

U.S. SENATE COMMITTEE ON APPROPRIATIONS: SUBCOMMITTEE ON COMMERCE,
JUSTICE AND SCIENCE HOLDS A HEARING ON FISCAL YEAR 2006 NASA
APPROPRIATIONS (MAY 12, 2005)

SPEAKERS:

SENATOR RICHARD C. SHELBY (R-AL), CHAIRMAN; SENATOR JUDD GREGG (R-NH);
SENATOR TED STEVENS (R-AK); SENATOR PETE V. DOMENICI (R-NM); SENATOR
MITCH MCCONNELL (R-KY); SENATOR KAY BAILEY HUTCHISON (R-TX); SENATOR
SAM BROWNBACK (R-KS); SENATOR CHRISTOPHER (KIT) BOND (R-MO); SENATOR
THAD COCHRAN (R-MS)

EX OFFICIO MEMBERS:

SENATOR BARBARA MIKULSKI (D-MD), RANKING MEMBER; SENATOR DANIEL K.
INOUYE (D-HI); SENATOR PATRICK J. LEAHY (D-VT); SENATOR PATTY MURRAY (D-
WA); SENATOR HERB KOHL (D-WI); SENATOR TOM HARKIN (D-IA); SENATOR BYRON
L. DORGAN (D-ND); SENATOR ROBERT C. BYRD (D-WV)

EX OFFICIO WITNESSES: MICHAEL GRIFFIN, ADMINISTRATOR, NASA

SHELBY: Committee will come to order. This hearing of the Senate Commerce, Justice,
Science and Related Agencies Subcommittee -- this is our first meeting of the restructured
committee.

I want to welcome the new NASA administrator, Dr. Michael Griffin, who's joining us to
discuss the presence of fiscal year 2006 budget requests for the National Aeronautics and
Space Administration.

Dr. Griffin, in assuming your new post as the NASA administrator, I can only imagine how
busy the past few weeks have been for you. Now that you've had some time to reacquaint
yourself with NASA's activities we look forward to discussing your thoughts about how
NASA is doing and hearing your insights as to what they could be doing better.

I also anticipate that we will have an ongoing and open dialogue about NASA's progress
with return to flight and achieving the president's vision for space exploration. I'm very
interested in discussing how we can preserve the expertise within the activities and
institutions that will be necessary to take this ambitious journey.

More than a year ago the president presented a vision for space exploration that calls for a
return to the moon and eventually a manned mission to another planet. I'm excited myself
by the opportunities that lay ahead with the exploration vision at NASA.

There are fiscal realities, like it or not, that may affect the vision. That is what we deal with on this committee, and I believe it is one of the difficulties that you will face as the NASA administrator, having to balance NASA's limited resources with its programs and requirements.

I believe that we all appreciate the inherent risk involved with many of the activities NASA undertakes. We also appreciate that with risk comes the potential for failure.

Inevitably, failures increase the overall cost of the activity. And one of the problems that I anticipate along the path to the moon is the potential for failures that could pose a significant challenge to the forward momentum of the program and vision.

Of course we all hope there will not be any failures, but I believe we have to build in the possibility.

We've already experienced such a challenge with NASA's return to flight requirements. Specifically, we've seen a strain on science missions and aeronautics as NASA has redirected funds to pay for return to flight cost overruns.

These fund shifts have caused programs and facility projects to be deferred, created uncertainty regarding the state of the Hubble telescope and resulted in aeronautic spending being flat.

Dr. Griffin, I believe you have the knowledge, the background and the ability to guide NASA. But I also believe that you must begin your journey on a firm foundation.

Getting back to the moon will take more than just plans for a rocket. It will also take a sound financial structure and capable management in order to balance all of the important activities that NASA undertakes to make this exploration vision a reality.

I believe there are several looming issues that must be addressed if NASA is to maintain the forward momentum of its exploration goals.

The first, as I alluded to before, is the shuttle fleet and how that impacts any future crew exploration vehicle, CEV. NASA has been working diligently to complete the necessary changes to the shuttle that will provide additional safety for our astronauts and the vehicle itself.

However, the shuttle is targeted to be decommissioned by 2010. The next U.S. manned space vehicle, the crew exploration vehicle, is not currently scheduled for a manned flight until 2014.

I'm concerned by such a gap in U.S. manned space flight. And more importantly, I'm concerned that the time schedule for the current 25 or more shuttle flights prior to the 2010 retirement is quite optimistic.

Any deviation in these schedules as they relate to funding could cause this gap to widen even further than is currently anticipated.

I understand that you have your own ideas, Dr. Griffin, as to how the gap between the shuttle retirement and the CEV could be closed. I'm interested in hearing how you believe this is possible during the tight funding environment.

The second challenge, the completion of the International Space Station, is directly linked to the first. The construction of the station is dependent on the shuttle for critical supplies and parts that cannot be delivered by any other vehicle.

Our international partners have done an admirable job filling in while the shuttle is undergoing repair, but there is an expectation that the shuttle will return as essential to complete the space station.

The U.S. has a commitment to our international partners to complete the station. I believe we must maintain that commitment. And I'm interested in learning of your thoughts here about NASA's plans for completing the International Space Station, and further, how that will impact our ability to work cooperatively with other countries in the future on the vision that we have.

Finally, I believe NASA faces a significant challenge in building the technical workforce necessary to carry us into the future.

NASA's one of the most publicly recognized agencies within the federal government. We all know something about NASA, whether it's stunning pictures of the universe from the Hubble Space Telescope, photos from Mars, or even astronauts living on the space station.

Such high visibility and name recognition can be powerful tools in inspiring and recruiting future scientists and engineers. But I believe the success of NASA programs in science and exploration that students see today is the inspiration necessary to attract the young people of this nation to these careers in the future.

I know that you realize that the missions of tomorrow will not be possible if there are no scientists and engineers being developed today. This is a serious issue that must be addressed in order to ensure that future exploration in space can occur.

I want to thank you again for being here today. It's my hope that this will be the beginning, Dr. Griffin, of a productive relationship between NASA and this newly constituted subcommittee.

Senator Mikulski?

MIKULSKI: Thank you very much, Mr. Chairman.

And today is really the first hearing of the new Commerce, Justice, Science Committee.

And I want to say how much I look forward to working with you, Chairman Shelby.

Though we are new together in our assignment on this subcommittee, Senator Shelby and I have had a very long and collegial history together. We served on the same committee in the House of Representatives on energy and commerce. We were on the Appropriations Committee since our arrival in the Senate. And we've worked closely with Senator Shelby when he's had other committee responsibility.

And I must say, Senator Shelby, I've always found you to be a good friend and a very collegial colleague and look forward to that relationship.

Also in your remarks and the priorities that you've laid out in your opening statement, I want to assure all, those are also my priorities and that we can work on a bipartisan basis in the interest of the United States of America and go forward with you. And since we both have a parallel will to finding the wallet.

I'm excited about this new subcommittee, though I was initially disappointed at the dissolution of the V.A.-HUD committee.

But what we see here, I think you and I have a new opportunity for a true science committee. I recall that our colleague and former astronaut John Glenn said that we should have done this a long time ago, that too much of our science was stovepiped into too many different subcommittees.

But here now in this subcommittee we have something quite unique. We're bringing together the NASA, NOAA, the National Science Foundation, the National Institute of Standards, the Patent Office and the president's science adviser.

So we would hope that this would be the beginning of kind of a leveraged science policy.

I'm excited about this because I believe that science is the key to innovation, and innovation is the key to our future.

If we're going to have a safer country, a stronger economy we need to be smarter. And that involves really leveraging our research and technology development and a world-class workforce. Our economy and our national security will depend upon it.

And I also think that we, because of this subcommittee, both through NASA and the National Oceans and Atmospheric Agency, could present an incredible opportunity in terms of far-reaching research and far-reaching exploration of exploration of the stars, but in a way that we would focus efforts on Earth science that would save lives, save livelihoods and advance our technological competitive edge.

So, today I'm looking forward to hearing from Dr. Griffin, our new head at the helm of NASA.

I personally want to thank President Bush for appointing an actual rocket scientist to head NASA. But I would also like to take this opportunity to thank someone in the audience, Mr. Chairman, Mr. Fred Gregory, who served as the acting director of NASA and provided a very steady hand.

And, sir, we would like to thank you and salute you for the job you did during that time, but also in your career at NASA.

And I think it points out to the wonderful civil service we have at NASA. These wonderful men and women who give their lives to scientific exploration, who work in the government sphere to advance our national priorities. So we want to say thank you to you personally and to you representing really what an outstanding civil service we have. So thanks again.

We're looking forward, though, to hearing from Mr. Griffin. As the chairman said, we've got to talk about the shuttle. We've got to make sure the shuttle flies when it should fly so that it can go to space and return our astronauts safely.

At the same time, I, too, am concerned about the fact that we could be without a crew exploration vehicle for four years.

We know that the shuttle is aging technology. We know that it will get us through a difficult time now. But I believe that we owe it to the country, we owe it to our astronauts, that we really look at what is a wise, prudent way to accelerate this crew transportation system.

The United States of America should always have its own access to space. The space station, too, we need to be able to finish that, keep our commitment to our international partners, and keep it as a premier research facility.

And, of course, then there is Hubble. Everyone knows my position on Hubble. And I believe it's been the greatest telescope invention since Galileo himself stood on that rooftop in Florence.

And, as Dr. Griffin knows, I stood on those rooftops in Baltimore with the Space Telescope Institute and our beloved Hubble.

But Hubble has resulted in enormous scientific breakthroughs. We look forward to the next generation. But we think if we can repair Hubble, give it new batteries and new optics, that it will take us far into the future at many different levels.

But, of course, then we look at the NASA budget. I'm concerned about the shuttle cost and our ability to pay for it, the space station and our ability to maintain it, that aging infrastructure that Senator Shelby's talked about, and our new vision -- or the president's vision -- to go into space.

But along the way, I really hope that we do not neglect the other dimension of the NASA responsibility, and that's aeronautics.

20 years ago, the United States had over 90 percent of the market share for commercial airliners. Today, we have 50 percent of that market. And the National Institute of Aeronautics told us we must really continue to focus on aeronautics for our national security and our economic security.

Mr. Chairman, I look forward to working with you, as always, on a balanced program, a reliable space transportation system, always supporting the daring and the outcome of human exploration, but also a special emphasis on science, both in terms of understanding our own planets, others out there and also new breakthroughs in aeronautics that will help our country be safer and stronger. So, Mr. Chairman, I look forward to working with you, listening to Mr. Griffin. And again, Mr. Gregory, thank you very much.

SHELBY: Senator Hutchison?

HUTCHISON: Thank you, Mr. Chairman. And welcome again, Mr. Administrator. I certainly look forward to having you at my subcommittee next week as well to talk about space shuttle and beyond.

The proposed budget for NASA is certainly one that reflects difficult choices. But, given the overall reductions in discretionary spending, I think it is generous and fair.

Undoubtedly, many areas of traditional NASA activity feel the pressure from our new priority, preparing humans for missions back to the moon and on to Mars.

This is a new direction. It's a bold direction and one that I totally support.

NASA should be bold. And having the long-term vision is essential for NASA.

Where I have questions and concerns about NASA, they revolve around longer-term impacts to our current investments in human space flight capabilities.

As you know, Mr. Administrator, I am concerned about the possibility of a gap between the planned retirement of the shuttle and the availability of the replacement crew return vehicle.

I think a five-year gap is unacceptable. I think it is not only a risk to the important scientific research that we are doing, but it is a security risk to our country.

And I am pleased that you have shared the same concerns. And I know both the chairman and the ranking member here have also expressed those concerns.

I also am concerned about the investment that our nation and our international partners have made in the International Space Station, and wanting to assure that, with the budget priorities that we have, that we keep the commitments to the International Space Station and finishing the job of building it out.

In addition, of course, I believe that the science is going to be the most important thing that we do with humans in space. And therefore, we need to have the space station totally ready with its build-out and with the scientific emphasis that is so important for the missions to succeed.

So I am looking forward to working with you. I think what you have done in delaying the return to flight is exactly the right thing. Your concern for safety and your jumping right in and going to the bottom -- not just the top -- to determine that we were ready to go was exactly right. And as my friend and colleague, Senator Mikulski said, we wanted to go badly. But we wanted to go at the right time more.

So thank you very much for being here and I look forward to being able to hear you and then ask questions.

Thank you, Mr. Chairman.

SHELBY: Dr. Griffin, your written statement will be made part of the record in its entirety. You proceed as you wish.

GRIFFIN: Thank you, Senators. It is also my pleasure to be here. I thank you for the invitation to appear before your committee and begin the process of communication with you which I pledge will be thorough and ongoing throughout my tenure.

In the spirit of Senator Mikulski's remarks, I would like also to take a moment and thank Colonel Gregory for his service between Administrator O'Keefe's departure and my arrival.

Fred is a personal friend of more than 15 years' standing, a person who has risked his life on behalf of this country in Vietnam, in military test flying and weather research flying, and on the space shuttle.

His services, in linking the tenures of Administrator O'Keefe and myself, have been invaluable. And he continues to be invaluable today. And I want to take this opportunity to thank him publicly.

Thank you, Fred.

Chairman Shelby, Ranking Member Mikulski, Senator Hutchison, members of the committee, thank you for this opportunity to discuss the president's FY 2006 budget request for NASA and our strategic direction in carrying out the nation's civil aeronautics research, space and earth science and space exploration activities.

A month ago today, I appeared before the Senate Commerce, Science and Transportation Committee as the president's nominee to be the NASA administrator.

I want to thank the Senate for your prompt consent to my nomination. It's been a busy month. The agency is well underway towards implementing the vision for space exploration.

I have said before and will say again that, as a nation, we can clearly afford vigorous, well-executed programs in both robotic and human space exploration, earth science and aeronautics research.

In presenting the vision last year, the president put forth the commitment that our nation will undertake a journey of space exploration over the next several decades.

I am personally committed to carrying out that vision. Every journey begins with a single step. The first step in that journey is to return -- not rush -- the space shuttle to flight. The next launch window for the first space shuttle mission following the Columbia tragedy begins in mid-July. Space shuttle Discovery mission STS114 will be commanded by Eileen Collins - I might add, Colonel Eileen Collins.

Our top priority in my tenure will be to make each successive flight safer for the crew than we believed the last one to have been.

The second step in the vision is to complete the construction of the International Space Station and to retire the space shuttle by 2010.

After two successful return-to-flight shuttle test flights, the agency will complete its assessment of the relative risks of a space shuttle mission to service the Hubble Space Telescope to increase its capabilities and to extend its operational life.

The next step in the vision for space exploration is to develop a crew exploration vehicle that will be capable of ferrying the next generation of astronauts to the space station, the moon and Mars.

As you may know, I recently kicked off an exploration systems architecture study team to examine ways to accelerate the development of the crew exploration vehicle in order to minimize any gap in the United States' capability for human space flight.

As I think all of you know, I completely share your concern about any gap between the retirement of the shuttle and initiation of the flights of the follow-on vehicle.

I hope to share with you by mid-July NASA's plan for how we can accelerate development of the CEV, as well as that of the rocket needed to launch it.

I also hope to share with you NASA's plan for the space architecture that will allow us to return to the moon and eventually head onwards to Mars.

NASA's FY 2006 budget also funds a variety of satellite missions and scientific research and earth science, as well as other planets in our solar system.

It funds development of even more advanced space telescopes to follow the Hubble, such as the James Webb Space Telescope.

NASA's FY 2006 budget for aeronautics research is focused on achieving results, such as reducing noise emissions, improving aircraft safety and security, and improving the capacity and efficiency of the national air space system.

NASA is working closely with the FAA, the Defense Department, the Department of Homeland Security and others to achieve those results.

While today's hearing concerns the upcoming fiscal year, I also want to update the committee concerning the difficult choices that must be made in executing NASA's FY 2005 budget and my guiding philosophy in dealing with those challenges.

First, I want to thank this committee and the Congress for providing NASA with the additional flexibility to address our challenges in this year's appropriation bill.

It is my pledge to keep you fully informed as to how this agency spends its allocated resources in accordance with the flexibility you've given us.

In our FY 2005 operating plan, which has been provided to this committee, NASA is fully funding a \$762 million cost increase for space shuttle return-to-flight, consistent with the recommendations of the Columbia Accident Investigation Board.

Over \$400 million in congressionally directed items, \$291 million for Hubble servicing options, and over \$500 million in programmatic cost increases for various programs, including the Mars Reconnaissance Orbiter set to launch in August, and the new Horizons mission to Pluto set for launch in early January -- and numerous others I might add, not just those two.

To find offsets needed to fund these items, we've made some difficult choices. NASA cannot afford everything that is on its plate today. We must set clear priorities to remain within the budget NASA has been allocated.

In order to preserve the option of servicing the Hubble Space Telescope and to provide for a safety orbit, NASA must defer work on even more advanced astronomy missions planned after the Webb telescope.

These projects, which are phenomenal technical achievements, will be done, but at a slower pace, because we cannot afford to do everything at once.

We will also look at deferring some Mars missions currently in their formative stages and restructuring the Project Prometheus space nuclear power efforts.

We must focus our nuclear technology efforts on our highest priorities for near-term needs. And we will examine alternative nuclear systems, including surface nuclear power, nuclear thermal propulsion and nuclear electric propulsion systems to support human and robotic missions.

Turning to NASA's FY 2006 budget request, I think it is useful to emphasize that the proposal is balanced, allowing us to address national priorities in aeronautics and earth science while maintaining our focus on the vision for space exploration introduced in NASA's FY 2005 budget.

Budget highlights include a \$5.5 billion request for the Science Mission Directorate. This will support 55 missions in orbit, 26 in development, including the Lunar Reconnaissance Orbiter, which will map the moon's surface in great detail, and 34 projects in the design phase. NASA has a robust science agenda.

Our \$3.2 billion request for the Explorations Systems Mission Directorate includes \$753 million, a down payment toward the crew exploration vehicle so that we will have the capability to launch humans into space as soon as possible after the shuttle's retirement.

One of the ways we may accelerate development of the CEV is by down-selecting to a single contractor in early 2006, as opposed to the previously planned 2008.

Likewise, we may also need to defer work in certain exploration- related technologies that are not needed in the early years of implementing the vision for exploration.

The funding request of \$6.8 billion for the Space Operations Mission Directorate includes \$4.5 billion for the space shuttle, and \$1.9 billion for the International Space Station.

NASA is currently examining alternative configurations for the space station that meet the needs of the United States and our international partners.

We hope to provide the committee our results from this study of the station configuration this summer.

NASA's request for the Aeronautics Research Mission Directorate is \$852 million. NASA's technical expertise and its facilities for aeronautics research must continue to become more focused and results- oriented.

NASA must set realistic priorities for its aeronautics program within its limited resources.

As we move forward, a broader national dialogue on aeronautics R D goals may be appropriate as we enter the second century of aviation. These discussions must include a range of stakeholders and customers, including the Congress, Department of Defense, commercial civil aviation and, of course, NASA.

NASA's education initiatives need to establish clear goals, metrics and monitoring techniques in the coming months to ensure that the funds that the Congress provides will achieve the greatest benefit.

I also intend to review how NASA can best harness the unique capabilities of the workforce at its field centers to achieve our nation's objectives in aeronautics research, space science and exploration.

To conclude, let me stress my firm belief that, as a nation, we can clearly afford vigorous and well-executed programs in both robotic and human space exploration, earth science and aeronautics research.

I plan to work closely with your committee to help achieve these ends. Thank you once again for the opportunity to appear before you this morning.

SHELBY: Thank you, Dr. Griffin.

The proposed budget for NASA has the space shuttle schedule for retirement in 2010. We've been talking about that. And the next man-rated vehicle, the crew exploration vehicle, CEV, is expected to be ready by 2014.

The critical funding for the CEV, I understand, is dependent on the retirement of the shuttle.

It's been widely reported, Dr. Griffin, you're an advocate of closing this four year gap -- I mentioned it in my opening statement -- in the U.S. -launched manned space flight.

Whenever I hear about the acceleration of such programs, concerns rise -- being an appropriator -- about cost increases and development setbacks.

So how much do you anticipate accelerating the CEV will increase the near-term costs of this vehicle? And where will these funds come from?

GRIFFIN: Sir, the widely circulated reports of my dissatisfaction with the gap in manned space flight have the virtue of being true.

SHELBY: I'm glad. Thank you.

GRIFFIN: I am dissatisfied with those and we will be working to close that gap.

I will say at the outset, I cannot say at this moment what the near-term cost increases will be, because that study effort is ongoing as we speak.

When I have some knowledge of that it will be communicated to this committee and to the Congress.

But let me outline the broad plan for things we might do to accomplish that.

First of all, I might add also, I believe it is true that when one stretches a project out beyond its appropriate and natural lifetime, that also causes cost increases.

SHELBY: It does.

GRIFFIN: The 10-year period that we have been planning on as our first plan to design and develop and procure the new crew exploration vehicle is a lengthy period of time relative to our prior history in manned spacecraft development and, I believe, reflects lack of the best possible planning as much as it does any fiscal realities.

That said, what could we do to make a difference? First thing that I've indicated that we could do is we, NASA, have announced in our early planning documents to carry two contractors through 2008 before making a final down-select.

I believe that the design of the crew exploration vehicle should be sufficiently straightforward, should be sufficiently within our experience base that it may not be necessary to carry two contractors that long, that it may be more appropriate to down-select earlier, as I said, in fiscal 2006.

That saves an amount of money on an order of \$1 billion or more, which can be used in the near term to fully fund one vehicle.

Some of our early planning has focused on the possibility of hardware demonstrations in mid-term development for the exploration crew vehicle.

Those may or may not be necessary. We'll be examining that as we'll be examining the rest of these issues, but certainly such early demonstrations will require money that might best be spent bringing the vehicle to completion.

Thirdly, as I've indicated, we have a substantial technology development line in exploration systems. I have been in charge, on behalf of the Defense Department, in a prior experience, of even more substantial technology development budgets.

And I would say that, regarding my personal preferences, nothing would give me more pleasure than to sow the seeds widely in our NASA technology development.

It's been a long time since we've been able to afford to do that. I would like to do it.

But we must put development in new technology in second place behind the development of existing capability on the part of the United States to ferry astronauts and limited amounts of cargo to and from the space station, and to get started down the path back to a lunar return.

SHELBY: Doctor, along those same lines, financial responsibility -- we have a great challenge, all of us here.

What steps is NASA taking to be sure, as much as they can, the contracts that you're entering into are independently assessed for cost control and technical viability?

GRIFFIN: Sir, you raise a very important area.

As I know that everyone knows, whether directly or not, you are referring to the fact that our audit posture is not a favorable one. We received, at the end of 2004, a red audit. We expect to receive another one, I am told.

We, NASA, need to, frankly, get busy on our financial accounting and make sure it passes all the tests. We also need, in terms of the conduct of our programs, to make sure that, when we sign contracts, that they have clearly specified goals, funding profiles are clearly made available and that we, in general, know what we're doing.

I have put in place -- I am in the process of establishing a new office of plans, analysis and evaluation, which will carry a set of forward-looking and backward-looking responsibilities.

Backward-looking responsibilities -- we will be assessing programs as they carry forward, and determining whether they are meeting their cost, schedule and performance goals, and making recommendations as to what to do if they fail at those.

We will also be looking at our track record for the development of hardware, in terms of cost and schedule, and we'll be factoring those estimates from the past into our predictions for the future.

Looking forward, the new office will carry the responsibility for strategic budgeting, making sure that we have appropriately accounted for all the exigencies which we can determine, and we will be looking -- the new office will carry a directorate for advanced planning, helping to remove some of the responsibility for the advanced planning function from those mission directorates which must carry it out.

I referred to this a little bit as eliminating the fox-in-the-hen-house problem. I might say my mission directorates focused on executing the direction they're given, rather than determining what that direction should be.

I hope and believe that this new office will assume a major responsibility for helping get our programs on track.

SHELBY: Senator Mikulski?

MIKULSKI: Thank you, Mr. Chairman.

Picking up, I'd like to go right to the Hubble space telescope. As you know the history. Administrator O'Keefe was going to cancel the Hubble. He did agree to seeking a second opinion. And the National Academy of Science recommended that we do it, and they recommended two possibilities: a robotic mission to repair Hubble robotically -- not repair but give it its batteries and its new optics; and then the other was a shuttle mission, for which there is some question about the safety of the astronauts.

Now, where are you in the Hubble, and where do you see us going? And, in support of Hubble, what will it take from this subcommittee to support you to do that?

GRIFFIN: Senator, as I believe this committee and, indeed, most of the world paying attention to Hubble knows, I have committed to reexamine the decision to do a shuttle servicing mission for SM4 in support of Hubble refurbishment and upgrades, once we've accomplished our return-to-flight objectives. To recap the reasons behind that statement, I would say that Administrator O'Keefe's decision, made in the aftermath of the loss of Columbia and before we had our return-to-flight planning fully fleshed-out, was the reasonable one for the time.

But when we return the shuttle to flight, it will be essentially a new vehicle, and in some specific ways it will require careful examination to assess its ability to support SM4, and that's what we'll do, but we have a new vehicle.

It's appropriate, I think, then, to reconsider that earlier decision in light of the fact that we will be flying a very much improved vehicle, and to assess the relative risks of a Hubble mission.

The National Academy did suggest that the human servicing mission was the proper path to go down, and in addition, there was an independent committee established to assess the feasibility of a robotic-servicing mission.

Before I was nominated to head NASA, I was the head of that independent commission. I think it is safe to say -- although my tenure on that committee was interrupted by President Bush's nomination of me to serve as administrator -- I spent enough time with that committee to know, definitely, that each and every person on that committee, all of them very capable engineers and scientists, believed that the robotic mission was infeasible to accomplish within the time available before Hubble would degrade irreversibly, and within any reasonable amount of money that could be appropriated to accomplish it.

I believe that is the best technical judgment that we will get concerning the feasibility of robotic servicing of the Hubble within the available time, and I think we should simply get off that page.

MIKULSKI: Without getting onto the page, first of all, number one, we thank you for taking this so seriously and giving it such a high level of professional attention.

In your testimony, both on pages three and six about the Hubble, as I understand it, you said, Servicing of the Hubble will depend on the performance of the return to space on the shuttle safely and the return of the astronauts, and that it would take two missions to do that, to assess whether, according to the testimony on page three and six, whether the station was up to a Hubble mission.

My question, then: What would be the time line where you would see those two missions being accomplished? And, in the meantime, what should Goddard do? Does it just sand down, and we could goose everybody and everything?

Or do you see things moving forward in a simultaneous way, and what would be the price tag on that -- if that's your administrative recommendation?

GRIFFIN: Yes, Senator, I'll return to this in a moment, but it is correct that we need the two shuttle return-to-flight missions in order to fully assess certain technical issues that I'll get to in a moment.

If we were to wait for the conclusion of those two missions to begin work at Goddard on SM4, we would, if I could use a colloquial expression, get ourselves behind the eight-ball on doing that servicing.

MIKULSKI: It would be too late to get ready.

GRIFFIN: It would be too late.

MIKULSKI: So when do you?

GRIFFIN: So I directed Goddard to begin work on shuttling servicing mission four, under the assumption that we will be successful with return-to-flight and in our technical assessment of shuttle capabilities.

The first return-to-flight mission should occur in July, the second one in September. And by that time, we will have accomplished the detailed test objectives we need to accomplish in order to know that it will be safe and effective to allow astronauts to service Hubble from the shuttle.

MIKULSKI: Well we, of course, wish God speed to our astronauts, and I know Senator Hutchison will be raising some important shuttle questions, I presume.

Number one, that's heartening. Number two, we look forward to talking about what we need to put in the appropriations to keep the simultaneity of these two endeavors going.

But if I could have just another thing, because we need to address the shuttle -- we're shuttle obsessed, as you can imagine.

Earth science and space science. Do you see new -- as you know, there was another National Academy study that said we were losing ground on the study of earth science, that projects were either de-scoped, delayed, detoured, derailed, et cetera.

And now, with NOAA being in this committee, do you see the potential to continue or to focus on a true earth science set of projects that truly serve this nation and even friends around the world -- in terms of understanding our planet, both in terms of any number of aspects that have a great impact, from atmospheric to ocean currents to ocean winds, and a variety of other things that truly impact the global environment and also how to make

those projections that save lives and save livelihoods, which kind of NOAA, NASA and perhaps NSF partnership?

GRIFFIN: Yes, Senator. I absolutely look forward to enhancing the NOAA-NASA partner and NSF partnership in earth science. Several comments on your point. First of all, we at NASA have heard the response of the community to the changes we made or proposed for and carried out in our science program in FY '05. We had allocated and planned to allocate, in FY '06, a substantial increment to funding Mars exploration, robotic Mars exploration, in the out-years.

We have withdrawn from that and are rebalancing our portfolio to, again provide emphasis on earth science as an important part of our portfolio.

So we have heard the response of the science community, and we, in turn, are being responsive, and you will see that as we go forward in our out-plan for '05 and in '06.

MIKULSKI: Well my time is up and if we have a second round, we'll return to...

GRIFFIN: OK.

SHELBY: We'll have a second round.

Senator Hutchison?

HUTCHISON: Thank you, Mr. Chairman.

Dr. Griffin, we've heard that some members of the House -- on the House side -- have urged moving funds from the International Space Station budget for 2006 into the aeronautics line to offset the proposed reductions in that area.

That was the president's budget, and clearly, having an International Space Station and the return-to-flight are the highest priorities.

I wanted to ask you if you can tell the committee what impact any reductions such as that, in the International Space Station funding, would have, and will you oppose that?

GRIFFIN: Senator Hutchison, I'm the president's nominee and I support the president's budget. The administration's allocation of relative priorities between human space flight, science and aeronautics is clear, and I do not propose any changes to those priorities.

Within those lines, we may choose to emphasize or deemphasize certain things, but I simply cannot support moving money from completing the assembly of the International Space Station to any other activity.

HUTCHISON: Thank you.

The space shuttles were originally intended to be capable of flying 100 missions. The Columbia had flown the most at 27.

When you were talking about the expense of making the shuttles go longer -- I'm sure that maintaining them does get more expensive as they grow older -- but is that still something that would be more feasible since they were supposed to have been able to have longer terms anyway, as a way to shorten the gap between the crew return vehicle coming on if, in fact, you're not able to bring that in at an earlier stage?

GRIFFIN: Senator, I cannot support that position. Again, I am the president's nominee and the administration is committed to shuttle retirement in 2010.

The expense of maintaining the shuttle fleet, year after year, is so great that, in order to move effectively ahead on the crew exploration vehicle systems, we must retire the shuttle.

We must retire it in an orderly fashion. We must fly every flight safely, but we must get it behind us.

The shuttle is inherently flawed. It does not have an escape system for its crew, and we all know that, since human perfection is unattainable, sooner or later, there will be another shuttle accident.

I want to retire it before that flight can occur.

I want to work with you and this committee to understand how we can accelerate the development of the crew exploration vehicle, so that there is the minimal possible gap in transitioning from one system to another.

On a personal note, I was in my late 20s and early 30s, working in the space program, as I have most of my life, when we underwent a six-year gap between the completion of the last Apollo -- the Apollo- Soyuz flight -- and the first shuttle flight.

That gap damaged our program. It damaged our unmanned program as well. It was damaging to the United States.

I don't want to do it again, and I know you share that view.

But the way to prevent that is not to continue to rely upon the shuttle, which is an outdated system, but to move as expeditiously as we may toward the new system, and that is what I am here to support.

HUTCHISON: I accept that, and I think you've made the case very well. Let me ask you this: If you are going to put more emphasis on the crew return vehicle, there have been other

suggestions that you would take them out of the basic research budget in the International Space Station.

Is that something that would be viable in your mind? And what impact would it have on the long term national science assets that we have there, if you take money from the research projects in the space station for the crew return vehicle?

GRIFFIN: Senator, the impact would be of delay, not of deletion.

Yes. If I need the money to close the gap in human space flight between the end of the shuttle program and the beginning of its replacement, my recommendation would be to take money from the research to be done on space station or other exploration systems research and technology development, simply because, as I said in my opening statement, we can't do everything on our plate, and we have to have priorities, and first things first.

Now, the research of which you speak is very valuable and it must be done. But if it is delayed a very few years in order to allow us to complete and effect a suitable transition between systems, then I believe that that delay would be worth it, and that would be where I would look for the money.

HUTCHISON: Let me just ask my final question then. If you did something like that, you don't mean that you would stop all of the research on the space station at any point, would you? Or would it be just some projects that could be put off?

GRIFFIN: The phrase I've used is that, when cutting budgets, you need to use a meat ax rather than a scalpel -- or a scalpel rather than a meat ax, pardon me -- and I think...

HUTCHISON: Thank you.

(LAUGHTER)

HUTCHISON: ... for correcting that.

GRIFFIN: It needs to be done carefully. We would obviously not go in and stop on a wholesale basis everything which is ongoing. Stopping projects in their middle is usually not an effective way to save money.

I would look, generally, toward delaying projects which have not yet started.

The space station, once built, will be an excellent platform for a number of different kinds of engineering, physical science and biological research -- and we will do that. It will be flying for many, many years.

But if, in order to produce the next vehicle which will allow us to ferry astronauts back and forth to the space station -- if in order to do that I need to delay some of that research, then that is what I will have to do.

HUTCHISON: Some is the operable word.

Thank you.

GRIFFIN: Thank you, Senator.

SHELBY: Senator Cochran?

COCHRAN: Mr. Chairman, thank you. Let me first congratulate you, Mr. Chairman, on assuming the responsibility of chairing this subcommittee with an enlarged scope of jurisdiction.

We look forward to working closely with you to help ensure that we meet our goals and identify our priorities in a thoughtful way -- and I think starting the process with a new administrator of NASA is an exciting opportunity for all of us.

I want to congratulate Dr. Griffin for your selection as administrator of this important agency, and say that we appreciate the fact that you are a person of experience and a great deal of education in these technical and scientific areas.

I was just looking at the number of master's degrees that you have been awarded at various universities, and it's really quite impressive and I hope you don't mind my refer to you as Dr. Griffin, because you did get a Ph.D. also, and that was in the University of Maryland system, which I know Dr. Mikulski...

(LAUGHTER)

... may identify with, with some pleasure.

But this is a big job and I know you are well-suited and totally well-qualified for it.

And even though you indicated that you support the budget request because you're the president's nominee, and you're in this position to carry out these policies, we do notice that the research funding has been reduced because, I guess, of the increase in exploration initiative costs -- over \$675 million for the moon and Mars exploration initiative.

So this decreases other activities.

Have you looked at ways that you can balance that competition inside the agency so that there is not any serious harm done to our interests or traditional activities that have been carried out by NASA?

GRIFFIN: Senator Cochran, the science budget in the large at NASA has not been cut to serve the needs of exploration, moon and Mars.

The science budget request for '06 is \$5.5 billion. We expect it to grow with inflation in the out-years.

We have not and, unless under the most extreme budget pressure, I would not cut science in order to feed manned space flight.

I believe that NASA has several substantially differing activities: human space flight, science and aeronautics.

The president's priorities among those different activities are expressed in his FY '06 budget -- the proportions among those numbers -- and I would intend to respect those proportions.

If we need to solve problems in human space flight, we will do it within the human space flight suite of activities.

So I must respectfully suggest we've not cut the science budget in order to do exploration. In fact, I would say that the exploration budget has been reduced and exploration activities have been delayed in order to accommodate shuttle return-to-flight costs.

COCHRAN: In looking at the global situation in terms of our relationships with other countries in cooperation in the space program -- Russia's been actively involved in the manned program for a good many years -- are there other nations that are interested or active in becoming partners in space exploration?

GRIFFIN: Senator, I have not had the opportunity to assess that yet. I will be, in fact, attending the Paris Air Show next month, and there will be, as you know, other international events at which my attendance will be expected and I will be there.

And then there will be formally arranged meetings, government-to-government meetings as well and, in the course of the next few months, I hope to get a feel for which nations wish to join us in this venture. I hope there are some.

I think one of the best things to come out of the space station program is the international partnership that has been developed. And we take very seriously -- the administration takes very seriously -- this nation's commitment to those partners.

So I look forward to it. I have not had an opportunity to assess it yet.

COCHRAN: Well, we look forward to working more closely with you, as we go through this budget process. And we intend to closely consult with you along the way, to be sure that we cooperate in supporting the administration's initiatives in these areas. We appreciate your leadership.

GRIFFIN: Thank you, Senator, and I will offer you my full cooperation as administrator.

SHELBY: Dr. Griffin, Project Prometheus has been a priority for NASA over the past two years. This nuclear program has the potential of providing great benefit to future NASA missions in the exploration business, it seems to me.

However, the Jupiter icy moons' orbiter mission has been determined to be too technically difficult, and the same operating claim you mentioned in your written testimony also includes a reduction of \$161 million to the Prometheus Program to reflect the mission deferment.

With the deferment of the Jupiter icy moons' mission, NASA is looking at alternative missions to demonstrate a nuclear power system in space.

Was the Jupiter icy moons' orbiter mission too ambitious? If so, what are the possibilities that NASA intends to explore and how will this affect the funding level for Prometheus in the 2006 budget?

GRIFFIN: Senator, let me -- there are several questions there, and if I miss one, you can remind me. Let me address the...

SHELBY: I bet you won't miss one.

(LAUGHTER)

GRIFFIN: I don't want to bet too much, but we'll try.

The Jupiter icy moons' orbiter mission was, in my opinion, too ambitious to be attempted.

Let me give a couple of specifics. The vehicle would have required at least two heavy-lift launches to put into orbit, where it would have been assembled prior to its departure from earth to go to Jupiter.

That would have been an extremely expensive undertaking, one which we have not performed before.

The nuclear electric propulsion system being developed for it does not presently exist, would not exist for some time and, if successfully developed, would have required approximately twice the world's annual production of xenon to be fueled -- to carry out the mission.

It was not a mission, in my judgment, that was well-formed.

The original purpose of the Jupiter icy moons' orbiter was to execute a scientific mission to Europa -- Europa, a moon of Jupiter, which is extremely interesting on a scientific basis.

It remains a very high priority, and you may look forward, in the next year or so, maybe even sooner, to a proposal for a Europa mission as part of our science line.

But we would not -- we would, again, not -- favor linking that to a nuclear propulsion system.

With that mission taken off the table as being something just too big for our plate at this time, the question then arises as to what shape and form we want the space nuclear program to be.

I will say, categorically, we cannot effectively explore space without nuclear power and, in the longer run, nuclear propulsion.

But having taken JIMO off the plate, Jupiter icy moons' orbiter, the proper ordering of priorities now changes.

The first thing we will need is surface nuclear power for our astronauts when they return to the moon, in a decade or so. The next thing we will need will be nuclear...

SHELBY: How difficult will that be?

GRIFFIN: Sorry? Sorry, sir?

SHELBY: How difficult is that?

GRIFFIN: We need to do -- how difficult will it be -- we need to execute some development programs that we have not done in a while, but many nuclear reactors have been flown in space -- one by the United States, many by the former Soviet Union.

We have that technology. We merely have to develop it -- we merely have to integrate it again.

Nuclear thermal propulsion will be the next step. That is, a nuclear upper stage is the most effective way to take humans to Mars. The United States had prototype versions of such engines, back in the late 60s and early 70s.

In 1972, when President Nixon decided that the nation would not be going to Mars under his tenure as president, the NERVA, Nuclear Engine for Rocket Vehicle Applications program, was terminated.

We have not had a need for such a program in the last three decades. As we journey forward to Mars, we will need it.

Finally, the last priority would be the nuclear electric propulsion which was linked to JIMO, and that will be useful for cargo missions to Mars -- but well after we start sending humans there.

SHELBY: Doctor, in another area, to what extent will it be possible, or even desirable, to maintain informative, skilled workers currently involved in space shuttle and station activities, as NASA transitions to a post-shuttle era and reduces its station-related programs.

GRIFFIN: Senator, it will be absolutely crucial. As I pointed out earlier in response to Senator Hutchison's question, I, as a professional lived through the gap in manned space flight from '75 to '81 and I don't propose to repeat it.

One of the things that happened during that period was the loss of skilled and experienced personnel in space flight of all varieties -- both manned and unmanned -- to other pursuits.

When those people have gone to other occupations, our experience is, we don't get them back.

So we must effect an orderly transition from the shuttle to the new system. I owe this Congress a plan for doing that, and I've said on several occasions in several ways, that the first step is minimizing that gap.

SHELBY: What's your view, doctor, of the role of the field centers in the Prometheus Program? In other words, do you believe that the program is doing a good job of utilizing the full range of research and development capabilities that exist within the field centers? And if not, what action do you plan to take to employ the technical talent base within NASA?

GRIFFIN: Senator, the question was applied by you to Prometheus, but it goes beyond that. I've not had an opportunity to look at the Prometheus program directly. As I said, we will be restructuring it, not because it is not a valuable program. It's incredibly valuable. But I want to change the definition of what they produce first.

Now, with regard to your broader question, what are the value of the field centers, I have also, in public utterances, been most specific on this point.

The president's vision for exploration is a multigenerational program. It will require decades. The people who will be taking us to Mars are in elementary and middle school today.

Contractors and businesses come and go. They succeed and they fail. The government ownership of the intellectual property that sustains our space exploration journey will be with us always, as long as there is a government.

The core capability, the core intellectual property that will sustain this journey must reside within NASA as an organization, and particularly within the NASA field centers.

I am committed to maintaining and to restoring capability where we need to do it. I'm committed to changing the skill mixes of the centers, as we transition from a shuttle operations culture to the development culture required for the new vehicle systems we must bring about.

But in the process of adjusting the details of how the field centers accomplish their missions and what they do, I am committed to retaining strong field center capability.

SHELBY: Doctor, what's the status of planning for a heavy lift launch vehicle, to send large quantities of mass to low earth orbit or directed at the moon?

GRIFFIN: Senator, there are -- that's a very interesting question.

I can plan the development of a heavy lift launch vehicle from a clean sheet of paper, which would likely be too expensive for this subcommittee or the full committee to provide me the money. Or I can utilize the heavy lift launch vehicle that I presently own, as the NASA administrator, which is the space shuttle.

We talk about retiring the space shuttle. What is really meant is that we need to retire the space shuttle orbiter. The space shuttle is a system of systems. It consists of a number of very, very valuable, very expensive-to-develop components: The shuttle external tank, the shuttle solid rocket boosters, the shuttle main engines, and other lesser things -- as well as the assembly and launch pad infrastructure at the Cape.

Every time that stack lifts off, it carries 120 or so metric tons into orbit. If I remove the orbiter and put on a cardinal module, I have a heavy lifter.

To me, I have indicated on several occasions, that seems the shortest path to a heavy lifter.

If money were free, and being provided in unlimited quantities, I would enjoy the challenge of developing a new vehicle. But we all know it's not. So I believe that that is the appropriate way forward.

SHELBY: Basically, the expendable launch vehicle versus the shuttle-derived launch vehicle -- where are we?

GRIFFIN: Do you mean the evolved expendable?

SHELBY: Yes.

GRIFFIN: The evolved expendable launch vehicle families, offered by Lockheed Martin and Boeing -- they are the nation's transportation fleet for payloads of 20 metric tons or less. And I certainly would propose no NASA development of such vehicles, because we don't need more.

In terms of payload capability above about 20 metric tons, the field is open and from, again, from NASA's perspective, to meet my heavy lift needs, I would probably stick with what I have.

Again, we need to make these judgments on a cost basis, and I'm in the process of assessing those costs, but it looks likely to me that sticking with what I have is the way to go.

SHELBY: Senator Mikulski?

MIKULSKI: Thank you, Mr. Chairman.

I want to pick up the line of question both from Senator Shelby and Senator Hutchison. And it goes to the shuttle and the completion of the station. How many flights will it take to complete the station? How many shuttle flights? And how long do you anticipate that this is going to take?

GRIFFIN: Senator, the current plan on the table at NASA is a 28- flight sequence, of which 18 flights are assembly flights, five flights are logistics flights, and five are utilization flights.

I've indicated, in response to the senator's question, that some of the research to be accomplished on the utilization flights could be deferred until we have a new system.

So, the bare minimum, I guess one would say -- and let me further comment that, with some time to plan, say looking out two or three years in the future, out to '08 or so, some of the logistics flights' cargo could be offloaded onto expendable vehicles: the Arian transfer vehicle, the Japanese HTV or new commercial systems which we would develop.

That leaves a core of 18 shuttle-assembly flights.

Again, with time to plan, even some of that hardware could be put up by alternate means. But right now, we're looking at a core of about 18 assembly flights. MIKULSKI: Let me jump in here. Because, first of all, again, we're very concerned about the shuttle, the safety of our astronauts, but also those 15,000 people, the contractors or civil servants who are employed.

Now, it's 2005. We're talking about retiring the shuttle in 2010. So that gives us essentially four and a half years to do 15 flights.

Do you think it can be done?

Well, actually, that's not the question. I am really concerned with the magnitude that it will take to complete the station -- and we know it must be completed for both scientific reasons, honoring our commitments to international partners.

We do not want to jeopardize that relationship because we're going to need it. We both need and want international partners for other things that we hope to do in space.

But my point is, then, if you have, let's just say, 18 in four a half years, that seems like a robust schedule, given to the fact that, by the time we do the next two flights, presuming

everything goes the way we hope, that would be -- we're then into 2006. That gives you 2006, '07, '08, et cetera.

How do you see all of this unfolding?

GRIFFIN: Directly answering your question, it is an extremely robust schedule. We are not sure we can accomplish it. We are looking at alternative assembly sequences for the shuttle that we would use, in case we were not able to get all 18 assembly flights accomplished with the shuttle.

I will provide a set of options for this Congress by mid-summer.

MIKULSKI: And I think what we're looking at, then, is the impact on the workforce. And also, presuming then that they're working non-stop to do this, we'd be concerned about, then, its impact on safety -- just even general fatigue of those people and the shuttle itself.

We've got three orbiters, and one has to go, one's got to be ready to go, and one's taking a breather.

That's kind of a liberal arts graduate's description of this.

But then, of course, what would be the cost to do this? Would it accelerate, et cetera?

And I think you might not be able to do this. We know you support the president's budget. But we would like to also know the consequences of this, because we're then talking about five or six flights a year, and we haven't even ever met that -- have we ever met that type of schedule?

GRIFFIN: I believe we have, but it was very difficult, and it was in a different environment. With the care that we are taking today, we're not planning on a six-flight-per-year schedule. We would need roughly four flights a year to fly 20 flights, and the FY '06, '07, '08, '09 and '10.

MIKULSKI: And with one flight hopefully going to Hubble.

GRIFFIN: And one going to Hubble.

MIKULSKI: Which would be an additional flight.

GRIFFIN: Senator, the point -- your question is extremely on point. There is no question, as I said before. It's an extremely aggressive schedule and we must have fall-back options if we are not able to meet it, because we do not want the program to be schedule-driven. We do not want safety to be compromised.

We will provide, by mid-summer, a set of options that we can offer to avail ourselves of -- if we're not able to carry out the aggressive flight rate required to get all 18 assembly flights completed by the time we're ready to retire.

MIKULSKI: Well, I think this committee is looking forward very much to working with you and with our authorizer, Senator Hutchison, on this endeavor.

I had the good fortune to visit Texas with Senator Hutchison, to see the kinds of research that we're talking about, in the shuttle.

I am also (inaudible) at Marshall, physical science, life science, that could be stunning and for an international partners to have a completed shuttle -- where we're really working together on break-through ideas -- I think would go a long way to science, a long way to international cooperation.

I think the world would feel better about the United States and its preeminence in space, particularly in the civilian side. So we want to be able to do that.

And I know that my time's up and my next area would be, of course, aeronautics.

SHELBY: Senator Hutchison?

HUTCHISON: Well, I just wanted to follow along with what Senator Mikulski was saying, because it seems to me that you've got two major priorities here.

You were very firm about wanting to retire the shuttle on time, but also equally firm -- as is the president -- on finishing the space station for all of the reasons that Senator Mikulski said.

If we cannot finish the space station with what you have available -- let me rephrase. Are you prepared to say that finishing the space station is the top priority?

GRIFFIN: Well, the administration has said that we will finish the space station. Again, I've advanced several alternate means. Let me back up.

For the next two to three years, unequivocally, we're dependent upon the shuttle to go to the space station and begin the process of completing that assembly.

If we look farther out, there are alternative means we could engage to get that hardware up there, and we, of course, would look at that, because we need options.

In the longer term, if the time comes to retire the shuttle and we're not finished, then I have said for the record, on several occasions, both before and after becoming administrator, that the United States should complete the station, but we may again encounter some delays in accomplishing that, until we have a new system on board.

I do want to complete it. I think it is worth a lot for the United States to keep its word, to maintain our obligations to the partnership and to go forward together.

And we will try to do that.

All we are discussing here are ways and means of accomplishing it, not whether or not the president is committed to completing the station, because with his speech of a year ago, and his budget in '06, he clearly is committed to that completion.

HUTCHISON: Well, as all of us have said, we are going to work with you. We know that you have to have time to put alternatives together.

But just one more time to reemphasize. In addition to keeping our word to the international community, which is very, very important, it just seems, if we are not committed to the science, that one of the key reasons that we have NASA is diminished.

And I don't want to ever have any indication that the actual science that will be done at the space station is in any way a lesser priority.

GRIFFIN: Yes, Senator. I don't think it is a lesser priority either. But if, again, if the funding to do science is getting in the way of the funding to complete the station, I would be presented with a Hobson's Choice.

I will work with you and with the committee to minimize the dislocation. But if completion is the first priority, I must do what I must do.

HUTCHISON: I understand. And we will work with you in every way. I just hope we don't end up being the hospital that's clean because there aren't any patients. We really have to go on with the mission.

GRIFFIN: Yes, Senator, I understand.

HUTCHISON: Thank you.

GRIFFIN: I understand.

SHELBY: As we move forward, how many shuttle flights do you think will be needed to complete construction of the International Space Station.

GRIFFIN: Well, again, the final answer on that may depend on the outcome of some of the studies we have ongoing, and which I've promised to you by mid-summer and I understand that commitment.

The current baseline is 18 assembly flights, five logistics flights, five utilization flights.

SHELBY: OK.

International partners. It no longer seems that NASA plans to provide everything that it promised -- or could perhaps -- in international agreements that govern the International Space Station program.

What discussions are planned or under way with the other partners to rebalance what each partner is required to do and what it gets in return? In other words: Where are we going now?

GRIFFIN: Senator, I'm disconnecting a little bit with the intent of your question.

As we stand today, we are committed to orbiting the partner hardware and providing the partner flights.

If there is or needs to be any change to that -- disasters can ensue, as we know -- if there is any planned change to that, I would come forward to this committee and discuss it first.

SHELBY: Have any agreements been made in this regard at this time?

GRIFFIN: Not at this time.

SHELBY: OK. Financial management. We have to do this because we're in the appropriations business here.

NASA continues to face significant challenges in improving financial management. I know you haven't been there long.

In the past two years, NASA's auditors were unable to issue an opinion on NASA's financial statements, because NASA could not provide the auditors with sufficient evidence to support the statements.

While NASA implemented a new integrated financial management system in '03, NASA auditors found pervasive errors in '04 financial statements generated from the new system.

In October of this past year, the NASA inspector general reported that one of the most serious management challenges facing NASA is, and I quote, Ensuring that the integrated financial management system improved NASA's ability to allocate cost to programs -- we've been talking about this -- sufficiently provides reliable information to management, and supports compliance with the chief financial officer's act.

Also, in January of this year, '05, the GAO, the Government Accountability Office, in its high-risk series reports stated, and I quote, While it has taken recent actions to improve the contract management function, NASA continues to face considerable challenges in the implementing financial management systems and processes that would allow it to manage its contracts effectively.

My question, Dr. Griffin: Does NASA have a written, corrective- action plan that addresses the scope of its problems and the resources at the time that will be needed to fix these problems pointed out by the inspector general and GAO?

GRIFFIN: Senator, we do not at this point. I take your -- I take the GAO's comments, our independent auditor's comments, as seriously as I know how to say.

We understand, as an agency, that our financial accountability has been lacking. I will not hedge. We have lacked that.

I have, as we speak, a team of people working on putting the plan together for how we will get from where we are to where you require and where we want us to be.

SHELBY: You're committed to do whatever's necessary?

GRIFFIN: I'm absolutely committed to providing the resources necessary to get our financial management on track, and I will share with you the plan to do that, when we have it.

SHELBY: What obstacles have you encountered -- or maybe perhaps you'll come with it later identified -- that would have an impact on your financial management efforts? Are you there yet?

GRIFFIN: We're really not.

SHELBY: OK.

GRIFFIN: I've not been able to see obstacles, so much as we simply have not stepped up to the plate on it.

The major -- I guess it is an obstacle -- the major situation is -- aspects of the situation -- are driven, as you know, by the fact that NASA has 10 field centers. They didn't even historically all come from the same agency. Some came from DOD. Some were created out of a whole cloth. Some came from NACA.

They all have their own financial management systems, and they were never really linked up.

Part of our integrated financial management plan, as the name implies, is to have, if you will, one NASA, one system, and be able to account for all the money in a common framework.

Linking those 10 centers and headquarters together in a transparent and straight-forward way has proven to be more of a challenge than anyone has thought -- clearly it has because we've flunked the last couple of years.

I am absolutely dedicated to seeing to it that, as my tenure goes forward, we don't flunk -- that we pass with flying colors.

SHELBY: Thank you. Senator Mikulski, do you have any other statements?

MIKULSKI: Well, thank you.

First of all, I want to associate myself with Senator Shelby's questions about the fiscal accountability, fiscal responsibility, and implementing the reforms that are in the GAO report.

I also want to thank you, in this testimony here, for your candor about what you're facing -- and actually, I think, we're off to a good start. Even if some of the things are giving us heartburn, at least we feel that we're getting the candid conversation and look forward to more.

I want to raise an issue about workforce. You talked about the astronauts that will be on the trip to Mars are now in elementary school. And we also know that NASA has an aging workforce. It has an aging workforce on certain projects.

So you need to retain, you need to recruit, and there needs to be a development of our future scientists and technologists.

Could you give us your views on two things? Number one, the workforce at NASA and their ability to retain the qualified people that you need to complete the priorities that you outlined and we support.

And number two, what do you see NASA's role in really helping to generate, cultivate, that next generation of scientists and technologists?

GRIFFIN: Well, Senator, this is a subject that, as I believe you know, I am quite passionate about.

MIKULSKI: I know you are.

GRIFFIN: I sometimes say, who is it that you'll find who loves education more than I do?

That said, two things. First of all, we have \$167 million in the NASA education program and more in the mission directorates as we sit here today.

I believe that we need to focus that education program, establish goals and metrics for it, and make it effective -- but it is a substantial amount of money. But in addition, I think it's time to recognize that NASA's biggest, most important, most lasting contribution to education for our future workforce is to do the kinds of things that excite young kids enough to want to be part of the space program, and to get an education to do it.

They can get almost any kind of an education, and we'll have a place for them at NASA. We are a very broad agency. We need a lot of different specialties.

But an education is a requirement. If we return to the moon, if we set up a permanently manned lunar base there, if we go to Mars, if we visit the near-earth asteroids, if we service the James Webb Space Telescope in future years, if we look beyond moon and Mars -- young kids today and young kids of the future will want to be part of that program, as I did when I was a small boy, and they will do what is necessary with their education to get it.

It is in that sense that NASA best serves the educational community, in my humble opinion.

MIKULSKI: Well, on a personal note, you grew up in Maryland. You grew up in Aberdeen, close to a military base. It's the home of Cal Ripken.

GRIFFIN: Yes, Senator, I was born on a military base.

MIKULSKI: That's exactly right -- and you went to our public schools. What was it that got you interested and what do you think -- you've outlined those projects -- but what got you interested?

GRIFFIN: This story is almost embarrassing to recount. I haven't told it in public for some years, but it is true that my mother was a teacher when I was a kid, and the first book that I was ever given was a book on astronomy and space.

I've since commented at some times that, based on what we know today, everything in that book was wrong.

MIKULSKI: Gee, I started with The Three Bears.

(LAUGHTER)

GRIFFIN: Well, we went down different tracks. I still have that book, actually. And I was five, this was in 1954, and I was absolutely fascinated by it, and from that time forward, I never considered for myself anything other than being a scientist or engineer or mathematician and involving myself in the space business.

And I never did.

So that was what motivated me. I have no doubt -- I hear often from -- they're not kids anymore, men or women in their 30s whose early memories are the Apollo landings on the moon -- stimulated them into science, the development of science and engineering. I hear from other young men and women who have technical educations that they were fascinated by Bob Ballard's discovery of the Titanic.

Any sort of exploration into the unknown, any sort of discovery of the new and unknown, excites our kids. And if you catch them at that age, they're with you forever.

We all went through puberty. If you let kids get to middle school and high school before having fastened onto that interest, they're going to be interested in girls and football, or guys and football, whatever it is.

But it's less likely to be science and engineering. Because science and engineering are hard.

MIKULSKI: They are hard. Well, first of all, I couldn't agree with you more that it is, number one, people interested in young people and expose it to them. Number two, that it is wonderful projects that get people excited, and young people knowing and hearing about them.

And then, also, I believe, that with the \$167 million in NASA's education budget, that we really get perhaps more of a focus on where we would like to do it.

Should it be in those areas like what we would call extra- educational institutions? Like science centers and others?

But today's not the day of doing that, but we want this year to be a success. We want to be preeminent for the decade. We want to be preeminent for the century in science and exploration.

So we look forward to working with you and we would hope that, with all the work you do, you can start a treaty negotiation with NOA, and we'll look forward to hearing about that.

And I and the Hubble will be keeping an eye on you.

(LAUGHTER)

GRIFFIN: Senator, I will make sure that you don't have to keep a sharp eye. I'll make sure that you know what we're doing with Hubble and with NOA.

MIKULSKI: Thank you very much.

SHELBY: Thank you, Senator Mikulski.

Dr. Griffin, I want to thank you for appearing here today before our subcommittee. I'm sure you'll be back many times. We will all be in on a dialogue with you.

You've got a lot of work cut out for you. I think you're up to the challenge. You bring the experience.

You're candid -- which is something we like. It's refreshing. And we look forward to working with you. We've got some hurdles to jump over, and you'll be our leader in that regard. The committee is adjourned.