

[Transcript] The Realignment / 405 | Loren Grush: The Artemis Moon Mission & NASA's Past, Present, and Future

Marshall here, welcome back to The Re-alignment.

The show has spent a lot of time covering a topic of space this year.

Back in May, I spoke with Elon Musk biographer, Ashley Vance, about his book, When the Heavens Went on Sale, which covers the non-billionaire aspect of the private space race in the United States and across the globe.

Last week I debated tech critic Jonathan Taplan about his opposition to manned Mars missions and his skepticism of the overall privatization of America's space efforts.

Today then, my guest Lauren Grush, the space reporter at Bloomberg, has a new book out that I'm really excited to speak with her about.

It's called Six, The Untold Story of America's First Women Astronauts.

In this conversation, we cover everything from the history of NASA, after the moon landings, the successes and failures of the Space Shuttle program, the initial barrier to women astronauts, and the new efforts to diversify the space program along with NASA's return to the moon.

Lots of great stuff here, hope you all enjoy this conversation.

Huge thank you to the Foundation for American Innovation for supporting the work of this podcast.

Lauren Grush, welcome to The Re-alignment.

Thanks so much for having me.

Yeah, I'm really excited to speak with you.

As we're just discussing, you cover the space category from Bloomberg, which is kind of funny if you say it out loud because that's an entire geographic, I'm kind of missing the terminology category, including basically everything outside of Earth orbit.

But you cover space and you have a new book out about women in the US space program.

Get into all that, but I'd love to just to start by just asking you, what are you particularly excited about when it comes to the space category that's outside of the various SpaceX propaganda bits that I've done the past few years, because listeners haven't heard that as much?

Well, that's a tough one because SpaceX does kind of take up a lot of the air in the room.

They are kind of the main player when it comes to anything space related.

One of NASA's biggest, if not the biggest NASA partner at the moment, but maybe in that vein, it is a really exciting time to cover space.

And one of the main things I'm interested in that kind of relates to the book we're going to talk about is NASA's Artemis program. So for the first time in quite some time, NASA is focused on returning humans to the moon. And part of the Artemis program stated goal is to send the first woman and the first person of color to the surface of the moon. So it's really fascinating to see the space agency put diversity and inclusion top of mind when it comes to this big, ambitious program. But SpaceX is also a part of that program. They are building the human lunar lander. So you can't escape SpaceX these days when you cover space.

Yeah. So I think this is where this gets really interesting from a historical perspective.

If we're looking at a lot of the mid-stage, 60s, 70s, like Cold War dynamics that drove the space program and the competition between the US and the Soviet Union, like gender and race were actually a huge part of that. So I think it'd be a useful place to start and then take us into the 1980s, the period you're discussing in the book. Yeah, absolutely. Well, when the space race was in full force, when I talk about this in the book, there was an effort to include women in the

astronaut corps. There's a very famous group of women kind of known as the Mercury 13. That's the name they've been given recently, but obviously not a great description for them. It's a nod to the Mercury 7, who were the first seven astronauts that NASA chose. But anyway, they're a group of women that passed the same tests that the Mercury 7 had to go through in order to be chosen for that

program. And they simply wanted to keep training. They had other training lined up that got canceled

ultimately when NASA and the government kind of found out about it. And so they lobbied Congress in order to get that training reinstated and also to emphasize why it would be important to include women in the space race and sending a woman to space. But ultimately, it just wasn't taken seriously at the time. And I think the sentiment was that anything that detracted from winning against the Soviets to be the first on the moon was kind of seen as a distraction.

And so this idea of being inclusive and having women in the program, that just wasn't a priority.

And so when the Soviets did end up sending the first woman to space, Valentina Tereshkova, it was written off as a publicity stunt at the time. NASA officials were just,

they waved it off. And so that was just not something that they were, that was a race that they weren't really keen on winning. It was really all focused on getting to being the first

to the moon. And so those mistakes caught up with them as America transitioned and evolved in the 70s and the 80s. The civil rights movement happened. The feminist movement happened. And so NASA really couldn't explain away any longer why they hadn't included women and people of color in the program. And so that was really top of mind in the 1970s when NASA decided to bring in a new

group of astronauts. They put diversity and inclusion at the forefront of that initiative, and that ultimately made that initiative a success. And they were able to bring in the first women and the first people of color into the program.

Yeah, it's interesting. I don't want to force you to take any political stands you're not interested in taking. So total leeway as the guest on the show. But I'd love for you just hearing what you're saying. I'd love for you to kind of articulate the difference between kind of diversity of inclusion, maybe in the more white culture aspect, and just the fact that it seems like it just literally wasn't possible for a woman to become an astronaut in the 60s and 70s.

Because I think it's easy to say in the mid-stage, culture war 2020, it's like, oh, so affirmative action, or oh, isn't the objective winning? Why are you focusing on the private parts that are actually flying up? But it seems like an important part of meritocracy is everyone is actually capable of actually competing in the first place.

So can you just talk about the awkwardness of that dynamic?

Sure. I mean, I think the issue at play is the criteria that NASA chose from the start.

The reason that it was impossible for women to join the astronaut corps was because they dictated that you had to have advanced degrees in STEM and that you also had to have jet piling experience. But women were banned from flying jets for the military. So it was ultimately the criteria that NASA set that excluded women from the program. And it wasn't until they relaxed that criteria, and that was aided by the fact that they created this new vehicle, the space shuttle, but also NASA made that conscious decision to relax that criteria that allowed for women to join the program. But even there were women pilots back in the

60s and 70s when they were choosing this, but they had just made those criteria so stringent. And a lot of women didn't have advanced degrees back then. So it was a lot of the cultural context that precluded women, even if NASA hadn't made it, or at least if NASA hadn't made it so that they needed jet piling experience, it still would have been extremely difficult for them to enter the program because of all of these other requirements that they added on at the time. Oh, that is so interesting. So I guess there's the obvious conversation we get into about de facto discrimination versus de jure discrimination. So obviously in World War II, there were women pilots. I think there were wasps. They weren't wasps, wasps, wasps. I forget. I listened to a lot of Audible books, so I haven't seen the word. No, it's the wasps. And then I do mention them a bit in the book as well. So yeah, the key thing is the wasps for people who don't know. They weren't flying combat missions, but let's say you've got a B-24 that's coming out of Willow Run in Detroit that is flown to a base in, let's say, the South. And a woman pilot would do that. You don't need to have the arbitrary gender discrimination. And it also puts aside the combat arms part of the debate. So you had that going on. But then after World War II, you have both the invention of the jet, and then you have the test planes, the X program, etc. But you also have the Korean War. So a lot of astronauts came out, flew in combat in Korea. So I guess in that context then, what do you think about the requirement for jet experience in the 60s? So there are a lot of reasons created for the jet filing requirement. Obviously they wanted, NASA at the time wanted someone who could think cool under pressure, be able to handle complicated machinery, be able to take the controls if necessary. But that was ultimately dictated by the design of the spacecraft. And so one of the points that I like to make is that, yes, obviously if you're going to make these design choices, and then that's going to help determine what kind of people are able to fly or capable of flying in that vehicle. But that is also a choice. The way we design our vehicles ultimately leads to those to who can be on them. And so my argument is always, well then if you put more thought and effort into the design and make that design more inclusive, then you have a wider array of people who can fly. Obviously the politics of the time in the 60s and 70s, I'm sure they weren't really thinking of that when they were creating the vehicles that they did. But now that we are in this new era, in this new generation, we can put more thought into the types of vehicles that we create. I think a good example of this is I covered this nonprofit called Astro Access. And their goal is to send a person with a disability into space. And one of the astronauts or the participants that I spoke to with that program talked about how dangerous it can be when there have been astronauts who have gone blind during spacewalks because of water in their helmets or some kind of equipment malfunction. And those moments become extremely dangerous because they are the way that we design spacewalks and the way we design vehicles, having that ability of sight is very important. But if we were to design these vehicles or these spacesuits with the idea that you could lose your vision or that people with disabilities would be able to operate them, then they wouldn't need to be that dangerous when one of those things happens when there is a malfunction. So it actually makes it safer for everyone to design these vehicles with a more inclusive amount of people in mind. Obviously, I'm not a spacecraft engineer, so I'm sure there's quite a few people that might think differently. But I do think that when we go about creating these vehicles and who can fly them, those kinds of decisions really ultimately dictate just how safe the vehicle can be and what kinds of people can fly on it.

And I really do want to get very directly at the book and at the 80s. But one quick question before we go there, I guess what you're raising here is an obvious question about what is the purpose of manned space exploration then? Because as you're articulating the issue like, you know, inclusivity, bringing someone with disabilities into space, I think the obvious is not even pushed back because it's like context by era. It's like, look, if it's the 1960s, the Cold War is still red hot, you know, you still have the Cuban Missile Crisis, obviously on the priority list, getting a disabled person to space is just not on the table on a couple of different levels, which could be entirely separated from the gender-related question. But I think if the question is, what is the purpose of space exploration when space exploration fills a bunch of different functions now? Like there's the military aspect, obviously, great power competition. There's also, hey, like, trying new things, getting access to people, driving interest. How would you think about like this dynamic? Well, this is a big topic of discussion that's been ongoing for a while. You know, there are, there's a quite a number of folks in the space community who don't even think we need spaceflight. And I like to use the term crude over man just to be, you know, more inclusive. But yeah, there are quite a few who think we should just focus on sending robotic spacecraft into space. It's much safer. You don't risk any lives. You know, some robots can reach places that humans definitely can't. I mean, the human body is certainly not designed to survive in space. We evolved in one gravity with an atmosphere. And so, you know, just keeping the human body alive and all the mitigation measures we have to do to make people safe when they go to space is, you know, some would argue it's not worth our time. You know, I obviously think there's quite a number of benefits of sending humans into space. Not all of them are necessarily logical. I would say a lot of people would argue that, you know, there are geopolitical benefits to sending humans into space. You know, back in the Cold War, you know, it was definitely more of a race, right? You know, showing you are dominant, you know, being the first to do something. Now it's more about, you know, geopolitical cooperation, international countries working together to see what they can accomplish when we join forces. And I think that is definitely an added, a very powerful reason that we do go to space, even when it comes to robotic spacecraft and to crude spacecraft, you know, bringing countries together, you know, seeing what we can accomplish when we work together, that's a huge goal of space exploration, the peaceful exploration of space today. And then also, you know, there are a lot of benefits of crude space travel that you find out when you get there. So, you know, sending humans to the surface of the moon will be able to collect quite a bit of material and do quite a bit more work than we're able to do when we send landers to the moon. So that, but those benefits and those applications are hard to determine until we actually get there. And I know that's a bit of a catch 22 reasoning to do it, but it does open up, you know, the possibility of what we can achieve. There's probably a lot more opportunities that we don't even know about until we get there. And so it's, there is an argument to be made that, you know, we have to kind of send them there and then see what we can do once we get there. Yeah, I think that takes us directly into the era of the book. So the way you've told this story, got, let's say, three constraints on women in space going out of the 70s, as we're leading out of the moon landing program. So you've got the advanced degree

requirement.

You have the jet requirement. And those are both centered on the actual design of the ships, rockets in question. So I guess it'd be used for them before we go into the individual bios of the female astronauts to actually talk about the technology change that happens, like the shift to the space shuttle, which is going to presage before they came in. And then even like changes in American society. So obviously the advanced degree problem is going to just go away naturally through completely non space related issues that have to do with like higher education, etc. Yeah, start with the technology bit. Right. So obviously the space shuttle is one of the main characters of this book. It was meant to be this paradigm shift for the space agency. So rather than, you know, just sending astronauts into deep space into the moon, you know, NASA really was looking to make space travel routine and affordable. And so reusable is a buzzword that we hear all the time now with SpaceX. But really it started with the space shuttle. Now there's arguments to be made of whether or not NASA was successful. But the shuttle was a partially reusable vehicle. And another thing is that it was bigger. So it could accommodate more crews, more different type of people. They didn't need just pilots. They could, you know, bring on engineers, scientists, people to operate the satellites, you know, and that's ultimately what led to the creation of this new role called the mission specialist. And that's really what allowed more people to come into the program. So that they while they still wanted jet pilots and people with piloting experience, the mission specialist role had much more relaxed criteria. You all you needed was, you know, a degree in STEM education, obviously an advanced degree was preferred. And all of the women did have some kind of advanced degree. And then also, but you just had to pass a basic physical. And, you know, there are some other, you know, height requirements and things like that. But ultimately, it was the most relaxed criteria that they had ever had for astronauts before. And so that was really what allowed NASA to open up the program to others. And it also helped with these other categories, you know, even by the 70s and 80s, there weren't women flying jets, you know, so that was, and still it was probably that there wasn't a heavy pool of women who had advanced degrees. So it's still difficult, but, you know, it was allowing more and more people to come in during this era of the country. And then you also mentioned, you know, how things were changing at the time, like I said before, civil rights movement, the feminist movement, NASA was starting to get questions about, you know, why had they hadn't brought in women and people of color to the astronaut corps. And so it was something that they really just couldn't ignore. And so during the 1978 selection, the selection committee put these topics top of mind. And it also dictated, you know, how they advertised, where they went, you know, what kinds of universities they went to, what kinds of groups they spoke with, you know, they went on a bit of a tour around the country to really advertise this program, put these advertisements in places that people will see. They also hired Nichelle Nichols to come in and, you know, do a video dressed in her dressed in an astronaut uniform. And for those who don't know, Nichelle Nichols was lieutenant or her on Star Trek. And so it really was a very different approach for NASA. You know, there, I mentioned in the book, there was one astronaut who, you know, felt like NASA didn't need to advertise, you know, it was in the past, they could just kind of say, you know, this is happening and the right people would come to them. But in this instance, NASA went out to the people. And I think it was reflected, you know, their efforts were reflected in the

types of people that they were able to bring in and choose for the 1978 selection.

I guess I really appreciate your articulation of the rationale behind the Space Shuttle program, putting aside the gender diversity on issues. It just seems like, given the metrics you articulated, capturing the imagination, reusable, therefore, specific missions, costs, etc., at the end of the, you know, Space Shuttle program, you know, early 2010s, it seems like it just completely failed, given some of the metrics. You kind of, it's kind of depressing to kind of hear it that way. But I'd love to hear your reflection on that.

Sure. So I have to, a bit of a disclosure on my end, I'm a daughter of Shuttle engineers.

So the Space Shuttle is, you know, near and dear to my heart. But yes, you know, there are, the Shuttle didn't really end its time. A lot of people would argue it probably wasn't a success, if not an abject failure. You know, they routine and affordable were two of the biggest, you know, things that were advertised when the Shuttle, you know, was first created.

I think some of, I can't, I don't have the numbers off the top of my head, but the metrics that came out once the Shuttle program ended show that it was definitely not affordable. I think it was, you know, nearly somewhere in the billions or hundreds of millions per, per launch routine, you know, obviously during the early days in the program, they really were trying to amp up that flight cadence. But then you had the Challenger accident. And one of the main criticisms during that investigation was that there was a bit of this launch fever going on when it came to the Shuttle. And some were worried that, you know, that was what led to two very high-profile accidents,

was people were very eager to launch and to get the Shuttle into the sky. And, you know, over time that led to accepting more and more risk into the program that ultimately led to tragedy and fatalities. So, you know, it was, it was definitely a first of its kind. Was it a success? You know, that is, I'm sure going to be debated for many decades to come. But it definitely was a paradigm shift for NASA. And I think a precursor for, you know, the kind, the commercial spaceflight we have today, you know, like I said, reusability may sound new with SpaceX, but it was a primary focus of the Space Shuttle program when it first began. So I think we see a lot of Shuttle elements as we move forward. But, you know, not everything that is first is always a smashing success. Another part I'm curious about particularly is the capturing the imagination part. Again, once again, like to the point of your parentage and your familiar legacy with it within the, you know, Space Shuttle program, it's, I guess when we ask you, isn't the, like, technical aspect of it, it's more of the program design aspect of it. I kind of wonder, was the inherent close to orbit nature of the Space Shuttle program just not enough to capture

the public's imagination in terms of funding, in terms of basic interest, in terms of, like, focus and attention compared to ambitious, we're going to go to Mars, we're not going to do this, it's not, because I just had a guest on the show, this is actually a convenient timing of publication, Jonathan Taplan, he's a very aggressive critic of the technology industry, he's a very aggressive critic of, like, the manned space program. And in his book, he's just kind of discussing, like, look, I remember, like, in the mid-60s, you know, people were, Pan Am did a kind of, like, not like a joke, but it was a gimmicky thing where they're like, hey, like, reserve your, reserve your seat on a moon flight in the year 2000, which is very much not the ambition of that post-70s, 80s space program. So I love you to just kind of reflect on that part too.

Yeah, so it's interesting that you mention this because when I was a kid, you know, and this definitely has to do with the fact that I grew up with the Space Shuttle program, you know, the Space Shuttle, what did seem kind of boring to me, but I think that also came with the fact that as a kid, your parents, what your parents do for a living is definitely not cool. But even at the time that I grew up with the Space Shuttle, it definitely had kind of the cache of it had definitely fallen away. What was really fun with this book was going back to the early days of the program and realizing that it really did have a bit of a following. Shuttle flights during the initial, the very early 80s when it started first flying, they did receive quite a bit of attention. And especially when Sally and the first women started flying, you know, they were still getting quite a bit of coverage from the media. So I definitely think, I mean, obviously going to orbit does not sound nearly as exciting as going to the moon, but there was a bit of fascination for the Shuttle in the early days of the program. I think what just happens, and this is what happens with any spaceflight program, I've seen it when I cover, you know, commercial companies now, it's just the more you do it and the more routine it becomes, the more that novelty wears off. And I think that's ultimately what we kind of want, right? Like, we don't want to make space travel this kind of, you know, miraculous enterprise anymore, we want to make it something that's routine. You know, I hate to use the analogy that everyone uses, but kind of like, you know, air travel, because, you know, that way, that means that we're conquering it. That means that we are, you know, making this endeavor that once was extremely difficult, something that we can, you know, keep a hold of and, and, you know, make something that is routine and affordable. Are we there yet? Absolutely not. But, and, and something that we should always keep in mind in the Challenger and Columbia accidents are a very, a very illustrative of that is that we should never, we should never think of space travel as easier without risk. It's always going to have risk. And so that's going to make it, you know, much different from, say, something like the airline industry. Just the fact that you're coming through, you know, you're moving at those insane speeds, and you're coming in and out of the atmosphere, that's always going to make it a very difficult endeavor and a risky endeavor. But yes, I mean, over time, you know, these things, we want them to be in a place where we aren't, you know, celebrating every single launch because it's, we've been doing them so often. So I think, yes, to your point, it definitely, you know, going to orbit, we go to orbit all the time now, you know, we're sending humans to the International Space Station on the reg. And that is, and I imagine they don't get nearly as much attention, you know, I cover them because I'm a space reporter, but I imagine the general public doesn't really know much about them when they occur. And while that might seem sad, I think that's ultimately kind of, it shows that we're being successful in, in, in evolving and moving the space industry forward. I'm particularly proud of myself because when you're doing a book interview, that's kind of like mixed into current events, it's hard to do the awkward. Okay, so now tell me the biographies of the astronauts, but I've got, I've got a good hook that fits our theme here. So as you're describing everything you're saying, I just keep thinking back to Tom Wolf's book, *The Right Stuff*, which is just about, it's somewhere back here, I haven't actually technically read it, but like a good podcaster, I can bullshit about it. Regardless, it's about the stories of the, of the, you know, the first astronauts, like the aspects of them, the events that shaped them, et cetera, et cetera. So I think in some ways you could think of your book as accomplishing the same

task for the first female astronaut. So I kind of asked the question on two fronts, and this allows you to, in a not awkward way, introduce the actual astronauts and all those different things. What were the quote, right stuff to be a post-moon program female astronaut? And then two, if we're going to say that the early male astronauts were shaped by World War II, the Korean War, and the X-plane program, like what were the shaping events that shaped these astronauts?

Absolutely. So we touched on it a little bit in terms of the criteria, just kind of the basic criteria of what allowed them to come into the program. But one of my favorite chapters in the book discusses their, you know, each finalist candidate that NASA picked had to come to Houston for a week to go through a series of tests and an interview in order to determine if they were right for the program. So that included basic physical exams, a psych evaluation, you know, that was a, there was a good cop psych and a bad cop psych. And, you know, one of them would ask you,

you know, what's your relationship like with your mother? If you could be an animal, what would it be? You know, just really basic nice questions. And then the other one would ask you to count backwards from 100 by seven and, you know, yell at you when you got it wrong, inevitably. But obviously those were kind of pass fail criteria. The biggest thing that they were judged on was this hour and a half long interview that they had with the selection board. And it really was just getting to know you session. And they ultimately wanted to learn more about the candidate's history and, you know, who they were as people. And that ultimately, you know, I mean, there was some subjectivity into the process, but that comes with any kind of selection process. But, you know, ultimately, they wanted to determine if they felt like these, the candidates were right for the job, if they understood the job, because being an astronaut means a lot of waiting. Going to space is actually a very small part of being an astronaut. And, you know, just if they had the right temperament for it. And so the six are a great example of how there really is no proper resume in order to be an astronaut, you know, they all had very different backgrounds. Sally, an astrophysicist and tennis player, Judy, an electrical engineer. Kathy was an oceanographer and geologist, Ray and Anna, two medical doctors and Shannon a chemist. And so that's just a very, very diverse range of backgrounds that you can have. And yeah, I find that to be inspiring, because it just goes to show, you know, you don't really, there's no one set path to getting to space, you know, there were there are many roads to reach orbit. And then, yeah, as we discussed, I would say, you know, the feminist movement definitely was kind of a defining moment for them in their lives. You know, they a lot of them had come had grown up after, you know, a lot of that work had been done, or, or at least it was happening as they were growing up. And, you know, they were they were kind of benefiting from the changes that society was making while they were learning and growing and going to school. And you can also see this and kind of the differences between the women who were older at the time and younger. So Shannon Lewis is a good example that I like to use, you know, she was slightly older than the rest of the group. And her experience, just trying to get a job before going to NASA, was extremely more chaotic than the rest of them, you know, she was constantly being told that she wouldn't be hired, because, you know, she was a woman, or that shouldn't be paid the same as her male colleagues. And so just those few years and difference in age and in generation shows just how far we came as a society during that time. And so I think that it just that's just very illustrative of kind of the world we were coming out of and the world we were entering by the time this program began. I think something people are

going to be curious about is by the time the space program was opened up with these initial female astronauts, how much of this was considered an experiment. So let's say you had your face female astronauts, and then whether or not this was the astronauts' fault, something goes terribly wrong. Was there a word where NASA goes, hey, like we made a bad call, this actually is a gendered space? Like how much of that was a dynamic early on? I think it was very top of mind, especially for the women. I don't think they were obviously they weren't calling it an experiment by any means, but the women certainly had an understanding that when you're first, there's a lot of scrutiny upon you. And so any mistake that you make has outsized impact on not only your job, but also everyone to come after. And I think this happens with any group that is underrepresented. When you're the first one in that group to do something, you're not just representing yourself, you're representing everybody like you. And so Sally even mentioned that when she first went to space, one of her biggest fears was messing up. And I think it's very clear what she's saying by that is that she knew that if she messed up, it wasn't going to be Sally ride messed up in space. It was going to be woman messes up in space. And so that just has a much bigger impact for all the women that came after. But obviously, they all did an extremely amazing job. And I think we're all grateful for that as well. Another thing is that while NASA made this a stated goal, not everybody at NASA was on board with this change. And that is reflected in some of the friction that they had when they came on board. Now, most of the women would say that they had a fantastic time at the space agency. And any of these hiccups were very rare. But there were some, some men were worried about being seen with them and sharing a condo or something like that. But if the condo was for work or something, some of the astronauts' wives were not very keen on the women flying with their husbands in the backseat of the T-38 jets, which they had to do. They had to get 15 hours of flight time each month in order to be current. But I'd say the real big antagonist in the room, I don't want to say antagonist, but certainly not as enlightened was the press and that the types of questions that they asked the women. And they seemed to just be kind of a gawg at the idea that women were going to be flying in a space with men. And so they would ask, you know, they asked Sally, you know, famously if she wept when the simulator broke, you know, if she wanted to be the first mom in space, you know, how they were going to clean each other, you know, or how they were going to stay hygienic together in a closed, cramped environment, you know, all sorts of things like that. And so it just, it was, I think it was a reflection of the fact that society at the time still wasn't quite grasping the idea that women were going to be flying into space with men. Well, you know, I'll just try not to be a 1970s press person and ask this question like delicately, but appropriately. So look, like as we have seen since the integration of genders in the military, this is separate from just like combat arms is just like in general, like design of bases, issues of sexual. So I think these are like genuine, like serious, serious, serious issues. So is the space program just so small that like the structural things just don't matter as much. So for example, if you're if you're if you're integrating thousands of thousands of thousands of people on a base, I think questions about birth questions about like, how are you all going to shower together, et cetera, et cetera, et cetera, like actually matter deeply at scale to your point about designing structures at the start of the episode. How much did that play out seriously in the space shuttle program and just like the International Space Station itself? I mean, obviously, there had to be accommodations for women when they came

on board, you know, couldn't be the same space program that we had during the Apollo era. You know, one of the things I spoke with Carolyn Huntoon about was she and she was kind of like the mother hen for the women when they came on board is that, you know, NASA had to make space for women. So that included, you know, adding a women's locker room, or women's restroom to the locker

room, you know, creating a new toilet that women could use because the apparatus that they used during Apollo was not going to work. It was essentially a cuff and I'll leave it at that.

Yeah, I was going to say like, what's the technical reason why that was an issue?

I mean, the reason, one of the main reasons, you know, diapers are primarily used is by everyone is because of the introduction of women into the astronaut corps. So obviously, it's not as if we can simply ignore, you know, and we don't want to ignore that. We want to be as accommodating to as many people as possible. And then when it comes to NASA, you know, the way that NASA trains its

crews, you know, it's very much about making everyone a family and, you know, it's working together towards this goal of scientific achievement. And also, you know, when you're, it's a matter of

life and death, you know, you have to be so in sync with your crewmates in order to survive and to execute the mission as planned. And the amount of work and preparation that goes into that, I think, is really crucial and key. And one thing I've always seen when I've met astronauts is just the kind of love that they have for their crewmates. It's it really is a family because you work so closely together when you go into space, that and you have to be able to trust that person with your very life, you know, so I find that really inspiring. And I, you know,

kind of running out of quite an answer for you. No, that's okay. Well, I'll take it in a slightly different and honestly unfair to the women you profile direction. You've saying psych test and Houston made me think of a rather famous female astronaut from my middle teens, Lisa Noak, famously, you also brought diapers. This is all going to come about. Could you kind of did her story like at all? I mean, I'm just like, this isn't relating at all to your book or to your thesis. I just I'm just like, what happened? What happened? Could you explain what happened?

What happened to her? That's all I'm asking. You know what, I have to politely decline. I really do not know much about that. I didn't look into it at all for this book. So it's out of my realm of expertise, unfortunately. Yeah, no, totally fair. And that's once again, like this is the I literally was just sort of like, oh, whatever happened with that story. So listeners, you can go look up Lisa Noak on Wikipedia if you're looking to learn more. So okay, so in this in this last section here, I think the real question this could take us back to your present day Bloomberg reporting is as we've gone through the past 50 plus years of the space program, you've had the very like public minded aspects of it, the desire to represent American society, you have the private aspect of like companies like SpaceX and you very much have like the quasi military and national security related aspect, especially in those early years. Where does NASA find itself on that spectrum, especially when it comes to the kind of like diversity inclusion related topics we're discussing here? Well, NASA's astronaut program is, you know, much more inclusive than ever before. And we're finding even more avenues for astronauts to join the program. You know, I think recently, I had a fun time because there was an oil drilling engineer who was selected for the program. And if you remember, it reminded me of the movie Armageddon.

Are you going to bring up the Ben Affleck thing? I hope you are. I hope you are.

I did. I did have to ask her at the time, you know, now we can answer the question should who's better at, you know, going to space is it oil engineers as astronauts or astronauts as oil engineer or oil drillers? She said we could finally answer that question. But you know, what did she say? What did she say? She said we can finally figure that out now, you know, because we have an oil driller as an astronaut. But, you know, we, the way that we're building spacecraft now, you know, they're much more automated than they were in the past. And, you know, obviously there were some sentiments about automating spacecraft, you know, the whole spam and a can thing. But it is making it easier for a wider array of individuals to fly in these vehicles. We're seeing that with, you know, tourists going to space. Obviously, a lot of people know about Virgin Galactic and Blue Origin. You know, simply just you sit there and you enjoy it. But even with SpaceX as a crew jag in spacecraft, they sent a group of, you know, all civilian astronauts to space for this mission called Inspiration 4. Now, I don't want to downplay what they did. They went through quite a bit of training. But I think it's just as we, you know, innovate and evolve our technology and make it more user friendly. I think that opens up the opportunity for much more individuals to go to space than ever before. And so when it comes to NASA, you know, obviously, the requirements are still pretty stringent for the program. They've been relaxed from time to time. They obviously still prioritize, you know, any kind of jet training that they have or piloting experience. STEM is obviously heavily prioritized. But I think as we move forward, you know, these commercial companies have opened the door to, you know, more creatives flying into space, you know, artists not necessarily, you know, putting STEM top of mind. And I think that's just, you know, it's indicative of how far we've come and how advanced our vehicles have become, you know, making it easier for more and more people to fly.

So last three questions. Number one, India obviously made some big strides when it came to their Moon program. Obviously, China is doing lots of launches. We started this episode by discussing the ways that the Soviet Union really prioritized for, I think we could say good faith and bad faith reasons on a couple of different levels. You get to determine however you want to go. If I'm not an expert on the Soviet Union, so like I'm sure someone's deeply right on like the internal motivations of putting women in space first. But are there any ways that this is playing out in other countries' space programs today that we know of? You mean in terms of making it an effort? Just like our other countries like saying like, hey, like how are we going to prioritize different, because that was a big part of the literally space was I'm curious as we're entering like a new space race area. Is that playing out? Yeah. Well, first they have to get there, you know. In terms of, you know, I don't have as much insight into the Chinese space program. And I think that's by design. You know, they have sent women into space when they've, you know, for their orbital space station. And obviously China is working towards getting to the moon. So we'll have to see what kind of crews they prioritize for that. Russia is also trying to get to the moon, but, you know, struggling in various ways. And, you know, I wouldn't necessarily, you know, obviously they have their, they have the records for the first women who've gone to space. But, you know, I wouldn't necessarily say that the context is important when it comes to the Russian space program. And if you look at the types of the astronauts that they've sent into space over the years, you know, I wouldn't necessarily deem it a feminist space program. So we'll have to see, you know, in terms of first can they get there and then who they prioritize

when they send. For now, you know, NASA is the one with the stated goal, you know, Artemis is about sending the first woman and the first person caller to the moon. I think there are different opinions of whether or not that should be the stated goal. But I think for a lot of people that's really inspiring to see that that is top of mind. So it's not, not just about getting there, but who we send when we get there, you know. And then obviously there's all these other efforts from countries around the world just to land on the moon at all. I mean, I think it's important to remember that it's still quite difficult to touch down softly on the moon. We've only had four countries do it with India being the most recent inclusion. And still that's only with robotic spacecraft. You know, obviously the US is the only one to have actually touched down people there. So, you know, it's, it's, we still have quite a long way to go before we see, you know, this metropolis on the moon. But there's a lot of interest and there's a lot of interest in getting to the South Pole now because that's an area that, you know, scientists are very excited about. It's thought to have water ice and permanently shadowed regions and craters in the moon where

things get really very cold. And so depending on what kind of composition that ice is in, you know, there's talk of mining it, using it for water, breaking it apart into rocket fuel. Obviously we don't really have much of a concept of how much is there or what kind of consistency it's in. So that's going to really determine whether or not we're successful there. But, you know, it's very tantalizing and there's a lot of interest in one of the driving factors to go. So I think that's a very big part of the reason why we're seeing all this interest in the moon right now. And basically last but not least here, the way we tell and the way we've had this conversation, the way this comes off in the book is this is deeply driven by technology, the design of the early space program going into the space shuttle. Just what is the actual design of like the Artemis program? Like what's what helps? So what's how does that actually work and cut? How is it different than the original moon program? How is it obviously, I mean it's obviously, I hope listeners can figure out how it's different than the shuttle program, but just close with that. Oh, gosh. Well, how much do we have another podcast to do because that's your best version of the answer.

So the Artemis program is a very unique marriage of old and new NASA. So the old way NASA did things was by sending out these big contracts to major defense contractors, they would build the vehicles with NASA oversight, and then NASA would end up operating the vehicles. And we do have that

with Artemis. The main kind of centerpiece of the Artemis program is the space launch system, which is that massive new rocket. Many might remember it. It launched last year for the very first time. And then the Orion crew capsule, which launches on top of the space launch system. And they're both designed to send humans into the near the vicinity of the moon. And that and those the way those vehicles were created was very much the old way of doing business. NASA contracted Boeing and Lockheed Martin to make those vehicles. And, you know, there's been some criticism of how much money it's taken to build them, how much time it's taken to build them. But they did end up launching. And they their first flight didn't have any people on it, but it was successful. Now what you need in order to actually send people to the surface is a lander, right? And so NASA is kind of moving forward with this new space initiative. And they've contracted SpaceX

and most recently Blue Origin to create lunar landers to take humans to the surface of the moon. And they've done that in a bit of a different way. So rather than doing these cost plus contracts and overseeing every state stage of the design, NASA is acting more like a customer, you know, ordering that they'll put in money for development, you know, partial money, but then they'll order the service, they'll order flights of the the lander, just as any customer would who wants to fly on on a plane or something like that. So it's it's definitely a new era that NASA is working toward. And so Artemis is a bit of a marriage of those two eras. Obviously, there's some friction and some debate over which way is the proper way to go. But we'll see them working in tandem for the first time, which I think is not the first time, but in such a complex architecture like this. And so I'm excited to see how that works out. And so I think many people might be familiar with SpaceX Starship Rocket. That is the massive deep space vehicle that that company has been developing

in Texas. And so they're still in the very early development stages for that. And I think we might see a second test flight of that soon. We're waiting for an FAA license. You know, hopefully that doesn't come by the time that airs, because I'll be very busy, but we'll see. But yes, so there's quite a lot of moving parts for the Artemis program. But it's just, you know, it creates a lot of opportunities for folks all around the world to participate. And, you know, we'll be seeing a lot of astronauts chosen for that program moving forward. We already have our Artemis 2 crew that

sets a fly next year in November. And that will send the first crew to deep space in quite some time. And that also includes Christina Cook, inflictor Glover, who will be the first woman and the first person of color to fly to deep space. So NASA's already making good on those promises there. I think that is an excellent place to end. Lauren, can you just shout out the full title of the book for listeners who don't have their iPhones or computers directly in front of them?

Absolutely. It's the sixth, the untold story of America's first women astronauts.

Thank you for joining me on The Realignment. Thank you.

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