

**NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT
COMMERCIAL CREW & CARGO PROGRAM OFFICE
ORAL HISTORY TRANSCRIPT**

LORI B. GARVER
INTERVIEWED BY REBECCA WRIGHT
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[This oral history with Lori B. Garver was conducted via telephone from Houston, Texas to Washington, DC.]

WRIGHT: Today is June 26, 2013. This telephone interview for the NASA Commercial Crew & Cargo Program Office History Project is being conducted with Lori Garver, who is the NASA Deputy Administrator, and is speaking from her office at NASA Headquarters in Washington, DC. Interviewer is Rebecca Wright, who is in Houston, Texas at the Johnson Space Center History Office. Also in the interview is Dennis [A.] Stone, at the Johnson Space Center Commercial Crew and Cargo Program office.

Thanks again for taking time for us today. We'd like for you to start by providing a brief background of your involvement in the advancement of commercial services for space.

GARVER: Thank you. It's great to talk to you and think back about this exciting history that is now making so much progress. I would trace my personal involvement in commercial transportation services to well before COTS [Commercial Orbital Transportation Services], to the mid-1980s when I was first involved at the National Space Society. We were all about not only driving down cost and providing best value for the NASA programs that were funded by the taxpayers, but really to get a spacefaring civilization.

Everybody knows if you're going to do that over the long term—which is what the National Space Society was based on—you would not be having the government footing the bill for everybody and everything going into space, or that would never happen. In order to reach the goal of a spacefaring civilization, you really need to drive those costs down, and the best way to do that is through commercial activities. In my view that just was never a controversial concept, starting from when I first entered the space field in mid-1980s.

Both in graduate school as well as in my work, there were many people who had written about it who had views that shaped mine from those early days. Gary [C.] Hudson is someone that comes to mind. He was involved with the [Pacific American Launch Systems] Phoenix Program, looking at commercializing space transportation.

Of course, Pan Am [Pan American World Airways] back then, and Tom [Thomas F.] Rogers's involvement with Bob [Robert A.] Citron—all trying to look at commercial crew programs. We didn't call them "crew" then, but it would be transporting people to and from space for less cost. It was really related to generally reducing the cost and getting more markets open for space. As that developed into the '80s, it became clear that it wasn't coming around as fast as we had all hoped.

I came into NASA in the mid-1990s and [Administrator] Dan [Daniel S.] Goldin was also very much speaking about this as something very positive, a natural way of progression that we would be following. I would say certainly the commercial programs got their start under Mr. Goldin. Alt Access [Alternate Access to Space Station] in particular was a focused program in the late 1990s. You'd have to ask people who were here when the COTS program actually got formed, but I'm told that Alt Access fed into the start of the COTS program.

We were only able to get a handful of millions [of dollars] for those programs, but you had at that time a number of companies working to capture these markets. You had Kistler [Aerospace], Kelly Aerospace [Inc], Beal Aerospace, Rotary Rocket [Inc.], Andrews Space, HMX [Ltd.] evolved from Rotary, CSI [Constellation Services International, Inc.]—all who wanted to drive down launch costs and do that through commercial programs. I should go back [to 1982], to that first FAA [Federal Aviation Administration]-licensed flight with Deke [Donald K.] Slayton's group, Space Services [Inc. of America]. I went to that launch.

Driving down the cost, getting the FAA involved, understanding that the governments weren't going to be the best at developing these rockets, and opening space—just not a new idea by the time COTS came out. What COTS did, in my view, was really, finally, focus enough resources on the task of utilizing the [International] Space Station as the market to make it real. And the fact that that happened has opened up all kinds of possibilities. It will be looked back upon as one of the brilliant strategies of that era. Full credit goes to [NASA Administrator] Mike [Michael D.] Griffin and the team who really forced that strategy.

Having been here in the '90s and being here now, I'm well aware that NASA does not loosen its grip on programs easily. It takes a force effort to say, "You know what? We've got plenty to do, we've got plenty on our plate. Let's partner with someone else in a new way to provide this service." When I returned, on Transition Team in 2008, COTS was already funded, and it was controversial.

There were people who didn't want to keep funding it, so I would say my key role at that point was to keep funding it, and try and protect it, and let the great folks who are working it work it. Like Dennis [A. Stone] down there, certainly Alan [J. Lindenmoyer], Kathy [Kathryn L. Lueders], the whole team. Then we got to the a point where I knew we needed some more

support, and we came up with, hopefully, a creative way to be able to get more milestones and more data to have it be successful.

My involvement, I would say, in COTS is a lot less than people generally give me credit for. I'm happy to give credit to the people who were really here when it was created, and I know that it's been a long time coming.

WRIGHT: Could you share a little more detail about your statement on being able to provide more support for COTS in creative ways?

GARVER: This was purely the additional data that we ended up beyond the base program providing funding for. That was something that folks recommended here, and of course, as all things with the budget and with this program, was controversial, but we were really convinced we needed to do that. I wasn't here during the time when we had to change course between [Rocketplane] Kistler and Orbital [Sciences Corporation], but when I came in transition in '08, and then into this current job in 2009, the program was well on its way. Again, I was just providing top cover for the support that all the professionals in the program told me they needed.

WRIGHT: Does that also include attempting to find additional funding, as in the [fiscal year 2011] augmentation?

GARVER: That's what I'm talking about. When we came in, that was their suggestion of how we do it. I'm just making it clear none of those were my ideas. That was purely people coming to us and saying, "We need this," and me saying, "Absolutely, we'll try and make that happen."

WRIGHT: Before we started the interview you mentioned that of course COTS hasn't finished everything that it started yet, so we know that it's not concluded, but based on what you know that the program has already accomplished, what do you believe that this foundation will do to serve for future private-public partnerships with NASA?

GARVER: Well as I said, it didn't start with COTS, and it won't end with COTS either. If it did, then it really would be unimportant. The whole point of something like this, unlike I think a lot of NASA missions—and maybe that's some reason why it doesn't come as naturally to some people—its whole point is to lower the cost of access to space, open more markets, and then have NASA be able to focus on doing new things and making new discoveries.

You can look at the legacy of COTS both as reducing the cost of getting to and from the Space Station—all kinds of things wouldn't be happening if we hadn't been able to do that—but even broader, it's a signal. I don't think a day goes by when someone doesn't bring me an idea that they have for getting new partnerships, reducing cost, getting NASA to focus on the new things and do less in the operational area. They have this idea because they know we did it on COTS successfully.

It was sort of a make-or-break thing. I'm never one of those who says, "We would have never done it if it weren't for COTS," because we tried so many times. It just so happened this one was tried in a way and with the right people and at a time when it was going to be successful. It would have come eventually, but say this hadn't been successful and we either lost some of those first missions or we just couldn't have gotten the funding and it would have failed like so many other past efforts to do it, people would have tried again.

There's just no way, as an advanced civilization that we are today and how long we've been able to go to space—from this country and others—that it inevitably wouldn't have developed in this way. In my view, all modes of transportation develop in this way. Really the question was, "Is the U.S. going to lead it?" I think because of the really focused effort by a handful of people in NASA, the U.S. is leading it.

WRIGHT: The companies that have been involved so far—where do you see them going from here in other markets that are not involved with NASA? Do you think this has opened up different ways for them to achieve their goals?

GARVER: I think everybody who is involved is involved with NASA at some level. SpaceX [Space Exploration Technologies Corp.] and Orbital are the two COTS players, so they're involved with NASA in other ways.

WRIGHT: What else are they going to do with their technology that NASA has helped them prove? Earlier you mentioned the activities and events that you were involved in, in between the times that you were at NASA, to move that forward. Do you see other markets opening up because of this activity that Orbital and SpaceX have worked with NASA?

GARVER: In my view, that's the whole point. It goes without saying. If Station was the only market and NASA was the only market, then these folks wouldn't have invested other monies that they have. It would be a different kind of program. The whole point to this is that NASA is not the only customer. We are providing that anchor tenant with the [International] Space

Station certainly, for crew and cargo, but it leaves behind the capability to lower launch costs, to be able to have the United States compete in commercial markets.

The fact that we have a competitor in SpaceX who is already doing that—I'm sure we can, and somebody should, calculate the benefit to this country from being able to have that. And over time, what will that mean? I was just reading an article in *SpaceNews* today about how ULA [United Launch Alliance] is now working to sharpen their pencil and be able to compete, and how the Europeans are looking to restructure their programs for their launch vehicles, for Ariane 6 [rocket] and so forth.

Recently I was at an interview with a Tweetup [social media meeting through Twitter], so you have to give short answers, unlike this interview. They asked, “What do our International Partners feel about our COTS program, generally?” I answered with one word: envy. I work for the U.S. government right now, and I take that responsibility very seriously. Not only are we reducing the cost for NASA, but we are reducing the cost so that the United States can win back this business that we have lost to the French, the Chinese, and the Russians.

I'm not embarrassed to say that's the point. If you go back to the [1958 National Aeronautics and] Space Act, one of our very *raison d'être* is to have that investment in our science and technology research, so that U.S. industry can be more competitive. Lots of folks within companies' boards look out for their bottom line in the next year or two. When you're in the government, you have the luxury of being able to look out for the U.S.'s bottom line over the longer term. We're the safety net. Over the longer term, we want to be able to have a competitive launch industry when we are doing more and more in space.

Yes, it's about new markets; of course, new markets. As launch costs go down, more people have reasons to launch satellites and do activities in space that we cannot imagine today.

The requirement for broadband is exponentially increasing. We couldn't have imagined most of what we do from space today. Lowering the launch costs, which have been the driver for keeping us from being able to do more in space, is absolutely critical. The whole nation owes NASA for this and owes these couple of individuals who made it happen in COTS. There's just no question in my mind COTS, followed by commercial crew, is something that will be seen as absolutely a turning point within our space development.

WRIGHT: Thank you. I appreciate that information, and for wrapping that up into a good statement about how these other capabilities are going to be more accessible to others. Is there anything else that you'd like to add, or any other thoughts? My time is running out with you, and I don't want to go over the limit.

GARVER: Let's see, make sure I have my main points. I think in the very early years we did believe it would go faster. We certainly believed getting lower launch costs would be something that there would not be any controversy about. Given how many different companies have competed for this over decades, you have to give SpaceX and Orbital Sciences a lot of credit just for hanging in there for years. Neither were some of the most early competitors, but by hanging in there, investing their own money, they're really performing.

The NASA people I see now, being in this position compared to when I tried to start these programs decades ago, it's just so satisfying. I was at the Cape [Canaveral, Florida] for the last SpaceX flight [CRS-2/SpX-2] that we had the problem with the Dragon [capsule] on orbit. Because Charlie [Charles F. Bolden, Jr., NASA Administrator] wasn't there I was the senior person, so I went out to where the folks were working on the issue.

Watching the NASA people work with the SpaceX people, recognizing SpaceX is really in the lead—I have characterized what I saw in Bill [William H.] Gerstenmaier and Mike [Michael T.] Suffredini as they were like grandfathers taking their grandsons fishing. I said, “They’re not fathers, because my experience with fathers is they tend to be a little more hands on and pushy and negative.” This was the most gentle touch of, “You know, maybe you want to try looking over there.”

They’re watching all the data, and I was over their shoulders going, “Why don’t you tell them that if you think that?” They answered, “We’ve got to let them get to it. We’re going to let them.” This is really important that the NASA people are absolutely trusting the partners to do this. I tried to let the folks in COTS who weren’t there in the room know how far we have come—we, NASA, but also the commercial partners.

I also was at the first Orbital [Antares rocket] launch, and you just can’t imagine the excitement and relief. Being out there with Billie [M.] Reed, who was working on the Virginia commercial launch site [Mid-Atlantic Regional Spaceport (MARS)]—he decided he’d show me around out there in the early ’90s, and joked that if he’d known it’d take this long, we would have both gone and done something else! It seems like it took forever, but once COTS came about—I guess I would leave you with this. They really did get this done in a way that was almost better than we could have imagined. When you just look at the straight numbers, it has saved taxpayers and NASA a tremendous amount of money, and it’s going to allow us to really open up space. There probably isn’t a program I’m more proud of at NASA. I know I get tagged with it a lot, so I’ll just own it.

I really appreciate the time to talk about it, because this is one of the more important things NASA’s done in its 50 years, and it is the way we’re going to hopefully go in the future. I

know we're like a big ship and we don't turn easily, but when we do it's also hard to turn back. This program, while just a teeny tiny fraction of our budget, has caused a shift in Agency thinking, and hopefully the thinking of all of us about how we're going to go forward in space. There are more exciting things to do, but the point of this is it allows us to go achieve those. That's what I love about it.

WRIGHT: Thank you.

GARVER: You're so welcome!

[End of interview]