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PRESS BRIEFING: SPACE SHUTTLE PROGRAM UPDATE

Presentation by

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P R O C E E D I N G S

MODERATOR: I am here with Bill Gerstenmaier. He is the Associate Administrator, Space Operations. Star-6 mutes, and star-6 unmutes. We have a very limited amount of time. So we are going to go ahead and get started, and I am going to try my best to get through as many of you as I can through the list. I don't guarantee I am going to get through everybody. If you hear your question asked, please don't ask it in a different way because I will probably just say that has already been asked and move on, so we can get through with the time we've got available to us.

With that, let me turn it over to Bill, and as soon as he is done, we will start with the questions.

MR. GERSTENMAIER: Thanks.

I guess I just want to give you a chance to get an update of where we are overall in the Shuttle program. If you remember, not too long ago on November 22nd, Wayne and John Chapman and the team came and talked to you about this finding we had on External Tank 120, and that was some of these small cracks that we saw in the protuberance airload ramp. Here we are and it is December 15th, and I

just want to give you a chance to understand kind of where we are in the overall process.

It has been less than a month, and we have got a tremendous amount of information from these cracks. The teams have been able to go ahead and look at the cracks, where they originate in the foam. They have done a tremendous job of analyzing and understand where the cracks are coming from, how they come about.

We still have several theories on where the cracks initiate and where they come from. So that is not totally closed out, but they have done just a tremendous job of pulling all of that together.

In the spirit of being just totally open with you and tell you where we are going, Wayne has been reviewing with the teams today in the PRCB series of activities, statusing where we are on the PAL ramp and what we are going to do in the future. While he is doing that with the technical teams, I thought I would give you kind of an overview of where we are overall and kind of where we are as we are looking now at probably not flying the PAL ramp. We think that is the best thing to do is just take it off.

Things have changed dramatically from the last

time that we talked to you about not flying a PAL ramp. If you remember way back in the August time frame when we first looked at not flying a PAL ramp, we talked about potentially not being able to look at a launch period until maybe later in the year. Now the analysis comes in, and it looks much better.

We have spent 2 months looking at the aerodynamic loads associated with removal of the protuberance airload ramp on the cable tray and on the press lines, and things are much better than we had thought when we first looked at that 2 months ago.

So, again, I would say overall we started out with the plan in August. We are slowly marching through that plan. We are working off all of the items that we wanted to go look at. We brought the external tank in as soon as we could. We started looking at the crack formation which was a new finding to us. It has given us a lot of insight into the crack phenomena. It has given us some potentially new failure modes to look at that we hadn't even thought about in terms of foam loss before. It has really helped our overall understanding, and the teams have just made tremendous progress in a very short amount

of time from November 22nd.

It helps us to understand where we are going in the future, and as the teams work over the holidays, we will get back together as a team and will probably be able to give you a status of where we are with the specific fixes and what we are going to go do, specific schedules and those kinds of things.

MODERATOR: Whoever just joined, mute your mic with a star-6.

MR. GERSTENMAIER: So, again, where we are overall is the teams have done a great job of staying on schedule of moving forward with the analysis. There is still a lot of engineering to be done and put in place. We will plan to get back together with you in the January time frame and then kind of give you the details of where we are with our engineering assessments and where we fit overall, but again, that was the purpose of today is to kind of give you just an overall status of where we are from before.

With that, I will open it up to your questions.

MODERATOR: Okay. I am going to go in the order that people signed up for this. Please ask one question, and try not to make it two or three parts. Again, I am

going to be limited on time. So keep your mics muted until I call on you, and star-6 to unmute.

Mark Karo.

QUESTIONER: Thanks.

Can you give us some idea of what kinds of analysis you will do and at what point you can look at the results and say it is an option or it needs to be later?

MR. GERSTENMAIER: I think right now we know a lot about the cracking phenomena. We still haven't pinpointed it down to the exact phenomena that causes the crack initiation. So, until we get that phenomena pinned down, it is difficult to pick an engineering solution that will fix it.

We have a series of engineering solutions that are available, and the teams are trading those engineering solutions to try to decide which one is the best one that will go and implement it. It will end up with essentially a foam application process or a way to fly the tanks. It will be good to support the entire launch sequence through the 19 flights, and it is not really a one-flight sequence.

I think the thing is they have identified today a series of engineering fixes. We are going to go evaluate

those engineering fixes over the next couple of weeks, and then we will down-select those.

By engineering fixes, we have decided to not fly the protuberance airload ramp, but we have to put some kind of close-out in the area around the ice frost ramps. There needs to be some work done there, and that is the area the teams are concentrating on is to determine how to close out that area near the ice frost ramps, do they close it out in a manner similar to what is on the aft part of the tank or do we do something different in that area, but again, that is the engineering that is being traded, and there are multiple solutions that result in multiple amount of time to get that work done, and they are just trying to decide which one of those is the right one to do that gives us the right safety margins.

MODERATOR: Warren Leary.

QUESTIONER: Warren Leary, New York Times.

Bill, while the PAL ramp did come off on the flight, we also lost several other pieces. Is there any indication from tests or anything else that this cracking problem may have been the cause of the other foam losses, and are you doing any type of laboratory tests, perhaps

with cryogenics in that, to see if this was a problem with the other losses also?

MR. GERSTENMAIER: The other losses that occurred on STS-114, we understand fairly well. Again, the bipod area was the cable that essentially brings cryogenic nitrogen underneath the foam and then causes it to crack, and we have got a fix for that, and again, that is progressing on very well. The engineering is complete. We have got that activity about completed.

We also had some other areas of lost foam. We know it is not related to this phenomena, but this new phenomena we got could explain what we saw when we lost the bipod ramp way back when on Columbia.

So this phenomena that we have uncovered through this testing has applications to other areas, and now we are going through methodically to make sure that it doesn't apply to any other areas on the tank.

MODERATOR: Craig Kavolt [ph].

QUESTIONER: Bill, relative to the road forward here, what amount of margin are you looking for in terms of testing the work around to the PAL ramps, and has wind tunnel testing already tested to that margin?

MR. GERSTENMAIER: In terms of margin to the PAL ramp removal, we have gone back and looked at some pervious wind tunnel data. We have also done some CFD analysis. The dynamic loading that we were initially concerned about or the aeroelastic phenomena where there cable trays or press lines could vibrate in the aerodynamic flow field, that doesn't turn out to be as big a driver when we look at it analytically as we had thought. So that is not a concern to us.

We have a pretty good margin from a cable tray and from a press line standpoint, much better than we thought. So that is very good news from our ability to remove the PAL ramp.

We will confirm those analytical results with the wind tunnel tests probably in the February time frame just to confirm that that is where we are. So, again, that is not necessarily what the big constraint is not.

The constraint is we need to put some kind of closeout in the areas of the ice frost ramp where the PAL ramp used to be to prevent ice formation from the bracketry in that area, and we are not sure exactly how to design that. Once we get it designed, we will go ahead and do

some offline tests, as was discussed in the previous question, to confirm that that is the right fix, and then we will be ready to go flying.

MODERATOR: Todd Halberson.

QUESTIONER: Thanks.

On another subject, though, I got this letter that Tom Delay and a bunch of Congress people sent to the President last Friday, and I am wondering if you are actually considering or actively considering mothballing Shuttle Atlantis to, I guess, reign in the shortfall and the Shuttle budget in the out years, and whether or not the number of flights, the 18-plus-1 plan you have, might have to be cut back significantly if OMB comes back with the budget they are on the course to come back with.

MR. GERSTENMAIER: I really can't discuss any of the budget activity now because it is really all embargoed. So I really can't answer any of that for you, and we will know in February when we see the actual budget language come back.

MODERATOR: Bill Harwood.

QUESTIONER: Hi, Bill. Bill Harwood with CBS News.

Just a quick one, following up on Craig's question a little bit about ice frost ramp closeout. Obviously, it is not just coming up with a new way to put the foam on. You have got to certify that and go through that whole review process.

I realize you don't want to talk dates today or windows, but in keeping with Wayne's ceiling that we are the only ones that put schedule pressure on you guys, can you just give us some sense about this? I mean, it looks to me that May would have to be pretty much impossible right now, just based on that process you have outlined.

MR. GERSTENMAIER: Again, I think that the good news is that we don't need to do -- at least the initial indications based on the data we have reviewed, we don't need to do any redesign of the cable trays or the press lines. So there is no redesign of the basic bracketry or the basic tank structure. That all looks fine. We will confirm that with a wind tunnel test.

The margins look very good in that region. They are not driven by the aeroelastic loads. So that is a very positive thing that takes a lot of that work out of the critical path.

The thing we need to look at a little bit is if you remember, the ice frost ramp sticks under the cable tray a little bit, and it sticks into that region where the PAL ramp was. We saw some cracking in that ice frost ramp, right next to the cable tray or actually maybe a little bit under the cable tray.

What we need to do is understand what caused that cracking and will it be prevented by just removing the PAL ramp, do we need to do something in that area, do we need to put some kind of other foam over that to prevent ice formation in that area. That is the kind of work that we need to get understood.

The engineering teams have many solutions for that, and we will check some of those out analytically and test over the next couple of weeks. We will pick an engineering solution probably within the next week or two and schedule a little bit of confirmation tests or analysis in the early part of January, and then if we need to make a physical fix on the tank by spraying foam, we would do that in the middle part of January to the later part of January, and then we would ship the tank around the first part of February.

So, again, from an overall standpoint, depending on what engineering solution gets picked, May is still very viable. Some to the other engineering solutions that require a more detailed certification process of foam applications, et cetera, may move us somewhere else.

Again, I think the thing that is important, like you said in your question to me, is that we don't fixate so much on the launch period, but let the guys drive home and understand this cracking phenomena is happening and how it occurs because this is a really unique opportunity. For the first time, we are really gaining insight into this cracking phenomena and how this foam performs. If we can capture that information, that will create tremendous benefits to us in the future.

So the focus has got to be on understanding the cracking phenomena, then working the engineering solution, and then that will drive us to where we think the right period is for launch.

So, again, I think the teams are doing an unbelievably great job in a limited amount of time, and we are making very good progress.

MODERATOR: Dan Belo [ph], are you on?

QUESTIONER: I am here.

MODERATOR: Okay.

QUESTIONER: My question for Bill is about pressure, and all of the talk that you do here about major budget cuts and the possibility of "Well, if it takes you so long to get back into space with the Shuttle, why fly it anyway?" Do you hear and listen to those things, and does that sort of talk affect you? Do you feel any pressure from that?

MR. GERSTENMAIER: I think, again, from my perspective, I don't feel a lot of pressure from that.

The thing that we are looking at is -- again, like I discussed -- is we are looking at a 19-flight sequence, but we have got some margin. We don't need to have a flight this spring to make the 19 flights. It still looks fine. We need to average about four flights a year, and that is pretty much consistent with what we have done over the entire history of the Shuttle program, if you average it out, and that includes the times when we were down for both Challenger and for Columbia.

So I don't see it as a big driver to us. I see, more importantly, that we get this right, and we understand

what is going on with the foam and the foam performance, did we get this thing solved for us, so it doesn't reoccur either on the next flight or a later flight down the road. So I think we have got a unique opportunity here to get it right, and when we get it right, we will be ready to get back into a repeatable flight sequence, and we will easily meet what we want to do which is complete the International Space Station for our partners.

So I don't feel a lot of pressure. We are going to do the right thing and let the data drive us where we need to go.

MODERATOR: Guy Gugliotta.

QUESTIONER: Hi, Bill. Just a clarification. You said at the top that you were looking at not flying the PAL ramp. Can we say basically that you will not fly the PAL ramp again, or is that still possibly --

MR. GERSTENMAIER: I think as we know the PAL ramp, we will not fly the PAL ramp. So there may be some little areas near the ice frost ramps that will be maybe a little foam put in those areas that might look like a little mini PAL ramp, maybe, but in terms of the big large structure that was on the tank before, I don't think we

will fly the PAL ramp as a large structure.

MODERATOR: Chad Murry, are you on?

[No response.]

MODERATOR: How about Tarrick [ph]?

QUESTIONER: Hi. I am here.

MODERATOR: Okay.

QUESTIONER: Bill, my question was you had mentioned earlier that you had made a lot of headway in identifying where the cracks came from, but you haven't pinned down the source itself. I guess I was curious to find out what were some of those identified parts or in terms of that progress and what other things I guess are you looking at to put up on the shelf, if you will.

MR. GERSTENMAIER: I think what the teams have done is they have done a tremendous job of kind of chasing the cracks. So we saw the cracks in the nondestructive testing, in the x-rays, and in the terahertz radar data, and what they have done now is they have carved out the cracks and they followed the crack as it goes down into the foam, and then they see the crack actually break into smaller cracks, into some delamination layers down internal to the foam, and then we see some of the cracks progress

slightly underneath the cable tray. We see some of the cracks actually produce out into the acreage foam. So we know where the cracks are running.

What we don't know is really why they are initiating. We have some theories. The other key thing we have is we now have some finite element models of the PAL ramp where we can look at the differential thermal expansion of the foam.

There are two different types of foam. There is the foam that is on the acreage of the tank that is about an inch thick, and then we spray this PAL ramp foam on top of it. Those two types of foam have different thermal expansion coefficients. So we now have a map modeled to fit the stress field between those two foams as they chill down, and that is a key driver. Where we put one type of foam on top of another type of foam, it causes that lower layer of foam to be colder. It is not as strong as cold temperatures. So the cracks can initiate down there, and they carry up into the upper piece of foam. So we are learning lots of information about how this all comes together.

What we haven't got is really where is the

initiating point in the foam or what is the driver that is predominantly causing these cracks to form. We know it is related to the chill-down. We know it is related to some pressurization of the tank, but exactly how those fit together, we haven't had a chance to pull together. So the teams have the data. It is now just time for them to sit back and sort through the data and then build the theory along with the finite element models to understand this problem.

So, again, it is not an easy problem. It is going to take analytical tools as well as testing to solve this, but we have got the data, both the analytical tool and we have got the physical data from the tank that we can put both of those together. So all the teams need is about another -- a little bit more time to put that together into something that we can really, really work with and will really understand it.

MODERATOR: Let's see. Ned Potter, are you on?

QUESTIONER: Who did you say?

MODERATOR: Ned Potter.

QUESTIONER: Can you hear me now?

MODERATOR: I hear you, Ned.

QUESTIONER: I feel a little bit as if this has been asked before, but --

MODERATOR: Uh-oh.

QUESTIONER: Yeah, exactly.

You were feeling pretty good about May? This was the main thing in the way?

MR. GERSTENMAIER: Again, I think we ought to not think about May right now.

Right now, the most important thing to do is we are so close to understanding what is the root cause kind of for this cracking phenomena, and we need to make sure that that has occurred. Then after that occurs, then we need to figure out the right and appropriate engineering solution that will be good for the long haul of the Shuttle program. Then after we have done those two things, then we can build an intelligent schedule, and then we can talk about when launch periods may be.

So I think it is wrong to take the launch period and speculate whether we are going to make it or not because that actually puts some schedule pressure on the teams. It is much better if I let them drive to a quick conclusion and then pick an engineering solution that is

smart, maybe not the perfect solution, but it is a good enough solution for the remainder of the Shuttle flights in front of us, and then we are ready to move forward. Then we can talk intelligently about where we end up.

MODERATOR: Let's see. Diane with WKMG, are you on?

QUESTIONER: Yeah, we're on. No question, though. Thank you.

MODERATOR: Thank you.

Tracy Watson?

QUESTIONER: Hi. You mentioned that there are some solutions that would be quicker and some of them may take a little bit more time, and I am wondering if you can maybe give us one of each and tell us which ones can keep you closer to May and which ones might take you out beyond.

MR. GERSTENMAIER: Well, obviously if we don't have to do anything in terms of putting new foam on around these ice frost ramp areas that helps obviously from a scheduling testing standpoint.

If we have to put something on and it is something we have done already on another ice frost ramp in the back part of the tank and that works fine, then that

also is very easy to accommodate.

If we have to put some foam on in a way we need to certify how we put that foam on to provide insulation, then that will take a little bit longer.

So, again, those are the kind of concepts. Those are things that Wayne and his team are discussing today, which one of those are the right ones to go, and again, I think it is better that we don't think about the end point, but we let the engineering stand on its own and pick the right solution that will give us the long-term fix that we don't' have to worry about and keep analyzing and keep working in the future.

MODERATOR: Irene, are you on?

QUESTIONER: I am. Thank you.

Bill, so far it seems like the Shuttle program has been pretty much given an open budget to fix the problems with the tank, and in light of the deficits that Dr. Griffin has spoken of before Congress and all the squeezes that are being placed on existing programs to go ahead and fund the new Exploration Initiative, do you feel that this is justified, and do you have a sense of how long you are going to be able to go on with this?

MR. GERSTENMAIER: Well, first of all, I would tell you we do not have an open budget in terms of working this activity. We are very cost-conscious in what we are spending our resources in and how we are doing this activity.

You will see in the TPS repair area, we are going to probably drop some of the TPS activities not necessarily because of budget because it is really the right thing to do. We have taken them to a point in the design, their design life, that we realize they don't have much benefit to us in the future. So we are going to go ahead and drop those activities.

My first answer would be that we are very conscious about what we are doing. We are very aware of where we are and the fact that we want to get back flying as soon as we can, and we are ready to go do that again. We are not overly pressured to go do that, but we will do that at the right time, and I would say that, again, this is a small investment in what we are doing here to get us back a tremendous capability, and that is to complete the International Space Station, prepare ourselves for Exploration, and get moving forward with the vision.

So, again, I think this all fits well in the overall vision. This is just a piece of it. This is the first pieces to gain this experience back.

I would also add the fact that our teams are working together and doing this kind of forensic analysis of these cracks, and how they work and how they operate as a team, they are showing a tremendous ability to operate in the kind of culture that the CAIB wanted us to operate in and the Stafford-Covey Task Force wanted us to do. So these teams are operating at peak performance. It has given us a great chance for engineers to learn. It is a great chance for our new engineers to learn, and all of this activity will carry directly into Exploration.

So you can say we are doing this maybe pointedly for Shuttle, but at the same time, we are using this as a chance to learn and teach new engineers on how to handle problems that are going to come up in the future vehicles as they start working on Exploration.

MODERATOR: Mike Habbage.

QUESTIONER: Mike Habbage with the Orlando Sentinel.

A question on the cost, following up on that a

little bit. My understanding is that this whole PAL ramp fix is going to cost between 12- and $20 million, depending on the engineering solution that is chosen. Is that accurate?

MR. GERSTENMAIER: I don't think that is accurate to portray.

Some of this activity is part of our sustaining work that we would normally do in getting tanks ready to go fly. So some of it is covered under that. Some of it is unique work, and to give you an accurate number, we need to break those two out into two pieces and characterize specifically the criteria we would use to do that, and then we can give you an estimate on the budget number. But I think it is not appropriate to state that value.

Some of this is really ongoing work that we would be normally doing to get a tank ready to go fly.

MODERATOR: Let's see. Jay Barbary [ph], I heard you earlier.

[No response.]

MODERATOR: Kelly Young, are you on?

QUESTIONER: I am.

Mr. Gerstenmaier, which TPS activities are you

going to drop?

MR. GERSTENMAIER: Well, one of them we are going to go look at is this -- we are going to look at the CIPA, the cure-in-place. We have got an engineering activity to go look at that and evaluate that activity to see if that was something we want to continue. They are supposed to report out today to Wayne, but that is one of the items that we think we have done enough investigation and it looks like something we would recommend stopping and no longer pursuing, but again, there is a team coming in today. In fact, they are probably doing it right now as we speak, providing Wayne with a recommendation on that activity, but I think that is probably one of the predominant ones we would talk about taking off the table.

The reason we take it off the table is we think we have some other overlay techniques to provide that same capability for us, and we think those techniques are much farther along in their engineering development activity and they are much easier to be done in space than the ones that we are dropping, but that is an example of one that is being talked about.

MODERATOR: David Gustenbaum [ph], are you on?

[No response.]

MODERATOR: How about Jeff Morris?

QUESTIONER: No question.

MODERATOR: Okay. Let's see. Mike Schneider with AP, are you on?

QUESTIONER: Yeah. I know you said that you all know that it is related to chill-down, but what are the theories you are working with as far as determining the root cause? What are some of those theories that you say you need to probe further?

MR. GERSTENMAIER: I think what we see kind of from our thermal and finite element analysis is when we put foam on top of foam. Essentially, the tank has about a one-inch layer of foam all around the tank, and then the PAL ramp is about probably an eighth-to-ten-inch sprayed on foam, BX foam that is sprayed on top of that.

What happens is, that foam that is sprayed on top, it provides an insulating layer that allows that one-inch piece of foam to get cold through its entire length. So it is now cold from the surface of the tank all the way to the top of that one-inch layer of foam.

The fact that that foam is cold, when it gets

cold, it loses some strength or it is more brittle and easier to crack, and then the fact that the foam on top is expanding at a different coefficient of thermal expansion, it causes a shear or a stress layer on top of that one-inch layer of foam as well as there is a shear layer or a stressed layer down where the foam attaches to the tank. So then that can cause a crack to initiate somewhere in that underlying one-inch piece of foam, and then that crack can then propagate on up into the foam on top of it. If that crack goes all the way to the surface, that is where the outside area is, and it goes all the way down to the tank, then that provides a path for air to come in, liquefy in that lower region next to the tank, and then it pools into a liquid -- cooled piece of cold or liquid air in that region, and then as the hydrogen is drained out of the tank and that area warms up, that liquid air then expands, pushes out on the foam, and can cause a large piece of foam to come off. So that is kind of theory we are looking at.

We need a little bit more understanding of where the cracks are initiating to verify that that is really a fact, but that is the basic theory in as simple terms as I can describe it to you.

MODERATOR: Justin Ray, are you on?

QUESTIONER: I'm on. Thanks.

My question is about getting a second tank ready for flight. Would that tank actually be ready to support safe haven if you launched Discovery in May, and would that be ET-120, or might you have to go to ET-118?

Thanks.

MR. GERSTENMAIER: And I think we are looking at that right now.

I think the general consensus is we would have to do quite a bit of work on ET-120. So probably right now, I would say probably ET-118 looks to be the favorite, but I am letting the engineering teams take their time and go analyze that and make the right decision.

Presently, we carry ET-120 as the plan, but I think we would probably look seriously at 118, and it looks like both of those from an overall standpoint ought to be able to support us for where we want to go.

MODERATOR: Gina, are you on?

QUESTIONER: My question has been asked. Thank you.

MODERATOR: Thank you.

Ted Oberg, are you on, Channel 13, local, Houston?

[No response.]

MODERATOR: Let's see. The last person on my list that I haven't called on is Jim Oberg. Are you on, Jim?

QUESTIONER: Yeah. Yeah. I'm here.

Well, this is kind of a good strategic question, Bill, because this looks like a real good bunch of work you are doing, but I guess the question I need to ask you is what thinking have you been getting to having done this kind of work, not now and not after the accident, but say sometime ago. Could this work have been done, say, 20 years ago, and how do you get into the right kind of thinking that you would do this kind of research before a major accident rather than after?

MR. GERSTENMAIER: That is why I really think we need to purely capture what we have got now with this tank. We have got a unique opportunity with ET-120 to really maximize our learning, and we need to learn that for the future, so we don't have problems in the future.

I think we need to just stay hungry and keep

staying inquisitive and look at our systems generically and keep investigating things.

When you assume a system is operating fine and you have flown fine and everything is going well, that is when you need to step back and say do I really understand the environment as well as I should, should I be analyzing more, et cetera.

We learned an awful lot in this activity when we looked at removing the PAL ramp. The state of computational fluid dynamics is much, much better now than when we did the original design of the cable trays and the pressurization lines.

So now that we have that CFD, it is a fairly easy thing to go back and run the computational fluid dynamics and understand that environment, and we need to build some time and some plans to go look at things like that in the future.

So, as we go forward, to keep flying safe, I think you need to spend a little bit of extra time kind of what if-ing and looking at what environments you should relook at again, what thinks you ought to reinvestigate. Even though you have been performing well, you need to

carve away a little bit of time in some of those high-risk areas that you go take the time to go look at and investigate, and that is the way you fly safe.

I think with Exploration coming on line and them using many of our same systems, both the solid rocket motor, the main engineers, and some of the external tank aluminum systems, we have a unique chance now to continue some of that investigative activity for exploration. At the same time, it helps us fly better for Shuttle and Station.

So the short answer is you need to stay inquisitive, keep looking, and just because you have flown successfully, don't assume that you are flying an operational vehicle.

You truly are flying a test vehicle in a very dynamic environment. Keep looking at that environment to make sure you understand it.

QUESTIONER: Thank you.

MODERATOR: Let's see. I have gone through my entire list. I congratulate everyone on being concise with their questions.

The only person that I called on that I had on

the list is Jay Barbary. So, Jay, if you are on, I will give you one last chance.

QUESTIONER: Mark with Innerspace.

MODERATOR: I'm sorry?

QUESTIONER: Mark with Innerspace.

MODERATOR: Oh, I'm sorry. Mark, you got a question?

QUESTIONER: Sure do.

For Bill, I missed the first half of the briefing. So I apologize if you got into this. I was wondering if you can describe the process of actually removing the ramp in terms of the underlying acreage foam. Does that mean there is going to be a 20-foot-long patch there, and do you have the operational experience to have a patch that size? Also, could you describe the wind tunnel testing you are going to do in February, how long that testing is supposed to be, and how long it will take to digest the data after you do the runs?

Thank you.

MR. GERSTENMAIER: Okay. In terms of removing the PAL ramp, as part of this investigation activity on ET-119, we have already removed the PAL ramp down to about

an inch away from this one-inch foam that sits on the tank and sprayed all around the tank. So we have left about a one-inch piece of foam above where the acreage foam sits on the tank.

We will probably sand that one inch down to make sure that it is smooth and we keep a good contour on the area where the PAL ramp used to be, and then we will determine whether we need to put some kind of coating on the top of that foam to prevent the air leakage, or we can leave it as it is. So it won't be a patch per se, but it will be -- essentially you could think of it as sanded down to a uniform thickness like the rest of the tank.

And some of the other discussions I had a little bit was the ice frost ramp areas. We are not sure exactly what we need to do there. We can make it look like maybe the ice frost ramps look in the back of the tank, or we may need to do some foam spray in those areas, and that is one thing that the engineering teams are taking a look at right now. So basically that is where we are, and we are pretty close to having the tank ready to fly from the majority of the PAL ramp locations, the way it is now. We will still have to sand down that one inch of remaining foam, but that

is a pretty straightforward process.

In terms of the wind tunnel testing, it looks like it is probably a couple-week activity, maybe 2 or 3 weeks, some pretests in the tunnel before that, and then the analysis of that would occur probably a couple weeks later.

Again, we are pretty confident in our computational fluid dynamics. We are pretty confident in our structural models of the cable tray and the press lines. I look at this test as almost a confirmational test. In other words, we just need this test to confirm that there is nothing wrong in our analysis, there is nothing wrong in our analytical techniques, that it is the right thing. So the analysis and review of this won't be as involved as it would have been way back when, when this was done before and we didn't have these other tools. So we have very good map tools. This test hopefully will confirm that. It should be pretty quick to understand that this test is confirming what we see in our tools. If we see something we don't like, then that is another story, but that is why we are doing the test, just to make sure.

We are not going to trust our analytical tools.

We are going to make sure that things are the way that they should be and the way we think they are.

MODERATOR: Okay. That is all the time we have. I think I will turn it back over to Bill for any final closing comments he would like to make before we wrap up.

MR. GERSTENMAIER: Again, I would just state from kind of both a Station and Shuttle standpoint, this has been a great year for us.

STS-114 was an awesome flight. We flew it safely, and as we had said before, we talked about it being a test flight. It truly was a test flight. It gave us invaluable data that we couldn't have gotten anyway other than flying that flight. It was so important that we flew STS-114.

All the camera systems worked. All the data systems worked. The radar stuff worked great. The Shuttle Station team interaction on that flight was phenomenal. It showed me that the teams are ready to get back to assembly, when we get back to assembly. It was just a super, super flight, and even the tanking test we did that gave us ET-120, it have us an unbelievable tank to go dissect and take a look at and find these cracks. It gave us some

information that will be invaluable to us in the future and is really going to help us understand foam performance.

From a station standpoint, it is hard to believe it has been 7 years since the hardware first went up for Station. We have had 5 years of human presence on board Station. The Station is in great shape.

This last week, we just fixed the volatile organic analyzer on board Station. That is a device that can sample the air automatically and look for a contamination in the air.

If you remember, that device failed probably about 2-1/2 years ago. We thought there was no way we could fix that device on orbit. We were planning to return it to the ground.

We went to Smiths Industries in England and actually took apart a component and figured out the most likely failure and flew some tiny parts up on a Progress vehicle, and the crew this week was able to go install those parts into the analyzer, and it is up and operating today. So, again, we learned an unbelievable lesson for the future.

We are going to be able to maintain stuff at a

much lower level than we ever anticipated, and that will be critical to Exploration. So, again, the Station is in just a great shape.

From the expendable standpoint, you are going to hear Monday where we are with the New Horizons mission and how that is coming along, and that is great from the expendable side.

Again, I consider it for myself a tremendous pleasure to work in this program that I am in. I probably work with the most talented work force, the most dedicated work force you can ever imagine.

The evening before Thanksgiving, the team down in Michoud was calling me and telling me how they were doing on finding cracks as they were sanding the cracks down into the underlying layer of the foam, and I told them it was time to go home and have Thanksgiving. And they said they were going to do that tomorrow, but they wanted second shift to compete this work because they really wanted to get this data to us.

So, again, here I have got a team that is just so dedicated, so motivated, so ready to go work. They are just awesome.

They are going to have to work a little bit over Christmas doing some of this engineering analysis. The Station team is always there. They are always working. We have got two crew members on orbit during the Christmas time. It is just a great, great program, and the neat thing is we are really training the engineers for the future. We are teaching them the best ways, the best techniques that we can to do this analysis that we have to go do, and we are really setting ourselves up to be in great shape for the future Exploration activity.

So it has just been a great year from the Station Shuttle Exploration standpoint, and again, thank you.

MODERATOR: Okay, everybody. You all take care, and we will talk to you in the New Year. Take care.

[End of Space Shuttle Program Update.]

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