

NASA Advisory Council  
National Aeronautics and Space Administration  
Washington, DC 20546

September 29, 2000

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Mr. Daniel S. Goldin  
Administrator  
National Aeronautics and  
Space Administration  
Washington, DC 20546

Dear Mr. Goldin:

We had a very substantive meeting at Ames Research Center in Mountain View, California on September 12-13, 2000. The Council was pleased with the quality of presentations and would like to thank Ames Research Center and its Director, Dr. Harry McDonald, for hosting the Council. Dr. McDonald explained several of the new innovative technologies being developed including intelligent, evolvable, and adaptive systems. He provided great detail on the workforce challenges facing the Center and provided insightful ideas on how to resolve this problem, including the use the Intergovernmental Personnel Act (IPA). During our tour of Ames, we were able to see a wonderful facility - Future Flight Central. The research and testing that can be explored in this facility can only help our over crowded air transportation system.

Dr. Thomas Edwards presented a report on the scope and breadth of the NASA air traffic management research program. He described the agency's success in developing Center-TRACON Automation System (CTAS) computer tools that assist in the planning and control of air traffic. He explained efforts at developing the Traffic Management Advisor and the passive Final Approach Spacing Tool (pFAST). The Council is very impressed with this work. Many of these tools are scheduled to become operational in the near future as a part of the FAA's Free Flight program. The Council is also impressed by the level of cooperation between NASA and the FAA in this area. I have enclosed a resolution that is the Council's view on this important subject.

The Council also heard from Mr. Dennis Smith on the status of the Integrated Space Transportation Plan. The Council believes the plan put forth by Mr. Smith is a good technology development plan that may provide valuable technological breakthroughs. However, the Council is

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not sure this is the correct path the agency should take. The Council's Space Transportation Subcommittee presented their report after visiting the X-33 contractors at Palmdale. They believe little is to be gained by continuing the X-33 program to flight in light of its technical problems during the past year. They conclude a viable Single-Stage to Orbit system is not possible with current technology.

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Unfortunately, the Council was not able to come to consensus at Ames on what path the agency should pursue in developing a future space launch system. Therefore, we asked Mr. Jacobs, Mr. Rosenberg and Mr. Monroe to assemble a short white paper with several recommendations on the agency's space transportation plan for discussion at the next Council meeting.

In our Non-FACA session, the Council was briefed on the status of the NASA Integrated Action Team (NIAT) report by Chief Engineer, Brian Keegan. Individual Council members provided several informal suggestions. In our public session the next day, Mr. Keegan provided his strategy on addressing their comments. We re-emphasized the Council's thoughts on the Mars review reports:

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- Smaller missions do work.
- FBC was not a well defined concept.
- Resource needs not carefully assessed nor provided.
- Risk was not clearly assessed and communicated.
- Inexperienced Project Managers were disconnected from historically successful management techniques and policies.
- Fear in organization reduced effective vertical communications.
- Review processes were abandoned.

The Council also received a presentation by Mr. Richard Beck, on NASA's FY 2002 Performance Plan. This presentations was to provide the Council with an opportunity to discuss and comment on the agency's FY 02 plan before it is sent to Congress. Mr. Beck also prepared the Council for the December task of reviewing the agency's FY 00 Performance Plan. Our only general comment on the FY 02 Plan is a concern that the objectives and targets in the plan are not measurable and that one must go to the third level down – the indicator – to find measurable metrics. Additionally, since the objectives and targets are written in general terms, we believe these could have been shared in detail during our public session.

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The Council also heard from a number of committees. The Council received a report from Dr. Stephen Squyres on the wording of a charter for the new Planetary Protection Advisory Committee of the NAC which we recommend be adopted, (enclosed). The Council also heard from the Space Flight Advisory Committee on the Shuttle Safety Upgrades and I have enclosed recommendations on this important subject.

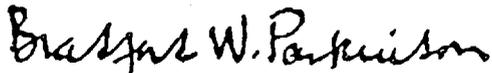
Finally, the Council was surprised by the news of the possible creation of a fifth Enterprise encompassing biological and physical sciences. The Council had many questions about this new Enterprise and would like the opportunity be more thoroughly

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briefed on the issue. Dr. Mulville assured us that both the Space Science Advisory Committee and the Life and Microgravity Applications Advisory Committee would have an opportunity to review the plan and provide feedback.

The Council's next meeting will be at Kennedy Space Center on November 30 - December 1, 2000, to see the launch of STS 97. We hope to see you there.

Sincerely,



Bradford W. Parkinson  
Chair

3 Enclosures

NASA ADVISORY COUNCIL (NAC)  
Ames Research Center  
September 12-13, 2000

**NAC Resolution on the need for cooperation and support of NASA and  
FAA programs to improve the Nation's Air Transportation System**

The NASA Advisory Council is acutely aware that the nation's air transportation system is struggling to meet demand, increasingly resulting in air traveler "rage" and a decreasing efficiency as the engine of commerce. R

The forecast of burgeoning future demand, without dramatic increases in capacity, foretells virtual gridlock at the nation's airports.

Advanced technologies currently being pursued by NASA could provide air traffic control tools that can increase system capacity if they can be implemented over the next several years.

The FAA and NASA are working in collaboration to facilitate the transfer of technology from the laboratory into the "operational" air traffic control system.

Neither the FAA nor NASA can do the job alone. FAA does not have the research and technology base to develop the advanced technologies and NASA does not have the operational or system acquisition responsibility.

The prospect of gridlock in the air transportation system is an issue of critical national importance. Unfortunately, funding of NASA's aviation capacity programs have not been given the priority of the visibility commensurate with their potential for providing solutions.

The NASA Advisory Council is concerned that the appropriate committees of the Congress, responsible to fund NASA and the FAA, have not worked in concert to foster an integrated approach to adequately fund technology development for increased air transportation capacity within NASA coupled with the funding for the FAA to transfer that technology, in an efficient and timely manner, into enhanced operational air traffic control capabilities.

NASA ADVISORY COUNCIL (NAC)  
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**Approved scope for Planetary Protection Advisory Committee charter:**

"The Committee will advise the NASA Administrator through the NASA Advisory Council on Agency programs, policies, plans, and other matters pertinent to the Agency's responsibilities for planetary protection, as defined in NPD 8020.7x, including NASA planetary protection policy documents and components, implementation plans, and organization. The Committee will provide a forum for advice on interagency coordination and intergovernmental planning related to planetary protection. The Committee will review and recommend appropriate planetary protection categorizations for all bodies of the solar system to which spacecraft will be sent. The scope of the Committee's responsibilities will not include issues that pertain solely to the quality and interpretation of scientific experiments and data."

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NASA ADVISORY COUNCIL (NAC)  
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NAC Approved Recommendations:

**Space Shuttle Safety Upgrades**  
**Selection and Prioritization of Current Upgrades**

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1. The Committee agrees with the evaluation on the first five upgrades, the Cockpit Avionics, EAPU, AHMS, TVC/APU, and SSME Block III improvements.
2. Although there is justification for all the items listed for upgrades, after the first five, the process for selection and prioritization was unclear. It appeared that some high priority items did not make the final list. It was difficult to discern whether selections were based on financial or safety criteria.
3. The Committee is also concerned that there are no safety related infrastructure upgrades under active consideration.

**Recommendation:** Definition of criteria for selection and rigor in applying criteria and ranking upgrades needs to be more apparent.

**Budget and Schedule**

4. The Committee believes that the timeframe of having the upgrades operational by 2005 and the stringent budget limitations hinder the process of selecting and implementing the optimal upgrades. The Committee understands that the 2005 date reflects the desire to gain maximum benefit from the upgrades prior to the circa-2005 decision on the next generation RLV. Extensive development programs are required for some of the upgrades. Rigorous management to meet program cost and schedule goals will be required for a successful upgrade program. Accomplishing all of this by 2005, an aggressive schedule cap, makes this a highly success oriented effort.

**Recommendation:** Recognizing external policy and budgetary constraints on NASA, the Committee urges the Office of Space Flight to work proposed upgrades with a critical and extremely realistic view of schedule, cost, and budget.

**Human Factors**

History suggests that the majority of mission failures, particularly in mature systems, are caused by human errors that may not be detected by test, oversight, or independent verification and validation. This failure class did not appear to be rigorously treated in the Space Shuttle Upgrades program.

6. A concerted effort needs to be made in the examination of human error in past mishaps to factor in the risk in future flights. The Committee will watch, with interest, the development and use of the Quantitative Risk Assessment System (QRAS) in selecting Space Shuttle upgrades and evaluating their contribution as the program evolves. However, sole dependency on the QRAS does not account for all possible sources of risk and does not incorporate the knowledge gained from the program's history.

**Recommendation:** The Committee believes that human error must be factored into risk assessments utilized in establishing the Space Shuttle Upgrades program.