# Amazon plans nationwide broadband—with both home and mobile service

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Amazon is seeking government permission to launch 3,236 broadband satellites that would cover nearly all of the United States and much of the rest of the world.

Amazon subsidiary Kuiper Systems filed its application with the Federal Communications Commission on Thursday last week, saying it intends to cover all of the US except most of Alaska.

“The Kuiper System covers the area between 56°N and 56°S latitudes,” the Amazon subsidiary told the FCC. “Accordingly, customers throughout [the] continental US, Hawaii, and all US territories will have access to Kuiper System services. So too will customers in many other countries within the coverage area. The Kuiper System will not provide FSS [fixed-satellite service] in the majority of Alaska, however, because the state’s high latitude is outside of the coverage area.”

Amazon’s plan for a nearly global broadband system was previously revealed in filings with the International Telecommunication Union (ITU), as we reported in April. It’s not clear when Amazon will launch this service, but FCC rules require the launch of 50% of satellites within six years of

authorization and all of them within nine years unless a waiver is granted.

Even if the network covers the whole continental US, it could be most popular in areas that lack cable or fiber access. Amazon said in April that Kuiper's focus is on unserved and underserved parts of the world. "This is a long-term project that envisions serving tens of millions of people who lack basic access to broadband Internet," Amazon said at the time, adding that it intends to offer broadband service through partnerships with other companies.

Amazon's satellite plan isn't solely for residential and business Internet—it's also for mobile access. In its new filings, Amazon said its network will be available to mobile operators, raising the possibility that small rural carriers could buy bandwidth from Amazon to boost coverage in areas with poor cellular access.

"The Kuiper System will help bridge gaps in coverage by complementing the efforts of terrestrial fixed and mobile carriers and reaching some of the most remote and hard-to-reach areas—where it is often geographically difficult or cost-prohibitive for terrestrial service providers to operate today," Amazon said. The online behemoth added that it will sell backhaul services to Internet providers. Amazon's plans are detailed in a legal narrative and technical appendix filed with the FCC.

It's not clear whether Amazon will sell broadband directly to consumers. But whether it's a mix of direct-to-consumer and wholesale (or wholesale only), Amazon said it will build customer terminals that provide Ethernet connectivity in residences and businesses.

# Former SpaceX exec leads Amazon project

Kuiper is wholly owned by Amazon, and its president is Rajeev Badyal, a former SpaceX vice president who was reportedly fired because SpaceX CEO Elon Musk was unsatisfied with his company's satellite-broadband progress.

Amazon says it intends to operate the satellites at altitudes of 590km, 610km, and 630km, putting the system in the low-Earth orbit category. SpaceX already has FCC permission to deploy nearly 12,000 low-Earth satellites. The FCC also previously approved requests from OneWeb, Space Norway, and Telesat to offer broadband in the US from smaller numbers of low-Earth orbit satellites.

Low-Earth satellites should offer much better latency than current satellite systems, potentially making them a viable substitute for wired broadband networks. While fast wired networks aren't available in many rural parts of America, Amazon told the FCC that it "will help close this digital divide by offering fixed broadband communications services to rural and hard-to-reach areas." Amazon said its Kuiper system "will also enable mobile network operators to expand wireless services to unserved and underserved mobile customers and provide high-throughput mobile broadband connectivity services for aircraft, maritime vessels, and land vehicles."

Amazon's application didn't specify prices or exact speeds in megabits or gigabits per second. But the document promised "high-speed, low-latency" broadband. Amazon wrote:

> *The Kuiper System's orbital architecture is designed to maximize capacity and coverage for customers at full constellation deployment. By using overlapping altitude shells at different inclinations the constellation design minimizes total number of satellites required to spread*

*coverage evenly across geographic latitudes and provide link diversity even when one satellite experiences an inline interference event with other systems.*

## First launch will get service up and running

Amazon said it will launch the 3,236 satellites in five phases and start commercial operations after a first-phase launch of 578 satellites.

“During deployment, full-time commercial service will initially be available between 39°N-56°N and 39°S-56°S latitudes,” Amazon said. “Additional deployments will expand full-time commercial service towards the equator until the Kuiper System has full-service coverage throughout the 56°N-56°S latitude range.”

Amazon said it will file separate FCC applications to operate ground stations and the customer terminals that will deliver service to homes and businesses.

“Gateway earth stations will be connected with high-speed fiber links to global Internet exchange points and point-of-presence sites to interchange traffic and reduce network hops and latency,” Amazon said.

The number of gateway earth stations “will be approximately equal to the number of active satellites serving US territory,” Amazon said. Amazon said it will install more Earth stations “in regions where higher rain fade is present” to account for signal loss, as well as along coasts “to support offshore customers.”

Each Kuiper satellite will be able to access two gateway earth stations as part of Amazon’s plan to minimize downtime. “Customers will always see a persistent connection” over a

standard Ethernet interface in their homes and will be “unaware of the switching of satellites, gateways, or routes through the Kuiper System network,” Amazon said.

Amazon will have to convince the FCC that it has a sufficient plan to avoid orbital debris after satellites go out of service. Amazon said it will take less than a year to “actively decommission and deorbit” each retired satellite, allowing them to burn up in the atmosphere. Satellites will also “be deactivated automatically if all communications to ground stations cease for a pre-determined wait period.” In those cases, a “passive deorbit” that relies on atmospheric drag will take five to seven years, Amazon said.

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