

NASA Deputy Administrator Lori Garver

Women, Innovation and Aerospace

George Washington University

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Thank you Rebecca. Good morning everyone and thank you for joining us for this important day-long conversation about the important role that women play in innovation at NASA and how we can increase our numbers and impact throughout government and the aerospace industry. I also want to thank all of today's panelists and speakers. You are about to hear from some of the most accomplished and brilliant women and men who have built impressive careers and made important contributions because of their interest and involvement in science, technology, engineering, and math, commonly known as the STEM disciplines.

We will talk more about that later. I just wanted to take a few minutes before our opening panel to share some thoughts about the importance of diversity and the unique contributions women bring to NASA, the aerospace industry, and any innovative endeavor.

There are a number of tough questions related to women and innovation that I hope we explore today. Among the most provocative—

- Does diversity, and specifically the inclusion of women, really add to the development of innovative solutions?
- What is the importance of collaboration in innovation and how do women uniquely contribute to that process?
- As NASA and other government agencies update their workplace flexibility policies for the 21st century, what are some of the things we are doing today that 50 years from now will be or should be extinct?
- Should workforce flexibility policies even be considered at all related to issues of gender?
- How do those of us in government advance new ideas in a bureaucracy structured to protect the status quo?

Throughout the day we'll highlight and celebrate the strides we have made, while acknowledging how far we still have to go. Perhaps we can agree to talk about how to accelerate the progress we have made. Needless to say, even 25 years ago, when I was just entering the field, it would have been a lot harder to convene this many women involved or interested in the aerospace professions. Especially in leadership as will be represented on our panel.

Overall, about 6000 women hold jobs in NASA's 18000-employee workforce. And over the last decade we have seen significant increases in several categories. For example, the number of women supervisors increased 59%. But of course, when one looks behind the percent increase, in 2011 that amounts to 29% of supervisors at NASA being women. The number of woman aerospace engineers increased 76%, but again, does that translate to 50% of engineers at NASA being women? No. Rather, 20% of engineers are female, and 22% of the AST population is female. We still have a ways to go—of course, women at NASA are making a difference. The principal investigator of the NuStar mission is a woman. The principal investigator for the GRAIL mission is a woman. A woman leads the team that is responsible for Cassini. Our CFO is a woman. Our CIO is a woman. Our chief human capital officer is a woman. And of course, we have launched 43 women into space since Sally Ride became America's first woman astronaut in 1983 (out of 330).

But again, I can't help but ask...what percent of our PIs and Program Managers are women? 50%? Not yet. How many Center Directors (one of nine). Mission Directors? Zero of nine. Senior leaders (six of 40).

Sometimes we like to remember how bad it really used to be. In 1968, NASA was holding "Miss NASA" beauty contests among its employees and one lucky contestant was even chosen "Queen of Outer Space." Our head of HR who is here today recently shared a 1970 memo with Rebecca and me..."just a reminder of how far we have come." It is to: All Goddard Gals. Subject: Pantsuits. It said, "There are many pros and cons on this subject; in fact, it is as loaded as 'midis' vs. 'minis.' On one side of the coin, I have to face you girls and your desire to be 'mod,' and on the other, the male population who would only vote for minis." It said, "If you feel that a pants suit would not be offensive to your boss and would not embarrass him..." and it concluded by advising "the gals" to bear in mind, "if someone forgets to treat you like a lady – it was you who elected to wear the pants."

While today it seems hard to imagine a culture where such attitudes were commonplace our varied reactions to this memo highlight the tension that still exists. Rebecca quoted from the memo at a recent senior staff. The most common response was laughter. Some earlier career women expressed shock, and a few women older than me (or men with daughters) expressed shock and maybe a little anger. We all have our anecdotes...I wasn't allowed to wear pants to school in a public elementary school in the '60s. I loved "gym day" because we were allowed to wear shorts under our dresses.

1970 was the 50th anniversary of Women's suffrage. We all have our anecdotes. It wasn't allowed to wear pants in a public elementary school in the 1960s. I loved 'gym day' because we were allowed to wear shorts under our dresses.

More directly related to our topic today, my high school didn't offer calculus and six of us in my year had taken all the math offered by junior year. When I came back senior year, the other five students – all boys, had enrolled in and were attending calculus classes at the nearby university. When my mother found out, she called the university and asked why they had not been contacted to enroll me along with the rest of the students. She was told, without hesitation, 'that because I was a girl, and it was assumed I wouldn't be interested in continuing

in math'. I had never seen my Home Economics major 'stay at home' mom so angry. We are hardwired to want better for the next generation.

So, yes, let's celebrate our progress since it is less likely that would happen today. But, since we acknowledge we are not yet at a point where women are equally represented in NASA or STEM fields or in leadership positions at NASA, or certainly the Aerospace industry (or in government or the private sector generally, for that matter) – 'How can we accelerate the progress we have made?'

This is where I believe 'innovation' comes into the discussion. Recently, at Columbia University, they created a definition of innovation – 'taking ideas that have already been successful and combining them in new ways to address new challenges'.

We like to say 'NASA is all about innovation.' Are we really? We had a senior management meeting and they voted as NASA's most innovative moment not landing on the moon, but Apollo 13. In the beginning, we had to be all about that. When you're doing something for the first time, you had to innovate. You take ideas, techniques, and technologies and apply them to new challenges.

Everything is a new challenge! How do you launch a satellite? A bigger one? How about a person? You have to bring them back! How can you look at the Earth from space? How can you study the universe from a space craft in space?

These questions and answers, and thousands of others, drive NASA to 'innovate'. But now, we run up against barriers. It doesn't matter that it was predominately white males tackling the problems. We know how to launch satellites, even people, but we like to keep doing it – the same kinds of people came to NASA to do it (and it provides jobs in key districts).

So, we need to answer the next big questions. Take on the next big challenge! Do and think differently those new, hard things that require us to innovate! How much of our budget is spent truly innovating? Could we help do more to our US industry to be more competitive? Is the government driving innovation today – or is the private sector? There certainly continue to be examples of innovation at NASA (and in government). Science questions, James Webb, some International Space Station research, parts of aero and technology. But, where is the balance?

But, if we agree it is at the core of our purpose and vision – how do we do more? How do we break down existing barriers? And, what does this have to do with women? And a more diverse workforce? Again, the definition of innovation is 'new ways to address challenges'. People who think differently, who collaborate – to innovate, we need diversification of perspective.

Women have contributed to so many fields in equal numbers. Why not in engineering and math? Why not in leadership positions? Why do we think it is okay that women make up over one-half the population but only one-third the NASA Workforce? Why do we think it is okay that men still earn about 80% of bachelor's degrees awarded in engineering, computer science and physics?

Maybe we have grown complacent. Let's ask today...Are we doing everything we can to provide equal opportunities and incentives to women in these fields? At NASA and throughout the government? Are we adopting innovation? Are we adopting innovative strategies to recruit and retain women? Or are there still a few women 'pantsuit issues' out there? Maybe some of us are just so darn glad we don't have to wear a skirt every day, that we have overlooked a few barriers and dis-incentives to young women entering these fields, or our work places, today.

Maybe we don't innovate as much as we think we do...or used to... Maybe NASA needs women to help do this as much as women need NASA. Does our culture truly value women? Looking back, 30 years from now, what will look like our 'pantsuit' memo? Still commonplace, at least on the 9th floor at NASA, when three or more females are speaking together, a man walking by will make note of the occasion – 'Ugh, what's going on here? Am I in trouble?'

What if a woman expressed concern at such a gathering of men? How about the constant comments on our clothes? Hair? I'll go on the record – it is no more appropriate for a man to comment on a woman's hair color or style than for you to comment on your colleague's lack of any hair at all! These are small, cultural 'norms' that need to change.

But, what about the bigger differences between women and men – yep, I'm going there. We bear children. Child-rearing expectations and roles. How will these differences matter in 30-40 years? I think we need to acknowledge it is still a key issue. Granted, we don't all do it and some of us choose not to, for reasons other than our careers. (By the way, don't ask us about that either!) But that doesn't mean that those of us who do choose to do it should have to choose between having children and having a career.

Any more than a man would have to choose between the two. There are some careers where family planning is easier than others. Astronaut is NOT one of them (ask any of those 43 women. A few astronauts have missed the births of their children.)

Flexible workforce – we were going to roll our new policy out this month, tied to women's history month. We decided they should be separate. Not a woman's issue. Everyone wants a flexible workplace (it will even help us innovate). I want to live in a time when men and women share the responsibilities for child-rearing equally, making workplace flexibility a gender-neutral issue. But we do not live in this time.

85% of single mothers versus 17% of single fathers. The average amount of time spent with their children by working mothers? 21 hours a week. Fathers are 9 hours per week. Fathers are 2.7% of the nation's 'stay at home' parents.

How many men are asked if it was hard to decide to go back to work after they had children? I am asked this at every mentoring session and by hundreds of young women, and only by women, for the last 20 years. So, let's be innovative about how can we tap into the potential of all women. How about those who choose to end or pause their careers for a number of years to raise their children full time, when they are ready to re-enter the work force. ? Many of these women are my friends and let me tell you – they have skills; they have a different perspective and they innovate!

Maybe part of the problem is that we've taken a bit too much credit for slow progress. We've 'settled' for one or two female astronauts per mission instead of equal representation. But I am still my mother's daughter; I'm hardwired to want more for the next generation. Women comprise only 25% of STEM jobs.

So, I hope we can talk today about these very real issues.

We at NASA want to continue to lead innovation in the future and make sure that NASA, the American aerospace industry and the nation's technology sector continue to benefit from the ideas, talents and insights of all. Today, let's celebrate our achievements – This can be so important in so many areas. But, let's recognize how we can do even more. We can acknowledge that we need a more accepting culture and more forward leaning and need innovative policies in order to benefit from the full potential of women in our workforce, which will, in turn, allow NASA and all of us in the aerospace community to continue to provide the most advanced and innovative aerospace programs in the world.