

A SKYied Approach for Connecting and Accessing Different Geographical Locations

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Abstract- The most transformative Technologies of a lifetime is internet. But still 2 out of 3 people cannot afford internet connection. The above mentioned project is very applicable for Terrestrial challenges to internet connectivity like forest, mountain etc. Google launch a new project called a project loon to solve above-mentioned problems .Flying around the sphere on the stratospheric wind's that provide internet access to the earth below. They uses balloon for this project and It provide 3G or 4G internet access does it can be used to connect ruler area, remote area and undeserved area.

A special Internet antenna attached to their building to connect the users of the service to the balloon which travels through the network. By balloon to balloon this signal, then to a ground-based station connected to an Internet Service Provider (ISP), then onto the global Internet.

I. INTRODUCTION

It is the project of exploration for providing [Internet access](#) to [rural](#) and remote areas. Its works at altitude of about 18 to 35km to create an aerial [wireless network](#) with up to 4G-LTE speed placed in the [stratosphere](#) using [high-altitude balloons](#) . Google itself found the new idea of providing Internet access to the remaining 5 billion population unprecedented and soft-witted. Since 2013 there are 2.2 million people were accessing the internet but after launch of this project 3.2 million people are accessing the internet. To transmit signals to ground stations or LTE users [patch antennas](#) are used by the balloons, which are [directional antennas](#) –Some smart phones with Google SIM cards can use Google Internet services. The whole infrastructure is based on LTE; the [eNodeB](#) component (the equivalent of the "base station" that talks directly to handsets) is carried in the balloon.



The inflatable part of the balloon is called a balloon swirl(envelope) .Loon’s balloon envelopes are made up from sheets of polyethylene plastic and they measure 15m wide and 12m tall when fully inflated. At the time of taken balloon out of the service gas is released from the envelope In the unlikely event that a balloon drops to quickly and parachute attached to the the of envelope is deployed.

The solar array is a flexible plastic coat supported by a light-weight aluminum frame for providing electronic powered. It uses high efficiency monocrystalline solar cells. The solar array is mounted at a steep angle to effectively capture sunlight on short winter days at higher latitudes. Opposite directions are being faced by the array which is divided in two sections .The panels produce approximately 100 Watts of power in full sun, which is enough to keep Loon’s electronics running while also charging a battery for uses. The solar array is mounted at a steep angle to effectively.

TIMELINE :

In 2011 under incubation in [Google X](#) with a series of trial runs in [California's Central Valley](#) was Unauthorized development on the project began . On June 14, 2013 this project was officially announced as a Google project.

In coordination with the [Civil Aviation Authority](#) from the [Tekapo area](#) in the [South Island](#) Google began a [pilot experiment](#) in [New Zealand](#) On June 16, 2013 where about 300 balloons were launched. After this initial trial, Google plans on sending up 300 balloons around the world at the [40th parallel south](#) that would provide coverage to New Zealand, Australia, Chile, and Argentinaetc .On November 9, 2017, it was reported that Google had launched several balloons from Nevada and positioned them over Puerto Rico via [Flightradar24](#) as part of an effort to bring 100,000 people online

EQUIPEMENT:

The balloon envelopes designed by Raven Aero star which used in this project..And are composed of polyethylene plastic about 0.076mm in thick. The balloon are field with Helium ,Standing 15m across and 12m tall when fully inflated. It carry a custom air pump system , that pumps a releases air to constancy(ballast) the balloon and control its elevation .It carry a small box having weight 10kg containing each balloon .And this box contains circuit boards that control the system .Radio antennas and a Ubiquity Networks ‘Rocket M2’ to communicate with other balloons and with internet antennas

on the ground ,and batteries to store power so the balloon can operate during the night .

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WORKING :

Above the Earth's balloons are travel in the stratosphere. Where the wind are stratified and the layer of that varies in speed and direction. For moving the balloons in each one into a layer of wind in the right direction this technique used software algorithm. To

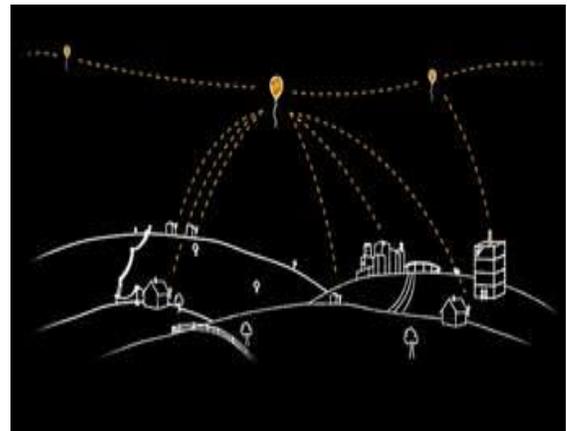


form one large communications network , the balloons are arranged by moving in wind. Situated on the edge of space, between 10 km and 60 km in altitude, the stratosphere presents unique engineering challenges: air pressure is 1% that at sea level_ this atmosphere offers less protection from UV radiations and lyric temperature swings, which can reach as low as -80°C. This technology is designed carefully the balloon swirl to withstand in these conditions. And this is the most advantageous part was taken, the stratosphere's the winds and remain well above the weather events and not only wildlife but airplanes also.

Firstly to connect to the Internet we used the expensive fiber cable which was now avoided by this technology .And because of that great increase will be in the Internet usage in developing countries in regions such as Africa and Southeast Asia which are unable to afford for fiber cable.

The balloons which is made up of The high-altitude polyethylene fly around the earth on the prevailing winds mostly in a direction of east or west. Solar panels supplied by Power Film, Inc about the size of a card table that are just below the free-flying balloons generate enough electricity in four hours to power the transmitter for a day and beam down the Internet signal to ground stations. These ground stations are spaced about 100 km (62 mi) apart, or two balloon hops, and bounce the signal to other relay balloons that send the signal back down.

This makes Internet access available to anyone in the world who has a receiver and is within range of a balloon. Currently, the balloons communicate using unlicensed 2.4 and 5.8 GHz ISM bands, and Google claims that the setup allows it to deliver "speeds comparable to 3G to 4G" to users. It is unclear how technologies that rely on short communications times (low latency pings), such as VoIP, might need to be modified to work in an environment similar to mobile phones where the signal may have to relay through multiple balloons before reaching the wider Internet.



Powering it all is a 600-watt battery, charged by solar panels on a carbon fiber frame atop the box. These large, extra-light photovoltaic cells -- amorphous silicon crystals on a fabric substrate -- keep the weight of the balloon low so that the Loons can run for long missions without landing. During the daytime, the batteries charge, and at night they switch on, to vent out excess air and keep the computers running.

Each Loon balloon has three radio frequency antennas (on 2.4 Ghz and 5.8 Ghz bands) and a ground-pointing WiFi antenna, which beams an Internet signal to Earth in a 12-mile radius. And though the balloons are mostly steerable, Google has done a lot of programming to make them work on their own as well; In addition to Mission Control, Google's Loon balloons can talk to each other, and control themselves."We use a distributed mesh network, so each balloon is pretty autonomous and has pretty much the same hardware in it," Sameera Ponda, a lead aerospace engineer at the Dos Palos

site that day, said on the video stream. "As one balloon floats over a certain area that balloon is talking to the ground antennas, and as that balloon floats away, another balloon comes in and takes its place, so it's a pretty seamless operation."

II. EXPERIMENTAL IMPLEMENTATION

In South Island authority from the Tekapo area in the coordination with the Civil Aviation300 balloons were launched on 16 June 2013 Google began of pilot experiment in New Zealand .where about in the using special Antennas about 50 local user in the around a Christchurch and Canterbury region tasted connection to the aerial network about 50 local user in the .these techniques using special Antennas served successful network to New Zealand, Australia, Chile and Argentina Charles Nimmo was the first person who get the Google balloon internet access in the terrestrial region.

Rather than negotiate a section of bandwidth that was free for them worldwide they would instead become a temporary base station that could be leased by the mobile operators of the country.



The balloon-powered internet access venture in Piauí, Brazil, marking its first LTE experiments and launch near the equator In May-June 2014 which is tested by Google. In 2014 Google did partner ship with France's Centre national d'études spatiales (CNES) on the project of balloons.

For the area which is twice the size of New York City, which is near about 1,250sq.km and each balloon would provide Internet service to that area, and terrain is not a challenge. Balloon science from NASA studied by the Google Engineers, the Defense Department and the Jet Propulsion Lab to design their own airships made of plastic films similar to grocery bags.

Recovery of balloon:

To travel the balloon in desired direction they are controlled by raising and lowering them to an altitude with wind. We make arrangement to take our balloons down over preselected,

safe recovery zones so we can easily collect them to reuse and recycle their parts. In the situations of an unexpected landing, every Loon balloon is equipped with a parachute to slow its descent. There is special team for recovery to track down and collect landed balloon. The specialist track the balloon continuously in the wind by GPS as well as they note the location of the balloon when they are landed. when the location of balloon is known the recovery team will go there. Also we plan to land the balloons in various collection points around the world.

III. CONCLUSION

Communication and connectivity of internet became one of the basic need in modern human life. During and after natural disaster it can provide backbone communication when the underground infrastructure cannot work. Project loon is initiative to help fill in those internet gaps through the use of networked balloons. The two thirds of the world is accessed by this project, which is used to provide broadband like internet for that doesn't have access to a reliable internet connection by balloon.

To fill those internet gaps project loon take an initiative though network balloon. The I am provided by Google Loon is to provide broadband like internet for the two-third of the world that doesn't have access to reliable internet connection by balloon. The plastic that used to make balloon is similar to that in shopping bags and the electronics are not that different from consumer electronics. To connect the world this is very cost effective technique.75% comment is in the favour of this technique.in future this project get great success Balloons are the best option for connecting rural area ,remote area and undeserved areas for helping with communication after natural disasters.

ADVANTAGES:

- A. Easy to use.
- B. Speed: It can deliver the speed of 2.0MBps to 7.5MBps.
- C. Increasing internet uses .
- D. It is present at the high altitude and remains out of the reach of weather events airplanes and wildlife.
- E. Balloons could help with the Rescue missions.
- F. It 100% renewable energy.
- G. Increasing the internet uses.
- H. Availability of information
- I. Collaboration

DISADVANTAGES:

- A. Maintenance cost will be high .
- B. Balloons must be replaced for every two to three weeks.
- C. Less life of balloon (it is near about 200 days only).

IV. REFERENCES

- [1]. ^ Jump up to:^{a b c d e f g} Levy, Steven (June 14, 2013). "How Google Will Use High-Flying Balloons to Deliver Internet to the Hinterlands". *Wired*. Retrieved June 15, 2013.

- [2]. ^ Jump up to:^{a b c} "Google to beam Internet from balloons". Agence France-Presse. Google. June 15, 2013. Archived from the original on June 17, 2013. Retrieved June 16, 2013.
- [3]. **Jump up**^ "Google launches Project Loon". *The New Zealand Herald*. June 15, 2013. Retrieved June 15, 2013.
- [4]. **Jump up**^ Lardinois, Frederic (June 14, 2013). "Google X Announces Project Loon: Balloon-Powered Internet For Rural, Remote And Underserved Areas". *TechCrunch*. Retrieved June 15, 2013.
- [5]. **Jump up**^ Mack, Eric (June 14, 2013). "Meet Google's 'Project Loon:' Balloon-powered 'net access'". *CNET*. Retrieved June 15, 2013.
- [6]. ^ Jump up to:^{a b} Brodtkin, Jon (June 14, 2013). "Google flies Internet balloons in stratosphere for a "network in the sky"". *ArsTechnica*. Retrieved June 15, 2013.
- [7]. ^ Jump up to:^{a b} "A Lawsuit Has Alphabet's Project Loon In Jeopardy | Backchannel". *WIRED*. Retrieved 2017-09-27.
- [8]. **Jump up**^ Sharma, Amol (February 20, 2008). "Floating a New Idea For Going Wireless, Parachute Included". *The Wall Street Journal*. Archived from the original on February 23, 2008. Retrieved June 16, 2013.
- [9]. **Jump up**^ The Next Web: Google celebrates Project Loon's birthday with first LTE experiments and launch near the equator.