Episode 4 – A Return to Orbit? A Look Into the Past, Present, & Future of Commercial Spaceflight Regulation

Introduction: Welcome to *A Hard Look*: The Administrative Law Review podcast from the Washington College of Law. We'll discuss how administrative law impacts your daily life. From regulatory actions by agencies and the litigations over them, to the balance of power among the branches of government. This is *A Hard Look*.

Steven: Welcome back to *A Hard Look*! On this episode, we will be exploring the regulation of commercial spaceflight activity. Today, with the help of our guest, Caryn Schenewerk, we will review the evolution of commercial space flight and the regulations that have spawned from humanity's leap towards the new frontier. But before we dive into our topic for today, let me take a brief moment to introduce our guest.

Caryn is the Vice President for Regulatory and Government Affairs at Relativity Space. Prior to her time with Relativity, she worked at SpaceX as the Senior Counsel and Senior Director of Spaceflight Policy. She is also an adjunct professor at Georgetown University teaching a course in commercial space law. Beyond her private employment, she has represented the Commercial Spaceflight Federation as a member of the US delegation to the United Nations Committee on Peaceful Uses of Outer Space. Her educational background includes a J.D. from the University of Texas and an LL.M. from the University of Nottingham.

As a disclaimer, the views of our guest are her own and are not a reflection of that of her employer, firm, organizations, clients, or other parties in which her opinions could be imputed.

Caryn, welcome to *A Hard Look*.

Caryn: It's a pleasure and an honor to be here! Thank you for the warm welcome and for taking an interest in the trajectory of commercial spaceflight regulations.

Steven: So, flight has come a long way in history. If we go back to the early 1900s, it seems like Kitty Hawk feels like forever ago. I think the interesting midpoint between then and now is that President Kennedy standing before Congress asking for the development of a national space program. So thinking about regulations generally from the beginning to where we are now, has aviation and spaceflight regulation developed in sort of the same way or evolved?

Caryn: So not yet, or yeah, at least not yet. I attribute that largely to the small number of launches. We only see around 100 launches worldwide compared to the tens of millions of flights that happen every year. So, do I want to see a day where we see millions of space launches and space flights in a regular economy flying back and forth between, let's say, Earth and Mars? Absolutely. But we are so not there yet. We have a lot of work to do.

There are a couple of key differences between aviation and space flight regulation that really matter and are worth noting up front in this conversation. One, and the biggest one, is the difference in the level of accepted risk. Commercial aviation activities have evolved into being truly routine. We get on airplanes every day, we feel perfectly safe doing so, and we should. They are reliable and very low risk. They are also highly regulated to that point. So, passengers expect the safe flights. Space flight is still accepted as

being a very risky activity. Its regulations are focused on protecting the uninvolved public, not the participants in the actual activity.

The second key difference is there are no sovereign boundaries in space. So, we think of the concept of controlled national airspace as applying to the flying public commercial activities, even military activities. That's not so in space. Once you cross over into space into Earth's orbit and beyond, there is no sovereignty.

Steven: That's really interesting. It's really the great beyond of no control. So, once we think past sort of the sixties and the seventies after we eclipse the space race, we get to the 1980s where Congress decides to take some actions to regulate commercial launch activities generally, so in the 1980s we get the Commercial Space Launch Act. What sorts of responsibilities did Congress confer to the Department of Transportation, and I guess vicariously to the Federal Aviation Administration as a result of this legislation?

Caryn: Yeah, so this legislation, like many pieces of legislation, grew out of a problem. A group of people were trying to launch a rocket from Texas, the Conestoga launch, and they found themselves having to go through a whole host of agencies to try and get a license to launch the vehicle. And it led to the idea that we want to foster this activity—we wanted commercial activities. So, Congress decided to take action and they granted oversight of commercial expendable rocket launches and spaceport in 1984 to the Secretary of Transportation. A few years later, Congress added an indemnification regime to limit liability from third party claims. And then in the 1990s, the FAA was given oversight of space vehicles reentering orbit. So, there was an evolution of capabilities grown out of the realization that we needed to provide a clear path for regulating rocket launch and to foster commercial space activities in the United States. One notable thing though, is that when they were given all these authorities, and even as they evolved into the nineties, the FAA was not, and still has not, been given oversight of activities in orbit. Those activities, things that you think of like communication satellites or remote sensing satellites, those are governed by the FCC and NOA within the Department of Commerce, respectively.

Steven: That's really interesting. So, after we go through this sort of uh, I guess just regular course of action of this legislation and its sort of life span, Congress decides to come back and amend it in the CSLA in 2004. What sorts of changes did they make to the legislation as a result of the amendments?

Caryn: So again, action by the industries spurred action by Congress. So we had the X PRIZE flight, which was the first successful commercial human space flight in the United States. And so in 2004, Congress granted FAA the authority to license human space flight and they specifically designated those folks as "human space flight participants." That term was very purposeful. Given the high risk, they wanted to distinguish them from passengers who constitute the flying public and face much less risk as we were previously discussing. So, while human space flight was added to FAA's authority, Congress did also decide to put a moratorium on their ability to impose regulations that would govern the design or operation of a space vehicle. So, notably, only one flight occurred with people on board and then they took actions that said "let's not overregulate and squash the industry. Let's be really thoughtful about this."

Steven: So then in 2015, with no significant commercial space flights occurring, Congress extended that moratorium that you had just mentioned. And also called the "learning period" on human space flight regulation, specifically the regulation of occupant safety. But now times have changed and technology

has evolved to a point where becoming an astronaut is on the verge of becoming its own commercialized activity. The recent space race between Virgin Galactic, SpaceX, and Blue Origin have really illustrated this possibility. What has been the role of the learning period in this recent space race? Are the companies' activities regulated in a similar manner?

Caryn: So, I want to start by emphasizing that these companies are highly regulated. So, this is not the wild west where they are conducting themselves without regulation. As we have already talked about, dating back to the eighties, there have been regulations governing aspects of their activities. And so the learning period still exists, and is still on occupant safety. Notably, we have only seen a couple of flights from these companies. So, we can look at that and see that there is a burgeoning industry, but we have not yet seen it materialize into passenger flights.

So, looking at the actual capabilities themselves. SpaceX built the Falcon and the Dragon to meet NASA crew requirements and provide commercial services for NASA astronaut delivery to the International Space Station. Thanks to the contracting terms, little shout out to the federal acquisition regulations there, SpaceX can also sell its services to non-US government customers. They can fly private citizens to orbit as they did with the Inspiration 4 mission. Virgin Galactic's and Blue Origin's commercial space flights, those are suborbital flights. They don't reach Earth's orbit, like the Inspiration 4 example or reaching the ISS requires. While these are different vehicles, though, the human aspects in terms of the FAA regulations fall under the same rules. They fall under Part 460 of title 14 of the CFR.

Each of those instances, each person that flies, is required to engage in an informed consent regime. It also kind of characterizes an acceptance of the risk, and they also have to sign cross waivers of liability, the text of which is actually dictated in the regulations themselves. So, it's really important to note that these are not unregulated activities. Even the human space flight aspects are regulated to some degree. They are just not regulated to exactly say what kind of seatbelt you need or what kind of attachment device or what kind of emergency abort system do you need?

That said, all of these companies are highly incentivized to conduct their activities as safely as possible.

Steven: So, even thinking too that the sunset date is on the horizon for this recent moratorium. Do you think there is any chance we might see an extension of that moratorium in the near future?

Caryn: I think there is a chance, but it's unclear to me exactly how this will turn out at this point. There are still a limited number of entities engaging in this activity. There are significant efforts underway to develop consensus industry standards for human space flight. That is in accordance with congressional direction from the 2015 Act. So, I think it's a possibility. I do think there is a lot of thought and discussion going into what happens with human space flight. I also think it's interesting because it is such a high-profile activity. Everybody is really excited. I personally would be thrilled to go to space!

Steven: It would be super cool! So similar to general aviation, to shift a little bit, there are licensing requirements for commercial space launch activities. How does the licensing program for commercial space operate? How does it traditionally differ from aviation licensing?

Caryn: So the key difference is that risk profile. So, commercial space regulations are focused on protecting the uninvolved public. So those are the people that are uninvolved with the space operation. That means the folks launching the rocket, in terms of the launch hardware, the satellites that are on board, if there are people flying, they are accepting the risk of that flight and they are not protected

specifically by the regulations. But the people on the ground, the folks watching, the folks flying in aircraft, the folks out at sea, all of those folks are the uninvolved public and they are protected. So to do that, the FAA looks at the flight safety processes, it looks at the hardware that's involved in protecting the public, it looks at the company's ability to control the vehicle, it looks at ground safety systems. There are requirements related to the communications and training of the people involved in the space flight activity. So the actual team/staff of the companies. There are also regulations for the mishap investigations that occur if something goes wrong, so that you can understand how you can bake that into the safety system going forward.

So it's a significant aspect. That's different than aviation. I am not an aviation regulation expert, but the regulation of aviation is much more piece-par, much more detailed than what we have for space flight.

Steven: The advent of increasing sophistication in technology coupled with deeper understandings of space has made the dream of entering space come alive. Beyond the excitement of increasing human spaceflight, what other issues challenge the regulatory regime for commercial space flight activity?

Caryn: Yeah, so there are a couple of big ones. One of them is that gap in who regulates what happens in orbit. So, we have been able to close that with things like payload reviews. So the FAA reviews the payload and the payload activity, and that's an interagency review that engages with the State Department, the Department of Defense, and NASA depending on interests.

So, we have been able to conduct commercial activities in space, but again, it would be nice to have a more one-stop shop place that if you are wanting to put a habitat in orbit, for example, or if you are wanting to land something on Mars, that you could go to a government entity and know that that entity is going to give you a license and regulate that activity. That has been proposed at the Department of Commerce, and I'm hopeful that we will see some traction on that in the next congressional budget cycle.

Space debris is also a top issue. So, there has been a lot of discussion and a lot of focus on this, especially after the Russian ASAT tests that occurred this year. Really unfortunate. That should be significantly condemned in terms of sacrificing what happens in our orbits. And one of the things that we talked about there were rules of the road. So do we develop rules of the road for increased NGSOs? So it's the constellations that are occurring, operations.

So those are the two key issues. Orbital debris and what else, and who else is doing something in orbit and how are we overseeing it.

Steven: So we have this regulatory picture we just illustrated, but what about from the perspective of commercial space entities? What challenges lie ahead the next time Congress or the FAA begins to regulate in this area for them?

Caryn: Yeah, so it comes to this question of am I going to get to go to the Department of Commerce and request a license, and what does that regulatory regime look like at the Department of Commerce? There has been a lot of advocacy around it being a light touch, a flexible approach. Again, wanting to foster space activities, wanting to grow a trillion-dollar economy in the United States. And, you know, at the same time, the government is on the hook in the outer space treaties and various obligations to make sure we oversee this activity and its conducted in accordance with those treaty obligations.

You can see the treaty, you can see the statute, then you see the regulations, and what we have right now is we have treaty and statute, and we could use some regulations that make clear what that licensing regime is. Again, advocating for flexible, light touch, but I really want to be able to see commercial habitats in orbit. I want to see sustainable exploration of Mars, human exploration of Mars. I think the commercial role in that is going to be increasingly important, which means an appropriate level of regulation is going to be necessary so companies have certainty around their investments. Especially since this is such a venture-backed activity.

Steven: So in recent time too, there are a variety of actors that sort of have a stake in the commercial space regulatory space. But the FCC recently initiated a rulemaking on a spectrum of launch vehicles. Can you kind of walk us through what their rulemaking does and how does it weave into the existing fabric of commercial space launch activity?

Caryn: Yeah, so the FCC always has a huge role in commercial communications satellite activities. But their role in launch activity has been a little lesser-known. So anytime we launch a vehicle to space, we need to be able to communicate with that vehicle. It's a key aspect of the safety of that vehicle. And in the past, most launches that were occurring in the US were happening by government entities, and they continued to happen today largely from government facilities. So that means the FCC is the door to applying to U-spectrum, but we are using actually government spectrum, so it's an interesting interplay with the NTIA, which is housed in the Department of Commerce and oversees use of government spectrum, despite the fact we are commercial entities applying to the FCC. So that is a rulemaking that is underway and looking at how we open up and improve the licensing regime of commercial launch spectrum.

Of course, the FCC is also looking at NGSOs, constellations, there is regular news being made about the oversight of new constellation enterprises that are coming on, and the growth of those constellations, and thousands and thousands of satellites, and the role of the FCC in orbital debris. I'll also note the FCC is an interesting organization because it is in independent agency. So while there are a whole of government activities occurring through like the White House National Space Council to address things like orbital debris, the FCC can be an outlier in the process because it is independent.

Steven: That's really interesting. So like taking this whole conversation that we have had today, and thinking about it, one thematic thing that really runs through is the blurring between the government enterprise and the commercial enterprise. Does this gray area have any broader implications for the commercial space flight activity? How does it tend to affect our thinking about space generally?

Caryn: Yeah, absolutely. So the more commercial activity we have in the United States, the more commercial capabilities that are developed, the more the government can capitalize on those and focus its resources on the exquisite needs the government has. So, whether those are intelligence capabilities, or science needs, like the James Webb telescope that is going up. So exciting! Those are the things the government can focus on and invest in and not have to invest in thing the commercial sector can provide in a routine manner, like launch now, right?

So launch used to be something the government conducted for itself. We now have launch capabilities being provided in a commercial-like manner to the government. Firm fixed-price service contracts. That's a big step improvement from where we were with the government having to develop costs plus contracts for developing launch capabilities.

And then there is the possibility of the government piggy-backing on, where the government doesn't need to be the anchor tenant, but can take advantage of the satellites that commercial entities are putting into orbits, habitats they can fly scientists to, to conduct science experiments on. All of these commercial enterprises all facilitate positive government outcomes.

The company that I'm at now, Relativity. We are focused on additive manufacturing, 3-D printing rockets. We are doing that in a commercial way. The government will definitively benefit from higher reliability, less costly vehicles that we produce because we invested in that in a commercial manner, and not because the government invested in it and had to develop that technology themselves.

Steven: Caryn, thank you so much for this interesting and thoughtful discussion on this evolving subject. Do you have any parting comments for our listeners?

Caryn: I just want to encourage anybody who is thinking about administrative law to think about space law. There are two underlying classes I encourage my students to take, one is international law and the other is administrative law. Space law at the end of the day is an administrative practice and it is a very enjoyable, very growing industry, and it's an exciting time to be in this industry. So take your administrative law classes seriously, and then look at what that means to be a space lawyer someday.

Steven: Thank you so much! As always, I want to thank our guest for her substantial and important contributions to the discussion today; the American Bar Association's Administrative Law Section; the Administrative Law Review; and of course, the podcast's own Kübra Babaturk for their continued support, resources, and work on making this podcast a continued contributor to the important discussions happening in the world of administrative law. Thank you and see you on the next edition of *A Hard Look*.