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NEWS CONFERENCE

MIKE GRIFFIN, NASA ADMINISTRATOR

DEAN ACOSTA, MODERATOR

EXPLORATION SYSTEMS ARCHITECTURE STUDY

SEPTEMBER 19, 2005

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MR. ACOSTA: Good morning and welcome to NASA Headquarters, here in Washington, D. C., for the announcement and rollout of the exploration systems architecture study.

And I'm about to introduce NASA administrator Mike Griffin. I want to pass along a couple of the guidelines for today's events.

We're going to have an all media--I want to know and let you know that we're going to have a question and answer period. So, after the administrator gives his briefing, we'll open that up to questions here at the headquarters and we are going to go to a NASA field centers also for questions.

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So, without further ado, let me introduce NASA administrator, Mike Griffin.

[Applause]

DR. GRIFFIN: I think I'm on.

Let's see, operating on the belief that a picture is worth many thousands of words, I'm going to try to keep the initial briefing relatively short. We will show an animation and then try to leave the balance of time, as much as possible, available for questions.

Today is the day when we are talking to you about how NASA will fulfill the President's vision for exploration, as it was offered to NASA in a speech on January 14th of 2004. We believe this architecture, which is the product of an intensive summer of work by hundreds of folks here at the agency achieves those goals in the most cost-effective, efficient manner that we could do it. It fits within the available budget without asking for new money and does so in as timely a manner as we could discern.

So, if I could have the--well, this is my first chart. Thank you.

The President, just to reset the clock here a little bit, the President put out a very old vision for space exploration, the best mission statement NASA has had in 40 years, to be honest. The essential components of that vision were as follows on the chart; that NASA should complete the international space station in accordance with our obligation to international partners.

In order to do that, would fly the Space Shuttle until 2010. But after the Space Shuttle, if we were to move beyond low earth orbit, we would need something different. That new vehicle would be called the crew exploration vehicle and it should be developed and flown not later than 2014. We have adopted an internal planning goal of not to exceed 2012, but that will be driven by the availability of funding, as I will point out later or further.

We will return to the moon no later than 2020 and expend human presence across the solar

system and beyond. In concert with this human exploration program that the first few lines address, there will be a sustained and affordable robotics program designed to augment and build off of the human exploration program.

We will develop supporting innovative technologies and adding to our knowledge and developing appropriate infrastructure to support the vision for exploration.

Finally, we want the architecture to promote international and commercial participation. We believe that the architecture that you're about to see today accomplishes all of those goals. We hope you will agree with us that it does and we're proud to be showing it to you.

If I could have the animation at this point.

[Animation shown]

DR. GRIFFIN: What you see is the first piece of what is basically a one and a half launch concept, a shuttle-derived vehicle, where we use the

solid rocket boosters, but extend it to five segment boosters and show an external tank, lengthened, but fundamentally the same tank, with five shuttle main engines on the back. The booster stage in the normal way after two minutes or so, two minutes and seven seconds of burn. The core state injects into a low earth orbit. You can see there the first stage falling away, followed by the earth departure stage, which will ignite and burn into low orbit.

The cargo then contains the lunar lander and whatever other cargo is requires and it awaits in orbit for a period of up to 30 days, but hopefully as short as possible for the lift off of crew on board this vehicle, also a shuttle derived vehicle, using a shuttle solid rocket booster first stage, which is reusable and a new upper stage, a new second stage which would be powered by a single shuttle main engine.

The second stage--the first stage drops off. The second stage deploys, fires the command and service module, very Apollo like, although

upgraded technology into an initially low orbit. Command and service modules circularize, rendezvous with the earth departure stage and the lunar lander and whatever other equipment and supplies may be going.

You will note that the command and service module, the crew exploration vehicle have solar rays the first time on a U. S. space craft. What you're seeing here is a porthole eye view of the docking maneuver. The docking system will be androgynous and will be uniform throughout the exploration program so that all pieces of equipment can dock with all other pieces of equipment.

After the earth departure stage injects the overall payload to the moon, the payload is extracted. The lander and the CVE are extracted and continue on to the moon, where they are injected into orbit using the service module engine. The service module engine will be a LOX/methane engine, as will be the ascent stage of the lunar lander. Here, you can you see the lunar lander doing a burn

down to the lunar surface, very much as on a power, except that the descent stage will be locks hydrogen, the most efficient propellant combination we have.

The lander concept is very notional, because implicit in our requirement is the, we believe the requirement to have a man tended or tenable lunar base capability. That will be best obtained by a lander design, which leaves us much on the surface as possible, because the lander, of course, is expendable. There is no sense expending it to ill purpose. We'd like to leave as much on the surface as we can. So, the lander may well look different from this. But in this concept, the lander then lifts off after a four to seven-day stay by a crew of four, rendezvous with the CEV, which has been left untended in orbit or, I should say, robotically tended. The lander is left behind. The ascent state is left behind. The crew comes home in the CEV.

Shortly, prior to earth entry, the service

module separates. The command module re-enters, very much like a power, landing on the west coast. As we've said in several prior briefings, it needs to land on the west coast of some country, because we want the service module to go in the water, rather than landing on people's heads or on their cows.

At the completion of entry, pretty much the standard fashion. Drogue sheets are deployed. The heat shield drops off. Airbags pop out. After the drogue sheets have done their work, three main shoots come out, although only two are required for survival. So, there is redundancy.

We are targeting in this concept. Edwards Air Force Base as the landing point. That's the compass roads out of Edwards, if you've ever been there. In this concept for touch down, we use the airbags and the shoots to cushion the descent. Ultimately, it will be up to the contractor to decide the exact surface contact method, some combination of airbags, retro-rockets, stroking

seats or other means as required.

So, that's basically the architecture. I think the video does a pretty good job of explaining it to you and, of course, I will be doing questions. But if I could have my next slide now.

[Slide presentation]

DR. GRIFFIN: What you have seen is an architecture that needs all of our human space flight goals as enunciated by President Bush. It's a significant advancement over Apollo. Much of it looks the same, but that's because the physics of atmospheric entry haven't changed recently. In the common requirements, there is often the derivation of common function.

We have said a number of times that, in the course of this summer study that we did, we really proved once again how much of it the all the Apollo guys got right. And we looked at every--well, maybe not every conceivable architecture, but we looked at a very large number of them and this is what we came up with.

It does, however, offer quite a lot of advancement, double the number of crew to the lunar surface, four people instead of two. At least double the amount of time. We're talking seven-day missions being available even on the first returns back to the moon. So, therefore, four times the number--the amount of lunar surface crew hours.

This architecture provides global lunar surface access, because the scientists have--Apollo was limited roughly to equatorial regions. Scientists have interests in the moon that expand well beyond equatorial regions and this system provides that, together with any time return to earth, which is crucial.

It allows us but does not require us to establish a permanent human presence on the moon while preparing for Mars and beyond. The architecture can make significant use of lunar resources. At first, in all likelihood oxygen obtained by soror[ph] roasting, if the availability of either water ice or hydrogen in other forms at

the lunar poles is ultimately confirmed, then we will be able to extract hydrogen from the moon and would have the constituents of the most important propellant combination for at least the next several decades right there on the moon.

Finally, we believe this architecture is significantly safer and more reliable than previous human space flare architectures that the United States has had available. It is sized to provide a minimum of two lunar missions per year, but clearly more can be done depending of, again, the go as you can afford to pay philosophy. It provides a 125 metric ton class launch vehicle for lunar exploration and later Mars missions and beyond.

There's been an enormous amount of study done on Mars missions and most of those converge on the requirement that at least several hundred metric tons are required in order to mount a reasonable voyage to Mars. That can be done with four, five, six launches of the heavy lifter that we developed for the lunar architecture, off of pads at--pads 39

(a) and (b) at complex 39 at Kennedy Space Center, launching on five or six-week centers. We can put the Mars payload together in low earth orbit in a few months with a few launches.

Indeed, it was that requirement to be able to service a reasonable Mars architecture with what is known today about going to Mars that drove this style of lunar exploration. So, we started with the requirement for what we would have to do to get to Mars and worked backward.

The crew ascent system offers, we believe, considerably more safety than the Space Shuttle, using apples to apples, probabilistic risk analysis approaches. The existing figure for the Space Shuttle is one in 220 failure rare, whereas for the crew launch vehicle, the system that you have seen, will have approximately one in 2,000, so a factor of ten improvement on crew safety. That is achieved by means of the escape tower, which you saw on the top, the abort system as well, of course, the inline use of the shuttle solid rocket boosters and the new

upper stage.

It's a U. S. system, capable of servicing the Internal Space Station, consistent with our obligations to do so. But also allows the possibility of standing down when and if a commercial capability to meet the station servicing requirements becomes available. The system is the core--obviously, both those vehicles, the one and a half launch solution are the core architecture of the lunar return. So, when we develop the lunar return architecture, as you have seen that that enables, but does not require the system to be used to support the space station.

It provides an orderly transition of the space shuttle workforce. We estimate that we can use about 85 percent of the facilities that are in play today for the space shuttle. It is a requirement--it, it fosters a requirements-driven technology program. We will develop and utilize those technologies which are necessary to support this architecture and given the desire to and the

necessity of husbanding our resources to the maximum extent possible, NASA will not for the next at least several years do technology develop other than that which is necessary to implement this architecture.

Finally, for about the third time, it is an annual go as you pay architecture that supports the annual budget planning that we must do in concert with the White House and Congress. This architecture was designed to fit within the administration guidelines on our forward-looking budgets and to be adjustable and adaptable to fit the amount of money that Congress each year finally appropriates for us. The architecture will not need to change. The pace with which the implementation proceeds will change to suit the funding which is made available.

If there is one more chart, I would like to make the point earlier, this gives us just a hint of the answers to the question of, well, what will you do when you get to the moon. We convened a large group of lunar scientists, asked them what the sites

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of interest were to them on the moon and they ranged from the poles to the equator. Apollo was restricted only to the equator. The Apollo landing sites are shown, but many of the most interesting places are sited well off the equator. This architecture can service them.

Let's see, is there one more slide or is that it?

[Pause]

DR. GRIFFIN: I think that's it.

So again, I think the pictures cover it and we now stand prepared to take questions.

Dean, would you like to join me up here and you can moderate and we will figure out how to get through this.

MR. ACOSTA: I'm standing with you or sitting with you.

DR. GRIFFIN: All right, good.

MR. ACOSTA: All right, as I said earlier--

DR. GRIFFIN: We've also got some models.

MR. ACOSTA: We will take some questions

here at headquarters and then we will go around the centers. We will start off here at headquarters.

First, let's go with Tom, right here.

[Whereupon, a question and answer period follows.]

REPORTER : Thank you, Dean. Thank you, Dr. Griffin.

I think the question much of the country is wondering today in the wake of this hurricane is how does this country afford being able to go to the moon? Six weeks ago, the country was, of course, captured by the enthusiasm of the discovery program returning to space and flight. Today, we're looking at two to $300 billion to help the people along the Gulf Coast.

Do you have any concerns about whether NASA --pardon me--the Congress will be forthcoming in wanting to support this expenditure and how much is this all going to coast?

DR. GRIFFIN: Well, that's a lot of questions and I have answers. So, let me start.

First of all, we're talking about returning to the moon in 2018. There will be a lot more hurricanes and a lot more other natural disasters to befall the United States and the world in that time. I hope none worst than Katrina. I've been down there. I've flown over the Gulf Coast. I've met with our employees at Stennis and Michoud and it's just devastating.

But the space program is a long term investment in our future. We must deal with our short term problems while not sacrificing our long term investments in our future. When we have a hurricane, we don't cancel the Air Force. We don't cancel the Navy and we're not going to cancel NASA.

When we talk about two or $300 billion of aid to the Gulf Coast, I would point out that, one of the primary constituents of any aid to a devastated region in the wake of any sort of disaster, one of the primary constituents is real jobs. Between Michoud and Stennis, NASA and other places on the Gulf Coast, frankly--Florida is also a

Gulf Coast state--NASA has thousands and thousands of real jobs, no WPA work, not reconstruction work, but strategically important work that has been done in those regions, in that region for decades.

So, I would submit that our first step in recovering from Katrina can't be to lay off all the people who were working on the human space flight program and who were largely resident in the Gulf Coast states.

As to what it's all going to coast, our estimates are about--that it will cost for the first human lunar return, it will cost about 55 percent measured in constant dollars of what Apollo cost spread out over 13 years. Apollo was done in eight years. So, spreading it out over 13 years, it will cost about 55 percent of what Apollo cost, a specific number in today's dollars, about $104 billion for the first human lunar return along the lines of the architecture you saw today.

Let me also point out that, for the first five or six years, what we are really developing is

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the shuttle successor, the crew exploration vehicle. The crew exploration vehicle is designed with its launch system to go to low earth orbit. Once you're in low earth orbit, you can do any number of things. You must go through low earth orbit to go anywhere else. We can go to the moon. In later decades, we can go to Mars. We can service the space station. We can undertake the service of the Hubble space telescope or other space telescopes, as may exist. We can do anything.

This new vehicle is the vehicle that lets us do that and unless the United States wants to get out of the manned space flight business completely, then this is the vehicle we need to be building. And I don't hear anyone saying that the United States would be better off being out of space when other nations are there.

So, that's my answer, Tom.

MR. ACOSTA: All right, let's go with Frank, right up here.

REPORTER : Speaking of that new

vehicle, what guidance have you given the contractors in the [unintell] improvements to the CEV contract that is outstanding? How much of the design of the vehicle will NASA set and how much--you mentioned one example. How much will they be asked to provide in their competition?

DR. GRIFFIN: The reason for the timing of this announcement, frankly, is that we have two existing contractors which have been selected from a spring[ph], RF competitive sourcing that was conducted for the CEV. That source, that initial down select was conducted at a very high level, in order to get a real vehicle out of that procurement. We need to be much more specific and as you said, Frank, we will real shortly be issuing a call for improvements based on this architecture study.

We had first, we had first to do the architecture study in order to know what the required improvements would be. As to how--and those requirements will be published to the contractors within a very few weeks. Obviously, the

basic design that you've seen here today is something that we are communicating and have communicated in order that we can get people working towards our goals, our specific goals, because we really don't have the money to be allowing the contractors to articulate their way through a very large trade space. We need to be very specific in order to be efficient stewards of the resources which we've been given.

So, in answer to your question, the contractors will be given the outer mold line. It is very Apollo like. It may have a different shaped heat shield. It may have a different surface contact system, but the outer mold line is very Apollo like, except larger. Think of it as Apollo on steroids.

Currently, we're looking at a five and a half meter based diameter compared with a 3.9 meter Apollo diameter. That may not ultimately hold up, but that's what we're thinking today. But final numbers will be provided within a few weeks. We're

talking about a system, a CEV capsule that weights about 50 percent more than the Apollo command module, but can carry twice the number of people, can sustain itself for six months in lunar orbit. It offers quite a lot more capability, to be honest.

We're talking about a design that is fundamentally reusable. It must have the capability in a survival mode to land on either land or water, obviously. We are currently base lining a land landing, as you saw, but ultimately that is up for grabs, as is the method of surface contact.

The level of reusability is something also that will be left to the contractors to decide. We will vote on that, but if we can reuse the vehicle even a few times, it's--if the price of reusability is lower than the cost of having to replace the vehicle each time we want another one, then reusability will be to a decided advantage. We are not thinking in terms of shuttle-like reusability in it's original design specs of a hundred flights. We are not going there.

Where we are going is reusability on the order of five to ten flights. And if that isn't the right number then, you know, it will be another number and we'll look for input on that.

So, we will be specifying the capabilities that the system has to have and we'll be specifying the outer mold line, things like the level of radiation protection that we want. We will be specifying a particular docking system. Most of it, however, will still be left to the design discussion of the contractors.

MR. ACOSTA: Di, did you have a question?

REPORTER: Not right now.

MR. ACOSTA: All right, David.

MR. KASTENBAUM: David Kastenbaum, "National Public Radio."

I understand you at some point asked the administration about the possibility of getting an extra 4.8 billion of the next five years for this. Is that accurate and, if so, what came of that discussion?

DR. GRIFFIN: No, that's not accurate.

This architecture absolutely fits within the funding guidelines that the administration has provided.

MR. KASTENBAUM: But in the sense there are sort of no guidelines, right, because you do as much as you can each year, right. Is there a specific schedule or do you have sort of flexible dates for when we get something accomplished?

DR. GRIFFIN: Well, I think I was fairly specific about the dates. The President has said not later than 2014 for deployment of the pre-exploration vehicle. Our internal planning goal is 2012 and that will be governed by the funding which is available.

The President has said not later than 2020 for human lunar return. Our internal planning goal at this point is 2018. Again, that date will be driven by the availability of funds. But if you've heard a rumor that I've asked for extra money for this exploration architecture, that would not be

correct.

MR. KASTENBAUM: Why was it so long back and forth with OMB then?

DR. GRIFFIN: Because people vacation in August. Only those of us hunkered down here at NASA were working feverishly away.

MR. KASTENBAUM: Okay, thank you.

[Laughter]

MR. ACOSTA: I second that. I was one of those.

We're going to come back to headquarters for some questions in a little bit. We're going to go out to Marshall for some media members who are out there for their questions.

[Technical interruption]

DR. GRIFFIN: I'm pretty sure I can't answer that one.

MR. ACOSTA: I like hearing myself.

[Pause]

MR. ACOSTA: All right, well, you know what we're going to do? We're going to come back to

headquarters and we will work out those little bugs. Let's go--actually, I want to get to Guy. I knew Guy had his hand up.

[Pause]

REPORTER : Yes, Guy Gugliotta, "The Washington Post."

Does this now mean that you're willing to live with a two-year gap between 2010 and 2012, between the retirement of the shuttle and the onset of the CEV?

DR. GRIFFIN: Yes, we're willing to live with it, because it is what we believe we can afford based on the budget which is in play. Again, all of our goals will have to be funding driven. All right, the dates will have to be adjusted to match the funding which is made available. We're not talking about new money here. We're talking about revectoring the money which is and has been made available to NASA in support of different human space flight goals.

MR. ACOSTA: All right, now, instead of

coming back to headquarters, we're going to go to Kennedy Space Center and get some questions from there.

[Pause]

MS. DUNN: Yes, hi, this is Marsha Dunn with The Associated Press.

If you reach your goal of 2018 for the first lunar expedition, when would you envision the earliest that an expedition could be launched to Mars?

DR. GRIFFIN: We've not gotten out that far in our planning, Marsha. I just don't have an answer for you.

[Pause]

MS. KAISER: Hi, it's Chris Kaiser from "Florida Today."

Given the potential gap between the end of the shuttle and the start of the CEV, do you have any specific numbers about how much of the workforce you hope to retain during that period?

DR. GRIFFIN: I, I just couldn't discern

your question. Could you just say it again?

MS. KAISER: Yes, I'm just wondering since there is a potential gap between the end of the shuttle and the launch of the CEV, you talked about retaining some of the workforce, but you didn't have any specific numbers. Can you talk about how many you hope to retain in that time?

DR. GRIFFIN: I don't have specific numbers, because that's the result of a planning and planning effort, frankly, and implementation effort that we will be doing over the next five years as we transition from shuttle to this new architecture. Now, I think the use of, the extensive use of shuttle components available today in this architecture was pretty obvious.

If it wasn't, I stated it on two or three occasions. So, I would say this approach allows us, affords us the opportunity to retain the maximum number of today's workforce, as appropriate for the design, for the designs that we have. Clearly, we will not be able to retain the entire shuttle

workforce for this new--to move over to this new vehicle, because it is considerably smaller and, frankly, if we can't do our new space launch architecture with fewer people than we executed the old one, the price will not go down. And it is important that we reduce the cost of human space excess in order that we have available some money to do other things.

I think the right way to look at it is, overall, the same number of people will continue to be involved in the U. S. human space flight program, but we will be shifting them from shuttle activities to a combination in the next few years of shuttle plus exploration development activities. So, it's really more a question of what they do rather than how many people will continue to be involved.

[Pause]

REPORTER : [Unintell]--excuse me--with "Time Magazine."

Mr. Griffin, you from the description you made, I didn't hear anything about the possibility

of using hypergolic fuels, which were used during the Apollo days because they were considered safe or safer than other fuels. Why are you using different types of fuels?

DR. GRIFFIN: Well, hypergolic fuels were used on board the Apollo command and service module and in the descent and ascent stages of the lunar module. Hypergolic fuels are reliable. They're storable at normal or what we call room temperature storable conditions and they offer those advantages.

However, they are not the highest performing propellant combination that we have available by a lot. I would point out that, during Apollo and then later in shuttle, we learned to make operational use of liquid oxygen and liquid hydrogen, which is the best practical chemical propellant combination that we can use. So, to the maximum extent in this new architecture, we are using liquid oxygen, liquid hydrogen. As I've said earlier, we are using also the shuttle solid rocket boosters, which are by now a very well proven

technology.

So, the really only difference is the addition of the LOX/methane system that's baseline for the CEV service module and for the lunar ascent. The LOX/methane combination offers quite a lot more performance capability than the storables that you were talking about in your question with, we believe, no additional risk. In fact, overall, we think the system will be safer.

We will be carrying as a backup in the program the use of hypergolic propellants on the service module and on the lunar ascent stage such that, if the lock-methane technology development does not work out as we expect, we will have a system that will work, although of course, it will provide lesser performance than what we're talking about today.

[Pause]

REPORTER : I'm Mark [unintell], [Unintell].com.

I know you said already that 2012 was your

target date to get the CEV flying. Could you or are you willing to fill in the blank in regards to what happens between now and then in terms of a rough estimate of when you want requirements out, when you want to start awarding contracts, when you want to start fabricating hardware? Did you say already whether or not both vehicles are going to be developed in parallel given the current budget outlook?

DR. GRIFFIN: Let me take the last of those first. No, the vehicles will be developed--I'm not sure what vehicles you mean. If you're talking about the crew launch vehicle and the crew exploration vehicles, yes, those will be developed in parallel because one obviously needs both of them to put people in orbit.

If you're talking about the shuttle derived heavy lifter--and I don't know if you can see this from where you are but the shuttle derived heavy lifter for lunar cargo looks like this. That will only be--development of this vehicle will only be

initiated after the crew launch system is completed.

And, no, I'm not prepared today to talk about the acquisition timeline that we will be using as we go forward, except to repeat, as I said earlier, that specific requirements will be made available to the contractors for the next round of competition within a few weeks.

MR. ACOSTA: We have a couple more questions at Kennedy.

MR. WATERS: David Waters from "Central Florida News 13."

For how long is the estimate that you could have a manned presence on the moon? Is there an estimate at this point that your folks have been working on for how long people can stay there? How much will old Apollo sites, old Apollo landing sites looked at for potential study of lunar wear and tear?

DR. GRIFFIN: We've not yet gotten into the issue of looking at old Apollo sites. Where we go on the moon will largely be driven by science or so

we devoutly hope.

What was--I'm sorry. Say again the first part of the question.

MR. WATERS: The first part of the question was how long can--is there an estimate of how long people can stay there, on the moon?

DR. GRIFFIN: Thanks, I blanked on that.

We're planning--the architecture will support crew rotation schedules very similar if not identical to what we do today at the space station. That is, we could take a crew to the moon. Let them work for six months and then return them. And so, the vehicle design is that it should be capable of withstanding a six-month stay in lunar orbit.

Obviously, we don't intend to do that on our first missions back to the moon and, indeed, we might conduct many sortie missions before deciding--if we do decide that it is important to place a, put in place a lunar base with extended crew support and crew rotation schedules and all of that. What we wanted to do is to design an architecture which

would allow it, but not require it. And that's what we've done.

[Pause]

MR. ACOSTA: One more question at Kennedy.

REPORTER : Dan [unintell] from "WEHS-TV."

Dr. Griffin, how concerned are you about that gap between 2010 and 2012, given that everything usually takes longer than it's supposed to. What is the cost if that gap lengthens in terms of know-how and personnel?

Additionally, could you say if you think that the normal attrition between now and then might offset some of the job losses in Florida that might be expected around that time?

DR. GRIFFIN: Well, with greater attrition there may--of course, people retire. NASA will--25 percent of NASA's workforce reaches retirement age in the next five years and it will not be different in our contractor community, because we're one community. So, there will be attrition. But if

we're going to continue to fly the shuttle safely, some of that attrition--I'm tempted to say most of it will have to be made up for with newer, younger people, because you know, we're not padding the shuttle program today with excess people who can just be allowed to go away and continue to fly the shuttle as if nothing happened.

We need the shuttle workforce that we have. And we will need to transition them carefully into this new system in order that both the new system and the old system work well, the old system right up until the last launch and the new system right from the first launch.

Some gap in human space flight capability for the United States is inevitable between the retirement of the shuttle on whatever day that actually occurs and the first flight of this new system on whatever day that actually occurs for the reasons that you mentioned, maintenance of critical skills, just overall preservation of the workforce, continuity in the program. It's obviously desirable

to have that gap be lesser rather than greater and the plans we have worked out, I think, offer us the best chance to do that.

MR. ACOSTA: We're going to be coming back to headquarters for a couple of questions and then going out to Johnson. All right, let's start back here.

REPORTER : Will other countries be involved in this--

MR. ACOSTA: Please identify yourself.

MR. HARTER[ph]: John Harter, from "ABC 7 News" here.

Will other countries be involved in this program in any way?

DR. GRIFFIN: If you noted, the architecture has a feature that basically provides transportation and transportation infrastructure for a crew. It does not, at this point, speak to the development of facilities for use on the moon or later on, Mars. It is our view that the United States, as the President said in his speech,

welcomes international partnership just as we've had on the space station.

So, the quality of the activities that we perform on the moon, their extent, their nature will be driven, in our view, largely by what nations elect to partner with us. The United States will be able, when this architecture is implemented, to provide core transportation to and from the moon and we will hopefully combine that with the efforts of international partners to make a truly robust lunar exploration activity and something which is possible.

MR. ACOSTA: Let's go to Warren.

MR. LEARY: Warren Leary, "New York Times."

When the CEV is ready to go to the station, will it be strictly used as a true transfer vehicle or will there be a light cargo version that might also go to the station and could a version of this be used as a crew rescue vehicle for the station?

DR. GRIFFIN: There are several questions and they are all good. The CEV, because the video

ran short, I didn't get a chance to put all of this in and I was hoping for a good question.

The CEV can carry crew up to six for a round trip to international space station which, of course, addresses the issue of the full complement of crew complement of ISS in its final form. It can carry fewer than six crew and can carry with them pressurized cargo, up to several thousand pounds, depending on how many crew one wishes to have with them.

It can function completely autonomously, carrying up to about 7,000 pounds of pressurized cargo and, of course, can then come back and be reused.

The service module in concert with the crew launch vehicle can carry unpressurized cargo logistics up to; again, the payload of the vehicle is around 25 metric tons. This system with each launch places in orbit the same net payload, net useful payload as does the shuttle system and, in fact, a little more, some 25 metric tons in a

station compatible orbit.

What it does not do is to combine crew and cargo for each launch. So, if we need a launch cargo, we do that. If we need a launch crew, we do that. If we need to launch some reasonable mix, we can do that. I think of it as being like your car. It has a trunk and it has a glove compartment and they're available. If you need really heavy cargo moved around, you hire a moving van and this system provides all of those.

It also, again, offers us the opportunity as commercial players come into the mix, we can stand down all or a part of our own operations in order to accommodate operators. And I have said on numerous occasions that we will do that.

MR. ACOSTA: All right, we will come back to headquarters. We want to go to Johnson for a couple of questions and Houston.

[Pause]

REPORTER : Mark [unintell] of "The Houston Chronicle."

Under the architecture strategy, would you continue to do mission control and astronaut training and even development oversight for the CVE in Houston or is all of that up for grabs or some part of it?

DR. GRIFFIN: Mark, I didn't see any need nor did any of the folks in this architecture study see any need to throw up in the air the traditional roles and missions that have been assigned to our senators historically. If one were working with a clean sheet of paper, obviously any assignment could go anywhere. But we have a 45--in excess of 45 year history at this point and I saw no reason to disrespect that history.

So, the CEV will be assigned to Johnson Space Center for development. Launch vehicles will be assigned to Marshall Space Flight Center. Other assignments will be as appropriate. We will be working, however, to make sure that individual centers, that overall mass of manpower does not grow and that individual centers do not grow, but instead

take advantage of the capability of other centers within the overall NASA system to accomplish the work that needs to be done.

REPORTER: Jennifer [unintell], "ABC News" for Mr. Griffin.

Mr. Griffin, how do you transition shuttle to CEV at the same time? What is the challenge that you face with that?

DR. GRIFFIN: Well, it's a little bit like the old joke about how do porcupines mate, you know, very carefully. We need to be extraordinarily careful to make sure that our last shuttle flight is the safest one we ever do. My own view and our view is that, the architecture of the one, of the style of the one we have developed here, which is based on the extensive use of existing shuttle components, where that use is cost-effective and technically effective offers a future who are today working on the space shuttle program.

Frankly, it offers a future for the heroic folks in the Gulf Coast states who risked their own

lives to save NASA hardware and NASA property. So, we have a transition path from shuttle to shuttle-derived components and with a couple of new things that are not shuttle-derived thrown in that give us the new U. S. human space flight architecture.

And we're going to be working with our prime contractor, United Space Alliance and with our many other supporting contractors to define that transition over the next five or six years. We have time to plan for this and if we do it properly, it can be a good thing.

[Pause]

REPORTER: Nancy [unintell], [unintell]. A couple of things.

Since this is so Apollo like, did you talk to any of the people who worked on the design of Apollo? Did you reach out to them in any sort of consulting capacity and go back to some of the people who designed the original Apollo to help work on this?

Secondly, you said it's like ten times

safer, I believe. Why did you arrive at that ten times safer? What makes this so much safer than the shuttle?

DR. GRIFFIN: On the first question, we had numerous review boards and review activities studying this architecture as we developed it since April. And that group did include several--I'm tempted to say many, but we didn't have many people. We had several people from the Apollo generation guiding us.

Understand and let me be very clear about this. We did not set out to make it look like Apollo. We set out with requirements provided to us by the administration, by the President personally. We set out with requirements. We had goals in mind. This is a goal-driven architecture. We really did not approach this with a pre-conceived view that it would wind up looking like Apollo. We studied several different kinds of, for example, entry vehicles.

We looked at different types of rockets,

everything that our group could think of. And as I said before, about half way through it, people started realizing that this was an opportunity once again to demonstrate that by and large the Apollo folks got it right.

The technology we have available, other than in the areas of electronics has not changed significantly since the time of Apollo. Maybe it should have. Maybe we would like for it to have and if we had spent more money on it, possibly it would have. But none of those things came true.

There have been tremendous revolutions in electronics and avionics and software since the time of Apollo and those will be fully incorporated into our thinking and into this design. But it looks like what it does because of the requirements of high speed aerodynamics and the necessity to be efficient and effective with out use of weight break downs throughout the system. And those requirements are the same as they were in 1962. So, that's why it looks the way it does.

Why do we think it's safer?

Again, using apples to apples, methods of analysis technique that often is referred to as probabilistic risk analysis about which I could go on in way more length than I knew you would care to hear, today's estimate of the reliability of the shuttle is one loss of vehicle in 220 missions. Using exactly those same techniques, we believe this vehicle has in excess of a one in 2,000 reliability or unreliability I should properly say.

What makes it safer from a loss of crew perspective is the abort system that this new vehicle has and the fact that, well, frankly, that the two failure modes which caused the loss of Challenger and Columbia cannot happen on this vehicle, due to the basis nature of its design. It is an inline vehicle. Nothing can fall on the crew module from above and the shuttle solid rocket boosters are well to the aft of the crew.

I would note that the design flaw which caused the lass of Challenger was in the shuttle

solid rocket booster. That design flaw itself has been fixed. The solid rocket booster to this point has had 178 flights in a row fully successful. To my knowledge, it is the most reliable piece of human rated space transportation machinery ever built. So, we feel we are in pretty good shape. But it is those differences which cause us to have a ten times higher factor of safety for this design.

MR. ACOSTA: We have about ten minutes left. One more question to Johnson and then we're going to go to the Glenn Research Center and then come back here at headquarters and wrap it up here.

[Pause]

MS. : [Unintell] from "KPSC-TV."

I know you're dealing with staying within budget and also a bulk of retirees coming up in the next couple of years.

Specifically, my question is about job, workforce here at Johnson. Do you expect layoffs or even a job boom here?

DR. GRIFFIN: Let me say again for at least

the third time, this is not about new money. This is about a budget which keeps NASA in constant dollars approximately where it is today. It is about re-directing the use of that money to new goals in the human space flight program.

It is not about taking money from the science program or the aeronautics program in order to fund manned space flight. It is, again, about utilizing the money that we have to achieve different, I think, far more exciting goals in human space flight.

So, that said, we should expect neither a job boom at NASA or at any NASA center nor a job boost. I'm not expecting layoffs at the Johnson Space Center, nor am I expecting the Johnson Space Center to grow significantly.

What I am expecting is that folks at Johnson Space Center will be for the first time in decades working on the design and development of a new human space vehicle.

MR. ACOSTA: All right, now we go to Glenn

Research Center for a question.

MS. : Dr. Griffin, this is Becky [unintell] at the [unintell]. I wanted to ask another question about the CEV and the role centers will have.

Will Glenn be getting a lead role in the service module as it is set? You didn't specify that.

DR. GRIFFIN: Well, the service module is part of the crew exploration vehicle and it is not clear to me that it can be broken out separately or should be. That answer will emerge in the fullness of time. I don't plan to proscribe it, but the folks who are writing the requirements will produce the requirements that the CEV needs to satisfy and then we'll see how things can be broken up.

I do not at this point see the service module as a lead element of its own. It is part of a larger system. Whether the service module could be separately bid by a different contractor or it must be integrated as part of a whole, again, a

whole CEV is a discussion we have yet to have.

MR. ACOSTA: All right, we're going to come back to headquarters for a few questions. We will start off with [unintell].

REPORTER: Hi, this is Deborah Zabarenko working for Reuters.

This is a really exciting program. Everybody has been waiting for this architecture for a while, but NASA does other things besides human space flight.

What is the impact of this program, if any, going to be non-human, for lack of a better term, science that NASA does so well?

DR. GRIFFIN: Well, good question. I think I just said this was not about taking money from the science programs for human space flight and it's not. The science program has not--in our forward planning, we do not take one thin dime out of the science program in order to execute this architecture. It is about re-directing what we do in the human space flight program.

Now, that said, as we develop and carry out these plans, this response to the President's call for a new vision for exploration, it affords, in my view, huge opportunities for science, huge opportunities. I hope and believe that the NASA science community, the global space science community will want to take advantage of the opportunities that these plans offer.

MR. ACOSTA: All right, Brian.

MR. BERGER: Brian Berger with "Space News and Space.com."

Should it prove necessary, could you use the CLV to complete a space station assembly and can you fly the space shuttle through 2010 without more money than you have in the currently public five-year budget plan?

DR. GRIFFIN: Well, surely we can fly the space shuttle through 2010 with no more money than we have in the five-year budget plan. The question is what effect that will have on other dates within the program and we don't know that yet. NASA has

enough money to fly the space shuttle.

Now, with regard to using the CLV, the crew launch vehicle to finish emplacing station components should that not be completed by the shuttle, yes, of course. This is a vehicle which can lift in an unmanned mode 25 metric tons. It can easily lift, easily lift any payload allocated presently to the space shuttle.

There would be substantial extra expense if we had to develop a strong back to allow the space shuttle present--to allow the cargo elements and international partner elements presently manifested on the space shuttle to be flown on the CLV. So, extra money would be required and possibly some requalification of the partner modules would be required for this new system.

But it could be done. I would rather not do it. We don't want to spend the money to do something like that, which is why I have said on several occasions that the President's plan to utilize the space shuttle for its intended purpose,

to complete the assembly of the space station is the right plan. Life will be much easier if we complete the space station using the shuttle.

MR. ACOSTA: We have time for one last question. Let's go right here.

MS. WATSON: Tracy Watson, "USA Today."

Given that you're depending on international partnerships for the lunar infrastructure what, if anything, can you tell us about how frequent missions would be after that first iteration in 2018 and the goals of those first, you know, ten or dozen missions.

DR. GRIFFIN: Well, let me clarify. We're not depending on international partner contributions for the core infrastructure enabling us to go to the moon. Again, this architecture is sized and costed for two lunar flights per year, which was the kind of standing rate during Apollo or, at least, the latter part of Apollo.

Whether more flights will be desirable will in part depend upon the interest of the people of

that time, which will include the international community. What we do on the moon is at best 13 years away. It will be left to the planners of that time to say. I have a long list of interesting lunar objectives from the lunar science community such that we can do many missions to the moon and not satisfy them. But it's not the subject for today.

Dean, let me, if I might, since we told them from 11 to 12, let's give them the full 12. So, that will give us five more minutes and we will do a hard cut off at that point.

MR. ACOSTA: All right.

DR. GRIFFIN: There are so many people out here and so many questions. I'd rather not cut short.

MR. ACOSTA: You're absolutely right.

MR. HOFFMAN[ph]: Carl[ph] Hoffman, "Popular Mechanics."

Burt Rutan, **Elan Musk**, Jeff Bazos, all these entrepreneurs are out there. Do you perceive any

role for some of those people in this much bigger plan?

DR. GRIFFIN: NASA has not had at its upper levels a manager or an administrator more supportive of commercial enterprise than I. We are base lining in the out years past the retirement of the shuttle, we are base lining commercial service to the station. That is the only known and knowable, at this point, market for those entrepreneurs that I have to give. We are base lining the use of that market for them and are providing, will be providing this fall a new procurement to try to stimulate that market.

That said, at the end of the day, what commercial means is, that it is not government directed. So, I can provide the incentive and I can provide the market that I have and commercial providers will either emerge or not. It is not acceptable for a publicly funded program not to have a way of meeting its mission requirements in the event that commercial operators do or don't

materialize. So, the architecture that we have advanced allows NASA to meet its mission requirements, but also allows NASA to concentrate its resources on other more advanced activities if commercial providers can emerge in the next five to seven years. That is exactly our intent.

Our fondest desire would be to keep NASA on the very frontier of space activity, letting commercial provider fill in for those activities which are not frontier activities. We will be putting some money where our mouth is.

I do have to do that very carefully, because when we put that money on the line, it is a bit of a gamble. When we use a conventional prime contractor approach, which is emphatically not commercial, not entrepreneurial, it is more expensive. No one would ever say that the government and government prime contractor activities represent the most efficient use of the nation's resources.

However, they do pretty much guarantee that

we get a product. When we gamble on other suppliers who do not yet exist, we don't know that we're going to get a product. I hope that we will and I believe that we will and we're going to be using some money to find out. It is a bit of a gamble.

MR. ACOSTA: All right, we have time for one more question.

DR. GRIFFIN: One more

MR. ACOSTA: We're going to actually go out to JPL. The Jet Propulsion Lab has a question.

REPORT: This is [unintell] with [unintell]. I have a two-part question. One is related to robotic missions. Would there be one prior to manned missions? Secondly, could you explain how you will not need extra money considering that the annual budget or annual spending on this program is, what, eight to $9 billion and human space flight right now is at four or $5 billion?

DR. GRIFFIN: I'm going to take the second part of your question first. At the top line,

NASA's budget this year in FY '06 is a little bit over $16 billion. The administration will be requesting--our guidelines are that we will be requesting approximately that same amount in constant dollars, adjusted for inflation in the next four or five years.

When I say we are not asking for additional money, we are not asking for additional money beyond that. The President's vision for space exploration has already brought about a restructuring of what it is that NASA does within that top line.

I have also said that we will not be cutting into, further into the science area, not its budget in order to implement demand--space flight program. If I say it again, I'll be repeating myself more than three times and it's going to get boring. I don't know further fuzz to put on it.

Now, with regard to the robotic program, yes, there will be a lunar reconnaissance orbiter that is being developed as we speak, headed out of the Goddard Space Flight Center. We will shortly be

assigning work on a robotic lunar lander.

DR. GRIFFIN: Thanks for coming to talk to us and hear our response to the President's 2004 vision statement.

MR. ACOSTA: An exciting time here at NASA. For more information please go to www.nasa.gov.

That concludes today's press event. Thank you very much.

[END OF NEWS CONFERENCE.]

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MILLER REPORTING CO., INC.
735 8th Street, S.E.
Washington, D.C. 20003
(202) 546-6666