

Competition in the Low Earth Orbit Satellite Industry (Part 1)

Introduction

00:22 – 00:26

Tom Romanoff- Director of the Technology Project, Bipartisan Policy Center

Hello, everybody, and thank you for joining us for today's video on competition in the low earth orbiting satellite industry. Today, we'll be talking about how competition can be spurred by government action and what the FCC can do to help promote competition in this space. We'll be talking to a number of experts, including the top academic and civil society and industry voices in low earth orbiting satellite space.

This is part one of a two-part series on competition in low earth orbiting satellites. And it's part of an overall series where we will be discussing not only competition for LEOs, but also how LEOs address the digital divide and an overview of the industry. Thank you for joining us.

Let us meet our experts

01:05 – 01:20

Mike O'Rielly- Strategic Advisor & Advocate, MPOrielly

I'm Michael O'Reilly. I have my own consulting firm, but prior to that I spent seven years as an FCC commissioner, and before that I had a long career as a policymaker on Capitol Hill, as a staff in the US Senate and on the US House of Representatives.

1:20 – 1:30

Whitney Lohmeyer - Assistant Professor of Engineering, Olin College

My name is Whitney Longmire. I'm on the faculty at Olin College of Engineering, and there I'm the director of the Olin Satellite and Spectrum Technology and Policy Group. We call ourselves OSSTP.

01:31 – 01:48

Kevin Bryan – Associate Professor, University of Toronto

I'm Kevin Bryan. I'm a professor of strategic management at the University of Toronto. I also help run the Space Entrepreneurship Program with the Creative Destruction Lab. We've been doing that for four or five years now. I think we're the largest space entrepreneurship incubator in the world at this point.

1:49 – 2:03

Mindel De La Torre - Chief Regulatory and International Strategy Officer, Omnispace

My name is Mendel Doherty and I'm the Chief International Strategy and Regulatory Officer at Omnispace, which is a satellite company and mobile satellite service company. And before that, I was the Chief of the International Bureau at the FCC.

2:04 – 2:13

Julie Zoller - Head of Global Regulatory Affairs, Project Kuiper at Amazon

My name is Julie Zoller, and I head the Global Regulatory team at Project Kuiper, Amazon's low earth orbiting broadband system.

2:14 – 2:30

Harold Feld - Senior Vice President, Public Knowledge

My name is Harold Feld. I'm Senior Vice President at Public Knowledge, which is a nonprofit digital advocacy group here based in Washington, DC. I've been a telecommunications lawyer for over 20 years.

[Big picture, what are LEOs and NGSOs, and how do they differ from other satellites?](#)

02:37 – 03:18

Mindel De La Torre - Chief Regulatory and International Strategy Officer, Omnispace

A LEO is actually a subset of an NGSO. So LEO stands for the low earth orbit, and NGSO is a non-geostationary orbit. So there's different kinds of non-geostationary satellites. There's the LEOs which are in low earth orbit. There's some that are in MEO orbit (mid-earth orbit). And then there's also highly elliptical systems that actually they go, basically if you think about it, they go from sort of the North Pole to the South Pole. And so they're used a lot by military and by weather and etc. So there's different kinds of NGSO satellites and LEO happens to be one of them. They're the one that you read about the most right now because everybody's putting them up.

[What does the current landscape look like for the LEOs industry?](#)

03:24 – 5:00

Whitney Lohmeyer - Assistant Professor of Engineering, Olin College

The LEO landscape is somewhat challenging to define because we often resort to FCC filings to understand current systems. But the way that we authorize satellites for U.S. market access is through something called a processing round. And once you file to the FCC an application, it's actually kind of challenging to modify that application. And if you do modify it, you have to show that your interference environment is not increased. So what actually happens is that operators over-file for their systems. So you'll see applications of tens of thousands of satellites. Right now, as of December 2022, we had about 4,000 broadband satellites in orbit, in low-earth orbit, mainly from OneWeb and StarLink. Kepler has also launched a few satellites, but we anticipate based off the market access applications that there could be upwards of 70,000 satellites. Now, I personally don't believe that's going to happen. I think that was, like I said, the product of our market access application system, these processing rounds. But currently the landscape is that SpaceX has 3,000 plus satellites in orbit, OneWeb approaching a thousand. And they're our two main players. We'll see what comes with Kuiper and Telesat who are also not so far behind in launching.

05:00 – 05:37

Julie Zoller - Head of Global Regulatory Affairs, Project Kuiper at Amazon

Next generation satellites are revolutionizing the communications landscape and the United States is leading in that regard. We're innovating and investing in satellite and customer terminals and antenna technology here at Amazon. The growth of the LEO broadband industry played a part in FCC's recent announcement of the Space Bureau and the focus on improving the efficiency and effectiveness of the Commission's processes.

05:37 – 06:45

Kevin Bryan – Associate Professor, University of Toronto

Globally, it's become much bigger. So essentially, private space business is booming at the moment. There's tons of money going into it, partly because of regulatory changes that have just made this possible. So it wasn't feasible for especially small organizations to be involved in putting things into orbit until recently. So the legal change has been important, but the bigger change has been the cost. So if I drop the cost of something 10x, which is essentially what happened with satellite launch and dropping even further every year. So, once the next SpaceX version arrives in a year or two, you could see another 10x reduction in the per-pound launch costs of satellites. And it's really amazing—to give you an idea of what the numbers look like. As of 2010, I don't think we'd ever had at any point a thousand active satellites in orbit. And now, every year we put more than that number of satellites into space. There's something like 10,000 satellites in space at the moment. And, you know, this year, if we if we had 200 launches and another 2,000 satellites go into space, I don't think anyone in the space world would be surprised.

06:46 – 07:17

Harold Feld - Senior Vice President, Public Knowledge

We're in an emerging industry here. We have one player in the United States, SpaceX and its service, StarLink, which have at the moment a first mover advantage. They are the company that has launched the greatest number of satellites. They're vertically integrated, so they have both launch vehicles and satellites and they're actually offering commercial service both to residential customers, to local and state governments, and internationally. We have a number of other providers who have either started service but have a smaller number of satellites up in orbit and need to catch up to reach that capacity, and we have a couple of players who are not yet entering, have not yet entered the market, but have plans to enter the market and expect to enter the market within the next one to three years.

How is the FCC involved with LEOs?

07:48 – 08:40

Julie Zoller - Head of Global Regulatory Affairs, Project Kuiper at Amazon

The FCC licenses satellite systems and to do that for LEOs, the FCC initiates a processing round, establishes a cutoff date for applications in that processing round for the specific spectrum that's at play. The FCC puts these applications on public notice, grants the applications that meet their standards, and regulates those NGSO systems with rules such as power limits for ensuring compatibility with other services, coordination requirements, and they also include space safety requirements, such as filing an orbital debris mitigation plan for commission approval.

8:41 – 9:36

Whitney Lohmeyer - Assistant Professor of Engineering, Olin College

The FCC is the governing body in the United States through which all of these networks have to receive authorization. They are the body that effectively permits entities to transmit over certain radio frequencies. As a result of launching a satellite, you generally want to communicate to it. You want to send commands up to it. You want to send your requests to post your picture to Facebook, your email, and then you want to receive data from it. So you want to transmit information back to the ground. And the FCC authorizes one's ability to utilize radio spectrum. So given frequencies for these LEO systems, it's generally Ku-band, Ka-band. So 10 gigahertz, 27 gigahertz, upwards to V band, which is more like 47/50 gigahertz.

What changes have occurred in the past five years that brought LEOs to the forefront of the FCC's attention?

09:45 – 10:17

*Mike O'Rielly- Strategic Advisor & Advocate, MPO*Rielly

Well, we've had an explosion of applications and, you know, since pretty much 2016, of different ideas on what the LEOs, different models of what the fleet systems could look like from different providers. And we've also seen a reduction in the cost of launch. And then you also at the same time saw an explosion in broadband and the desire to have everybody in the earth, particularly, all users in the population covered by broadband services and satellite potentially. And LEOs can serve that marketplace.

How should policymakers think about competition policy in the space industry?

10:23 – 11:58

Kevin Bryan – Associate Professor, University of Toronto

There's one company, SpaceX, whose costs of getting to orbit are just much better than everyone else. And their technical lead is only growing. So from a competition policy standpoint, on the one hand, should I worry about a company that's essentially single-handedly responsible for a huge drop in the cost of assets in space? Probably not. You know, on the other end, you worry a little bit about the incentive to invest in other technologies that might be useful for space when you have such a big dog in this area. So to give you an example, solar panels have decreased in cost also, you know, an order of magnitude in the past ten years. This seems like it would be good. It's not necessarily good for innovation in the sense that investment into solar innovation has fallen a lot as well. Just because the panels are so cheap, it's not worth the R&D cost. And so if I were on the competition side, the only thing I would worry about is anti-competitive actions by a company like SpaceX, which reduces the incentive to innovate in other areas of the space ecosystem. I haven't seen anything that worries me at this point. I think actually the decrease in launch costs have been spurring complementary innovation. So we've seen actually a lot more, say, venture money going into small space companies than we did ten years ago, which generally I would take as a sign that competition policy is not a major worry at this point.

11:58 – 12:53

Mindel De La Torre - Chief Regulatory and International Strategy Officer, Omnispace

Well, you know, the space industry is diverse. We've talked about, you know, the different kinds of satellite systems, but they also, some of them focus on broadband, as I said, some focus on aviation and maritime and some focus on the Internet of Things. And, you know, everybody sort of every company has sort of a, I would say, a niche. And some obviously focus on broadcasting and, you know, different things. And I do see, though, that, you know, things like some of the companies are merging, they're looking to create, you know, different kinds of policies going forward. And, you know, you have anything from the spectrum assets of companies, national security, and, you know, competition, I think is all is out there and making it a very different space than it used to be.

12:53 – 14:03

Harold Feld - Senior Vice President, Public Knowledge

Establishing competition from the get-go is very important. One of the things that's important to understand is that while space is big, given the positions that these satellites have to be in and the number of satellites that you have to have in the air in order to offer a service that we think of as

modern broadband, it's actually crowded and getting more crowded. The concern on competition is that if you have a free for all, it just becomes a race. One provider gets as many satellites up in the air as they possibly can, and then they are able to screen out all other potential competitors. So we need to be thinking about competition early. We need to think about how to foster an environment where, on the one hand, the service is economically sustainable and, on the other hand, though, where consumers enjoy the benefits of multiple providers, providing multiple differentiated services at different price points.

14:03 – 14:37

Julie Zoller - Head of Global Regulatory Affairs, Project Kuiper at Amazon

Rules should foster competition and innovation while protecting investment. We're operating in shared spectrum and shared orbital space, and the rules are shaped around that reality. Policymakers should establish target objectives and provide enough flexibility to enable operators to evolve designs for the better and determine how to meet the regulatory framework operationally.

14:38 – 15:07

Mike O'Rielly- Strategic Advisor & Advocate, MPOrielly

Well, I think the appropriate thing is to find the right balance. You certainly want to have a policy that protects the innovators, those that are first to launch. But you want to make sure that that policy doesn't prevent new entrants because competition, having two, three, four, or five LEO systems in the marketplace can really lower the cost for consumers and bring a real competitive force to existing landline services. So you want to make sure that the right balance and the incumbents are not overly protected, and particularly as it relates to interference.

15:08 – 16:42

Whitney Lohmeyer - Assistant Professor of Engineering, Olin College

When I think about policymakers, I think of a few different types of individuals. So there are policymakers at the FCC. The FCC is, I believe, doing an incredible job of sitting with a system that was developed in the early 2000s. So that was that processing round that actually came out of the results of efforts to do exactly what we're doing now with satellite broadband in the nineties. And so they created this processing round system, and realistically, I would argue that when they did, they weren't expecting more than one or two systems to come to fruition. They certainly weren't expecting more than 20 distinct operators to file for over 70,000 satellites, which we've seen in the past like eight years since 2016. And so currently the FCC is starting to think about how these NGSO or LEO systems are going to coexist and share spectrum. They're starting to think about competition in the form of spectrum being a shared but limited resource. And so one of the questions, too, in thinking about how they're going to exist in competition, the FCC started to propose rulemaking of how are we going to share beam pointing information? How do we ensure that these systems are working together? And already as a result, we've seen SpaceX and OneWeb come out saying that they've reached coordination as well as Kuiper and Telestat reaching coordination agreement. And that's publicly saying we can coexist and we're working together to ensure that interference won't occur.

See Part 2 for more on LEOs