

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

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INTERVIEWED BY REBECCA WRIGHT
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WRIGHT: Today is June 12, 2013. This oral history interview is being conducted with Bill Gerstenmaier at NASA Headquarters in Washington, DC, for the Commercial Crew & Cargo Program Office History Project. Interviewer is Rebecca Wright. Mr. Gerstenmaier is the Associate Administrator for the Human Exploration and Operations Directorate at NASA Headquarters, and has been in that position since August of 2005. Thanks again. We know you're always busy, so thanks for taking time to talk to us.

Prior to being in this position, you had served as the Program Manager for the International Space Station [ISS]. Can you share with us what some of the thoughts were when you were still in that position—before COTS [Commercial Orbital Transportation Services] was introduced as a concept—of the ideas that you were going to use to help supply the Station?

GERSTENMAIER: It was an interesting time. We were given the decree that Space Shuttle was going to be retired at some point fairly soon. Space Shuttle was a critical element of being able to supply Space Station, as well as to actually assemble Space Station. We were really scrambling on how we were going to replace the capability of the Shuttle with a new system and a new vehicle. We had to figure out the right phasing and work through all of the political activities associated with that.

When a new [NASA] Administration came in under Mike [Michael D.] Griffin—from Sean O’Keefe we had gotten a previous decree. Under Administrator O’Keefe, the Vision for Space Exploration was established and the Vision framework involved retirement of the Space Shuttle Program and a goal of lunar exploration. Under Administrator Griffin, the details of Vision were developed. This included the exact number of remaining Shuttle flights and details of an exploration strategy—Ares I, Ares V [rockets], Altair lunar lander—and Orion [Crew Exploration Vehicle] that began with the Moon.

We were going to do the Constellation Program, and we were going to retire the Shuttle Program and move forward. Mike wanted to expedite that activity to actually move a little bit faster than what had been done under O’Keefe. He was looking to try to ramp down the Shuttle Program even faster than the previous Administrator had done. We were under a lot of pressure to try to figure out creative ways of keeping Space Station supplied and functional, and able to do research.

We also had to convince our International Partners. Their modules had not flown yet to Space Station, they had made significant investments in Space Station, and their stuff was still sitting on the ground. This was post-*Columbia* [STS-107 accident] and we hadn’t really established a repeatable flight rate after *Columbia* with Shuttle. Then we’re already talking about Shuttle potentially retiring. We had a lot of work to do with the partners to convince them that we had a viable plan for Space Station and that their modules were really going to get launched. We were going to actually complete assembly, and then once we got assembly done we would have the ability to resupply cargo and research and keep Space Station resupplied.

It also really changed the way we did business. Station was designed with hardware that was intended to be returned to the ground, repaired on the ground, and then flown back up on

Shuttle. We had to go to a totally different philosophy with all our hardware onboard Space Station. We had to now look at hardware as being expendable, where it could not be returned, because we lost a lot of return capability when the Shuttle went away. So that hardware had to essentially be disposed of on orbit, and then replaced in a steady stream from the ground. It changed our entire management and operations philosophy with Station.

When you hear about the program and you think about what we were facing at that time, we were in a tremendous transition period and tremendous uncertainty about exactly how we were going to realize the vision of completing Station assembly and then also moving into research. It looks all fine and well ordered from today, looking backwards, but at that time there was a tremendous amount of angst in the system about how we were going to pull all of this off. I'll tell you frankly, even today we're not fully transitioned. We're in the process of that, and we can talk about it more later. We're not there yet fully, but at least we're down the path. It looks like we're on a strategy that's sustainable and allows us to get really quality research out of Space Station, which was our overall intent.

The other thing is that we really honored all of our commitments to all our International Partners, and all of their hardware is on orbit. That was also tremendously important for them. There were lots of debates between myself as [ISS] Program Manager in Houston [Texas] and Mike Griffin up here. He sent a group down to restructure the entire launch sequence and cut the number of flights, so I had many interesting discussions with the team about how they were going to do business in a new way, and we weren't always thinking correctly. In the end, we ended up with a plan that was executable, and we're moving forward.

WRIGHT: Do you recall some of the creative ways that you were trying to possibly resupply Station?

GERSTENMAIER: We looked at things. First we had to change the logistics stream, so we had to repackage hardware. Large Orbital Replacement Units [ORUs]—we knew they could not be returned, so they had to be redesigned. One thing we've done that recently occurred was we upgraded the communications system. There were eight individual Orbital Replacement Units, think of it as eight avionics boxes. We now have one, so that got replaced with modern digital equipment. We redesigned a pretty complicated, pretty integral system into a single package.

For ammonia, the intent was to bring up large ammonia tanks and large ORUs to replace ammonia. Now we had to make the ammonia system reserviceable, so we had to put a disconnect on it. Same thing with oxygen. We used to just change out the huge, big oxygen tanks on the outside of the airlock. We could not do that anymore, so we had to essentially put a quick disconnect on the side so we could recharge them. We didn't have the capability to bring high-pressure oxygen up, so now we have an oxygen recharge system and a compressor that actually raises the pressure from supply tanks.

There was a ton of work of taking a Station that was designed to be reserviced and operated with the Shuttle in place, to the new system. The big changes were really in the oxygen system, the nitrogen system, and the communication systems. All of those had to be redesigned to accommodate some new, smaller transportation system.

WRIGHT: Share with us how you formed the COTS program office, and what were your expectations?

GERSTENMAIER: About the time that COTS came along, Mike Griffin asked, "Could we take a look at doing a new, innovative, and creative way of trying to get cargo transportation?" At that time there were two separate directorates here up at Headquarters. I came up in 2005, and I took over the Space Operations Mission Directorate [SOMD]. At that time [Scott J.] "Doc" Horowitz was in charge of the Exploration Systems Mission Directorate [ESMD]. The way it worked was SOMD did operations, and ESMD did development. The COTS program actually lived under ESMD, under the other directorate, not under myself.

Since I was going to be the recipient of whatever they developed, I was involved pretty extensively in putting together the COTS office and seeing what we could do. The idea was to try a totally new approach, where we would essentially see if we could develop, in a simple way, services, which we would eventually acquire, to provide cargo. As the Shuttle goes away, we needed a way to get cargo to Station. The idea was, could we do very lean development with industry paying for most of the development? Then we would eventually acquire services from that development activity. By services, that's transportation and cargo up, and maybe a little bit of cargo down.

We created the COTS office under the ESMD, and Alan [J. Lindenmoyer] was appointed to go do that. He created a couple of teams to look at innovative ways to pull this together, with the legal community and the procurement community. He looked at Space Act Agreements and cost sharing and other things. If you look at the first initial agreements, the \$500 million, a lot of that was associated not so much with the technical side, but if these companies had sound financial plans. Were they able to move forward? It took a lot of creative thinking on Alan and the team's part to pull this together. They actually brought in some business folks who were

familiar with commercial startups and could evaluate and move forward. That was the beginning of the COTS activity.

WRIGHT: You had worked with Mr. Lindenmoyer before. This was going to be a new way of looking at things—were there certain attributes that you felt he would be able to bring to this new program?

GERSTENMAIER: Yes. Alan had done some traditional procurement activities for me in the past, and he ran the Source Evaluation Board for some contracts under Space Station. Alan had an excellent understanding of what it took to put together contracts. He had an excellent ability to work with a team, to make sure that they actually got through this traditional procurement activity in a good fashion. He did an extremely good job of managing that activity. He had worked earlier in the Station Program, so he really knew the Station's basic requirements and what hardware was needed, how the basic Station operated. He had a really deep understanding of what we required. He had the ability to lead a typical procurement team.

I would say the third strength he had was that he was pretty innovative and creative. He has a unique way of looking at things. He looks for creative solutions that I might dismiss as not being practical or prudent, but he sees as a path going forward, and I think that's good. There's an innovative side there, there's a creative side, but he also had the ability to actually execute. If you're just totally creative and you don't have any process behind you, then you're creative and nothing ever happens. If you're creative and you have enough business sense, you can build a decent process. You can actually end up with something you can use.

Even though it was going to be under Doc Horowitz, I had a lot of discussions with Mike Griffin about, "Was Alan the right person for this job?" I remember some great discussion I had with Mike where I finally told him that if he really wanted this program to be successful, he needed someone with the skills and abilities that Alan had, or it wasn't going to happen. If he would've picked a typical NASA person, they would've ran into the first roadblocks, and looked at the financing and looked at how little funds were available and said, "There's no way this would ever happen."

You needed somebody that wasn't constrained by the thought process that was pretty open, pretty innovative, yet had enough business sense that they could actually pull together an organization and pull that off. That was Alan.

WRIGHT: When the COTS program office was being formed back in 2005, was it seen as a viable resupply option? Or was it being put together as a contingency if other areas were not going to be there?

GERSTENMAIER: I think it was looked at as a high-risk ability and a way to potentially provide cargo to ISS. It was seen as a way we could explore and see what industry could do. It was seen as high risk, and whether it achieved success or not, it wasn't as critical as it could be. There weren't really a whole heck of a lot of other options. Even though we treated it as not being absolutely required, it soon became pretty important that it actually had to really deliver and move forward.

There were hard decisions through the process. Rocketplane Kistler did not produce and did not deliver, so they ended up being terminated and removed. They didn't meet their

financing gates. Doc gave them numerous chances to try to redeem themselves from a delivery standpoint. Then when it became inevitable that they weren't there, they were able to actually stop that activity and bring Orbital [Sciences Corporation] online. That worked out well.

Again, it showed that there wasn't 100 percent success here. The market may not be there, the development activities may not occur. This was truly a high-risk venture. We didn't have a lot of other options. I will tell you that I kept other options in the background just in case. They weren't pretty. We could've potentially extended Shuttle for some period; we could've done some other things outside with some providers. We were pretty committed to this, but it was seen as high risk and it might not come through, so we need to be prepared with some kind of backup just in case.

That was basically the way that COTS started. If I go back and reflect on it, when we started it was a small amount of money in the big scheme of things, the \$500 million that we invested in this activity. It was seen as potentially high payback, but also whether it could occur or not was much less than certain.

WRIGHT: What were the thoughts moving forward with these being under Space Act Agreements, versus the traditional FAR [Federal Acquisition Regulation] procedures?

GERSTENMAIER: I think the idea with the Space Act was that it would allow us to work kind of hands off. It allowed the developers to develop at their own pace and in their own way, without a lot of NASA involvement. It provided them some funding, but it also required them to provide a lot of their own funding. If you look at the early milestones, they were more funding milestones based on could they actually raise capital, could they actually move forward. Were

they actually viable companies? Were they doing the design? It had a technical piece, but it was more were they actually viable and was there potentially a business base for them.

If you look at Space Acts, they're good if we're trying to potentially enable an industry for a service that we don't need. If we—NASA, the government—need the service, then we ought to be looking at a contract mechanism. At that point, we didn't actually need the service. It wasn't required. We still had the Shuttle, we still had [Russian] Progress and [European Space Agency] ATV [Automated Transfer Vehicle] and [Japan Aerospace Exploration Agency] HTV [H-II Transfer Vehicle] to resupply Station. We were okay from a resupply standpoint, but this was something we wanted to investigate, and the mechanism to investigate is the Space Act. I think it's the appropriate instrument for us to do this investigation.

WRIGHT: In December 2008 the Commercial Resupply Services [CRS] contract was awarded, and you were the Selection Authority. Can you share with us the timing of that, and why it seemed to come earlier than most people had expected it to?

GERSTENMAIER: There was a lot of discussion about that. Ideally when we envisioned this, we would've run the COTS program under Space Acts, they would've flown their demonstration flights, and we would've waited a period of time. Then we would've done a typical Request for Proposal for services contract, and then awarded the contract.

The problem was that we were dictated the Shuttle Program was going to end in 2010, and if we didn't move out with some kind of services contract there was going to be no ability to resupply the Space Station. This is where it became serious. We absolutely needed this service; we were destined to retire the Shuttle. They had picked how many flights we would have, which

was a finite number. Later I got those increased, but at that point there were a smaller number of flights, so we had no choice. If we were going to deliver, we needed to go do the services contract, move out, and move forward.

The other thing that I think is important is that there was no relationship really between the COTS activity and the CRS [Commercial Resupply Services] activity. There was no requirement under CRS for us to pick the providers from COTS. It was a full and open competition. Anybody that had worked on any kind of services that could provide cargo capability to ISS were viable candidates for that. There was no tie between the two. Sometimes you'll hear it even talked about today, "Why didn't the COTS demonstration flights occur? Are those required before you go do the CRS flights?" They are not.

We could go directly to the CRS activity right off the bat, even without COTS. There wasn't a tie there at all. Maybe in a past performance sense it might've been there, but it was really weak. This was a full-up competition on its own, totally independent from COTS. Again, as I described earlier, when you have a Space Act it's when you're enabling an industry. You're getting a new development group of individuals or companies together that can provide service for you and other non-NASA customers. Then when you actually need services you go in and do the contract. That's where CRS came about.

The other thing that occurred during this timeframe was that somewhere in there, we did the COTS manifest assurance funding, which is roughly \$300 million we added in on the existing Space Acts. That was again, separate from all of this other activity, but at this point we determined that if we were going to really have this industry built, there are some things that they probably ought to be doing. We looked at where they had not done some things. In the case of one of them, they didn't do any thermal vacuum testing; they didn't do any EMI

[Electromagnetic Interference] testing. They didn't think it was necessary, and we thought it was. We were able to, under COTS assurance, have them go do some activities in that area.

In the case of one of them, we put an extra flight in where the rocket would just fly by itself without the capsule on top going to Station. We thought that was another assurance measure. These things we would say are not absolutely mandatory, but from a prudence standpoint our experience base has been that you ought to do these things. We gave them extra funding to go do that. We gave them some idea, "Hey, we want you to do these other things." They provided some stuff to us, and we said, "Yes, these are the things we'd like you to do." It turned out that was tremendously important.

I don't think we would've had the success we had with COTS if we had not done some of that testing, especially in the EMI area. There were huge problems in one of the vehicles in terms of EMI that was discovered during that testing. The thermal vacuum tests didn't yield much new information. They may not have been mandatory, but it's clear that the EMI test was. I would say again, that was another contributing factor to the overall success of this program. If we would've just stayed with the \$500 million and we would've had them try to fly their test flights and their demonstration flights, I believe we would've seen a much higher failure rate. That assurance money was pretty important, that got added to the COTS program.

WRIGHT: That augmentation was a bit novel in the fact that some people say that NASA asked for it, and then others will say that NASA had the opportunity to have this money. Can you give some background on how you were able to secure those funds, to be able to reduce those risks?

GERSTENMAIER: Again, from my perspective—the way I would describe it is that when we started the COTS program, we had the \$500 million like I described earlier. We weren't counting on success for this program. If it didn't work and it didn't deliver anything, no harm no foul. At this point now, Shuttle was definitely going to be retired. We didn't know exactly when or how many flights, but it was going to be retired.

The game had now changed a little bit. Whereas before it was a "nice to have," it was becoming now, "This better be really successful." Then our argument was, from a mission assurance standpoint, to improve the probability of success we wanted to invest this additional \$300 million in the COTS program. It was the Exploration [Systems] Mission Directorate's act to do that.

We thought it was in the best interest of the government to put those funds out. The way we described it to the Congressional folks was that this money wasn't absolutely required, but if you were really prudent and you really want this capability, we believe this funding is required to go do these types of activities. They're not mandatory, but they are really close. If you want mission assurance, or you want a chance to make sure that when these things fly, they're going to fly with the minimum amount of risk from early failures, you want to do some of this additional testing.

That's where those items came from. They were described as truly mission assurance, and I think that's the way we described it in the official documentation. These were things that we didn't consider mandatory, but they were important if you really wanted to have a high probability of success on the early flights.

WRIGHT: You mentioned Congress, and I'll just segue into that for a minute. I know that you've had to testify over these last few years about a number of things, but the commercial aspect continues to come up. When you first introduced this concept, did you feel there were advocates for NASA to help fulfill its charter with starting these new ventures with these public/private partnerships?

GERSTENMAIER: I would say that at the very beginning, and even today, there was not a whole lot of support. It's a different way of doing business. "If the market is really there commercially, why can't these companies do it on their own without any government funding at all?" There's a general feeling within Congress of that. I think when we started this program, it was seen as not being a very large investment in the big scheme of things. The probability of success was not seen as mandatory, because the Shuttle could still be around. Folks at that time were still advocating for continued Shuttle flights.

Congress more or less tolerated it at the beginning, but didn't really accept it. There was nobody clamoring and saying "This is something we ought to go do." Even within the administration, the administration at that time was not driving us to go do this. This was something that we thought was prudent to do, to see if there's a different way of acquiring services. People look back on it and they see some brilliant guidance, and everybody takes credit for the success and they disavow all knowledge of the failures.

Looking at it at that time, and looking forward, there wasn't a whole lot of support for all this stuff. We thought it was a prudent thing to do, it wasn't a big investment, and we could move forward. Then it became more serious and we added the additional funds, the assurance funds. It was not easy adding those funds. Some folks say that's a 60 percent increase in the

original program cost. They see that as a big increase, but I saw that as the focus had changed a little bit. Development of this new industry was going to be critical to us in the future. It was time to invest a little bit more money to keep that moving forward.

The other thing was the schedule took a lot longer than anybody ever predicted. If you look at the original proposals, they've been flying for four or five years now. They were fully established by now, and they're not. Orbital's just coming online. Their demonstration flight to ISS will probably be in August or September of this year, pending we get through some launch-range stuff. Then SpaceX [Space Exploration Technologies Corp.]—their next flight, their third flight will probably be towards the end of this year. There's still a lot of activity occurring. They're still not in a repetitive, reasonable flight rate. They're still both in startup [phase], there's still a lot of risk in the program.

It's okay, but it's still not where you would really want it to be with this \$40 to \$60 billion asset called Space Station that is absolutely dependent upon this capability. We're still in a very high-risk posture; the jury is still out on how this occurs. I wouldn't be surprised if there was a failure somewhere along the line in either one of the two programs. How we react to that as a government is going to be absolutely critical. If we stand down for an extended period of time, that's going to be not acceptable. We need to accept the fact that there's potentially a failure here, fix it, and then get back to flight as soon as we can.

We're able to do that because we deemed cargo as disposable. The components we're flying are items that if we lose them, we can replace them. They're not so valuable, like a one-of-a-kind unique satellite. They're not nearly as valuable as human life. We have a different degree of freedom here that other programs don't have. Going back full circle, I think the program started out as, "We'll just see what happens," and then it got "We need to get a little

more serious.” That was the COTS assurance injection. Once we put the services contract in place, then it was “no kidding, we need this service” and we’re moving out in a more traditional activity to go do it.

To come into Station, we have to show that you cannot damage Station. It’s a different requirement. The asset responsibility is totally on the contractor. The term responsibility is totally on the contractor. Only when they get into the [Keep Out] Sphere around the Space Station do we get involved with the requirements. All we have to do there is show from a mission safety standpoint that they can’t damage Station. You can design systems that if this box fails, or this component doesn’t work, or this sensor doesn’t work correctly, you can abort out. Okay, the cargo didn’t get there, but that’s acceptable. The cargo was disposable to begin with, that’s okay. Station is protected. We have a very nice, succinct set of requirements that we on the government side can enforce to make sure that we protect the asset that we care about, which is Station.

Whereas when you then expand to crew, it’s a different game. Now NASA needs to be involved in the ascent piece, because we have to take care of the crew. NASA has to be involved in the orbit piece, NASA has to be involved in the descent piece. It’s much more complicated with crew. Mission success and safety are 100 percent linked with crew. For cargo, safety (protection of ISS crew and facility) can be protected and mission success (cargo delivery) sacrificed if required.

The other thing is that also with crew, you lose that option of just aborting. With the crew, mission success includes returning the crew safely. The demands for crew are much more rigorous than they are for cargo. In the cargo case, all I’ve got to do is not hit Station. In the

crew case, you've got to return the crew safely, and you've got to protect them all the way from launch, all the way through entry.

It's not fair in any way, shape, or form, to compare what we did with cargo and what we're potentially going to do here with crew. They are very different programs. Again, in this town, folks see them as exactly the same and they don't understand why the requirements aren't the same. You would not start a program out, I don't believe, the way we did with cargo. We'd essentially be hands off and all we had to worry about was when they came into Station that they protected Station. I think it was a reasonable approach for us to do on cargo. We learned a lot by doing it, and learned a lot from the way we acquire services. That general learning is applicable to crew, but the safety requirements and environment are very different.

WRIGHT: Most of the COTS program office like to share that when they entered into this new area, it really was a new way of doing business. Again, a lot of that was supported by the Other Transaction Authority to allow them to do it with the SAAs [Space Act Agreements]. Do you think in the future that's going to be another avenue? Or do you believe that most of what you're looking at, working with the commercial sector, is going to have to go back underneath the traditional FAR?

GERSTENMAIER: Again, as I described earlier, if we're just enabling an industry and we're doing those things, Space Acts are the way to go and this Other Transaction Authority is the way to do it. Once we need a service, then we need to go into the typical FAR-based service kind of activities.

WRIGHT: Certainly not asking you to look into a crystal ball, but do you believe that based on what NASA has invested in this partnership, that these markets will be able to develop in the future for other customers for them?

GERSTENMAIER: I think one key role Station can play is the proving ground for other commercial companies. Under the Center for Advancement for Science in Space, the CASIS activity with Station—we've asked them to reach out to more traditional companies that do terrestrial-based research, like pharmaceutical companies, or potentially materials, companies that manufacture materials or alloys. Lots of things in the biology area, the human area. The idea for CASIS is to go out to these commercial activities and see if they have an interest in doing space-based research. When you go to microgravity, genes and cells express themselves in a very different way than they do on the ground. We're not sure exactly why, but they do.

For example, you can fly salmonella to space. The genes mutate in a different way in space. They actually become more virulent, or more disease causing. You can then look at that, determine which particular gene turned on, which turned off. Then you can actually return a sample to the ground, and through genetic engineering you could knock out selected genes and then actually create, essentially, a vaccine for salmonella. What's intriguing is that you don't actually do the manufacturing in space; you use the space environment to show you a different way that the cell performs. Then by taking that knowledge, you can apply that with terrestrial-based genetic engineering to actually engineer a vaccine.

I liken it to when they went to the jungles of Africa to look for other potential pharmaceuticals, and they went out and grabbed plants. They would inject them to find out what they would cure, or not. There was nothing special about Africa, but it was just that the stuff was

a new environment. They got a chance to look at a new chemical compound, a new way of doing things that actually had healative or protected the body kind of effect. We can do the same thing in space. If we can get somebody to go talk in a way that pharmaceutical companies can understand, then they can go test things in space.

The other thing that occurs in space is that muscle atrophies, or weakens, because it's not used. That's indicative of what happens in the elderly, so there may be some pharmaceutical remedies that can occur there. We can fly some animals to space, and actually try new candidate drugs on them to look at muscle wasting and bone loss. A lot of different things. Another one is the immune system is not as effective in space for some reason. That's another way you can now look at things that actually improve the immune system.

The idea is that we can potentially fly animals and rodents to look at that. Pharmaceutical companies can then test very quickly in space and see whether this drug is effective or not effective. That can inform their decision on whether they want to go into Class III FDA [Food and Drug Administration] trials on the ground. This is a very quick way for them to determine, "Does this drug have enough promise to invest tens of millions in research, or something that just doesn't look like it's going to pay off?" You can use microgravity as that truth of "Is this a good drug, or not a good drug?" to move forward.

The idea is to expose a bunch of folks that are not familiar with what happens in microgravity to the unique properties of microgravity. Have them use what they understand, terrestrially and building stuff on the ground, and say, "If I can take advantage of this new test environment, I can actually get an economic advantage over all the other companies that are not testing in space." Then maybe that kicks off a new economy in space. We've got the

transportation market established through cargo, and we'll have a crew transportation market established. Then we've put the basis together of another new economy in space.

If I dreamed a vision, it's that Station allows us to experiment on a very low-cost basis with a lot of commercial companies. The commercial companies get excited and it's no longer the government saying, "We need to go to space to go do research." These commercial companies say, "I need to be in space to have a global competitive advantage over other companies." Then we've also got to enable the transportation market for them to go realize that. That's nirvana for us. They're in low-Earth orbit, the government's not investing. The government is now moving on beyond low-Earth orbit. We're out in the vicinity of the Moon or beyond. We're heading towards Mars or asteroids, and pushing that next series of boundaries.

We'll see how all of this plays out over the next 10, 20 years. Station plays a very key role in showing the market is there. We can do stuff today on Station extremely quickly, we can do it in a matter of months. Pharma wants to do something different, Station's already established. We can go do it through the CASIS organization, we'll go fly it, and we'll get results back in a couple of months. We can answer things on a pace that commercial companies are used to seeing, so we'll see if this pays off, and if all this works or not.

WRIGHT: Sounds like a good plan to me.

GERSTENMAIER: It'll be interesting. Life's never dull.

WRIGHT: It's a continuation of what you started so many years ago. Are there any more thoughts about the COTS program? Any regrets? You wish you would've done something different, now that you can look back and see what's been done?

GERSTENMAIER: I think in the end it was okay. You can always refine stuff when you look back a little bit. I think the important things to take away were that COTS was really not related to CRS, and I didn't really do CRS because I wanted to do CRS when it occurred. We had no choice. I don't think others fully realize that. When they told us the Shuttle Program was shutting down, that was tremendously difficult. That forced a lot of decisions.

We were luckily able to get another Shuttle flight, STS-135 added in, which was critical, because the cargo providers were late in coming. If we wouldn't have had that flight, we would've been in a posture where we probably would've had to reduce crew size on Station. It would've been a different posture. We were really lucky we were able to get that flight, and we were able to keep that option open for an extended period of time. We actually got four additional Shuttle flights beyond the original commitment. That was not an easy thing to go do. I worked amazing processes to pull that off with our team. Luckily folks were not too picky, but they didn't look too closely and kept options open. They worked out well.

We'll still see how it happens, whether these guys really come online. Like I said earlier, there's probably a failure coming, and how we react to that failure will be extremely critical. We lost a Progress about a year and a half ago, and we recovered from that very quickly. Hopefully we can do the same thing if we have a cargo failure. The other thing too is that I don't think folks realize how difficult this source selection was for this CRS contract. You know about all of the protests.

WRIGHT: Would you like to share some perspective of trying to put that together, with all of those complexities?

GERSTENMAIER: It was not easy, but life is never easy. We made the selection, and we immediately got protested to GAO [Government Accountability Office]. Then the first point was, did we want to get an [automatic] stay. Typically what happens when a protest is filed, it stops all work on the contract. Then we had to go to GAO and make an appeal to continue work even though we were being protested. That was not easy.

If you look at the logic, what I described earlier, I didn't want to do this procurement anyway, but I had to because of the time criticality. Now to take a delay for a year to deal with this protest would've stopped all work on the cargo activity for a year. This makes absolutely no sense. This is exactly what you don't want to do. We had to articulate all that in writing to GAO, and luckily GAO was understanding enough and understood our logic, and read through it, and said, "Yes, this is right. They need to keep moving on."

We were able to continue on with the two contractors, with Orbital and SpaceX, while we were still dealing with the protest, which took about a year to get resolved. That was really hard. I had advice to find some way to compromise to satisfy the intent of the protest, but it didn't make sense. We didn't have the resources, we didn't have the funds. I was pretty clear in my source selection statement of what my rationale was, and I believe it was the best decision I could've absolutely made with the data. It wasn't biased in any way, shape, or form. I was ready to go defend that, but the consequences of us not winning could've been a real mess to us in the future.

My life is full of risks, so what's another one, right? We just moved on and went through that process. I spent an inordinate amount of time getting ready for the GAO testimony, and spent eight hours I think on the stand with GAO. It was hard, but it's what I'm supposed to do. My logic was there. In hindsight, the miracle was that with help from others, we wrote a very sound source selection statement. I learned that from previous procurement activities I had the privilege of selecting. It's really important that those things are written well, and your logic is there, and it's sound and defensible.

It's not much different than what I do in my everyday life, when I go to a Flight Readiness Review and I commit to a Shuttle launch with crew members' lives on the line. I know their kids and their wives. There's probably no more serious decision I ever make in my entire life than those kinds of activities. I treat these procurement activities exactly the same way. If I'm going to make a mistake, it's an honest mistake. It's not because I didn't listen to anybody, and it's not because I didn't pull together all of the important information I believe to make the decision. Now hindsight may reveal that I missed some piece of data, but it wasn't for lack of trying and searching. We worked hard.

Out of all of that I learned that if you really write down succinctly what your logic is and what your rationale is, it's there. Some people trivialize the fact that we picked two contractors for cargo. That was not an easy decision. I had a choice to stay with one or two. I still don't know if that's the right decision yet. We'll know somewhere in the future. We need both of them. We need 40 metric tons to be delivered to Station between now and the end of the contract, as the minimum. We need each contractor to deliver their 20 metric tons, so I need both Orbital and SpaceX.

We'll see if that was a good thing, or it was a bad thing. It might've been better to pick one, but the logic basically was, I wasn't smart enough to know which one was really going to be there and I wanted some backup capabilities, some redundancy in delivery. Whether that was smart or not, or you would've been better off placing all our resources on one and all our effort in making sure that one was successful, it'll play out in the future.

I think some of this stuff in hindsight gets perceived as being easy and it's obvious that these decisions were made. There's speculation as to what political motivation made these decisions. I can tell you all the stuff that I've been involved with, that wasn't there. They were not easy, and there was no other motivation than to try to do absolutely the best thing for this government, for NASA, and for space exploration. Those fundamental underpinnings are there, and time will show how well all of this stuff worked out.

The other thing I would say in closing is that I have an unbelievably great job, and work with phenomenal people in this Agency. I think a lot of people share the same passion, the same desire for excellence that I do. If I can explain a problem to them, and I can step back and stay out of their way, I'm continually amazed by what this team will accomplish and what they can go do. There are things that I can see absolutely no way that this is ever going to work, but this is what we have to go make work. If I can articulate it with the right constraints to them, and then step back, the teams can absolutely 100 percent deliver.

To me, that's just an unbelievably great blessing to work with folks who are that dedicated, that talented, and ready to move out and do things even though they may not even see a path through the wilderness. I think that's what makes us great as a nation, and that's what makes this Agency special from other agencies. You're either wired this way or not.

There are those extra credit problems in the textbooks that don't have an answer. There's some folks that, man, you can't hold them back from those kinds of questions, those problems. Somehow I'm kind of wired that way. That's what I like doing.

WRIGHT: Which is good, because it seems like you've had an extra quota of extra credit problems lately. It's good you've got a lot of practice. Thank you for everything you've offered, and good luck with everything coming up.

GERSTENMAIER: All right, thanks.

WRIGHT: Thank you.

[End of interview]