NASA AT 50 ORAL HISTORY PROJECT
ORAL HISTORY TRANSCRIPT

DAVID A. KING
INTERVIEWED BY REBECCA WRIGHT
HUNTSVILLE, ALABAMA – 4 MAY 2007

WRIGHT: Today is May 4, 2007. We are at the [NASA] Marshall Space Flight Center in Huntsville, Alabama, to speak with Center Director Dave King for the NASA at 50 Oral History Project. The interviewer is Rebecca Wright, assisted by Sandra Johnson. In preparation for the space agency's fiftieth anniversary, the NASA Headquarters History Office commissioned this oral history project to gather thoughts, experiences, and reflections from NASA's top managers. The information recorded today will be transcribed and sent to the [NASA] History Archives in Washington, D.C., where it can be accessed for future projects.

Are there any questions before we begin that I can answer for you?

KING: I think I'm ready to go, Rebecca.

WRIGHT: Okay. Thanks again for providing us with this time. I'd like to begin by asking you to briefly describe your background and tell us how you got to the position you are in today.

KING: Okay, great. Well, let's see. I was born in Indiana. I grew up in South Carolina and went to the University of South Carolina [Columbia, South Carolina]. I made a friend there by the name of Ralph [R.] Roe [Jr.]. I studied with him for a couple of years, and, when I got out of school, I worked for a small engineering company there in Columbia for a couple of months, all the while working to get on with NASA.

I was able to get an interview in the October-November time frame of that year, and came to work at [NASA] Kennedy Space Center [Florida] in December of 1983, working on main propulsion systems and space shuttle main engines. Little did I know at the time that I'd be here working on propulsion systems later on in life.

I did that for about six years. Then I went to be an intern with Jay [F.] Honeycutt when he was the director of Shuttle Processing, and I learned so much in a six-month period. I went over to the operations world and was a vehicle manager and flow director for a couple of different vehicles – on the inaugural flight of [space shuttle] *Endeavour* and some pretty significant missions for [space shuttle] *Discovery*. After about three years of that, I spent a year in the Center Operations Directorate, learning about the center and what it takes to run a center, from security to roads to utilities and those kinds of things. It was a very valuable experience for me, now looking back at it, running a center today.

I went back into the Shuttle Program in 1996 or '[9]7 as the deputy director for Shuttle Processing. I was then pretty quickly named the launch director, where I remained for six missions during about a three-year period. There were actually two launch directors at the time – it was sort of a first for the agency as well. Then I was the processing director for a few years, and, in 2002, was asked to come to Marshall to be the deputy director.

I was in that job for just a few months – three months – when the [space shuttle] *Columbia* [STS-107] accident happened. I was asked to run the ground operation for the *Columbia* recovery, both crew and picking up the pieces so that we could put them back together. I did that for about three months off and on.

When I got back here to Marshall in May of 2003, I was asked to be the center director, and I've been in that position since June of 2003. So it's been an interesting road.

When I went to work for NASA, I loaded everything I owned into the back of a Honda Civic hatchback with no air conditioning and moved to Florida. I was pretty wide-eyed. The first day on the job, they brought me in to the space shuttle *Columbia* and – wow! – what an experience that was. It's been a great experience ever since. It's just been extraordinary.

WRIGHT: Tell us how NASA has changed in the last twenty-five years.

KING: I've seen it from a wide perspective over the last twenty-three years that I've been in the agency. Originally, I saw things from a technical perspective, trying to learn how to process and get vehicles ready to fly, to ensure that they would perform in the proper ways – to now overseeing one of the larger space centers. Back then, I was just totally in awe of what the agency was doing and could do, and the successes that it had. It had its challenges then, clearly, but a whole different set of challenges.

Then, over the middle part of my career through middle management, if you will, I saw us go through a phase where we were trying to get out of operations. We spent a great deal of time on consolidating contracts and trying to save the agency money so that it could then go do other things. Anytime you go through transitions like that, it's difficult for the people culturally, and there are good things that happen and not-so-good decisions that are made.

I think that got us away from our core, the thing that made us great as an agency – and that is designing, building, and flying launch vehicles and spacecraft. We got away from the core engineering that needed to be done and relied more on our contractors. We have an incredible contractor capability, but I think what made NASA great was that it had many of those skills resident inside the agency, and we got away from that over the years.

Over the last few years, we have been trying to build that in, and Mike [Michael D.] Griffin has brought that clearly to the table as something that he wants to accomplish under his tenure as NASA administrator. We're working hard to do that, taking a slightly different tack on how we move forward and how we implement the programs that we have under Mike's leadership, and I think it will serve the agency well for a long, long time.

You know, clearly, technology has changed dramatically in some ways and not so dramatically in others. The physics of going to the moon hasn't changed. The vehicles we're going to use this time around will be very similar but very different. And we have a great deal of experience that we are hoping to apply because of the evolved nature of the vehicles that we're using today. Using the experience that we built on from Saturn and, more specifically, shuttle.

We've had some tragedies along the way and some major successes, and it's been said before by many that those tragedies and triumphs define the agency. I think that's true. I think it changes you and defines how you go about doing your business. I think the transition of the workforce throughout all of those different things has been healthy and good, and we have huge capabilities within the agency – I'm looking forward to our future.

WRIGHT: Tell us about your vision for your center, how you want to shape the mission, and what you'll be doing here in the next years to work part of the bigger vision.

KING: Marshall has a very rich heritage in space flight in many different areas. It began in 1960 when Wernher von Braun was named as first center director here at Marshall. He came over from the Army, Redstone [Arsenal, Huntsville, Alabama]. So there were numerous contributions that Marshall made – from the Mercury Redstone Project to the Saturn V, which was the biggie

early on, obviously – to provide the launch vehicle to get us to the moon. Then shuttle propulsion elements, external tanks, solid rocket motors, and the space shuttle main engines were all huge development projects that we provided for the Shuttle Program.

But Marshall has also been very diverse in the kinds of products and services that we provide for the agency in the science world, in the habitat world. When you look at the contributions Marshall made to Skylab, Spacelab, SPACEHAB, shuttle, [International Space] Station, the Chandra [X-ray Observatory], Hubble [Space Telescope], and all the concepts for space transportation across the history, it's been quite diverse.

Obviously, the thing that we have on our plate today is to rebuild the infrastructure we had with Saturn V, and I believe it's unfortunate that we got away from that infrastructure and that ability to do those kinds of things. So we now have to build the capability for a crew to go to low-Earth orbit – to finish building the station, obviously, first, but then to build the new vehicle that will replace shuttle so we can get a crew to low-Earth orbit. Then we have to build the heavy launch vehicle so we can really explore, go back to the moon and then beyond.

So putting that infrastructure back in place is going to be the real key for Marshall, and I believe the agency's success will be defined by that. And Marshall is well positioned to make that happen. We certainly are working hard at it and we're excited about that future.

There will be many other areas where Marshall will be able to contribute, but, clearly, the launch vehicle – putting that infrastructure, those enabling functions in place – will define Marshall over the next ten or fifteen years, and that's our primary goal and objective for the agency.

WRIGHT: What type of challenges do you foresee that you're going to be looking at in order to accomplish the goals that you want?

KING: Marshall has really developed two launch vehicles over the last forty years, and we have two to develop over the next ten to fifteen years. The challenge – the volume of work that's going to be required to get those enabling systems in place so that we can explore – is huge. We have a lot to learn. I think we have the capabilities and we can do this, but we have some things to re-learn.

Fortunately, we have a lot of history and a lot of experience on our side, having designed and built Saturn and then been a major player in the shuttle propulsion systems as well, and I'm convinced we can do it. But just the enormity of a program, all of the elements that have to go into it, and the integration of all of those elements so that you get everything just right – it can be a little bit overwhelming and will be a real challenge for us.

We are challenged by all the details associated with that and making good decisions along the way to ensure that these systems cost less than the shuttle does today, so the agency can do other things beyond just the transportation system. This is not just about having a transportation system. You have to have the transportation system to enable these things, but we also have to do it in a way that it won't take the entire NASA budget or a big portion of the NASA budget. Accomplishing this work within the constraints of lowering the operational cost so that we can proceed with the exploration and science – that, I think, will be a key to our success in the future and will be a huge challenge for us.

WRIGHT: With everything that you have going on, are there other programs or other areas that you would like to see Marshall be able to be involved in in the next years?

KING: We are involved in a number of other programs. We're involved in a rather big way in the Station Program, and we'll continue to be. We're excited about finishing the station successfully. That program is an unbelievable engineering feat in and of itself. Most people don't understand how complex this system is to design, build, and then operate. We are learning so much from the station, and our continued involvement is very important so we can learn the lessons we need to enable us to explore for longer periods of time. It is essential, and that is one of the primary benefits we have from the Station Program.

The international component of the station has taught us much as well. I think in any exploration program there's going to be an international component, so station has brought us many lessons that are absolutely invaluable.

We are also involved in a number of science programs. We manage the Discovery & New Frontiers Program for Science Mission Directorate. We are about to get data back on the Gravity Probe B mission that we flew a couple of years ago to test [Albert] Einstein's general theory of relativity, and that will be very interesting. We have a heritage in those programs, and we want to stay involved.

We do not have the breadth of experience in science programs that [NASA] Goddard [Space Flight Center, Greenbelt, Maryland] or JPL [Jet Propulsion Laboratory, Pasadena, California] do, clearly. However, we have some very specific skills in some very specific areas that I think can make a huge contribution to the agency, and we have to line those up with what the agency wants to do. So we're looking at some areas in which we think we can continue to

help and make a major difference in the way Science Directorate does business, and we're looking forward to that.

WRIGHT: During the past decade, you've been in some pretty vital positions and decision-making situations. What lessons have you learned along the way that you're applying and will take into your leadership here at Marshall?

KING: We've learned many lessons from our successes and failures over the years. My personal experiences have made me who I am; our experiences make us who we are. I learned a lot of things from *Columbia*, the most recent learning experience we had – just the rigor that needs to come to everything we do, attention to detail. The devil is always in the details and paying attention to every detail.

Integrating those lessons at a very high level and understanding your risk is so very important. I learned a lot about how to manage risk and how to get people to speak up and ask that next question beyond just, "Here's where we think we are." It's important to bring that rigor to every process we have, to be curious to ask that next question about why things are as they are, and to evaluate the data and the reasons.

I learned how important testing is to anchor the models and the analysis that you do as engineers and scientists. I learned that bringing experts to the table is extremely valuable. Differing views, differing perspectives, and an open culture of dialogue are critical. I learned to value those differing views and the rigor that comes with it.

I've also learned a lot about the people aspects regarding the agency. We can accomplish so much, and have accomplished so much, and it really is about the people and their

perseverance. We face so many challenges and struggles daily, yet somehow we are able to persevere through them. That is a characteristic that is way underrated – just sheer perseverance toward a particular goal. Staying diligent about what we know we need to do day by day and staying true to what we have learned over the years is a real key.

We learn constantly from every Failure Review Board that you cannot communicate too much. Putting accountability in place is a huge key, so that people feel personal responsibility toward things. And then learning from our experiences, both successes and failures, is critical for us. I believe you can learn as much from successes as you can from failures. Just because you had success doesn't mean you did everything right. We have to judge those successes very objectively to ensure that we learn everything we can, because there are indicators in everything we do that will help us learn and get better.

I've learned a great deal about how important it is to work together, how the ability to work together means so much to this agency. We sometimes have difficulties when we are in different states or different regions, but we all wear the NASA badge and we all are part of that team. The contributions everyone makes are important and vital toward meeting our goals and objectives.

WRIGHT: After *Columbia,* there was a lot of discussion about culture across the NASA agency. What do you feel the culture is here at Marshall, and are there areas that you would like to improve?

KING: There are always areas that you want to improve on. We have a number of initiatives in place to try to deal with some of those things. I believe that we have a healthy environment

today to work in. We've had a somewhat painful impetus for change over the last four years, but that's not a bad thing if you look at it the right way. We've learned much about personal responsibility. We've learned an awful lot about some of the things I was discussing earlier – being curious, asking the next question, being rigorous in all the things we do, and being open to other people's views and perspectives and different kinds of experts.

We've added a lot of rigor into our processes to be able to come to the proper conclusions and take the time to listen to other folks and use their experiences to assess the risks we have before us. This approach enables us to make good decisions about when we're ready to fly and when we're ready to accept the level of risk that we have, or when to not fly and to buy that risk down further by doing more. We've worked very hard to change the culture, to put the checks and balances in place that are necessary among Engineering, Safety and Mission Assurance, and the projects, as well as the institutional side. There are checks and balances that are required to hold people accountable and elicit the right questions.

We've put a very good governance structure in place, with specific responsibilities for specific people who look at things from different perspectives, and we end up with a much better product as a result. I think we've made great progress.

We still have a way to go in accepting other people's views, and process rigor can always be improved. But we've put a rigorous process in place, and we've put the governance structure in place with the checks and balances that will allow us to be successful – these processes were much softer in former years.

WRIGHT: We were talking earlier about the rich history Marshall has and the impact that it has had on the local area. What do you believe to be NASA's impact on society as a whole?

KING: We've done some recent surveys that help us to understand that people have a very positive view of NASA, but they don't know why sometimes. There are all the typical answers: It gives us national pride. NASA does the hard things. There's economic and technological advantage that comes from what we do. We serve as a catalyst for many things that make us better as a society. I think all those things are true and meaningful, but I really believe it's even more about allowing people to dream and then make those dreams come true. People are just in awe of the things we are doing.

When you say, "This is what we are doing. We are going to Mars. We are going to Pluto. We have probes all over the place. We are living in space. We are going back to the moon to live there for periods of time, and then we are going on to Mars." – it just boggles people's minds. We don't understand it as a people; even those of us who are involved in trying to make it happen don't really have a sense of it – for this is difficult and hard and it is dreaming big. I believe that's what NASA brings to our country.

I think that may be the most important aspect of what we do – that national pride and that ability to dream and then make those dreams come true are hugely important to a country such as ours. We have to believe we can do these hard things; otherwise, we never will. Sometimes we succeed and sometimes we have setbacks, but we have to look at those setbacks as steppingstones to the future. That's what this agency has done, and I think that's the way the country has overall dealt with it. I see it as a huge opportunity to inspire people to do more and better. NASA has played a large role in that, and I hope that will continue in the future.

WRIGHT: While we're talking about the future, talk about the involvement for future work between human and robotic exploration, and your thoughts on that and how you and your center will be involved in making that work.

KING: I think it's hugely important that we integrate science and exploration, because there should not be two parts of NASA. It needs to be integrated. One of the benefits that Marshall has is that it's been involved in both aspects. Many other centers are involved in one or the other, or primarily in one area or the other, but not both. We've done a lot of thinking about how to integrate this. A big part of our success in the future will be defined by our ability to integrate science with exploration. It can be done. There are many ways in which science will inform exploration, and exploration will make us ask more questions from a science perspective.

So integrating science and exploration is essential to a vibrant future for the agency. Clearly, they are related and they should be related in a much bigger way than we have been able to do in the past. The two areas have their own programs and projects, and those probably need to stay distinct and different. But at least in the planning and in what we do, they need to be integrated in a much more structured way than they have been in the past. I look forward to trying to play a role in that.

WRIGHT: Do you see robotics working along with the science and exploration effort as well?

KING: Absolutely. Robotics will be a big part of enabling humans to explore. I see no other way. There are things robots can do better than humans, and so we should use robots to do those

things and not take the risk with humans. There are things humans need to do that robots cannot, and so we have to utilize those strengths toward our goals in science and exploration.

WRIGHT: Before NASA, there was NACA [National Advisory Committee for Aeronautics], and so its beginnings laid the foundation of aeronautics. With the budget so tight and the vision so strong, do you find that aeronautics will be able to still be a part of NASA in its future?

KING: I think so, and I think it should. It has definition today like it has not had before. We now have an aerospace policy from a national perspective. We have defined roles for what NASA does, what the FAA [Federal Aviation Administration] does, and what others do in a way that we have not before. That will be very helpful in aeronautics and will help the nation to move forward in a more consistent and efficient way. But I do see aeronautics as something that the agency needs to continue to do, but only in the areas that have been defined for the agency. That has been clarified recently, and I think that will help us move forward.

WRIGHT: Before we close today, I wanted to ask your thoughts on the fact that you've spent the last twenty-three years with NASA. Why would you, or would you, encourage someone starting a career? Why would you suggest to them that they move toward the space agency as the place for their future?

KING: NASA is an incredible organization that takes on some of the most difficult challenges imaginable to humankind, and has successes toward those challenges. If someone wants a huge challenge in life, I can think of no better place than the agency to get that and to be able to

contribute toward the betterment for humankind. You get to work with the smartest people in the world – some of the most competent people you will ever run into. You get to do some of the grandest things you can ever imagine, beyond your imagination in many cases. And you get to do it across centers that are all good places to live and with good people across this agency.

There are huge challenges. We have many constraints that you have to learn to work within, but, overall, it is an amazing opportunity to learn and grow and contribute to a goal this nation has. I think the world is beginning to see the challenges that are there and what can come from efforts in space. So I would say absolutely that it's been an awesome opportunity for me. I've learned so much and feel like I've contributed. We have incredible people who have made sacrifices to contribute to this end, and I'm proud to be a part of that.

WRIGHT: Well, we've talked about NASA's past and current and future. Is there anything else that you'd like to add before we close today about thoughts of NASA being fifty years old next year?

KING: Fifty years – you know, there are times when you look back at that and you say, "Look at how much we've accomplished," and then there are other ways to look at it and say, "We could have done more." But I think that's the spirit that's embodied and that people love in the agency.

We have much to do. We have a vision today that we haven't had for a number of years, and I'm excited about that. I'm excited about being a part of this vision, and I have many colleagues who are very excited about it. I think we will accomplish it. I'm hopeful that the public and our government stakeholders will support the agency's goals in a way that will allow

us to accomplish them quickly, because there are a lot of people who are committed to making that happen, and it's exciting to be a part of it.

WRIGHT: Well, thank you, and we appreciate your taking time with us this morning.

KING: Thank you. It's sometimes good to be a bit reflective and think back on some of these things. Thanks.

WRIGHT: Thank you.

[End of interview]