarters a small but experienced cadre of program evaluation and cost estimation professionals to assist you and the Administrator in managing systems and programs from the fiscal, technical and political perspectives

of the Washington, DC, environment (e.g., cognizant of Congressional, OMB, GAO and advisory group concerns). We still think it vital to NASA's mission that strong Headquarters capabilities be maintained and resident in this area.

We will continue to monitor the implementation of these changes and offer our assessment of the organizational and process changes at periodic intervals.

Roberta L. Gross

cc:
AE/D. Mulville
E. Huckins
B/A. Holz
M. Peterson
LaRC/J. Creedon
W. Piland

National Aeronautics and
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Headquarters
Washington, DC 20546-0001

JUL - 9 1996

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TO: AD/Acting Deputy Administrator

FROM: W/Inspector General

SUBJECT: NASA Independent Assessment and Cost Estimation Relocation

Enclosed is the Office of Inspector General, Inspections and Assessment report on the proposed relocation of the subject function from Headquarters to the Langley Research Center. The report expresses our concerns regarding the current plan.

I am available to discuss the report and its recommendations at your earliest convenience.

Roberta L. Gross

Enclosure

cc:
AE/Dr. Mulville
B/Mr. Peterson
LaRC/Mr. Holloway

NASA Office of Inspector General
Inspections & Assessments

Assessment of the Relocation of NASA Independent Program Evaluation & Assessment Activities to LaRC

July 8, 1996

ASSESSMENT ACTIVITY: Transfer of Agency Independent Program Evaluation and Assessment to Langley Research Center

CURRENT STATUS:

This report deals with the organizational location of NASA's systems concept and analysis, and program cost estimation processes. The ***systems concept and analysis*** function can be generally defined as the structured review of programmatic or project requirements and benefits. Program and project ***cost estimation*** can be defined as the method used to approximate the potential and/or contingent costs of initiating, continuing, or changing the components of a project or program. These two processes have been combined with other key elements to define NASA program/project planning as a structured approach that integrates engineering, operational, schedule, procurement, and risk factors with Agency affordability and strategic planning.

The subject function, in part, resides in the existing Systems & Cost Analysis Division, Office of Chief Financial Officer (Code BC). The Division currently includes twelve full-time permanent civil servants and is to be reduced to a level of four employees as part of the NASA Headquarters downsizing activity. The staff is headed by an ES-2 and also includes three GS-15, six GS-14, one GS-10 Program Support Assistant and one GS-8 Secretary. The professional analysis positions are filled with Aerospace Technology (AST) - Technical Resources Management, Program Analysis, Management Analysis, and Operations Research Analyst specialities. Code BC is currently responsible for a broad range of analytic and administrative functions including independent cost estimating, analyses, special support tasks and studies, and administrative support activities.

Currently, five "billets" are to be transferred from Headquarters to the Langley Research Center (LaRC) for recruitment at the GS-14 and GS-15 levels. Position descriptions have been drafted by the Director, Systems & Cost Analysis Division and transmitted to the LaRC Chief Engineer, who has an action to develop and staff the subject function. Final reporting channels and organizational structure have not yet been established. However, interviews of staff in the Office of Chief Engineer and the Office of Chief Financial Officer have indicated that three officials will manage the LaRC independent assessment function: AE/Chief Engineer, B/Comptroller, and the Langley Center Director.

At the Langley Research Center, four organizational entities perform functions in the areas of systems analysis and cost estimation, the LaRC Chief Engineer, BA/Aeronautics Systems Analysis Division, CB/Space Systems & Concepts Division, and J/Hypersonic Vehicles Office. These last three units generally perform Phase A and Pre-Phase A analyses.

The Aeronautics Systems Analysis Division reports to the Director of the Aeronautics Program Group. The Division consists of 45 civil servants and includes two subordinate branches staffed with a wide specialty range of engineering professionals. The organization is responsible for

carrying out multidisciplinary system studies of advanced aeronautical vehicles and the integrated air traffic system.

The Space Systems & Concepts Division reports to the Director of the Space and Atmospheric Sciences Program Group. The Division consists of 61 civil servants and includes three subordinate branches. The staff includes engineering professionals drawn from several specialty fields. The organization is responsible for research in the areas of systems analysis of advanced transportation vehicles, advanced spacecraft, and instrument analysis of advanced remote sensors.

The Hypersonic Vehicles Office reports directly to the Center Director. The staff includes 16 civil servants and two subordinate units: Systems Analysis Office and Numerical Applications Office. The organization is responsible for all of the joint NASA/Air Force Hypersonic Systems Technology Program (HySTP) technical activity in NASA, as a part of LaRC's role as the Lead Center for HySTP.

BACKGROUND:

The issue of NASA's ability to accurately plan for, initiate, and estimate costs of new and ongoing programs and projects has a long history. More recently, as highlighted and facilitated by the Report of the Advisory Committee on the Future of the U.S. Space Program, December 1990, (Augustine Report), NASA has attempted to assure more effectiveness and credibility in technical and cost estimates in a number of ways, as described below.

The Agency's principal application of the Augustine Report recommendations is the ***Program Management Council (PMC)***, chaired by the Deputy Administrator. The PMC chairperson selects a chairperson for ***Non-Advocate Reviews (NAR)*** of proposed new programs. The PMC then receives team recommendations as to the status of the program's readiness to proceed to the next stage of either definition or development. Additionally, the PMC receives the results of ***Independent Annual Reviews (IAR)*** commissioned by the NASA Comptroller. In both processes, membership of teams is drawn from programs and organizations outside the subject of the PMC program review. Theoretically, the Administrator and his senior staff, through the PMC, receive evaluation from a group with no stake in the outcome of the presented program. Obviously, independence and impartiality play a key role in the actual and perceived credibility of the PMC process, within and outside NASA.

These concerns for independence, impartiality, and technical credibility were at the heart of both the Augustine Report recommendations and a 1992 General Accounting Office review of subsequent NASA implementation:

> *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.*

Because associate administrators are responsible for particular programs and compete with other associate administrators for limited agency resources, they may be viewed as program advocates.

- General Accounting Office,
SPACE PROGRAMS: NASA's Independent Cost Estimating Capability Needs Improvement, November 1992 (GAO/NSIAD-93-73)

. . . a Systems Concepts and Analysis Group [should] be formed in the NASA headquarters to serve the Administrator. This group would consist of a small, elite civil service staff supplemented by a new or existing Federally Funded Research and Development Center (FFRDC).

. . . an independent cost analysis group [should] 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. Their cost estimating procedures should include contingency analysis techniques.

-Report of the Advisory Committee
on the Future of the U.S. Space Program, December 1990

The Augustine Report actually sized both proposed units: "*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. . . top-notch specialized personnel will be required, perhaps 20 in number. . .*". The Report also suggested a staffing level for a systems analysis unit "*of perhaps some 30 highly qualified individuals.*"

ISSUES and DISCUSSION:

Although NASA has reorganized and instituted a new "strategic structure" (e.g., enterprises, centers of excellence), the requirements for impartial and unbiased analysis still remain. The placement of the function at or under a program official (e.g., enterprise manager or center director) places the unit's independence and impartiality at risk.

Moreover, accessibility of the unit's analysts to both top management officials and key project and program staff at both Headquarters and in the field is a key issue and fundamental to the unit's success. Placement of staff at one particular field site may hinder such necessary access. A staff located at NASA Headquarters and/or reporting to an official at NASA Headquarters will have the necessary aegis to organize and conduct necessary analyses. Additionally, a "core" staff

located in Washington, DC would have ready access to key counterparts at the Office of Management and Budget, Office of Science and Technology Policy, the General Accounting Office, the Department of Defense, and other Federal agency partners.

In addition, every NASA Center, including the Langley Research Center (LaRC) receives funding from some enterprise source. In such a fiscal environment, true independence and impartiality require that the function reside with officials without any stake in the competition for finite and dwindling program funding. Officials such as the NASA Chief Engineer, the NASA Chief Financial Officer, or the NASA Comptroller qualify unlike enterprise heads, program officials, center directors and those subordinate to such officials.

The physical movement of analysis functions from Headquarters to the field may be regarded as a retreat from long-standing commitments to build and sustain independent and impartial evaluation and costing functions. Additionally, confusion as to whom the staff reports or under whose authority they act, will leave the process vulnerable to charges of bias.

CONCLUSION:

1. NASA has not implemented the recommendations of the 1990 Report of the Advisory Committee on the Future of the U.S. Space Program (Augustine Report) regarding the establishment of a "Systems Concepts and Analysis Group" at NASA Headquarters staffed with "some 30 highly qualified individuals". It also has not fully implemented the recommendations of the Augustine Report regarding the establishment of an "independent cost analysis group" sized with a staff of "20 in number".

2. Although significant progress has been made in establishing and enhancing the NASA Program Management Council process, NASA has not fully implemented the findings and recommendations of the 1992 General Accounting Office report on "NASA's Independent Cost Estimating Capability Needs Improvement" regarding the need for a strong and vigorous independent cost estimating function.

3. NASA's proposal and plans to enhance the cost estimation and systems analysis capabilities of four distinct organizational entities at the Langley Research Center is not yet fully defined. Proposed staff and organizational responsibilities at LaRC are not yet clear, reporting and supervisory channels are not yet established, and the formal and informal relationships of the Langley staff to the Chair of the NASA Program Management Council, Chief Financial Officer, Comptroller, NASA Chief Engineer, Langley Center Director, and Langley Chief Engineer are not defined. Although the LaRC Chief Engineer intends to play a coordination role with regard to team analyses (i.e., intercenter, multiprogram, interdisciplinary), the roles and interaction of NASA centers is not yet fully defined.

4. The issue of independence and impartiality of technical assessment and cost estimation may be jeopardized with an undefined relocation to a subordinate field center. Even though the Langley Research Center is not likely to host a major technical program, the Center receives, as do all NASA field installations, funding from NASA enterprises and program managers. Moreover, the three existing "systems analysis" units operating at LaRC are explicitly linked to major programs and clearly identifiable enterprises.

5. Specifically, with regard to a relocation to Langley, needed enhancements to staff capability in systems analysis and cost estimation are not yet fully defined. The proposed migration of five (5) full-time equivalents from the Office of Chief Financial Officer, and subsequent recruitment for a duty station at Langley and organizational placement in the LaRC Chief Engineer's office will strengthen the capability, but may not be sufficient to provide adequate coverage for agencywide cost estimation functions. In addition, systems analysis staff at LaRC are most familiar with Phase A activity and not as familiar with subsequent stages of project life cycles.

RECOMMENDATIONS:

1. Select a single Headquarters organizational placement for the function to obviate the actual or perceived impairments to independence and impartiality. For example,

- Realign the function with and establish a division within AE/Office of Chief Engineer.
- Establish an office, headed by a Director, reporting to the Deputy Administrator in his role as Chair of the Program Management Council.
- Realign the function with and establish a division within Z/Office of Policy and Plans (A synergistic capability could be developed in consolidating NASA program performance, strategic planning, systems concept and analysis, and cost estimation activities).
- Continue placement within B/Office of the Chief Financial Officer.

2. Staff the function as follows: retain a small (i.e., seven to ten professionals) core staff at NASA Headquarters capable of managing and overseeing independent concepts and systems analysis and cost estimation. Fully utilize the systems analysis capabilities of the Langley Research Center for NASA-wide application by establishing a single organizational entity within the Center. This staff should be considered Headquarters staff, located at Langley.

3. Enhance LaRC staff capabilities in systems analysis and cost estimation beyond Phase A activities. The planned realignment of five Headquarters staffyears to Langley to accommodate the selection of cost estimation professionals should not proceed.