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PREPARING FOR THE WORKFORCE TRANSITION AT KENNEDY SPACE CENTER

FIELD HEARING

BEFORE THE

SUBCOMMITTEE ON SPACE, AERONAUTICS, AND RELATED SCIENCES

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION
UNITED STATES SENATE

ONE HUNDRED TENTH CONGRESS

SECOND SESSION

JUNE 23, 2008

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PREPARING FOR THE WORKFORCE TRANSITION AT KENNEDY SPACE CENTER

MONDAY, JUNE 23, 2008

U.S. SENATE,
SUBCOMMITTEE ON SPACE, AERONAUTICS, AND RELATED SCIENCES,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Cape Canaveral, FL.

The Subcommittee met, pursuant to notice, at 9 a.m. in Commission Room, Cape Canaveral Port Authority Maritime Center, 445 Challenger Road, Cape Canaveral, Florida, Hon. Bill Nelson, Chairman of the Subcommittee, presiding.

OPENING STATEMENT OF HON. BILL NELSON, U.S. SENATOR FROM FLORIDA

Senator NELSON. The meeting of the Subcommittee on Space, Aeronautics, and Related Sciences, of Senate Commerce Committee will come to order. I want to thank all of you for coming. I want to thank those thousand people outside that came to lend their support to the continuation of America's space program. I want to thank Joe Metheny, the Chairman of Port Canaveral, and the members of the Port Authority. We have several elected officials here, and I have a list that I've been given, so I'm going to recognize those on the list. If you're not on the list, then it's because somebody didn't give me that name.

In addition to the Port Commission, Brevard County Commissioners Truman G. Scarborough, Jr., the Chairman, Chuck Nelson, Jackie Colon, Mary Bolin, and Helen Volt.

Members of the State legislature delegation; Senator Haridopolos, the Chairman of the Delegation, Representative Altman, Representative Sansom, Representative Poppel, and many other officials who have come from all around, because of the enormity of concern that this community has with the economic devastation that has occurred in the past due to layoffs in the aftermath of the Apollo program and their potential to occur in the future. This is one of the reasons of having this hearing here today.

I have offered to have this hearing, as well, in New Orleans, in the Michoud National facility, which is the other facility which is projected to receive a huge reduction, concurrent to their existing workforce. We are just trying to work out the details with the two Senators from Louisiana for that.

In the projections, the Johnson Space Center in Houston, is also slated for some substantial cuts, but those come later on in the planning process.

It's the Kennedy Space Center where the projected figures released by NASA, could be as much as 6,400, on the high side, or about 5,300 on the low side. That is what we have to address today.

I am delighted that Senator Martinez is here, my colleague in the Senate. The Senator does not sit on the Commerce Committee or on our Space Subcommittee, but he and I share other committees, including the Senate Armed Services, and obviously he has an interest in the subject matter today.

I need you all to understand that the way we run a Senate hearing is different from how we would normally conduct a Town Hall meeting. There is formal testimony, we have a court reporter that is recording the proceedings, and there will be formal questions asked of the two panels that we have. What we are trying to do today is to get a better understanding of the workforce challenges that we're going to be facing, and how we identify solutions to those challenges. I know we're going to look today at the Kennedy Center. These cuts are going throughout, and it's an enormous time of not only unrest, and uncertainty, for folks because of their livelihood and their jobs, but it's a very important transition on our ability to have access to space.

Naturally, the fact that we're going to be laying off people here so that we can hire Russians to build Soviet spacecraft, so the U.S. Government can spend hundreds of millions of dollars buying rides to the International Space Station, a $100 billion investment, $75 billion of which is the United States investment, is of concern to people.

But it is what it is. We've been trying, in the Senate, and I can name you a bunch of other Senators, Senator Mikulski, Senator Shelby, Senator Landrieu, so, you see, it's bipartisan, Senator Hutchison from Texas, to get an additional billion dollars into last year's NASA budget, only to have the White House Budget Office say, "Nyet."

[Laughter.]

Senator NELSON. And I want you to know I don't blame these folks here. I want you to know that my personal opinion is, Dr. Griffin is doing a very good job under a very difficult circumstance.

First of all, he's a rocket scientist. He knows something about space. And that's important. And two, he has a sense of humility which, I think, is important in a leader, because he brings the team approach. And if ever there has been a team approach, it's the American space program. I mean, just look at the miracles that we have pulled off in the past. And I say we, because it's collectively we as the space team.

You know, I had one of the greatest times I ever had, having Gene Kranz come in. And I mean, I just didn't want to let him go, just asked him question after question. As the mission manager of Apollo 13 he's the one that coined that famous phrase, "Failure is not an option." They basically brought back three astronauts that we would have never seen again, and they brought them home safely.

That's the kind of can-do spirit and teamwork that is so much of a hallmark of NASA. And that's what we don't want to lose. And

yet, people, to use a Southern expression, get down in the mouth, when you see potentially huge layoffs.

Now, we've tried, this bipartisan group that I just named, have been trying to get extra money into NASA. It was cut out from last year's budget, we tried again this year, but we're not having success. Because it's going to be nixed, at the end of the day, by the White House Budget Office.

So, again I get to the point that in America you change policy by ballots, not bullets. And you have an opportunity now in an election, of changing governmental policy with regard to America's space program.

The problem is, that by the time the new Administration gets into place, an awful lot of time has been expended, and a lot of decisions that will have already been made that would be irreversible. And we're going to get into some of that.

So, Dr. Griffin, we welcome you, and I want you to know how much I appreciate you coming down here. This is not a session to beat you up, or Bill, or Mr. Cook. This is a session to learn, and to learn together. Most of you who are in here, haven't seen the visuals, of 1,000 people out there, all with handmade signs, that are concerned, not only about their jobs, but about the future of our space program, and how we will have human access to space.

We're concerned about losing the skills, the knowledge, the corporate memory, of all of these contracted partners. We learned a lot of lessons, when we stepped down after Apollo. Huge layoffs, a lot of lost corporate memory that took us a long time to work our way back to.

Now, before I turn it over to Senator Martinez, again, this is an official Senate hearing. This will become a part of the official Senate record, and I want to recognize my colleague, Senator Martinez.

STATEMENT OF HON. MEL MARTINEZ,
U.S. SENATOR FROM FLORIDA

Senator MARTINEZ. Mr. Chairman, thank you very, very much. I'm delighted to be here today and join in this Commerce Committee hearing. And as Senator Nelson said, I'm not a member of the Committee, but I'm delighted to have a chance to participate at his invitation, and thank him for that, very, very much.

The fact is that this is a problem which touches all of us who love Central Florida, who've grown up here, and who understand the fabric of this very, very wonderful space community.

I want to thank the elected officials who are here, the County Commissioners, other elected officials, and I appreciate their interest, as well. Also, our host—the Port Authority—I want to thank you for the great job that you do, bringing commerce and jobs to this community.

And let me thank the panel, and then the second panel, as well, for being a part of this important day, here.

You know, NASA, the space program has been to Central Florida, as part of what we are, as part of the fabric of this area. The fact is that, the jobs that are spun off—not only the ones that are directly related to NASA activities, but those that relate to the other activities that are generated, because of what NASA has valued as important to this and important to the State of Florida. And

now we're facing a situation where this family, this tremendous team of people that have come together to put us into space, in good times and in bad, who have known how to bring this program from the brink, on a couple of occasions after tragedy has struck, to put it back together, to put it back in flight, to keep it on schedule, and to do the things that are so remarkable.

I was so pleased to see the Japanese module get up into space. I remember seeing it here, stored and waiting for its turn, and delays and problems and challenges. This workforce has met them all. This is the best and the brightest and the most accomplished group of people you could have anywhere in the world, and it is a national treasure.

And it's a national treasure we cannot afford to lose. That we can not afford to just put out to pasture because of the inconvenience of time.

I'm concerned about two things. I'm concerned about the industry in this region, that employs more than 64,000 people in Florida. I'm concerned about the 1,034 separate contracts we've valued at more than $875 million—all of the things that, together, make this the economic engine that it is, but I'm also concerned for our national security.

I'm concerned about the United States losing the ability to put a human in space, and depending on the Russians to do this for us.

Now, you know, I love the fact that we get along with the Russians, and that we are in partnership and that we're doing things together. And this Space Station is called the International Space Station. So, I'm not going to go on longer about what that implies, but the truth of the matter is that we don't always know where Russia's leadership is on any given day. The fact of the matter is that we might cooperate very well in some things, and then from time to time we wonder about whether our goals are the same around the world, or not.

You know, they are not a democracy like we're a democracy, they have a little different system of government. And the fact of the matter is that I would hope—and I'm counting on the fact that we'll have the kind of cooperation we need—we need to be careful how we say this, but at the same time, it does seem to me that for us to be the preeminent nation in space—which we have been, ever since the workforce here at NASA won the race to the Moon—and that wasn't won just by wishing it. It was won by hard work, it was won by teamwork, it was won by skill, but it was also won by a national commitment by our Congress and the White House—it takes all of us working together to make that happen. And that is what I envision for the future of the space program, it's what I envision for the future of the Space Coast, and what I'd like to see occur.

Not only, by the way, with governmental-oriented programs, but branching out into this vast new world of public/private partnerships, of looking for ways that we can expand the horizons of space to, not only the governmental projects, but also to the private sector, so that we can see the fullness of space exploration—just like this port doesn't just depend on the Navy presence to function—it's a part of it, and the Coast Guard coming out of here—the fact of

the matter is that it's our private sector that has made this port flourish, likewise, St. Petersburg, Florida is ending on the ultimate destination, as ultimate possibility when it becomes a port, not only for space launch by government, but equally for space launch by the private sector.

We are falling behind as other nations in the world are taking a lead in the private exploration of space—we have got to play catch-up on that. And the thing we don't need to do is to lose this tremendous workforce, to put people out of work, give them their pink slip, while at the same time, we're generating jobs in Russia to accomplish the same mission. It's short-sighted, it makes no sense, we need to reverse it, we're delighted for the people who came out today to show their support for the Space Coast, for their jobs, and we're also pleased to welcome a panel—I really appreciate Dr. Griffin being here, and the other members of the panel we'll be hearing from.

So, thank you very much for coming today.

Mr. Chairman, thank you very much for calling this hearing. It is timely, it is important, and I appreciate the opportunity to be with you.

Thank you.

Senator NELSON. He is going to remain for the second panel, to hear from the Brevard County Economic Development Commission of Florida's Space Coast, and the Brevard Workforce Development Board. What we're trying to do, is to figure out how we can mitigate the job losses.

Dr. Griffin, you know my personal appreciation and affection for you. We have the Administrator of NASA, we have his Associate Administrator for Space Operations, Bill Gerstenmaier, and we have the Deputy Associate Administrator for Exploration System, Doug Cooke.

Dr. Griffin?

STATEMENT OF HON. MICHAEL D. GRIFFIN, ADMINISTRATOR, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION; ACCOMPANIED BY WILLIAM H. GERSTENMAIER, ASSOCIATE ADMINISTRATOR, SPACE OPERATIONS MISSION DIRECTORATE, NASA; AND DOUG COOKE, ASSOCIATE ADMINISTRATOR, EXPLORATION SYSTEMS MISSION DIRECTORATE, NASA

Dr. GRIFFIN. Thank you, Senator Nelson, Senator Martinez. It's a pleasure to be here, and especially with my colleagues—if you've got Doug Cooke and Bill Gerstenmaier here, you've got the best we have at NASA.

Thanks for inviting us to discuss the greatest challenge we have—flying the Space Shuttle safely to complete the International Space Station, then retiring it in 2010 and bringing new Constellation systems online, while remaining within our budgetary resources.

It is a difficult time. It is important to remind ourselves why it is also necessary.

Admiral Gehman's observation in the wake of the *Columbia* accident holds as true today as it did then, quoting, "because of the risk inherent in the original design of the Shuttle, because that de-

sign was based, in many aspects, on now obsolete technologies, and because the Shuttle is now an aging system, but still developmental in character, it is in the Nation's interest to replace the Shuttle as soon as possible as the primary means for transporting humans to and from Earth orbit."

We must not forget the, or the many other hard lessons of that tragedy. We've made great progress in 5 years. With enormous difficulty, we returned the Shuttle to flight, and we're flying well. We're successfully assembling the Space Station. We must maintain this sense of tenacity and purpose in the conduct of the remaining Shuttle flights. We must not allow our resolute sense of purpose—so fresh after the accident—to fade with time. We must avoid distractions.

Now, above all else, we need clear communications. Many stories were published the spring following our initial workforce transition report to Congress. Preliminary estimates of 6,400 job losses at KSC were reported out of context, without the qualifying information that we offered about the many contracts yet to be awarded, or the funds budgeted for future work at KSC.

As I offered in earlier testimony, I continue to believe that we are facing an actual reduction of three to four thousand workers at KSC. We're working every day to reduce even less, but there's no simple solution within the resources provided. There is no silver bullet.

Now most of those who work in the space business do so for reasons beyond money, but still they have families to support. And to that end, we've identified retention incentives for certain critically skilled Space Shuttle operations personnel.

We will issue a Request for Proposals early next year for ground operations processing in KSC. After this fall's Hubble Servicing Mission, we will begin mods to Pad 39B to prepare for a series of Ares I flight tests, beginning in 2009. And KSC will be the lead center for the disposition of Shuttle assets, after we retire that system.

Because the Orion and Ares–I systems are much simpler and safer than the Space Shuttle, we will not need nearly as many people for KSC launch operations. Thus, our hope is that many engineers and technicians will transition to the assembly and integration of the Ares V heavy lifter, and the Altair Moon lander.

We're taking steps to work with Federal, State and local agencies on necessary retraining. But I must be perfectly clear—the single pacing item for maintaining a cohesive workforce while bringing new systems online is the funding provided by the Congress each year, and the budget projected for the agency over the next several years.

Our plain contract awards and our pace of work, are contingent upon programmatic and funding stability.

So, while I sincerely thank both of you for your support for NASA over the years, it remains true that the actual budget received for these systems has eroded significantly, compared to that which we were promised 5 years ago.

Again, *Columbia* Accident Investigation Board offers a crucial perspective, "This approach can only be successful if it is sustained over the decade, if by the time the decision to develop a new vehi-

cle is made, there is a clear idea of how the new transportation system fits into the Nation's overall plans for space, and if the U.S. Government is willing at the time a deployment development decision is made, to commit the substantial resources required to implement it."

Thus, I cannot guarantee that the Orion crew vehicle will be available sooner than 2015, although we will certainly try. Nor can we afford to start an additional procurement for commercial crew transport development within our existing exploration systems budget.

With the $500 million allocated already to the COTS program, our first priority is to develop an affordable, commercial cargo capability for our assets logistics.

So, the United States will continue to be reliant upon the Russian Soyuz system for ISS crew transport and crew rescue, something I find to be unseemly in the extreme. However, I can't find a way to avoid it.

While I do not relish the idea of Senator Nelson and Senator Martinez—as you've said—of American taxpayers paying Russian engineers, I'm nonetheless glad that the Russians are our partners on Space Station, because without them, the International Space Station would be in jeopardy.

We'll need the help of Congress—specifically, the Foreign Relations Committee—to allow NASA to continue to make such purchases from Russia, after 2011. We need that help this fall, in order to have adequate time to negotiate contracts for production.

Finally, Chairman Nelson, Senator Martinez, I thank you for your leadership and support for NASA. Our budget—less than six-tenths of a percent of the Federal budget, about 15 cents a day for the average person—leverages a much broader range of American leadership around the world than its mere size would lead many to believe. To preserve that leadership, we must stay the course, we must remain focused upon the challenges ahead. Thank you.

[The prepared statement of Dr. Griffin follows:]

PREPARED STATEMENT OF HON. MICHAEL D. GRIFFIN, ADMINISTRATOR, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to appear today to discuss the transition of NASA's workforce at Kennedy Space Center (KSC) as the Space Shuttle Program approaches retirement at the end of FY 2010 and NASA embarks on returning Americans to the Moon and opening up the way to other destinations in our solar system with the new Constellation Program. The transition from Space Shuttle to Constellation over the next few years provides a rare opportunity to reinvent NASA and reinvigorate the Nation's space exploration capabilities. NASA is executing the first major change in United States civil space policy in 35 years with bipartisan Congressional support of the NASA Authorization Act of 2005 (Pub. L. 109–155). I believe that this Act remains the finest policy framework for United States civil space activities that I have seen in forty years, and I thank this Subcommittee for its leadership role in crafting this legislation.

NASA's budget is sufficient to support a broad variety of excellent space programs, but it cannot support all of the potential programs all of our stakeholders would wish for us to execute. Balanced choices must be made, but they cannot continually be remade and revisited if there is to be steady progress toward our common, defined objectives. As the *Columbia* Accident Investigation Board noted, and as stakeholders acknowledged in ensuing policy debates, it would have been far worse to continue with the prior lack of strategic direction for human spaceflight,

to continue dithering and debating and inevitably widening the gap between Shuttle retirement and the availability of new systems.

There have been suggestions that NASA extend Space Shuttle operations beyond FY 2010, but this would have serious budgetary and schedule repercussions for the Constellation program. The cost of continuing to support Shuttle operations beyond 2010 would be about $2.7 to $4.0B per year. The substantial funding for such an approach would come out of the Constellation Program, disrupting its schedule and delaying the initial operational capability of the Orion Crew Exploration Vehicle. In addition, the Constellation architecture is designed to take advantage of Space Shuttle infrastructure, production capabilities, and workforce once they are no longer needed for flying the Shuttle. If the Shuttle were kept flying past its planned retirement date, these capabilities could not be released for Constellation's modification and use. It will also be extremely difficult to keep the Shuttle workforce engaged if Shuttle fly-out is extended. Ending Shuttle operations on a planned date known well in advance is much easier for the workforce and planning than having a floating end date. Keeping the Shuttle system operational past September 30, 2010, would only compound the problem of getting Constellation into service, exacerbate the gap in NASA human space launch capabilities, and delay America's return to the Moon. Not moving forward or delaying exploration capabilities would be more deleterious to the KSC workforce than the current plans. The KSC community will benefit directly from the lunar activities.

NASA's focus is on safely flying the Space Shuttle to complete assembly of the International Space Station (ISS) and honor our commitments to our international partners prior to retiring the Shuttle in 2010, while bringing the new Constellation systems online by 2015 or sooner. Through this period, NASA's greatest asset will continue to be its people—the thousands of individuals across the country in both government and industry who conceive, design, build, operate, and manage an ambitious program of space exploration on behalf of the Nation. Our greatest challenge over the next several years will be managing this extremely talented, experienced, and geographically dispersed workforce as we transition from operating the Space Shuttle to utilizing the ISS as a National Laboratory, and expanding our reach to the Moon, Mars, and beyond. We must work as carefully as possible to preserve the engineering and technical skills we need to carry out these efforts and minimize impacts to our workforce, both at KSC and at other Agency and contractor facilities across the Nation. These are our people. We need them to carry out our mission, and we care for their well being.

Transition Challenge and Response

NASA remains committed to the concept of "ten healthy Centers," and still plans to spend generally the same amount on human spaceflight labor nationwide, but our workforce will need to transition from primarily operations to development work. NASA does not yet have all the answers for carrying out this complex transition safely and effectively; however, we have been actively dealing with these issues for the past several years and working on them each and every day. Our best tool to retain employees is to provide meaningful and challenging work. We are doing this now through the challenging and exciting ISS assembly missions. Looking toward the future, we are working hard to give people an opportunity to transition the skills learned flying the Shuttle to the design and operation of the next generation of vehicles, through work sharing, retraining, job rotations, and other mechanisms.

Today, a large portion of the Agency's skilled civil servant and contractor workforce is focused on the safety of ongoing mission operations. Much of the experience and expertise within this workforce is required for the Constellation program to succeed. However, the effects of the transition will not be the same for everyone. While approximately 80 percent or more of NASA's budget will continue to pay for the purchase of contractor products, goods, and services, the nature of the work being done will change. NASA's human spaceflight workforce will shift from a focus primarily on operating spacecraft to a new recurring cycle of spacecraft development and operations. NASA recognizes and values the dedication of its Space Shuttle workforce and will leverage this resource, where feasible, by engaging those men and women in the challenging future work that capitalizes on their unique skills and abilities to the maximum extent practical.

We will keep the Congress informed as we know more, award more contracts, or assign new roles and responsibilities to the NASA Centers most affected by the retirement of the Space Shuttle, such as KSC and the Michoud Assembly Facility (MAF) in Louisiana. The entire NASA management team takes the displacement of lives and skills very seriously as we wind down the Shuttle program. We will ensure that critical skills are retained to carry out the exciting missions before us. We are already ensuring that the lessons learned by the people operating NASA's complex

systems will be captured by allowing these people to work on the new Constellation systems. As one example of this commitment, the personnel supporting Shuttle launch will help to launch the first test flight of Ares (Ares I–X), scheduled for next year.

NASA Opportunities at KSC

KSC has always played a vital role in human and robotic space exploration, and will continue to do so, for both NASA and the emerging commercial space sector. With the planned retirement of the Space Shuttle following flyout of the current flight manifest by September 30, 2010, and planned initial operational capability of the new Ares I Crew Launch and Orion Crew Exploration Vehicles in the Constellation Program in 2015, this four-and-a-half-year gap in NASA human space launch capability will be anything but quiet at KSC. During this period, the flurry of activity at KSC will include: lunar requirements development; facilities, operations, and vehicle planning; new construction and extensive modifications to existing infrastructure; robust systems testing and evaluation; operations and launch procedures and checklist development; extensive training; large scale systems processing and integration; and, vigorous production—all of which will engage our skilled workforce. In addition, important transition and retirement work associated with Shuttle equipment and facilities will contribute to the continuity of employment between flyout of the Shuttle and the initial flight of Orion.

It is important to recognize that in the near-term future, there will be fewer jobs at KSC. One example of how we have mitigated this is with Orion assembly at the Operations and Checkout building at the Center. In addition, we have assigned significant lunar roles to the Center, though the benefits of this will not be felt in the immediate future. The near-term mix of tasks that NASA is planning to execute will involve more work going to design contractors located around the Nation, and less work going to operations contractors at KSC. We are working with state and county officials to help bring in non-NASA work.

Enabling Workforce Transition Through Retraining and Incentives

Many members of the KSC aerospace workforce will need to transition from launch operations and Shuttle Orbiter ground processing to development, assembly, integration and test activities for our Constellation systems. Over the past year, NASA has made a concerted effort to share workforce among multiple programs, particularly Shuttle, ISS, and Constellation, enabling people to build crossover skills. The effort, known as Workforce Synergy, enables the Constellation Program to progress while ensuring that the critical skills necessary to safely and efficiently execute the remaining Space Shuttle missions (complete assembly of the ISS and service the Hubble Space Telescope). On the civil service side, NASA is tracking workforce time on Space Shuttle, ISS, and Constellation, and the analysis has revealed that more than half of our human spaceflight civil servants are working on more than one program. This encourages the transfer of lessons learned, the incorporation of operations needs into design, and demonstrates to the workforce that they will have future work on the Constellation Program as Shuttle is retired.

NASA is providing the tools, training, and time for workers to gain experience and skills on new processes we know we will implement for Orion and Ares. NASA is applying these new processes required for Constellation into Shuttle processing now, to provide skill and experience that the workforce will need to do future work on Constellation. This will be real, hands-on experience that will qualify workers for future work. Examples include:

- The United Space Alliance (USA) Shuttle Program Operations Contract (SPOC) workforce is being used by Constellation to process the Ares I–X vehicle for the first Constellation test flight, scheduled for spring–summer 2009. The Ares I–X flight will be conducted with the help of many contractor personnel from the Space Shuttle workforce.
- For STS–120, a single Solid Rocket Booster was stacked one segment at a time to gather engineering information on the Mobile Launch Platform for Ares I–X.
- On STS–118, the Shuttle *Endeavor* was powered up during operations and check-out using a new "paperless" process as a test of future procedures for the Orion.

As part of its efforts to cooperatively work transition issues with state and local officials, on May 27, 2008, NASA signed a non-reimbursable Space Act Agreement with the Brevard Workforce Development Board (BWDB) with the objective of preparing Brevard County's highly skilled contractor workforce for the transition from Shuttle to the Constellation Program. These efforts will enhance the BWDB's mis-

sion to retain, strengthen, and expand the county's aerospace contractor workforce. Under the terms of the agreement, NASA will participate in initiatives of the Board's Aerospace Career Development Committee, meet with the Board to provide workforce data, provide a representative to serve as an *ex-officio* member of the BWDB Board of Directors, and collaborate in the development of space workforce training and assistance initiatives. The BWDB will work in support of existing and future KSC missions through cooperation in requirements planning and implementation of training and other initiatives to assist in the development of needed new skills and capabilities, and meet with KSC senior leaders periodically to educate and inform them on their program of work.

NASA is also working with contractors to enable them to implement incentive programs to retain skilled employees as the Agency approaches transition. Examples include:

- NASA is advised that United Space Alliance (USA) has established two programs for employees impacted by Shuttle transition. The Enhanced Severance Pay program will provide USA employees who are laid off a minimum of 4 weeks' pay and maximum of 26 weeks' pay, depending on years of service, subject to policy criteria. The Shuttle Program Operations Contract (SPOC) Completion Bonus, which is additive to Enhanced Severance Pay, will provide SPOC employees with critical/essential skills who are laid off with a minimum of 15 weeks' pay and maximum of 26 weeks' pay, depending on years of service. More than 6,000 USA employees (~4,000 of whom are at KSC) meet the "critical/essential skill" criteria.
- On April 30, 2008, NASA announced a modification of the Lockheed Martin Space Systems External Tank contract which will provide incentives to eligible contractor personnel to ensure mission success and construction of the remaining External Tanks to support the Space Shuttle through its retirement. The contract modification is valued at $39.5M.
- On June 10, 2008, NASA announced a modification of the Pratt & Whitney Rocketdyne (PWR) Space Shuttle Main Engine (SSME) contract to incorporate an employee retention incentive plan to ensure that critical skills are retained to enable the safe fly-out of the Space Shuttle fleet. The modification is valued at $16.8M.

KSC Future Role in Human Spaceflight

KSC is already taking a leading role in many areas of the Agency's future human spaceflight program, including:

- Supporting Exploration experiments on the ISS.
- Constellation program integration and support for safety, reliability and quality assurance (SR&QA); systems engineering and integration; and test and evaluation. This effort supports integrated hazards analysis and preliminary hazard analysis; Risk Management, and quality assurance for the Constellation Program.
- KSC ground operations activities include project management and integration; responsibility for achieving all Agency ground operations objectives allocated to the launch and landing sites; leading design, development, test and engineering, and logistics activities for all ground processing, launch and recovery systems; and serving as lead for ground processing, launch and landing operations planning and execution. On June 6, 2008, NASA selected contractors for a fabrication of ground support equipment for Constellation and other space programs at KSC. The multiple award indefinite-delivery indefinite-quantity contract has a maximum value of $400 million during a basic five-year ordering period with the potential to be extended for as much as 1 year past the end of the ordering period. Several Florida companies, including Engravers Metal Fabricators of Cocoa; TJ Inc. of Christmas; Precision Fabricating & Cleaning Co., Inc. of Cocoa; Coastal Steel, Inc. of Cocoa; Met-Con, Inc. of Cocoa; Samson Metal & Machine of Lakeland; and Specialty Maintenance and Construction of Lakeland, were awarded contracts as part of this award, along with companies from other states.
- KSC will provide contractor oversight for the Orion ground processing effort, including ground support equipment, and will lead the launch operations and recovery support during design, development, test and engineering; as well as perform prime contractor oversight and independent analysis.
- KSC will support work that will be done under a contract awarded on June 12, 2008 for the design, development, and production of a new space suit system for Constellation astronauts.

- For the Ares I, KSC will lead ground processing, launch operations and recovery support during design, development, test and engineering; as well as lead launch operations planning and execution for Ares I–X and other flight demonstrations.
- In support of the 2009 Ares I–X test flight, as well as other flight demonstrations, NASA started the construction of facilities modifications to KSC in 2007. KSC is modifying equipment and facilities used most recently by the Space Shuttle, such as Launch Control Center Firing Room One, and Launch Pad 39B, to prepare for Constellation testing.
- Other construction of facilities (CoF) projects to be carried out as part of the Agency's transition activities include modifications to the Operations and Checkout building, the Vehicle Assembly Building (VAB), and the Multi-Payload Processing Facility (MPPF). Constellation's facility requirements continue to evolve in parallel with flight hardware maturity. As project offices are created and move into manufacturing and processing, facilities requirements are being identified, evaluated, and requested. The contractor workforce that will be associated with construction of facilities projects has not been included in the "Workforce Transition Strategy—Initial Report." At this time, NASA cannot estimate the number of contractor personnel to be associated with the various CoF projects, in part because Agency bases its contract awards on open competitions that do not stipulate workforce numbers. In addition, the full scope of CoF activities in support of Constellation is not yet known.

Further into the future, KSC will support lunar architecture work for the Constellation Program system engineering; ground operations, and assembly for Orion and Ares I Low Earth Orbit operations phase; Ares V ground processing, launch operations and recovery support during design, development, test and engineering; final assembly of and ground processing support for human lunar lander; and lunar surface habitat management and integration. Additionally, KSC will be the NASA lead for lunar surface *in situ* resource utilization systems and support surface systems logistics concepts, all of which are vital to our Exploration success.

Therefore, given the exciting and varied amount of work that is in KSC's future, it is clear that NASA is not going out of business at KSC; rather, this transition will enable a new line of NASA business at KSC as the Center increases its involvement with Exploration activities that will be pursued for decades to come.

Launch Services Program

As we prepare for the future of human spaceflight, it is important to remember that KSC has also been key to launching NASA's robotic explorations of the Earth and space, and this will continue through the transition from Shuttle to Orion and beyond. The Agency's Launch Services Program (LSP) has maintained a success rate of 98.8 percent since 1987. LSP supports NASA science missions, as well as the launch of National Oceanic and Atmospheric Administration spacecraft (*e.g.,* Geosynchronous Operational Environmental Satellites), Department of Defense spacecraft (*e.g.,* Global Positioning System and Defense Support Program), and commercial satellites (*e.g.,* GeoEye 1).

Commercial Space Activity at KSC

In addition to playing a key role in the Constellation Program, KSC will support commercial space activity. NASA is actively encouraging the growth of a new, robust, commercially-based space economy through the Commercial Orbital Transportation Services (COTS) project. From the beginning, NASA has considered COTS to be an investment in space commercialization, and with that investment, there were inherent risks associated with stimulating a market capability that is in its infancy. Therefore, NASA is providing $500 million as "seed money" to spur the commercial space industry to develop and demonstrate commercial orbital transportation services. It is also important to understand that NASA is only one investor in the overall demonstration of commercial cargo services. The commercial space companies (and their other private investors) are the largest investors because they stand to reap the financial benefits of developing a proven commercial space transportation capability that they can sell to other non-NASA customers.

Both of the funded COTS Phase I partners, SpaceX and Orbital Sciences Corp., plan to demonstrate cargo mission capabilities to the ISS in calendar year 2010. NASA has identified ISS commercial cargo requirements in the 2010–11 timeframe, and the Agency is in the process of procuring commercial cargo services through the ISS Commercial Resupply Services acquisition. The Request For Proposals (RFP) for these services was released on April 14, 2008, with an award expected by the end of 2008.

By investing in U.S. private industry through COTS, NASA is facilitating development of reliable, cost-effective access to low Earth orbit (LEO). The intent is to create a market environment in which commercial space transportation services are available to Government and private sector customers. The availability of safe, reliable and economical service to LEO will help NASA achieve the Nation's goals of retiring the Space Shuttle and building a new space transportation system.

In addition to COTS, the possibility of leasing land to one or more commercial entities to develop and operate a Commercial Vertical Launch Complex (CVLC) on KSC property is being considered.

Enhanced Use Leasing (EUL)

NASA's use of Enhanced Use Leasing (EUL) improves the Agency's performance by allowing it to recover asset values, reduce operating costs, improve facility conditions, and improve mission effectiveness. It also opens up opportunities for commercial vendors who can make effective use of NASA facilities and equipment at the Agency's Centers, including KSC. NASA encourages the use of its facilities by other agencies, industries, and universities (*e.g.,* Space Shuttle Landing Facility). NASA's Centers have begun to develop enhanced use leases for their underutilized real property, and KSC and Ames Research Center (ARC) have participated in an EUL demonstration program that will likely continue to result in lease awards in FY 2009. NASA will continue to provide a fiscal year report to Congress on the progress of its use of enhanced use lease authority.

Iran, North Korea and Syria Nonproliferation Act (INKSNA) Relief

In order to minimize impacts to NASA's workforce, it is essential that the Agency transition from the Space Shuttle to Constellation as quickly and as smoothly as possible. One key element of this effort is the extension of relief from the Iran, North Korea and Syria Nonproliferation Act (INKSNA) to enable the Agency to purchase Russian services beyond 2011. On April 11, 2008, the Administration submitted a proposed amendment to Congress to extend the exception for payments to Russia for Soyuz crew transportation and rescue services until the Orion Crew Exploration Vehicle reaches Full Operational Capability or a U.S. commercial provider of crew transportation and rescue services demonstrates the capability to meet ISS mission requirements. In addition, the amendment would enable NASA to purchase Russian-unique equipment and capabilities, such as sustaining engineering and spares, through the operational life on the ISS. This is essential to maintain an American presence onboard to sustain and utilize the ISS. Continued operation of the Station is also important for the developing cargo resupply commercial market. We look forward to working with the Congress on enactment of this crucial legislation.

Conclusion

NASA continues to make steady progress in managing its challenges, including the critical challenge of transitioning our Shuttle workforce to exciting new projects. The Agency has assigned leadership roles and responsibilities for exploration and science missions to NASA's ten field Centers across the country in order to help restore the core technical capabilities across the Agency as we transition from the Space Shuttle to new capabilities. Thanks to its dedicated, highly skilled aerospace workforce, Kennedy Space Center will continue to play a key role in launching both human and robotic space missions, as it has since it was established in July 1962 as the Launch Operations Center.

In a short span of years, we have already taken long strides in the formulation of strategies and programs that will take us back to the Moon and on to Mars and other destinations in our solar system. These efforts will result in tremendous opportunities for those interested in becoming involved in space exploration and development at KSC, in both the Federal and commercial space sectors.

Chairman Nelson, with your support and that of this Subcommittee, we are making the right strategic choices for our Nation's space program. Again, thank you for the opportunity to appear before you today. I would be pleased to respond to any questions that you may have.

Senator NELSON. Dr. Griffin, I think I heard something new. You spoke of a cut of three to four thousand jobs. Instead of the projection, on the upside, that we've heard, of 6,400 jobs. You want to clarify?

Dr. GRIFFIN. Yes, sir. You and I have, of course, talked privately about that in your offices, and we have talked publicly about that.

We—the projected cuts of 6,400 people that we're showing in that initial Workforce Transition Report, did not—and could not at the time—also include the work which we expect to come to KSC in the future as we develop Ares and Orion and move on to our lunar—to our lunar systems.

So, we think, at this point, that the net reduction would be somewhere in the three to four thousand, rather than in the six to seven thousand range.

Senator NELSON. Even during the time-frame of 2011?

Dr. GRIFFIN. We do not think the 6,400 that was offered in that report represents the complete picture. We're putting this picture together, as we go. You will receive, by law, a new report every 6 months, and as increasing maturity of the newly developed programs becomes available, we will refine those estimates. But our best guess for a long time has been three to four thousand, not six to seven thousand, even in 2011.

Senator NELSON. Well, this is the first time that that has been stated publicly. In your previous testimony before our committee you had said 6,400. So, now putting it at three to four thousand, instead of the 6,400, even in year 2011. In the chart of the contractor workforce that was shown the high end was a 6,400 cut, low end was showing a cut of about 5,300, in 2011. Now we're hearing a cut of considerably less. Of three to four thousand.

Dr. GRIFFIN. Yes, sir.

Senator NELSON. That is some news. I can't say it's good news, but it's certainly news that's a step in the right direction.

Now, to put this in perspective, the overall employment at the Kennedy Space Center is about 14,500. The projections that you all put out in your cuts were from just the Shuttle workforce, which started at 8,000, not at 14,500. So, is it reasonable to think that the workforce over and above the Shuttle workforce at the Kennedy Space Center will be fairly much intact, or do we not know?

Dr. GRIFFIN. I think that that workforce will remain fairly well intact. There certainly can be collateral effects of retiring the Shuttle that may influence that workforce, but I would, again, offer to this committee that we are, after all, retiring the Shuttle. So, eventually there will be no Shuttle jobs.

What we are not yet able to show is the number of new jobs that will be developed in the course of awarding bids for Ares I, Ares V, Altair Lunar Lander, KSC ground operations to prepare the facilities and the pads for those vehicles, ISS experiment support, as we begin to use the ISS, and many other things that we do intend to do here at KSC that are budgeted, but for which contracts are not yet awarded, and therefore no preliminary manpower count can be allocated.

So, you're seeing reductions in Shuttle, but you're not seeing, yet, and we'll give it to you when we have it, but you're not seeing, yet, the increases that will result from new programs.

Senator NELSON. And, part of that is the fact that you will basically assemble the Orion spacecraft here in the ONC building?

Dr. GRIFFIN. That's affirmative. The contractor—the winning contractor on Orion is now working with us to modify the ONC building at the Cape for Orion assembly.

Senator NELSON. So, to put it in its context, I want to do this, because I think this is, although we can't say good news when you talk about cuts, it is clearly a step in the right direction of mitigating these cuts, a total of 14,500 approximately that are employed at the Space Center. About 2011, before we start ramping back up in 2012, you're looking at a net of three to four thousand cuts from that total workforce of 14,500.

Dr. GRIFFIN. That's what we think today, sir, and as I said in my opening statement, we are working to mitigate that number. We do not take the loss of our skilled workforce lightly, and have been working every day to find ways to ameliorate that issue.

Senator NELSON. Before I turn to Senator Martinez, I just want to say that you know how I have expressed to you, and all of you, in rather vigorous terms, that your own goals for NASA include 10 healthy Space Centers. Needless to say, when one of those Space Centers gets absolutely whacked, where its heart is cut out, it's not a healthy Space Center, it's a Space Center that's on life support.

So the fact that that you have given us this news today, I think, is significant. But, in terms of specifics, of nailing down the net job loss, it's really going to be when you report to us much later this year. Is that going to be the time when we will have a better fix on the specific number of job loss?

Dr. GRIFFIN. We probably won't have a significant reporting change in, for the October report—that would be 6 months after the one we gave you from April, and they're due every 6 months, as I know you're aware, but I wanted to get on the record. Because some of the significant contracts will still not have been let at that point.

So, we have a considerable amount of forward work yet to do before we would have put out RFPs, selected contractors, and then been able—from, with that behind us—to give any sort of an immediate, an ameliorative estimate.

So, you won't have something significantly different this October.

Senator NELSON. I just want to say that I have had innumerable private conversations with Dr. Griffin. And he is doing everything humanly possible, within the confines that he has to operate in, to mitigate these losses, and to be creative in an approach for the future workforce here at Kennedy Space Center, which we will get into the specifics of later on.

I thank you for that, Dr. Griffin.

Senator Martinez?

Senator MARTINEZ. Well, I'm looking forward to hearing from the other members of the panel, as well, but just to follow up, Dr. Griffin, as you go forward and make these additional contracts that will then give a clearer picture of the workforce left—what, if anything, can we from Congress do to help alleviate the problem? To minimize the job loss?

Dr. GRIFFIN. Within the context of—I think Senator Nelson has his finger on the core of the issue, and so I'll restate it again, for emphasis. But, it is—it is in the nature of what it is we do here at KSC. We integrate and launch space vehicles here—it's NASA's primary center for doing that. And I've worked down here on and off for 30 years now, in one role or another. This, in some ways,

is the least satisfying of those roles, I liked it a lot better when I was in closer touch with the hardware.

But what we do here is we integrate and launch space vehicles. The retirement of the Shuttle, and the development of new systems that will enable us to return to the Moon, and also service the International Space Station as the Shuttle does, are necessary things. The Shuttle retirement, and the development of new systems is necessary for this Nation.

The only thing which could have prevented this downturn in operations period that some have called "the gap," would have been for the Congress of the United States, and for the Administration to request, and for the Congress to approve, a significantly higher NASA budget, so that we would operate while we were also doing development.

We didn't do that. The Administration has proposed for the last 5 years, and the Congress has approved, for the last 5 years, essentially, in constant dollars, a flat NASA budget. Within the context of that budget, we are doing everything humanly possible to minimize this gap.

We have a forward plan to sustain the Space Station, admittedly, through the services of our Russian partners. But it will at least protect our $100 billion investment in the Station.

But within the context of the monies that we have available, I believe we have the best plan that we can have, and we have the plan which causes the least disruption possible, here at KSC.

I wish that it were less. I've said this on the record for the 3 years and 2 months that I've had this job. I wish that there were something else that we could do about it. But, within the context of the resources available, we're doing the best we can.

Senator MARTINEZ. So, the job losses that we're going to anticipate are reasonably forecasted—they're very reasonably forecasted, given a 5 year legacy of flat budgets for NASA by the Administration and the Congress?

Dr. GRIFFIN. Yes, sir. We have projected—for several years now, we have known, and we have been very clear—that there will be a gap between Shuttle flights, and Ares/Orion, which will be the replacement vehicles.

Senator MARTINEZ. So, you basically have been fulfilling your mission, given what the Congress has given you, and what the White House has given you?

Dr. GRIFFIN. That is correct, sir. So, we have known of this gap, we are trying to plan our way through it, it is no secret.

Now, it is regrettable, the fact that it is not a secret does not mean I don't regret it—I hugely regret it. But, we've done the best we can to plan our way through this very difficult time.

Senator MARTINEZ. Thank you, I have no other questions.

Senator NELSON. And I want to point out that Dr. Griffin operates within constraints. He's given a budget that he has to live within, and so his public stance has to be in support of that budget.

Now, let me just illustrate how difficult this is. When we launched *Challenger* over two decades ago, there was a return-to-flight cost to bring back the Shuttle. That cost was not only the investigation and the examination of what happened, but also the recovery of the Shuttle itself off of the bottom of the Atlantic. But,

the Administration and the Congress supported NASA by replacing those funds that NASA had to use for the cost of recovery. Not so this time.

In the loss of the Space Shuttle *Columbia,* the costs of recovery were $2.8 billion. NASA was forced by the Budget Office to eat that out of its operating revenue. Thus, that was the reason that last year, bipartisan Senators got into the NASA funding bill, the Appropriations bill, an additional billion dollars just to partially reimburse NASA for the money they had spent on the recovery of the Space Shuttle *Columbia*.

Of course, at the end of the day, we couldn't get the support and that effort was not successful. So, we're trying the same thing again this year.

The problem is that you start to run out of time, as it gets closer and closer to the time of the shutdown of the Space Shuttle.

Let me ask you, Dr. Griffin, NASA's report on the economic impact of NASA in Florida, points out that for every direct job at KSC, it is multiplied into 2.5 jobs in Florida. The question is, the reverse of that. Do you anticipate the total loss of jobs to be 2.5 Florida jobs for every job that is lost at KSC?

Dr. GRIFFIN. Yes, sir, that is the multiplier effect that we're talking about, so—if those analyses are very difficult to do, but if you believe the analysis, then the multiplier effects of government-funded work at KSC is about 2.5 to 1, either up or down.

Senator NELSON. OK.

Now, let's look ahead. Which Space Center, is going to manage the Constellation ground processing contract?

Dr. GRIFFIN. That would be here at KSC.

Senator NELSON. OK. That's good to have on the record. Since the processing is going to be here, that ground processing contract is going to be managed at the KSC management level.

Dr. GRIFFIN. Yes.

Senator NELSON. Mr. Cooke?

Mr. COOKE. Yes, sir, that's true. We have the ground——

Senator NELSON. Get a little closer to the mike.

Mr. COOKE. We have the Ground Operations Project Office at Kennedy Space Center which will manage that.

But irrespective of the management—which I appreciate that KSC wants to manage its own work, and that is our plan, but the crucial point, in terms of job losses, is the work would be done here. I want to get that on the record as well.

Senator NELSON. For the audience, the new rocket, is called Ares, and the new spacecraft, which is a design like the old Apollo capsule, only it's a lot bigger, is called Orion. Together the whole thing is called the Constellation project.

Has there been discussion about locating the Constellation sustaining engineering work here at Kennedy?

Dr. GRIFFIN. Yes, sir, there has. And we're considering where we want the split in the work to be. As we transition from development to routine operations, you then raise the question of how do you handle the sustaining engineering for those systems, and where should it go? And it has been our position that by and large the sustaining engineering work should wind up here at KSC.

Now, that would be a change in our paradigm from the Shuttle era, but we're changing what we're doing. In order to return the United States astronauts and our international partners to the Moon, we have a suite of development projects which must take place. And so the development centers—Johnson and Marshall—will be continuously busy with the development of new systems, and here at KSC, folks will be continuously busy with operating systems that have been developed. So, we think, in large measure, that the balance of sustaining engineering will probably wind up being here. That will be a difference from past practice.

Senator NELSON. Whereas, under the Shuttle, that sustaining engineering was done at other Centers?

Dr. GRIFFIN. That's correct.

Senator NELSON. It was done at Johnson and Marshall?

Dr. GRIFFIN. Primarily.

Senator NELSON. Well, that's some good news. And of course, you don't want to venture to guess how many jobs that might entail?

Dr. GRIFFIN. Well, I don't. Because, I mean, to be very honest, we're trying to give you the best bang for the buck that we can. The objective that I have always had since we had an opportunity offered by this President and this Congress to return to the Moon, the objective that we have is to utilize the fewest possible number of people for launch operations and sustaining engineering, because that reduces the cost of it, and then within the context of a fixed, overall NASA budget, that allows more money to be made available to do the kinds of things that I know you want to do, just as much as we do. So, the less money that we can spend on operations, the more we have for other things.

It has then been my goal to move some new types of tasks down here to KSC to make up for other types of work which will no longer be done.

Therefore, hence the assembly and integration of Orion being done at the ONC building. Now, we have several more contracts of a major scope to let. It is my hope that we can do—it is my hope that the winning contractors will also plan to do much of their assembly and integration work here at the Cape. That hasn't been done in the past. So, we're changing some of the paradigms about how NASA executes its business.

Senator NELSON. Well, I think whoever the next President is, we're going to request that he keep you as Administrator of NASA.

Dr. GRIFFIN. Drop me a note and let me know how that works out.

[Laughter.]

Senator NELSON. Mel will work on one side and I'll work on the other side.

All right, before I turn it to you, I want to get this in. You know that here at Kennedy, we have an expertise in logistics management.

Dr. GRIFFIN. Surely.

Senator NELSON. Have you considered developing a centralized logistics capability for future programs here at KSC?

Mr. COOKE. I don't think we've discussed that in great detail.

Dr. GRIFFIN. We haven't got that far, to be honest with you.

Senator NELSON. Well, I want to suggest that you consider that. Kennedy has that expertise.

Dr. GRIFFIN. Yes, sir. Suggestion accepted. We're still early in our developmental phase, and I'm not dismissing or minimizing your point, we'll note it down and we'll take it under action.

Right now, I'm worried about the problems of finishing the Station and developing new systems, and I have no, in fact, my—you know, I would love to be in a world where I was worried about the logistics for supplying Ares and Orion and returning to the Moon—that's the place I want to get to.

Senator NELSON. Senator Martinez?

Senator MARTINEZ. That's the exciting stuff.

Dr. GRIFFIN. It is, yes, sir.

Senator MARTINEZ. And we really thank you and your team for all that you're doing to minimize the pain in our community, and to not only lead the program, but to also be mindful of those problems and concerns.

And I'd like to ask this question, and maybe one of the others might prefer to answer, but it's up to you—tell me about that relationship with the Russians, and tell me about—the concerns that we have all voiced, and we all have. I understand that we now have Medvedev as the new President, Putin has stood in the background.

You know, I have been to Georgia, not the one that grows peaches, but the other Georgia.

[Laughter.]

Senator MARTINEZ. And these people live in constant fear that the Russians will cut off their gas. And not because they haven't paid their bill, but just because the Russians will use the supplying of gas as an instrument of international politics, as an instrument of policy. Now, that's kind of foreign to us, as Americans, but this is the way they play the game.

Are we concerned that in a moment in time when we might have no other alternative, that the Russians might decide that they'll fly someone for us, or provide a mission, if we were to do something different somewhere else in the world, or whatever they might come up with? I mean, have these discussions taken place?

And let me broaden the question a little further—you know, if you—I remember they had a return to Earth, you know, OK, but not exactly in the place that they had planned for it to be. As I recall, they were 700 miles off course, and so operationally, are we concerned about the capabilities? And, you know, I understand you all have to continue to work in a positive atmosphere, but I think we need to ask these questions today, about what is life going to be like during that 5 year period, when we're totally dependent upon the Russians for manned flight?

Dr. GRIFFIN. I do understand, sir. I run NASA, and I need to stay out of world politics, and will.

Senator MARTINEZ. That's the great thing about being a Senator, we can build rockets, and do international politics, and second-guess anybody better than anybody.

[Laughter.]

Dr. GRIFFIN. And you should be very grateful that I will stay out of world politics.

[Laughter.]

Dr. GRIFFIN. With regards to operating with the Russians as partners, and the reliability of their systems and all of that, I'm going to turn that answer over the Bill Gerstenmaier.

Gerst has lived in Russia, and worked with the Russians, in the course of our Shuttle Mir program. We may have some folks at NASA who have more experience working with Russians than Gerst does, but not many.

So, Bill?

Mr. GERSTENMAIER. First of all, I can't answer the political questions, either. But, I can talk from an engineering standpoint, and from a capabilities standpoint.

We've worked very closely with the Russians, we work with them daily onboard Space Station today. As you mentioned earlier, it's an international facility. We have to coordinate things back and forth—who generates oxygen, when, who removes oxygen, we provide power to the Russians, they provide re-boost to the Space Station for us—so, it's truly a cooperative engineering effort between us and the Russians.

And from a technical engineering standpoint, that's going extremely well. We're very good partners, we exchange data every day, we are in constant communication with them, the Space Station cannot fly with either country in charge, it requires both countries to work cooperatively together, and as an engineering team, that's been going extremely well.

You mentioned the Soyuz, that didn't return correctly. Probably the most—thing that concerns us the most, is that the instrumentation, or propulsion section did not separate correctly from that spacecraft, and that forced it to fly a different entry trajectory than we anticipated.

Two vehicles have done that—the last two vehicles in a row have done that. There's currently a Commission going on in Russia, investigating that activity. Their report is due out sometime this summer. I have made one trip to Russia to go understand how they were progressing with that analysis, they were very open with me, they showed me all of the data, they showed me the drawings, I saw the physical hardware, I went through a detailed discussion of their engineering processes, they're the same as ours, they're searching for root cause, it's not easy flying in space, and they're having problems understanding that, but they're working through it very well.

I will go, again, to Russia, here in about a week, and I will, again, get a chance to see.

I think the thing that concerns me a little bit is the fact that we will have a single transportation system, not that it's Russian, not that it's another country. You know, when we had the *Columbia,* tragedy if it wasn't for the Russians, we would not have been able to keep the Space Station manned, and we would not have the Space Station we have today.

So, it's nice having two transportation systems that can back each other up. And that's where we want to get to—we want to get this CEV flying as soon as we can. We need stability in our budget, we need stability in our direction, we need to keep moving forward, we've made good progress. Doug and his team have done a great

job of moving things forward, we need to keep that momentum going forward, so we're dependent upon the Russians for as short a period of time as we can, and then we can have, back to our dual transportation system, which is what we really want for Space Station.

Senator MARTINEZ. OK, I appreciate that good answer.

I suppose that what we need to do is to focus on trying to minimize the potential for the political issues to arise that might give cause to that. And I know in many spheres, we work very cooperatively with the Russians, and I know there's a lot that we do together, frankly, when it comes to trouble spots in the world. They're greatly cooperating with us on issues relating to nuclear proliferation and in that regard I know that is a very, very hands-on cooperative relationship just as it is on the space program, as you've described.

So, I'm one of those that's, you know, very optimistically looking for a very good strong relationship as we go forward. But at the same time, it is a troubled time, it is a troubling sort of scenario we see that we would be so dependent. And I guess this issue that you mention, as well, just the fact that we'll be relying on a single mode of transportation, and it better all be working or it would be—really not good for the Space Station.

Relating to the future here at KSC, we haven't touched on what the second panel will be focusing on to some degree, which is the alternatives to space exploration, in combining public/private partnerships.

Dr. Griffin, can you tell us a little bit about where you see that future, and how do you see that incorporating into what we do here at the Kennedy Space Center?

Dr. GRIFFIN. Senator, I will have to respectfully say I'm not an expert on those issues, and we're supportive of them. But, how work in other sectors of the economy could blend in with what is done here at KSC to support East Central Florida is certainly a goal I share with you, but one that I would have to—I hope to hear some clever ideas from future panel members, as well. I will be in a listening mode on that, other than a talking mode.

Senator MARTINEZ. Good deal. Thank you.

Senator NELSON. One of the painful lessons in the layoffs of Apollo was that when we ramped back up on the Space Shuttle, it was hard to get some of those technical positions filled, because people, since there was a big gap there, had packed up and moved away, and had left NASA. You want to comment on what you plan to do as we ramp up here?

Dr. GRIFFIN. Well, we are, even now, beginning efforts at retraining and transition for folks who we think need to transition on—from Shuttle on to Ares and Orion. Some types of folks, for example, some types of skills won't be needed. We won't be having Shuttle tiles anymore. So, we are working with the companies, and beginning to work with other Federal agencies and State agencies to try to forecast which folks can transition over and have that shift happen.

Doug, do you have any more comments on that, or Gerst?

Mr. GERSTENMAIER. We have a couple of training opportunities for employees to go begin training for some of the new skills, as

we anticipate the work that's coming, the new type of work we describe may be less processing, more—not quite as much hands-on, getting ready to go launch kinds of things as you describe, some of the other skills.

We've got some training opportunities for folks to go do that. We're trying to make those available to employees. We've worked with the companies some flexibility in terms of time off, things for employees to do, the State's been also supportive in helping us with some education classes along those lines.

So, we're trying to take our existing workforce that knows how to fly complicated space hardware, take that basic knowledge, and then apply it in a slightly different manner by giving them some skills on top of that.

So, we've been working pretty actively with the various companies to try to prepare for that activity, for the ramp up.

Senator MARTINEZ. Mr. Cooke?

Mr. COOKE. Yes, sir.

Senator MARTINEZ. We do have USA processing for Ares I–X test launch next spring, so that's using a workforce that has been working Shuttle to come over and begin getting skills in what we're doing, and we have worked very closely with Bill's organization, Space Ops, to figure out where we can get synergies between what their skills are, and what work we need to have done, so that is a part of the transition effort—something that we've put a lot of effort into and continued to look for opportunities to begin to get the employees working in areas where we will be going on Constellation, so that they'll have those skills. And I know that Bill's also working—has worked a couple of retention activities in order to keep critical skills going on the Space Shuttle program.

Dr. GRIFFIN. And further, we've looked at some procedures, you know, today we use a lot of paper products to process our vehicles here. We're going to some wireless systems where we no longer need to have paper products, we're actually putting those in place today in the Shuttle program, and that's allowing employees to actually participate and use the system that will be the system of the future. So, they're actually getting real skills today processing Shuttle hardware with the same kind of paperless systems that they will be using to process the next generation of vehicles. So, we're looking forward, and we're trying to actually use those systems and skills today, so they'll be more seamless when we transition to the new systems in the future.

Senator NELSON. Well, this is good, I want to suggest, additionally, that you take the experience of the Base Realignment and Closure Commission, BRAC. Specifically, the Department of Defense worked with the Department of Labor and the Department of Commerce in order to minimize the disruptions and to help in the workforce transition as they shut down military bases.

And so the Department of Commerce, and the Department of Labor, having done this, this is another opportunity for you to reach out.

Dr. GRIFFIN. We have begun to do that, specifically, with those two agencies, and we will continue.

Senator MARTINEZ. I just have one last question when you're done.

Senator NELSON. Go ahead.

Senator MARTINEZ. I was just going to ask about the current Shuttle missions. I know we just had a fabulous mission that concluded. I know we had a little hiccup in some debris, apparently, was visible in the—which apparently turned out to be of no consequence. Just give me a word on where we are on finishing out the Shuttle program, I know it's been terrific, how we got back to flight, and things seem to be going very well, but I just wanted to hear from you on that.

I know this last mission, in terms of what it accomplished, had to have been very satisfying to all of you.

Dr. GRIFFIN. It was, sir, and Bill Gerstenmaier is the guy whose job it is to get those missions executed, so I'll let him comment.

Mr. GERSTENMAIER. And the next mission we have will be the Hubble Servicing Mission, so we're going to go back to the Hubble Space Telescope again, and to put a brand new set of optics and upgraded cameras on it, repair some gyroscopes on it, so that's a very exciting mission—that will be this fall on October 8.

Again, because that's the first flight where we're not going to the Space Station, we have to have another Shuttle ready, in case a rescue is needed for the Shuttle that's serving the Hubble, so we'll have two vehicles out on the launch pads—one out on 39B and one on 39A.

And then after that flight occurs, that vehicle from 39B will roll over to 39A and will carry logistics up to the Space Station, and the cargo that it's carrying up are systems that will allow the Space——

Senator MARTINEZ. When will that be?

Mr. GERSTENMAIER. That will be November 10th. And the idea there is to carry up the equipment that's needed to increase the crew size onboard Space Station to 6. You know, currently we have three crew members that stay onboard Space Station, but we're going to increase that to three——

Dr. GRIFFIN. Increase that to 6.

Mr. GERSTENMAIER. Increase that to 6, increase it by 3, I'm sorry. And then we'll bring our water reclamation system up on that Shuttle flight. We'll bring some crew sleep stations up, some galley equipment, some extra exercise equipment, and an additional bathroom for the Space Station.

So, we'll be prepared, then, to increase the crew size in the spring of next year, probably around May of 2009.

The next flight will be roughly, we think, in February, and we have a change request out now that's being reviewed, that will bring up the last solar array, the last big solar panels on Space Station, and that will get added out on the starboard side of the Space Station, out on the S–6 side, or solar starboard side 6, solar arrays will be added to Space Station early next year.

Then, the flight after that will be a Japanese-exposed facility, it'll be the third piece of their laboratory they had a little pressurized section, and then the big lab which was just launched this last flight, and then have an exposed facility, and that will be in kind of the April time-frame of next year.

And then there's—beyond that there are about 7 more Shuttle flights to carry logistics up, and essentially outfit Station, so it's

ready to, essentially, be built, be completed and then be serviced by commercial cargo transportation, serviced by the Soyuz and serviced by the CEV, or commercial crew transport, whenever it comes online.

Senator MARTINEZ. Very good, thank you.

Senator NELSON. Dr. Griffin, one of our problems in the past is that Kennedy has been pigeonholed as an operations center. And you know how I have talked to you about bringing research and development here, to expand the role.

So, is it possible, from your leadership standpoint, to expand KSC's charter, and include R&D as part of its charter?

Dr. GRIFFIN. Sir, I—with respect, I would not urge that we try to make Kennedy a development center. We need development centers at NASA, and we need operations centers. Where I am trying to move the boundary a bit, back—because development work would be removed from places that have it, and brought here.

And second of all, it really would do nothing to address the job loss of the people whose jobs from Shuttle would be cut. All you would be doing is importing development engineers from other areas, or hiring them locally, but it would not ameliorate the job losses of the people who would not be doing Shuttle operations.

Senator NELSON. Well, you know my opinion. We've got 150,000 acres here, and expand the role, other than being an operations center. And indeed, you have had some good news about the Constellation ground processing, and about the sustaining engineering. And I brought up the question of our overall logistics management.

Once Ares and Orion become operational, could the program shift here to Kennedy Space Center?

Dr. GRIFFIN. Well, that depends on what you mean by program management. And again, I'm not——

Senator NELSON. Tell me what you mean.

Dr. GRIFFIN. The overall program management will include developmental efforts for succeeding block upgrades, you know, we—our equipment can't stay static in time, as well as improvements and also the overall Constellation program work will include the development of Ares V, the heavy lifter and the Altair Lunar Lander, and then later on, surface systems for the Moon.

The overall program management for those things needs to be at the development centers. I'll call it a sub-set of that program management—the operational, the execution of operational could well reside here at KSC.

Senator NELSON. Well, that would be interesting. When might you come to a conclusion on that?

Dr. GRIFFIN. Too soon to tell, to be straightforward with you, it was a significant topic of discussion at my last management monthly.

Senator NELSON. What is that technical term again, operations, what?

Dr. GRIFFIN. Well, the operational program of flying the existing vehicle, you know, when it is developed, within the envelope of its flight regime could well be managed here at KSC, and it is my view that it probably should be. But there are a number of subtleties to it that we need to work out, and so I would not want to give the impression that those decisions have been finalized yet—it is a cur-

rent topic of discussion within NASA, as we seek to manage our affairs efficiently.

Senator NELSON. I know you don't want to get tied down on these details, because you just have it under discussion, but the overall operational program, are we talking about Ares and Orion and its future, or are we talking about all the way to Ares IV?

Dr. GRIFFIN. It's too soon to tell, sir, and I just have to leave it at that.

The first thing on our plate is getting Ares and Orion developed and working, and that is clearly a Developmental Center activity, in conjunction with our contractor's on this, Boeing and Lockheed, and ATK.

When that development program is done, then we have to address, I think, the transition of a development program to an operational program. I would like to see the operational side of the program managed here at KSC, and I've been quite forthright about that.

As I said a few moments ago in questioning, that represents a change in how we do business at NASA, I think it's a productive change, but it is a change. That's as far out on that limb as I want to go right now, or I risk saying something that would commit us to a path that would prove later to be stupid, and I don't want to do that. I want time to study the issues to make sure that we get it right.

But we are leaning in the direction of including some new roles and missions here at KSC that haven't been done before. But we want to do it right, and we want to think about it carefully before we commit to it.

Senator NELSON. I was asking Orbital Space to study the issues, as well, in the launch here from the Cape, and they chose, instead, to go and launch from Wallop's Island.

Dr. GRIFFIN. We did, sir.

Senator NELSON. And I will continue to ask those questions. Do you have included in the President's budget request for NASA, the contractor retention programs?

Mr. Gerstenmaier?

Mr. GERSTENMAIER. Yes.

Senator NELSON. Thanks. The answer is yes. OK. And tell me, as you project out over the years in the chart that showed the high of 6,400 lost by 2011, nevertheless the civil service employment with regard to the Shuttle Program, stayed level at 1,000 at each of the years, even in 2011, 2012, 2013. Explain that, please?

Dr. GRIFFIN. I guess in the Civil Service side, we have a core side of folks that are going to be doing the new work we just talked about, you know, we have the test programs that are going to be done down here, we have some development associated with that. The Ground Processing contract management that we talked about earlier, that's going to be managed here by civil servants. So, that's where that workforce is going to be utilized in the future.

The Safety Group sits here, and stays the same. We now have common engineering down at the Kennedy Space Center like we do at other places where the engineering team supports more than just one program, they support all programs, so as the Shuttle ramps down, that same engineering team that supports those ac-

tivities, will continue to support engineering activities, but now for the new vehicles. So, so that's the basis of why that stays flat through that period, in terms of civil servants.

Senator NELSON. All right, thank you.

Now, as you know, we have a difference of opinion about flying one additional Space Shuttle flight. You have responded in your letter to the House Chairman. They've passed the authorization for one additional Space Shuttle flight.

You're operating within the constraints of what you're told your budget can be, and I understand, you don't want to take money out of Constellation in order to put it into an additional Shuttle flight.

But, under a new Administration, if we were able to get the additional money for another Shuttle flight, over and above what you have already built into the budget, can you venture an additional cost for that additional Space Shuttle flight that would be to get a whole bunch of scientific experiments up to the Space Station that you don't have room for now?

Dr. GRIFFIN. We have said, I believe, in that report, and I know that, you know, I've been on the record publicly on this, that the marginal cost of that additional flight would be a few hundred million dollars, $300 to $400 million. I don't have a more precise estimate than that for you at this time.

Senator NELSON. Will we be beyond the point of no return by the time we get a new Administration in place in early 2009?

Dr. GRIFFIN. No, sir. The—we have an 18-month, basically, integration and operations template for a given Shuttle mission, it's approximately that. So, we need to know—I do understand that the House has authorized that additional flight. You do understand that the Administration considers it not to be necessary. In the end, of course, we will obey the laws that are passed. If decisions are made by approximately February of 2009, that sort of a timeframe—we could execute such a mission, then, in the late summer of 2010, and we would be able to do that.

Senator NELSON. OK. Well, we'll continue to work with you on that.

Now, the critical piece of hardware that's got to be decided as to whether or not you continue to build additional hardware is the external tank. That's making the assumption that on the last Space Shuttle flight, this extra one we're talking about, that you have to have another external tank that would be used for a rescue Shuttle. At that point, would you necessarily need that extra ET, since the last Space Shuttle flight would be going to the safe harbor of the International Space Station?

Dr. GRIFFIN. And that's exactly the point. First of all, let's all recognize that there does, at some point have to be a last Space Shuttle flight.

Senator NELSON. But right now, manifest on the last Shuttle flight in October of 2010, you're still having a spare, external tank, are you not?

Dr. GRIFFIN. Yes, we have a contingency flight beyond the last Shuttle flight. And we're looking at the things that you just described to see what makes technical sense, we're looking at the capability of the Space Station to support an extended crew for a long period of time, we're looking at the robustness of the Shuttle sys-

tem, by that time we will have flown some more flights, we'll continue to look and we'll make the right trades at the right time to go support what we need to go support in the future.

Senator NELSON. OK. The reason I wanted to get that out is the fact is that if there were a change in policy in the new Administration, we would have that additional external tank, so that if the choice were made by the new Administration to fly that additional flight of scientific experiments, we could, in fact, do it?

Dr. GRIFFIN. We're not limited on hardware. This was——

Senator NELSON. We're not limited on hardware, exactly.

Dr. GRIFFIN. This is a policy difference that you have with this Administration, which I represent, and it's a fiscal matter. It does cost three or four hundred million dollars that is not appropriated in our budget today, and that we—I cannot, in good conscience, sit here and tell you I could fly that flight and just absorb that hit. Three or our hundred million dollars worth of content, that you have already approved, would have to go away. And so we don't have that money in the budget.

Senator NELSON. And we understand that. You would have to be provided that additional money by the new Administration.

Dr. GRIFFIN. That would be correct, sir.

Senator NELSON. Yes, sir.

Senator MARTINEZ. And that new Administration could be a Republican Administration or it could be a Democratic Administration.

[Laughter.]

Senator MARTINEZ. And, by the way, it has to pass both houses of Congress, including the Senate, which has not yet passed this.

Senator NELSON. Right.

Senator MARTINEZ. But, anyway.

Senator NELSON. And speaking of that, the extra money that you want to put in this year, even in authorization, as we've got the authorization bill coming up sometime in July, it's not a done deal to pass it through the Senate, because one Senator can ball up the whole works, and grind the Senate to a halt.

So, unless you have unanimous consent in the Senate, it might be tough sledding, even to get an authorization bill for NASA passed.

Dr. GRIFFIN. Which was, in part, why I made the point that within the context of our current authorization and appropriations—and especially appropriations—I don't have the money for that flight.

Senator MARTINEZ. Well, the new Administration budgets the Congress appropriates——

Dr. GRIFFIN. That is true, sir.

Senator MARTINEZ. And so, it's going to take a lot more than just a new Administration that is willing to do that, it's going to also take a Senate, particularly, that's willing to do it.

Dr. GRIFFIN. I regret more deeply than I can say, that when we agree on so many things that we have this continuing controversy over this AMS flight. I deeply regret it. But at this point, I simply don't have the resources to execute that mission, without removing resources from projects that have already been approved by the Congress.

Senator NELSON. This has been an excellent discussion, it has laid the predicate, for now, the discussion of specifics as to how we can transition the workforce.

Dr. Griffin, you, as usual, are candid, and you are doing a good job.

So, we thank you, we will ask the second panel to come up, and as we are bringing them up, we will take a three-minute recess.

[Recess.]

Senator NELSON. Before we resume with our second panel—if we can have your attention back there—I'm going to ask Dr. Griffin if he would make one additional clarification on the last question that was asked of him.

Dr. Griffin?

Dr. GRIFFIN. Yes, thank you, Senator Nelson.

In hearing what was said in my mind, and talking with my NASA colleagues, I realized that we might have left some confusion in place in talking about whether or not this last flight is flown.

In the draft authorization bill that you've offered up, there are provisions that require us to keep Shuttle production contracts open. That's extremely expensive to do, and that leads us into the $3 to $4 billion range to preserve the program for another year, which we—and this is the point of clarification—do not need to do to fly a final flight.

Once the hardware has been delivered, if we are allowed to continue shutting down the program on schedule, as we planned, the launch team can launch that last flight on the monies that have been appropriated, even if it comes after the fiscal year boundary, because the money has already been appropriated, and normally you give us two-year money. And it would not require us to keep Shuttle production contracts open, thus allowing us to save considerably more money.

Senator NELSON. And that's where you come up with the estimate of $300 to $400 million, extra?

Dr. GRIFFIN. Exactly, exactly. It's only if we retain the opportunity to produce more Shuttle hardware by keeping contracts open that we get into the multi-billion dollar range, and I would really, really want to avoid doing that.

Senator NELSON. All right, thank you very much, Dr. Griffin, for that clarification.

Dr. GRIFFIN. Thanks for asking.

Senator NELSON. Yes, sir.

We want to welcome the next panel.

Lynda Weatherman, the President and CEO of the Economic Development Commission of Florida's Space Coast, Ms. Lisa Rice, President of the Brevard Workforce Development Board, Mr. Randy Berridge, President of the Florida High Tech Corridor Council, and Mr. Steve Kohler, President and CEO of Space Florida. We certainly welcome you all.

What we're going to do is ask you to keep your remarks to 5 minutes, and is it OK with you that we just let them go, all, and then we'll get into the questions. And there is a clock before you, so you can watch your time.

Ms. Weatherman?

STATEMENT OF LYNDA L. WEATHERMAN, PRESIDENT AND CEO, ECONOMIC DEVELOPMENT COMMISSION OF FLORIDA'S SPACE COAST

Ms. WEATHERMAN. Thank you. Thank you, Senators.

The Economic Development Commission of Florida's Space Coast is seriously concerned of the economic and business impact of retirement of the Shuttle, and the impending gap of lost jobs due to transition. Earlier this year, NASA released preliminary estimates of the expected employment changes, as a result of the upcoming shifts in the workforce.

Through 2010, the Agency projects between 5,700 and 6,400 workers will be displaced. An internal EDC analysis of the higher job loss figure, using a widely accepted economic impact model, estimated that the cumulative economic impact to Brevard County over the next 3 years, at approximately 13,000 jobs lost, and $650 million in direct revenue.

Since the announcement of the *Vision for Space Exploration,* the EDC worked to develop a plan of action to mitigate the job loss.

The first, and successful, effort, was to attract and build the Crew Exploration Vehicles, Orion, in Brevard County. This was an immense undertaking, as in the 50 years of space exploration in the State of Florida, the state has never been successful in attracting the manufacturing and/or assembly of a launch vehicle of a major component of such size.

On February 22, 2006, Lockheed Martin announced plans to assemble the CEV in Brevard County, contingent on securing final CEV contract.

This will result in 400 direct jobs, and at minimum, $35 million capital investment, a first successful—however, initial—step in mitigating the job loss due to the Shuttle transition.

Now, for the plan of action to mitigate the job gap. The EDC strategy is centered around 4 initiatives—number one, work derived from exploration program, mostly our Constellation-oriented programs; number two, commercial opportunities tied to COTS, CRS, supply chain business opportunities, satellite and assembly manufacturing facilities; three, space tourism; four, emerging opportunities.

Initiative number one, exploration. Key one, keep the Constellation Program sold during the change in Administration. This involves educating the Presidential candidates, shaping platforms, and informing selected House and Senate members and staffers, related to the importance of Constellation to the state and Brevard County.

Key two under the exploration program: get work tied to that and bring it here. Participate in a development and implementation of a plan for incumbent contract workers during a transition period from Shuttle to Constellation.

Key three, make widespread distribution of Central Florida supply chain study results, which identify several hundred high-tech companies capable of satisfying Federal requirements, this will be spoken more by my colleague, Mr. Berridge.

And finally, key four, identify and bring Constellation programs here to KSC, not as a sense of entitlement, but in the same spirit, Senator Nelson, and Senator Martinez, as we did with BRAC—

identifying what can we do as a local community to enhance programs being brought here, what we do as a partnership, and certainly not a sense of entitlement.

Initiative number two, commercial. Key one, identify and make contact with each potential contractor associated with COTS and CRS, and International Space Station.

Key two, maintain KSC as the gateway to space, promote the use of utilizing existing launch infrastructure for support of the International Space Station for cargo, and leverage existing workforce inherent in the use of Atlas and Delta.

Key three, promote and support the use of launch capabilities of crew support for ISS out of KSC, the United States of America, and to address the U.S. human spaceflight gap.

Key four, identify and characterize all support facilities that may be of use to COTS, or CRS contractors.

Key five, identify and characterize those incumbent contract employees that may be available to support commercial launch and processing opportunities.

Key four, under commercial, identifying and promote to domestic and international satellite and relevant component manufacturers, the competitive advantages of locating plants in Brevard County.

Initiative number three, space tourism—establish and maintain a flight operations capability in Brevard County, maintain awareness of the evolving space industry and promote the competitive advantage of Brevard County, and work with our tourist industry to promote this area—both in economic development and tourist initiative.

In emerging opportunities, key one, maintain an awareness of those opportunities that involve exploiting KSC-developed technology, tracking newly assigned R&D tasking for KSC, promote KSC as a gateway to International Space Station, and the National Laboratory, market the national Shuttle Logistics Depot as the Depot for continuing support of Shuttle, ISS, and all Constellation programs.

Number four, key number two under emerging opportunities, lobby for closer cooperation between all Federal agencies that have an interest or need for space-based operations, including DOD, NIH, DOA, DOE.

The EDC will work with Space Florida, Enterprise Florida, Workforce Florida, and the Brevard Workforce Development Board, and other state and county organizations.

Senator NELSON. I need you to wrap up, Ms. Weatherman.

Ms. WEATHERMAN. Yes.

Senator NELSON. And each of your written testimonies will be put in and become as part of the record.

Ms. WEATHERMAN. OK, and one sentence and I'm done. Thank you, sir.

While the challenges of our area are indeed serious, the passing successful actions will provide a template for future actions, however, the current potential recessionary economy, the need for support via Federal, State and local agencies is critical, and will determine the degree to which we mitigate the impending job loss at the Space Coast.

Thank you, sir.

[The prepared statement of Ms. Weatherman follows:]

PREPARED STATEMENT OF LYNDA L. WEATHERMAN, PRESIDENT AND CEO, ECONOMIC DEVELOPMENT COMMISSION OF FLORIDA'S SPACE COAST

Economic Impact

The Economic Development Commission of Florida's Space Coast (referenced in document as EDC) is seriously concerned of the economic and business impact of the retirement of the Shuttle and impending "gap" of lost jobs due to the transition.

Earlier this year, NASA released preliminary estimates of the expected employment changes at each of its centers as a result of upcoming changes to the agency's program of work.[1]

Through 2010, the agency projects between 5,700 and 6,400 KSC workers will be displaced as NASA transitions from the Shuttle Program to that of the Constellation, before the center regains some employment as it ramps up in preparation for the new vehicle.

An internal EDC analysis of the higher job loss figure, using a widely-accepted economic impact model and the opinions of our contracted Space Consultants, estimated the cumulative economic impact to Brevard County over the next 3 years at approximately *13,000 lost jobs and $650 million in lost income:*

Estimated Economic Impact of Proposed KSC Job Losses*

	Direct [1]	Indirect [2]	Induced [3]	Total
FY 2008–FY 2009				
Employment	700	301	419	1,420
Labor Income	$44,800,000	$14,224,290	$12,236,400	$71,260,690
Output	$210,693,460	$48,808,770	$37,767,010	$297,269,240
FY 2009–FY 2010				
Employment	900	387	538	1,825
Labor Income	$57,600,000	$18,288,370	$15,732,520	$91,620,890
Output	$270,891,580	$62,754,130	$48,557,590	$382,203,300
FY 2010–FY 2011				
Employment	4,800	2,062	2,871	9,733
Labor Income	$307,200,000	$97,537,960	$83,906,760	$488,644,720
Output	$1,444,755,070	$334,688,630	$258,973,790	$2,038,417,490
Cumulative				
Employment	6,400	2,750	3,828	*12,978*
Labor Income	$409,600,000	$130,050,620	$111,875,680	*$651,526,300*
Output	$1,926,340,110	$446,251,530	$345,298,390	*$2,717,890,030*

*All numbers negative; analysis assumes average annual wage of $64,000, per EDC Space Consultants.
[1] Captures the impact the initial job loss has on the KSC population.
[2] Captures the impact of decreased inter-industry purchases as KSC responds to decreased activity.
[3] Refers to the impact of the decreased activity that occurs across the Brevard economy because of the lost income paid by all of the businesses involved, directly or indirectly (diminished household spending).
Source: Economic Development Commission of Florida's Space Coast (using IMPLAN economic software).

Background and Early Success

Since the announcement of the *Visions for Space Exploration* the EDC worked to develop a plan of action to mitigate the job loss. The first and successful effort was to attract and build the Crew Exploration Vehicle (Orion) in Brevard County. This was an immense undertaking—as in the 50 years of Space Exploration in the state of Florida, the state has never been successful in attracting the manufacturing and/or assembly of a launch vehicle of such a major component. On February 22, 2006 Lockheed Martin announced plans to assemble the CEV in Brevard County contingent on securing the Final CEV contract. On August 31, 2006, NASA announced the award of the contract to build the CEV to Lockheed Martin. This will result in

[1] "*Workforce Transition Strategy—Initial Report*", National Aeronautics and Space Administration, March 2008.

400 direct jobs and $35 million capital investment—a successful initial step in mitigating the job loss due to the Shuttle transition.

Plan of Action to Mitigate the Job Gap

The EDC's strategy is designed around four key initiatives: (1) Worked derived from Exploration Programs (mostly Constellation oriented programs; (2) Commercial opportunities tied to COTS, CRS, Supply Chain business opportunities and Satellite Manufacturing and Assembly facilities; (3) Space Tourism; and (4) Emerging opportunities. The overall goals of the key initiatives is focused on generating new (and/or retaining existing) high skill high wage jobs in Brevard County).

Those Key Actions associated with each of the four major areas of interest are listed below.

Initiative 1—Exploration

Key 1. Keep the Constellation program(s) sold during the change in administrations. This involves educating the Presidential candidates, shaping party platforms and informing selected House and Senate members and staffers relative to the importance of Constellation to the State and to Brevard.

Key 2. Participate in the development and implementation of a plan for incumbent contractor workforce during the transition period from Shuttle to Constellation.

Note: At the same time the space workforce is likely to decline, the demand for aviation workers in Brevard is expected to increase. Hence, it is critical that training programs be put in place to effect a smooth transition between these two sectors of the aerospace industry. It is also extremely important that the potential aviation employers be identified together with a characterization of their workforce requirements (skills, quantities and need dates).

Key 3. Make widespread distribution of the Central Florida Supply Chain Study results which identified several hundred Florida High Tech Corridor companies capable of satisfying Federal requirements for small business participation in the Constellation program(s).

Initiative 2—Commercial

Key 1. Identify and make contact with each potential contractor associated with COTS (Commercial Orbital Transportation Services) and CRS (Commercial Resupply Services (of the International Space Station)). Identify needs and demands of these contractors associated with COTS and CRS so that we can respond to their specific business, investment and workforce needs.

Key 2. Maintain KSC as the "gateway" to Space. Promote the use of utilizing existing launch infrastructure to support the International Space Station (ISS) for cargo and leveraging existing workforce inherent in the use of Atlas and Deltas.

Key 3. Promote and support the use launch capabilities of CREW support for ISS out of KSC to address the U.S. Human Space Flight Gap.

Key 4. Identify and characterize all support facilities that may be of use to a COTS/CRS contractor.

Key 5. Identify and characterize those incumbent contractor employees that may be available to support commercial launch and processing opportunities. This effort includes making available the Supply Chain information referenced above.

Key 6. Identify and promote to domestic and international Satellite and related component manufacturers the competitive advantages of locating plants in Brevard County. As this industry sustains and grows, the need for additional sites in key markets such as the U.S. and Florida will be needed. The EDC will aggressively seek out this new diverse investment opportunity.

Initiative 3—Space Tourism

Key 1. Support Zero G in establishing and maintaining a flight operations capability in Brevard.

Key 2. Maintain an awareness of the evolving space tourism industry and identify potential flight operators and related ground based service providers.

Key 3. Market Brevard's technical and tourism capabilities to the several space tourism operators.

Initiative 4—Emerging Opportunities

Key 1. Maintain an awareness of emerging opportunities to include but not limited to:

a. Exporting KSC developed technology to Brevard businesses and conversely promote technologies and capabilities of those same Brevard businesses to NASA and the Constellation prime contractors.

b. Tracking newly assigned R&D tasking for KSC.

c. Promote KSC as the "gateway" to the International Space Station National Laboratory.

d. Market the NSLD (National Shuttle Logistics Depot) as the depot for continuing support of Shuttle, the ISS, and all Constellation programs. Additionally, promote NSLD in support of commercial and space tourism hardware elements.

Key 2. Lobby for closer cooperation between all Federal agencies that have an interest or need for space-based operations (to include, NASA, DOD, NIH, DOA, DOE, NOAA, FAA, etc).

Note: The most common product associated with the activities surrounding "emerging opportunities" is likely to be a series of position papers suitable for education and lobbying.

Key 3. Identify and attract diversified industries to Brevard County. These industries, not directly associated or inherent in space, will contain high tech methods and kindred skill mix classifications associated with potential loss workers tied to Transition. This key initiative is best noted in the recently successful location of *Embraer* on May 13, 2008. The assembly of the Very Light Jet (VLJ) Class Phenom 100 and 300 in Melbourne, Florida will hire 200 technically skill workers. Some of these workers may be absorbed from the job loss tied to Transition.

General and Closing Comments

1. The EDC will work with Space Florida, Enterprise Florida, Inc., Workforce Florida, Inc., the Brevard Workforce Board, and other state and county organizations together with companies from the aerospace community to accomplish the intent of the Space Plan.

2. Many of the companies expressing interest in doing business in the county have need for financial assistance and/or incentives. Accordingly, part of our action plan is to develop a capability to define sources of financial support and to serve as a "broker" between the parties.

3. Virtually all-prospective employers are interested in workforce quality and availability as well as available facilities to house their employees and operations.

While the challenges for our area are indeed serious, the past and successful efforts provide a template for future actions. However with the current potential recessionary economy, the need for support via Federal, state and local agencies is critical and will determine the degree to which we mitigate and at best nullify the impending job loss on the Space Coast.

Senator NELSON. Thank you.

Ms. Rice?

STATEMENT OF LISA RICE, PRESIDENT, BREVARD WORKFORCE DEVELOPMENT BOARD, INC.

Ms. RICE. Thank you for allowing us to come before you and address the efforts the Brevard Workforce Development Board is taking in regards to the Aerospace Workforce Transition.

It has certainly been a collaborative effort, and I thank all of those who have been involved. We're very anxious to serve the community, and mitigate that impact of the changes, as you mentioned, Senator Nelson.

In August 2007, the Workforce Board released the *Aerospace Workforce Outlook Report,* which actually talked about 3,500 jobs being lost, at this point. And in it, we also address the need to gather stakeholders to determine the path that we would take in this workforce transition. Those stakeholders were brought together, and form the Aerospace Career Development Council. They set up work teams, and the result is $1.25 million coming in general revenue from the State of Florida in funds.

It's the implementation plan of those funds that I'm going to speak about in just a minute, however, I'd like to tell you very quickly about a bridge.

In 1989, the Oakland Bay Bridge top deck collapsed onto the lower deck. Normally, it would have taken months to bring that bridge back into full operation. However, it was just closed for over 30 days. The amazing reason that it was—had a quick rebuild, is directly relevant to the upcoming changes from Shuttle to Constellation. The winning contractor embedded his city's workers, and the city inspectors into the production plans, to allow for a quick design to development to implementation cycle. This is exactly the type of forward thinking that needs to be applied, and it is what the Workforce Board is taking, with respect to retooling and retraining of the aerospace workforce.

The Board's Transition Plan begins with a communication effort, focused on lifelong learning. We know that we need to engage the workforce in skills upgrades for both Constellation activities, and for those who may venture into totally new phases of their careers. We look at this as both retooling for the aerospace phase, and also retraining for new careers.

Additionally, we know we have to communicate with businesses, to understand the emerging skills that they have, and that will translate into skills training for our workforce.

Our second component involves an assessment of workers, again understanding where their skill levels, and what type of training needs to occur, in order to bring them to the skills levels needed for Constellation activities, or for new occupations. So, obviously, training is the largest component of our plan.

We have already started with retooling of workers with Lockheed Martin and the Orion production activities. We were able to sit early with Lockheed Martin, and determine the needs that they have, and this has really given us a jumpstart with their workers.

The retooling activities are essential, if we want to model that proactive stance that was taken with that bridge in California. Our workforce has been through a lifecycle of a space flight system, they are ready for a new challenge.

Following NASA's Systems Engineering Framework, our training is focused on common technical processes, we incorporate tools and methods, and we know we have to engage the workforce early. We have to recognize that the U.S. has not had a new space flight system since Shuttle, and it is incumbent upon us to undergo a corresponding organizational and skills transformation, one that has not been seen since Apollo.

We have the talented workforce, now we can build upon skills by embedding their training into the design, the development, the production, and the implementation phases that are critical to Constellation's success. Embedded training is not a new concept, by the way, it was used with the International Space Station, where operations people were embedded with the design and development, and that allowed them both to share ideas and perspectives.

Our fourth component, and final component, addresses the human factor of the plan. It's about the life changes that are occurring with this workforce, already. We will provide career transition mentoring that's designed to motivate workers, by moving through the phases of transition, helping them understand challenges, define goals, and develop realistic action plans.

In closing, Wayne Gretszky was often recognized as the very best hockey player ever, and when asked why, Wayne replied that he goes to where the hockey puck is going to be, not to where it is. Well, that's exactly the same approach that this Workforce Board is taking. We're working now to increase the workforce proficiency, at the earliest possible stage, while in complete support of the beginning of a new systems engineering life cycle.

Thank you for your time.

[The prepared statement of Ms. Rice follows:]

PREPARED STATEMENT OF LISA RICE, PRESIDENT,
BREVARD WORKFORCE DEVELOPMENT BOARD, INC.

Thank you for this opportunity to address your committee regarding the efforts of Brevard Workforce Development Board (BWDB) related to the aerospace workforce transition. This has been an ongoing collaborative effort and I thank all of those who were involved. We are anxious to serve the community and mitigate the impact of the changes as much as possible.

In August 2007, the Board released the *Aerospace Workforce Outlook Report,* which addressed several recommendations including gathering stakeholders to determine the path for the workforce transition. The Aerospace Career Development Council (ACDC), set up work teams around workforce, education and economic development activities, which resulted in securing $1.25 million in general revenue funds for retooling and retraining the aerospace workforce. It is the implementation plan for these funds I will focus on in the next few minutes. However, before I begin outlining the plan, I'd like to quickly tell you about a bridge.

In October 1989, the Oakland Bay Bridge top deck collapsed onto the lower deck. Normally it would take months to bring such a structure back into full operation; however, the bridge was closed for just over 30 days. The amazing reason for this quick rebuild is directly relevant to the upcoming changes from Shuttle to Constellation. The winning contractor embedded his workers and the city's inspectors into the production plants to allow for a quick-design to development to implementation cycle for rebuilding the bridge. This forward thinking approach is the same one the Board is taking with the retooling and retraining of aerospace workers.

The Board's transition plan begins with a communication effort focused on life long learning. Engaging the workforce in skills upgrades is necessary for those going to work on Constellation and for those who may venture into totally new careers. We view this as either retooling their skills for the next phase of aerospace work or retraining them for their next phase of life.

Additionally, communication with businesses will provide us information about emerging skills which then translates to training requirements for the workforce.

Our second component involves a workforce assessment to understand where workers need to improve to be competitive for Constellation activities. This will ensure that NASA and contractors take full advantage of the current workforce skills for the new spaceflight system.

However, not all workers will remain with Constellation and for those who are ready for the next phase of their life the workforce assessments will be valuable in pointing the way to high demand, high wage occupations in the area.

Training is the largest component in the transition plan. We're already retooling workers with Lockheed Martin's Orion production activities. The ability to sit with Lockheed Martin at an early stage to identify these training needs gave a jumpstart to the training processes.

These retooling activities are essential if we want to model the proactive approach used on that bridge in California. Our workforce has been through the life cycle of a spaceflight system and they are ready for the challenges of a new system. Following NASA's systems engineering framework, training is focused on common technical processes, incorporates tools and methods, and engages the workforce early. We must recognize that the U.S. has not had a new spaceflight system since the Shuttle and it is incumbent upon us to undergo a corresponding organizational and skills transformation that's not been experienced since the end of Apollo.

We have the talented workforce, now we can build upon their skills through training embedded in the design, development, production and implementation phases critical to Constellation's success. Embedded training isn't a new concept as a similar approach was used with International Space Station allowing operations people to learn the system first-hand and offer operations perspectives from the start.

The fourth component addresses the human factor of the plan. This is about life changes the workforce is already experiencing and will provide career transition mentoring designed to motivate workers by focusing on moving through the phases of transition. Our staff will be there to help the workers understand challenges, define goals and develop realistic action plans.

Additionally, staff will analyze customer education and work experience to provide direct information on occupations that match closely to their skills. As training needs are identified staff will: provide information on available courses; enter into individual training agreements with financial support; and follow up with individuals throughout the training process.

In closing, Wayne Gretsky was often recognized as the best hockey player ever. When asked why, Wayne replied that he goes where the hockey puck is going to be, not where it is now. We are taking this same approach in order to, increase workforce proficiency at the earliest possible stage while in complete support of the beginning of a new systems engineering life cycle.

Thank you for your time.

Senator NELSON. Thank you.

Mr. Berridge, of the Florida High Tech Corridor Council?

STATEMENT OF RANDY BERRIDGE, PRESIDENT, FLORIDA HIGH TECH CORRIDOR COUNCIL

Mr. BERRIDGE. Chairman Nelson and Senator Martinez, thank you, on behalf of UCF President John Hitt, USF President Judy Genshaft and UF President Bernie Machen, thank you for the opportunity to share a brief overview about our Florida High Tech Corridor Council and our mission to attract, retain, and grow high tech industry, and the workforce to support it in the 23 counties in the central part of the great State of Florida.

We invest in research projects with companies, we invest in marketing projects with economic development organizations, and we invest in workforce projects with workforce boards, and community colleges.

In our first 12 years, we have partnered with more than 250 companies on 900 research projects, where we have put $50 million of Florida High Tech Corridor funds on the table, and the success of the program is that those companies have put more than $450 million on the table, either in their funds, or in Federal grants, to do the research—think about it—with the very companies and the very industries that we're all working to attract, retain, and grow.

In that process, we engaged 1,500 doctoral and graduate students, and 300-some professors to do those research projects. A coed came up to me last year and said, "This is really a retention program," and I said, "Yes, go to the head of the class, it certainly is."

We also invest in marketing projects, to market our entire region as a high-tech region, and were recognized last year by Core Net Global as one of the top 5 innovative high-tech regions in North America.

We do that by partnering with our economic development partners and creative folks, like Lynda Weatherman, who come up with ideas, in terms of getting more contracts for existing companies and new companies, in terms of the very subject we're talking about today. So, we're proud to invest in the program that, that Lynda came forth with.

We also invest in workforce projects with our community colleges, and I'd like to single out Jim Drake, with Brevard Community College. We invested—thanks to Tom Gamble, God rest his

soul—we invested more than $100,000 in a recertification program for their existing, nationally recognized aerospace technician recertification program—think about that, helping re-certify a recertification program.

I'd like to share with you in this setting—I realize it's a public setting—Enterprise Florida hosted a gathering of the CEO and members of his team, of a rather large company that was looking to do an expansion in our great state. We had dinner with the CEO. And in that dinner, he indicated that Florida was not on the top 3 states that he was considering for that expansion. And one of the members of the team at that dinner asked him why, and he said, "Well, I'm really concerned that I can't find the engineers, some 200 that I need out of the 600 employees that I'm going to hire for this expansion, I don't believe I can find the engineers in Florida that I need to do this project."

I asked him if he was familiar with the imminent transition of the Shuttle to the new—I didn't get past the word "new," Chairman Nelson, he cut me in mid-sentence—he said, "You've just come to the top 3 in terms of states we're considering." It hit him that the potential for this entire region is to help Brevard County and help others in terms of mitigating the results of this surplus.

So, the Florida High Tech Corridor Council is here to serve, through research projects, helping our marketing friends, and helping our workforce friends, in this charge that you have.

Thank you for the time.

[The prepared statement of Mr. Berridge follows:]

PREPARED STATEMENT OF RANDY BERRIDGE, PRESIDENT, FLORIDA HIGH TECH CORRIDOR COUNCIL

On behalf of UCF President John Hitt, USF President Judy Genshaft, UF President Bernie Machen, co-chairs of the Florida High Tech Corridor Council, thank you for the opportunity to present a brief summary of our 23-county Florida High Tech Corridor Council (FHTCC). Our mission is to attract, retain and grow high tech industry through our Matching Grants Research Program (MGRP) as well as through our marketing and workforce initiatives. On behalf of our three research universities, our council, our core team, our economic development, workforce, academic, corporate, governmental and community partners we hope that we can add value to the region's efforts during this time of transition.

Let me first start by providing a very brief background about the Florida High Tech Corridor Council (FHTCC). A dozen years ago, the presidents of the two major research universities on the I–4 Corridor, Dr. John Hitt at the University of Central Florida and then University of South Florida President Betty Castor, recognized the benefits of working together to provide research and other support needed by high tech, high wage industry. Through designation by the Florida Legislature the Florida High Tech Corridor Council was formed in 1996. The University of Florida joined the Corridor Council in 2005.

Our Council recently commissioned a study to analyze the impact of our unique public-private partnership that engages university researchers with corporate entities seeking technological breakthroughs.

The results are outstanding: During the first 12 years of operation, the FHTCC, through its Matching Grants Research Program, delivered an incredible 9-fold return on investment . . . $450 million on an initial investment of just $50 million.

The basics are this: From July 1996 to June 2008, FHTCC invested $50 million in 900 applied research projects with more than 250 Corridor companies . . . attracting $450 million in corporate and Federal matching grants. Importantly, these figures *do not* include the application of a 3 to 1 multiplier commonly used in economic development assessments.

The sheer numbers and return on investment are impressive, but the real story is what's behind them. Each applied research project involved the keen minds of professors and students at the Corridor's three renowned universities (the Univer-

sity of Central Florida, the University of South Florida and the University of Florida) and their corporate partners at companies large and small. Let me give you just a few highlights:

- 20 participating companies leveraged our grants to attract 60 Federal SBIR/STTR grants worth $12 million.

  &One such company is Rini Technologies Inc. Its scientists and engineers, along with UCF professors, have conducted applied research on a new system to cool laser weapons. Let me quote Dan Rini: "Without a doubt, the FHTCC matching grants research program had a measurable impact. The structure of the program is well thought-out, and it pays dividends. Without the program, more than likely I would not be in business."

- More than 100 patents have been awarded to participating partners and more than 130 additional patents are pending.
- 8 new companies have been created.
- 7 new centers of research have evolved, thanks in part to our FHTCC support.
- 1,500 graduate students have been engaged in these applied research projects.
- More than 120 of those students have been hired by the participating companies.
- 300 faculty members from the three universities have guided the research.

These applied research projects have generated countless technological breakthroughs, ranging from improved medical therapies and treatments, to vastly more efficient lasers, satellite communications, computing ability and power generation. *Whether for military, industrial or consumer applications, there are far too many technological accomplishments to list here.*

The study clearly demonstrates that the Matching Grants Research Program (MGRP) produces vast, tangible benefits for the companies that UCF, USF, and UF partner with in Florida's High Tech Corridor and for the state's economy as a whole. Whether it's developing new intellectual property, building a highly skilled workforce, obtaining specialized equipment for our universities, creating new companies to commercialize emerging technologies . . . or achieving technological breakthroughs that improve the human condition . . . the MGRP, through the leadership of our three universities, has consistently delivered a tremendous return on investment through this unique partnership with corporations, the state and the Federal Government.

As we have noted earlier, with the mission to attract, retain and grow high tech industry in our 23-county Corridor, FHTCC invests the majority of its state funds in its MGRP, benefiting companies in the varied industries we are working to attract, retain and grow. FHTCC focuses matching grants on the following industries targeted for growth: Agritechnology; Aviation and Aerospace; Digital Media/Interactive Entertainment; Financial Services; Information Technology; Life Sciences and Medical Technologies; Microelectronics/Nanotechnology; Modeling, Simulation and Training; Optics and Photonics; and, Sustainable Energy.

In addition to a recognized successful research program, FHTCC also invests in marketing and other programs with more than two dozen economic development partners throughout our 23-county Corridor. So, as you would expect, we invest in advertising, trade shows and conferences across the state, the Nation and the globe as a way of promoting our Corridor as a high tech region. We also invest with EDO partners in programs designed to help companies in our various industry clusters. A prime example is our partnership with the Lynda Weatherman, President of the Space Coast EDC, and her associates, wherein we have invested in a program which she is managing to benefit not only Brevard County, but the other 22 counties in the Corridor. This initiative is designed to help companies obtain contracts to produce components and sub-assemblies associated with the new crew vehicle as well as the manufacture of components for a variety of military equipment.

The third major area of FHTCC investment is associated with workforce programs. We have invested in the development of associate degree programs by our community college partners in the areas of: Microelectronics; Biotechnology; Modeling, Simulation and Robotics; Photonics; IT Security; Wireless Technologies; and Digital Media. FHTCC, in partnership with Brevard Community College (BCC), invested $100K in a project designed to update the components of BCC's nationally recognized aerospace technician recertification program.

In addition to research, marketing, and workforce projects and programs let me conclude by showcasing an example of how I believe we can help Brevard County and the region mitigate the impact of the surplus of employees associated with the transition from the Shuttle to the new crew vehicle.

I recently attended a gathering at which Enterprise Florida and regional economic development leaders hosted a major corporate relocation prospect. At that dinner, the CEO of this prospect corporation shared with us that our state was not in the top three locations he was considering for the expansion of his company. The reason he gave was his concern over his ability to hire some 300 engineers. I asked him if he was aware of the surplus of some 6,000 highly trained engineers, technicians and other personnel associated with NASA's transition from the Shuttle to . . . the CEO did not let me finish the sentence. He realized the potential solution to his problem and told us that we had just made it into the top three.

This community of state, regional, county and city governmental, academic, corporate, workforce, economic development, and community leaders have and will continue to work together with NASA to resolve issues associated with the imminent surplus of some truly outstanding employees.

Senator NELSON. Thank you.

Mr. Kohler, of Space Florida?

STATEMENT OF STEVE KOHLER, PRESIDENT, SPACE FLORIDA

Mr. KOHLER. Thank you, Senator Nelson, Senator Martinez. It's our pleasure to be here.

As you are aware, Space Florida is a special district created by an Act of the Florida legislature in 2006, which is focused, as an entity, on the aerospace industry across 3 sectors, civil, military and commercial.

We're heard a lot of discussion this morning up to this point on the—with a great deal of appropriate focus on the civil side, with the detailed description of the activities at KSC and NASA.

One of the points that I wanted to bring up at the moment was the NASA bill that has made its way through for authorization and appropriations, although—as we heard—it may or may not survive in whole or in part through the process. There were some relevant items in that bill that I think were appropriate to draw attention to.

One, there was an inclusion of reference to the development of $150 million toward a commercial space crew vehicle. Another one was a reference to the support of COTS–D development, which is a commercial competition that would add to the current COTS competitive environment.

There were several references to the International Space Station, including a specific reference to the Life Sciences Lab that the State of Florida invested over $30 million in developing on the campus at KSC, and the relevance to that relationship between the ISS, now designated as a National Lab, and the lab that the State of Florida invested in.

Also, there was a reference to the need for the development of enhanced-use lease policy renewal, which is a critical tool that the state, Space Florida, and other entities would have to utilize in order to develop properties on that 150,000-acre tract of land that currently is held by NASA.

In addition, there was a specific reference to the need for an interagency study on range options, and range access, and then finally a reference to the need for export control issues. As you know, this has become a competitive challenge for us—not only in Florida, but in the Nation, in order to have an effective space launch capability, and commercial development capability.

From the state's perspective, and Governor Crist's leadership as the Chair of Space Florida Board, and his designee, Lieutenant

Governor Kottkamp, the legislature in a tough budget year in the State of Florida, managed to appropriate directly, $20 million toward space-related activity. In addition, through S.B. 2310, directed 1.5 percent of the state's net pension assets to be used for R&D, advanced technologies—including space—and that is almost $2 billion worth of potential.

And then, finally, in an informed consent legislation at the state level, which was a key piece in order to maintain a competitive edge, if you will, to entice commercial space interests for the State of Florida.

Last week, our Board of Directors met, and we talked specifically on three—among many—elements. One was the assignment of Launch Complex 36 to the state through Space Florida, for the purposes of developing commercial space capability for multiple users. I can report to you that the delivery of that presentation to the 45th Space Wing was made, where the Space Wing has now moved up the chain of command, and last week was presented to General Shelton, and we expect it to move on through to the 4-Star for consideration. It is critical to have that piece of infrastructure to add to the capacity that NASA provides here at KSC.

We also continue to pursue horizontal launch access options, and our relationship with NASA KSC included the signing of a recent MOU to enable us to pursue these kind of opportunities for development of assets that exist on the campus.

And we continue to work, through your efforts, as you might recall, the assignment of Launch Complex 40, and one of the COTS competitors, and we work hard to develop continuing efforts with that company as it completes its obligations to NASA.

And then finally, we continue to work toward the development of a Logistics Center, as well. We recognize the importance of this skill set that exists that is unique to this range, and this base, and in fact is unique to the marketplace. And many of the commercial providers have a distinct interest in that capability.

Finally, on the military side, we are supporting research at UF, to develop a Blue Force tracking capability that would involve situational satellite awareness development, and potentially commercial market application.

We think that these are the kind of issues, and the point of drawing the attention to the relevance of those bill sections is that there is a connection between what is being considered in Congress, and hopefully, eventually, enacted in law, and what we can do at the state level to leverage, in order to improve these opportunities.

Thank you, and I would be willing to answer any questions.

[The prepared statement of Mr. Kohler follows:]

PREPARED STATEMENT OF STEVE KOHLER, PRESIDENT, SPACE FLORIDA

Introduction

Thank you Chairman Nelson and Senator Vitter:

I am Steve Kohler, President of Space Florida. Space Florida is a special district responsible for promoting and developing Florida's space and aerospace industry. More specifically we were created by the Florida legislature and the Governor's office for the purpose of advocating for the space industry in Florida.

I want to thank you for holding this hearing here at the Kennedy Space Center to address and bring attention to the issue of Shuttle workforce transition. As you

all know, with the retirement of the Space Shuttle in 2010 approximately 6,400 jobs will be lost as a result.

I would also like to thank you for working to get an additional $200 million in funding for NASA added to the Iraq Emergency Supplemental package. The added funding is critical for NASA's ability to return to flight activities associated with the Space Shuttle. This funding is also critical to help close the "gap"—the anticipated time between the Shuttle retirement and the launch of the new Constellation program. As you know, the longer the gap, the more stress is placed on the Florida space and aerospace workforce. We need a strong retention program so that the skilled labor is in place when the new Constellation program is in full swing.

Securing this funding will be a very significant achievement in such a tight fiscal year. Space Florida is pleased to be able to work with you and your colleagues on such an important issue. We will continue to support your efforts for additional NASA funding to help shape the budget for the incoming administration.

Additionally, your work on the NASA Authorization bill is to be commended. While we realize the Senate version has yet to be introduced, your committee's leadership on this issue has been significant. We believe the House of Representatives has done a very nice job in working on a NASA Authorization bill that includes additional funding for NASA as well as important range study and enhanced use lease language. I would also like to applaud the Space, Aeronautics Subcommittee for working in a bipartisan manner to provide NASA with the tools to move from the Shuttle program to the Constellation program.

However, I do think it is important to note that there are other options of returning to the Moon, and in the future, Mars, namely Commercial Orbital Transportation Services (COTS) D. COTS–D focuses on manned spaceflight and would work toward creating that capability in the commercial sector in addition to what NASA has undertaken with the Constellation program. The job creation from a COTS–D program would fit very well with the type of jobs that are currently held by NASA contract employees.

Actions by Space Florida

While the space industry in Florida is enduring a difficult period of time with the Shuttle transition it is important to note that Governor Crist and the Florida legislature have done a tremendous job of promoting the overall space industry in Florida. Florida is not sitting back during the Shuttle transition; we are working to support your leadership and are bringing the Florida delegation together in support of the space industry, which as you know is vital to the economy of Florida.

Space Florida is uniquely positioned to advocate for the space industry especially because of the tools the State of Florida has given us. Space Florida has the ability to work with the commercial space industry along with the Governor's office, the Florida legislature, the regional economic development groups, Congress, and many others. This flexibility gives us the capability to do tremendous things when working and advocating for the space industry in Florida.

Space Florida's workforce initiatives are focused on bringing new government and private sector opportunities to this area of the state. We have partnered with the Florida legislature, Workforce Florida, the Brevard Workforce Development Board, the regional economic development groups, and many others to help to bridge the gap between Shuttle retirement and the advent of the Constellation program. We have taken the lead to collaborate with the Florida delegation in a national leadership role to secure funds that NASA has lost due to the *Columbia* accident and Katrina setbacks and to acquire future funding that is vital to the space program here in Florida.

Direct Action

The workforce, as it relates to the Shuttle, has over time developed a very unique skill set that we are working to keep entrenched here in Florida. While many of Space Florida's initiatives to improve the workforce are indirect in fashion (*i.e.,* introduction of new businesses and business growth to stimulate job growth), Space Florida has worked with the Brevard Workforce Development Board on projects to address the Shuttle retirement in a more direct fashion. For instance, Space Florida has awarded the Brevard Workforce Development Board with funding to assist in providing aerospace workforce services in Brevard County regarding the transition of the aerospace workforce from Shuttle program activities to the Constellation program. Importantly, Space Florida provided a $50,000 grant to the Brevard Workforce Development Board to conduct an analysis of Space Shuttle retirement implications with respect to the aerospace industry workforce in Florida. This report was completed in August 2007 and provided a forward-looking analysis of the Brevard

County and statewide aerospace workforce that will be impacted by the planned retirement of the Space Shuttle in 2010.

Indirect Efforts

Additionally, we are engaged in projects related to improving future range development, enhanced use lease agreements with vertical and horizontal capabilities, prospective trade and enterprise zones, and particularly future commercial space development. For example, Space Florida has worked with companies, including SpaceHab and SpaceX on different projects to deliver valuable cargo to the International Space Station (ISS) in the future. Further, our most recent project with SpaceHab will establish a space-based, biotech corridor that stretches from the ISS to the Space Life Sciences Lab here at NASA's John F. Kennedy Space Center.

It is important to note that all of these investments being made by Space Florida for different projects, as well as research and development, will help to mitigate the effects of the Shuttle retirement. These research and development opportunities lead to job and new commercial partnerships at the Kennedy Space Center. For instance, our collaborative effort with the University of Florida on Blue Force Tracking Satellites will contribute most importantly to saving the lives of our troops in harm's way. As you all know, projects like this can lead to additional research, manufacturing, and thus new job opportunities in Florida.

While many jobs will be lost as a direct result of cutbacks to NASA with the Shuttle retirement, I think it is important to keep in mind the many indirect jobs that will also be lost as a result. Many NASA employees will likely transfer to elsewhere in the country or at the very least move away from Florida to find opportunities in a similar field. When these direct jobs leave Florida, and particularly Cape Canaveral, businesses such as restaurants, hardware stores, and other "mom & pop" establishments will be forced to close. As you well know, this will lead to very difficult economic times in Florida, which could be especially difficult considering the current economic troubles our Nation faces. However, you have a great opportunity to help turn things around.

Conclusion

In conclusion, we will continue to partner with the Air Force, NASA, our industry stakeholders and other states, when appropriate, to compete to attract business to Florida. We know we have the workforce, infrastructure, and overall mission capabilities that will best serve the national interest of space research and exploration.

We thank you again for coming and look forward to continuing to serve as a full-time resource to the Committee and our Florida delegation whenever and wherever you need us. I look forward to answering any questions you may have of me today.

Senator NELSON. I was deeply disappointed in the Orbital Sciences Corporation decision to launch in Wallop's Island, Virginia, instead of utilizing so many tremendous assets of pads that can be converted at the Cape Canaveral Air Force Station. You mentioned going up the command of the Air Force, I've gone all the way to the new Four Star Head of Air Force Space, talking to him about making it easy for you guys to work with them so that we can convert some of those pads, just like we're doing for SpaceX right now. Convert them for commercial launches, other than what's out there with the Atlas and the Delta.

Thank you for your presentation.

Senator Martinez?

Senator MARTINEZ. Thank you. Well, you know, Mr. Kohler, I want you to know that Senator Nelson and I will be working as a team, and anything we can do to make sure that Congress is there for these kinds of appropriations as time goes on.

And following up, as well, I'm going to be visiting the Patrick Air Force Base after we finish here today, on the very topic that you've discussed—the need for us to have a strong, cooperative partnership, so that the—the seeds have been planted over the last half century or more, here, of space exploration, can begin to now flour-

ish as part of a broader participation by the private sector, which I think is really where the future ultimately lies.

I just wondered if I could get a comment on those of you focused on workforce, as well as economic development, in reaction to what we heard today, which might be a substantially lower workforce loss than what we had been anticipating, and what your reactions are to that?

Ms. RICE. I would start out by again, going back to the fact that the Workforce Board did do an *Aerospace Workforce Outlook* report in August 2007. And when we did that report, we actually looked at some things that NASA didn't. We sat down with the prime contractors, with the subcontractors, and we talked to them very privately, and we aggregated their information to come up with historic retention rates, their retirement rates, and then we talked about new business packages. And what they, as a company, thought they would be bringing, or could bring, and estimates about the manpower that they thought they'd use.

And that's how we got to about a third of the workforce—not including NASA's workforce, I might add—we're looking at about 3,500 to 4,000 people or about one-third, retirement, normal attrition. Another third, to new packages, new business work that these companies expect to be bringing in.

Now, when I talk about new business work, it could very well be the kinds of things that NASA is releasing, or it could be new—completely new—business work that the company has in mind.

So, that leaves us with around 3,000–3,500 that we see are without a job. And that doesn't mean that that's the only place that we focused, because as I say, we have to look at the retooling, as well. Even if they're going to go to new business packages, the skills that they have at a mature level of a life cycle, which is where they're at, have to have some upgrading to match with that new infancy level, shall we say, of a life cycle of a new spaceflight system.

So, we see it as both pieces—we're looking at retooling for about 3,500, and we're looking at retraining, so there isn't a job loss, for another 3,500.

Senator MARTINEZ. Very good, I noticed in Mr. Griffin's testimony, he mentioned there won't be a need for tiles. And obviously there is a workforce there that is going to need to be looking at—obviously skilled, obviously talented, obviously needed—but they're going to be doing something different going forward than what they were doing in the past, and that's an interesting, sort of, realization.

Ms. RICE. Absolutely.

It is a challenging realization.

Senator MARTINEZ. Yes.

Ms. RICE. Because obviously one of the things that we don't want to create is any type of a panic, where people feel like they need to be leaving right now, find that job now, thinking what's going to happen to me? That's really why it's very important that everyone here at this table works together, and we make sure that the workforce understands that we're there to help them prepare today for 2010, but that we're also very cognizant of certain—occupations, like tile workers, who really need to focus on what's going to be their next effort.

And actually, there are quite a few efforts that we've been in conjunction with—EDC, as well as Enterprise Florida—the Workforce Florida Board, which I do have to thank them very quickly, they've put in some dollars, as well, and we also have one of the Workforce Florida Board members, Belinda Keiser, here with us today.

But we've been working on different industries that can use those same kinds of skills.

Did you want to say something there?

Senator MARTINEZ. No, we—go ahead, please.

Ms. WEATHERMAN. I was just going to say, the difficulty is knowing what tomorrow the skills are going to be, a challenge. But we could actually start identifying now, the CEV that we referenced was 2 years ago, it seems like a lifetime ago, just within the last 6 weeks, we have announced Embraer locating here in Brevard County.

Aviation, not aerospace, but technically similar nonetheless. So, we're starting to develop that skill mix train as we go on and be more successful.

Senator MARTINEZ. It's really encouraging to me to see what you're doing locally, and how you're pulling all of this together. Because, we know, in Washington, we don't have all the answers. In fact, we have darn few answers, and it really does take a community coming together and working together with all of these various component parts to ensure that this workforce has a place to go, and a future, and a hope.

And I think what you're saying is exactly right—we don't need the discouraging words to now, all of a sudden, panic folks and so forth. Remaining here, giving them a way where they can see a future for themselves and a future workforce, really is a terribly important part of the process.

Well, I want to thank all of you for what you do. Randy, great to see you, and your continuing work is very, very exciting, what you do in that High Tech Corridor initiative is so important to our future. We wish you well, and if we can be of help, I'm sure that both Senator Nelson and myself would love to hear from you as to how we can be helpful.

But, anyway, thanks to all of you.

Mr. BERRIDGE. Thank you, Senator.

Senator NELSON. And I thank Dr. Griffin for remaining here so that he can hear this discussion on how we're going to try to take care of our people. So, thank you very much.

Ms. Rice, what particular industries outside of space, and particularly, spaceflight, do you think that could readily utilize these kind of workers?

Ms. RICE. Actually, there are a lot of them. First of all, I would definitely echo onto aviation. That is a very key industry. The aerospace technicians that we have, going through Brevard Community College and SpaceTEC, have a lot of similar skills that flow along with the aviation industry.

In addition to that, alternative energy, especially with solar, since we have the Florida Solar Energy Center here, it's a Banner Center through WFI, Workforce Florida funding, there are many opportunities that will be coming out of that area.

Across the Corridor, we see biomedical growing in leaps and bounds, and the skills that come into play there are, again, very technical in nature. They require, not only people who are interested in life sciences, but people who are also mechanical in nature.

There's additionally, digital media that is taking on a whole new leap and bound, and I heard a wonderful presentation at the last Florida High Tech Corridor Workforce and Education Council meeting around digital media, and what it is going to entail. And it's going to have a lot of the same kinds of things, as far as technicians, engineers—we have the capability to walk these people into other jobs.

The primary point that I think that we need to focus on, is how do we embed that training as early as possible? And when you're talking about it with Constellation activities, then you're talking about something I heard very encouraging here today, which is the fact that we need to be having more of that production, more of that design and development—yes, I'm going to push the envelope there and say that we're not just operations and launch—and bring those activities, or at least embed our workers into those activities, so that they're working faster and harder together. That's the primary piece that I think we need to focus on.

Mr. BERRIDGE. Senator Nelson, if I might—compliments to Lisa and her team for using a few Corridor dollars, and others that you've managed to scrounge from various places, to do a study—not just in the Corridor, but around the state, in terms of potential openings that might fit the skills set. Don't want to lose them from Brevard, for sure, we're going to lose some, potentially. Why not be prepared to see where we might find opportunities for them in Orange or Osceola, or Lake or Volusia, or other surrounding counties? Perhaps the family could remain intact, and the talent could be kept as close to possible where it is located now.

Senator NELSON. Mr. Berridge, any other particular industries, companies that you think would be attracted here because of this pool of trained employees that will be temporarily laid off?

Mr. BERRIDGE. We've seen some recent reports showing the increase in IT employment in our region, perhaps bucking some national trends. So, there's an opportunity.

The digital media mentioned by Lisa, modeling simulation and training, a number of us in this room are part of the Military Affairs Commission in the Metro Orlando area, designed to protect the some $5 billion investment that we have there, in terms of modeling simulation and training industry. That industry seems to be growing.

So, there's some potential of, I would submit, of cross-pollinization.

And then you have the State of Florida investing close to a billion dollars in the likes of Scripps and Torrey Pines, and Burnham and SRI, and what we're trying to do to grow that bio-life sciences industry. So I'm—I've got to believe from a background at AT&T over 30 years, there's got to be some potential synergy there, as well.

But I would echo the comment—if our state and our region is willing to invest as much as we have in research, my gut is that today, perhaps, didn't give us the opportunity for a full vetting,

there's got to be some research opportunities that we can partner on together.

Senator NELSON. And with the announcement that Embraer is coming, and will be assembling the very light jet. Then depending on the Air Force tanker contract, that now looks like it's going to be re-competed, were that ultimately to be awarded as it was, originally, that would have been 500 sustaining engineering jobs over several decades, the life of that contract. But, it looks like that will be completely re-competed.

So, there are these opportunities, if we stay on top of it.

Ms. Rice, do you have a particular message here today to all of those workers that are concerned about getting laid off, on what they need to do to prepare for the transition?

Ms. RICE. Yes, I do—thank you very much for allowing me to do that.

The very, very first message is about lifelong learning. They have got to take advantage of coming out, meeting us, we have a Brevard Job Link Express coming out, thanks to our Space Act Agreement that we have with NASA, we're bringing that out onto NASA facilities, onto the Kennedy Space Center. There are multiple places, they can come in and can access our services—they can learn about other occupations, they can learn about what kind of training, we'll have workforce assessments out there—they have to take advantage of that. If they don't walk in there, they need to walk into one of our one-stop locations. They've got to do something to increase their skills. Assess where you're at, take advantage of the training dollars that are available for you, and increase your skills.

Senator NELSON. Thank you. And if all of those folks here who are reporting this meeting will help us get that word out, and if this meeting is still being televised by the NASA Channel, those who are within the sound of our voices, please take Ms. Rice's suggestions to heart. Go and apply for that additional training.

Mr. Kohler, I wanted to ask you, General Kehler, and Brigadier General Helms, the Air Force has had a new attitude in working, it hadn't been all so rosy in the past, but it seems to be a new attitude of working, and trying to free up, particularly some of those abandoned pads. Do you have any additional suggestions for what we ought to be doing?

Mr. KOHLER. And that's correct, Senator, you're right, it's had a history—it's a very difficult process as you know. You have a military range, a Federal property in NASA KSC, and actually, two different missions, as you well know—the U.S. Air Force's mission for national security has requirements and priorities that sometimes don't necessarily complement well with the commercial access to space.

And so, what we have found—and you're correct—both at the command level, here with General Helms, and right up through the chain of command, an awareness of the need to be able to in some way, integrate viable commercial space activity with an active military range. And somehow, there needs to be a way to be able to operate effectively and competitively on a global scale, in those environments. And I think that the work that's been done with re-

spect to LC40 and SpaceX and their COTS award, has been a great pathfinder for our efforts to seek an assignment for LC36.

And as a consequence, the 45th Space Wing has actually operationally arranged for—as customers come to the range, looking for pad assignments, they engage Space Florida immediately, in order to allow a combination of business case evaluation to be completed on our side, with range technical access evaluation on the military side.

This needs to continue, and actually needs to be more formalized, and I think you're correct—my presumption is that General Kehler and the entire command structure is recognizing that, and taking active steps to arrange for that kind of support.

Senator NELSON. You mentioned in your testimony a space-based biotech corridor.

Mr. KOHLER. Yes.

Senator NELSON. Talk to us about that?

Mr. KOHLER. Certainly. We had—and this is in concert, in cooperation with NASA, actually, the STS 123 and 124, exampled by our support of SpaceHab, and their effort to do some salmonella research on Station in the last mission. We supported that financially, and authorized an additional amount for that.

And what I mean by that, conceptually, is that we have the International Space Station as a National Lab. We have what we feel are very unique, differentiating capabilities at the SLSL, Space Life Sciences Lab, in that you have technical skills that are able to integrate science into payload processing, which then the complicated matter of making that move from a laboratory to a launch vehicle in a timely fashion, so as not to compromise the science, and then be able to launch it.

The concept, basically, is to be able to connect, in a real sense, the lab and that work at the ground level with what exists on Station, and could go so far as to even incorporate things that are relevant in free trade zone, foreign trade zone activity, in terms of being able to create that kind of economic opportunity for things that are done on-orbit.

Senator NELSON. Mr. Berridge, the High Tech Corridor—you and University of Central Florida—are looking at these space-related research and development opportunities.

You want to comment on that?

Mr. BERRIDGE. I spoke briefly on that just a minute ago, Senator Nelson, in terms of if you have the state investing close to a billion in major entities, including, in this metro area, the Burnham Institute.

And I believe, Lynda, you've got a meeting coming up with the Burnham folks in about a month?

And then you have, thanks to Dr. M.J. Soileau, and Dr. Eric Van Stryland and others, UCF as being recognized as one of the leading laser photonics research facilities in the world.

You have the investment that University of Florida, and University of South Florida and UCF have made in meeting the state's investment in terms of bio-life sciences. You have all of these synergies going on in terms of Brevard, and the Universities—UCF and UF, in particular—and I think the goal on the table today is,

we ought to have an opportunity to explore other research capabilities.

We didn't exist 12 years ago, as an organization. We've invested in 900 research projects through our 3 universities with companies up and down the Corridor in a host of technologies. I just think there are some opportunities that could be explored.

And you and I served together on the Founding Board of the Astronauts Memorial Foundation, I'm proud of that fact. I just think there's some opportunity with some very intelligent people in this room, to look for ways that we could partner together—the state, the region, and do some additional research.

Thank you.

Senator NELSON. Senator Martinez, any further word?

Senator MARTINEZ. Well, just to conclude, let me thank the Administrator and the people of NASA, as well as the panelists here in the second panel.

I want to tell you that in my view the Space Coast and the whole space program, as well as the people who work here could not have a more knowledgeable and passionate advocate than Senator Nelson. I think we all know how his life has been driven by the space program, and I think by bringing this hearing here today, he has taken one more step in fulfilling that tremendous commitment that he has to the people that have made space exploration a part of their lives.

So, anyway, I want to thank you, Senator, for bringing the hearing here to Central Florida, right here to the heart of the space program, and for your continuing commitment to this effort.

Senator NELSON. Thank you, Senator Martinez.

We want to thank everybody, particularly Rosalind Harvey here at the Port Authority, who has set up all of this meeting today. We want to thank everybody for coming, and all those folks that braved the heat out there, and the thousand folks in the rally, and certainly we added a dimension to this hearing that we wanted to.

Because what Senator Martinez and I wanted to do was to give people hope and that's what you all have done along with the testimony of Dr. Griffin, and Mr. Gerstenmaier, and Mr. Cooke.

We also wanted to give them a glimpse into where we can go in the future so that we can continue to soar in the heavens. Part of our character as a people, is to be an adventurer, an explorer. That's part of our character as Americans.

And so, thank you all for having made this possible today.

The meeting of the Committee is adjourned.

[Whereupon at 11:45 a.m., the hearing was adjourned.]

A P P E N D I X

PREPARED STATEMENT OF ALAN BERGMAN, REPUBLICAN CANDIDATE, U.S. HOUSE OF REPRESENTATIVES, FLORIDA 15TH DISTRICT

Members of the Committee, Staff, and guests: I would like to express my gratitude to you for letting me address you today. These are important matters, and the input of those of us here in Florida is, and must be, a vital part of your decision-making process.

I have been a resident of the Space Coast for seven exciting years. Just as all of you, I have seen the growth of our space program and the socioeconomic rewards it has brought to our world. As a direct spin-off of the space program we are healthier, able to live longer, more exact in storm prediction, and safer, to list but a few of the advances we have garnered from the Space Program. The many thousands of patents developed out of the Space Program attest to these facts.

As a candidate for the U.S. Congress, 15th District, I have a deep concern for the welfare of my country as well as my district. I have met with Steve Kohler of Space Florida, Linda Weatherman of the Economic Development Corporation, and Brevard County Commissioners, among others, to seek insight on these matters.

Drawing from my experiences as a community leader and in the financial marketplace, as well as the education that I have received at the feet of the various experts I have heard on the subject, I have reached the following conclusions:

1. The government should not bear the entire responsibility for the launch facilities at NASA. I know we have been trying to bring in private entrepreneurs to Florida, as exemplified by Space Exploration Technologies Corporation (SpaceX).

2. I have spoken to Fortune 500 companies about using our launch facilities and designing and developing programs for the manufacture of compounds that can only be created in the unique environment of space. They are interested! I would be happy to share more information with you regarding the companies and the products, but I am bound by the confidentiality of these discussions.

3. I would suggest a division of Space Florida be established for the purpose of procuring commercial contracts with the private sector, to continue the work I undertook in this area. Several corporations are interested, and when their competitors learn of their interest, the competitors will be interested as well. This is one of the advantages of our capitalist system, and should be respected as such.

4. I have been reviewing the International Traffic in Arms Regulations ("ITAR"). These regulations must be revised if we are to allow foreign corporations and/or governments streamlined access to these services without threatening our national security. Efforts must be made to convince the various Executive Branch officials with the power to revise these regulations to agree to the need for ITAR revision in order for Florida to remain competitive as a launch site for private sector space ventures. These ventures would include both commercial manufacturing and space tourism. The possibility of subcontracted work from the governments of foreign states also exists.

5. The allocation of budgetary responsibility must also be revisited. Full cost accounting seems unfair to private enterprises, since NASA would be maintaining these facilities whether they would be used by private entities or not. Marginal cost accounting for costs above NASA's ordinary expenses without private sector access and launches seems a much more appropriate allocation of cost, and would make our Florida launch site much more attractive to the private sector. At the same time, all additional costs, including without limitation heightened security and additional maintenance, would be passed through to the private sector.

6. The Committee would do well to note that Florida's Space Coast has an existing trained and ready spaceflight workforce that is about to become seriously

underemployed. At the same time, we possess a physical infrastructure that is ideal for this type of program. Further, our geographic latitude allows for a higher total lift payload than do more northern latitudes. Our position on the Atlantic Ocean further increases our payload ability. Our weather allows the opportunity of many launch days per year. Any one of these features alone makes us a highly desirable launchsite. All these features together make us uniquely qualified for this type of private-public cooperation.

7. An added benefit of bringing these private ventures to Florida's Space Coast is the reinforcement of this area's economy. Rather than uproot the uniquely trained workforce that NASA has developed in this area, with the consequent disruption of family life, children's educational experiences, and lifelong friendships built in longstanding neighborhoods by moving these ventures to another, less astrophysically desirable, part of the country, I contend that it is in the best interests of the Nation, industry, and our citizens to keep Florida as the physical hub of America's space program.

I thank you for your time, and for the opportunity you have given me to share my views. God Bless America!

RESPONSE TO WRITTEN QUESTIONS SUBMITTED BY HON. MARY L. LANDRIEU TO HON. MICHAEL D. GRIFFIN

Question 1. Can you generally describe the impact that the Ares V Program will have on the employment numbers at both the Kennedy Space Center (KSC) and Michoud Assembly Facility (MAF)?

Answer. NASA plans to conduct Ares V final manufacturing and assembly of the both the Ares V core and earth departure stages at NASA's Michoud Assembly Facility (MAF) in Louisiana. This is due to the unique capabilities at MAF such as the physical capacity of the facility, experienced local workforce in large, human-rated cryogenic stages and access to the inter-coastal waterway and NASA's Stennis Space Center for testing. After delivery of the core and Earth departure stages to the Kennedy Space Center (KSC), stacking and final integration of the Ares V vehicle will be performed in KSC's Vehicle Assembly Building. Transport to launch pad 39A and conduct of launch operations will utilize unique KSC facilities and local workforce experienced in integration and launch of NASA's human rated space vehicles. Specifics of workforce numbers for either KSC or MAF will not be known until contracts have been awarded. Initial contracts for ground processing operations are currently planned for award for FY 2010; however, the scope of Ares V content for that contract has not been explicitly determined. Final prime contracts for development and production of Ares V are currently planned for award in FY 2012. Ares V will be the largest, most capable launch vehicle ever built.

Question 2. It is my understanding that in the FY09 Commerce. Justice, Science Appropriations, the Senate has added $30 million to the Ares V budget for Early Risk Reduction Efforts. If this funding is retained in the bill, what impact would that have on the long term schedule for Ares V?

Answer. The additional $30M reflected in the FY 2009 Commerce, Justice, Science and Related Agencies Appropriations bill. as reported by the Senate Committee on Appropriations on June 19, 2008, would not change the currently planned flight milestones for Ares V. However, this additional funding would reduce risk and add confidence in meeting schedule and will aid the transition to development for Ares V in FY 2011.

Question 2a. If this funding is retained in the bill, how would that impact the workforce at both MAF and KSC?

Answer. Workforce impact at NASA locations would depend on the specific tasks and contracts that are yet to be awarded.

Question 3. What type of schedule impact would you expect on the Ares V program from a 6-month Continuing Resolution from Congress?

Answer. There will be no schedule impact to the Ares V Project resulting from a six-month Continuing Resolution.

Question 3a. What type of schedule impact would you expect on the Ares V program from a one-year Continuing Resolution from Congress?

Answer. Given the relatively small amount of funds in the FY 2009 request for Ares V work ($7.0M), there would be no impact to the Arcs V schedule.

Question 4. As a result of the retirement of the Space Shuttle, NASA and its contractors could soon begin issuing Worker Adjustment and Retraining Notification (WARN) Act letters impacting thousands of workers at these facilities. With the cur-

rent live year gap until the Orion/Ares system is operational, NASA and its contractors would then turn around in about 2 years and start hiring workers for the Constellation Program. This approach would essentially involve laying off skilled workers one year, then staffing up 2 years later for the same type of skilled workers—workers who, at that time, may or may not be readily available.

Instead of the traditional WARN and rapid response protocol, it would seem to benefit NASA: the States of Florida and Louisiana; regional employers; contractors; and employees if funds were invested to keep workers employed during the gap to ensure skilled workers remain available.

Would NASA support a request to allow both states a waiver from the Department of Labor to utilize Workforce Investment Act funds to help find contract employment for impacted workers? If not, please explain why.

Answer. Retention of civil servant and contractor critical skills necessary to safely fly out the Space Shuttle Program manifest and enable the success of the Constellation Program is a top NASA priority. As the Agency transitions from Shuttle to Constellation, NASA plans to maintain approximately the current civil service workforce levels.

NASA expects the nature of near-term human spaceflight work to shift from operations to engineering design. development, and test soon after the Space Shuttle's last mission, and that the new Constellation vehicles will require less manpower to process and prepare for each mission than Shuttle. Reducing manpower levels on the new vehicles is critical to the success of the Nation's exploration efforts. Given that the Constellation program is a "pay as you go" construct with milestones based upon time-phased activity within the available budget provided by Congress, Constellation program requirements drive required workforce levels. From 2009 to 2011, NASA will hold competitions and award future Constellation contracts for ground operations and processing of Orion and Ares I, as well as the design and manufacturing of Ares V and Altair.

NASA purchases products and services, not direct labor hours, from contractors, so NASA does not directly manage the contractor workforce. Accordingly, NASA does not issue WARN notifications to the contractor workforce, but rather the prime contractors who employ the contractor workforce take that action, only if needed and according to their own policies. NASA continually seeks innovative solutions to the workforce challenges associated with the transition from Shuttle to Constellation. We understand that the Workforce Investment Act (WIA), under certain circumstances, authorizes the Department of Labor to allocate funds to state and local workforce investment boards for youth, adult and dislocated worker training services. There are also a number of restrictions on use of such funds, to include eligibility requirements, time limits, funding limits, employer match requirements, etc., which the Department of Labor has the authority to waive. It is difficult to judge the merits of any proposed waivers under WIA without knowing the specifics of what is to be waived and for what purposes. although it appears to be a matter between the Department of Labor and state and local workforce investment boards. However, should the Department of Labor seek NASA's view on a waiver request under the WIA; NASA would be pleased to review such a request.

Accordingly, while NASA does not seek, or advocate, additional retraining, placement or short-term work efforts by contractors funded within the NASA budget, in general, NASA supports efforts to help the Shuttle contractor workforce negotiate the transition between the Shuttle and Constellation Programs, whether that is to prepare for Constellation or other NASA programs, migrate to other aerospace work, or even pursue other fields. As part of this effort, NASA has broadly communicated a summary of the Agency's future contract acquisition plans—to the limit allowed by the Federal Acquisition Regulations—so that potential bidders and their employees can see what future work will be competed for Constellation.

Question 5. NASA receives Federal funding for its Institutional Assets. Unlike other NASA locations, the Michoud Assembly Facility (MAF) has not traditionally been considered an Institutional Asset, and thus, has not received those funds. Facility costs at MAF have instead been borne by program tenants. These costs are high because of the small number of tenants (the lower the number of programs/contractors, the higher their percentage of cost). As a member of the Senate Appropriations Committee, I would be interested to know additional information on facility costs at MAF. Has NASA conducted any studies to review the cost of doing business at MAF compared to market value? If so, please provide any completed studies. If not, will NASA agree to conduct such a study?

Answer. Currently, the Michoud Assembly Facility (MAF) is operated for NASA by Lockheed Martin as a part of the Shuttle External Tank (ET) production contract. NASA decisions to use MAF to support Constellation projects, in addition to the ET, drove an acquisition strategy which separates the facility operations, main-

tenance, and manufacturing support into a separate contract. The diversification of the MAF to support multiple projects, using multiple prime contractors, led to a NASA Request for Proposal (RFP) in June 2008 for a multi-program, mission independent contract for MAF operations. NASA currently anticipates making a selection for this contract in December 2008. The use of MAF for Constellation activities and this particular multi-project acquisition approach are intended to improve the transition from Shuttle ET production to Constellation activities (skill retention, capability preservation), while minimizing costs. Once in place. this contract is designed to allow increased penetration of facility operating costs and incentivize efficiencies in facility operation, maintenance and manufacturing support. The efficiencies anticipated will be informed by NASA's plans to conduct a study, after the new contractor is in place, to compare NASA MAF facility costs to market rates.

Question 6. As you know, there will be a new operations contractor at Michoud. It is my understanding that there is currently a maintenance backlog for the facility. The maintenance backlog is due to many factors including Hurricane Katrina, the upcoming retirement of the Space Shuttle and local economic conditions. What is the current status of maintenance projects at Michoud? Does NASA need additional funding to address the maintenance backlog at Michoud? (Yes/no) If yes, how much funding would be needed? If no, why not?

Answer. No, NASA does not need additional funding to address the maintenance backlog. The current status of deferred maintenance at MAF is consistent with all NASA installations. In addition, Congressional approval of the Katrina supplemental funding was significant in re-storing the facility to a good condition after the damage caused by Hurricane Katrina in 2005. The supplemental funds provided to MAF for Katrina recovery and repair at MAF totaled $181.0M. This supplemental funding allowed repairs to the facility to be made ($69.0M). as well as implementation of important asset protection measures ($70.0M) which hardens and safes the facility.

NASA's approach to facility management is to achieve an appropriate balance among facility maintenance, capital revitalization, construction of facilities and the retirement and elimination of facilities that have no future requirement or have become antiquated.

Question 7. Administrator Griffin, in your previous statements and in the initial NASA request for proposals (RFP), there was a commitment that Ares I was to be produced at MAF. The language was softened in the final RFP, allowing alternatives to be proposed. No language about design was included in the RFP language. However, it is my understanding, that at this time the first two Ares I development units are being built at the Marshall Space Flight Center, not MAF. These units require large investments for infrastructure and each unit will cost millions to produce. Once this investment has been made, there would seem to be a disincentive to move production to MAF.

For Ares V, you have also verbally committed that Ares V would be developed and produced at MAF. Like Ares I, however, it is being planned for the first two Ares V development units to also be designed at the Marshall Space Flight Center, not MAF. This will mean additional investments in infrastructure and production. Again, there seems to be little incentive for NASA to duplicate the capacity at MAF once it exists at Marshall.

Just as NASA showed a strong commitment to MAF in the aftermath of Hurricanes Katrina and Rita, it is essential to keep this strong commitment from NASA that work on Orion, Ares I and Ares V will stay at MAF.

Is NASA still committed to develop and build Orion, Ares I and Ares V at MAF? Would NASA support codifying this commitment in future legislation?

Answer. NASA has been consistent in its commitment to complete final manufacturing and assembly of the Ares I Upper Stage and Instrument Unit, and Ares V core and Earth departure stages, at MAF. This is due in part to the unique capabilities MAF offers, such as an experienced and abundant local workforce with considerable expertise in human-rated cryogenic stages, the physical capacity of the facility, and access to the nearby Intercoastal Waterway and the NASA Stennis Space Center for testing.

With regard to future legislation, NASA would defer to the next Administration for guidance with respect to legislative proposals for NASA.

Question 7a. Please explain why the first two Ares I and Ares V development units could not be designed and produced at MAF instead of Marshall.

Answer. For Ares I, NASA is currently planning to manufacture and assemble only one full-scale, integrated Upper Stage test article at the Marshall Space Flight Center (MSFC)—the Main Propulsion Test Article and other partial articles for developmental structural testing. The ground vibration test article and all subsequent

production articles will be manufactured at MAF. NASA has made no decisions as to the location of final manufacturing and assembly of the Ares V developmental units—this is forward work to the Ares V Preliminary Design Review (PDR). NASA is following the very successful Saturn model, where critical manufacturing processes are worked out prior to completion of design in physical proximity to vehicle designers and unique test facilities. This is also in keeping with best practices of industry. In addition, there are schedule conflicts within the MAF facility due to ongoing Shuttle External Tank production which hamper earlier Ares manufacturing. It is also important to note that MSFC facilities arc not capable of ongoing, full-scale production—they are sized to support non-recurring development activities.

The MAF production flow has been optimized for low-cost manufacturing based on lessons learned from the development work at MSFC. The optimized approach will be implemented at MAF and not retrofitted at MSFC. The Upper Stage manufacturing assets at MSFC are used for process development and production of early development test articles. These assets cannot support flight production due to the developmental nature of their design. The MSFC manufacturing capability will be used for problem resolution after the Upper Stage production system is established at MAF and will later transition to Ares V development activities. This plan is still undergoing finalization and will be completed this fall as NASA concludes the Ares I PDR.

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