THE NASA WORKFORCE: DOES NASA HAVE THE RIGHT STRATEGY AND POLICIES TO RETAIN AND BUILD THE WORKFORCE IT WILL NEED?

HEARING

BEFORE THE

SUBCOMMITTEE ON SPACE AND AERONAUTICS

COMMITTEE ON SCIENCE

HOUSE OF REPRESENTATIVES

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SECOND SESSION

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June 13, 2006

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THE NASA WORKFORCE: DOES NASA HAVE THE RIGHT STRATEGY AND POLICIES TO RETAIN AND BUILD THE WORKFORCE IT WILL NEED?

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TUESDAY, JUNE 13, 2006

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON SPACE AND AERONAUTICS,
COMMITTEE ON SCIENCE,
Washington, DC.

The Subcommittee met, pursuant to call, at 10:30 a.m., in Room 2318 of the Rayburn House Office Building, Hon. Ken Calvert [Chairman of the Subcommittee] presiding.

SUBCOMMITTEE ON SPACE AND AERONAUTICS
COMMITTEE ON SCIENCE
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, DC 20515

Hearing on

The NASA Workforce: Does NASA Have the Right Strategy and Policies
to Retain and Build the Workforce It Will Need?

June 13, 2006
10:30 a.m. – 12:30 p.m.
2318 Rayburn House Office Building

WITNESS LIST

Ms. Toni Dawsey
Assistant Administrator
Human Capital Management
National Aeronautics and Space Administration

Dr. Lee Stone
Legislative Representative
International Federation of Professional and Technical Engineers (IFPTE)

Dr. David Black
President
Universities Space Research Association

Mr. John W. Douglass
President and CEO
Aerospace Industries Association of America

SUBCOMMITTEE ON SPACE AND AERONAUTICS
COMMITTEE ON SCIENCE
U.S. HOUSE OF REPRESENTATIVES

The NASA Workforce: Does NASA Have the Right Strategy and Policies to Retain and Build the Workforce It Will Need?

TUESDAY, JUNE 13, 2006
10:30 A.M.–12:30 P.M.
2318 RAYBURN HOUSE OFFICE BUILDING

Purpose

On Tuesday, June 13th the Subcommittee on Space and Aeronautics will hold a hearing on the National Aeronautics and Space Administration's (NASA) workforce strategy. The hearing will examine whether NASA is taking the steps necessary to ensure that it has the workforce to carry out its plans.

NASA is facing a critical period in ensuring that it has a workforce of appropriate size and with appropriate skills. On the one hand, NASA has several major new undertakings related to the goal of returning to the Moon by 2020; on the other hand, to free up funds for that purpose (among other reasons), it is terminating the Space Shuttle program in 2010, reducing aspects of International Space Station research, and reducing the budget for aeronautics. In addition, NASA never fully reassigned its workforce after canceling earlier projects, such as the Orbital Space Plane. As a result of all these current and pending shifts, NASA estimates that it has about 1,000 employees without sufficient tasks, but at the same time the Agency faces a potential surge of retirements in the coming years. To handle its apparent short-term problem, NASA has been offering buyouts to employees, and may lay off employees in the future. The *NASA Authorization Act of 2005* (P.L. 109–155) forbids layoffs (officially, Reductions in Force, or RIFs) before March 16, 2007.

The Science Committee has taken steps in recent years both to help NASA put together an appropriate workforce and to review NASA's actions. Most significantly, the Committee passed, and the President signed, the *NASA Flexibility Act of 2004* (P.L. 108–201), which gave the Agency additional authority to offer recruitment and retention bonuses. The law was based on language requested by NASA. Also, the *NASA Authorization Act of 2005,* required NASA to develop an overall workforce strategy through fiscal year 2011. This plan was released in April, and will be a focus of the hearing. The plan has been criticized by the International Federation of Professional and Technical Engineers (IFPTE), NASA's largest union. The Authorization Act also required NASA to submit a report describing its plans for the Space Shuttle workforce. Finally, the National Academy of Sciences in late April released an interim report on NASA's workforce. The report was completed before NASA's workforce strategy was released.

Witnesses

Ms. Toni Dawsey, NASA Assistant Administrator for Human Capital Management.

Dr. Lee Stone, Legislative Representative, International Federation of Professional and Technical Engineers (IFPTE), and an employee at NASA Ames Research Center.

Dr. David Black, Co-Chair, National Academy of Sciences Committee on Meeting the Workforce Needs for the National Vision for Space Exploration; and President and CEO, Universities Space Research Association.

Mr. John W. Douglass, President and CEO, Aerospace Industries Association.

Overarching Questions

1) Does the NASA workforce currently possess the critical skills that will enable NASA to complete its goals in space and Earth science, aeronautics, and exploration?
2) Does NASA have a sound knowledge base upon which to base workforce decisions?
3) Has NASA succeeded in attracting and retaining skilled employees?

Background

NASA currently employs nearly 17,000 permanent Civil Service employees, and more than 40,000 contractors work closely with the Agency. By comparison, the aerospace industry as a whole employs 600,000[1] people within the United States.

NASA has said its strategy involves keeping all 10 of its current centers around the country "healthy." As part of this, NASA has sought to ensure that each of the centers contributes to major programs at the Agency. This strategy marks a departure from earlier trends that saw Centers specializing in specific areas. The change will require the distribution of key skills to all the Centers, which means some current centers have even more under-employed staff than before and some have fewer.

Issues

Does NASA currently have too many employees and, if so, what should it do about it?

NASA believes it has about 1,000 full-time equivalent (FTE) employees who are underemployed, many of them in aeronautics. NASA uses the term "uncovered capacity" to describe employees who do not have enough tasks for them to be considered fully employed. The three aeronautics centers—Ames in California, Glenn in Ohio, and Langley in Virginia—have the greatest percentage of their staffs considered "uncovered capacity;" 15 to 30 percent of their staffs, as compared to five to 15 percent at other centers. What makes this tricky is that most employees do not work on a single project. Because individual employees may have only a portion of their time uncovered, 1,000 uncovered FTEs does not equate with 1,000 employees with no assigned work. This distinction drives what solutions are available to the Agency. Issuing a buyout to an employee who is 90 percent "covered" may deprive the Agency of a needed individual while doing little to reduce "uncovered capacity." Alternatively, finding additional work for an employee with few current assignments may not be possible. NASA is currently assessing how the total amount of "uncovered capacity" is distributed among individual employees. The IFPTE, the larger of the two unions representing NASA employees, questions whether the calculation of 1,000 FTEs is accurate and claims that NASA in recent years has changed its lists of which skills are no longer needed, raising questions about whether NASA has a clear sense of which employees should be encouraged to leave (or eventually be laid off).

To reduce its workforce, NASA has instituted three buy-out and early retirement programs since 2004. About 950 employees have taken advantage of those offers to leave the Agency, and 1,138 employees have accepted buyouts since 2002. A key question is whether the "right" employees are accepting the buyouts. Is NASA targeting the buyouts to those areas in which it least needs employees, and is it ensuring that its buyouts are not disproportionately accepted by its most skilled employees since they may be most able to find other work?

What is the longer-term outlook for NASA's workforce?

More than 30 percent of NASA's employees are currently eligible for regular or early out retirement. NASA estimates that by 2011, 28 percent of its engineers and 45 percent of its scientists will be eligible to retire. Furthermore, less than 20 percent of NASA's overall workforce is under 40, and less than 10 percent of NASA's scientists are under 40.

This "retirement bulge" comes as NASA will need to ramp up its workforce for its lunar programs. Some of the workforce for those programs will come from shifting employees who are currently working on the Space Shuttle program, which is scheduled to be terminated in 2010, especially since the new lunar vehicles will use elements of the Space Shuttle. But there are still questions of whether NASA will have the young, creative workforce it needs to carry out the new programs.

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[1] Aerospace Industries Association. Series 12. Updated 05/08/06. *http://www.aia-aerospace.org/stats/aero_stats/stat12.pdf*

Does NASA have the data and information systems it needs to judge the adequacy of its workforce?

NASA has developed a Competency Management System (CMS) to track its workforce through two databases, one that tracks the skill requirements of all of the Agency's positions, and another that tracks the multiple skills of each employee. These databases, which NASA is still in the process of implementing, should allow NASA to match employees to positions that need their particular skills. The IFPTE argues that the CMS produces misleading results, in part because it only takes into account the primary competency required for an employee's position. Yet most employees work on more than one task and have more than one set of skills. NASA has said in response that eventually the system will be sophisticated enough to account for more than just primary position competencies.

The union also argues that NASA's method of "full-cost accounting" exaggerates the cost of carrying employees and leads NASA to believe it has more "uncovered capacity" than is actually the case.

Has NASA made adequate and appropriate use of its special authorities to attract and retain employees?

The NASA Flexibility Act gave NASA additional authority, including the ability to offer larger recruitment and retention bonuses, beyond that of other federal agencies. NASA pressed Congress to get this authority, but so far the Agency has made very limited use of the authority. For example, it awarded only 35 recruitment bonuses under the Act in fiscal 2005, despite hiring 324 employees. The IFPTE complains that NASA has given disproportionate bonuses to its Senior Executive Service (SES) employees, as opposed to rank-and-file scientists and engineers, compared to other federal agencies. NASA says it will make greater use of the Flexibility Act in the future as it undertakes more hiring.

Should NASA begin to hire more employees for limited terms as opposed to traditional Civil Service hiring?

NASA has said that in the future it will hire more employees for limited terms rather than add them to the traditional Civil Service workforce. NASA argues that this will provide greater flexibility and will not saddle the Agency with excess employees once a project has ended. The IFPTE, on the other hand, worries that reliance on term employees will prevent NASA from developing deep, ongoing expertise in key areas. It also expresses concern that term employees, who will lack Civil Service protections, will be less willing to speak out or question management decisions, potentially allowing unsafe practices to develop without comment.

What mix of in-house and contractor employees should NASA use?

NASA Administrator Michael Griffin has said that NASA has become too dependent on outside contractors, hollowing out some of the skills the Agency needs in-house to oversee and evaluate programs. The National Academy of Sciences' interim report also questions whether NASA currently has sufficient skills inside the Agency, and, not surprisingly, the IFPTE has raised similar concerns. How will NASA decide the extent to rely on contractor employees for its upcoming plans? Will NASA's workforce strategy enable the Agency to have sufficient expertise in-house?

Does NASA's workforce strategy provide Congress and the public with the information it needs?

The strategy document released in April describes in general the skills the Agency believes will be important for implementing NASA's new programs, but it does not detail how many employees will be needed overall or for specific programs or how NASA would go about achieving such numbers. The National Academy of Sciences interim report recommended that the Agency develop "policies and procedures to anticipate" changing skill requirements beyond the current problem of "uncovered capacity."

Witness Questions

The witnesses were asked to address the following questions in their testimony:

Ms. Toni Dawsey

1) Do the centers continue to have uncovered employees and does the Agency expect further action to reduce the number of employees? If so, how will those reductions be pursued?

2) How has NASA ensured that employees with critical skills are not accepting buyouts? How has NASA identified those critical skills?

3) What are the critical skills that are hiring priorities for the Agency? How does NASA know which skills are most needed?

4) Why has NASA not made greater use of the hiring authority granted by the NASA Flexibility Act?

Dr. Lee Stone

1) What are your concerns regarding NASA's released workforce strategy?

2) How has NASA ensured that employees with critical skills are not accepting buyouts? How has NASA identified those critical skills?

3) What are the critical skills that are hiring priorities for the Agency? Do you think NASA has a good sense of which skills it most needs? What additional steps ought NASA be taking to make such an assessment of its needs?

4) Has NASA been making sufficient use of the hiring authority granted by the NASA Flexibility Act?

Dr. David Black

1) What are the critical skills that will enable NASA to complete its goals in space and Earth science, aeronautics, and exploration?

2) What decisions must NASA make now to prepare for its future workforce needs?

3) Does NASA's current workforce strategy fulfill the needs identified by the NRC interim report?

4) What are the tradeoffs associated with completing work in-house at NASA or contracting them out?

Mr. John W. Douglass

1) What are the critical skills that will enable NASA to complete its goals in space and Earth science, aeronautics, and exploration?

2) What are the tradeoffs associated with completing work in-house at NASA or contracting them out?

3) Does the industry have the capacity to successfully absorb additional work from NASA?

4) What trends in the aerospace industry should affect NASA's workforce planning?

Appendix A

Excerpt from the *NASA Authorization Act of 2005* (P.L. 109–155)

§101 (f) Workforce.—

(1) In general.—The Administrator shall develop a human capital strategy to ensure that NASA has a workforce of the appropriate size and with the appropriate skills to carry out the programs of NASA, consistent with the policies and plans developed pursuant to this section. Under the strategy, NASA shall utilize current personnel, to the maximum extent feasible, in implementing the *Vision for Space Exploration* and NASA's other programs. The strategy shall cover the period through fiscal year 2011.

(2) Content.—The strategy developed under paragraph (1) shall describe, at a minimum-

(A) any categories of employees NASA intends to reduce, the expected size and timing of those reductions, the methods NASA intends to use to make the reductions, and the reasons NASA no longer needs those employees;

(B) any categories of employees NASA intends to increase, the expected size and timing of those increases, the methods NASA intends to use to recruit the additional employees, and the reasons NASA needs those employees;

(C) the steps NASA will use to retain needed employees; and

(D) the budget assumptions of the strategy, which for fiscal years 2007 and 2008 shall be consistent with the authorizations provided in title II of this Act, and any expected additional costs or savings from the strategy by fiscal year.

(3) Schedule.—The Administrator shall transmit the strategy developed under this subsection to the Committee on Science of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate not later than 60 days after the date on which the President submits the proposed budget for the Federal Government for fiscal year 2007 to the Congress. At least 60 days before transmitting the strategy, NASA shall provide a draft of the strategy to its federal employee unions for a 30-day consultation period after which NASA shall respond in writing to any written concerns provided by the unions.

(4) Limitation.—NASA may not implement any Reduction in Force or other involuntary separations (except for cause) prior to March 16, 2007.

Figures

		Full-Time Permanent		Part-Time Permanent		Term		Temporary		Other	
		NASA Employee History									
Year	FY1994	23,499	92.7%	215	0.8%	22	0.1%	90	0.4%	1527	6.0%
	FY1995	22,218	93.6%	188	0.8%	23	0.1%	67	0.3%	1240	5.2%
	FY1996	20,671	94.2%	172	0.8%	29	0.1%	71	0.3%	998	4.5%
	FY1997	20,089	94.7%	168	0.8%	85	0.4%	123	0.6%	738	3.5%
	FY1998	18,790	94.1%	170	0.9%	316	1.6%	102	0.5%	580	2.9%
	FY1999	17,710	93.4%	167	0.9%	487	2.6%	73	0.4%	527	2.8%
	FY2000	17,703	94.6%	202	1.1%	221	1.2%	30	0.2%	550	2.9%
	FY2001	17,809	94.6%	200	1.1%	190	1.0%	28	0.1%	605	3.2%
	FY2002	17,932	94.2%	193	1.0%	220	1.2%	30	0.2%	651	3.4%
	FY2003	17,943	94.6%	193	1.0%	181	1.0%	29	0.2%	616	3.2%
	FY2004	17,876	93.8%	193	1.0%	280	1.5%	58	0.3%	659	3.5%
	FY2005	17,738	91.7%	180	0.9%	504	2.6%	144	0.7%	780	4.0%
	FY2006	16,758	89.6%	162	0.9%	864	4.6%	113	0.6%	798	4.3%

Source: Provided by NASA Human Resources

Total Aerospace Employment
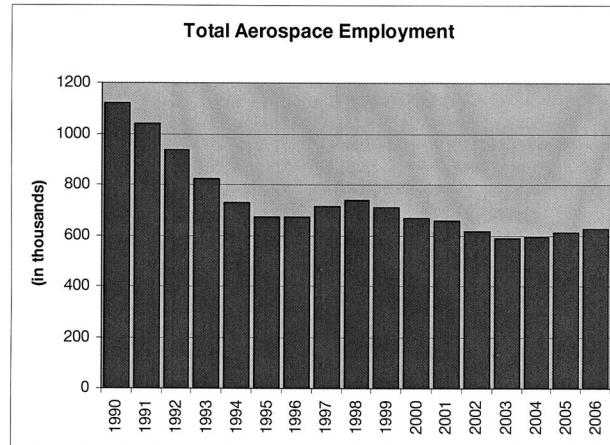
Source: Aerospace Industries Association. Series 12. Updated 05/08/06. http://www.aia-aerospace.org/stats/aero_stats/stat12.pdf

Full-Time Equivalent Projections										
	HQ	ARC	GRC	LARC	DFRC	GSFC	MSFC	SSC	JSC	KSC	NSSC
FY 2005	1397	1380	1821	2130	524	3303	2668	294	3126	1981	0
FY 2006	1390	1284	1700	1963	488	3332	2600	284	3237	2082	50
FY 2007	1300	1193	1562	1839	488	3223	2600	284	3262	2107	121
FY 2008	1300	1070	1428	1749	488	3223	2600	284	3262	2107	146
FY 2009	1300	1070	1428	1749	488	3223	2600	284	3262	2107	157
FY 2010	1300	1070	1428	1749	488	3223	2500	284	3172	2107	159
FY 2011	1300	1070	1428	1749	488	3223	2400	284	2905	1902	159
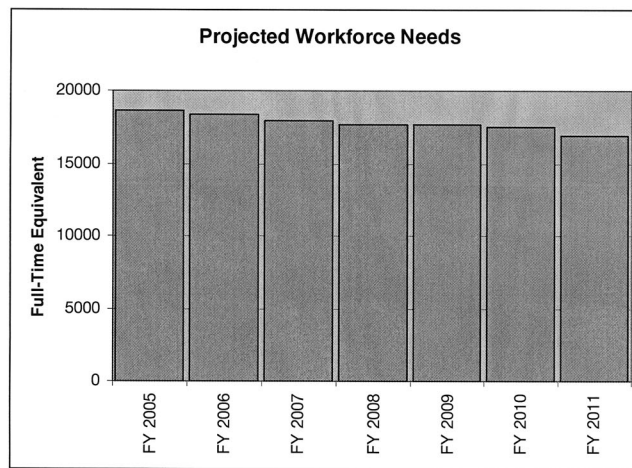
Source: NASA 2006 Workforce Strategy

Source: NASA 2006 Workforce Strategy

2002-2006 Buyouts

Source: NASA Workforce, http://naade02.msfc.nasa.gov/workforce/

Center Permanent Workforce 1994-2006

Center Permanent Workforce 1994-2006
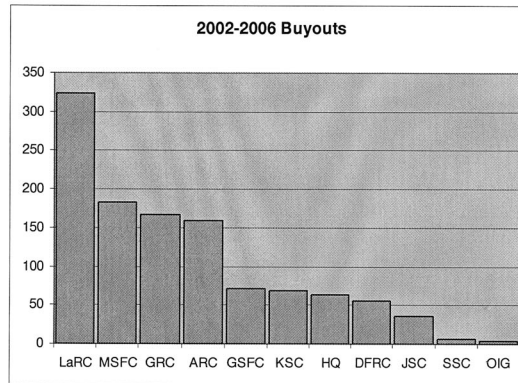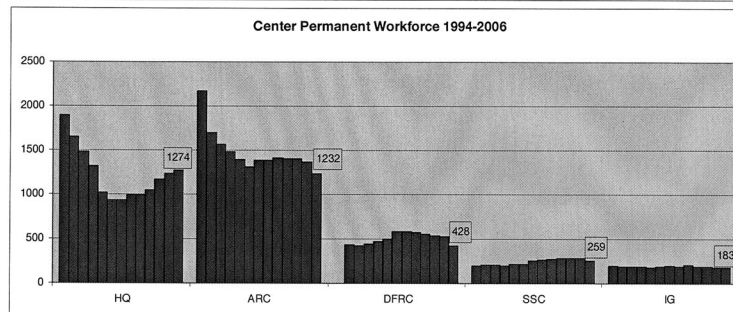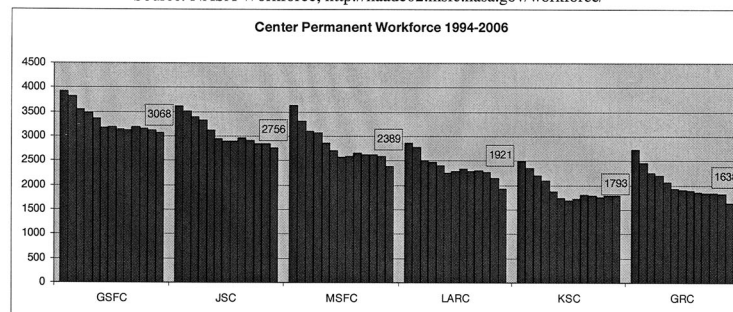
Source: NASA Workforce, http://naade02.msfc.nasa.gov/workforce/

Acronyms

ARC—Ames Research Center, CA
DFRC—Dryden Flight Research Center, CA
GRC—Glenn Research Center, OH
GSFC—Goddard Space Flight Center, MD
HQ—NASA Headquarters, DC
IG—Inspector General, DC
JSC—Johnson Space Center, TX
KSC—Kennedy Space Center, FL
LaRC—Langley Research Center, VA
MSFC—Marshall Space Flight Center, AL
NSSC—NASA Shared Services Center, AL
SSC—Stennis Space Center, MS

Chairman CALVERT. Good morning. In the interests of time, I am going to get this hearing going promptly. We have a series of votes starting at approximately 11:30, so we would like to move forward. So with that, good morning.

I look forward to hearing from all our witnesses on the question that affects every aspect of the workforce that NASA has. Does NASA have the right strategy and policies to retain and build the workforce it will need? It is vital that NASA have the access to the critical skills necessary to lead America and the world in the areas of space, aeronautics, and science. There are hard fiscal realities facing NASA, as we know, but just as important and disconcerting are the hard technical realities of which the Agency will be reliant on its workforce to manage.

To respond to these challenges and to the requirement in the NASA Authorization Bill of '05, NASA released its Workforce Strategy in April. In the report, NASA outlined those skills that will be needed to a greater or lesser degree over the next five years. It then outlined the strategies that NASA plans to use to meet these workforce demands. In addition, the National Research Council has released an interim report from its committee on the workforce requirements for the *Vision for Space Exploration* that urges NASA to expand the scope of its workforce planning.

Although NASA's report has identified the obvious need for competencies in program management and systems integration, the report is far less specific on other skills needed, or potential retention of such skills, once identified. The National Academies, however, note that NASA does not currently have the expertise within its current workforce to support the many new developments planned. While many of these skills are readily available in the private sector, Dr. Griffin made the argument that NASA already contracts out too much of its development work, and needs greater in-house expertise to better manage its programs.

NASA faces workforce challenges in a number of areas in the next few years: retirement of the Space Shuttle in 2010, development of the Crew Exploration Vehicle and the Crew Launch Vehicle, and the return to the Moon by 2020. Not only is the skill mix a critical issue, but the age distribution of the workforce is also troubling. Although the workforce mirrors the aerospace industry, it has a significantly smaller number of employees under 40 than the national workforce. It is these younger employees who will be needed to build and operate its major exploration missions.

I have noticed that the NASA Civil Servant employment in the last 10 years has declined by more than 20 percent. Are we keeping the skills we need with this decline? How will NASA prepare for its future workforce needs? What are the tradeoffs associated with completing work in-house at NASA versus contracting them out? Has NASA been successful in recruiting and retaining those skills it has needed to date? What are the critical skills that NASA needs to complete its goals in exploration, aeronautics, space, and Earth science?

Finally, is NASA prepared for the great projects it has downstream? This Workforce Strategy is just the first step in creating and nurturing a workforce to bring about the *Vision for Space Exploration.* Now, it is time to make sure that we have the policies

and the strategies in place to ensure that we don't get held up mid-stream.

[The prepared statement of Chairman Calvert follows:]

PREPARED STATEMENT OF CHAIRMAN KEN CALVERT

Good Morning. I look forward to hearing from our witnesses on this question that affects every aspect of the work that NASA wants to do—does NASA have the right strategy and policies to retain and build the workforce it will need? It is vital that NASA have access to the critical skills necessary to lead America and the world in the areas of space, aeronautics and science. There are hard fiscal realities facing NASA, but just as important and disconcerting are the hard technical realities of which the Agency will be reliant on its workforce to manage.

To respond to these challenges and to the requirement in the *NASA Authorization of 2005,* NASA released its Workforce Strategy in April. In the report NASA outlined those skills that will be needed to a greater or lesser degree over the next five years. It then outlined the strategies that NASA plans to use to meet these workforce demands. In addition, the National Research Council has also released an interim report from its committee on the workforce requirements for the *Vision for Space Exploration* that urges NASA to expand the scope of its workforce planning.

Although NASA's report has identified the obvious need for competencies in program management and systems integration, the report is far less specific on other skills needed or potential retention of such skills once identified. The National Academies, however, note that NASA does not currently have the expertise within its current workforce to support the many new developments planned. While many of these skills are readily available in the private sector, Dr. Griffin has made the argument that NASA already contracts out too much of its development work and needs greater in-house expertise to better manage its programs.

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Finally, is NASA prepared for the great projects it has downstream? This workforce strategy is just a first step in creating and nurturing a workforce that bring about the *Vision for Space Exploration.* Now is the time to make sure that we have the policies and strategies in place to ensure we don't get held up mid-stream.

Today's hearing will allow representatives from NASA management, the NASA unions, and academia to discuss NASA's workforce planning and to place it within the broader context of the aerospace sector. We will look forward to getting these answers from our witnesses today. Thank you for your time to come to our Subcommittee to guide us through these complex and important challenges.

Mr. Udall, we look forward to hearing from you now.

Chairman CALVERT. With that, Mr. Udall will be here shortly. I am going to go ahead and start with the witnesses at hand, and then, when Mr. Udall comes in, we will ask for his opening statement.

The first witness with us today is Ms. Toni Dawsey, is that how you pronounce it? Yeah, okay. The Assistant Administrator, Human Capital Management, National Aeronautics and Space Administration. With that, Ms. Dawsey, you are given five minutes for your testimony.

Thank you. Mic.

STATEMENT OF TONI DAWSEY, ASSISTANT ADMINISTRATOR, HUMAN CAPITAL MANAGEMENT; CHIEF HUMAN CAPITAL OFFICER, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Ms. DAWSEY. Chairman Calvert and Members of the Subcommittee, I am pleased to appear before the subcommittee today to discuss NASA's Workforce Strategy.

Chairman CALVERT. Toni, you might bring that mic just a little closer to you. There you go.

Ms. DAWSEY. The *Vision for Space Exploration* and NASA's mission of scientific discovery and aeronautics research offer unique and exciting opportunities for the Nation and for the Agency. They also offer significant challenges. NASA must retire the Space Shuttle, complete the International Space Station, develop new transportation and launch support systems, maintain a robust science portfolio, and refocus its aeronautics program in core disciplines and research areas appropriate to NASA's unique qualifications and capabilities. I would like to take a few minutes to talk about the Agency's workforce issues created by these challenges and opportunities, and how NASA is addressing them.

NASA does have a Workforce Strategy. It was submitted to Congress in April. The strategy is based on three underlying principles: building and sustaining ten healthy Centers, maximizing the use of NASA's current human capital capabilities, and evolving to a more flexible workforce. The overall objective of the Workforce Strategy is to transform the composition of NASA's workforce so that it remains viable for the long-term goals of NASA's missions.

The successful accomplishment of NASA's missions requires ten fully engaged and productive Centers which have clear, stable, and enduring roles and responsibilities, clear program project management leadership roles, major in-house, durable space flight responsibility, skilled and flexible blended workforce with sufficient depth and breadth, technically competent and values-centered leadership, capable and effectively utilized infrastructure, and strong stakeholder commitment.

NASA also seeks to maximize the use of the Agency's current human capital capabilities. The current workforce represents a wealth of skills and valuable experience. Throughout the reshaping process, the Agency is committed to capitalizing on the potential of this workforce by using, expanding, rebalancing, and realigning existing skills as necessary. NASA must also have a more flexible workforce, with sufficient bench strength to respond effectively to mission, programmatic, and budget changes, as well as demographic and labor fluctuations.

NASA's Workforce Strategy hinges on certain key actions and initiatives, implementing a new workforce planning process, assessing competency gaps with greater detail and accuracy, and making effective use of a broad array of human capital tools and options to address workforce issues.

Our two most pressing workforce challenges are uncovered capacity and the retirement of the Space Shuttle program. NASA's approach to addressing these challenges reflects the Agency's commitment to the principles and approaches reflected in the Workforce Strategy.

NASA has been addressing, through a number of means, the challenge of mitigating the number of Civil Service full-time equivalents not currently supporting NASA programs, the so-called uncovered capacity. Initial efforts included retaining work in-house to protect and strengthen core capabilities, sponsoring job fairs to facilitate transferring employees to Centers needing their skills, implementing hiring controls, and encouraging voluntary attrition through buyouts and early-outs. Although these efforts have been helpful, they have not reduced the uncovered capacity to a manageable level.

NASA is now focusing its efforts to solve our uncovered capacity problems through a number of other actions, including the assignment of new projects to research Centers that will maintain their base of in-house work, the movement of certain research and technology development projects from Centers without uncovered capacity to Centers who have the problem, retraining efforts at Centers so that the technical workforce can develop new skills, and the pursuit of reimbursable work for projects and research to support other government agencies and the private sector through Space Act Agreements.

NASA is also addressing the unique challenges presented by retiring the Space Shuttle: retaining the skills necessary to safely execute the remaining Space Shuttle missions, and managing the transition of the Shuttle workforce in a way that balances both Agency and employee needs, capitalizing on the capabilities of that workforce to advance the *Vision for Space Exploration*. The magnitude and complexity of the Shuttle workforce issues require coordinated and integrated workforce planning at all levels across the Agency, and continuing analysis of competency gaps and surpluses. A Shuttle Human Capital Working Group has been established to oversee that work. NASA will continue to conduct active, timely, and open communications with Shuttle employees on the status of their work, future opportunities, and issues of concern.

In conclusion, the Workforce Strategy that NASA has developed and will continue to refine allows NASA to deal effectively with the critical issues now facing the Agency. NASA realizes, however, that it is not sufficient to solve the immediate problems. Rather, the Agency's goal is to address these issues now on an integrated, Agency-wide basis, putting in place approaches that not only alleviate the Agency's current imbalances, but also provide a structure that allows such issues to be resolved in the future as part of a normal process. NASA does recognize that some future events, such as retirement of the Space Shuttle program, require long-term planning and Agency-level coordination. The foundation being built today, however, will greatly facilitate their resolution.

Thank you for giving me the opportunity to share NASA's workforce planning efforts.

[The prepared statement of Ms. Dawsey follows:]

PREPARED STATEMENT OF TONI DAWSEY

Chairman Calvert and Members of the Subcommittee, I am pleased to appear before you today to discuss NASA's Workforce Strategy.

The *Vision for Space Exploration* and NASA's mission of scientific discovery and aeronautics research offer unique and exciting opportunities for the Nation and for the Agency. They also offer significant challenges. NASA must retire the Space

Shuttle, complete the International Space Station, develop new transportation and launch support systems, maintain a robust science portfolio, and refocus its aeronautics program in core disciplines and research areas appropriate to NASA's unique capabilities. I would like to take a few minutes to talk about the Agency's workforce issues that arise from these challenges and opportunities and how NASA is addressing them.

NASA Workforce Strategy

NASA has always understood that a well-trained, highly skilled, and high-performing workforce is essential to mission success. The NASA Workforce Strategy, submitted to Congress in April, is designed to ensure that the Agency can maintain the knowledge base of the current workforce, as well as broaden, reinvigorate, and acquire new skills necessary to accomplish the *Vision for Space Exploration* and NASA's science and aeronautics mission. The document is based on three underlying principles: building and sustaining ten healthy Centers; maximizing the use of NASA's current human capital capabilities; and evolving to a more flexible, scalable workforce. The overall objective of the Workforce Strategy is to transform the composition of NASA's workforce so that it remains viable for the long-term goals of NASA's missions.

Key Principles

Successful accomplishment of NASA's missions requires ten fully engaged and productive Centers. The "healthy Centers" approach fully utilizes all of NASA's resources and vastly increases the Agency's ability to manage the normal cycles of programs and projects in a comprehensive, reasoned, and cost-effective manner. As described in the 2006 NASA Strategic Plan, strong, healthy Centers have: clear, stable, and enduring roles and responsibilities; clear program/project management leadership roles; major in-house, durable space flight responsibility; skilled and flexible, blended workforce with sufficient depth and breadth; technically competent and values-centered leadership; capable and effectively utilized infrastructure; and strong stakeholder commitment. A healthy Center must also have an appropriately-sized workforce and infrastructure to meet mission needs.

NASA also seeks to maximize the use of the Agency's current human capital capabilities. The current workforce represents a wealth of skills and valuable experience. Throughout the reshaping process, the Agency is committed to capitalizing on the potential of this workforce by using, expanding, rebalancing, and realigning existing skills, as necessary.

NASA's workforce must have the flexibility to respond effectively to mission, programmatic, and budget changes, as well as demographic and labor fluctuations. As these changes occur, the Agency must be able to adjust quickly to address staffing needs or skills imbalances, requiring a more appropriate blend of permanent and nonpermanent (term and temporary) civil servants.

Key Actions and Initiatives

NASA's Workforce Strategy hinges on certain key actions and initiatives: implementing a new workforce planning process; assessing competency gaps with greater detail and accuracy; and making effective use of a broad array of human capital tools and options to address workforce issues.

Past approaches to workforce planning were predominantly Center-based, short-term, ad hoc, and loosely-connected. NASA's new approach reflects planning and integration among all levels of management, with workforce planning integrated with strategic, business, and resource planning activities in order to assess how best to use both internal and external workforce to meet work requirements. With an enhanced workforce planning capability, NASA will be better able to identify areas of potential risk in matching workforce to work, allowing more time to develop strategies to mitigate these risks.

Agency-wide, integrated workforce planning also strengthens the Agency's competency assessment ability—the ability to assess the demand for, and supply of, workforce skills based on current and projected work requirements. The most recent analyses of competency gaps and surpluses, summarized in the Workforce Strategy, were conducted in January 2006 and cover the period FY 2006 through FY 2011. They were derived from NASA's Competency Management System and then reviewed and updated by the Centers and Mission Directorates. The Agency will continue to update and refine these analyses as the Agency completes plans for exploration systems programs and projects, defines the nature of the work content for the programs/projects, and determines the roles the various Centers will have in accomplishing this work. Further refinements are likely in the area of aeronautics as well, as NASA returns to long-term investment in cutting-edge fundamental research.

NASA has, and will continue to, make use of available tools and flexibilities to recruit and retain a quality workforce, including financial and non-financial incentives, technology-based processes to facilitate recruitment, and a high-quality work environment.

Pressing Workforce Challenges

NASA's approach to addressing its two most pressing workforce challenges—uncovered capacity, caused by program changes and cancellations and budget constraints, and retaining Space Shuttle employees through its retirement in 2010—reflects the Agency's commitment to the principles and approaches reflected in the Workforce Strategy.

NASA has been addressing the challenge of mitigating the number of civil service full-time equivalents (FTEs) not currently supporting NASA programs (the so-called "uncovered capacity") through a number of means for many months. Initial efforts (since 2004) included: retaining sufficient work in-house to protect and strengthen core capabilities; sponsoring job fairs to facilitate transferring employees to Centers needing their skills; implementing hiring controls and establishing ceilings on Center complements to provide more opportunities for placing employees; and encouraging voluntary attrition through buyouts and early-outs. Although these efforts have been responsible for reducing the problem by two-thirds, NASA still has significant uncovered capacity problem.

NASA is focusing efforts to deal with our remaining uncovered capacity through a number of other actions, including: assignment of new projects to research Centers to maintain the base of in-house work; movement of certain research and technology development projects from certain Centers without uncovered capacity problems to Centers that have them; retraining efforts at Centers so that the technical workforce can develop new skills; and the pursuit of reimbursable work for projects and research to support other government agencies and the private sector through Space Act Agreements. The first examples of the new assignments were provided in last week's announcement of the placement of some of the Constellation program's work. All Centers are now a part of the Constellation program, and major new assignments were made at several Centers that reduced their uncovered capacity significantly. We expect to continue to address the uncovered capacity through additional actions, as described above, throughout this fiscal year. As we have testified before, NASA will conduct a reduction in force of any of our civil servants only as an action of last resort consistent with our statutory constraints.

The Subcommittee has asked how NASA has ensured that employees with critical skills have not accepted the buyouts I mentioned a moment ago. The answer is this—As required by the *NASA Flexibility Act of 2004,* NASA periodically conducts analyses of critical workforce needs and documents in a Workforce Plan the Agency's *critical* (as defined in that document) workforce competencies. The most recent Workforce Plan, Revision 1, dated June 6, 2005—provided to the Congress in accordance with the Act—lists the following among the critical workforce competencies: program/project management, systems engineering, integration engineering, mission assurance, quality engineering and assurance, safety engineering and assurance, propulsion systems and testing, habitability and environmental factors.

In addition, since FY 2003, and consistent with Congressional direction from NASA's annual appropriation, the NASA Administrator has certified that any payments to separated individuals under approved buyout plans will not result in the loss of skills related to the safety of the Space Shuttle or the International Space Station or to the conduct of independent safety oversight in NASA.

Buyout plans are developed by Centers, based on their in-depth analysis of the competencies needed to staff their continuing programs and the number of employees needed in each competency area. A Center's buyout plans must identify the competencies they intend to reduce. Buyout plans are then reviewed by Headquarters staff to ensure that NASA is not buying out critical competencies, and the plans must be approved by the Chief Human Capital Officer. As a general rule, the Agency would not permit Centers to include any critical workforce competencies in their buyout plans. However, it is possible that a particular Center might need fewer employees in a critical workforce competency than currently on board, while other Centers might have vacancies in that area. If this were to occur, NASA would attempt to place those individuals at other NASA locations where their skills were needed before offering buyouts. Only if this were not possible would the individuals be approved for a buyout. The Center's buyout plans must provide documentation that they are not buying out individuals associated with a critical competency that could be used at that employee's Center or another Center to which the employee is willing to relocate.

NASA is also addressing unique challenges presented by retiring the Space Shuttle: retaining the skills necessary to safely execute the remaining Space Shuttle missions and managing the transition of the Space Shuttle workforce in a way that balances Agency and employee needs, capitalizing on the capabilities of that workforce to advance the Vision for Space Exploration, while recognizing that fewer people will be required to sustain exploration operations. The magnitude and complexity of the Space Shuttle workforce issues require coordinated workforce planning—involving Centers, Programs, Projects, Mission Directorates, and Mission Support Offices—and continuing analyses of competency gaps and surpluses. A Shuttle Human Capital Working Group has been established to coordinate the development, implementation, assessment, and updating of coordinated human capital plans and to ensure that Space Shuttle workforce issues and concerns are raised to all stakeholders so that solutions support both the current Space Operations Mission Directorate needs and future Exploration Systems Mission Directorate requirements. NASA will continue to conduct active, timely, and open communications with Space Shuttle employees on the status of their work, future opportunities, and other issues of concern. The Agency's approach to ensuring that critical skills are retained involves non-financial motivators as well as the more traditional incentives—providing challenging, exciting follow-on work in Constellation and other programs; maintaining NASA's quality workplace by providing a collaborative and creative environment and supporting career development and learning opportunities; and offering financial incentives (such as retention bonuses, qualifications pay, and temporary promotions) on a case-by-case basis, when appropriate.

Human Capital Tools and Flexibilities

The tools provided by the *NASA Flexibility Act of 2004,* for example—in conjunction with our other human capital flexibilities, programs, and initiatives—are vitally important to the Agency in addressing current workforce issues and in strengthening and reshaping the workforce to support the *Vision for Space Exploration.* The value of the NASA Flexibility Act lies in the fact that it consists of several diverse authorities and flexibilities that provide targeted solutions to multiple challenges—the need to recruit new talent and the need to leverage the talent of the current workforce.

When we choose to fill a position externally, we must make the most of the opportunity and hire the very best. The new hiring authorities and incentives help us attract the talent we need. Two incentives that have been particularly effective are the enhanced annual leave authority and the authority to pay full travel and transportation costs when a new appointee must relocate to accept the job. We must also leverage the talent of our current workforce as programs and technologies change. The qualifications pay and relocation bonus authorities are helpful when we must incentivize employees to take new positions in which their expertise is needed. Furthermore, the term appointment authority, the Senior Executive Service limited term appointment authority, and the extended Intergovernmental Personnel Act assignments are ideal hiring approaches to achieving the objective of an agile workforce suited to respond to program and project changes.

In addition, while we have not been able to employ as many recent college graduates as we had hoped over the last few years due to current uncovered capacity in some areas, NASA Centers have made use of programs such as the Student Employment Program ("Co-op" Program) and the Federal Career Intern Program (FCIP) to recruit new talent into the Agency. NASA Centers have cooperative education program agreements in place with multiple universities. Co-op students have an opportunity to demonstrate their abilities on the job to NASA managers, and the best of them are converted to entry level engineers, scientists and business professionals upon graduation. The FCIP has also allowed us to hire recent college graduates. The fact that these interns are brought in under term appointments, with the ability to convert them to permanent, provides additional flexibility in managing our FTEs. While the NASA Flexibility Act gives NASA the Distinguished Scholar Appointment Authority, the Agency has not made extensive use of this particular tool, since it does not provide the same flexibility as the FCIP to bring in entry level employees on term appointments. External hiring of individuals into *permanent* positions (as under the Distinguished Scholar Appointment Authority) is being more closely controlled until uncovered capacity numbers are reduced.

Among other human capital tools and programs critical to retention of needed workforce capability are efforts to support employee career development and learning activities. NASA is strongly committed to the principle of life-long learning for its employees and recognizes that providing employees a clear vision of career development opportunities is a valuable tool in retaining needed skills. NASA actively promotes training programs to develop and maintain skills, including leadership

skills. NASA's Strategy for Leadership and Career Development, for example, includes a framework for a consistent and integrated approach to leadership and management development. Elements include: core experiences and broadening opportunities, including intellectual and geographic mobility, as appropriate; core and optional courses relevant to both achieving mastery in the employee's current role as well as preparing for the next step; required role-specific courses on safety and diversity; assessments of feedback from subordinates, supervisors, customers, peers, and stakeholders; continuing education; individual development plans; and coaching and mentoring. NASA's leadership programs are benchmarked government-wide as a proven process to develop future leaders, as well as share mission-critical knowledge across an organization.

In addition, NASA sponsors programs for the transfer of technical and organizational knowledge through its Masters Forum, *ASK Magazine,* and the Academy of Program/Project and Engineering Leadership learning programs. From these activities, program/project managers and engineers engage, share, and learn from fellow practitioners through stories and lessons learned.

Beyond these Agency-wide programs, many Centers are taking steps to develop innovative programs for mentoring and building program and project leadership skills in the context of the Center's mission.

NASA recognizes the importance of maintaining a reputation as a "good place to work" and continues to support human capital practices that foster such an environment. For example, the Agency devotes significant attention to performance assessment and recognition, recognizing that these contribute to employee satisfaction and to resolution of problems that might otherwise impede mission success and morale.

The most important retention factor for NASA is the mission itself. We have a very low attrition rate because of the nature of our mission. Talented and high-performing individuals are attracted to organizations that provide challenging work in a creative professional environment offering opportunities for growth. The *Vision for Space Exploration,* which gives the Agency a new long-term vision and clear, bold objectives is, as the Workforce Strategy points out, the archetypal creative professional opportunity.

Conclusion

The Workforce Strategy that NASA has developed and will continue to refine allows NASA to deal effectively with the critical issues now facing the Agency. NASA realizes, however, that it is not sufficient to solve the immediate problems. Rather, the Agency's goal is to address these issues now on an integrated, Agency-wide basis, putting in place approaches that not only alleviate the Agency's current imbalances, but also provide a structure that allows such issues to be resolved in the future as part of a "normal process." NASA does recognize that some future events, such as retirement of the Space Shuttle Program, require long-term planning and Agency-level coordination. The foundation being built today, however, will greatly facilitate their resolution.

BIOGRAPHY FOR TONI DAWSEY

As the AA and CHCO, Ms. Dawsey has stewardship responsibility for NASA's civil service workforce, much as the Chief Information Officer and Chief Financial Officer do for information and fiscal resources. She is responsible for setting the Agency's workforce development strategy; assessing workforce characteristics and future needs based on the Agency's mission and strategic plan; aligning the Agency's human resources policies and programs with organizational mission, strategic goals, and performance outcomes; developing and advocating a culture of continuous learning to attract and retain employees with superior abilities; identifying best practices and benchmarking studies; and serving as a member of the Office of Personnel Management-led Chief Human Capital Officers Council.

Ms. Dawsey joined NASA in April 2004, returning to federal service from early retirement to serve as the Director of the Agency Human Resources Division within the Office of Human Capital Management. In her role as Director, she was responsible for establishing a broad range of Agency-wide human resources programs.

During her previous federal career, Ms. Dawsey developed an extensive background in all aspects of human resources (HR) management while holding HR specialist and manager positions at the Department of Transportation, Office of the Secretary; Department of Agriculture; NASA's Goddard Space Flight Center; and the Federal Trade Commission. Her experience also included positions of increasing responsibility in the Office of the Inspector General, Department of Transportation. From 1993 to 1995, she served as Deputy Assistant Inspector General for Inspections and Evaluations, Department of Transportation, where she directed a staff in

providing independent and objective inspections and evaluations of the Department's programs and operations to detect fraud, waste, abuse and mismanagement.

Ms. Dawsey received her B.A. from the University of Maryland. She has received many awards throughout her career, including the Department of Transportation's Silver Medal, and two Bronze Medals.

Chairman CALVERT. Thank you very much.

With that, I would like to recognize my friend from Colorado, Mr. Udall.

Mr. UDALL. I thank the Chairman. I want to welcome the panel. I would ask unanimous consent that my entire statement could be included in the record.

Chairman CALVERT. Without objection, so ordered.

Mr. UDALL. And with an interest in moving to the further testimony, I just had a couple of remarks.

I wanted to acknowledge that ensuring that we have the right sized workforce for NASA won't be a small task, and that is why we are glad you all are here today, and I think I join the Chairman in suggesting that I hope this isn't just one of—this is one of a series of hearings that we will have on this topic, because it is very, very important.

And in particular, I am looking forward to hearing from the NASA Professional Technical Engineers Union to get perspective on the employees' point of view. Also, we are not specifically having, as the prime focus today, the contractor workforce, but this has long been a debate in NASA, and I think this will be important to hear all your perspectives on that.

And finally, it is, I think, worth noting that if we continue, I think, an Exploration Initiative that eliminates or cuts other core NASA missions, in the end, that Exploration Initiative may be difficult to sustain, and similarly, a workforce strategy for NASA that is only based on the Exploration Initiative may also prove difficult to sustain.

So, again, I want to welcome the panel. I appreciate you taking time to come up here to the Hill, and I would yield back, Mr. Chairman.

[The prepared statement of Mr. Udall follows:]

PREPARED STATEMENT OF REPRESENTATIVE MARK UDALL

Good morning. I want to join the Chairman in welcoming the witnesses to today's hearing.

Ensuring that NASA has the right workforce for the future is going to be no small task, so we look forward to hearing your perspectives. However, it's clear to me that it will take more than one hearing to adequately address the issues surrounding NASA's workforce strategy and planning.

I hope that this hearing will just be one in a series of hearings on this topic—we owe it both to the highly talented NASA employees as well as to the broader aerospace community to make sure NASA and Congress "get it right" in attempting to shape NASA's future workforce.

Now, it should be evident that NASA's civil service workforce consists of some of this nation's "best and brightest." In most cases, they have made a long-term commitment to public service. I respect them for that commitment, and I think that whatever workforce strategy NASA develops should build on the strengths that those individuals bring to the Agency because if those skills are discarded, whether for short-term budgetary reasons or for some other reason, we could find out at a later date that it is difficult if not impossible to recapture skills that the Nation discovers it needs.

In that regard, I look forward to hearing from the representative of NASA's professional and technical engineers union to get the perspective of the employees on what NASA needs to do to attract and retain the best workforce possible.

This subcommittee needs to hear what the NASA *employees* think NASA is doing right—as well as what they think needs correcting. Yet NASA's civil service workforce is only part of the overall workforce equation.

NASA has long depended on the private sector to help carry out a significant portion of the Agency's activities. While that contractor workforce is not the prime focus of today's hearing, the issue of how best to balance the roles of NASA's civil service and contractor workforces is one that the Agency has wrestled with for a long time—with different Administrators often reaching different conclusions.

Currently, the problem of attaining an appropriate balance is made even more difficult by the ill-advised cuts that have been made to NASA's aeronautics, microgravity life and physical sciences, and long-term technology development programs, as well as to parts of NASA's space and Earth sciences activities.

In fact, those cuts are hurting researchers across-the-board: at NASA Centers, at universities, and at companies and other organizations as well as diminishing the amount of productive research that can be undertaken at each of those places.

Moreover, I fear that those cuts are going to wind up discouraging the *emerging* generation of scientists and engineers from pursuing careers in space and aeronautics at NASA—something that an agency with an aging workforce like NASA's can ill-afford.

I have made no secret of my belief that an exploration initiative that can only be implemented by cutting or eliminating other core NASA missions is going to be difficult to sustain. Similarly, a *workforce strategy* for NASA that is based only on the needs of the President's exploration initiative may also prove difficult to sustain.

Mr. Chairman, we have important issues to consider today. I again want to welcome our witnesses, and I look forward to their testimony.

Chairman CALVERT. I thank the gentleman, and I would ask unanimous consent for all Members to add supplemental material to the record.

Without objection, so ordered, and with that, Mr. Honda, you have a special guest that you would like to introduce.

Mr. HONDA. Yes, thank you, Mr. Chairman. I appreciate that.

I am about to introduce a nearer constituent, Dr. Lee Stone, of NASA's Ames Research Center. Dr. Stone is a human factors engineer and research psychologist in the Human Systems Integration Division at NASA Ames. That is a real important title there. He received his B.A. in biophysics from Johns Hopkins, his M.S. in engineering from the University of California-Berkeley, his Ph.D. in neuroscience from the University of California at San Francisco.

Dr. Stone has more than 20 years of experience studying and modeling human perceptual and motor performance, with an emphasis on the signals that influence tracking, search and control performance, and interface design. Since 1995, he has been a principal investigator on numerous NASA grants and projects, and has run a human performance R&D laboratory at Ames in support of aeronautics and space human factors programs. He also served as project scientist for the Rhesus Project and as Acting Chief of the Human Information Processing Research Branch.

Dr. Stone is the Vice President for Legislative Affairs of the International Federation of Professional and Technical Engineers Local 30 at Ames, and is the Legislative Representative of the NASA Council of the IFPTE Locals.

Dr. Lee and I have met several times before, and I know that he will be able to substitute for Greg Junemann, who was unable to be here because his son is on a brief leave from Iraq.

Thanks to Lee for being here, and thank you, Mr. Chairman. I will yield back the balance of my time.

Chairman CALVERT. Thank the gentleman, and with that, Dr. Stone, you are recognized for five minutes. Thank you.

**STATEMENT OF DR. LEE STONE, LEGISLATIVE REPRESENTA-
TIVE, INTERNATIONAL FEDERATION OF PROFESSIONAL
AND TECHNICAL ENGINEERS**

Dr. STONE. Good morning. Thank you, Chairman Calvert and
Ranking Member Udall, for providing the International Federation
of Professional and Technical Engineers, NASA's largest union, this
opportunity to present our perspective on the workforce challenges
facing NASA today. It is an honor for me to represent IFPTE and
to stand in for President Junemann, who could not make it here
today, because as you heard, he is with his son, a Marine who has
just returned from Iraq for just a few days.

So you ask, does NASA have the right strategy and policies to
retain and build the workforce it will need? Unfortunately, the cur-
rent short answer is no. Last February, NASA human resources
took a wrong turn in its workforce planning, and as yet, this has
only been partially corrected. After consideration of the facts pre-
sented here today, we ask that the Subcommittee support a course
correction.

IFPTE's response to NASA's draft workforce plan identified three
key issues at the core of NASA's HR problem, a faulty competency
management system, improper reliance on term positions, and
most importantly, the policy decision to seek full cost recovery of
Civil Service salary. While NASA claimed to convert over to full
cost accounting, in reality, it converted over to a full cost recovery
system that allowed distant program managers to siphon salary
and facilities money away from the Field Centers, and that precip-
itated two crises. First, key facilities went bankrupt, and second,
uncovered capacity was born.

In response to language in the Authorization Act, the Agency has
recently taken care of the former problem by establishing the
Shared Capability and Assets Program, or S–CAP, to fund other-
wise uncovered facilities. Unfortunately, the analogous threat to
NASA's intellectual capabilities and institutional knowledge re-
mains unaddressed.

Furthermore, NASA's Civil Service workforce is showing some
troubling trends. First, the ratio of science and engineers to non-
clerical administrative positions has been steadily decreasing, and
may soon fall below two. Any competitive, high tech, private sector
institution would be looking to streamline its management struc-
ture long before it would seek to eliminate technical experts and
R&D personnel.

Second, NASA has reduced its Civil Service complement by near-
ly 30 percent since 1994, yet now, it has much more on its plate.
Any further decrease in the Civil Service component would cut mis-
sion success, would put mission success at increased risk by leaving
NASA less able to perform proper technical monitoring and over-
sight of its contractor and academic partners.

NASA must begin to aggressively recruit what will become its vi-
sion generation, while also fostering carefully targeted, voluntary
separations. Attrition needs to be anticipated, controlled, and intel-
ligently compensated for, not blindly accelerated. To meet the in-
creased demand for technical work associated with the vision,
NASA's Workforce Strategy must focus on a hiring plan, not last
year's harmful and divisive layoff plan.

Administrator Griffin deserves considerable praise for realizing that all of NASA's Centers should share in the work opportunities provided by the Constellation program. This idea, however, has been difficult to implement fully. We urge Dr. Griffin to persevere in this critical effort to achieve the budgetary and programmatic balance needed to support 10 healthy Centers.

The Constellation work assignments, however, cannot be the complete solution. The only sustainable, long-term solution is to reverse NASA's current trend of cuts to aeronautics, exploration research and technology, and science programs, and to resurrect and maintain a strong, crosscutting R&D effort that benefits all of NASA's missions, and contributes to America's economic competitiveness.

Therefore, IFPTE would like to submit five recommendations for NASA management.

First, pledge not to lay off any NASA employees in the foreseeable future. Young engineers and scientists need, once again, to see NASA as a great career move, and the harmful distraction caused by disruptive and wasteful RIF planning must stop.

Two, request legislation to allow enhanced buyout authority. We need to provide a more appropriate compensation package, which would gracefully save the taxpayer a lot of money in only a couple of years.

Three, reject the failed policy of full cost recovery of Civil Service salary. Set up a salary equivalent to the S–CAP account to cover 25 percent of technical employees' time, to preserve our intellectual assets and our institutional knowledge, which are as important to mission success as are our facilities.

Five—I mean four. Embrace genuine and auditable full cost accounting, not full cost recovery. Require that all employees record their time accurately, and use the honest data acquired to perform valid financial and workforce planning.

Five, re-embrace NASA's aeronautics, science, and technology missions. The current and proposed cuts to all of NASA's activities other than Shuttle, ISS, and Constellation are too severe, and should be moderated.

In conclusion, IFPTE is greatly encouraged by Dr. Griffin's efforts to keep appropriate technical work in-house, and to distribute it more fairly and intelligently across the Centers. We ask that he reject last year's HR plan, and embrace a new approach focused on recruiting and retaining the world-class intellectual capital needed to meet the challenges of the *Vision for Space Exploration*.

In closing, we would also like to take this occasion to thank Chairman Boehlert for his long and dedicated career of public service. On behalf of the many thousands of NASA employees that we represent, IFPTE thanks him, and wishes him well in the next phase of his life.

Once again, Chairman Calvert, Ranking Member Udall, thank you very much for the opportunity to bring these important issues to your attention.

[The prepared statement of Dr. Stone follows:]

PREPARED STATEMENT OF LEE STONE

Testimony of Gregory J. Junemann, President, International Federation of Professional & Technical Engineers, AFL–CIO & CLC

Delivered by Dr. Lee Stone, Legislative Representative NASA Council of IPFTE locals

Thank you, Chairman Calvert and Ranking Member Udall, for providing the International Federation of Professional and Technical Engineers, NASA's largest Union, this opportunity to present our perspective on the workforce challenges facing NASA today. It is an honor for me to represent IFPTE and to stand in for President Junemann, who could not make it because today he is with his son, a Marine who has returned from Iraq for just a few days.

IFPTE's primary interest in testifying today is to provide forceful advocacy for maintaining the broad technical excellence and independence of NASA's civil service workforce that has served the Agency well for decades. Last January, we believe that NASA took a wrong turn in its workforce management and planning. We hope that, after careful consideration of the facts presented here today, the Subcommittee will support an urgently-needed course correction. Indeed, the new Administrator appears poised to steer HR in a better direction. We hope that this hearing will prove to be the turning point.

IFPTE fully endorses the "ten healthy Centers" philosophy put forward by Dr. Griffin. This firm endorsement of Field Centers, together with appropriate re-invigoration of NASA's commitment to Aeronautics, Scientific Research, and cutting-edge Technology Development will make for a healthy agency. Since last February, NASA's Human Resources (HR) however has remained engaged in an ongoing downsizing effort, inconsistent with ongoing programmatic planning, with inadequate attention to the long-term mission needs of the Agency.

Recent history:

In July of 2002, then-Administrator O'Keefe testified to the Full Committee that NASA was facing a looming workforce crisis because its core technical staff was rapidly nearing retirement and had not been properly replenished over the years. He asked for, and was granted, several changes to Title 5 that afforded him new authorities. These new powers were specifically designed to retain and postpone the retirement of NASA's technical staff so that they might serve as mentors while the Agency aggressively recruited the next generation of young scientists and engineers. This was a good plan, and IFPTE endorsed Chairman Boehlert's Flexibility Act to give NASA management the tools they requested to implement that plan.

Rather than moving forward with hiring this urgently-needed next generation of scientists and engineers, NASA actually proceeded in the opposite direction:

- In February of 2005, NASA management testified before this committee that there would be workforce stability and that there would be no layoffs for two years. Meanwhile, senior management had just approved and initiated a workforce transformation plan designed to reduce NASA's civil service complement by 2,673 employees (co-incidentally the number of retirement eligible employees) through increasingly aggressive tactics, culminating in a Reduction-In-Force (RIF) before the end of FY 2006 (Appendix A). Rather than working to retain its Apollo-era engineers and scientists, the plan targeted retirement eligible staff for buyouts and pressured them to retire.

- Frustrated by the legal requirement that 75 percent of the Flexibility Act bonus money is reserved for technical staff, management barely used the new flexibilities at all. Meanwhile, on average, they provided larger bonuses to their Senior Executive Service employees than any other federal agency (Appendix B). They also made little effort to use their new authorities to recruit new technical employees or to convert term employees to permanent status.

- Since February of 2005, threats of RIFs and/or forced relocation have been openly used to accelerate attrition with little regard to the skills being lost. In the several rounds of buyouts performed over the last two years, employees with skills listed as "critical needs" were offered buyouts. Many talented and experienced NASA employees left and the morale and productivity of those who remained were seriously harmed.

- Further evidence of the lack of thought in this process can be seen in the fact that the "critical needs" list has changed dramatically since its inception (Appendix C). Many skills deemed critical in 2004 are now listed as excess capacity and vice versa (e.g., Human Factors was deemed critical and slated for growth in 2004, yet in 2005 became slated for reduction; Computational Fluid

Dynamics and Rotorcraft were slated for near-elimination in 2004, but are now highlighted in NASA's new Aeronautics Program).

In the *NASA Authorization Act of 2005,* Congress once again called on NASA management to provide a coherent and thoughtful "Workforce Strategy" that the Science Committees could use to guide their oversight of the Agency's realignment in support of the *Vision for Space Exploration.* The plan delivered to Congress was however seriously deficient. IFPTE provided two analyses of the draft submitted to us: one providing traditional "consultation" on policy weaknesses in the Strategy (Appendix D) and a second that addresses the failure of the document to meet the minimum standards set forth in the Authorization Act (Appendix E). Unfortunately, despite our input, NASA management did not modify their draft in any substantive way before delivering it to you. The bottom line is that while there are a number of legitimate ways of overseeing a workforce transformation that could be the focus of discussion here, NASA's Workforce Strategy simply does not have sufficient content to engender that discussion. Indeed, even last week's announcement of the Constellation "Work Assignments," an essential component of the ten Healthy Centers philosophy, did not have any concrete manpower and budget estimates associated with them. Two months after Congress explicitly asked for delivery of these key workforce numbers, NASA management continues to work the issue and has not given an indication when those numbers will be provided.

NASA's Workforce Strategy—April 2006:

IFPTE's response to the Draft Workforce Plan identified three key general issues at the core of the problem with their current HR activities.

First and foremost, full-cost recovery of civil service salary is the key driver of the current crisis:

- When NASA claimed to convert over to "full-cost accounting" in FY04, it actually converted over to a full-cost recovery system that allowed distant program managers to siphon salary and facilities money away from the Field Centers. By giving so much power to program managers who have little interest in preserving institutional capabilities, labor and facility costs were lowballed to increase the manager's discretionary spending. This precipitated two crises: 1) key facilities went bankrupt and 2) uncovered capacity was born. The Agency has recently taken care of the former problem by establishing the Shared Capability Assets Program (S–CAP) to fund otherwise "uncovered" facilities, in response to key language in the Authorization Act. Unfortunately, the analogous threat to NASA's intellectual capabilities and corporate knowledge remains unaddressed.

- It is a fallacy that uncovered capacity (personnel not funded directly by program funds or by "good" G&A) is idle or unneeded capacity. Program managers are using what was once civil service salary money to pay for procurement and that, in turn, makes Center management divert money that once was available to pay for programmatic activities to increase the Center G&A needed to pay for the "uncovered" salaries. The net effect of this circular juggling act is the creation of the false perception that there is a mass of civil servants who are not performing useful work and are not needed. Uncovered capacity keeps increasing, despite all the recent downsizing activities. Last November, HR told IPFTE that there were only 850 uncovered employees left. In December, about 350 took a buyout or early-out. Yet, HR now claims that the uncovered capacity is back up to 1,000. How can this be? Uncovered capacity is a fiction, an arbitrary number created by management's desire to convert people into money to pay for the short-term financial needs created by unfunded programmatic mandates (i.e., moving up the CEV delivery date to 2012 or earlier).

- The conversion to "full-cost accounting" has paradoxically provided no usable accounting data on actual cost. Program management first almost arbitrarily assigns a work group a list of charge numbers (Work Breakdown Structures or WBSs) ostensibly representing the various programs (and/or G&A) supporting the employees in that group. Employees are then instructed by line management to log their fixed ration for each pay period *regardless of what work was actually performed.* This process is required by the Integrated Financial Management System that creates hundreds of salary bins that need to be precisely spent (or funds will run out or be left over). Thus, the false accounting of work is simply a regurgitation of management's fictitious workforce planning. This is closely related to NASA's ongoing inability to cleanly pass a financial audit.

- The assignment of work is then done completely independently, such that some activities are performed yet don't show up on the books (e.g., some employees tasked to work on the Smart Buyer Project were not provided a charge number so they charged time elsewhere) and some "work" is charged that is not actually performed (e.g., upper-level line managers routinely charge their time to programs although they generally perform no programmatic work. This is used as a means to artificially reduce Center G&A).
- The bottom line is that NASA's bizarre version of "full-cost accounting" does not account for the work its employees are actually performing. The false data generated can neither be used to make NASA more efficient/effective, nor to do any rational financial or workforce planning.

Second, HR has is relying overwhelmingly on term positions.

- Of the 1,426 outside hires since the beginning of FY 2005, only 403 were full-time permanent employees, leaving 1,023 employees likely to be separated from the Agency in two to six years.
- The decision to offer term or permanent status should be based on a careful technical analysis of the job requirements and of the long-term need for the relevant skills, but no such analysis is happening. Employees are hired in as terms simply to undermine the civil-service tenure process; many are slated for long-term employment, but are simply not hired as "perms."
- The extensive use of term positions is threatening the quality of our technical staff. The best and brightest new scientist and engineering graduates are being wooed by MIT, Johns Hopkins, Stanford, Cal Tech, UC–Berkeley and many other high caliber academic institutions. All premier academic institutions offer tenure. In the past, NASA has been able to get its fair share of these candidates because it offered a similar package of benefits and a similarly excellent intellectual environment. Term positions, together with full-cost accounting and the large-scale de-scoping of NASA's in-house Research & Technology programs, hinder NASA's ability to recruit the best talent. If tenure were a bad idea, elite academic institutions would have abandoned it years ago.
- Tenure is the foundation of intellectual freedom. Permanent civil service employees are more likely to summon the courage to speak truth to power and perhaps save the Agency from another catastrophe. Term employees, or even uncovered permanent employees under the threat of RIF and forced to plead for a charge number, are much more vulnerable to the pressure to go with the flow. They might remain silent at that crucial moment, which is one of the major concerns brought to light by the *Columbia* Accident Investigation Board.
- Tenure is the foundation of institutional memory. Mission success, especially at an Agency that is embarking on a 30-year mission to get to Mars and back, will be put at considerably increased risk if its technical staff is constantly turning over. We need the same young engineers, who design and test the Crew Exploration Vehicle, to be available as older engineers when NASA is facing some as-yet-unforeseen technical problem down the road.

Third, NASA has based its plan on a poorly implemented, improperly interpreted, and ill-defined Competency Management System (CMS).

- HR CMS analysis does not distinguish between 100 employees who have five percent of their salary uncovered (a healthy situation) from 95 fully covered and five fully uncovered employees (a less healthy one). Given that people are not easily sliced, the competency numbers are *a priori* not particularly useful for determining or forecasting "uncovered" capacity.
- The CMS dictionary vocabulary is vague, overlapping, continuously under-revision, and at odds with the vocabulary used for the Critical Needs List. Some competencies are so vague as to be useless (e.g., "Program Management"—program success depends on having specific skills tailored to the specific program, and not generic ones). What is the difference between the "Power and Propulsion" competencies that we plan on increasing and the "Advanced In-Space Propulsion" and "Power Systems" competencies that we plan on decreasing (both on p. 18 of the Workforce Strategy)?
- When the CMS was first presented to the Union in April of 2003, we were told that there would be multiple, multi-dimensional databases (that would include the primary and a series of secondary competencies of current positions, current employees, future demand, etc.) and that most of these data-

bases would be validated and certified by the end of FY03. Three years later, HR is still only using the primary competency of the least useful "position" database, which contains very little information about the skills and capabilities of the current workforce.

In addition to these key flaws above, HR's Workforce Strategy simply does not provide the information about NASA's workforce sought by Congress under the Authorization Act (see Appendix E) nor does it provide an analysis of NASA's management structure.

Balancing NASA's workforce:

NASA has experienced an accelerating increase in the proportion of non-clerical administrative positions, even excluding SES (see Appendix F). NASA now has only 2.1 scientists & engineers for every administrative position. This is clearly unbalanced. Any successful, competitive, private-sector institution would be looking to streamline its management structure long before it would look to eliminate technical experts and R&D employees. Current HR practices are however only making a bad situation worse (all of the numbers below come from NASA's Workforce website).

- Of the 403 full-time permanent employees hired since the beginning of FY 2005, only 90 (22 percent) were scientists or engineers while 299 (74 percent) were non-clerical administrative.
- Of the 1,905 full-time permanent employees lost since the beginning of 2005 (Note: >10 percent attrition over 20 months), 906 (48 percent) were scientists or engineers while only 646 (34 percent) were non-clerical administrative. This is reflective of a random attrition model, as opposed to a properly controlled attrition model that encourages retention of technical skills.
- NASA has given 981 buyouts since the beginning of FY 2005, 455 (46 percent) to scientists and engineers but only 272 (28 percent) to non-clerical administrative employees, again reflective of a skills-blind downsizing effort.
- NASA management has been limiting the hiring of rank-and-file technical employees (i.e., many Centers have been working under a near-total hiring freeze) while increasing the hiring of administrative positions (e.g., up to 600 new financial/business management positions are foreseen on p. 16 of their Workforce Strategy, independent of the hiring going on at the NSSC).

IFPTE fully believes that NASA benefits from the synergy generated by its combined federal and private-sector workforce. We believe that NASA has already achieved a reasonably healthy balance between its current full-time permanent civil-servant workforce of 16,664 and an "in-house" contractor workforce of around 40,000. There has already been a nearly 30 percent decrease from the civil service compliment in FY94, which was 23,695, yet NASA now has much more on its plate. Any further decrease in the civil service component below the current ratio of more than 2.1 contractors for every civil servant puts mission success at risk, leaving NASA incapable of proper technical monitoring and overseeing its contractor efforts (see the *Columbia* Accident Investigation Board final report).

The Agency needs to engage more scientists, engineers, and technicians, and fewer managers, deputy managers, associate managers, and assistant managers. NASA's dedicated technical workforce at all of its Centers, both civil servant and contractor, stands ready, willing, and able to support NASA's missions.

Attrition:

Attrition needs to be controlled, not blindly accelerated. If NASA does absolutely nothing, its workforce will soon fall below the 16,000 contemplated by the aggressive downsizers (Appendix D). Just to maintain the reduced workforce levels projected in the Workforce Strategy, NASA must perform an intelligent combination of aggressive recruitment and carefully targeted *voluntary* separations. The Workforce Strategy should focus on a hiring plan, not last year's layoff plan that is still working its way through its timelines, impeded only by the RIF-moratorium in the *NASA Authorization Act of 2005*.

Work transfers:

Administrator Griffin deserves considerable praise for realizing that all of NASA Centers should share in the work opportunities provided by the Constellation program, according to their capabilities and facilities. This idea, however, has been difficult to implement fully, and is ultimately only a short-term solution.

- Two successive attempts to shift work from over-funded to under-funded Centers have not fully come to fruition. We urge Administrator Griffin to per-

severe in this critical effort to achieve the budgetary balance needed to support ten healthy Centers. The Exploration Centers must forge greater collaboration with the other Field Centers in order to progress beyond the current crisis and ultimately to make NASA stronger.

- The Constellation work assignments are largely short-term technical oversight tasks for hardware development programs, with the lion's share of the work ultimately being handed over to the private sector. These assignments do not cover many of the Agency's world-class scientists and technology developers, whose innovative research is critical for the long-term health of the Agency and the ultimate success of the Vision for Space Exploration. Visible investment in such self-initiated research and development (R&D) is also essential for recruiting and retaining the best and brightest young minds, interested in cutting-edge research. Even more importantly, after the current flurry of spacecraft designing is over, many employees could find themselves "uncovered" once again. The only sustainable solution is for NASA to reverse its current trend of severe cuts to its Aeronautics, Exploration Research and Technology, and Science programs and to resurrect and maintain a strong cross-cutting R&D effort that benefits all missions.

Technical Independence:

The reason that all premier Universities continue to embrace tenure as a key component of their workforce planning is that, not only does this allow them to compete successfully for the best new talent, but also because it is a proven path to academic freedom and credibility. In the federal sector, comparable civil-service protections translate into the ability to speak truth to power. Tenured NASA engineers and scientists continue to face the potential threat of reprisal for expressing technical views that are at odds with management. Recently, we have witnessed evidence that the Public Affairs Office has altered or suppressed scientific expression on the Big Bang, climate change, and astronaut survivability. While we applaud the new Administrator's repudiation of such behavior, it remains obvious to many that speaking out still has its price. NASA still needs to improve on this. Full-cost recovery of salary, RIF threats, and term hiring only serve to undermine the independence of NASA's technical experts. Successful policies and missions rest on a solid backbone of truthful, reliable, fearless data gathering and analysis by experts, who are shielded from political or financial pressure.

Recommendations:

In order to move forward and better support all of NASA missions, IFPTE would like to submit the following recommendations for NASA management:

1. **Pledge not to lay-off any NASA employees in the foreseeable future.**

   - Civil Servant employees must once again feel respected and valued.
   - The best and brightest young engineering and science graduates need once again to see NASA as a great career move, comparable to accepting a job at a premier academic or private-sector research institution (e.g., MIT or Google).

2. **Request legislation to allow limited, targeted, enhanced buyout authority.**

   - Many non-critical employees would like to retire immediately, but need to stay on a few more years for financial reasons. A more reasonable compensation package would greatly help NASA and would save the tax payer a lot of money in only a couple of years.
   - The industry standard is one year's pay, which is much more than NASA's $25,000.

3. **Reject the failed policy of full-cost recovery of civil service salary.**

   - Set up a salary equivalent to the S–CAP account to cover 25 percent of all technical employees' time. This would more honestly cover training, outreach, proposal writing, center-supported high-risk high-payoff pilot research, Space Act agreements that don't involve salary, and other management assignments that are currently falsely assigned to programs.
   - This would not only eliminate the false uncovered problem once and for all, but would also empower line managers who currently feel disenfranchised by "full-cost."

4. Embrace genuine and auditable full-cost accounting (not full-cost recovery).

- Require that all employees log their time accurately reflecting the work performed as assigned by one's supervisor, instead of back-filling what center or program management wants to see.
- Use the honest data acquired to perform valid workforce planning (indeed by noting the deviation between predicted and actual work hours performed in each category, one can improve the financial and workforce planning processes).
- Require all managers to charge their salary to an appropriate G&A account, unless they actually perform technical work for a program. This frees up program dollars to support actual programmatic work and properly logs increasing G&A costs so that they can be properly identified and controlled.
- Require a clean audit of any full-cost accounting before allowing NASA to make fundamental, irreversible decisions based upon that accounting.

5. Re-embrace NASA's Aeronautics, Science, and Technology missions.

- See IFPTE's letter to Dr. Marburger for our analysis of the FY07 budget's adverse impacts on NASA science and technology capabilities (Appendix G).
- See IPFTE's letter to Chairman Shelby and Ranking Member Mikulski with our FY07 appropriations recommendations (Appendix H). Since this letter, NASA has effectively canceled the current Robotic Lunar Exploration Program (RLEP) program and re-channeled the funds into a new Lunar Precursor and Robotic Program, which appears to be shifting its focus to the development of the Lunar Surface Access Module (Appendix I). This conversion of Science funds into mostly hardware design, development, and validation funds represents an additional cut of as much as $134.6 million to the FY07 Science budget.

In conclusion, IFPTE is greatly encouraged by Dr. Griffin's recent effort to distribute Constellation work more fairly and intelligently across the Centers. We also praise his decision to reject many of the technical decisions of his predecessor and to keep more of NASA's technical work in-house. We now ask that he complete the healing process by rejecting his predecessor's ill-advised workforce plan and embrace a forward-thinking approach whereby all NASA's career employees can once again feel like full stakeholders in NASA's Vision. Let us work together to do the world-class Aeronautics, Science, and Exploration work that the American people deserve and expect of us. NASA employees all across the Agency are ready, willing, and more than able to do so, if simply given the chance.

Finally, we would also like to thank Chairman Boehlert for his long and dedicated career of public service. He has done great things for the American people and for NASA. On behalf of the many thousands of NASA employees that we represent, IFPTE thanks him and wishes him well in the next phase of his life. The nation is losing one of its wisest lawmakers.

Once again, Chairman Calvert and Ranking Member Udall, IFPTE thanks you very much for the opportunity to bring these important issues to your attention.

Appendices

Appendix A

Office of Institutions & Management

Workforce/Institutional Transformation Status

James L. Jennings

Associate Administrator,
Office of Institutions & Management

February 14, 2005

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Transformation Tools

Office of Institutions & Management

- Buyouts/Early-outs
- Job Fairs
- Manage Tactical Program/Project Decisions
- New Legislation
- Brokered Transfer of Work
- Contracted Work Review
- Review of Work Available for Competition
- Core Competency Health Assessment
- Near term Facility Closures/Consolidations
- IRTT (Institutional Realignment & Transformation Team
- Directed Reassignments
- Involuntary workforce realignment preparation

6/9/2006

Buyouts/Early outs

Office of Institutions & Management

- Buyout/early out conducted in 11-12/2004 at ARC, GRC, LaRC, MSFC, and DFRC
  - Results yielded 314 actual versus 450 target
- Second round of buyout/early outs to be conducted at all Centers and HQ consistent with guidelines
- Center plans will:
  - Establish targeted number of buyouts by workforce competency
  - Ensure workforce competencies bought out are not needed elsewhere in the Agency
  - Do not buy out a position unless it will not be refilled, or will be refilled with an employee whose position has been identified as surplus from another center
- Applications window for second round: March 2005

Buyouts	2005											
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Center plan submits		■									
Agency feedback on center plans	2/18 ◇										
		3/4 ◇									
Second round announcement (tent.)		3/7 ◇									
FTE off rolls		4/3 ◇									
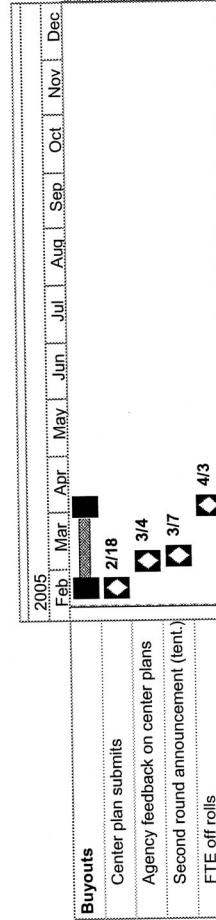
6/9/2006

Job Fairs

Office of Institutions & Management

- Provide employees at centers with uncovered capacity awareness of job opportunities at other NASA centers.
  - Employees have active role in career determination
- Job fairs will be conducted at ARC, DFRC, GRC, LaRC, and MSFC. Recruiters and hiring managers from HQ, GSFC, JSC, KSC, and NSSC will attend these events.
- Positions to be filled through voluntary reassignments.
- Positions and recruitment information will be made available at the transformation website

Job Fairs	2005. Feb.	Mar	Apr	May	Jun	Jul	Aug
LaRC	2/23						
GRC	2/24						
DFRC	3/1 3/2						
MSFC	3/1 3/4 (tentative)						
ARC (TBD)	3/3 3/5						

6/9/2006

Manage Program/Project Decisions

Office of Institutions & Management

- Addressed at January 2005 Leadership Council meeting
  - Goal is to provide some stability to Centers during this difficult transition period
- Mission Directorates and Corporate G&A budget owners should not move work from Centers in FY05 and FY 06 because of increases to indirect rates
- Mission Directorates, Center Directors and Center CFOs must coordinate program/project decisions
  - Decisions and funding flows need to consider impact on Center G&A
- Center CFOs should receive notice of any transferred work contained in guidelines
- Decisions should be reflected in Center Implementation Plans

	2005												2006			
	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Manage Tactical Program/Project Decisions																
Center report impacts to MD				◇ 4/1												
Preliminary Report – MD to IC				◇ 4/7												
G&A rates established				◇ 4/15												

6/9/2006

New Legislation

Office of Institutions & Management

- Eight provisions have been included in the draft FY06 Authorization Bill
  – Authorization should be cleared by OMB and transmitted to Congress 2/15
- Provisions include:
  – Voluntary separation incentives
  – Conversion allowance
  – Temporary continuation of coverage of health benefits
  – Waiver of annuity offset for reemployed annuitants
  – Waiver of requirement for IPA'ed civil servants to return to gov't organization after completion of assignment
  – Application of post employment restrictions for New Organizational Model
  – Enhanced Use Leasing
  – Retention of proceeds from sale of real and personal property
- Measures may not be in place in time to effectively mitigate current issues

	2005											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
New Legislation	1/3	2/16										

6/9/2006

Brokered Transfer of Work

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- Discussed at January 2005 Leadership Council
- Mission Directorates in coordination with Center Directors will identify proposed transferable work (i.e., from one center to another)
  - Limited applicability
  - Work to minimize implementation inefficiencies
- Develop process to communicate potential transfer of work between Centers

	2005								
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Brokered Transfer of Work 2/1					6/1				
SMD discussion retreat (GSFC & ARC)	3/1								

6/9/2006

Contracted Work Review

Office of Institutions & Management

- Short-term efforts: Review existing contracted work and consider appropriate civil servant versus contractor balancing.
  - Extension of process Centers have historically used to manage a mixed workforce, with civil servants providing the base capability and contractors handling the above base flexibility.
  - Civil service workforce must be sustained at a "critical mass" level to support core competencies.
  - Centers must ensure coordination with legal and procurement offices. Actions that raise formal objections may be difficult to sustain.

- Long-term efforts: OCFO/Procurement is working on guidelines/process regarding formal competitions for previously contracted work.
  - Near term actions – delivery of candidate list of work for transfer.
  - Example: Review contracts whose base period are due to expire in the near term.

Short-term actions	2005 Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	2006 Jan.
Contracted/Civil Service Work Balancing												
Center coordination with proc/et.al.			4/10									
MD /IMD validate business base			4/10	4/15								

Long-term actions	2005 Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	2006 Jan.
Contracted Work Formal Competition (A-76)												
Guidelines/Process developed (tent)	2/18											
Center del. Of candidate list to OCFO		3/3										

6/9/2006

Core Competency Health Assessment

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- Evaluate the health of the NASA core competencies to ensure that they are adequate and fully responsive to our mission objectives.
  - Supports strategy to sustain Agency-wide set of core competencies to guarantee long-term mission success

- Core competencies have been identified at Agency level by Center

- Coordinate competency health assessment to align with needs of ESMD investment strategy

- Core Competency strategy/health will be periodically reassessed to maintain synergy with continued Agency transformation

	2005											2006
Core Competency Health Assessment	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Center plan submits	2/7											
Int. Center inputs and develop actions	2/25											
Validate and refine inputs	2/28 3/7											
Develop final set of recommendations		3/10										
Finalize assessment and recomm.		3/22										
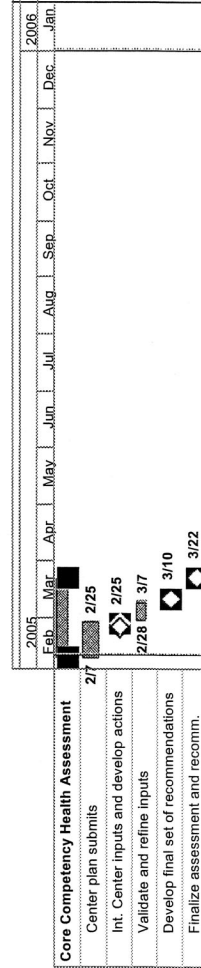
6/9/2006

Review of Work Available for Competition

Office of Institutions & Management

- Evaluate projected work not committed contractually
  - Assess how acquisition options could help mitigate workforce issues
  - Understand schedule for planned selection decisions
- Results of Core Competency Health Assessment need to be factored in to future competitions prior to moving forward.
- Mission Directorates identify discreet work items and estimated funding.
  - Consolidated list to OIM 2/18

	2005											2006
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Projected Work Review												**12/28**
Consolidated list to OIM	2/4 ◇ 2/18											

6/9/2006

Near-term Facility Closures/Consolidations

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- Center recommendations for facility closures are being analyzed by Real Property Mission Analysis (RPMA) Team.

- Develop process to ensure availability and viability of unique facilities needed for mission and vision.

- Process and closure plans to be coordinated through the HCE.

- Center closure reclamas to be presented to the PMC.

2005											
Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Closures/Consolidations (short term) 2/7 4/10

6/9/2006

IRTT

Office of Institutions & Management

- Institutional Realignment and Transformation Team instituted to recommend specific alternate institutional alignments for NASA Center transformation
  - Combined efforts of NASA Organization Model Evaluation Team (NOMET) and Real Property Mission Assessment (RPMA)
    - NOMET has prepared final report and it is in the final editing process
    - RPMA is preparing final analysis and recommendations for real property balance and alignment
- Mission Directorates and Centers working in parallel in reviewing organizational structures and real property
- IRRT will integrate results of Agency teams, Centers, and Mission Directorates to develop an Agency-wide perspective on institutional realignment and transformation

2005	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
IRTT (Inst. Realign.& Transformation Team)	1/26						7/31					
LaRC Center Ops Model		2/9										
IRTT review MD & Center proposals (tent.)		2/21 2/25										
Status briefings to AA/OIM				4/28	6/8							
Final Recommendations to AA / OIM							7/31					

6/9/2006

Directed Reassignments

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- Facilitate inter-center movement of skills to ensure critical skills remain available.
- Need dependent on success of other mitigating activities (buyouts, early outs, etc...)
- Center managers with HR office identify surplus positions at "losing" centers and needed positions at "gaining" centers.
  - Seek volunteers if possible
  - Process in place if volunteers not available
- Communication with employees is key.
  - Notification of positions considered for realignment
  - Notification in writing of Center management decision
  - Notify affected employees of option if declining directed reassignment
- Consider full cost implications.
- Specific actions and due dates remain TBD.

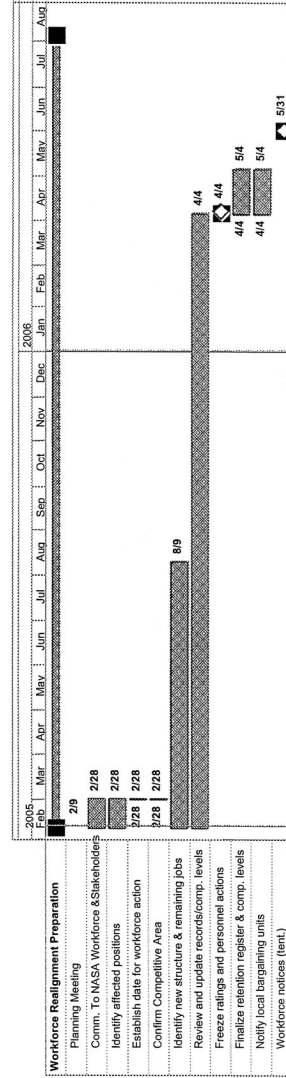|	2005											2006								
	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Directed Reassignments				6/1																8/31

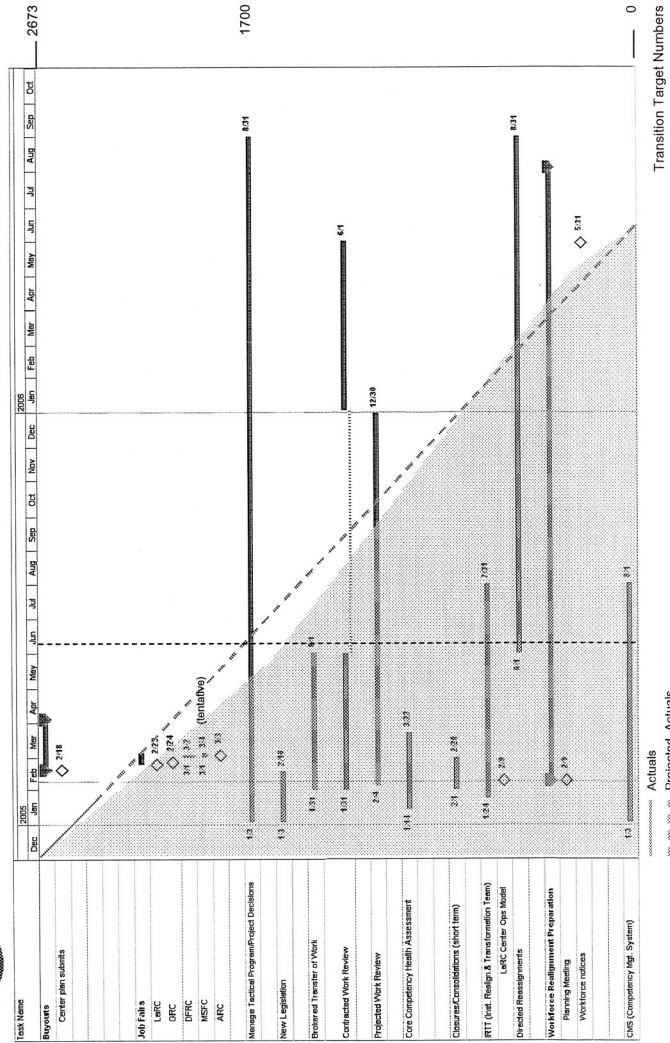6/9/2006

Involuntary Workforce Realignment

Office of Institutions & Management

- Adverse activities to be taken after all other mitigating strategies to alleviate current workforce issues have been implemented

- Activities require 18 months of lead time

  – Team is establishing interim planning dates (dates below are tentative)

Workforce Realignment Preparation		
Planning Meeting	2/9	
Comm. To NASA Workforce & Stakeholders	2/28	
Identify affected positions	2/28	
Establish date for workforce action	2/28	
Confirm Competitive Area	2/28	
Identify new structure & remaining jobs	8/9	
Review and update records/comp. levels	4/4	
Freeze ratings and personnel actions	4/4	
Finalize retention register & comp. levels	4/4 5/4	
Notify local bargaining units	4/4 5/4	
Workforce notices (tent.)	5/31	

6/9/2006

Near Term Institutional Transformation Schedule
Office of Institutions & Management

Transformation Actions Status

Office of Institutions & Management

Action	Lead For Action Implementation	POC(s)	Status To Date	Next Key Milestone	Key Issues	Activity Completion Date	Results
Buyouts/Early outs*	OIM	JoAnne Mueller (202)358-1202	First round completed at 5 centers. 2nd round to be implemented Agency-wide	Centers to submit buyout plans for review 2/18	Identification of surplus skills	4/3/2005	Round 1: 450 projected 314 actual
Job Fairs*	OIM, with Center Directors	Melissa Riesco (202) 358-1518 Charlotte Canon (757) 864-2515	Schedule in place. STARS implementation in work.	2/23 at LaRC	Congressional Sensitivity. Employee uncertainty	3/3/2005	TBD
Manage Tactical Program/Project decisions for near term stability	Mission Directorates and Corporate budget owners	Mission Directorate Business Leads	Discussed at January Leadership Council	Center CFO notice to OIM of any transferred work upon receipt of guidelines		Ongoing	TBD
Pursue new legislation	Legislative Affairs. With OIM	Deb Hollebeke (202) 358-1924 Carolyn Davis (202) 358-0046	8 Provisions included in FY06 Auth Bill. Draft sent to OMB.	Submit to hill mid February	None to date	Passage of authorization bill.	Facilitate direct workforce actions and overall transformation.
Review of Existing Contracted Work	OCFO/Procurement, with Center Directors	Ron Lentz (202) 358-1064 Center CFOs	Centers analyzing contracted work for applicability, coordinating with Procurement.	4/1/05 Centers have candidate list of transferable work to MDs	Boundary conditions included in guidelines	7/1/2005	TBD
Review of Projected, Uncommitted Work Available for Competition	OCFO/Procurement, with Mission Directorates	David Schurr (202) 358-4489	Mission Directorates identifying discreet work items and estimated funding.	Develop consolidated list 2/18.	Estimating FTE by work item. Timeliness of work availability.	Mission Directorates validate Center business base assumptions.	TBD

Transformation Actions Status

Office of Institutions & Management

Action	Lead For Action Implementation	POC(s)	Status To Date	Next Key Milestone	Key Issues	Activity Completion Date	Projected Results
Core Competency Health Assessment	ADA/SI, with Mission Directorates and OIM	Jerry Simpson (202) 358-1011 Rick Keegan (202) 358-0765	Refined definitions. MD and Center inputs to plan received.	2/25 Center plans due	Agreement on competency health quantification	3/22/2005	TBD
Brokered Transfers of work between centers	Mission Directorates, with Center Directors	SOMD - M. Milsted (202) 358-4728 ESMD - P. Lovingood (202) 358-5179 ARMD - J. Henn (202) 358-4741 SMD - A. McNally (202) 358-3885	Discussed at January Leadership Council	3/1/2005 SMD retreat between GSFC and ARC	Impact on donor center and on efficient management of work	6/1/2005 (Center budget submission)	TBD
Pursue near term closures and/or consolidations	OIM with Mission Directorates	Al Johnson (202) 358-1834	ARMD list of proposed closures vetted w/ other MDs	Solicit lists from all MDs	Potential closing facilities needed by other programs	TBD	Dollar savings. Potential increase to uncovered FTE.
IRTT (Coordinate RPMA/NOMET efforts) - Institutional Realignment and Transformation Team	OIM with Mission Directorates, Center Directors	Al Johnson (202) 358-1834 Joan Salute (202) 358-0944	Team being formed. MD members needed. Brief all members on RPMA/NOMET	2/21-25 - IRTT review MD and Center proposals	Differing center perspectives	7/31/2005	Flexibility. Potential increase in reimbursable work.
Directed reassignments*	OIM, with Mission and Center Directors	Melissa Riesco (202) 358-1518	Team is being formed.	2/9 planning meeting	CMS updates. Union involvement. Congressional sensitivity.	8/31/2006	
Involuntary workforce realignment preparation*	OIM with Center HR Directors	Melissa Riesco (202) 358-1518 Leah Meisel (757)864-2953	Team is being formed.	2/9 planning meeting	Uncontrollable end state. Workforce mix. Congressional sensitivity.	8/6/2006	Elimination of an residual uncovered capacity by end of FY06.

6/9/2006

Appendix B

Executive bonuses in 2004			
Agency	Eligible Execs	Execs Getting Bonuses	Average Bonus
Agriculture	280	81.4%	$15,861
AID	17	52.9%	$8,889
Commerce	263	77.9%	$12,299
Defense	1,049	43.4%	$16,958
Education	60	67.8%	$10,325
Energy	347	64.0%	$8,863
EPA	264	50.4%	$11,797
GSA	75	97.3%	$12,705
HHS	307	70.2%	$12,536
Homeland Security	204	46.6%	$16,424
HUD	69	60.9%	$8,092
Interior	219	30.1%	$13,017
Justice	523	56.5%	$11,858
Labor	141	89.4%	$11,999
NASA	401	42.6%	$17,483
NRC	150	62.0%	$16,946
OMB	55	48.3%	$10,100
OPM	42	69.0%	$15,044
SBA	30	100.0%	$9,518
SSA	133	63.2%	$14,419
State	125	32.8%	$11,037
Transportation	180	51.4%	$10,790
Treasury	386	64.4%	$15,607
VA	262	89.3%	$16,287
All Others	266	56.4%	$12,360
GOVERNMENTWIDE	5,848	58.2%	$13,734

Appendix C

APRIL 2005	MARCH 2004
Acquisition and Control Management	Acquisition and Contract Management*
Advanced Mission Analysis	Advanced Mission Analysis
Advanced Technical Training Design	Advanced Experimentation and Testing Technology
Astronomy and Astrophysics	Advanced In-Space Propulsion
Avionics	
Biology and Biogeochemistry of Ecosystems	Aerodynamics
Budgeting Management	Budgeting Management*
Climate Change and Variability	Business IT Systems
Control Systems, Guidance & Navigation	Business Management *
Cost Estimation and Analysis	Communications Networks and Engineering
Cryogenics Engineering	Computer Systems and Engineering
Earth Atmosphere	Design and Development Engineering
Electrical and Electronic Systems	Electrical and Electronics Systems
Electro-Mechanical Systems	Engineering and Science Support
Environmental Control and Life Support Systems	Financial Management*
Financial Management	Flight and Ground Data Systems
Flight and Ground Data Systems	Fundamental Human Factors Research
Habitability and Environmental Factors	Human Factors
Integration Engineering	Human Resources *
Intelligent/Adaptive Systems	Institutional Facilities Operations
Laser Technology	Institutional Facilities Planning
Materials Science and Engineering	Integration Engineering
Mission Analysis and Planning	Intelligent/Adaptive Systems
Mission Assurance	Legal *
Mission Execution	Mathematical Modeling and Analysis
Network Systems and Technology	Mission Analysis and Planning
Optical Systems	Mission Assurance
Planetary Science	Mission Execution
Power Systems	Nuclear Engineering
Program Project Management	Program/Project Management
Propulsion Systems & Testing	Propulsion Systems and Testing
Quality Engineering & Assurance	Public Communications and Outreach *
Remote Sensing Technologies	Quality Engineering and Assurance
Risk Management	Safety Engineering and Assurance
Safety Engineering and Assurance	Systems Engineering
Simulation/Flight Research Systems	Test Engineering
Space Physics	
Structural Dynamics	
Systems Engineering	
Test Engineering	

Appendix D

INTERNATIONAL FEDERATION OF
PROFESSIONAL AND TECHNICAL ENGINEERS
AFL-CIO & CLC

NASA Council of IFPTE Locals

**Comments on NASA management's
Draft Workforce Strategy**
(Dated 2/6/06; Delivered by Management on 2/7/06)

As required by the NASA Authorization Act of 2005

March 9, 2006

1. Overview

The draft workforce plan delivered to the NASA Council of IFPTE Locals on February 6th appears not to meet the requirements set forth in the 2006 NASA Authorization Act. However the following does not address that concern directly (that legalistic issue will be addressed by a separate letter from IFPTE International) but instead looks at the plan in hopes that our comments will be used to improve the plan.

The NASA Council feels that this plan leaves multiple of questions unanswered and contains compromises that may not be necessary. We hope the comments and questions below can be answered by the Administration so that Congress and the American people can better understand the vision that Administrator Griffin brings to our Agency.

We do not believe the Agency can move forward with this workforce strategy, which does not provide a clear overview of the existing skills of its workforce. Indeed, this workforce strategy illustrates a lack of understanding of the capabilities of the employees at the Agency. Since this document has been written, an attempt has been initiated to improve the CMS system in an effort to remedy this situation and the Union is looking forward to these changes. It remains unclear how the current draft strategy can have any validity value given that this precursor activity is as yet incomplete.

Three troubling philosophical issues run through this draft strategy plan:

- The misapplication of full-cost accounting has generated an artificial crisis that is driving an arbitrary unfocused downsizing of NASA technical civil service staff.

- The astonishing abandonment of a internal workforce system successful for decades consisting primarily of dedicated tenured permanent employees with absolute loyalty to the agency and long-term engagement in mission success for a supposedly cheaper short-term job-shop system that will generate little loyalty or interest in the long-term success of programs, limit employees experience to single projects, and undermine NASA's ability to compete with elite academic institutions for the best and brightest young talent.

- The reckless use of a flawed and incomplete competency management system that supports the current workforce planning with no solid link to actual technical skills.

The misapplication of "full-cost accounting" is the primary driver for the current workforce faux crisis and remains embodied in the *ad hoc* numbers of the Table on p. 9. Any thorough workforce strategy would have devoted considerable space to exactly how these numbers were derived rather than simply stating them as immutable facts. When NASA converted to full-cost, rather than simply accounting for the FTEs working on each program, program managers were simply given the salary funds to do with as they

pleased. Many managers took advantage of the apparent new found wealth in their program budgets to divert civil servant salaries to increase procurement and outsource program activities. Civil servants, unfairly shackled by run-away overhead costs resulting from poor center management of institutional costs, were made to appear artificially expensive. This fact then in turn drove programs to shed FTEs to reduce the institutional burden that was being shifted from Centers to Programs. However, shedding civil servant FTEs did not actually reduce overall agency costs because the center overhead charges that would have been assigned to the rejected FTE were merely redistributed over the remaining workforce at a given center. Full-cost accounting should merely have kept track of how NASA FTEs were being assigned to the various programs or institutional activities. It should not have been used to drive FTE assignment decisions as is made clear by the statement "These FTE projections are based on mission requirements and anticipated funding (p. 9)" and the emphasis is on the latter factor as illustrated by the awkward turn of phrase on p. 5 "when programs are resourced to require fewer personnel". Programs are given overall budgets but their personnel requirements should be driven by mission milestones and not predetermined salary limits. Program technical and administrative needs should drive the number of FTEs assigned to a program; FTEs should not be arbitrarily limited as in the Table to free up funds for other uses.

It seems that "full-cost" is invoked whenever an excuse is needed to kill something technical but self-motivated, full cost seems to say if we have a big program sanctioned with certain dollar and time constraints, employees' time can be charged to this program but they must only work on that program and not some other or do research for the future or do things which follow up on a technical idea that has not been officially sanctioned. Yet many times we are indeed called upon to support non-technical work that has no official support and this raises no red flag. Those things do not seem to bring down the "full cost wrath", yet they have no charge code that management expects us to use. In a (not too unusual) day, a supervisor may spent 3 hours with a high school student shadowing him, an employee may be asked to attend two safety meetings this week or to attend a telecom on how to deal with unruly employees, or to attend a Center Staff meeting. Employees are often sent Center Directives to review each with many, many pages or must take some "computer" training which lasts an hour or more. We have been encouraged to do proposals so that we have work in the future. Who pays for all this? Which program, which project? What is OK to do, what is not? Who pays for all the non-program tasks we are asked to do? Hours and hours of bureaucratic busy work is supported in secret under direct violation of the core principle of full-cost but following up on an original technical thought is a crime. So NASA's workforce strategy should seek to better define "full cost" as it is now working and "full cost" as envisioned in the future. The new "simplified full-cost" effort is promising but once again the current workforce document and its key numbers do not reflect this ongoing full-cost reform process.

HR tools available to the Agency give us some hope, yet give us concern. Of concern is the proposed wide use of "term employees" and other temporary employees. More than half the hires since 2004 have been terms. This is a dangerous trend that will do

irreversible harm to NASA's ability to compete in the future for its fair share of the absolutely smartest engineers and scientists. Tenure is good enough for Harvard, Yale, Princeton, Johns Hopkins, Cal Tech, Berkeley, Stanford etc... Furthermore, Boeing, Lockheed etc... will always be able to offer greater financial incentives. The scientists and engineers that NASA hopes to attract will choose these other options, if NASA becomes a mere soft-money temporary employment agency that pays civil-service wages. Using surveys performed prior to NASA's conversion to a philosophy of full-cost recovery to make claims that morale remains high and that NASA jobs remain as desirable is overtly misleading.

There should be hard rules defining when hiring of "term employees" is appropriate and permissible. Technical supervisors say that they hire terms, not because they desire a term, but because "perm hires" are simply not authorized. That is not a mission-driven "workforce" reason, but rather reflects an *ad hoc* anti-civil-servant philosophy against long-term commitment to allow for easier budgetary planning at an Agency level at the expense of productivity and technical excellence. For freshouts, this is less of a problem, as post-docs and internships are a way of life for some early in their careers. But for high-quality technical people of experience, they don't want short-term employment, they need stability in their lives . . . and the best and the brightest are looking for "tenure". If you only analyze responses from those you hire as terms, you will never learn the real affect of this flexibility. If you ask the current "perms" what they think of being converted to a term, then the real answer will be obvious. Furthermore, the term appointment flexibility granted the Agency through the NASA Flexibility Act was not intended to create a revolving door practice at NASA, which is where the Agency seems to be headed. Instead Congress intended that legislation to be the catalyst in retaining and recruiting talented personnel willing to make NASA their careers, versus the term appointments who come in one day, and are gone the next.

There is also the opposite situation where a "perm" offers more flexibility than a "term". Terms are hired to do a specific job and they cannot always, by law, be moved to something else that is more pressing. That is not the case for permanent employees, they are not constrained, management has the flexibility to move them to any work that the Agency needs. So again, terms play a role but a very limited role, when the best interest of NASA is at heart. The workforce strategy should very carefully define when a "term" is appropriate.

NASA is only in the beginning phase of setting up a Competency Management System to support workforce planning despite the fact that they have been at it for more than 3 years and have spent considerable money on it. The workforce strategy draft document clearly shows that the only "competencies" considered were those of the employee's current position, not the employee's full capabilities. Indeed even these position competencies have been further trimmed down to just one primary position competency. This will clearly create an absolutely false representation of the true capabilities of the present workforce, and make "capitalizing on the potential of this workforce" impossible. Although focusing on the primary competency "makes workforce forecasting and data

analysis more manageable (p. 12)", it certainly makes it less accurate and less informative.

NASA has yet to validate the CMS data base that describes actual employee skills although they have been talking about this for years (perhaps if the RIF preparation funds had been used to implement this task, HR would be further along). This is the key database that would theoretically help guide decision making as the Agency seeks to re-deploy intelligently. The CMS database that has been used to generate the draft strategy is associated with "positions" not employees and thus does not actually contain information about NASA workforce. In addition, its "dictionary" employs ridiculously vague terms like "program management". A program manager in Astrophysics requires very different technical skills and knowledge than one in Astrobiology, so it is simply meaningless to say that such skills will need to trend up or down. HR is applying a shoe factory model to NASA workforce planning; its plans assume that all program managers are interchangeable within a content-free management world. This is dangerous and is a key manifestation of NASA's culture problem identified by the Columbia Accident Investigation Board as a primary cause of the disaster. In an Agency that needs to maintain a complex technical and scientific skills mix, the simple-minded human capital tools that NASA has applied to generate the draft strategy are inadequate and the results cannot be trusted.

2. NASA's (un-auditable) Budget

With the considerable, un-auditable budgetary issues of the Agency over the past 5 years, and with the concerted current effort by the CFO of the Agency to balance the budget and audit the books, it is critical that the financial picture be clarified before a workforce reshaping driven to recoup funds is implemented, especially such drastic measures as a Reduction in Force (RIF). The current financial justification for the downsizing NASA by about 1,000 civil service jobs is premature and all of the associated repertoire of possible hostile HR actions remain ill-advised given the effect of such actions on employee morale and Agency effectiveness. A careful cost-benefit analysis of the effects of using blunt instruments such as RIFs must first be performed with a credible level of accuracy.

Under "Change to Full Cost Management" (p. 5) it is stated, "When programs are resourced to require fewer personnel, the mission directorates cannot immediately reduce personnel costs. They must continue to fund employees until redeployment or reduction can be effected." While Civil Service staff cannot be quickly reduced, they are in fact quickly re-deployable. A CMS system that is more detailed, involving competencies beyond the primary one, would be an effective tool for redeploying the workforce.

There is no shortage of work that needs to be done to support the VSE and most of the currently "uncovered" workforce could be directly redeployed to support NASA's current missions if there is a will to do so. If anything, a dramatic wave of hirings should be contemplated in the current strategy to bring in the next generation needed to get this ambitious job done, especially given that a huge portion of the civil-service workforce

will retire over the next decade. The primary rationale for the NASA Flexibility Act given by then-Administrator O'Keefe in his congressional testimony was to keep old timers on board as mentors, while expediting the hiring of young engineers and scientists. In direct opposition to that public argument, NASA has engaged over the last two years in budgetary machinations, a series of broad buyouts, and RIF-mongering that was used to drive 950 employees out, many of whom were on the critical needs list of the Flexibility Workforce Plan or had other key skills needed for to support the VSE. We are now facing the CEV era with fewer Apollo era experts and support staff just as we critically need their knowledge and skills. This is not a good thing unless simple downsizing targets are the goal.

3. Looking Forward and the Needs of NASA's Missions

As required by the Authorization Act of 2005, the draft plan must include (specific) categories and numbers of employees to be reduced or increased in the coming years including justifications. While this plan does identify specific competencies (e.g., 10-50, p. 17) to be reduced, it is not clear whether these are reductions are per competency or total, or at which Centers and within which organizations these reductions are expected. Most importantly, the plan fails to make a connection between the competency targets listed and the actual categories and numbers of employees affected or to provide the required mission-based rationale. Indeed, the strategy confesses that although it is monitoring and planning based on competencies, these numbers do not correspond to categories and numbers of actual employees (p. 13). Thus, a pool of 100 employees who are 95% covered is indistinguishable from 5 fully uncovered employees yet it is obvious that for any real workforce reshaping these two scenarios are quite different and require different approaches. No solution to this glaring flaw in the CMS approach to workforce reshaping is provided but no intelligent planning can occur unless this problem is solved.

In addition, the plan seems to contain significant contradictions in identifying needed and uncovered competencies. For example, Section 3-C (p. 15), "systems engineering and integration engineering" is the second category identified under "Increased Need Through FY 2009," and is estimated to increase 100-150 FTE's. However, the previous section (Section 3-B, p. 14, bottom) states, "the principal competencies associated with the current uncovered FTEs include the following: ... various engineering of systems competencies". Perhaps the document should explain how "systems engineering" should be differentiated from "engineering of systems"? Are we to RIF 100 to 150 "engineers of systems" so that we can hire 100 to 150 "systems engineers"?

Also, is the Agency really going to hire up to 600 new accounting/finance/business people above and beyond the NSSC (p. 16) while it cuts Science projects Aeronautics R&D, and its science and engineering staff? Do the downward overall FTEs trends proposed on p. 9 include these 600 new bean-counting positions? What analysis supports the contention that NASA's accounting problems have been due to a shortage of manpower as opposed to lousy SAP software and needlessly arcane and inefficient accounting practices (e.g. head taxes and square footage calculations for G&A as opposed to simple percentage of direct costs like every University in the country)?

At the beginning of Section 2 (p. 9) we are presented with a Table containing the bulk of the quantitative information in the entire document. The caption calls it a "trend", but the workforce document under review is supposed to be a "strategy" that states clearly the Administration's goals over the coming years. Do the numbers in this Table reflect the outcome of buyouts and retirement and RIFs to meet arbitrary budget-driven downsizing targets or do they reflect appropriate workforce estimates based on technical project managers' analyses of what manpower is needed to support high-quality, on-time deliverables for the VSE and NASA's other missions? No specifics are provided as to how these numbers were obtained from the data developed by "all levels" of management as part of the creation of this document. Can NASA provide the source data (and acquisition and analysis methods) from which these numbers were calculated? We cannot fully comment on this Table without such information.

Section 5-B of the Workforce Strategy states that the Agency's natural attrition rate is about 4%. Analyzing the Table in Section 2, and starting with 18,624 employees in FY2005 and applying a straight 4%-per-year attrition rate yields the following:
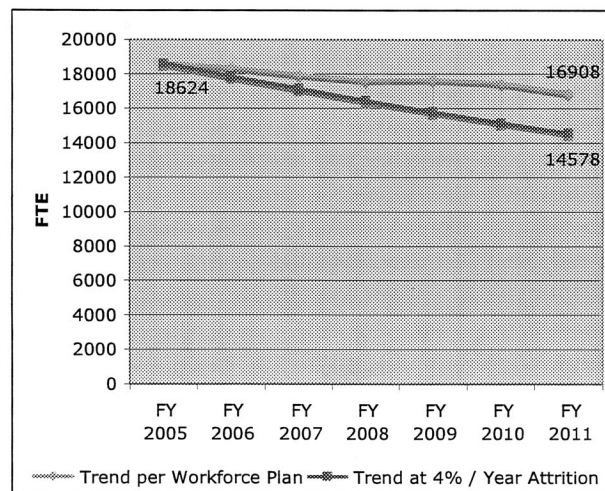

The trend stated in the Workforce Strategy calls for a reduction of 1,875 FTE from FY 2005 to FY2011. However, as shown in the chart above, with a 4% natural attrition, the workforce will be reduced by about 4,046. Thus, given the NASA's natural attrition rate, the Agency will have to hire 2,171 FTE over the next 5 years to overcome natural attrition and meet the Agency's overall workforce strategy goals as well as achieve the new skills mix needed to support the VSE. Where is that hiring plan? It is also quite

likely that the 4% natural attrition rate over the next 6 years is a conservative estimate based on the fact that the retirement eligible workforce is growing (see Section 1). Given the magnitude of these trends, any reasonable NASA workforce strategy must contain a more detailed analysis and estimate of natural attrition and of expected retirements for the NASA workforce. Much greater emphasis should be placed on training, mentoring (and retention of senior mentors who would otherwise retire), and hiring of new needed skills than on workforce reductions.

In analyzing the trends as they are projected to FY2011, it is apparent that each Center individually will also be at the expected levels or below due simply to this 4% attrition rate, as illustrated in the chart below.
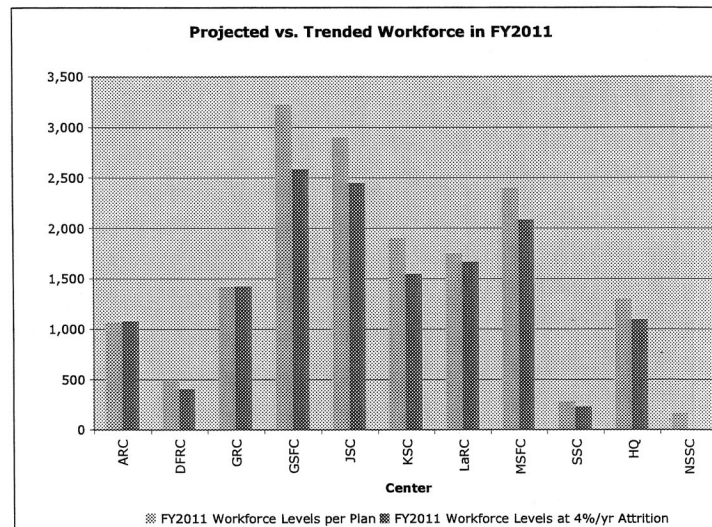
Is it expected that the Agency will hire new employees at a rate high enough to account for attrition in order to meet the staffing levels as stated in the trend chart? What percentage of these new hires is expected to be Term appointments? How many FTE's are expected to be hired under the various authorities (SES, GS, NEX, etc.)?

In the second paragraph of Section 1-C (p. 7, bottom), we read, "All levels of management are involved", yet this is immediately followed by a list, "(Agency, Mission Directorates, Program Managers, Center management)", which refers only to upper management. From our own experience at the Centers, the immediate managers of the

workforce and the hands-on human resource specialists have not been adequately involved. How were inputs from the division chiefs, branch chiefs, project managers and group leads included in the workforce planning activity? These are the people most in touch with actual manpower requirements for the various activities.

A couple paragraphs later we read that, "Civil service labor supports five principal work areas. ... Each of the five components is spread across multiple Centers, though they are not distributed equally among Centers." How are these five components distributed across the Centers and what process created the disparate ratios?

The first paragraph of the Introduction (p. 2) states that the "strategy is based on objectives that contribute to accomplishing the President's Vision for Space Exploration (VSE), while also recognizing the Agency's financial responsibilities and limitations" without any mention of NASA's science or aeronautics missions, or NASA's facilities and capabilities that are and could be useful to other agencies and industries. While the VSE is currently the major driver of new workforce needs, how are NASA's other missions and functions included in the objectives?

The strategy claims that it "is predicated on the Agency's commitment to building a stronger, healthier NASA, one that fully utilizes - and even expands - the capabilities of its Centers and its current workforce", yet the Table on page 9 shows consistent down trends in FTEs at all eight of the large Centers. Only the two smallest Centers, DFRC and SSC, are shown with stable workforces into the next decade. Why? What is the justification for the phrase "and even expands"?

One of the five main contributors to "uncovered capacity" is stated to be "Restructuring of the science program and subsequent redirection of funds to higher priority missions in science." Elsewhere, this document says of the science program that, "There will be evolution in the schedule and mix of programs and projects, but the work and competencies needed remain the same overall." We don't believe "the work remains the same", the work has changed, contributing to the number of "uncovereds", e.g. scores of life, micro-gravity and biotech scientists were left uncovered. To be covered, they were moved out of science to engineering jobs. Many "competencies" such as engineering and support are relevant regardless of the science supported, and are applicable to all of NASA's missions. So there really are changes in the science program that result in restructuring the workforce, are there others?

4. The Competency Management System (CMS)

Under the heading of "MAXIMIZE USE OF NASA'S CURRENT HUMAN CAPITAL CAPABILITIES", it is stated that "Throughout the reshaping process, NASA is committed to capitalizing on the potential of this workforce by using existing skills - expanding, rebalancing, and realigning them where necessary", however the remainder of the document shows that, to accomplish this, NASA is relying on a computerized "competency management system". The document clearly shows that the only "competencies" considered are those of the employee's current position, not the

employee's full capabilities. Indeed even the position competencies have been trimmed down to just one primary competency. This will clearly create an absolutely false representation of the true capabilities of the present workforce, and make "capitalizing on the potential of this workforce" impossible. We know from direct experience and from listening to both workers and managers, that the categories in the "Competency Management System" (CMS) are vaguely defined, vaguely delineated, and have many gaps in coverage. This system should have been tested, then fixed, then fully validated before any realistic workforce planning was attempted. It is admitted that some of our employees are working in areas of their weakest competencies and they have stronger competencies that are not recognized because they are not the "primary" one. How will management ensure that an employee's personal competencies are taken into account, when matching the skills of the workers with the needs of NASA's missions? It is stated that, "the designation of a primary competency makes workforce forecasting and data analysis more manageable" (Section 3-A, p. 12). However, it does not make the forecasting better, but worse. By implementing the CMS as a computer database, why does the Agency not utilize the power of its multiple databases to take into account all position competencies when determining mission needs and all personal competencies when identifying the workforce capabilities? An immediate impact of using only primary competencies is failure to deal with systems or other integeration positions, in which the products of more than one discipline must be coordinated. These are, in fact, the categories that can be expected to have the greatest need as we move into designing and implementing a new space transportation system. It also will lead to failure to account not just for all the skills in the workforce, but also for all the skills currently being used in the workforce. The workforce strategy is fraught with serious errors caused, in large part, by solely relying upon "primary" competency.

The use by the Agency of CMS for buyouts was the only experience that NASA has with this system and no analysis was done to see how well it actually worked. Indeed, because of the discrepancy between the critical needs and competencies nomenclature, it appears that critical needs were indeed bought out. Although the system shows promise, continual improvements will be necessary before CMS can be used for *bone fide* planning. How does management intend to make the Competency Management System an accurate tool for workforce planning and how does management intend to use it in determining what new positions are needed and what old ones should be abolished?

5. Employee Performance Communications System and Position Descriptions

There have been recent extensive changes in the Agency's Employee Performance Communications System. In addition, in preparation for a RIF, there has been greatly increased effort to revise and update Position Descriptions to bring them up to date and have them accurately reflect the work being performed at the Centers. HR organizations have repeatedly stated that this is an effort to have the records accurate in order to perform a RIF that will withstand scrutiny if a RIF becomes necessary. NASA has started to maintain CLs (Competitive Levels) so that a RIF can be carried out yet there is no mention of this in the strategy. Indeed, over the last year, extensive RIF planning has been a dominant factor in HR activities yet this is downplayed in the official strategy.

Position descriptions, the official documents identifying the needs of the agencies, have long languished at the Centers and are now, in a flurry of activity, being updated in a mad rush. How are these updates to position descriptions being incorporated into the CMS system so that decisions made based upon CMS yield consistent results with the position descriptions?

6. Hiring and Maintaining a Workforce of the Best and Brightest

It is encouraging that this plan includes tracking the employee's ratings of NASA as presented in the report, "The Best Places to Work in the Federal Government." On the face of it, this information appears to be an indicator of the state of the Agency and an important factor when a scientist or engineer considers taking positions in the federal government. However, the workforce strategy states, after enthusiastically highlighting the positive elements in this report (p. 28) that "Some of the NASA data shows declines in satisfaction levels, much of which is reasonably attributable to uncertainty created by the initial 2004 announcement of the Vision for Space Exploration and by the first transformation activities."

On the contrary, it is more reasonable that the VSE should have generated even more satisfaction and enthusiasm. What data shows these declines? How is the drastic decline in perception at two Centers (NASA Headquarters and NASA Ames, declines of over 8.5% and 10%, respectively) explained by this claim? It is clear that the "health of the Center" correlates closely with the rankings in this survey (JSC: 5th, KSC: 7th, GSFC: 11th, SSC: 33rd, GRC: 47th, LRC: 76th, ARC: 106th, DFRC: 121st, HQ: 143rd.) It is likely that the threat of a RIF is a significant contributing factor to the low morale at these low-ranking Centers. What is the Agency strategy for dealing with retaining its best employees during the current round of buyouts, looming RIF, and even furlough threats that NASA employees have been subjected to over the last year and a half at the poor Centers? Has NASA HR seriously studied the impact of these falling rankings on hiring the best and brightest scientists and engineers from academia and industry? How is the refusal to take RIF off the table (p. 23) consistent with the recent emphasis on Ten Healthy Centers? There is no way a RIF will lead to anything resembling health at any targeted center as the bitterness and associated productivity losses (and litigation) will persist for many years; this is common knowledge among senior HR professionals. Given the attrition analysis provided above, it is truly inexplicable as well as unwise for NASA to even be talking about RIFs.

The "Best Places to Work" report states, under the heading of "Top Movers", that:

Six of the 30 largest agencies experienced double digit increases since 2003. Two leaders of this pack are the Department of State and the Agency for International Development, with increases of 14.7 percent and 13.0 percent respectively. In both cases, the sharp upswing in employee engagement was assisted by large gains in the Training and Development workplace dimension, which increased by 14 percent at AID and 25 percent at State in just two years.

This is of great significance, when the total amount of money spent in FY05 for training at Ames Research Center (the Center that declined over 10% in rating) totaled less than $300K spent on technical academic courses (less than $300 per employee, or $1,000 per employee if that total expenditure was focused exclusively on the uncovered workforce). The Ames Local has reported hearing, from top management, that investment such as funding advanced degrees are no longer being considered and that NO money was set aside for training of uncovered employees in transition. This Local raised this serious concern in October of 2005 and continues to raise this concern with their local management and management at HQ. This significant lack of funding for educational and other training investment seems counter-intuitive for an Agency and a Center intending retooling, retraining, and retaining the best and brightest it already has and at odds with the multiple assertions about "aggressive retraining" being a core feature of the strategy.

It is encouraging that the plan states a commitment to "retrain employees whose competencies are in areas of reduced need" and is "devoting funding to support retraining to meet these [mission] needs." However, with less than a year until the Agency can execute a planned RIF, the time for retraining is at hand and quickly passing, yet little tangible action has been taken. How much money has the Agency spent in previous fiscal years on technical coursework in order to retrain employees, particularly those employees considered uncovered and lacking specific experience and skills that are necessary to meet NASA's mission needs in the future? How much money does the Agency intend to spend on retraining employees in FY06/07, particularly for these uncovered employees? Are the employees being trained immune from a RIF? It makes sense to the NCIL to train employees in areas of need and then keep them.

The "Strategy for Leadership and Career Development", as presented on p. 29 of the workforce plan presents an encouraging proposal for realigning the employees of the Agency using a variety of tools. It is stated that NASA will be adopting this plan "during the current fiscal year". With around 7 months to the fiscal year remaining, and a RIF possible in the near future, when will this plan be put into effect? What is the budget of this plan, including a breakdown by Center? What percentage will go to the uncovered employees? What percentage will go to each of the elements listed on pp. 29-30? What percentage will go to scientific, engineering, and other technical areas of development? What percentage will go towards non-management employees?

Later, under the heading of "Targeted Retention Tools" (p. 31), authorities given to NASA under the NASA Flexibility Act and other retention incentives are identified. How have these tools been used in the past fiscal years? Particularly, how have these tools been used to retain scientists and engineers in the technical workforce? Please provide specific numbers (number and nature of IPA assignments to other agencies, money spent on qualifications pay, relocations incentives, critical position pay authority). Please decompose expenditures by Center, by organization, and the amount of the expenditure for the scientific and engineering workforce versus program/project/line management and employees in administrative roles.

Under the heading of "Knowledge Management", the plan states that, "Most Centers have active mentoring programs." Mentorship is a critical tool not only to retain knowledge currently residing in the workforce but also for retraining employees in the specialized fields and in the unique experience of the NASA workforce. What is the nature of the mentoring programs at the Centers that have them? How are mentorships arranged? Are mentorships being considered now or in the future for retraining uncovered employees in skills they are currently lacking?

7. Leveraging the Existing Workforce

Under "Aeronautics" (p. 10) it is stated, "Requirements for human factors research and engineering, avionics, network systems and technology, and skilled mechanics and technicians will trend downward." There seems to be no recognition of the fact that several of these fields (along with a lengthy list of other fields of scientific research and development maintained at NASA's Centers such as propulsion research, materials sciences, life sciences, astrophysics, etc.) will have an increased contribution in efforts contributing to the Exploration Vision. Is it implicit here that there should be no transfer of workforce among the mission directorates? This is highly inefficient, and contrary to the very concept of workforce strategy. A key goal of this effort is to avoid laying off and then soon hiring the same skills. This document has apparently missed accomplishing this goal in regard to transfers of skills from one mission directorate to another. The workforce strategy should more specifically describe how to leverage the skilled employees who work currently primarily for the Aeronautics and Science mission directorates to support the Exploration Vision.

It has been stated that there will be significant increases in the number of positions in certain competencies and reductions in others. However, it has not become apparent that those positions requiring those competencies have been or will be advertised to the workforce so that employees currently uncovered can apply and compete for these new positions. When will HR announce these new positions? How long will they be limited to NASA CS applicants and will the work be mobile or are employees expected to move to other Centers in order to perform these roles?

Under "Science" (p. 11, Section 2) the sole problem identified is the need to hire new personnel to replace those who retire. This would be welcome news but there is more to this than that; at more than one Center, scientists and scientific support personnel have been ordered off of scientific projects in a wholesale fashion and assigned to every conceivable support function. Will remaining employees be reassigned to scientific projects as older scientists and technicians retire? Are these unfunded science directorate employees already categorized as nonscientific personnel?

Stated in Section 3-C (p. 16), "Fabrication work previously done by in-house technicians is now available outside of NASA at better terms for the Government." Upon what financial basis is this statement true, particularly for the one-of nature of most of NASA's fabrication needs? Can management provide a specific cost-benefit analysis of fabrication inside versus outside of NASA to support this bold assertion that is being used to argue

for reductions in the competencies? The engineering and development activities, including fabrication, manufacture, and maintenance of specialized models, instruments, and other components (often times flight hardware) requires specialized skills, experience, and a strong understanding of the unique nature of NASA requirements. Many corporate contractors have been able to provide services in a cost-effective and productive manner, but NASA has certainly had its experiences with cost increases, schedule slips, manufacturing flaws, and other significant problems that affect the ability to be an effective agency. The bankruptcy of the corporation in charge of the SOFIA main cavity door, and the subsequent manufacture by the civil service and in-house contractor support staff is a specific example of the importance of maintaining an in-house capability and leveraging that capability in cases where the mission is at risk. Additionally, an in-house capability is critical to provide smart buyer know-how, quality and safety oversight, construction planning and cost analysis, and other activities that require deep knowledge of the technical work needed to be performed to build the hardware critical to meeting NASA's mission needs.

8. Concluding remarks

With the announcement of the Vision of Space Exploration and the appointment of Dr. Griffin as Administrator, it is apparent to the Nation that there has been a significant change to the portfolio of goals of the Agency that will impact its workforce needs. However, Administrator Griffin properly recognized the technical missteps of his predecessor and has worked diligently to reverse the O'Keefe-Steidle outsource-everything-spaceship plan with a more intelligent and cost-effective primarily in-house ESAS plan. Unfortunately, only recently have the concepts of work package transfers, 10 healthy centers, and full-cost simplification come to the fore to allow NASA to begin the process of reversing the flawed Jennings Human Capital Management plan (2/14/05) as well. We urge a wholesale and overt rejection of the failed workforce policies of Dr. Griffin's predecessor, including the ludicrous idea that NASA needs to RIF (or even to threaten to RIF) its technical employees while it ratchets up its technical needs. One should not over-estimate the time necessary to train or re-train enthusiastic and willing employees of the caliber that NASA currently employs. To many of our people, Space is almost a religion and their dedication says that we owe it to them and to the taxpayers to give a little extra to see that all of our employees are properly valued and that we do not betray our people because they are old or because we have a short-term budgetary shortfall or because management erred in the past. The principles of "One NASA" and of "10 Healthy Centers" are certainly consistent with IFPTE's ideals and we hope these slogans become the new workforce reality. To reach that desirable reality, NASA however needs a more thoughtful and thorough workforce strategy that recognizes that we need not destroy to create.

INTERNATIONAL FEDERATION OF PROFESSIONAL AND TECHNICAL ENGINEERS
LOCAL 30
AMES FEDERAL EMPLOYEE UNION
Representing over 1,100 Federal Employees at NASA Ames Research Center

Appendix E

March 28, 2006

General Michael Wholley Esq.
Office of the General Counsel
NASA Headquarters
300 E St. SW
Washington, DC 20546-0001

Dear General Wholley:

Section 101(f) of Public Law 109-155, the NASA Authorization Act of 2005 (hereafter referred to as the Act), requires that NASA "develop a human capital strategy to ensure that NASA has a workforce of the appropriate size and with the appropriate skills to carry out the programs of NASA." The Act also requires that this workforce strategy "cover the period through fiscal year 2011" and "describe, at a minimum— "certain specific content (see below). **NASA's draft strategy submitted to its Unions on February 6th 2006 for review objectively failed to include much of the required content.** Therefore, submission to the Unions of this inadequate draft failed to meet the Act's clear minimum requirement of proper notification and consultation of a *bone fide* workforce strategy to its Unions for a 30-day review. The International Federation of Professional and Technical Engineers (IFPTE) nonetheless submitted its comments in good faith in a timely manner while also pointing out that concerns about the legal sufficiency of the draft would be sent under separate cover. **This letter asks that you thoroughly review the final workforce strategy document due to Congress by April 9th with the particular intention of ensuring that it fully comply with the minimum requirements of the NASA Authorization Act of 2005.**

Below is greater detail of how the February 6th draft failed to meet the minimum congressionally mandated content.

Requirement 1: any categories of employees NASA intends to increase (or reduce), the expected size and timing of those reductions, the methods NASA intends to use to recruit the additional employees (or to make the reductions), and the reasons NASA needs (or no longer needs) those employees.

While the draft strategy makes repeatedly vague statements of "competencies" facing downward trends or upward trends in Sections 2 and 3, it simply does not provide the information required by paragraphs A and B of Section 101(f). It does not provide all of the categories, numbers, and timing of future reductions or increments of employees as required by law. Nor does it provide anything more than cursory references to any "reasons NASA no longer needs those employees". To meet the requirements of paragraphs A and B, the draft must provide a Table (or equivalent) of all planned reductions and increments of actual employees (not competencies) in fiscal years 2007 through 2011, including the timing, methods, and rationale for each of these increments/decrements as clearly stated in the Act. Although the Table in Section 2 provides crude overall target numbers of employees at each Center over the FY005 to FY11 timeframe, the granularity of the information is clearly less than that mandated by the Act and no direct link is made between these numbers and any of the workforce reshaping activities described in the draft document.

Requirement 2: the steps NASA will use to retain needed employees

The draft document provides an enumeration of a set of tools, including retention bonuses and re-training, but it fails to address how these tools will be translated into concrete "steps" by failing to mention that little or no funds have been allocated for using these tools.

As far as retention bonuses are concerned, according to Headquarters Human Resources only $190,526 was spent on retaining technical employees in all of 2005. Meanwhile, $72,254 was spent to retain only 3 non-

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technical employees. This demonstrates NASA's feeble effort to use its previously accorded flexibilities specifically designed to provide retention bonuses in order to maintain its core technical workforce. It also suggests that NASA management may be sidestepping the Workforce Flexibility Act of 2004 by using more than 25% of its bonus authority to provide lucrative rewards to a few managers (as opposed to maintaining its technical skills set as intended by Congress).

As far as the re-training budget is concerned, in response to questions in a telecom between IFPTE and NASA Headquarters management on February 15th, Human Resources responded that they had performed "no assessment of the retraining budget" and that there was "no agency-wide figure or estimate of this". This shows that there was no effort made in any of the HQ budget planning to include the needed funds to support the document's assertion that the "key focus will be on aggressive retraining (p. 33)." As such, the document failed to meet above requirement to provide the actual concrete "steps [not simply the potential tools] NASA will use to retain needed employees." Furthermore, the failure to make agency-wide budgetary plans to support this proposed training suggests that the repeated references to aggressive training are disingenuous.

Requirement 3: the budget assumptions of the strategy, which for fiscal years 2007 and 2008 shall be consistent with the authorizations provided in title II of this Act, and any expected additional costs or savings from the strategy by fiscal year.

Section 2 of the draft workforce strategy states that "The President's FY 2007 budget submission reflects an overall downward full-time equivalent (FTE) trend from now through FY 2011. These FTE projections are based on mission requirements and anticipated funding." The decision to use the President's fiscal year 2007 budget submission (or the vague term "anticipated funding") to derive NASA's projected FTE trends directly violates the Congressional mandate to use the Act's budgetary guidance for FY07 and FY08, which is considerably higher and would clearly accommodate a larger workforce.

The draft goes on simply to assert in Section 3B that "NASA has approximately 1,000 uncovered FTEs throughout most of the five-year budget horizon" but there is no clear linkage made between this number and any meaningful assessment of mission needs, or budgetary constraints, or list of employees or positions, or the Table in Section 2, or even competencies. On p. 14, the draft asserts that two of the reasons for the uncovered FTEs are the "reduction of funding for the aeronautics program" and the "restructuring of the science program", neither of which is consistent with the Authorization Act of 2005. These statements overtly reject the budgetary assumptions for FY07 and FY08 of the growing Aeronautics and Science budgets prescribed in the Act and instead assume the proposed decreases to Aeronautics and Science funding in the President's FY07 budget proposal, not likely fully accepted by Congress.

The actual number of uncovered employees is arbitrary and has been fluctuating chaotically over the past two years. NASA's proposed workforce strategy of tracking and minimizing "uncovered capacity" is thus flawed at its root. It is also inconsistent with the Act because rather than providing transparency in workforce planning as intended by Congress, it focuses instead on managing an arbitrary number calculated behind closed doors, using secret subjective methods, unrelated to the actual technical skills needed to support either the Vision or the Appropriations and Authorization guidance provided by Congress. The fact that an ill-defined notion of "uncovered capacity" is the centerpiece of NASA's current workforce planning is contrary to the specific intent of section 101(f) of the Act, which requires management to provide up-front a transparent, objective, and concrete proposal of how it intends to reshape its workforce. Over the last two years, NASA's "critical needs" reported to Congress have also changed wildly; competencies deemed critical in the initial Workforce Plan of 2004 (i.e. after the announced Vision for Space Exploration) are now deemed uncovered and vice versa. It is also troubling that employees with primary competencies on the critical needs list have been offered buy-outs demonstrating that NASA has been reporting to Congress one set of priorities and yet acting based on another. The fact that NASA management has repeatedly provided Congress with workforce planning documents that management has then ignored reveals a troubling pattern of behavior that reflects inadequate respect for Congress' legitimate right and need to get thoughtful and complete responses to its workforce queries.

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In conclusion, the draft workforce strategy simply sets arbitrary goals for workforce downsizing and does not provide any intelligible link between the stated trends and programmatic requirements, the Vision for Space Exploration, or NASA's authorized budget. The Act requires that NASA provide a straightforward workforce strategy with the specific content based on the budgetary assumptions of the Act. The above provides evidence that the February 6th draft workforce strategy document fails in a number of ways to comply with the requirements of the Act. We therefore request that you investigate this concern and take appropriate action to make sure that the final document submitted to Congress is in full compliance with the law. In closing, NASA's Office of Human Capital Management is spending millions of taxpayer dollars on workforce planning; it would seem that the deliverables generated by such funds should meet the absolute highest possible standards and, at the very least, meet (or exceed) the customer's (i.e., Congress') clearly stated specifications.

Sincerely,

Paul Davis
President, IFPTE local 30
Vice President, NASA Council of IFPTE locals

Co-signers:
Lee Stone, VP for Legislative Affairs IFPTE local 30
Chris Knight, VP for Negotiations IFPTE local 30
Dora Herrera, VP for Safety IPFTE local 30
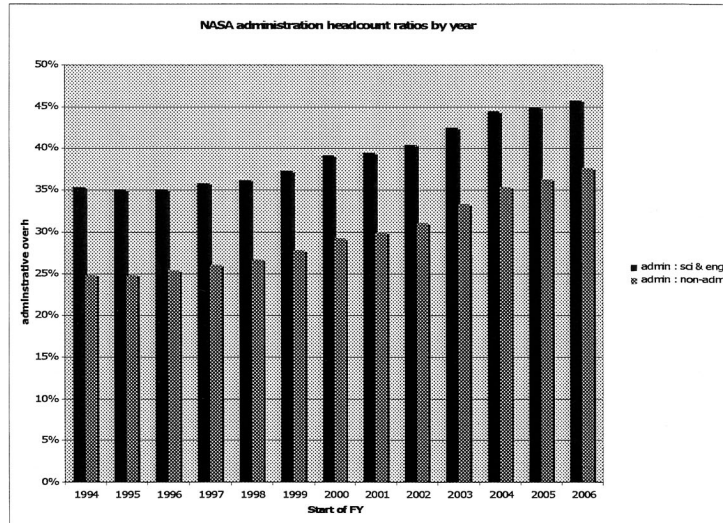Jim Eilers, Trustee IFPTE local 30
John Lehman, Secretary IFPTE local 30

Cc:
Dr. Michael Griffin, NASA Administrator
Ms. Toni Dawsey, NASA Chief Human Capital Officer
Mr. Robert Cobb, NASA Inspector General

Appendix F

Ratio of Administrative to S&E or to total non-Administrative positions

NASA administration headcount ratios by year

Appendix G

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8630 Fenton Street, Suite 400, Silver Spring, MD 20910
301-565-9016 • FAX 301-565-0018 • www.ifpte.org

EXECUTIVE OFFICERS

Gregory J. Junemann
PRESIDENT

Dolores A. Gorczyca
SECRETARY-TREASURER

AREA VICE PRESIDENTS

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WESTERN

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EASTERN FEDERAL

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WESTERN

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SPEEA

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SPEEA

Joseph McGee
NORTHWESTERN

Larry Chojnacki
MIDWESTERN

Andrew Müller
CANADIAN

John G. Lowden Jr.
ATLANTIC

Benjamin T. Toyama
ESTERN FEDERAL

Allan Yamaguchi
NORTHWESTERN

May 11, 2006

Hon. John H. Marburger, III
Director
Office of Science & Technology Policy
Executive Office of the President
Washington, DC 20502

Dear Dr. Marburger:

Thank you for your reply dated 4/12/06 to my letter dated 1/13/06 to President Bush expressing IFPTE's concern about the serious budgetary choices facing NASA prior to the announcement of the FY07 budget. Regrettably, it would seem that the very choice that we advised against (i.e., The Office of Management and Budget's decision to increase both Shuttle and Exploration activities to full throttle with little or no increase in NASA's top line) was indeed made, triggering devastating cuts to NASA's science and technology programs even while retreating to uninspired, backward-looking designs for the next generation of spacecraft. IFPTE finds the simultaneous abandonment both of NASA's traditional missions and of the bold revolutionary spirit of the President's Vision for Space Exploration (VSE) deeply troubling. Recent broad-based push-back makes it clear that our concerns are shared by the National Academies, academia, professional societies, and even key private-sector stakeholders.

As your letter points out, the proposed FY07 budget increases Shuttle funding by $2.6 billion and increases Exploration funding by 30%, yet the overall NASA budget increases by a mere 3.2% (which is not even adjusted for inflation). This is a formula for disaster. When President Bush proposed the VSE, his budget charts showed that the required funds would be recouped by the retirement of the Shuttle and the completion of International Space Station (ISS) assembly activities, leaving Aeronautics and Science whole throughout this transition and deferring full-scale Exploration activities until Shuttle retirement. This was the explicit promise of pay-as-you-go. Unfortunately however the FY07 budget violates that promise and starts the Agency down a dangerous path of cannibalism as Shuttle/ISS and Exploration eat their way through the rest of the Agency's budget. This is an unwise and unwarranted plan that is unsustainable, as future funding budgetary shortfalls for Shuttle/ISS and Constellation will require even more harmful cuts in Aeronautics and Science in FY08 and beyond. Perhaps even more importantly, the mad rush to initiate contracts for the new Crew Exploration Vehicle (CEV) is reminiscent of the same schedule-driven management culture identified by the Columbia Accident Investigation Board (CAIB) as a primary cause of the disaster. Seeing things in hindsight is not good enough; NASA must

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learn to identify recidivist weaknesses in its management processes in real time, lest the nation will needlessly face tragedy again.

As the President's Chief advisor for Science and Technology issues, you must be concerned by the following facts:

1. NASA's Research and Technology programs have been decimated by decreases of a quarter to a third.

    a. The Aeronautics Research Mission Directorate is slated to decrease by 31.5% over three years (24.7% over two years) from $1,057[1] million in actual expenditures in FY04 and $962[2,3] million in FY05 to the $724[2] million proposed in FY07.

    b. The Exploration Systems Research and Technology program is slated to decrease by 28.1% from $898.9[4] million in the final FY05 Operating Plan to the $646.1[4] million proposed in FY07.

2. NASA's Life and Microgravity Science programs have been all but abolished, leaving even a completed ISS with little purpose or scientific return on investment and undermining the VSE's promise to send humans safely back to the moon and on to Mars.

    a. The now-abolished Office of Biological and Physical Research, which oversaw Life and Microgravity Science, had $924.6[2] million in actual expenditures in FY05, but this effort is slated to decrease by at least 70% to $274.6[5] million within the proposed FY07 budget for the Human Systems Research and Technologies program.

    b. The set aside for Life and Microgravity Science mandated by the NASA Authorization Act of 2005 to maintain these capabilities within the Agency has not been adequately funded.

3. NASA's Space/Earth Science budget has been significantly reduced.

    a. NASA's Science Mission Directorate budget decreased by 8.5% from $5,824[2] million in actual FY05 expenditures to the $5,330[2] million proposed for FY07.

    b. Despite extremely misleading statements about a 1.5% increase, NASA's Science budget is facing a proposed 4.8% decrease from the $5,596.8[6] million initially appropriated by Congress in FY06 as stated in NASA's initial FY06 Operating Plan, although some of that reduction is due to an ill-advised lateral transfer to the Exploration Systems Mission Directorate.

4. Some of NASA's best and brightest scientists and engineers are leaving or contemplating leaving because of the hostile anti-science and anti-technology environment at NASA's Research Centers created by the current short-term, narrow-minded view of the VSE.

5. NASA management has allowed the dissemination of scientific information about Astronomy and Climate Change to be interfered with by managers within NASA's public affairs office acting with improper political motives.

6. The weakening of civil-service protections, created by the decision to implement full-cost recovery of salary, exposes NASA's workforce to improper internal and even external influences and pressures. America needs to return to the incorruptible, straightforward, direct allocation of civil service salary based on complement in order to keep its scientific and engineering experts free from the fear of harassment and termination or from the enticement of financial reward, so that we may continue to trust the independent information, judgment, and advice that the nation gets from them and bases its policy decisions on.

7. NASA has dramatically cut its education program and grant/fellowship support for young scientists in training. NASA's failure to meet its responsibility to nurture the next generation of aerospace scientists and engineers may have the greatest adverse long-term impact of all. In my opinion, NASA should be less concerned about a 4-year gap in US-piloted access to space and more concerned about a burgeoning 4-fold gap (currently 2.5-fold by the most conservative estimates[7]) between China's and America's production of new engineering graduates, with India not too far behind.

The good news is that the worst aspects of the proposed damage could be reversed and key capabilities kept minimally functional by a relatively modest investment of about $350 million, either by increasing NASA's top line or by rebalancing the current budget and moderating the excessively rapid budgetary increases proposed in support of two parallel full-fledged manned spaceflight programs. We ask that NASA restore no less than $179 million to Aeronautics to bring this budget back to rescission-corrected FY06 levels, restore at least $132.2 million to Science to bring this budget back to FY06 levels, and put a minimum of $50 million annually into the set-aside for Life and Microgravity Science mandated by the NASA Authorization Act of 2005, to keep these critical capabilities minimally active until such time that this program can be fully restored to support the true goals of the VSE.

A simple retreat from the unreasonable haste in Constellation timelines could free up sufficient funds to keep NASA's Science and Aeronautics missions minimally healthy. Furthermore, the rush to fly CEV is harming CEV itself by locking us into antiquated notions of spacecraft design and mission operations from the Apollo and Shuttle eras.

The intermediate to long-term space operations beyond low-earth orbit contemplated for the VSE will necessarily require much greater autonomous capabilities and this in turn will require incorporating advanced technologies (some that can be adapted from today's advanced commercial and military airplanes; some that need further maturation). All of this technology infusion will require careful and thoughtful testing and validation. We also need to pursue a vigorous research effort in Space Life Science in order to develop effective countermeasures for the long-term adverse effects on crew health and performance during the long-duration missions contemplated by the VSE. These, and other critically important things, cannot happen if the

design period is truncated to meet unreasonably early delivery dates and if NASA's Life and Microgravity Science capabilities are sacrificed to provide transient relief for a sustained budgetary problem created by the juxtaposition of a Herculean schedule with an anemic budget.

Looking at the big picture, it would seem that if the United States is going to remain a super power, it must make long-term Research and Technology investments to assure its future economic and technical supremacy over those nations striving vigorously to dethrone it. Unless we make pro-active decisions today that revitalize our commitment to the scientific research and technology development instrumental to a successful VSE program, to a safe and competitive US civil aviation system, and to the maintenance of America's unique international status in science, I fear that NASA and the nation may face a slow but inexorable slide into technical and scientific mediocrity. I ask that you take a stronger stand for science and technology at NASA and throughout the government, lest this fear become a reality. Superpowers don't simply happen; they are created by a sustained pattern of forward-thinking investments to make sure that the nation remains unsurpassed in technological and scientific excellence and productivity, from which flows both economic prosperity and homeland security.

I thank you in advance for your, and President Bush's consideration of these views.

Sincerely,

Gregory J. Junemann
President, IFPTE

cc:
The Honorable Speaker Hastert and Minority Leader Palosi
The Honorable Majority Leader Frist and Minority Leader Reid
The Honorable Chairperson Boehlert and Ranking member Gordon
The Honorable Chairperson Hutchison and Ranking member Nelson
The Honorable Chairperson Wolf and Ranking Member Mollohan
The Honorable Chairman Shelby and Ranking member Mikulski
Dr. Griffin, NASA Administrator
Dr. Lennard A. Fisk, Chairperson of NRC committee on balancing NASA's Science program

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1. See http://www.whitehouse.gov/omb/budget/fy2006/nasa.html for the actual FY04 expenditures.

2. See http://www.whitehouse.gov/omb/budget/fy2007/nasa.html for the actual FY05 expenditures as well as the FY07 proposed appropriations.

3. See http://thomas.loc.gov/cgi-bin/query/z?c109:S.1281: The $962 million is also the FY07 Aeronautics budget called for in the NASA Authorization Act of 2005.

4. See http://www.nasa.gov/pdf/142458main_FY07_budget_full.pdf on page SAE ESMD 3-1.

5. See http://www.nasa.gov/pdf/142458main_FY07_budget_full.pdf on page SAE ESMD 4-4. Note that the reference in the President's budget to the FY05 final Operating Plan call for $888.1 million for HSR&T does not jibe with the final expenditures for OBPR of $925 million in (2) above. However, even if the lower value is used, the budget for this activity has been cut by 69%.

6. See http://images.spaceref.com/news/2006/2006.02.06.OP.pdf. Add first column (President's proposed FY06 budget of $5,476.3 million) and second column (appropriation bill direction to modify the President's budget by +$120.5 million) to compute the initial appropriation level of $5,596.8 million. This is a conservative estimate because it takes advantage of loopholes that allowed NASA to focus general reductions in the Appropriations bill to the Science budget. However, even if one neglects the Appropriators direction entirely and uses the raw Presidential FY06 budget, the FY07 proposed Science budget is 2.7% lower than proposed for FY06. The only way to create an illusory +1.5% increase in the FY07 budget was to retroactively cut the FY06 Science expenditures below both the Presidentially proposed and Congressionally appropriated levels stated above down to the $5,254.7 million in NASA's FY06 Operating Plan.

7. See http://www.csmonitor.com/2005/1220/p01s01-ussc.html

Appendix H

EXECUTIVE OFFICERS

Gregory J. Junemann
PRESIDENT

Dolores A. Gorczyca
SECRETARY-TREASURER

AREA VICE PRESIDENTS

Dominick D. Critelli
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MIDWESTERN

Andrew Müller
CANADIAN

John G. Lowden Jr.
ATLANTIC

Benjamin T. Toyama
WESTERN FEDERAL

Allan Yamaguchi
NORTHWESTERN

April 26, 2006

Hon. Richard Shelby, Chairman
Hon. Barbara Mikulski, Ranking Senator
Appropriations Subcommittee on Commerce, Justice & Science
United States Senate
Room S-146A of the Capitol
Washington, DC 20510

Dear Chairman Shelby and Ranking Senator Mikulski,

In preparation for today's 2pm hearing with NASA Administrator Michael Griffin, and as you embark on the difficult task of crafting the Fiscal Year 2007 (FY07) Appropriations for the National Aeronautics and Space Administration (NASA), the International Federation of Professional and Technical Engineers (IFPTE) urges the Subcommittee to consider the following three important questions:

- How will NASA be able to support America's threatened leadership in civilian and military aviation if it cuts its Aeronautics research and development (R&D) budget by a quarter from FY05 levels?

- How can NASA lead the world in studying and understanding our home planet, our solar system, our Universe, and the forces acting upon them if it cuts its Science budget by almost 10% from FY05 levels?

- How can NASA attract and retain a workforce with engineering and scientific skills and capabilities second to none if it continues to threaten its scientists and engineers with layoffs in order to meet arbitrary downsizing quotas?

We at IFPTE believe that preserving America's leadership in Aeronautics R&D is a national priority that cannot be exaggerated. We must not grow complacent especially in the face of the serious competition from a European community that clearly understands the important role of government R&D in driving long-term technological breakthroughs and the associated economic vitality. The Senate should make sure that America remains at the cutting edge by appropriately investing in our nation's future, if we intend to leave our children an America as strong and secure as the one we grew up in. We cannot allow NASA's intellectual capabilities in Aeronautics to be farmed out to European interests while NASA's

current Administration is devoting 100% of its attention to Space Operations and Exploration. IFPTE urges you to once again adequately fund NASA's Aeronautics R&D programs at no less than the final funding level approved in FY06.

IPFTE believes that preserving America's leadership in Space and Earth Science is also a national priority. Given that ongoing climate change seriously threatens our economy and way of life, NASA must endeavor to learn as much and as quickly as possible about the natural and man-made forces that act upon our home planet. NASA must also continue to inspire the next generation of American scientists and engineers with continuous discoveries about our solar system and our Universe through exploration with amazing new telescopes and robotics. IFPTE urges the Subcommittee to reverse the proposed 4% cut to NASA's Science programs and to maintain these programs at a level at least equal to those appropriated in FY06. Today, the proposal is to sacrifice smaller, more vulnerable, Space and Earth Science programs, but you can be sure that when this stop-gap money runs out, there will be calls by some next year to cut the Webb Telescope and other cornerstones of NASA's scientific future. These are scenarios that only Congress can prevent.

We believe in NASA's Vision for Space Exploration (VSE) and envision a new generation of scientists and engineers inspired by the prospect of an American man or woman (now only a small child) setting foot on Mars and returning home safely with unparalleled scientific bounty. The workforce reshaping needed to meet the challenges of this dream is only possible if NASA maintains its traditional ability to attract its fair share of the best and brightest graduates this nation has to offer. NASA cannot be allowed to be transformed into what amounts to a temp agency, sacrificing long-term capabilities and long-held values to meet short-term budgetary pressures, especially when current downsizing targets can easily be met with voluntary attrition alone. The workforce chaos initiated a few years back is already causing many of NASA's best and brightest employees to flee and is undermining its ability to compete with elite academic and private-sector institutions for the best graduating talent. Unless some semblance of normalcy can be restored soon, the damage could be long term.

NASA's recently delivered Workforce Strategy is a largely content-less document that merely announces a mandate for downsizing the technical workforce by proclamation, with only the most superficial analysis of the future technical needs of the Agency and no analysis of the actual current capabilities of its workforce. IFPTE urges the Subcommittee to require NASA to deliver a more substantive Workforce Strategy that complies with the requirements of the Authorization Act and that contains real numbers of employees for each technical and administrative area, real justifications, a thoughtful retraining plan, a clear hiring plan given the large-scale attrition expected for NASA's aging workforce, and a real recruiting plan for meeting the technical challenges of the VSE. In the meantime, we ask that Congress forbid NASA from implementing lay-offs of non-managers during the next fiscal year.

In this light, we endorse the following three specific proposals and ask that the Subcommittee adopt them as a part of your FY07 underlying funding measure:

1. Appropriate at least $903 million for NASA Aeronautics. This no-growth level carried over from FY06 represents a 6% cut from the authorized budget of $962 million (as opposed to the

75

25% cut proposed in the President's budget). It is an increase of $179 million, consistent with the Budget bill recently passed by the Senate. The proposed increase should be used to fully restore the Airspace Systems (+$53.8 million) and Fundamental Aeronautics (+$114.5 million) programs and to increase the Human-Systems Integration and Validation elements within the Aviation Safety program (+$10.7million). We also ask that the Appropriators forbid NASA from allowing any of its financial or human capital to be diverted to support Aeronautics R&D efforts for foreign aerospace interests. Specifically, we ask that language be added to the report stating that: "*Although NASA collaborates with many foreign partners, the Agency works for the benefit of the American people and cannot outsource any of its resources in any way that might undermine our national competitiveness in Aeronautics.*"
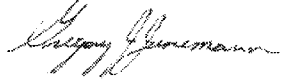
2. Appropriate at least $5.5968 billion for NASA Science. This no-growth budget level carried over from FY06 represents a 4% cut from the actual FY05 expenditures of $5.824 billion. It is an increase of $132.2 million over the President's budget and requires that the Robotic Lunar Exploration program and funds ($134.6 million) be retained within the Science account (as is appropriate given that the details of any ultimate human lunar exploration missions should be driven primarily by scientific goals developed and refined under this Science program). The proposed increase should be used to reverse proposed cuts to the Explorer (+17.7 million), Navigator (+17.3 million), Astrobiology (+$30 million), and SOFIA programs (+$67.2 million).

3. Streamline Administrative (G&A) costs and eliminate those for Reduction-In-Force planning and execution. The Corporate and Center G&A budgets, used in part to support an inefficient management system (NASA's administrative to Science-Engineering staff ratio continues to grow and has reached a ridiculous 0.46!), is the best potential source for sizeable inconsequential offsets for the increases proposed above. In particular, the $41 million proposed to implement workforce reshaping should be severely cut. Given NASA's failure to provide any specifics in their recently delivered Workforce Strategy, we also ask that language be added to the report stating that "*None of the FY07 funds appropriated in this Act shall be used to prepare or effect any involuntary reductions in NASA's Civil Servant non-management workforce.*"

To implement the above proposals, we strongly advocate for an increase in NASA's total budget. However, if this is not possible, the cost of our proposals can be recouped by relatively small decreases in the growth of the Exploration and Space Operations accounts, consistent with President Bush's pay-as-you-go philosophy. In that light, House Science Committee Chairman Sherwood Boehlert's specific proposal to reverse the current effort to accelerate the deployment of new manned spacecraft from 2012 to 2014 deserves strong consideration. This proposal would apparently free up $695 million (the difference the Exploration Systems budget projected for FY07 in last year's Presidential budget -- $3.283 billion without Prometheus -- and the one in this year's proposed budget -- $3.978 billion). The full offset would not be necessary because less than $400 million is needed to cover our proposals above while also fulfilling the call in the Authorization Act to sustain NASA's Life and Microgravity Science capabilities and programs, so crucial for any genuine implementation of the VSE. This approach is also appealing because it represents only a small slowing in the rapidly rising Exploration Systems budget and could be accomplished with no substantive impact on actual FY07 activities, given the apparent forward funding of future expenses and contingency costs within the proposed FY07 Constellation budget.

Thank you in advance for your consideration. Should you have any questions, you can contact me, or IFPTE Legislative Director Matt Biggs, at (301) 565-9016.

Sincerely,

Gregory J. Junemann
President

GJJ:kan
opeiu#2afl-cio

Appendix I

Subject: New Agency Assignment: Lunar Precursor and Robotic Program
Date: Fri, 26 May 2006 17:45:55 -0500
From: "Message From the Center Director" <Center.Director@msfc.nasa.gov>
To: XXXXX

Marshall Team:

I am pleased to pass along some exciting news released by the Associate Administrator for the Exploration Systems Mission Directorate (ESMD) today: we have been asked to take on an additional vital role in Exploration.

The Robotic Lunar Exploration Program (RLEP) has been renamed the Lunar Precursor and Robotic Program (LPRP) and will be located at Marshall. Marshall's Tony Lavoie, as Acting Program Manager for LPRP, will serve on detail to NASA HQ to spearhead the development of NASA's Human and Robotic Lunar Architecture being developed under the overall global architecture led by ESMD Deputy AA, Doug Cooke.

A new Lunar Lander Project Office also will be located here, reporting to the Constellation Program Office, and will be responsible for performing early trade studies and developing requirements for the Lunar Surface Access Module (LSAM).

We appreciate the confidence NASA Headquarters has in us, and we will now work to get the job done. As more details become available, we will share them.

David King, Director

BIOGRAPHY FOR LEE STONE

Lee Stone is a Human-Factors engineer and research psychologist in the Human-Systems Integration Division at NASA Ames Research Center. He received his B.A. in Biophysics in 1980 from the Johns Hopkins University, his M.S. in Engineering in 1983 from the University of California at Berkeley, and his Ph.D. in Neuroscience in 1987 from the University of California at San Francisco.

He has more than 20 years of experience studying and modeling human perceptual and motor performance with an emphasis on the visual, vestibular, and oculomotor signals that influence tracking, search, and control performance and interface design. Since 1995, he has been a principal investigator on numerous NASA grants and projects, and has run a human performance R&D laboratory at Ames in support of Aeronautics and Space Human Factors. He has authored or co-authored more than 35 publications in scientific and engineering journals, as well as many invited book chapters and NASA technical memoranda. He also served as Project Scientist for the RHESUS project and as acting chief of the Human Information Processing Research branch. He is the Vice President for Legislative Affairs of IFPTE local 30 (the Ames Federal Employees Union) and the Legislative Representative of the NASA Council of IFPTE locals. IFPTE (the International Federal of Professional and Technical Engineers, AFL–CIO) represents federal employees at four NASA Field Centers and Headquarters.

Chairman CALVERT. Thank the gentleman. Next, Dr. David Black, Co-Chair of the National Academy of Sciences Committee on Meeting the Workforce Needs of the National Vision for Space Exploration, and President and CEO of Universities Space Research Association.

Sir, you are recognized for five minutes.

STATEMENT OF DR. DAVID C. BLACK, PRESIDENT, UNIVERSITIES SPACE RESEARCH ASSOCIATION

Dr. BLACK. Mr. Chairman, Ranking Member Udall, thank you very much. And other fellow Members of the Committee. I appreciate the opportunity to talk with you today.

I appear today largely in my capacity as the Co-Chair of the National Research Council's Committee on Issues Affecting the Future of the U.S. Space and Engineering Workforce. The views expressed in my testimony will be those of the Committee. Occasionally, I will throw in my own, and I will try and make it clear where there is a difference. The latter views are fully supported by my co-chair of the study, Dr. Daniel Hastings, who is the Dean for Undergraduate Education and Professor of Aeronautics and Astronautics at MIT.

Among the questions you asked, one of them is what are the critical skills that will enable NASA to complete its goals in space, Earth science, aeronautics, and exploration. The Committee is in the throes of completing its report. We should be through at the end of the year, so we haven't gone through an exhaustive look at the critical skill needs that NASA has set forward. We recognize this as a daunting task for the Agency as it starts with essentially a blank piece of paper.

The NRCs, our committee's initial reaction to NASA's work done so far is that it is incomplete, and reflects a top-down view of what skill mixes are needed, and as such, is more theoretical than empirical. An essential aspect of any answer to this question has to do with the so-called make/buy ratio, which has already been discussed, that NASA decides to implement, that is, the division of responsibilities for work to be done by the Agency's Field Center employees, versus the work to be done by the outside contractors. I will comment more specifically on this ratio below, but let me just

say here that clearly, the demands on NASA's in-house workforce will be lessened if this ratio is low, and some of the requisite skill base can then reside external to the Agency.

One of the other questions is: what decision must NASA make now to prepare for its future workforce needs? We have identified, the committee has identified several key decisions that NASA faces, and there are sure to be others that will become as we complete our study.

In the view of our committee, the most critical decision is the one I just mentioned, that is, the amount of work to be done in-house versus outside. That ratio is very fundamental in determining the load and the concerns that the Agency has.

Furthermore, NASA needs to determine what means it will use to ensure that prospective employees entering jobs either inside the government or in the private sector, gain the requisite training and experience in those critical areas that are needed to fulfill the Agency's goals and objectives. NASA does have training and mentorship programs, and I should say parenthetically here that my organization has been working with NASA to expand those over the past years, but I would say that in general, these programs are modest in scope and impact.

NASA will need to make more decisions—make decisions regarding how it can provide assurance, or perhaps more on point, a sense of hope and promise, to potential future members of the Agency's workforce. Twenty years ago, or even longer, when I was thinking about the space program, the mere mention of NASA was an attractor. It had vocational pizzazz. That is no longer the case. Considerable publicity is given to NASA projects that are delayed or canceled, and there are fewer opportunities for NASA staff to be engaged in meaningful science and engineering.

I am concerned that many of the best and brightest young people are—who would be attracted to the science part of what NASA does, but the inability of the Administration and Congress to properly fund NASA's implementation of the *Vision for Space Exploration* means the support for science will erode. Research advisors in the academic disciplines associated with these science areas won't have the funding to support the best and brightest students, and those students will go elsewhere. The ability of NASA to develop ways to reinvent itself is—in the sense of attracting the best and brightest in science and engineering is very, very critical.

Finally, NASA will need to decide how much critical mass of expertise should be sustained in key areas, such as microgravity life and physical sciences. It is easy to turn off communities with budget decisions, but it is not as easy to turn them on in a timely manner at some point in the future. The employment ecosystem extends from NASA and other similar technical employers through universities, and arguably, down to high schools.

The life scientists needed to do cutting edge research in 2015 are in high school today. How likely are they to choose career paths that would take them to NASA, in light of recent decisions to minimize that field of work? A related aspect is that the university community that is the source of NASA's future workforce is already showing signs of steering their best students to other career paths, because NASA's commitment appears to be uncertain or unstable.

You have asked what are the tradeoffs associated with completing work in-house or contracting them out, and in the little time I have left, I would say that if the decision is to build, rather than buy, NASA will not need a large number of people with the requisite skills, but those on whom they rely must be exceptionally skilled and experienced. Choosing a path that emphasizes buying what is needed allows NASA to tap into a skilled workforce that is already largely in place, and which is unencumbered by Civil Service hiring and firing rules. This latter aspect makes it easier to adjust the workforces, budgets, and program schedules wax and wane. It also means that they will find support for the programs in a far broader base than was the case before.

In closing my remarks, Mr. Chairman, I would note that the committee feels strongly that NASA needs to look outside of itself in assessing the nature, scope, and possible solutions for its skill mix. NASA has historically been a can-do agency, but also one afflicted, to some extent, with the not invented here syndrome. The issues NASA faces, in terms of workforce, are national in character. They reverberate through other government agencies involved in space-related work, as well as the private sector, including universities.

NASA should not, in our committee's view, try to structure a solution in isolation from consultation with the broader set of communities noted above. While we have not formulated a recommendation in this area, I believe I can speak for most of the members of the committee in saying that the Nation's space program would benefit if the issue of workforce is addressed by involving representatives of the entire workforce ecosystem in the assessment of the problem and the range of possible solutions.

The final thing I would say, sir, to the Committee, is that one of the things that is absolutely essential is to see more hands-on opportunities for students at the university level. I have a figure which I can show later time, but time is passing, so I will stop here.

Thank you very much for the opportunity to testify today.

[The prepared statement of Dr. Black follows:]

PREPARED STATEMENT OF DAVID C. BLACK

Mr. Chairman, Ranking Minority Member, and Committee Members: I appreciate the opportunity to testify before you today. My name is David Black. I am the President and CEO of the Universities Space Research Association. The Universities Space Research Association was incorporated in 1969 in the District of Columbia as a private, nonprofit corporation under the auspices of the National Academy of Sciences (NAS). Institutional membership in the Association has grown from 49 colleges and universities when it was founded, to the current 100 institutions. All member institutions have graduate programs in space sciences or technology. Besides the 92 member institutions in the United States, there are two member institutions in Canada, three in Europe, two in Israel, and one in Australia. USRA provides a mechanism through which universities can cooperate effectively with one another, with the government, and with other organizations to further space science and technology, and to promote education in these areas. I am also an Adjunct Professor in the Physics and Astronomy Department at Rice University.

I appear today largely in my capacity as co-chair of the National Research Council (NRC)'s Committee on Issues Affecting the Future of the U.S. Space Science and Engineering Workforce. The NRC is the operating arm of the National Academy of Sciences, National Academy of Engineering, and the Institute of Medicine of the National Academies, chartered by Congress in 1863 to advise the government on matters of science and technology. The views expressed in my testimony today are in

part those expressed by the NRC Committee in its Interim Report,[1] as well as my own. I shall do my best to make clear which views are mine and which are those of the Committee. The latter views are fully supported by my co-chair of the NRC study, Dr. Daniel Hastings, who is Dean for Undergraduate Education and Professor of Aeronautics and Astronautics at MIT.

Prior to addressing the specific issues on which you have asked me to comment, allow me to provide some context for the NRC Committee's activity. I should note that the Committee has completed most of our fact-finding and will be preparing our final report near the end of the calendar year. As such we are not yet prepared to provide a complete set of recommendations but expect to do so in our final report.

The NRC Committee's charge from NASA is to explore long-range science and technology workforce needs to achieve the Nation's long-term space exploration vision, identify obstacles to filling those needs, and explore solutions for consideration by government, academia, and industry. The specific tasks that we have been requested to undertake are the following:

1. Assess current and projected demographics of the U.S. aerospace engineering and space science workforce needed to accomplish the exploration vision;
2. Identify factors that impact the demographics of the affected workforces;
3. Assess NASA's list of the workforce skills that will be needed to implement the *Vision for Space Exploration,* both within the government and in industry;
4. Identify the skills needed to implement NASA's *Vision for Space Exploration* within the academic community;
5. Assess the current workforce against projected needs;
6. Identify workforce gaps and analyze obstacles to responding to the workforce needs, and in particular, analyze the proper role of academia and the obstacles to achieving this proper role; and
7. Develop recommendations for specific actions by the Federal Government, industry, and academia to address those needs, including considerations such as organizational changes, recruiting and hiring practices, student programs, and existing workforce training and improvement.

The NRC Committee has drawn upon input from two workshops and documents provided by NASA to arrive at the following preliminary findings:

1. NASA has made a reasonable start on assessing its near- and long-term skill needs, and the Committee shares the view expressed by NASA representatives that there is still much more work to be done. However, NASA's work has focused on initial assessment of current workforce demographics and estimates of future needs, and at the time of the NRC's interim report NASA had not yet translated that analysis into a strategy and action plan.
2. NASA needs a strategic workforce plan that deals with the next five years and that lays the foundation for a longer-term process. This will be a new and difficult process for NASA, but it will nevertheless be vital for the Agency's success in implementing the space exploration vision.
3. The Committee has not seen compelling evidence for a looming, broadly based shortage in the supply of aerospace science and engineering workforce employees to meet NASA's needs. (This is not to say, however, that the committee disagrees with the broader issues about the adequacy of the U.S. science and engineering workforce.) However, the committee believes that in order to continue to have an adequate supply of these employees, it is important that NASA provide adequate funding for university based research programs and flight opportunities. This will help ensure that universities continue to sustain curriculum, faculty, and student interest in the aerospace sciences and technologies.
4. To address those skill areas where there are concerns (both for the near-term and the longer-term), NASA needs to pay particular attention to identifying and expanding ways to promote exchanges of personnel between NASA and the private sector (industry, academia, and non-government organizations).
5. The degree to which the Agency chooses to perform work in-house versus by a contractor will play a major role in the number of personnel that the Agency will require.

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[1] *Issues Affecting the Future of the U.S. Space Science and Engineering Workforce—Interim Report,* The National Academies Press, Washington, D.C., 2006

6. The Committee concludes that the ability to recruit and strategically retain the needed workforce will depend fundamentally on the perception of long-term stability of the *Vision for Space Exploration* and a sustainable national consensus on NASA's mission.

As a result of these findings the NRC Committee made the following recommendations:

1. NASA should develop and publicize a workforce strategy for ensuring that it is able to target, attract, and retain the skilled personnel necessary to implement the space exploration vision and conduct its other missions in the next five to 15 years.

2. NASA should adopt innovative methods of attracting and retaining its required personnel and should obtain the necessary flexibility in hiring and reduction-in-force procedures, as well as transfers and training, to enable it to acquire the people it needs. Transfers within the Agency could fill many needs if coupled with appropriate training. NASA should work closely with the DOD to initiate training programs similar to those that the DOD initiated, or otherwise participate actively in the DOD programs.

3. NASA should expand and enhance agency-wide training and mentorship programs, in order to develop or improve needed skills within the existing workforce. For example, NASA could provide some of its employees opportunities for gaining on-the-job experience for its most vital required skill sets such as systems engineering.

As you can see, the NRC Committee has made reasonable progress, but much work remains to address fully the charge that we have been given. That said, let me turn to the questions your committee has posed to me.

What are the critical skills that will enable NASA to complete its goals in space and Earth science, aeronautics, and exploration?

Although the Committee has not reviewed NASA's critical skill needs on an item-by-item basis, it is likely that the Agency will need to maintain at least a small core of employees having skills in the majority of the same areas that the Agency has depended upon throughout its history. Individuals with skills and experience in project management and systems engineering will be particularly critical to successful realization of NASA's goals. The NRC Committee intends to examine this issue in more detail in our final report after we have had a chance to evaluate the material that NASA has provided to our Committee. We recognize that this is a daunting task for NASA as it starts with essentially a blank piece of paper. The NRC Committee's initial reaction to NASA's work done so far is that it is incomplete and reflects a top-down view of what skill mixes are needed and as such is more theoretical than empirical.

An essential aspect of any answer to this question is the "make/buy ratio" that NASA decides to implement, i.e., the division of responsibilities for work to be done by the Agency's field center employees vs. work to be done by outside contractors. I will comment more specifically on the role of this ratio below, but let me just say here that clearly the demands on NASA's in-house workforce will be lessened if this ratio is low, as some of the requisite skill base can then reside external to the Agency.

What decisions must NASA make now to prepare for its future workforce needs?

The NRC Committee has identified several key decisions that NASA faces, and there are sure to be others that will become clear as we complete our study. In the view of our Committee, the most critical decision is the one just discussed, the amount of work done by NASA employees relative to that done in academia and industry. The extent to which NASA decides to develop and operate space systems in-house at its field centers or to contract such work out will have a substantial influence on the skills needed in-house. Moreover, such make/buy decisions also have a strong influence on recruitment of future NASA employees.

Furthermore, NASA needs to determine what means it will use to ensure that prospective employees, entering jobs either inside the government or in the private sector, gain the requisite training and experience in those critical areas that are needed to fulfill the Agency's goals and objectives. NASA does have training and mentorship programs, and I should say parenthetically here that my organization has been working with NASA to expand these over the past years, but in general these programs are modest in scope and impact.

NASA also will need to make decisions regarding how it can provide assurance, or perhaps more on point, a sense of "hope and promise" to potential future members of the Agency's workforce. Twenty years ago, the mere mention of NASA was an attractor. It had vocational pizzazz. That is no longer the case. Considerable publicity is given to NASA projects that are delayed or canceled, and there are fewer opportunities for NASA staff to be engaged in meaningful science and engineering. I am concerned that many of the best and brightest young people are attracted to the science part of what NASA does, but the inability of the Administration and Congress to properly fund NASA's implementation of the *Vision for Space Exploration* will mean that support for science will erode. The research advisors in the academic disciplines associated with these science areas won't have the funding to support the best and brightest graduate students, who may go elsewhere. The ability of NASA to develop ways to reinvent itself in the sense of attracting the best and brightest in its science and engineering competencies is very important.

Finally, NASA will need to decide how much critical mass of expertise should be sustained in key areas such as microgravity life and physical sciences. It is easy to turn off communities with budget decisions, but it is not as easy to turn them on in a timely manner at some point in the future. The employment ecosystem extends from NASA and other similar technical employers through universities and arguably down to high schools. The life scientists needed to do cutting edge research in 2015 are in high school today. How likely are they to choose career paths that would take them to NASA in light of recent decisions to minimize that field of work? A related aspect is that the university community that is the source of NASA's future workforce is already showing signs of steering their best students to other career paths because NASA commitments appear to be uncertain or unstable.

Does NASA's workforce strategy fulfill the needs identified by the NRC interim report?

Our Committee has not had a chance to review NASA's new workforce strategy, but will do so as the NRC study moves ahead during this year. The Committee's interim report does suggest a number of important elements that should be included in such a strategy. They include an analysis of future skill needs, both in terms of types of skills and numbers of employees, that is then linked to plans for recruitment and training to meet those needs, as well as plans for partnerships with industry, other government agencies, and academia to meet future training needs.

What are the tradeoffs associated with completing work in-house at NASA or contracting them out?

Our Committee has not yet addressed this question thoroughly, so I will have to give you what is largely my personal view at this point. As remarked earlier, the Committee does feel that this tradeoff is one of the more critical, if not the most critical, decision that NASA must make. Whether or not there is strong reliance on external organizations, NASA must retain a cadre of expert engineers and scientists on its own staff. Administrator Griffin has made the point that NASA needs to be a smart buyer, and that requires skilled and knowledgeable employees who are involved with buying decisions and in program management. Recent experience in the DOD indicates that when the government expertise in national security space was allowed to wane, the government made major mistakes in what and how it contracted with industry.

If the decision is to buy rather than build, NASA will not need a large number of people with the requisite skills, but those on whom they rely must be exceptionally skilled and experienced. Choosing a path that emphasizes buying what is needed allows NASA to tap into a skilled workforce that is already largely in place, and which is unencumbered by civil service hiring and firing rules. This latter aspect makes it easier to adjust the workforce as budgets, and program schedules, wax and wane. Selection of the buy path also expands the support base for NASA's programs in a political sense, as employees of companies and universities beyond the NASA field centers have a vested interest in the success of those programs. However, it is important to realize that NASA can never give up the core of talented people necessary to be "smart" buyers. NASA needs to retain enough in-house projects to develop and retain these smart buyers or facilitate exchange with industry to get smart buyers with current experience.

Conversely, should NASA opt to place more emphasis on building what is needed using an in-house workforce, they will need to recognize that in next five years or so, they will have gaps in necessary expertise that cannot be rapidly filled by training current in-house people or by inexperienced new hires. The NRC Committee has examined this issue, and the Committee concludes that ways must be found for

NASA to supplement its present workforce with members of industry, the retiree community, and academia who do currently possess the skills required.

The situation for the longer-term will depend upon NASA's ability to train in-house staff and to establish an environment that encourages the brightest young students to seek employment with NASA. A key element of this will be to provide opportunities within universities for meaningful hands-on training and experience for students. Data on the trend of NASA-sponsored opportunities of this type show a clear decrease over the past three decades or more (see Figure 1), and a projection into the future given the proposed budgets suggests that this decrease is likely to continue. The knowledge needed to become a skilled project manager is not found in a textbook or classroom; it comes from doing the work and experiencing failures as well as successes. A "build" as contrasted to "buy" approach will allow NASA to offer its employees compelling challenges, which is an important ingredient in making employment with the Agency attractive to young people. However the most effective, and perhaps even essential, approach to meeting the needs of both the Federal Government and industry for people with hands-on experience will be to nurture and expand ways to begin to provide that experience while science and engineering students are still in universities. As a companion NRC study committee recently recommended,[2] that will require reversing the trend of declining opportunities for programs that do provide the hands-on experiences.
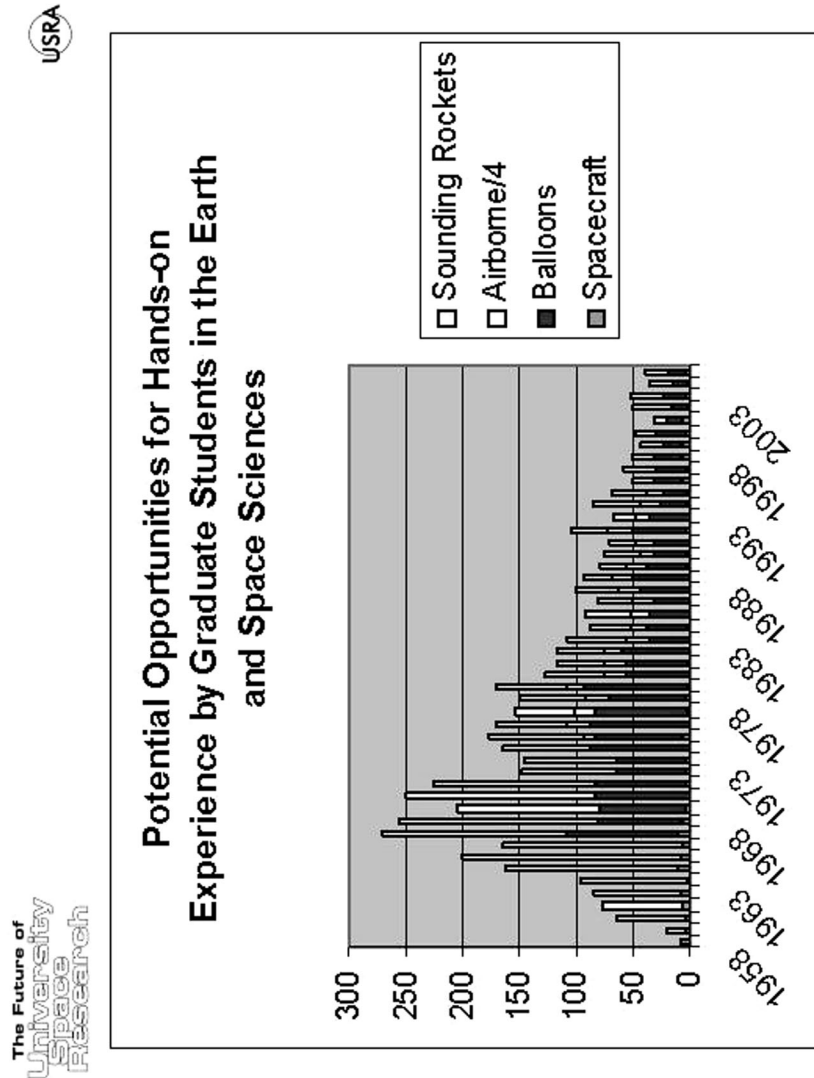
In closing my prepared remarks Mr. Chairman, I would note that the NRC Committee feels strongly that NASA needs to look outside of itself in assessing the nature, scope, and possible solutions for its skill mix. NASA has historically been a "can-do" agency, but also one afflicted to some extent with the "not invented here" syndrome. The issues NASA faces in terms of workforce are national in character; they reverberate through other government agencies involved in space-related work, as well as the private sector including universities. NASA should not, in our Committee's view, try to structure a solution in isolation from consultation with the broader set of communities noted above. While we have not formulated a recommendation in this area, I believe I can speak for many people in saying that the Nation's space programs would benefit if the issue of workforce is addressed by involving the representatives of the workforce ecosystem in both the assessment of the problem and the range of possible solutions.

I would be happy to expand on my remarks or address additional questions should you wish.

Thank you again for the opportunity to share with your committee the perspectives on this important issue that the NRC Committee has developed in this early stage of our work.

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[2] *Assessment of Balance in NASA's Science Programs,* The National Academies Press, Washington, D.C., 2006.

Potential Opportunities for Hands-on Experience by Graduate Students in the Earth and Space Sciences

BIOGRAPHY FOR DAVID C. BLACK

David C. Black is the president and CEO of the Universities Space Research Association (USRA), a consortium of 97 different colleges and universities having graduate programs in space science or engineering. He is also Adjunct Professor of space physics and astronomy at Rice University. Between 1970 and 1975 Dr. Black served in various capacities at NASA's Ames Research Center, including Chief of the Theoretical Studies Branch, Deputy Chief of the Space Science Division, and he was the first Chair of the Ames Basic Research Council. Dr. Black was selected as the first chief scientist for the space station program at NASA Headquarters in 1985. He returned to NASA Ames in 1987 as the chief scientist for space research. He spent an academic year as a Visiting Professor at the University of London (1974–1975). Dr. Black is an internationally-recognized researcher in theoretical astrophysics and

planetary science, specializing in studies of star and planetary system formation. He has also done pioneering experimental research involving the isotopic composition of noble gases in meteorites, he was the first to discover and correctly identify evidence for non-solar material in solar system matter, and was the first to show that the isotopic composition of solar flare noble gases differs from that of solar wind noble gases. He is a leader in the current effort to search for and study other planetary systems. He is Past Chair of the Solar System Exploration Subcommittee and the Origins Subcommittee of NASA's Space Science Advisory Committee. Dr. Black is Co-Chair of the NRC Committee on Issues Affecting the Future of the U.S. Space Science and Engineering Workforce, and he also served as a member of the Planetary and Lunar Exploration Task Group (1984–1988) and the Working Group on Search for Extraterrestrial Intelligence (1979–1983).

Chairman CALVERT. Thank the gentleman. Mr. John Douglass, President and CEO of the Aerospace Industries Association. Welcome, Mr. Douglass, you are recognized for five minutes.

STATEMENT OF JOHN W. DOUGLASS, PRESIDENT AND CEO, AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA

Mr. DOUGLASS. Thank you, Mr. Chairman, and I want to thank you and Congressman Udall for your leadership in holding this hearing. This is an important issue, and it is one that industry has been concerned about for the last four or five years, because the trends that are affecting NASA are affecting our entire workforce across the board.

You asked me four questions in your letter of invitation. I will answer those four questions. I am on the NRC Committee with Dr. Black, but the answers that I am going to be giving this morning are largely my own views, informed by the fact that I represent about 300 aerospace companies.

The first question was what are the trends that affect the NASA workforce planning, and the most important ones are as follows. The current workforce across our country is aging. When I was on the President's Commission on the Future of the Aerospace Industry in 2003, we estimated that the average age of our manufacturing workforce was 51 years old, and the average age of our engineering workforce was 54 years old.

The second point is that the workforce is globalizing, which makes it more complex. In the past, it was easier to rely on a workforce that was largely American citizens, and that is no longer true today. And the third point is that industry is in the process of rebuilding its workforce. By 2008, something approaching 30 percent of our workforce will be eligible to retire, and we are beginning to replace those people. In the last two years, for example, we have added about 50,000 workers to our industry, and we are going to be adding many more in the years in the future. What this means to NASA is that NASA is going to find that it is harder to compete for resources, as we get into the out years of the current vision.

And one of the things that the Committee talked a lot about was that the design of the systems that NASA will be developing in the next few years is going to be done by the people that are in NASA today, but it is going to be the long-term maintenance and operations of those systems, where we will need new workers, and those workers are going to be taken from a workforce field that is going to be increasingly competitive over the next eight to ten years.

What are some of the tradeoffs of in-house versus contracting out? Well, some factors favor industry and some favor NASA. The things that favor industry is that we have a lot of flexibility. We can expand and contract relatively easier than a government agency can. The second factor is that we have a very broad-based research and development programming. When you go to industry, you can pull in skills that are in the civil aviation area. You can pull in from civil space, military space, from other parts of our workforce that support the Department of Transportation across a broad level of skills. So there is a vast pool to pull from, and most economists agree that if you have a short-term need, something that is only going to last, say four or five or six years, it is probably more cost-effective to pull people from industry than it is to try to establish government positions.

On the other side of the coin, anything that is going to take a long-term, and involves a lot of basic research, where industry is not likely to invest in expertise, is more likely done through the Civil Service process, especially when having access to those key facilities that are involved in basic research, is a critical factor. So, I would say there are a lot of areas where long-term specialists, especially those related to space science and Earth science, it would be better to have those as NASA employees.

Finally, one quick comment on something Dr. Black raised, and that is that I think there is still a factor that, a segment of our population is motivated by service, and I still believe that NASA is a wonderful motivator for those young people in our population that want to serve their fellow citizens. Just as we have wonderful young people who are willing to serve in our armed forces, there are those who would like to serve in NASA, and that is a unique drawing power that NASA has.

You asked me what are some of the critical skills. I listed some in my written report, which I will submit for the record, Mr. Chairman. There are two that I would like to dwell on specifically. The first one is systems engineering. If NASA is going to do the systems engineering in-house, which is—appears what the Administrator is intending to do, then they are going to have to beef up their systems engineering workforce. We are seeing this, not only at NASA, but in the Department of Defense, and in other places.

As we get more and more complex technology, where what we used to call systems are really systems of systems, this systems engineering function is becoming increasingly important, and it is an area where the competition for resources is especially keen, between the government and industry, and in fact, between companies.

The second area is an area where I think NASA is moving pretty much in the wrong direction, and that is in the area of prototype development. There is an institution over in the Department of Defense called DARPA, that has been a part of the Department of Defense for the last forty or fifty years, and almost all the breakthrough technologies that are employed by our military today have come out of DARPA. It is where high risk, basic technologies can be turned into prototypes. And things like the Internet and network-centric warfare, and precision-guided munitions, and lots of other things came out of DARPA, and you would have to, if you get

up to the 50,000 foot level, and you ask yourself if that is good for the defense side of our national workforce, why don't we have something like that for the civil side, for our transportation and energy and air traffic control problems, and things of that nature. So, I think there is a need for that kind of skillset over in NASA, and indeed, I think that part of their mission needs to be beefed up.

Does industry have the capacity to absorb NASA work? And the answer to that is clearly yes. I apologize, because there was a chart I wanted to bring this morning, and I just couldn't find it. Dr. Black and I were talking before. Oh, we do have the chart. We were briefed about how many aerospace people are there in our country that are trained to do aerospace work, and it was an astonishingly large number, compared to the number that are actually working in the field. And so the answer, I think it is fairly well documented that industry could absorb more work. I would also point out that I think academia could absorb more work.

So, I think in the long-term, the limiting factor is not going to be human capital. In the medium to near-term, it is going to be our monetary capital. How much can we afford to invest in NASA's resources?

And—did you bring up the chart? Oh, there it is. Yeah. You can see the big red circle, are all the people that are trained in aerospace, and the blue part are those that are working in the industry. I found that to be an astonishing statistic.

So, just to summarize my part of the testimony today, I think that NASA is going to design the new systems with the workforce that they have. I think in the future, maintaining the NASA's workforce is going to be a challenge, Mr. Chairman.

I will be glad to answer any questions that you may have.

[The prepared statement of Mr. Douglass follows:]

PREPARED STATEMENT OF JOHN W. DOUGLASS

Introduction

Chairman Calvert, on behalf of the Aerospace Industries Association of America, or AIA, I wish to thank you, Representative Udall, and the Space and Aeronautics Subcommittee for the opportunity to testify on the human capital challenges that confront NASA and the aerospace industrial base. I would also like to commend NASA for requesting the National Academies study on its workforce, and I am honored to serve on this panel. I will leave the panel findings to Dr. Black and focus my comments on industry perspectives.

As you may know, AIA represents more than 100 regular member companies and 170 small business suppliers, and we operate as the largest trade association in the United States across three sectors: civil aviation, space systems, and national defense. The cyclical nature of our industry also provides us with a long history of workforce development initiatives.

The sections of my testimony, Mr. Chairman, correspond with the four questions that you posed in the witness letter of invitation.

What trends in the aerospace industry should affect NASA's workforce planning?

In workforce planning, NASA must remain aware that a healthy aerospace workforce holds the key to America's economic competitiveness.

Civil aviation workers foster the movement of people, resources, and ideas that anchor jobs at home while expanding our trade and investment opportunities abroad. Cable and wireless technologies pioneered by military contractors planted the seeds for the Internet and mobile telecommunications. Materials and optical transmission research performed by the space transportation industry has advanced life-saving diagnostic procedures, land management techniques, and our understanding of climate change. And in the realm of national defense, the producers of

precision-guided weapons and real-time reconnaissance systems allow our dedicated forces to protect the United States from asymmetrical threats.

Despite these successes, today's economic environment poses challenges to the U.S. aerospace workforce. Two recessions and subsidized foreign competition have caused the U.S. share of the global aerospace market to fall from 72 percent in 1985 to less than 52 percent today. The aerospace manufacturing workforce, more than one million strong in 1990, now stands at approximately 627,000. Because of the cyclical nature of the industry, NASA must manage its human capital accordingly. The Agency, for example, may not need solid rocket fuel until 2010, but rather than close the production facility, the Administration should negotiate with industry to keep it open, thereby preserving highly specialized non-recoverable labor skills.

Our industry also faces a significant shortage of younger, technically-skilled professionals. The average age of the American aerospace manufacturing employee is now 51; the average age for engineers rises to 54. In 2008, 27 percent of aerospace workers will become eligible for retirement. On the basis of briefings that I have received from NASA, the Agency's workforce is at least as senior, and perhaps more so, than the general population of aerospace workers.

Previewing future generations, foreign nationals now represent more than 40 percent of the students who earn engineering and science doctoral degrees in the United States. These young people often cannot qualify for sensitive domestic defense and space-related jobs. In addition, the bipartisan Commission on the Future of the United States Aerospace Industry, on which I had the honor of serving, found that the math and science testing performance of American students relative to their European and Japanese counterparts gradually erodes to the 10th percentile or below by the end of high school.

In summary, these trends mean that in order to maintain its skilled workforce, NASA must have a long-term plan for the renewal of its human capital and that competition for these skills will likely grow more intense.

What are the tradeoffs associated with completing work in-house at NASA or contracting them out?

As the forthcoming National Academies panel report will note, industry has the flexibility to move engineers and managers among programs depending on customer needs, a key advantage for NASA in a constrained budget environment. Work contracted to the private sector also offers the Agency the benefit of civil-military integration since so many aerospace companies maintain research and production lines in both sectors. Access to the people and technology in the companies that support the Department of Defense and Transportation will deliver significant benefits to NASA. We can summarize the third benefit of NASA contractor work in one word: relevance. Private sector work in the realm of aeronautics will ensure that federal research has relevance to engines and aircraft planned for public use. Research with product and application potential subsequently increases the Nation's return-on-investment at several levels, such as job creation, increased tax revenue, new services, and technology spin-offs.

NASA, however, must preserve its traditional mission of conducting basic, laboratory-focused research in areas such as aerodynamics or propulsion that yield broad public benefits. In the view of AIA, Agency centers, wind tunnels, and other core facilities will always ensure a role for government research programs that improve operational safety and protect the environment.

In the area of exploration, NASA obligates more than 80 percent of its budget to the space industrial base, giving industry an extensive record of systems development and testing that can support every stage of the *Vision for Space Exploration* (VSE). Since the retirement of the Shuttle and the early phases of the VSE will demand a shift by NASA from operational to broader RDT&E disciplines, it should remain open to alternatives for expanded contractor participation in the latter. The Aldridge Commission, for example, recommended that NASA designate industry as the main service provider for low-Earth orbit payloads.

What are the critical skills that will enable NASA to complete its goals in space and Earth science, aeronautics, and exploration?

NASA's Systems Engineering and Institutional Transition Team, Mr. Chairman, informs us that while 50 percent of the Agency's critical skills have applicability to only one mission directorate, more than 40 percent are needed in multiple directorates, and 80 percent fall under the category of exploration.

Bearing in mind this extensive overlap of disciplines and the centrality of exploration, I would identify the following as among the skills needed by NASA to successfully execute its full range of NASA missions:

- Systems engineering;
- Project management;
- Manufacturing technology for human space flight;
- Human space flight operations;
- Fuel technology;
- Aerodynamics;
- Experimental methods;
- Materials technology;
- Advanced space propulsion; and
- Small nuclear reactor skills.

I would just close this segment, Mr. Chairman, by noting that from its inception, NASA has served as an inspirational workforce organization for engineers and scientists. The half-century old X–1 project, for example, defined the post-war synergy among between U.S. military forces, industrial capabilities, and research facilities. This platform exemplifies the vision that the Agency must sustain to attract America's best and brightest.

Does industry have the capacity to successfully absorb additional work from NASA?

This question also serves as an appropriate point for the conclusion of my testimony. Without a doubt, industry has the personnel, facilities, and flexibility to absorb additional work form NASA. The cyclical nature of the aerospace business also means that extended partnerships with NASA and other federal agencies will support the industrial base in preserving core research and manufacturing competencies. This absorption can occur primarily through two of the Agency's mission areas:

- aeronautics programs that combines basic and transitional research for the benefit of society; and
- contractor R&D capabilities for executing the *Vision for Space Exploration* as NASA changes its operational and workforce and requirements with the retirement of the Shuttle.

Thank you once again, Mr. Chairman, for this opportunity to share the perspectives of AIA on the workforce challenges faced by NASA and industry. I am optimistic that the two parties can find creative and efficient ways to manage their human capital since space systems make such a vital contribution to the military and technological power of the United States.

BIOGRAPHY FOR JOHN W. DOUGLASS

John W. Douglass is President and Chief Executive Officer of the Aerospace Industries Association, which represents the Nation's manufacturers and suppliers of civil, military, and business aircraft, helicopters, UAVs, space systems, aircraft engines, material, and related components, equipment services, and information technology.

Mr. Douglass became the seventh full-time chief executive of the association in 1998. Before that he served for nearly three years as assistant secretary of the Navy for research, development and acquisition of defense systems for the U.S. Navy and U.S. Marine Corps.

A nationally recognized expert in systems acquisition, Mr. Douglass has extensive acquisition experience in Congress, the Defense Department, and the executive branch as a policy authority, contracting officer, engineering officer, test and evaluation officer, program control officer, and research director.

Before being named Assistant Secretary of the Navy, Mr. Douglass was with the Senate Armed Services Committee where he was foreign policy and science and technology advisor to Senator Sam Nunn and served as lead minority staff member for defense conversion and technology reinvestment programs.

Earlier Mr. Douglass completed 28 years of U.S. Air Force service and retired as a Brigadier General in 1992. His numerous Air Force assignments included service as the Deputy U.S. Military Representative to NATO as well as Director of Plans and Policy and Director of Science and Technology in the Office of the Secretary of the Air Force. He also served as Special Assistant to the Under Secretary of Defense for Acquisition.

Within the Office of the President, Mr. Douglass was Director of National Security Programs for the White House, responsible for formulating policy on a broad range

of national security issues. He served as President Reagan's personal representative to the Blue Ribbon Commission on Defense Management chaired by David Packard.

A native of Miami, Florida, he earned a Bachelor of Science degree in industrial engineering from the University of Florida, a Master of Science degree in industrial engineering from Texas Tech University and a Master of Science degree in management science from Fairleigh Dickinson University. Mr. Douglass has done postgraduate work at the Cornell University Center for International Studies where he was an Air Force Research Fellow with the Peace Studies Program.

Mr. Douglass is a member of the Board of Governors of the Aerospace Industries Association and Chairman of the Board of Trustees of the National Center for Advanced Technologies. He served on the Commission on the Future of the United States Aerospace Industry, which issued its final report in November 2002. Mr. Douglass is Chairman of the International Coordinating Council of Aerospace Industries Associations.

AIA Positions

Member, AIA Board of Governors

Chairman, Board of Trustees, National Center for Advanced Technologies

Chairman, National Institute for Aerospace Studies and Standards

Member:

American Astronautical Society Board of Directors

Council of Manufacturing Associations Board of Directors, National Association of Manufacturers

International Coordinating Council of Aerospace Industries Associations

FAA Research, Engineering and Development Advisory Committee

Industry Management Council, Next Generation Air Transportation System Institute

National Contract Management Association

University of Tennessee Aerospace Advisory Council

DISCUSSION

UNCOVERED CAPACITY

Chairman CALVERT. I thank the gentleman.

We have a number of questions and we appreciate your testimony. Ms. Dawsey, I am going to start with you. You brought up the issue of uncovered capacity, and you also mentioned NASA is carrying about 1,000 FTEs, or full-time equivalents. How many actual employees does that actually represent?

Ms. DAWSEY. Currently, it represents 828 employees.

Chairman CALVERT. Given that each employee generally has more than just one set of skills, and carries out more than one set of tasks, how do you know that eliminating those employees won't create new gaps for the Agency?

Ms. DAWSEY. Employees do have, as I said in my oral statement, we realize that there are a lot of valuable skills in the workforce. What we are doing is we are looking at our unfunded, uncovered employees, and focusing the training that they need, to develop skills that are useful, and that can be, make them viable for other work in the Agency.

Chairman CALVERT. So, are you saying you may not be laying off the 800 and some employees, that you are trying to retrain those individuals to other jobs?

Ms. DAWSEY. Hopefully not. We are—it is too early in the process. We are reassigning new project work to the Centers that have uncovered capacity. We are moving new work from the Centers that don't have an uncovered capacity issue to those that do. We

have retraining efforts going on at all of the Research Centers. Some of them are four to six month training assignments, for the current technical staff to develop new skills for the new work. We have training planned for our engineering technicians. That is another—probably another four to six month training effort to convert them to engineering technologists, which will allow them to do more sophisticated research work.

Chairman CALVERT. Well, given all that, assuming that program is successful, do you have any idea how many employees could still face the reduction in force?

Ms. DAWSEY. It is really too early to tell, because the work was just announced last week, the new projects and programs were just announced by the Administrator last week, so the Centers are looking at the requirements, and trying to estimate how many of the uncovered capacity will be assigned to this new work. We are hoping not to have to do a reduction in force. It has always been, and continues to be a tool of last resort.

NASA's WORKFORCE STRATEGY

Chairman CALVERT. Dr. Stone, in your testimony, you described the NASA Workforce Strategy as, as I understood it, seriously deficient. What specific areas are deficient, and what specific policies or data do you believe should be included in a Workforce Strategy?

Dr. STONE. Well, first and foremost, I think the thing to talk about is the competency management system, that management is touting as the method by which it is doing its skills calculations and its gap calculations. And I was fortunate to find this in my notes.

In April of 2003, Booz Allen gave a presentation to the Union on the competency management system, so that was quite some time ago, and what they described was actually a very interesting thought of how one could do these things in a systematic and quantitative way, and it involved a system of five databases that would catalog the various different kinds of skills, and it would do it multi-dimensionally, so that each one of these databases had a primary skill associated with it, and then secondary skills, so they would deepen that dimension.

But they would also be different kinds of datasets, so first of all, there was the current position capabilities, which are a list of all the capabilities needed to fill the current positions. Then, there was a second database that was supposed to be manufactured, which was the actual skills of the workforce, and what this reflected was the fact that a particular engineer assigned a particular position today might actually have a lot of other skills that weren't being used by that specific position, and that second database was critical to establish what skills are actually available in the population of employees.

Then, there was going to be a demand database of future demand for the various different programs, what they would need, and there were two others. So, I am not going to go through all of them, but the point is they were going to establish these five datasets. They were going to then have to validate and certify these datasets, and then, once they did that, they could actually calculate gaps, by saying okay, if the demand database for fiscal

year 2009 has this set of skills, and our current skills in our database have that, then this is our gap. We can calculate it, and figure out what is going on.

And actually, the timeline of this was, by the end of the fiscal year 2003, they were going to have validated databases for this entire system of software that was being proposed to be used by Booz Allen, by—for the Agency. Well, here we are in 2006, and as far as I know, perhaps someone can clarify this, only one database is in operation, and that is the current position database, which is the least useful database, and the entire strategy calculations that you see were calculated using only the primary competency of that database, which is the database of skills for the current positions. So, it doesn't actually include the skills that the workforce has, or the demand skills, and the proper calculations. Now, I know that this is a complicated and evolving this, but that is a fundamental problem with how they calculated their uncovered capacity.

The second and fundamental problem is that uncovered capacity is largely an arbitrary number for the following reason. It really hinges on a subjective estimate or judgment of good versus bad G&A costs. So, for example, let us say hypothetically a Center Director wants to hire a colleague or friend to support them in their travel, and carry their things for them, and do things like that, they can hire them pretty quickly, and get them onboard, and pay them with G&A, and this person is on good G&A and is covered.

Meanwhile, if you have an engineer who is working on a project, but the project is short on cash, and needs to buy a new computer because a computer broke, they can put that person on 75 percent time on that project. That person is then partially paid or even fully paid by G&A, and that person is on bad G&A, and that person is uncovered and considered actually a problem, when they may very well be working on the program that we are claiming they are not working on.

So, the problem is that that number is really fictitious, because the Centers have been forced, because of financial reasons, to put people on G&A to free up procurement money, and this is because fundamentally, the program managers who are setting the budgets are too far away from the ground, and don't make good estimates, cost estimates for labor costs, and for procurement costs, and so, their distant management is not allowing the Centers to do their jobs, which is what triggered a lot of the financial problems, and then, the uncovered capacity. So——

Chairman CALVERT. All right. I appreciate that, Mr. Stone.

We are going to recess for about 20 minutes. I apologize. You heard all those bells and whistles. That means we have two votes. So, we have a suspension, and then, we have the passage of the supplemental, and right after that, we will come—right after the last vote, we will come right back into session.

So, with our apologies, we will be back in about 20 minutes.

Mr. FEENEY. Mr. Chairman. Mr. Chairman—on your left here.

Chairman CALVERT. Oh, excuse me.

Mr. FEENEY. It may be a little longer. As I understand, we have a swearing in after the first vote, so it might be more like 30.

Chairman CALVERT. Oh. And it is a colleague, I think, from San Diego, I suspect. Let us give it one half-hour. We will come back in right at 11:45. Thank you very much.

[Recess.]

ROLE OF IN-HOUSE AND CONTRACTED EMPLOYMENT

Chairman CALVERT.—to reconvene this hearing. I will recognize Mr. Udall for his questions.

Mr. UDALL. Thank you, Mr. Chairman.

I am going to start with Dr. Black. Dr. Black, you noted in your testimony that: "The degree to which the Agency chooses to perform work in-house versus by contract will play a major role in the number of personnel that the Agency will require."

Ms. Dawsey, does NASA have a target for the percentage or work it intends to perform in-house, and if so, what is it, and if there isn't an approach here, could you talk about the metric NASA would use to determine whether there is an imbalance between the amount of work done in-house versus that done by contractors?

Ms. DAWSEY. Yes, and——

Mr. UDALL. And Dr. Black, I apologize for a little misdirection there.

Ms. DAWSEY. So, it is my question, right?

Mr. UDALL. Yes.

Ms. DAWSEY. Okay. The—we don't have a target number. We have asked the National Academy of Public Administration to actually take a look at the blend of Civil Service versus contractor work for us, and what are the guidelines we should be using in making those determinations. Right now, we do know that any work that is inherently governmental is done in-house. We spend about 80 percent of our budget on contracting work out.

Mr. UDALL. Do you think the current balance is about right, between the in-house and contractor percentages, and if not, do you have any sense of how it might be modified?

Ms. DAWSEY. As I said, I have asked NAPA to look at that for us.

Mr. UDALL. Anybody else on the panel care to comment? Mr. Douglass.

Mr. DOUGLASS. One comment that I would make, Mr. Udall, is that whichever way they decide to go, they need to maintain some stability. In other words, if you decide to do certain things in-house, you need to commit yourself to that, and stick to it. If you are going to do it out-house, you need to do it the other way. And there has been, in the past, a phenomenon when we have seen administrator to administrator to administrator, different views on this, and it is the in-out in-out that is—it causes, on both sides of the equation, difficulty.

Mr. UDALL. The lack of predictability and the changes create that difficulty. Dr. Black or Dr. Stone, would you care to——

Dr. BLACK. It is like a game show. Who is the quickest to the button to talk here? Yeah, I think the issue, at least as we look at it on the committee, is that you need to look at the full ecosystem, if you will, of the employment base. And if you look just at NASA alone, you will get one answer, but if you include the broader community, you might get a different answer.

And so, I think you want to optimize those, so you get the best program for the Nation out of that. I think also it is not just numbers of people, but making sure you have people with the right skills, the right experience, so if you have a smaller number, but if they are really the good people, you can pull it off, as opposed to having a large number.

So, I would urge as we go forward and look at this, you are not just look at the number of people, but the experience base and the quality of those people.

Mr. UDALL. Makes sense. Dr. Stone.

Dr. STONE. Well, according to NASA's website, they have 16,644 full-time civil servants, and approximately 40,000 contractors. So, the ratio is about 2.4 contractors per in-house person, and I think the budget, we were just told, is 80 percent of the budget goes out of house already. And I think one of the things that would—is very important to remember when you decide on how to create this balance is something that happened not too long ago, but we already seem to be forgetting this, which is the Columbia disaster.

And let me just read something from the CAIB report, which is: "Experienced engineers changed jobs. NASA grew dependent on contractors for technical support. Contract monitoring requirements increased, and positions were subsequently staffed by less experienced engineers who were placed in management roles. Collectively, this eroded NASA's in-house engineering and technical capabilities." And this was deemed to be one of the primary factors in the Columbia disasters, so we need to keep that in mind, that as NASA grows, and it will clearly need to have a growing participation of academia and the private sector, it needs people in-house to be monitoring and overseeing these activities, and that needs to be a credible, technically proficient workforce in-house, and so, I would say that that is the key factor to remember when you tweak that.

Mr. UDALL. Dr. Black, coming back to you, you said that this question is one of the more critical, if not the most critical decision that NASA must make. How would you suggest NASA and the Congress go about making that decision?

Dr. BLACK. Well, I think the view of the committee, and certainly, my own personal view, would be, as I say, to look at this in the broadest sense. This isn't just a NASA problem that must be viewed in that context. So, I would, and this is myself, the committee hasn't yet reached a recommendation on this point. I want to be clear on that.

I would suggest that—have NASA sit down with other elements of the government that are engaged in space-related research, DoD and others, sit down with the industry people, sit down with the academic people, recognize that this is a joint national problem, and therefore, come together and see if we can't have a solution that recognizes this. If you—I worry a little bit that if you try and optimize this just inside of NASA, that you may, in fact, not end up with the best solution.

Mr. UDALL. Thank you. Ms. Dawsey.

Ms. DAWSEY. I would like to add that I agree with Dr. Stone. We do realize that we need to retain program and project management skills and decision-making, and in making sure that we are respon-

sible stewards of the taxpayers' money, and we are making smart buying practices, decisions, and we are looking at the work that we retain with that in mind. And as our Administrator has recently said, we are undertaking a multigenerational program of sustained exploration, and we must ask where our intellectual capital should reside.

Should it be outside the government, in the hands of a prime contractor, whose interests may change over the years, or should it remain in-house, where we can sustain the program's momentum, and retain an institutional memory of the system and cost trades that are made, and a strong understanding of why the architecture is the way it is. And we don't believe that it is wise to contract out these vital functions. Thank you.

Chairman CALVERT. Thank you. Mr. Honda.

WORKFORCE GAP IN SHUTTLE TO CEV POLICY

Mr. HONDA. Thank you, Mr. Chairman. I am going to ask a question that doesn't really deal with the current situation, but acknowledges it by asking another question, and this is for both Ms. Dawsey and to Dr. Stone.

And the question reads this way. NASA has identified approximately 1,000 full-time equivalent employees worth of the uncovered capacity that was discussed earlier in the NASA workforce. NASA's Workforce Strategy report states that the bulk of the current uncovered capacity has come about because of, and I will quote the report: "cancellation of the Space Launch Initiative, redirection of funding for exploration research and technology developments to the CEV, reduction of funding for biological and physical research for the CEV, reduction in funding for the aeronautics program, and restructuring of the science program, subsequent redirections of funds to higher priority missions than science."

In other words, it would seem that the uncovered capacity at NASA is not because the skills of those employees are no longer needed. Rather, it appears to be the direct result of the Administration's unwillingness to propose a NASA budget level sufficient to fund the additional demands imposed by the President's Exploration Initiative on NASA. As a result, something had to give, and that something was the workforce.

The question is, do you agree or disagree, and that would be the question towards Ms. Dawsey and then, Dr. Stone. Then I have a followup quick question.

Ms. DAWSEY. Okay. The *Vision for Space Exploration* was the President's vision, and it was endorsed by Congress, and we developed the budget that we believe helps us implement the vision.

And yes, when you refocus work, when you redirect programs, you will have a certain skillset that you don't need any longer, and NASA does have that issue. We are looking at the unfunded, the uncovered employees, though, in terms of re-skilling them to move towards the exploration mission. That is what we have been working very hard on. We have retraining programs that include working with the colleges and universities to re-skill our employees. We have rotational experiences, on the job training planned, we have mentoring and coaching programs. We are developing new program project, or enhanced program project management training, and

systems engineering training. We have memos of understanding with DoD to help re-skill our workforce to do the new work.

Mr. HONDA. Dr. Stone.

Dr. STONE. I would fundamentally agree with your assessment that this is not a workforce crisis, but a budget crisis. So, I think you are absolutely correct, and I would like to make two quick followups to that, which is that what really is going on is NASA is being asked to do two jobs. It is being asked to continue Shuttle and IIS, which was the job it was working on, and now, it has a new job, which is develop the CEV, CLV, and an entire new generation of spacecraft, and they get one paycheck.

There is new work here, and no money to do the new work, and that has driven the crisis. But the second thing I would like to point out is that headquarters seems to repeatedly say that Congress has endorsed the *Vision for Space Exploration,* and I agree they have, but what—my understanding of what the Science Committees, in both the House and Senate side did, is that they endorsed, with the Authorization Act, a funded *Vision for Space Exploration,* and they funded aeronautics, and they funded science, as well as CEV and Shuttle ISS. The funding levels put forward by the Administration don't meet the funding levels that the Authorization Act asked for, and so, it is unfair to say that the committee has somehow endorsed that version of the *Vision for Space Exploration,* because my understanding is that the endorsement, you know, came with some money in the Authorization bill.

Mr. HONDA. Thank you, and I would—the other two care to comment in terms of I hear the term short-term and long-term. How does that—the situation fit in terms of the long-term?

Mr. DOUGLASS. I can just add to something Dr. Black said a few minutes ago, and that is that back in 2003, I was on the President's Commission on the Future of the Aerospace Industry, and it is absolutely true that the whole ecosystem, as he called it here, DoD, NASA, FAA, Department of Transportation, NOAA, the military services within the Department of Defense, and industry are all facing the same problem, in that there is a limited workforce out there, and it is aging, and it has to be replaced. And in regards to the uncovered positions, it is more—it appears from the outside looking in to be more of a funding issue than a national requirements issue.

Mr. HONDA. Thank you.

Dr. BLACK. The committee has looked at this, and at least in terms of the unfunded personnel issue, we have decided that is a short-term issue, and so, we are not going to really try and address that. We have divided our frame of reference up into two other windows. One is sort of the five year out, and then, beyond that, and it is the committee's sense that NASA currently does not have the expertise it needs in that five year window to do the task in front of it, if you look just at the NASA workforce. And so—and that is not likely to be remedied by hiring young people or training, in the timeframe that is involved.

And this gets back to my remark earlier about you really have to have people who understand these issues, particularly in the systems engineering and other areas. So, that is why I think if you look at the workforce more broadly than just NASA, in the five

year timeframe, that is where you are going to have to look to deal with that.

In the longer timeframe, I think it is appropriate to think about the training and hiring and bringing people in. The fact is that if you look at the opportunities present in NASA today, to get real hands-on experience, they are very, very limited, and one of the things that has made, I think, the DoD very successful, and John can speak better to this than can I, is that there were always a lot of projects going on, so people could get experience cradle to grave on what is involved in running these big projects. That opportunity really isn't there in NASA today.

Mr. HONDA. Mr. Chair, just—I know my time has run out, but I just wanted to ask that question to refocus. For the purpose of understanding that, folks here are trying to do the best they can with what they have got. The good thing is that the redirection of the mission has changed, because we have a new Administrator who is a scientist, and we understand that that is positive. But for the general public, they are like teachers. They are asked to do some impossible task with decreasing resources or revenue, and I think that it is totally unfair for all members, in that, you know, if we really say we support NASA in its long-term and short-term projects, then we got to put our money where our mouth is, and fund it properly, so that all folks can feel as if they are moving forward in ways that they were meant to be.

And so, I appreciate all four responses. Thank you, Mr. Chairman.

WORKFORCE TRANSITION POLICIES

Chairman CALVERT. I thank the gentleman. I've got to point out that, you know, we have a tradition around here of authorizing things, and sometimes, they don't get funded by the appropriators, so NASA is not alone in that distinction, unfortunately. But we are doing the best we can to lobby our friends in the Appropriations Committee to come up with some additional resources.

Before I go to Ms. Lee, I just wanted to ask a quick question for the record on the Shuttle and the Shuttle to CEV gap. Obviously, that was one of the two things, Ms. Dawsey, that you brought up as a pressing issue for the NASA workforce. What are you doing, as far as actions, incentives, to make sure that we continue to keep the workforce that is necessary to safely fly the Shuttle's remaining flights, and at the same time, coordinate with the contractors that are working directly for that program, as we transition to the CEV, and attempt to minimize that gap? I mean, this is—it is going to take all of Mr. Griffin's five Master's degrees and Ph.D.s to figure this one out, because it is a difficult problem with the amount of resources that he has, and I think he is the right guy for the job, but it is going to be a tough one.

So, what is your part of this, Ms. Dawsey, to keep the folks working and motivated, and making sure we keep that gap at a minimum?

Ms. DAWSEY. Okay, as I see it, I have four answers. The Shuttle, we have transition tools, we have retention tools, and we have staffing tools, and for the transition, we are doing workforce sharing between exploration systems and space operations, and we

have people working on detail assignments and working in matrix situations, so there is on the job learning as we go, on the exploration systems.

There are also retraining, as I have mentioned before. We take that very seriously, because we really do believe that with some of our employees, a reasonable amount of training will make them ready to take on the new exploration assignments. We are also making reassignments as people are no longer needed on Shuttle, so they can be reassigned to exploration. We are doing that.

And we have what we call a CTAP, a Career Transition Assistance Program going, that help employees if they are concerned about working at other centers, that they get counseling, and they get help on looking at what life is at other Centers, what the opportunities are there, in terms of schools and communities, et cetera.

In terms of retention, the—we are lucky, because the mission is exciting, both keeping Shuttle flying, and looking forward to the new exploration work. So, there is a lot of interest in our employees to stay with us. We have a very low—I am sorry, attrition rate. And what makes the retention easier, too, is that a lot of the systems and a lot of the work is Shuttle-derived. A lot of the exploration work is Shuttle-derived, so people see that they do have a place in where we are going.

We also have retention incentives, and like we can pay relocation bonuses, qualifications pay. We can give temporary promotions, and then, in terms of if that doesn't work, we have staffing tools that we can use. We can hire people on flexible term appointments, and convince them to stay if they have skills that we do need, because we do, through the Flexibility Act, the ability to convert them noncompetitively to permanent positions.

We also have emergency appointment authorities. We can hire and are hiring retired employees back into the workforce. And we are using experts. We can use experts and consultants, and we are able, because of the Flexibility Act, to offer attractive compensation packages.

When it comes to the contractor workforce, we are working closely with our contractor partners. They have their own human capital transition plans. They vary from one contractor to another, but we are working with them to let them know where we are going with our planning. And we can't, we are restricted from a lot of what we can do with contracting, the contracting partners, but they are sitting there involved in our planning, and will continue to be.

Chairman CALVERT. Thank you. Ms. Lee.

IMPACT ON THE SCIENTIFIC COMMUNITY

Ms. JACKSON LEE. Thank you very much, Mr. Chairman, Mr. Calvert, and Mr. Udall.

Let me offer my great appreciation for just taking a moment to hold such an important hearing. I will spend a good deal of my time, and let me thank the witnesses on offering, if you will, my deeply embedded outrage for where we are today.

I would say that each of you are diligent witnesses, committed to your testimony, but frankly, we are in a heck of a predicament. I understand, in an anecdotal story, that one of our colleagues was visiting Google, and of course, the relation is extended, and was

looking to meet the new recruits. A huge percentage of them were from foreign countries. Certainly, none were Hispanic and African-American.

So, one would ask the correlation, and I would suggest that a NASA which I view as the action engine of science, it is where we act on our scientific findings and beliefs, whether we gather the brightest of the bright, reflecting the diversity of America, and we do good work. And that means that biological and physical research, aeronautics programs, science programs, higher priority missions in science, all these that are part of the mission of reduction, we are simply undermining the prominence of the United States in science and also, doing a Band-Aid approach to this employer-employee relationship.

The idea of 1,000 FTEs, as I understand it, reduced, if I have that number, I heard 1,000 and 800, is not something that I can applaud, and frankly, I believe is unnecessary. And with due respect to my Chairman, who I know is a—just an outstanding resource for NASA, along with the Ranking Member, you are right that the authorizers have, in fact, heard the call, and recognized the importance of NASA.

But I am not even going to blame the appropriators. There has to begin to be made choices, and the choices have to be made from the bully pulpit, which is the White House, and budget decisions have to be made as to whether we continue a war, which we will debate this week, whether we find a way to transition, which we will debate this week, in Iraq, whether we will pay for tax cuts, or whether we will invest in what I think has been one of the singular most engaging international, if you will, elements of what the United States has to offer. We have seen the International Space Station, for example, truly be that. And it still sends chills up many, many Americans' spine, as they watch the collaborative effort, and NASA Shuttle or NASA CEV launch into space.

So, I would ask, Dr. Stone, for you to be as forthright as you possibly can be. We find ourselves talking about healthy Centers, and covered capacity. If we just did our jobs, if we just re-engaged science, aeronautics, if we just expanded our programs, so that we could be competitive, we would develop a pathway of new engineers and other disciplines, and be able to keep individuals who are productive. I am certainly well aware that every institution has to reform itself, so it is percolating at its peak, but give me a sense of what we can do if we were to be aggressive, if we were to turn the corner of funding, if we were to be serious about the pathway of training for young people who are not in the sciences, what, then, would we have out of NASA?

[The prepared statement of Ms. Jackson Lee follows:]

PREPARED STATEMENT OF REPRESENTATIVE SHEILA JACKSON LEE

Mr. Chairman, I thank all of the individuals testifying today. Let me welcome Ms. Toni Dawsey, Dr. David Black, Mr. John Douglass, and Dr. Lee Stone.

The Subcommittee hearing on the Issues Affecting the Future of the U.S. Space and Engineering Workforce discussed the effectiveness of the National Aeronautics and Space Administration and the structure of its workforce. We heard from the National Research Council, which informed us of a number of concerns that I hope to better understand today.

It appears that there are some problems with the current structure of the NASA workforce, such that there are 1,000 full-time employees who are not assigned to

any specific program and that much of NASA's tasks may be better suited for research in universities and companies in the country. This raises the potential issue of downsizing of the Agency.

There is also a conflict within NASA on the issue of the status of Term employees versus Permanent employees. The number of Term employees is roughly five times the amount it was FY 2003. The NASA employee union testified that this is a result of NASA's disregard for the civil service tenure process and could lead to a decrease in the quality of its workforce. NASA, however, maintains that this number should not increase significantly in the future, and that Term employees have the advantage of being hired to work on specific projects only. I would appreciate it if our witnesses today could expand our knowledge on this topic.

I am also particularly interested in hearing what our witnesses have to say regarding the responsiveness of NASA's Workforce Strategy to the reporting requirements in the *NASA Authorization Act of 2005*.

While I am concerned about ensuring that all NASA employees receive the treatment that they need, I also seek to maintain a workforce strategy that is competent and cost-effective. I hope that our witnesses today will be able to shed some light on these issues.

Thank you Mr. Chairman, and I yield the balance of my time.

Dr. STONE. Wow, what a question.

I am happy to say that I agree with your concern that for the last couple of years, we have been talking about contraction, while also talking about a vision, and the vision that you see of NASA not only accomplishing the *Vision for Space Exploration,* but accomplishing its role as an engine of—that manufactures a new generation of scientists and engineers by inspiring kindergarteners and grade school kids, and then bringing them through the process of attracting them into graduate schools and universities, to learn to be engineers and scientists, and then attracts them onwards to be productive in these areas, is something that NASA traditionally did. I am a NASA employee because I watched Neil Armstrong step on the Moon when I was a kid, and it was amazing, okay?

So, we know this, and I don't know why we are here talking about laying off 824 people. This is crazy. We have a vision that has been put forward by the President of the United States.

Ms. JACKSON LEE. Right.

Dr. STONE. And that vision says let us go to Mars, okay? And then, they turn around and say well, we need to lay off the life scientists. We are not going to Mars without life science breakthroughs.

Ms. JACKSON LEE. Absolutely.

Dr. STONE. Okay? And so, we need to be putting not only our money where our mouth is, but to really think about what it means to embrace the vision for what it means, which is that the use of the word vision means something. It means it is going to be a journey for the next 30 years, and it is my two year old, who is, you know, going to be the generation that watches the man land on, or the woman land on Mars, and we need to go back to the inspired vision that we had in the Sixties for Apollo, and that will take not only money, but consistency, and as I think my colleagues here have said, stability. We can't be programming and reprogramming and reprogramming the same things. We need to stick with it and do it.

And the workforce is ready to do it, and we are here, and if anything, we need a much larger workforce within NASA and across academia and the private sector.

Ms. JACKSON LEE. And disrupting people's careers. If the Chairman would indulge me, I just want to make this point. This is a hearing about workforce. It is 1,000, and then, it is actually 800, but it also is wrapped very closely and keenly into safety. And the more disruption you have, not only in career, but stream of thought, continuity, history, I know where this is, as the person who knows where this is, or what happened, trains the incoming, bright eyed, college M.A., Ph.D., that comes into NASA, then, ultimately, in their later life, in some wonderful corporate situation, where they are again boosting the economy, then we also have, I think, a failed system.

This requires funding. This requires telling authorizers, appropriators, that this is important for the United States, and I want a check written to build our scientific community, because we are losing it, and we are losing the international race.

I yield back.

Chairman CALVERT. I thank the gentlelady, and in the interests of bipartisanship, I would point out, as I know the gentlelady knows, that the prior Administration flat-lined NASA also for the eight years that they were in, and so, we are trying to increase that, along with the mission that everybody in this audience knows. So, we are attempting to do exactly that.

Ms. JACKSON LEE. If the gentleman would yield just for one moment, I have claimed bipartisanship in this issue. We now are dealing with the cards that we have, and I would love for it to be bipartisan, where this Administration wakes up and provides the funding that is needed to build our scientific community in the Federal Government back again. We are obviously again, I repeat, losing the international war, if you will, on scientific competition. And I welcome the bipartisanship.

Chairman CALVERT. I just—I thank the gentlelady. I was just pointing out that we have had this problem a long time.

Anyway, on to Mr.—my friend from Louisiana, who has joined us. The gentleman is recognized for five minutes.

MORE ON WORKFORCE TRANSITION POLICIES

Mr. MELANCON. Thank you, Chairman Calvert. I appreciate it.

Ms. Dawsey, as I am sure you know, the Michoud Assembly Facility is near my district, and I am very interested in making sure that the technical capabilities present at Michoud remain there, and remain sharp as we transition to this next exploration vehicle.

In your testimony, you state that NASA is attempting to manage the transition to the Space Shuttle workforce in a way that balances agencies' and employees' needs, capitalizing on the capabilities of that workforce to advance the vision for space exploration, while recognizing that fewer people will be required to sustain exploration operations.

One, how much of the existing Shuttle Civil Service and contractor workforce do you estimate will be needed for exploration operations? Two, what are the NASA plans for the rest of the Shuttle program workforce? And third, if there is anyone else that would like to comment on these questions, I would welcome that.

Ms. DAWSEY. I am sorry, the first part of your question.

Mr. MELANCON. How much of the existing Shuttle Civil Service and contractor workforce do you estimate will be needed for exploration operations?

Ms. DAWSEY. We don't have a precise number. As I said, we are working very hard to re-skill employees who are on Shuttle. Many of the employees, we won't even have to retrain, because exploration is—the Crew Exploration Vehicle and the Crew Launch Vehicle are Shuttle-derived. And so, we don't have an exact number. We are—as I said, we are continuing to follow the progress of Shuttle, and analyzing as we go, and hopefully, I just want to make sure that I was clear, I don't see that we have to lay off 800 or 1,000 employees. After the new work is assigned, we are hoping that there are a lot fewer people. We are optimistic that we will be able to transfer the——

Mr. MELANCON. People within.

Ms. DAWSEY. Pardon me?

Mr. MELANCON. People within—and retrain.

Ms. DAWSEY. Yes. Yes.

Mr. MELANCON. And the contractor portion.

Ms. DAWSEY. The contractor workforce, we are working with them. They—the contractor—our contractor partners are involved in the planning process. They have their own human capital transition plans.

Mr. MELANCON. And I wasn't looking to hold you to a number, but I was just wondering if you had a percentage or a ballpark number on either of those.

Ms. DAWSEY. No, we don't know yet. We really don't know yet.

Mr. MELANCON. So, it is still too early. The—and what's NASA's plans for the rest of the Shuttle program workforce? I mean—just do the retraining and——

Ms. DAWSEY. Yeah, we want to retrain and reassign. When they are not needed on Shuttle, we will move them to the new exploration projects. That is our plan, just to keep——

Mr. MELANCON. Is there any transferring between different worksites that—to accommodate the retraining and the new ones?

Ms. DAWSEY. Yes, we have—I am sorry, I—we have workforce sharing. We have matrix assignments. We have details, and we have reassignments, and I think that covers it. But we are working. Our head of our—William Gerstenmaier is head of our Space Operations Mission Directorate, is working with Scott Horowitz, the head of Exploration Systems, and to make sure that they are maximizing the use of employees in both of their projects. We consider it very, very important that we do have our employees who are currently working on Shuttle able to move on to the exploration mission.

Mr. MELANCON. Does anyone else—might have any comments on——

Dr. STONE. I would just like to add one brief thing, which is that the fear of RIF and layoff is almost as bad as RIF and layoff, and this continued wavering, and inability to just stand behind the workforce, and say we are going to keep you is really harmful. We are losing our best and our brightest young people, who are saying I am not sticking around to get RIFed. I am going to go take an academic job, and they leave NASA. And we are bleeding to the

private sector, too. People at Ames are going to Google. So, it would be very important, and this is the first recommendation, that HR here just stop the RIF threats, and just say listen, we are going to retrain you. We are going to put you to work, and a matter of fact, as I said with respect to the uncovered capacity, a large percentage of these people are already working, and it is a miscalculation of the numbers.

Mr. MELANCON. Is there anything on the part of Congress that we can do to help get that type of action taken quicker?

Dr. STONE. Well, we—IFPTE has asked the appropriators to put language in the fiscal year 2007 appropriations bill that said that NASA shall not spend any money on preparing for or executing a RIF, but these are continuous—it is a continuation of language that is already in the Authorization bill, but that expires next March. We—that is good for the short-term, but what we really need is a statement by the Administrator, and perhaps, the best way that Congress could work this is to have a nice, private conversation with him about this, because if we would stand from the top of Mount Olympus, and say there will be no RIFs under my watch, and we are going to do it together, that would do wonders for keeping morale up, and for keeping people from leaving the Agency, and to enable us to recruit people who don't want to recruit themselves into something, last hired first fired kind of thing. They would say okay, there is a job for me at NASA.

Mr. MELANCON. Thank you, Dr. Stone. Thank you, Chairman Calvert. Maybe if we all heard that, we can look at doing something.

Chairman CALVERT. And by the way, I thank your workforce in your facility for saving that facility during the Katrina hurricane.

Mr. MELANCON. That was unbelievable.

Chairman CALVERT. They did a fantastic job. They should be thanked, and we need to do—we need to get down there, and I have talked to you about doing that, Charlie. We—get a trip together, and maybe get the committee, and head on over there, and——

Mr. MELANCON. I would be happy to welcome you down there, and take you down.

Chairman CALVERT.—thank you in person. Appreciate your——

Mr. MELANCON. Thank you.

Ms. JACKSON LEE. Mr. Chairman.

Chairman CALVERT. Yes.

Ms. JACKSON LEE. If you would yield for a moment, I would just, if I might, have unanimous consent to just ask a quick question of Ms. Dawsey, in following up with Mr. Melancon, if I might.

Chairman CALVERT. Very quickly, because I know I am going to recognize Mr. Udall, and I am supposed to be someplace, so——

Ms. JACKSON LEE. And then, I will be quick, or I will yield to Mr. Udall, and go after Mr. Udall.

Chairman CALVERT. Go ahead, gentlelady.

NO TALK OF CLOSING SPACE CENTERS

Ms. JACKSON LEE. My understanding is that there are ten under the concept of healthy Centers, and we have mentioned one in Louisiana, and there are many. You are sort of talking to people across

America who are in these Centers, working very hard, Johnson and certainly across America. In this RIF that we hope maybe we won't hear about, is there any intent to close Centers?

Ms. DAWSEY. No.

Ms. JACKSON LEE. So that is not on the radar screen——

Ms. DAWSEY. No.

Ms. JACKSON LEE.—or being discussed——

Ms. DAWSEY. No.

Ms. JACKSON LEE.—at this time?

Ms. DAWSEY. It is not.

Ms. JACKSON LEE. So, we just have the issue of employment. I appreciate it. Many are concerned about their Center being closed.

Ms. DAWSEY. No.

Ms. JACKSON LEE. I yield back.

Chairman CALVERT. Well, we are certainly not looking in Houston.

Ms. JACKSON LEE. I yield happily back. Thank you very much.

Chairman CALVERT. Mr. Udall.

Mr. UDALL. Thank you, Mr. Chairman. I know we want to conclude the hearing, but I did want to notify the panelists, if I might, that I would like to extend questions to you that you could respond to us, I think, within a week or ten days, dealing with the age distribution dynamic, and I think each one of you has an interest and has a point of view, but I wanted to ask the Chairman if we could do so, and we will get those questions to you about how we best work with the age distribution situation.

Mr. Chairman, with that, I would yield back.

Chairman CALVERT. I thank the gentleman. I have a number of questions also. I wish I had more time to give them here in person. But I will submit them in writing, and hopefully, we will have a quick answer to those questions. So, with that, I thank all the witnesses for coming out, and I certainly thank the panel, and we are adjourned.

[Whereupon, at 12:30 p.m., the Subcommittee was adjourned.]

Appendix 1:

ANSWERS TO POST-HEARING QUESTIONS

Responses by Toni Dawsey, Assistant Administrator, Human Capital Management; Chief Human Capital Officer, National Aeronautics and Space Administration (NASA)

Questions submitted by Chairman Ken Calvert

Q1. What is the schedule and budget for implementation of the Competency Management System?

A1. The Competency Management System is currently being utilized for the purpose of helping with workforce planning and identification of employee expertise. The application and associated business processes are being reviewed and enhanced to adapt to the changes in the Agency's business environment, including specific mission needs and current workforce issues. Final deployment of the application to all employees requesting identification of their competencies is scheduled for completion for fall 2006. Other implementation milestones include conducting a new workforce competency gap assessment during the fall 2006 in conjunction with the Agency's FY 2008 proposed budget submittal, and integrating the workforce skills gap information with the Agency's employee development process. No additional funding has been identified or needed to implement these enhancements. The current budget for continued operations of this project is less than $90 thousand and 1 civil servant Full-Time Equivalent (FTE).

Q2. In the hearing, you testified that it is too early to know whether a Reduction-in-Force (RIF) will be needed. What are the criteria for determining whether a RIF will be necessary? When do you expect that you will know whether a RIF will be necessary? How far in advance of actually implementing a RIF, will you need to start the planning?

A2. Determining if or when a RIF might be necessary is contingent on a number of factors. Among these is a determination that there is a reasonable expectation that certain workforce skills are no longer needed, or no longer needed in the quantity they once were, to accomplish the mission and goals of the Agency. If the number of employees possessing the unnecessary skills is unmanageably large and cannot be reduced to a manageable level through other means, a RIF might be necessary. In addition to workforce skill changes, budget reductions or reprogramming may trigger the need for a RIF. However, before resorting to RIF other efforts to resolve the workforce imbalances through voluntary means would be pursued. These include encouraging voluntary attrition through a buyout and early out authority, internal reassignments, retraining, and other similar activities.

With regard to when a RIF might be necessary, the Agency is continuing its efforts to assign work packages to Centers to reduce their level of uncovered capacity. This activity is critical to determining whether there is an unmanageably large number of employees whose skills are no longer needed. If there is a large number of employees whose skills are not needed then we would pursue voluntary attrition activities before considering a RIF. Since this work is still to be completed, it could be several months or longer before we will know if a RIF is necessary at a future date.

The amount of time needed to plan and implement a RIF is dependent on the complexity of the RIF, to include the number of employees involved, the range of skills that are being reduced, the completeness and availability of RIF retention data, coordinating with external stakeholders, assigned resources, etc. Employees are entitled to a minimum 60 day advance notice of a RIF. However, due to the complexities involved in actually conducting a RIF, planning may take several months to over a year, depending on the complexities of the individual situation.

Q3. You announced at the hearing that the uncovered capacity currently amounts to 828 Full-Time Equivalents (FTEs). How many individual employees does this correspond to? How many employees are 100 percent uncovered? How many are more than 50 percent uncovered? NASA briefed the Committee staff to expect the level of uncovered capacity to remain at approximately 1,000 FTEs for the next five years. What factors cause this estimate to remain constant despite normal attrition, work transfers, buyouts, and other activities taken by the Agency?

A3. The 828 uncovered FTEs—the amount as of the date of the hearing—corresponded to 1,278 civil servants. There are 534 employees who were 100 percent uncovered and 868 employees who were more than 50 percent uncovered. (The 868 figure includes the 534 that are 100 percent uncovered.)

NASA's efforts over the past two years to reduce uncovered capacity have been successful in reducing the problem by two-thirds, so genuine progress has been made. We continue to work on actions that are reducing the current uncovered capacity to a lower, much more manageable level. Therefore, our latest estimates are such that we no longer believe that the level of uncovered capacity will remain at approximately 1,000 FTE for the next five years, but will be smaller by a still-to-be-determined amount.

The key factor contributing to the continuance of the uncovered capacity problem is the significant change in program content of the Agency. This resulted in changes to work and workforce requirements, which in turn created a diminished need for skills in certain technical areas and an increased need for skills in other areas. Addressing the skills' mismatches takes considerable time since actions such as redistributing work to locations having uncovered employees requires careful analyses and planning to ensure that proposed work transfers would not sacrifice mission success. Even retraining efforts would not result in immediate, noticeable results since highly technical skills needed for the work cannot be quickly developed. Attrition alone cannot solve the overall problem of having the right number of employees with the right skills, since the individuals who choose to leave the Agency are not necessarily the employees who are uncovered or in areas of excess skills.

Q4. The International Federation of Professional and Technical Engineers (IFPTE) testified that the uncovered capacity problem was created by a policy of "full-cost recovery." They argue that:

Program managers are using what was once civil service salary money to pay for procurement and that, in turn, makes Center management divert money that once was available to pay for programmatic activities to increase the Center G&A needed to pay for the "uncovered" salaries. The net effect. . .is the creation of the false perception that there is a mass of civil servants who are not performing useful work and are not needed.

Do you agree or disagree with this claim? Please explain.

A4. We disagree with these statements. Full cost accounting did not create the uncovered capacity situation. The "uncovered capacity"—the segment of the workforce not currently charging their time to funded NASA programs or projects—was caused by program/project changes and cancellations and budgetary constraints. More specifically, the workforce misalignments came about because of cancellation of the Space Launch Initiative, redirection of funding for exploration research and technology development to the crew exploration vehicle, redirection of funding for biological and physical research to the crew exploration vehicle, reduction in funding for the aeronautics program, restructuring of the science program, and redirection of funding from multiple programs to the Space Shuttle to enable continued flights through program end. The civil servants supporting those programs who have not yet been assigned to new projects represent the "uncovered" workforce. Although full cost accounting did not *create* the uncovered capacity problem, it enables the Agency to *identify* that segment of the workforce since it allows understanding of the true costs of the Agency's activities. Because full cost accounting allows NASA to identify the scope and location of the uncovered workforce—something that could not be done before—there is a perception among some individuals that full cost has in some way contributed to the problem.

In addition, the statement that Center management can divert money from programmatic activities to increase the Center G&A to pay for the uncovered salaries is incorrect. Under the full cost governance structure, Mission Directorates and Program Managers control the funding and the Center G&A rates are agreed to by the Mission Directorates during the budget formulation process. Center management cannot divert programmatic funding and cannot increase the Center G&A rates.

Q5. Experience from the end of the Apollo and Titan IV programs suggests that personnel costs will increase as the program nears its retirement date. Does NASA expect its shuttle workforce costs will increase as the program nears retirement due to increased use of workforce incentives? If not, why not?

A5. Although it is reasonable to assume that the use of retention incentives may increase as the Shuttle program nears termination, the increases may not be significant. The results of a recent survey of the Space Shuttle civil service workforce indicate that monetary incentives will not be the most important factor in retaining Shuttle employees until program termination.

As part of the Agency's effort to plan for Shuttle execution, transition, and termination, civil servants assigned to the Shuttle Program were asked to provide feedback on their intentions to stay with the program and the factors that would moti-

vate them to stay or leave. The response rate was very good (44 percent), and overall the responses indicated substantial commitment to the program. When asked to rank the factors that would influence them to remain with the Space Shuttle Program through program termination, the top factors were: having meaningful work in the Shuttle Program; commitment to the program and/or NASA; ability to make a difference in the program; and assurances of having interesting future work (e.g., Constellation Systems Program work). Monetary incentives were rated lower.

NASA intends to build on this commitment to the program, strengthen communication with the Shuttle workforce, and respond to the factors that appear to be important to retaining employees to program end—recognizing that there will be individual instances in which the use of monetary incentives will be necessary to retain critical skills.

NASA will use all available workforce management tools to retain the required workforce, as identified by the analysis discussed above, through Space Shuttle fly out, assembly and operations of the ISS, and during the transition to the Constellation Systems program. Several of these tools were provided to the Agency through the *NASA Flexibility Act of 2004*.

Transition Tools—To facilitate this workforce transition, particularly during the early stages, the programs will, as appropriate, use workforce sharing, matrix, and detail arrangements as well as a level of employee retraining. For Shuttle employees who are not reassigned to Constellation Systems or other programs, NASA will make every effort to place them elsewhere in the Agency where their skills can be used or assist them in transitioning outside of the Agency if desired. The goal is to maintain ten healthy centers, and one way to do this is to focus more on in-house systems management and engineering.

NASA has a contract in place to provide comprehensive career transition assistance and placement services to employees displaced by workforce actions. The assistance offered goes beyond the minimum requirements of federal regulations to provide a broad range of services, including job search support; assistance in preparing resumes, preparing for interviews, and negotiating salary and benefits; organizing job fairs; conducting workshops on financial planning; and providing federal specific information on a range of benefits and entitlements.

Retention Tools—One of NASA's most important retention tools is its mission—the exciting, challenging work provided by the Vision for Space Exploration. The Exploration architecture selected by NASA for the Constellation Systems program draws heavily on Space Shuttle heritage, facilitating a smoother transition of the workforce to follow-on programs that support *Vision for Space Exploration.* When necessary to retain critical skills in specific cases, NASA will use targeted tools such as retention incentives, qualifications pay, and temporary promotions to ensure it has the workforce necessary for safety and mission success.

Alternative Staffing Tools—Even with effective retention strategies, NASA recognizes that the loss of valued skills will remain a risk to the programs. NASA is prepared to address this risk through the use of alternative staffing tools that are available to recruit additional staff, when needed. These tools include the new flexible term appointment authority provided by the *NASA Flexibility Act of 2004,* emergency appointments, hiring retired employees, and other special hiring authorities. These flexible hiring authorities, combined with attractive compensation packages, will enable the Agency to address critical skills attrition as circumstances evolve.

These tools—individually or in combination—will be the primary mechanisms for mitigating defined human capital risk to the Space Shuttle and ISS programs and for ensuring a smooth transfer of human capital to the Constellation Systems program in as many cases as possible.

Q6. Your testimony states that NASA is now focusing on "retraining efforts at Centers so the technical workforce can develop new skills" yet Dr. Black mentioned that, in general, [NASA's training and mentorship programs] are modest in scope and impact." What is the budget for Agency training programs aimed at retaining employees with critical needs?

A6. NASA's total FY 2006 Training and Development budget is $63 million. These funds are invested as follows: $30.1 million for skills training, $9.8 million for executive development, $18.9 million for management training, 2.6 million for supervisory training, and $2.1 million for other technical training. Approximately $12.3 million of these funds are dedicated to program/project management and systems engineering management and technical courses. Many of NASA's critical competencies are in the engineering and program/project management disciplines and the Academy of Program/Project and Engineering Leadership (APPEL) supports these training

needs. In many cases, employees in a new job area are "learning on the job," i.e., not taking formal retraining, but working with and learning from a more experienced NASA colleague. In such cases, there is no additional budget that is needed.

Q6a. How many employees have taken such training programs over the past year?

A6a.

APPEL FY 2006 EVENT PARTICIPATION	
	Participating Personnel
Program Managers	95
Project Managers	288
Scientists and Engineers	923
TOTAL	1306

To date, during FY 2006, 1,306 scientists, engineers and program/project managers have participated in an APPEL training opportunity. This number represents 12 percent of NASA's scientists and engineers.

Q6b. To what degree have NASA employees participated in training programs provided by the Department of Defense (DOD)?

A6b. NASA, in partnership with DOD, has developed a strategy for the development of a space cadre. This strategy includes developmental opportunities in three areas: Educational Institutions (faculty positions and curriculum) which includes identifying courses that will support both NASA and DOD developmental and training needs; Experience/Exchange Opportunities; and Liaison Agreements.

Through an Agency-wide call released May 5, 2005, space cadre educational opportunities were announced and applicants were competitively selected. Three NASA employees were selected for faculty positions in DOD: two employees were selected for the Naval Post Graduate School and one employee was selected for the National Security Space Institute. Additionally, six NASA employees were assigned to DOD through an Experience/Exchange opportunity.

Q7. IFPTE claims that if NASA does no recruiting the workforce will fall below 16,000 due to attrition. Is this estimate accurate if NASA does no recruiting? If not, what is your estimate? Do you have specific targets for the number of new hires the Agency plans to make over the next several years? If so, what are those targets?

A7. We do not expect the NASA strength to fall below 16,000 over the next several years due to attrition as suggested by IFPTE, since the attrition rate for NASA is very low. The Agency does not have specific targets, per se, as we manage the workforce by its full-time equivalent ceiling (FTE). Centers are expected to hire based on the competencies and skills needed to support the NASA mission but must do so within their existing budget and FTE allocations.

As stated in NASA's Workforce Strategy (submitted to Congress in April, 2006) the President's FY 2007 budget submission reflects an overall downward FTE trend from now through FY 2011. These FTE projections are based on mission require-

ments and anticipated funding. They will require adjustment as more details are developed on the exploration systems' work content and as the long-term needs and goals of the restructured programs in aeronautics research are more clearly defined.

NASA FTE TREND THROUGH FY 2011 (Excludes NASA OIG)[1]

	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
ARC	1380	1284	1193	1070	1070	1070	1070
DFRC	524	488	488	488	488	488	488
GRC	1821	1700	1562	1428	1428	1428	1428
GSFC	3303	3332	3223	3223	3223	3223	3223
JSC	3126	3237	3262	3262	3262	3172	2905
KSC	1981	2082	2107	2107	2107	2107	1902
LaRC	2130	1963	1839	1749	1749	1749	1749
MSFC	2668	2600	2600	2600	2600	2500	2400
SSC	294	284	284	284	284	284	284
HQ	1397	1390	1300	1300	1300	1300	1300
NSSC[2]		50	121	146	157	159	159
Total	18624	18410	17979	17657	17668	17480	16908

[1] JPL is not included since this table represents FTE s of civil servants only.
[2] The NASA Shared Services Center is public/private partnership between NASA and the Computer Sciences Corporation Service providers, located at Stennis Space Center. The numbers in this chart represent the civil service FTEs associated with the NSSC.

Q8. IFPTE testified that NASA managers assign program specific charge codes to their employees to use regardless of the actual projects they work on, saying:

> *Program management first almost arbitrarily assigns a work group a list of charge numbers (Work Breakdown Structures or WBSs) ostensibly representing the various programs (and/or G&A) supporting the employees in that group. Employees are then instructed by line management to log their fixed ration for each pay period regardless of what work was actually performed.*

> *What is your response to the assertions made by IFPTE? What controls are in place to ensure that work performed is charged to the appropriate charge code? Can you explain what NASA's policies are regarding tracking of work? Is the situation described in the IFPTE testimony allowed or appropriate?*

A8. We disagree with the IFPTE assertion and think that the NASA policy on charging Civil Service labor provides sufficient guidance for employees to properly record their time. That policy states:

> It is the responsibility of every NASA Civil Service employee to record his or her time as accurately as possible against the particular program, project, service pool, or G&A activity for which the work was performed. The goal is to record to the "direct labor hour" for work performed to the actual Project WBS code assigned for that work. Labor Charge Codes for each particular program, project, service pool overhead function, or G&A function are managed in IFMP and provided the web-based Time and Attendance Distribution System (WebTADS) for selection by employees when recording time. If the proper labor charge code does not exist, exceptions may be made. In some cases, there are alternative charge codes such as Center or Organization "All Hands," awards ceremonies, education outreach, and Public Affairs Office events. Use of these codes should be rare and only represent a small fraction of an employee's time. In cases where alternatives codes do not exist, employees should charge their time to the activity upon which they spent most of their time for that pay period."

Questions submitted by Representative Mark Udall

Q1a. The NRC's workforce report, in commenting on NASA's ability to recruit the needed future workforce, states "Later recruitment will be especially challenging in areas where NASA curtails or terminates work in the near term, thereby handicapping or preventing later restoration of that workforce segment

in, for instance, areas such as astrobiology, life sciences, and microgravity research."

As a Human Capital professional, do you agree with that assessment?

A1a. NASA certainly recognizes that the ability to encourage talented individuals to seek employment in particular areas of science depends not only on their interest in the field, but on their perception that they can have viable careers in that field. In that sense, curtailing work in programs that rely on specific technical skills carries a risk of making it more difficult to attract individuals with those same skills at a future date.

Yet, NASA must face fiscal realities and make the difficult decisions on how to use available resources within the overall NASA portfolio, balancing current mission requirements and maintaining and developing future capabilities. We must set priorities, and do so wisely to ensure that we have, and will continue to have, the technical excellence in our workforce that we need to accomplish our mission.

This requires focus, direction, and careful thought in workforce planning. Toward that end, NASA has initiated an effort to strengthen its institutional planning, with emphasis on a longer-range planning focus. The new planning process, under development now, will integrate workforce planning with the Agency's business planning in a manner that will enable NASA to engage in more precise and longer-range workforce planning and thereby take appropriate workforce actions sooner to ensure that the Agency has the right skills in place.

Q1b. If so, why has NASA terminated work in those areas (e.g., life sciences and microgravity research), given that the Agency agrees that those skills will be needed for the exploration initiative?

A1b. NASA's Exploration Systems Mission Directorate underwent a realignment of its existing research portfolio to focus on work that represents the highest priority research in support of the newly defined exploration goals. As a result of this realignment, a significant share of the Agency's basic and applied research effort is being deferred. Research activities that are not closely aligned with the critical, near-term technology goals of the new exploration architecture have been subject to reduction or cancellation.

The U.S. Congress recognized this necessity, and included the following language (Section 305) as a part of the *NASA Authorization Act of 2005* which directs the NASA Administrator to:

- ensure the capacity to support ground-based research leading to space-based basic and applied scientific research in a variety of disciplines with potential direct national benefits and applications that can be advanced significantly from the uniqueness of microgravity and the space environment.
- carry out, to the maximum extent practicable, basic, applied, and commercial ISS research in fields such as molecular crystal growth, animal research, basic fluid physics, combustion research, cellular biotechnology, low-temperature physics, and cellular research at a level that will sustain the existing United States scientific expertise and research capability in microgravity research.

NASA has responded to the congressional directives by resurrecting a research program that covers fundamental biological and physical sciences. Some of the research platforms and categories of investigations include:

- Research that was part of NASA's International Space Station (ISS) microgravity research portfolio.
- Re-instatement of some of the ground-based research that was to be terminated.
- Free Flyer research opportunities as secondary payloads is also being pursued.

NASA concurs to some extent with the NRC's workforce report finding concerning the difficulty in recruitment in life sciences and microgravity research. However, while NASA acknowledges the impact of reduced resource allocation in areas of life sciences and microgravity research, it remains committed to retaining a core of life and physical sciences research that will help maintain a level of continuity in these discipline areas for the future. Moreover, Agencies such as NIH, NSF and DOE do fund research in related areas and therefore offer the opportunity for scientists and engineers to remain engaged in their fields. NASA does plan to utilize the ISS throughout its lifetime and will re-engage the community after dealing with the current resource gaps.

Q2a. The NASA Workforce Strategy states that authority to use term appointments and temporary hiring authorities "is among the most important of the human resources strategies the Agency plans to use in addressing competency issues.. . .Nonpermanent appointments, especially term appointments, provide an excellent method of obtaining skills without the long-term commitments made to permanent employees." Consistent with that view, data provided to the Subcommittee indicate that the number of term employees at NASA has undergone a five-fold increase since FY 2003.

Given the perceived benefits of term appointments and NASA's stated desire to move to a "more flexible and scalable workforce," how much of NASA's workforce (as a percentage of the total) would you ideally like to see become term appointments?

A2a. NASA has not established a numerical or percentage goal for the term workforce. In the coming fiscal year, the Agency intends to address the issue of how best to achieve a more flexible workforce.

Q2b. What activities, if any, do you think should be undertaken only by permanent employees?

A2b. It is appropriate to fill a position with a *permanent appointment* if the position clearly represents a continuing need and there is no known workforce action on the horizon to indicate that the position will be eliminated. Apart from that general guideline, there is some latitude in determining whether a position should be filled with a term or permanent employee in specific circumstances. Factors that are appropriate to consider are:

- Are the competencies needed for the particular position likely to be required by the Agency long-term, even if the need for the specific position under recruitment should diminish later?
- Do attrition projections suggest that the position should be considered as part of the organization's succession management strategy?
- Is there sufficient uncertainty about the Agency's future budget and program direction that adding to the permanent workforce now could create a significant uncovered capacity problem later?
- Is it necessary to offer a permanent position in order to attract and retain a high quality candidate? Or will an offer of a term position (with eligibility for conversion to permanent as well as financial incentives) be adequate?

A competitive service position that is not expected to last longer than one year must be filled with a *temporary appointment*. (A temporary appointment may be extended up to a maximum of one additional year for a total of 24 months of service). To ensure that this authority is used only when there is reason to expect that there will be no long-term need for the employee, federal agencies are prohibited from filling a position by a temporary appointment if that position (or one that is essentially similar) has been filled by temporary appointments for an aggregate of two years within the preceding three-year period.

Term appointments are appropriate to use when filling positions that are expected to last for more than one year, but not more than six years. They are appropriate for project work; addressing an extraordinary workload expected to last more than a year's duration; or filling positions in an environment characterized by uncertainty of future funding, contracting out, or a pending reorganization. It is also appropriate to use a term appointment to fill a position that is scheduled to be abolished in the future or when permanent positions must be held for the placement of employees who would otherwise be displaced from their organization.

Since many positions within NASA involve project work that is expected to last not more than six years, it would be appropriate for NASA to emphasize using term appointments to fill such positions. Doing so would result in a far greater percentage of non-permanent employees within the civil service workforce, thereby providing greater flexibility in responding to program and budget redirection.

It is also appropriate and prudent to emphasize term (rather than permanent) hiring when the Agency has significant uncovered capacity. This approach will maximize opportunities for reassigning uncovered permanent employees into permanent positions elsewhere in the Agency.

Q2c. What is the value of making term appointments for work on a particular project instead of simply contracting out the activity? How do you decide which is the better approach in any particular case?

A2c. The issue is not so much, whether to use a particular type of civil service appointment (term) versus contractors to accomplish a project, but whether to have the work done by civil servants or by contractors. This is an important issue, since decisions on whether to conduct work in-house or contract for the work also affect a Center's overall health, stakeholder support of the Agency, and institutional capability.

NASA strives for a balanced approach to competition and institutional health, based on the principles outlined in the NASA Strategic Management and Governance Handbook and OMB Circular A–76. Competition should be used to promote best approaches and solutions and to encourage innovation and efficiency. It is a strategy to take advantage of state-of-the-art techniques, methodologies, and solutions available within NASA, industry, academia, other federal agencies, and international partners. NASA will continue its practice of conducting science competitions, where NASA scientists and engineers compete with academia and industry for basic research opportunities under NASA's Broad Agency Announcements. NASA fosters competition when it helps achieve the mission and where the costs of competition do not outweigh the benefits.

NASA will not compete an activity if doing so would erode the required depth and breadth of intellectual capital of its civil service workforce. The Agency must maintain a critical mass of skills, with appropriate "bench strength" and an appropriate level of subject matter expertise to ensure it can meet mission and fiduciary requirements. For example, the Agency must maintain adequate expertise within the civil service workforce to independently and effectively evaluate contractor performance—being a "smart buyer." In some cases, having the appropriate level of expertise means retaining civil servants in particular technical areas due to overall scarcity of that expertise in the general labor market.

Q3. As you know, NASA asked for the provisions included in the NASA Flexibility Act of 2004. *However, based on the data provided to the Subcommittee, NASA does not appear to have made much of those provisions in the time since its enactment.*

Why is that and what are your plans for future use of those provisions? Do you believe that NASA needs any additional statutory authorities? If so, why, what are they, and does NASA intend to request them from Congress within the next calendar year?

A3. The *NASA Flexibility Act of 2004* provides the Agency with a suite of human capital tools that have been very instrumental in helping to attract and hire highly skilled employees. While some of the flexibilities have been used more extensively than others (e.g., the Term Appointment Authority), in all cases the focus has been on "quality use" of the flexibility rather than quantity. Recruitment, relocation and retention incentives will continue to be important to the Agency to leverage its workforce effectively. In particular, they have been effective in the Agency's efforts to address skills imbalances and strengthen core competencies at Centers.

Of particular note, NASA anticipates that both recruitment and relocation incentives will be necessary over the next several years to encourage NASA employees to accept positions at the newly-established NASA Shared Services Center (NSSC) located at Stennis Space Center. The surrounding area was devastated by Hurricane Katrina, resulting in limited housing availability. Attracting individuals to this area is a challenge.

While we have no requests for additional statutory authorities pending at the current time, we are continually analyzing barriers that prevent us from hiring, retaining and managing the workforce, some of which may require statutory authority to overcome.

Q4. In your testimony, you acknowledge the difficulty the Agency has had in being able to hire younger workers, but I did not see you describe any comprehensive Agency plan to address the problem. Does NASA have such a plan? If so, please provide it for the record.

A4. We think there may be a misunderstanding of the testimony language. The Agency has no difficulty in hiring younger workers. The problem, as indicated in the testimony, is that due to the uncovered capacity in some areas, we cannot hire as many recent college graduates as we would have hoped to hire.

Q5. In your testimony to the Subcommittee, you stated that NASA has asked the National Academy of Public Administration (NAPA) "to take a look at the blend of Civil Service versus contractor work for us, and what are the guidelines we should be using in making those determinations." When will that study be complete? Please provide the NAPA study's Statement of Task for the record.

A5. The study is scheduled to be completed January 2007. A copy of the Task Statement is attached.

Q6. What are NASA's plans with respect to any future buyouts? What role do you see buyouts playing in your workforce strategy? What about potential Reductions-in-Force (RIFs)?

A6. NASA's current buyout (VERA/VSIP) authority expires on September 30, 2006. As NASA works to reshape its workforce, we are assessing the need for additional VERA/VSIP authority to address skill misalignment and surplus competencies. Because these authorities are key tools necessary to both workforce reshaping and RIF avoidance, we anticipate requesting VERA/VSIP authority for FY 2007 and FY 2008. All buyout and early out programs will be targeted carefully to ensure that skills NASA needs are not eroded.

Questions submitted by Representative Michael M. Honda

Q1. One of the NASA Human Resources (HR) websites says that NASA currently has only 16,644 civil service employees, which is already below all of the target numbers in the Table on p. 9 of NASA's Workforce Strategy going out to 2011. Why isn't the downsizing over yet?

A1. The number 16,644 refers only to the full-time permanent workforce, rather than full-time equivalents (FTEs) as reflected in the targets in the President's FY 2007 budget submission (and repeated in the NASA Workforce Strategy). The total number of civil service employees on-board now (permanent, term, temporary, interns/fellows) add up to 18,082 (as of June 24, 2006). This is the number that is most appropriate to compare with the FTE trend chart.

Q2. Last year, NASA HR announced a plan to trim its Civil Servant workforce by 2673 before the beginning FY 2007. The target number for this downsizing appears to have been based on the number of employees eligible for retirement.

How is this consistent with an HR strategy based on maintaining an appropriate skills mix, especially given the broad and untargeted nature of the buyouts (for example, at Ames fewer than 100 out of 1200 employees were excluded from the last buyout)? What precautions were taken to prevent age discrimination?

A2. There may be some misunderstanding about this question. NASA did not announce that it planned to reduce the civil servant workforce by 2,673 employees before the beginning of FY 2007. At the time of the FY 2006 President's Budget submit there were 2,673 uncovered FTE. There is no correlation with this number and the number of employees that were eligible to retire at that time. Since that time, as a result of buyouts, job fairs, movement of work packages and normal attrition, that number as of June 1, 2006 was approximately 800.

This misunderstanding may have evolved from the Center buyout pools announced for earlier buyout programs. The buyout pool does not represent the number of employees to be reduced, but only the pool of employees who may apply for a buyout. Centers have specific buyout targets based on future work projections and excess capacity. Approved buyouts are limited to the number of the specified targeted buyouts. There is a great deal of rigor applied to the buyout process to ensure that it supports, not hinders, the Agency workforce strategy.

There are no age restrictions or considerations in requesting or receiving a buyout. All employees in the buyout pool, which are based on skill category, are eligible to apply. In all cases an employee's request for a buyout is voluntary.

Q3. Why is NASA continuing to seek full-cost recovery of Civil Servant salaries while it is setting up a partial-cost recovery system for its key facilities after having acknowledged that full-cost recovery was harming its critical facilities?

A3. There is not an inconsistent management philosophy with respect to civil service workforce and facilities. Full cost accounting allows management to focus on the allocation of resources and their relationship to programmatic requirements. Where programmatic requirements identify facilities as critical, as referenced in the question, management may utilize a business model requiring less than full cost recovery during periods of underutilization in order to assure the continued viability of a facility. Where programmatic requirements do not identify the need for a facility, management pursues efficient disposition of the facility in order to redirect the resources to program needs.

Our approach to managing workforce is very similar. Where programmatic requirements identify the future need for certain workforce capacity that is not cur-

rently fully utilized, Agency funding is provided to bridge the period of underutilization. Where programmatic requirements identify no future need for a segment of the workforce, management attempts to retrain or move the workforce to enable a match with programmatic requirements. If such solutions are not possible, NASA will move to shed the unneeded workforce in as non-disruptive a manner as possible in order to redirect the resources to program needs.

Q4. NASA claims that there are still approximately 1,000 uncovered employees. Please provide a breakdown of:

- *where these employees are*
- *what their skills are*
- *why their skills are no longer needed*
- *what analysis was performed to determine they were uncovered, and*
- *what were the assumptions of the analysis?*

A4. The location of the uncovered capacity is provided below.

	FTE	Headcount
Ames Research Center	292.2	362
Glenn Research Center	116.8	180
Goddard Space Flight Center	244.7	440
Langley Research Center	174.4	296
TOTAL	828.1	1278

[NOTE: These numbers reflect the FY 2007 level of uncovered workforce projected as of the date of the hearing. We continue to work on actions that are reducing the uncovered to a lower, much more manageable level.]

The number of employees (headcount) is greater than the number of FTEs since many employees are only "partially" uncovered. This is because employees often work on multiple projects, so when one project ends, only a portion of the employee's time becomes uncovered and the employee's remaining tasks continue to be funded by the other projects. For example, of the 1278 employees who are uncovered to some extent, 410 of them are uncovered 50 percent or less.

These employees were determined to be uncovered by center management, who compared funded work assignments with the center-based workforce needed to successfully complete those assignments within budget. The assignments determine the number and skill sets of FTE that are required, and by comparison to the total number and skill sets resident at the center, those that are not needed.

As part of the analysis, it was recognized that a small level of unassigned FTE exists temporarily at all Centers as part of the normal turnover in projects and programs. For that reason, data was collected only for centers that have unassigned FTEs constituting five percent or more for fiscal years 2007 and/or 2008, i.e., the ones with the largest number of unassigned FTE. The four centers shown above meet that threshold, so their number of uncovered FTEs and the primary competency of each individual associated with those FTEs were identified.

The principal technical competencies associated with the uncovered capacity at these Centers are identified below. Since *all* Centers have some administrative and administrative support skills associated with uncovered capacity, that set of skills is not individually listed with each Center. Also, the uncovered capacity included various management competencies at all Centers—such as technical work and team management, program/project management, and project work and team management. Accordingly, that set of competencies also is not individually listed with each Center.

Ames Research Center

- Engineering and science support
- Intelligent/Adaptive systems
- Mechanical systems

- Astronomy and astrophysics
- Astrobiology
- Human factors engineering
- Nanotechnology
- Computer systems & engineering
- Electrical and electronics systems
- Earth science applications research/Earth system modeling/Earth atmosphere
- Cell & molecular biology; biomedical research

Glenn Research Center

- Engineering and Science Support
- Software Engineering/Computer Systems & Engineering
- Power Generation-Photovoltaics/Power—Energy Storage/Power Systems

Langley Research Center

- Engineering and science support
- Earth Atmosphere
- Electrical and electronic systems/electromagnetics
- Simulation/Flight research systems
- Mechanical systems
- Mission Execution
- Aerothermodynamics/aerodynamics
- Computer systems and engineering

Goddard Space Flight Center

- Engineering and science support
- Facilities engineering and management
- Systems engineering
- Optical systems
- Electrical and electronics system
- Electro-mechanical systems/Micro-electromechanical systems
- Mechanical systems
- Remote sensing technologies
- Astronomy

The skill needs of the Agency have changed because of the significant change in the program content of the Agency. This resulted in changes to work and workforce requirements which in turn creates a diminished need for skills in certain technical areas and an increased need for skills in other areas. More specifically, the changes came because of cancellation of the Space Launch Initiative, redirection of funding for exploration research and technology development to the crew exploration vehicle, redirection of funding for biological and physical research to the crew exploration vehicle, reduction in funding for the aeronautics program, restructuring of the science program, and redirection of funding from multiple programs to the Space Shuttle to enable continued flights through program end.

Enclosure

NAPA Study Task Statement

(IN RESPONSE TO QUESTION #5 FROM MR. UDALL)

Revised Task 3—Civil Service and Contractor Workforce

NASA has a widely dispersed in-house workforce supported by a large number of government contractors. NASA requires a flexible workforce that can be reshaped to respond to changing mission objectives, program redirection, and budget imperatives. Taking advantage of knowledge of innovations and successes that have been implemented in other federal or non-federal organizations, the Academy shall review and make recommendations for workforce strategies and policies, taking into account 1) the monitoring and evaluation of contractors, 2) the determination of what skills NASA needs to retain in its civil service workforce, 3) use of non-permanent appointments to provide a flexible civil service workforce. Specific actions in support this task will include:

- Identify and review the relevant body of government, private sector and academic literature on the issue.
- Identify and interview those in NASA, in Congress, in OPM and OMB, and stakeholder groups who have insights and opinions on issues related to this Task.
- Identify thought leaders, as well as public and private organizations, that have a track record of successful practices relevant to the issues of this Task.
- Provide advice on effective ways to monitor and measure workforce composition, capabilities and dynamics as an aspect of a strong, healthy NASA Center, e.g., skills balance, contractor to civil service balance, alignment of workforce with mission, structure of workforce to accomplish the work to be done and similar issues.
- Review current NASA internal guidelines and practices related to dividing work between civil service and contractor elements.
- Review the parts of the recent Systems Engineering and Institutional Transition Team (SEITT) report that are relevant to the issue.
- Develop recommendations for revising NASA guidelines and practices related to dividing work between civil service and contractor elements.
- Develop one or several methodologies for planning and assessing the civil service and contractor mix.
- Recommend revisions in NASA guidelines and practices regarding use of non-permanent civil service appointments (an extension of work done in Phase I).
- Develop recommendations for addressing these considerations in NASA workforce planning.
- Develop recommendations for changing workforce acquisition, development and management processes to transition to a more flexible workforce.

This Task is to be completed within seven to nine months of the start date, and the Academy is to deliver to NASA an oral report of findings, analyses and recommendations for managing the civil service and contractor workforce mix. Within two weeks thereafter, the Academy will provide a draft written report. NASA will comment on that draft within three weeks, and the Academy will publish its written report within four weeks of receiving NASA's input.

ANSWERS TO POST-HEARING QUESTIONS

Responses by Lee Stone, Legislative Representative, International Federation of Professional and Technical Engineers

Questions submitted by Chairman Ken Calvert

Q1. In your written testimony you recommend rejecting NASA's efforts at full-cost accounting and suggest that those efforts have created the "uncovered capacity" problem. You state that NASA has "converted over to a full-cost recovery system that allows distant program managers to siphon salary and facilities money away from the Field Centers."

Q1a. What distinguishes full-cost recovery from a full-cost accounting?

A1a. Full-cost accounting is a process by which an Agency accounts for (i.e., records data documenting) how it has spent its money. This should be completely independent of how NASA manages its money, facilities, or workforce, or how it makes spending decisions. Unfortunately, NASA implemented a form of full-cost recovery that dramatically changed how it manages its funds and assigns work, and did so in a way that ironically further decreases the fidelity of NASA's actual accounting of its expenditures to Congress and the American people.

Administrator Griffin himself described in detail the difference between full-cost accounting and full-cost recovery at an All-Hands meeting on December 6, 2005.

". . .(T)he frustration I've experienced over full-cost accounting is not with full-cost accounting. That is merely a way of knowing where your money went. . .. Full-cost accounting and full-cost recovery are not the same thing. . .. (I)n our wish to demonstrate blind obedience by following full-cost accounting, we confused it with full-cost recovery. Now I've backed off of some of that and I promised you that I would and I have established what we are calling a capital asset management account to manage those assets, which are broader than a given program. . .. (C)ore support for these is available from the institution like as in the old days of R&PM accounting, but again that was too far in one direction. Full-cost accounting with everything having a project charge number is too far in the other direction. We also need to price our assets such that program managers both within and outside NASA want to use those facilities. You know, pricing our assets such that Boeing goes to the Netherlands to do wind tunnel testing is really kind of stupid. In fact it's not kind of stupid, it is *stupid. . .. (W)e are going to stop doing some stupid things and maybe do an experiment and do other new stupid things, but at least we would stop doing some of the things which were clearly damaging us. . .. Full-cost accounting is not the problem. Full-cost accounting is just a way of saying I know what I spent my money on. Who is going to object to that? Ok, it's a policy toward cost recovery that needs to actually be thought through as opposed to simply, you know, cookie-cutter one-size-fits-all."*

Administrator Michael Griffin
12/6/05

IFPTE couldn't agree more (see IFPTE recommendation #3 in our testimony). However, although the Administrator laments above how the "stupid" misapplication of full-cost accounting has harmed NASA's facilities infrastructure and lauds a new plan to cover facilities infrastructure through centralized non-programmatic institutional funding, he did not address the completely analogous threat to NASA's intellectual infrastructure from the same misapplication of full-cost recovery. Indeed, just as Dr. Griffin pointed out above, if inefficient management and institutional costs coupled with a mandate for full-cost recovery cause NASA to price its intellectual assets (i.e., FTEs) such that NASA program managers choose to cut corners on manpower assignments or simply to abolish key projects when there is under-utilized internal expertise capable of performing valuable work, [or, in the case of external programs, they simply refuse to pay for NASA labor], that's not kind of stupid. That *is* stupid. Until full-cost accounting stops being undermined by the inappropriate application of full-cost recovery, the crucial data needed to identify and correct this and other financial and workforce problems will remain beyond our reach.

1. Harmful full-cost recovery workforce policies implemented under the guise of full-cost accounting

Dr. Griffin's predecessor terminated the age-old method of providing Civil Service salaries to Centers directly related to their complement. Instead, centers are now only provided with a fixed amount of civil-service salary money by programmatic fiat for all rank-and-file employees, but can raise somewhat arbitrary amounts of salary money by center management fiat to add to a center G&A account that can expand to meet any emerging management salary needs. In other words, scientist, engineers, and technicians were suddenly uncovered by the *a priori* decision to with-hold salary money (not because of any requirement of full-cost accounting or any technical reason), yet there has always been enough money to hire yet another per-sonal "special" assistant for a Center Director.

Instead of having program managers assign projects/tasks to Centers and allow-ing the work to be assigned by local experienced supervisors who have direct knowl-edge of the expertise residing in his/her workgroup and who can properly gauge both the specific skills needed for the task as well as the manpower needed to per-form a particular technical task within a specified timeline, the manpower budget is arbitrarily assigned by distant program managers with little or no supervisory experience, little or no specific knowledge of the detailed expertise and experience available in the actual employees working at each Center, and little or no sensitivity to the long-term health of a Center's core intellectual capabilities. As one might ex-pect, these senior program managers could, did, and continue to set arbitrary work-force caps that limit the coverage of center employees. Furthermore, this top-down budgetary decision making is beholden to internal and external political constraints and thus often unresponsive to technical drivers. This problem has nothing to do with full-cost accounting; it is simply a top-down policy decision to create serious pressure to downsize the civil-service workforce at targeted Centers by shrinking the apparent demand for technical employees through arbitrary labor quotas. This has "worked" in that it is indeed driving away employees from NASA; this is failing because it is destroying morale, is driving away some of NASA's best current talent, and is scaring away future talent.

The new work assignment policy has been particularly harmful to NASA Science, Aeronautics, and Technology Development programs, which have traditionally un-derstood that the Agency's smartest people are rank-and-file employees and that the best way to foster creative and productive research and development is through a largely self-generated bottom-up process (with peer-review and appropriate top-down oversight as is done at the National Institutes of Health, for example). This well proven bottom-up Principal Investigator model, which has allowed NASA Science to flourish in the past and which has allowed NASA to compete for the best and brightest young scientific minds, has been replaced by a top-down autocratic model, whereby employees have fewer and fewer opportunities to write competitive grant proposals and are instead expected to wait by the phone for orders (and FTEs) from bureaucrats telling them what to do next. This new Soviet-style workforce-management model driven by full-cost recovery of civil-servant salary is killing mo-rale, stymieing creativity and entrepreneurship across the Agency, and is seriously harming NASA's intellectual infrastructure just as it was harming our facilities in-frastructure before the establishment of the Shared Capabilities Asset Program. IFPTE recommends that a similar account be established to preserve NASA's most important asset, its highly skilled and uniquely experienced employees (IFPTE Rec-ommendation #3).

Finally, full-cost recovery has also undermined NASA's line management and made program management all powerful. In a properly balanced matrixed manage-ment system, line management would control FTE dollars and program manage-ment would control WYE and other procurement dollars. This would make both jobs meaningful and would drive cooperation. Full-cost recovery has instead fostered a bitter conflict between line and program management and is driving desperate be-nevolent efforts by line managers to protect intellectual capabilities and to remain relevant, even if this means using "creative" accounting practices.

2. Improper accounting of work under NASA's faux "full-cost" policy

Rather than making NASA's financial and workforce accounting more trans-parent, which was the intent of congressional direction, full-cost recovery has fos-tered the emergence of even more Byzantine and opaque accounting practices (often times inconsistent across Centers). Whether performing workforce or financial ac-counting, rather than honestly measuring "actuals" and comparing them with "projecteds" in order to re-evaluate what actually happened and correct current planning deficiencies for the next budget cycle, management merely uses whatever

accounting means necessary to make reported "actuals" match the "projected" numbers, irrespective of what actually happened. That way, the plan was perfect by design and no learning can or does occur. The lack of corrective feedback is particularly damaging because significant errors made during the initial conversion to "full-cost" remain perpetually uncorrected. The management culture of making the books look like they want them to without regard to the reality on the ground is also at the core of why the Agency has consistently failed to pass a clean financial audit.

Some specifics:

a. **A center is often given a certain number of FTEs but is asked to deliver work to schedules that required more than that number.** If the Center or employee balks, programs can move FTEs elsewhere so employees all across the Agency are being pressured to work unremunerated overtime or are being assisted by "uncovered" employees or employees covered by other programs in order to meet milestones. If the milestone slips, nothing is done to analyze the root cause. If the milestone is met because of the hidden work, then the original low-balling of manpower is reinforced. The official manpower planning that assigns FTEs to perform work is budget driven and is completely detached from the technical work planning needed to get the work done. This problem harms both "rich" and "poor" Centers alike as "covered" employees find themselves under undue pressure to perform more than one FTE worth of work. The hours officially logged to a project by employees have little to do with the actual work performed: Work is performed for programs by "uncovereds" or employees covered by other programs; this work is NOT logged to the program that benefits from the work. Conversely, some large programs are systematically covering employees that are actually supporting other activities. The net effect is that manpower accounting for each program is consistent with the manpower plan for that program but not with the actual work performed. In sum, performed work is not being properly accounted for, which makes it impossible to assess whether initial manpower estimates were correct and to take appropriate corrective action either up or down. This process makes program managers look like they are meeting their metrics but it is simply generating false metrics to do so. The key problem with NASA's Workforce Strategy is that these false metrics are being used to identify uncovered and motivate RIFs.

b. **Employees are often assigned work but not given an account to charge it to.** For example, employees working on the Smart Buyer program (a program to anticipate bids for CEV development in order to support the procurement process) were accorded Group Achievement awards but many were not afforded the opportunity to charge to that Program. In other words, award-winning work was performed for free at least as far as full-cost accounting is concerned. We can therefore RIF these employees next year and apparently suffer absolutely no impact because, as far as the accounting is concerned, these award-winning employees don't exist and are not performing the award-winning work. A similar problem exists with Mishap Investigation Boards, where employees provide expertise and work that is not recorded under that Investigation. In sum, actual work is often not being accounted for, which again makes it impossible to determine what any program actually costs (the primary goal of full-cost accounting).

c. **Training and administrative work by non-administrative staff is not accounted for.** Technical and support employees are required to take generic training (e.g., IT security), to attend branch/division/directorate/center all-hands meetings, to fill out surveys, to reconcile credit cards and do other financial accounting, to fill out time cards and travel vouchers, and to perform other work assigned by their line management; this work is charged to unsuspecting programs [or to G&A (if uncovered)]. This completely violates the primary tenet of full-cost accounting as it improperly burdens programs with non-programmatic activities and makes it impossible to track how much of its manpower efforts are being devoted to training or diverted to cover administrative activities (contrary to popular myth, many of these are not statutorily mandated). In sum, one of the reasons that NASA can arbitrarily increase the administrative burdens on its employees is that the work time required to meet these burdens is not accounted for, in direct violation of full-cost accounting. The cost to the Agency of All-Hands meetings, surveys, etc.. . .is simply not calculated so doubling or tripling them has no impact on the reported manpower metrics even though it is clearly reducing actual programmatic productivity.

d. **Managers are improperly charging their FTEs to programs in order to lower reported center G&A costs.** Although some lower-level managers do indeed perform some *bone fide* technical work for programs (and this time should indeed be charged to the appropriate program), full-cost accounting should account for management time as G&A. Some Centers are allowing their senior managers to charge their time to programs merely for supervising employees working on a program, which is doubly harmful as it improperly burdens a program with charges that are not specific to that program and deprives real engineers and scientists from the stolen FTEs, thereby increasing the uncovered while also making management look falsely efficient. Since IFPTE's testimony in June, a move has been initiated by HQ to stop this practice and we applaud this. Another way true administrative costs are being underestimated is when "uncovered" employees perform critical administrative work, which is charged to a "transition" account indicating that they are uncovered capacity when they are actually performing valuable G&A activities. One of the most important benefits of full-cost accounting is that it can tell you how much NASA management is costing the Agency; unfortunately, because of the above mis-accounting of work, the actual full-cost of NASA management (both programmatic and line) remain unknown. Thus, management inefficiencies cannot be properly identified and addressed in workforce planning.

e. **No FTEs are provided for advance planning, proposals, or even successful grants and cooperative agreements.** The hallmark of a cutting edge research and technology institution is the quality of its technical staff. That quality is maintained by the continuous engagement of technical staff in vigorous intellectual interactions and collaborations with academia and the private sector through grants and Space Act agreements and by attending conferences. As NASA's internal R&D funds decrease, NASA should be encouraging its scientists to bring in funds from other Agencies by responding to external calls for proposals as has been done by NASA's most productive scientists and engineers for years. Under full-cost recovery, however, there is no way to receive NASA salary funds for working on grant or program proposals or even for working on successful external grants which bring both direct tangible benefits and indirect prestige and credibility to the Agency. Furthermore, external funding institutions (e.g., NIH, NSF) have not been asked to adapt to the new internal NASA funding environment and/or cannot afford to pay "full-cost" for the inflated FTEs that NASA charges, so there is little chance to recoup one's salary externally even with a successful external grant funding critically valuable work for the Agency and the Nation (e.g., NIH funding of radiation research). Efforts to have NASA affirmatively cover the salary portion of such innovative, competitive, entrepreneurial research have not succeeded. Although Dr. Griffin understands that recovering partial-cost for facilities is smarter than nothing as the basis for the current plan to save NASA's valuable facilities (see quote above), he remains unwilling to seek only partial recovery of civil servant salary from outside funding institutions in order to save NASA's world-class Space, Earth, Life and Microgravity scientists. Under the current misapplication of full-cost accounting, many of our best and brightest scientists are "uncovered" even when their research is funded. Feeling insulted and betrayed, much of our scientific talent is leaving or is considering doing so, when only a few years ago that would have been unimaginable. This is not good for NASA's long-term health or for the Nation. We propose that NASA's Science, Aeronautics, and Technology budgets be increased to reverse this trend before it gathers momentum so that NASA can retain its world-class scientists and research engineers (IFPTE recommendation #5).

Q1b. Please explain what steps NASA must take to implement a complete full-cost accounting system that addresses these concerns.

A1b. NASA should simply initiate a workforce accounting system that records the actual work performed (IFPTE recommendation #4). When in doubt, try the truth.

There should be a Work Breakdown System (WBS) number not only for all programs/projects (as is done currently) but also for all other assigned activities (training, administrative work performed by technical/support staff, etc.. . .) with sufficient granularity to allow for meaningful future planning. All WBSs must be accessible from all Centers so that employees at Center X assigned to work on program run at Center Y can easily charge his/her time, as assigned and performed, without the hassle of transferring funds from one Center to another. Employees should be

assigned work by their local line management (in response to task requests by program managers). Employees should then accurately record the hours they take to perform all tasks to the WBSs provided for each of their assigned tasks. If management assigns a task on Friday afternoon to be delivered Monday morning, then the employee should charge the time for all of the work they performed evenings and weekends even if it becomes overtime. Managers can make sure that employees are performing their assigned tasks but they cannot arbitrarily reject and rewrite the recorded hours in the employee's time sheet unless they have compelling evidence that the hours were recorded inaccurately. Employees should report hours spent attending management meetings or performing routine accounting activities under the appropriate administrative WBS, should report all generic training under a training WBS, etc. Principal Investigators on approved externally funded grants should also receive a WBS, whether or not their salary is reimbursed, to properly record the work hours devoted to that task. IFPTE is simply advocating for truth in NASA's accounting practices so that if employees are spending too much time doing A and too little doing B, management, Congress, and the American people will know it and can then try to do something about it next time around. Most importantly, this is the only way Congress can find out what a program's labor costs really were. Time cards should be considered data sets to be filled out by employees who have the only first-hand knowledge of the data (their work hours). Management should not be allowed to alter workforce data to come out "correctly" based on an *a priori* workforce spending plan.

Q1c. Do you think that the current accounting system has improved NASA's understanding of the degree to which its employees are fully paid for by its programs?

A1c. Regrettably not. Because of the systematic misrepresentations of actual work performed to meet projected manpower plans (as outline above), NASA is hopelessly lost as far as identifying the true labor costs associated with any program or other activity. Until the Agency undertakes radical reforms that reject its current top-down "make it so" accounting culture and implements a bottom-up, honest, data-driven accounting process like the one proposed in the response to Question 1b above, Congress cannot trust NASA's workforce numbers. Many of NASA management's similarly flawed financial accounting practices have been identified by outside auditors and therefore are in the process of being corrected. NASA should be compelled to subject its workforce accounting policies and practices to a thorough audit by an outside auditor so that the weaknesses at the root of IFPTE's concerns can be addressed and rectified.

Questions submitted by Representative Mark Udall

Q1. How responsive is NASA's Workforce Strategy to the reporting requirements contained in the NASA Authorization Act of 2005?

A1. NASA management has shown a consistent pattern of providing only *pro forma,* content-deficient responses to congressional mandates for information about workforce planning.

In a letter to General Counsel Wholley, Dr. Paul Davis and I described in detail how NASA's recent Workforce Strategy failed to provide the specific information required as per the *NASA Authorization Act of 2005.* The Strategy is statutorily required to describe, at a minimum—

> *(A) any categories of employees NASA intends to reduce, the expected size and timing of those reductions, the methods NASA intends to use to make the reductions, and the reasons NASA no longer needs those employees;*
>
> *(B) any categories of employees NASA intends to increase, the expected size and timing of those increases, the methods NASA intends to use to recruit the additional employees, and the reasons NASA needs those employees;*
>
> *(C) the steps NASA will use to retain needed employees; and*
>
> *(D) the budget assumptions of the strategy, which for fiscal years 2007 and 2008 shall be consistent with the authorizations provided in title II of this Act, and any expected additional costs or savings from the strategy by fiscal year.*

But unfortunately, it simply does not provide the above information nor does it abide by the above-required budgetary assumptions. Our letter describes the deficiencies in detail (see Appendix E of our testimony).

We received no reply from General Wholley in response to our enumerated legal concern that NASA management was not in compliance with the Authorization Act.

Perhaps it would be useful for the House Science Committee to compel a response? From our reading of the Act, Congress simply asked NASA to provide the obvious information that would be needed to support intelligent long-term workforce planning in support of the *Vision for Space Exploration.* Unfortunately, without aggressive and sustained congressional follow-up, NASA will likely continue to provide mediocre documents that hamper congressional oversight.

It is important to note that NASA still appears unprepared to release the requested information. In a NASA All-Hands in June 2006, NASA's Administrator and Associate Administrator for Exploration announced the assignment of Exploration projects to each of the Centers as part of the 10 healthy Centers plan. However, two months after the Strategy was delivered to Congress, they explicitly stated that they still had not determined the full extent of the Exploration's workforce needs, nor how the Center's newly assigned roles would impact workforce "coverage." It is hard to justify continuing NASA's ongoing downsizing in the face of the admitted uncertainty NASA upper-level management has about the demand side of the workforce issue.

It is also important to point out that the superficiality of the Workforce Strategy is not an isolated incident but part of a series of evasive and uninformative workforce planning documents provided to Congress in recent years. In response to the *NASA Flexibility Act of 2004,* NASA provided a Workforce Plan in April 2004 and then a revision in 2005. These documents also did not have the information required by Congress (in this case, under the Flexibility Act). On June 5th 2005, Dr. Wes Darbro, President of the NASA Council of IFPTE locals, provided IFPTE's comments on the proposed revised Workforce Plan and specifically informed NASA Human Resources of our legal concern that the Workforce Plan was not in compliance with the Flexibility Act:

> *In HR's responses to IFPTE's queries, it clearly considers its responsibility to IFPTE as a simple "consultation" as defined in the Federal Service Labor-Management Relations Statute. This approach fails to recognize the legal fact that the Flexibility Act compels NASA management to release specific information to NASA's Unions (as well as Congress) in order to establish the rationale for NASA's determination of each "critical need" (and not simply the new list as would typically be required by the Labor Statute). As such, Congress has greatly expanded IFPTE's consultation rights in this particular matter beyond our standard consultation rights, and HR must adjust its interaction with us accordingly. Our basic concern with Section I continues to be that it fails to fully comply with the Flexibility Act because it does not adhere to the details of § 9802— Planning, notification, and reporting requirements. Most importantly, the Workforce Plan does not include an adequate "description of each critical need of the Administration and the criteria used in the identification of that need." We brought this and other related issues up last year in our initial "consultation," but HR did not adequately address our concerns. Although the readability of the revised Section I is improved over last year's, our explicit request for the "criteria" used to determine which competencies are critical needs went largely unheeded. Instead, the Plan merely asserts that there were criteria and provides a description of the sequence of events that contributed to the decision making. The Flexibility Act demands more; it clearly states that the criteria themselves used in the identification of critical needs must be provided in the Plan.*

> *A second major compliance issue is the fact that, in January, NASA authorized and offered buyouts to many employees whose primary competency is on the current Critical Needs list (e.g., dozens of Human Factors experts were offered a buyout and many took it). This troubling action shows disdain for NASA's constitutional obligation not to mislead Congress. It is not right for NASA to tell Congress officially that it needs special authority to recruit new and retain current employees in certain areas, while using other authorities to push these employees out the door to achieve short-term financial objectives. This clearly violates the spirit if not the letter of the Flexibility Act and, whether deliberate or not, clearly misleads those Congressional committees responsible for NASA oversight.*

We urge Congress to insist that NASA Human Resources provide more thoughtful and thorough responses to congressional requests for workforce information and, in particular, to ask NASA to provide a revised Workforce Strategy that is fully compliant with the *NASA Authorization Act of 2005.* Proper oversight and policy-making cannot be made without accurate and complete information.

Q2. How do we balance the rights and capabilities of the current workforce against the need to bring younger scientists and engineers into the Agency? How would you recommend NASA address the problem?

A2. We believe the premise of any conflict between the older and younger generations of NASA scientists and engineers is false. Indeed, as former Administrator O'Keefe argued when requesting the *NASA Flexibility Act,* NASA needs to retain its aging technical workforce as it also hires the next generation so that the former can mentor the latter and provide for the effective transfer of institutional knowledge and experience from the Apollo and Shuttle generations to the Vision generation that will bring us back to the moon and on to Mars. This is even more true today as a new generation of engineers and scientists has been asked to go back to the future and re-enact Apollo for its first return to the Moon.

As far addressing the issue of NASA's aging workforce and the need to recruit a new generation of employees, we believe the answer is two-fold:

- Categorically reject layoffs and start talking about how the Vision will provide sustained growth and career stability to the next generation of NASA employees so that we may attract our fair share of the engineering and science graduates of the world's elite institutions (IFPTE recommendation #1). Start hiring young talent now. Reinstate a vigorous National Research Council postdoctoral program and other internship programs to attract fresh-out talented graduates into the Agency for a trial run, then hire the best of them as permanent tenured civil servants with the promise of a career as rewarding as anything academia or the private sector can possibly offer. The above philosophy has the added benefit of showing younger Americans that there is a good reason to get a degree in Engineering, Math, or Science; NASA is hiring and wants you to help America understand and protect our home planet, explore our solar system and the Universe, and send people to Mars and back.

- The law entitles NASA's older employees to fair and equal treatment but, more importantly, these employees have earned our respect and gratitude for their service to the Nation and should not be treated badly simply because of a turn in the political winds (as has been the case for the last two years). Any concern about the age distribution of NASA's employees will take care of itself through natural attrition over the next five years together with the aggressive hiring of new talent as proposed above. Given, however, that there is a small population of employees who would like to leave the Agency now, but are staying on merely to increase their retirement benefits, NASA should offer enhanced buyouts and early outs comparable to those offered by the private sector to encourage those who want to leave to do so sooner (IFPTE recommendation #2). This approach is not only more ethical and respectful to both our older and younger employees than any possible RIF scenario; it is extremely cost-effective with costs recouped within about two years. NASA could solve its entire so-called "uncovered capacity problem" quickly and painlessly if it offered a year's salary as a separation incentive (the high-tech industry standard). Any RIF process will take about a year, will cost millions to implement, will embitter much of the workforce, and will trigger costly and protracted litigation, so the wisdom of an enhanced buyout approach becomes even more obvious, not to mention the morale and productivity advantages.

ANSWERS TO POST-HEARING QUESTIONS

Responses by David C. Black, President, Universities Space Research Association

Questions submitted by Chairman Ken Calvert

Q1. The interim report from your National Research Council committee suggests that NASA should "work with the DOD to initiate training programs" or participate in Department of Defense programs. Can you elaborate on which training programs have particular relevance to NASA? Are there factors unique to NASA that a training program should take into account?

A1. The Air Force has a program through the Air Force Institute of Technology to send people for system engineering training. In addition, some of the commands have set up their own programs. The Space Missile Command in Los Angeles has a program with Caltech in system engineering and Space Command in Colorado Springs has an arrangement with the University of Colorado at Colorado Springs. These are all space oriented (primarily Air Force oriented) system engineering programs.

These programs serve both as models of the types of programs that NASA could set up, and/or make their use of existing NASA training programs more effective. The challenges facing NASA center primarily on systems engineering, with emphasis on culture change. NASA staff has a strong sense of "not invented here," and are therefore prone to not looking at lessons learned either from their own organization, or organizations external to the Agency.

One of the major challenges for NASA, in my personal view, will be to find ways to remake itself. It has become very top-heavy from a bureaucratic perspective, as much given to process as results. There are committees that had a real purpose at one time, but whose purpose now is less obvious, yet they persist and add to the management overhead.

The other thing that I believe NASA must do is seek training programs that allow their young people to actually do something with hardware. There are few places in the Agency where the NASA engineering staff has had actual experience in building something substantive, particularly in the human space flight programs.

Questions submitted by Representative Mark Udall

Q1. In your testimony, you state that the decision on how much work to carry out in-house versus contracting out is "one of the more critical, if not the most critical, decisions that NASA must make."

Q1a. What criteria should be used in deciding the best course of action?

A1a. The NRC Committee has not yet finalized its views on this topic. We have concluded that NASA does not have the expertise in-house currently to meet the various requirements of implementing the *Vision for Space Exploration.* This would suggest, in my personal view, that NASA should move forward cautiously on any major procurements until it either has the requisite skills in-house, or it is able to tap into the skills external to NASA to frame properly the requirements for major procurements. Conversations that I have had with members of both teams involved in the recent CEV procurement indicate that the teams felt that many aspects of the RFP for that procurement were vague and/or poorly stated. This will have cost and schedule ramifications as the requirements are sharpened after the contract is awarded.

Q1b. What do you think of "Ten Healthy Centers" as a guiding principle for NASA's workforce strategy? Do you agree with it?

A1b. This also is a topic upon which the NRC Committee has not finalized its findings. My personal view is that any attempt to optimize NASA's ability to accomplish the Vision in an environment of strongly constrained funding that is based upon a "Ten Healthy Centers" approach is flawed. While such an approach may be politically expedient, it is generally not an efficient use of limited resources, creates unnecessary interface and overhead problems, and as such is not in the best interests of either the Vision or the taxpayers who should be viewed as the ultimate shareholders in the enterprise.

Q1c. If NASA were to decide to simply retain the core of people necessary to be "smart buyers," what is your estimate of how large that remaining NASA workforce would be?

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A1c. The NRC Committee is considering this issue, but has not reached a consensus at this time. Given my personal view noted above, the issue here is not one of retention of people, but addition of people with the right technical skills in order for the Agency to become a "smart buyer." I would not hazard a quantitative estimate at this time of how big the NASA workforce would/should be if it eliminated positions that were not essential for the Agency to be a "smart buyer" on all aspects of its business. There are areas in my view where NASA is currently employing staff whose jobs are arguably not needed to implement the Vision.

Q2. The NRC Committee's interim report states that NASA is becoming aware that it has an age-distribution problem in its workforce, but that "the committee saw no indication that the Agency has begun to act on this concern." *How serious is the age-distribution problem, and what would the NRC committee recommend be done?*

A2. This is an issue that the NRC Committee has discussed extensively. I would beg the Chairman and Ranking Member's indulgence on this until our final report is available, as we have not yet finalized our finding and recommendation on this important point. I would remark that there are several means by which the age-distribution can be altered over time. The $64,000 question in my mind is "Is there a unique age-distribution that fits the Agency, and if so, what is it?" Also, should one view the workforce question solely from an agency perspective, or from the broader perspective that includes the aerospace and university communities as well? This topic is rich with potential for major policy implications.

Q3. The NRC report states that "The Committee concludes that the ability to recruit and strategically retain the needed workforce will depend fundamentally on the perception of long-term stability of the Vision for Space Exploration and a sustainable national consensus on NASA's mission." *Given that the current Administration has failed for the last two years to propose budgets consistent with the requirements levied on NASA, and given that there is likely to be a review of the priority to be given to President Bush's exploration initiative after a new Presidential Administration come to power in 2009, how should NASA proceed to address its workforce issues in such an environment?*

A3. My personal perspective on this issue is that the Agency should take no steps that would be either cause potential serious long-range damage to the Nation's civilian space program, or that cannot be remedied on a time scale short compared to a President's nominal term of office. As NASA is an element of the Administrative branch of government, the NASA Administrator may not have sufficient flexibility to avoid taking the kind of steps mentioned above. In that case, it seems to me to be unavoidable that the Legislative branch of government must be willing to provide the necessary steerage to keep the Agency moving forward in directions that best resonate with the will of the people and the best economic interests of the country.

Appendix 2:

ADDITIONAL MATERIAL FOR THE RECORD

STATEMENT OF THE AMERICAN INSTITUTE OF AERONAUTICS AND ASTRONAUTICS,
PUBLIC POLICY COMMITTEE

The American Institute of Aeronautics and Astronautics (AIAA) is pleased to provide this written testimony for the House Science Committee Hearing on the proposed NASA Workforce Strategy. A flexible, vibrant, secure and appropriately skilled NASA work force for executing exploration programs as proposed in the President's *Vision for Space Exploration* is critical to the Vision's ultimate success. The AIAA has reviewed the proposed Strategy document, and would like to make four key points.

1. A healthy and sustainable NASA workforce benefits the larger aerospace enterprise

A healthy NASA workforce, armed with appropriate skills and secure in its future, provides better oversight for technical system procurement and program management. This results in better performing systems, better ability to meet schedule, more productive interactions with other stakeholders in the aerospace enterprise, and more efficient use of taxpayer dollars. Even in the Department of Defense, where procuring complex space systems has been a prime job for several decades, experts are concerned about current government workforce competencies. The May 2003 Final Report of the Defense Science Board (DSB) Task Force on Acquisition of National Security Space Programs, chaired by Tom Young, stated "government capabilities to lead and manage the space acquisition process have seriously eroded." An organization like NASA, which has been an operational entity for much of recent history and which has less background and experience in development programs, should reasonably expect even greater challenges as it shifts its focus to a development organization and retrains its employees.

2. A healthy aerospace enterprise also benefits the NASA workforce

In so much as NASA draws employees from among experienced candidates already working in the larger aerospace enterprise, a healthy aerospace enterprise will benefit the NASA workforce. A healthy aerospace enterprise provides a motivated, skilled, and experienced workforce pool from which NASA can draw employees. A healthy aerospace enterprise also provides employment opportunities for NASA employees who desire or need to leave the Agency, but still wish to work in the industry.

3. The proposed strategy is a good start

The issue of workforce planning is an important one for NASA, and the proposed strategy is a good start. Implementation of the strategy, however, is likely to pose unanticipated challenges. Enterprises undergoing significant change typically encounter resistance and retrenchment across the ranks, which can derail even the strongest of change efforts.

Given the immediate concerns of uncovered capacity facing NASA, it is understandable that the strategy is focused largely internal to NASA. One area where the workforce strategy could be improved is in links to capabilities and human resources outside NASA. Other agencies have Fellowship programs, which bring in professionals from industry to spend a short tenure at an agency and become more familiar with its work and challenges.

4. Workforce strategy has far-ranging impacts on program (implementation) schedule, cost, risk, performance, and degree of in-house work performed

The proposed workforce strategy lays out ambitious goals for transitioning NASA from an operations-focused organization to a development-focused organization. It is important to recognize that workforce issues are inextricably linked to overall program implementation and acquisition strategy. The degree of in-house versus outsourced work, as well as the amount and kind of training required to transition the NASA workforce, influence the acquisition strategy to implement the *Vision for Space Exploration*. It is arguable whether NASA can both shift the focus of its organization and keep a large share of the work in-house, while also adhering to the current somewhat ambitious desires of policy-makers for CEV and CLV cost, schedule, performance and safety.

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