

Bridge the digital divide from the space

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In today's world, the issue of many forms of divide between people is front and center. For example, the gap between the standard of living, the economic polarization, the difference of values between people from diverse backgrounds. The digital divide is also one of that kind of problems we are facing. The internet became more necessary, following the outbreak of coronavirus pandemic. You might use it every day and take it for granted. However, the reality is that half the people living on the earth don't have access to the Internet. How can we solve the problem? Satellite constellation, the huge network of a number of satellites, is an answer to this problem.

The very first artificial satellite was 'Sputnik 1' made by the Soviet Union. In 1957, they successfully made it go into the orbit around the earth. In addition, Soviet launched a man in 1961, whose name was Yuri Gagarin, into the space and he came back to the earth. This year marks 60 years anniversary of his travel into the space. In 1969, the United States launched Apollo 11 with three astronauts and two of them landed on the moon. Thus, space projects have been promoted by national organizations so far.

While nations keep taking the initiative of huge projects or projects for basic science, now it is the era of private industry. The market of the space is expanding, and the size is predicted to become more than one trillion dollars in 2040. 'SpaceX' is one of the private enterprises which are utilizing the space for commerce. They have been developing rockets and spacecrafts. They transport supplies and astronauts to the International Space Station (ISS) by themselves with the rockets and spacecrafts.

Some people might remember that a Japanese astronaut Soichi Noguchi boarded the spacecraft of SpaceX and went to the ISS.

‘Starlink’ is one of the big projects of SpaceX. It is so called ‘satellite constellation’ and they are going to establish a huge communications network with more than 10,000 satellites. Can you believe that? You might not be able to believe that, but that is real. They have already had the ability to launch more than 100 satellites a month. Furthermore, they are even planning to launch additional 30,000 satellites and the number of Starlink satellites will be 42,000 in total. The ability to launch rockets by themselves is their strong point.



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Then, how can Starlink become a solution to digital divide? For example, up to now, it has been difficult to provide the internet connection to the area where the

population is small because of its low cost-performance. However, Starlink can cover all the area of the world. That also mean they are pioneering a new market of communication. It is expected that the size of consumer broadband market will reach almost 100 billion dollars in 2040. Imagine that the world covered with more than 40,000 satellites and we can have access to the Internet wherever we are. We are reaching to such a world like Science Fiction, aren't we?

We should keep in mind that satellite constellation does not mean the absolute answer to the problem of divides. The service is not for free, of course (Note: Remember that this is a business.). So, I don't think that people all over the world will be able to connect the internet immediately, while Starlink will be sure to close the divide between areas geographically.

Furthermore, it is true that Starlink project also has negative aspects to overcome. For example, the satellites interfere astronomical observations. That is because each satellite reflect sunlight and, to make matters worse, the satellites of Starlink are too many to ignore the effect. If the network of 42,000 satellites is completed, there are always 600 of them in the sky all the time. To solve this problem, SpaceX is experimenting with a new type of satellite, what is called 'Darksat'. It is painted with black paint on its surface in order to reduce the reflection. Astronomers is trying to get together to solve the problems. The most important thing is to get together and try to reach the point where astronomers and space industries (or astronomy and space development) can co-exist. There is no need to divide them.

It has been half a century since 'one small step' was printed on the surface of the moon by Neil Armstrong, the astronaut of Apollo 11. Today, we are reaching to the stage where all of us can enjoy private services from the space. It is true that such new

technology is not silver bullet, but we can use the space, global commons, in order to bridge divides. Starlink is a good example of that. We will continue to eliminate any type of divide step by step. I wonder what the next 'giant leap' is.