UDK 001.891.31

ABOUT PROJECT LOON LLC

Sovetkhanova Akzharkyn Bakdauletkyzy
zsovetxanova@mail.ru
Student of the Department of Radio Engineering, Electronics and Telecommunications of L. N. Gumilyov ENU, Nur-Sultan, Kazakhstan
Scientific adviser, – A.E.Nauryzbaev

While many of us take the internet for granted, large parts f the world are still unconnected. In big towns and cities providing connectivity with cell towers is economical, as there are lots of people there wanting to connect, but the further away from these towns and cities you go the fewer people there are until eventually connectivity just stops. To bring the internet to people in these areas we need to look up, way up, into the stratosphere. From here we can provide connectivity across much larger areas, bringing the benefits of the internet to more people. So how do we 'get there? With ballons. Really big ballons. Beginning their journey from one of our custom-built balloon launchers, our ballons are filled with lighter than-ai gas and released up into the skies. Rising 20 kilometres into the stratosphere Loon Ballons float twice as high as airplanes, well above weather and wildlife. To get to where they need to go. Loon balloons sail the winds by moving up or down into different wind currents traveling in different directions.Joining other ballons in small teams over areas where connectivity is needed. Ground stations connected to local internet service providers send signal up to the ballons and then back down to the ground over large distances, allowing people to connect directly to the internet with an LTE mobile phone. When it is eventually time for our ballons to come down, we navigate them to remote areas and work with local air traffic control to manage their slow descent down to earth where they're collected by our recovery teams. By repeating this process at scale we hope to provide continued connectivity to users on the ground. Bringing the Internet to more people in more places around the world.

How Loon Connects?

Each balloon has a radio antenna that provides constant connectivity to the ground and connects each balloon to other balloon. There is a special ground antenna that is installed on the home or workplace to access the internet from balloon. Google™ claims that each balloon can provide signal connectivity to a ground area about 40 km in diameter and able to deliver 3G comparable speeds (up to 10 Mbps). These antennas use ISM bands of spectrum 2.4 GHz & 5.8 GHz. ISM radio bands (portions of the radio spectrum) reserved internationally for industrial, scientific, and medical purposes other than telecommunications.

Groud Antenna. The specialized internet antenna on the ground sends signals to a balloon. Then signal hops forward from the balloon to neighboring balloons.Signals from the ballon reach a gound station which is connected to a local internet provider, or pre-existing internet infrastructure which provides service via the network of ballons Maintenance. If a balloon fails or needs maintenance, Google staff brings the balloon down. A trigger mechanism on the top of the balloon would deflate it by releasing gas from the envelope, and it releases a parachute that brings the balloon down to the Earth in a controlled descent. GPS equipment track where the balloon is landing. Google needs the dedicated staff across the globe for balloon maintenance. It may be very helpful in the Areas of….

- **Education:** There are millions of poor children all over the world who haven't even heard the word "school". Loon has the potential to become a school on the air for the under privileged.
- **Medicine:** Health and hygiene information can be made easily available to the people who haven't even heard of the word doctor.

- **Collaboration:** Connecting with the rerenmore countries and inaccessible terrains will no longer be impossible. It'll eliminate the need to lay down cables in those areas, and live weather forecast reports insuch areaswould be of a great help to the locals there.

"Communication satellites are typically pretty expensive, hundreds of millions to build and a hundred million plus to launch," says general director. "Whereas the balloons are an order of magnitude or two cheaper to operate on a daily basis, even for a global network."

Loon is always aiming to extend the lifespan of its flights, but in some ways, a short ride can be an advantage. "With balloons you're only four to five months away from having a fresh balloon," General director explains. "New technologies come, new compression algorithms, the electronics can be updated, so you have a pretty fresh fleet in the air at any time."

For connectivity the balloons link up with base stations and pass signal between themselves like relay runners exchanging a baton. The move to LTE has also given a big boost to the business model, because it's now a turnkey solution for wireless network operators.

Balloons launched in New Zealand flew over 9,000 kilometers (about 5,600 miles) to Latin America and delivered an internet connection, then flew back around the globe for another successful connection test in Australia, navigating the balloons within 500 meters of their target locations at opposite ends of the world.

Loon LLC or Starlink ?

Starlink is a network of satellites that provide internet. It's being built by SpaceX, general director's aerospace company.The satellite network operates at 550km above the Earth's surface in low Earth orbit, unlike conventional internet satellites that are positioned much higher, at over 35,000km.Project Loon is effectively about providing last-mile connectivity in remote areas (well, more like last 50 miles connectivity).While Starlink can also provide internet to remote areas everywhere on the globe and people usually associate it with that use case, this is not really its core purpose. Its primary goal is to provide low latency connections across large distances (e.g. across continents) utilizing the fact that light travels 50% faster in a vacuum than in optic fiber. Loon successfully flies over 1 million hours in the stratosphere, a harsh and hostile operating environment. Along the way, Loon travels 40 million kilometers (enough to make 100 trips to the moon), charting new territory and applying machine learning to complex navigational tasks.

Planning of Loon technology in Kazakhstan

The Republic of Kazakhstan is situated at the heart of Eurasia and is the worlds 9th largest country. When Kazakhstan became independent in the unstable days of December 1991, few people thought the country would achieve as much as it did in its first 29 years. Instead of disintegrating, Kazakhstan's economy became one of the fastest growing in the world, and the country has built a robust political system of presidential and parliamentary democracy with its media and NGOs enjoying a growing voice and role in shaping the society. In today's world, Internet technology is very important. Because these technologies have a lot of potential. At the same time, this Internet technology is surprising. That technology is Loon technology. What does this technology give to Kazakhstan? Firstly, the cost of the technology is reasonable. Secondly, through the use of this technology, Kazakhstan will be able to allocate funds for the Internet to other needs. Thirdly, with the help of this technology we can achieve economic success. It is very good to install in the settlements of the eastern part of Kazakhstan. Because in these regions the Internet is weak and almost non-existent. In particular, the village of Sarzhal in East Kazakhstan. The land area of this village is 2652.85 km^2. There are 3167 people in this area. This means that it is impossible not to spread the Internet to such a large population. That is a large number of consumers. If we bring this Loon technology to our country and install it in rural areas, we will fully cover the remoteness of the country with a resource called quality Internet. Therefore, it is clear that this technology will lead the country to some success in the Internet market.

Literature

1. http://www.google.com/loon/
2. Google Investor, 2014, Q1 2014 Quarterly Earnings Summary, viewed 12 October 2015 https://investor.google.com/pdf/2014Q1_google_earnings_slides.pdf

3. https://abc.xyz/investor/
4. https://legacy.wattzon.com/stuff/items/k49t7pnp5206tyaa72nyws146d
5. А.Л.Гельгор , Е.А.Попов Технология LTE Мобильной передачи данных (11-р)