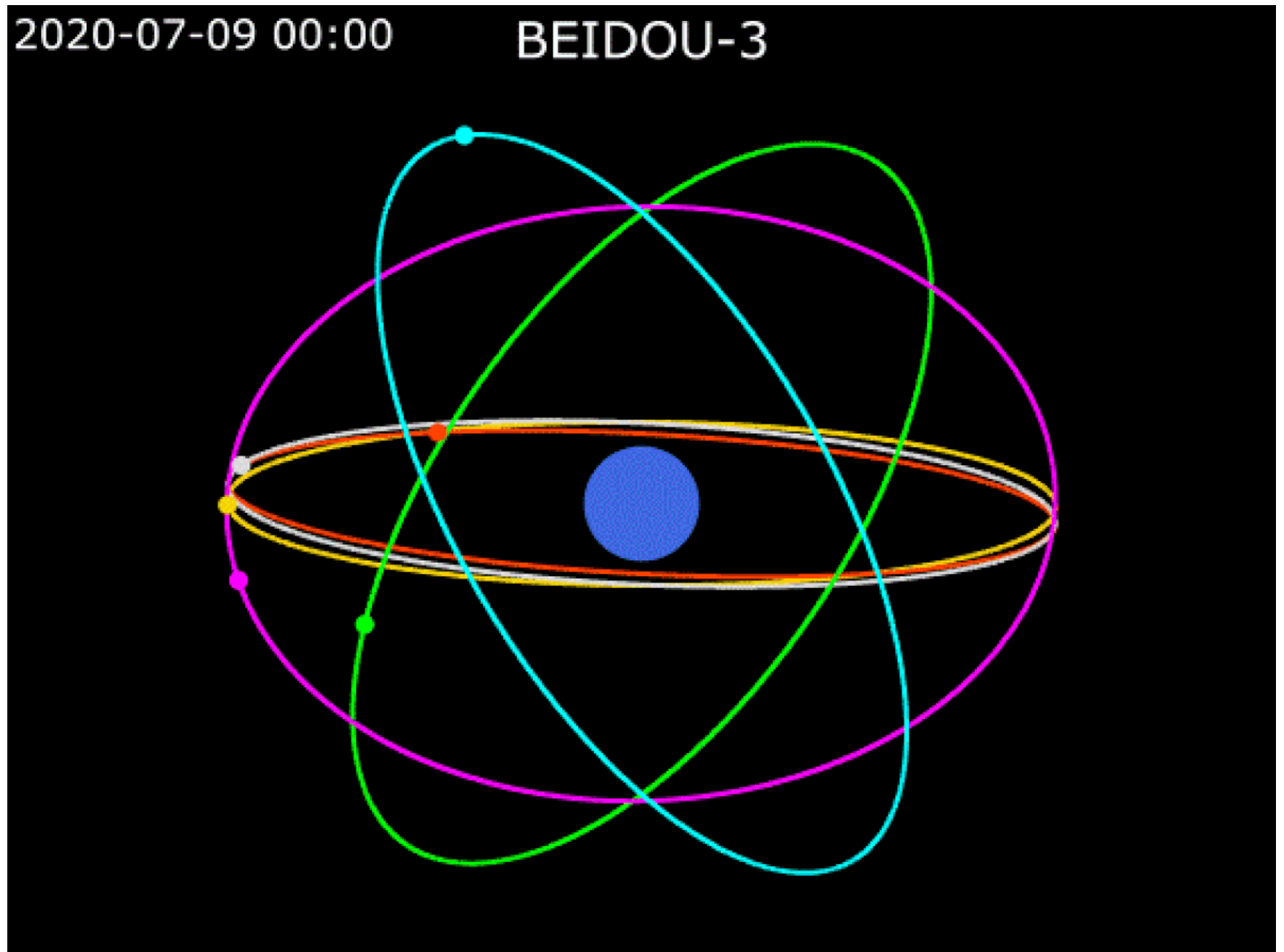


Beidou's Global Mark

China's answer to GPS can now be found everywhere — from Apple products to countries along the Belt and Road.

By [Katrina Northrop](#) — January 10, 2021



Credit: Phoenix7777, [Creative Commons](#)

When the iPhone 12 was unveiled in October, with new features like an ultra-wide camera lens and faster processing chip, many people may have missed something in the [fine print](#): the iPhone is compatible with Beidou's satellite system.

[Beidou](#), translated as 'Big Dipper,' is a satellite-based navigation system tasked with providing geolocation data to devices all across the globe. And it is China's answer to GPS, which was developed by the U.S. Department of Defense starting in the early [1970s](#). The first Beidou satellite was launched by the Chinese military in 2000, and the network was [completed](#) this summer with its 55th satellite.

While Beidou is a new system, it is already making a global mark, as evidenced by companies like Apple producing Beidou compatible products, and countries along the Belt and Road Initiative (BRI) signing up to use Beidou data. And the completion of Beidou is yet another example of the deepening technological [fissure](#) between China and the rest of the world, with China intent on creating independent systems for itself and its allies.

The Chinese government developed this technology, experts say, to avoid dependence on U.S. navigational systems. "In the late 1990s, China decided that having U.S. dominance in GPS was not particularly desirable strategically, or commercially," says [Christopher Newman](#), professor of space law and policy at Northumbria University in Newcastle, in the United Kingdom. And since then, they have spent an estimated \$10 billion on the Beidou project.

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[Saadia Pekkanen](#), a professor and co-director at the University of Washington's Space Policy and Research Center (SPARC)

"This is about national sovereignty" says [Tony Murfin](#), who runs GNSS Aerospace, a consultancy based in Florida. "In the worst case scenario, if other constellations go down, China will still have Beidou." And China is not the only country to decide that relying on U.S. controlled GPS is not ideal. The European Union's [Galileo](#) system became operational in 2016, and Russia's [GLONASS](#) system went live in 2011 — both of which are

alternatives to GPS with global coverage.

But while navigational security may have been the original motivation, Beidou also poses a global economic opportunity. "Is this a security or economic move? I don't think China sees the two as being siloed," says Newman. "They are both interconnected."

Though the Beidou navigation system is free to use, it is necessary to have Beidou compatible receivers and infrastructure in order to pick up the signal. Because of this, the government does not earn money from the signal itself, rather it is an enabling technology, meaning that Chinese companies can use the Beidou system to enhance their own products and services. "The commercial applications are all happening downstream," says [Tianyi Lan](#), CEO of Ultimate Blue Nebula and SpaceKey, two Beijing-based space consultancies. "But China is focused on developing this ecosystem of companies," she says noting that the Chinese driverless car sector, for example, stands to gain from the Beidou system.

The navigation services sector in China reached over \$53 billion in 2019, according to the 2020 Global Navigation Satellite System and Location Based Services Association of China white paper, which represents an over 14 percent increase from 2018.

China has also found an overseas market for Beidou technology: BRI countries. "This is not only about the advancement of technology, it is also about diplomatic relations about the BRI," says [Saadia Pekkanen](#), a professor and co-director at the University of Washington's Space Policy and Research Center (SPARC). "They thought ahead about how the technology can be used commercially along BRI."

China has exported Beidou-related products to more than 120 countries and regions, according to [the Economist](#), [including](#) Indonesia, Kuwait, Uganda, Cambodia, Thailand and Pakistan, along what some call [the "Space Silk Road."](#) These agreements mean that China provides Beidou

equipped receivers and infrastructure to these countries for free or at a subsidized cost.

Thailand was an early adopter of the system, signing a \$308 million [deal](#) in 2013 to use Beidou for disaster relief, power distribution and transport. Pakistan also signed on quickly, and China has even allowed Pakistan to use Beidou for [military purposes](#), rather than just commercial ones.

"In space, the biggest customers are governments, so export markets are very sought after," says [Blaine Curcio](#), founder of Orbital Gateway Consulting in Hong Kong. "China will pursue opportunities in countries that don't have the money to create their own satellite navigation systems."

And China is offering a whole range of things to make Beidou adoption more attractive. "One of the things they are doing to incentivize countries to use Beidou is offering to set up ground augmentation centers, which compensates for errors in accuracy, and actually makes the signal more accurate than GPS," says [Kevin Pollpeter](#), a research scientist in the China Studies Division at CNA, a nonprofit research and analysis organization in Arlington, Va. China already has agreements with [Thailand](#) and [Russia](#) to build ground stations, and more are in the works for other parts of Asia.

And as Beidou's usage becomes more global, some multinational technology companies are taking note and developing products that can pick up signals from the new system. In addition to Apple's new Beidou compatibility, Qualcomm has been [developing](#) Beidou compatible chips since 2013 and domestic Chinese brands like Xiaomi and Huawei use Beidou. "Business is business," says Lan, "if Beidou has more precision and less cost, there will be more and more companies who will use Beidou as a navigational system."

But it is not a zero sum competition between Beidou and other navigational systems. Instead, experts say that we are increasingly moving toward a world in which our technological devices will be compatible with more

satellite systems. "Cellphones can be used to collect signals from both GPS and Beidou," says CNA's Pollpeter, adding that receiving multiple signals means that navigation is more accurate. "That's a benefit to the customer."

Most experts agree that the security threat posed by the Beidou system is minimal, according to a [report](#) released by the congressionally mandated U.S. China Economic Security Review Commission (USCC). Though one feature of the Beidou system, an instant messaging function that GPS does not have, could be compromised, most global devices are not set up to do this transmission, according to USCC.

Beidou is not going to take over GPS anytime soon, experts say, given the headstart that the U.S. system has in most parts of the world. But in a world where navigation is becoming increasingly important, it makes sense that China wanted to reap the security, commercial, and diplomatic rewards of having its own system.

"The key thing to understand is how ubiquitous GPS signals are for not only knowing where you are but also even what time it is," says [Jonathan McDowell](#), astrophysicist at the [Harvard-Smithsonian Center for Astrophysics](#). "It is such an integral part of everyone's life — for China to rely on the U.S. wouldn't be realistic."



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