

# A Survey on Google Project Loon (Google Balloon)

Zunaid Ali

ASM Institute of Management and Computer Studies, Thane, Maharashtra, India

## ABSTRACT

Now a days most people are on the internet, we can say that internet is one of the important aspects in everyone's life. But many live-in areas where the infrastructure of internet has not yet reached. If you are in such areas and you need to use your phone's internet, where can you receive internet when you stuck into these areas? Simple, connect to the internet that is provided by balloon above you.

Google may initially partner with BSNL for testing this technology by use broadband spectrum in 2.6 GHZ band. When contract, a Google spokesperson refused to comment. The technology used for 4G service, has potential to replace mobile towers as it can directly transmit signals on 4G mobile phones.

The project name Project Loon was appropriately chosen because it partially involves balloons and partially because it sounds looney. This paper is going to introduce these topics- What is Google Balloon? How it Works? Is it useful?

**KEYWORDS:** Google Project Loon, Stratosphere, Equipment, Solar Plate

## INTRODUCTION

In 2008, Google had considered contracting with or acquiring space data corp; but didn't do so. Later unofficial development on the project began in 2011 under incubation in Google X. The project was officially announced as a Google Project on 14<sup>th</sup> June 2013.

On 16<sup>th</sup> June 2013, Google began a pilot experiment in New-Zealand where about 30 balloons were launched

It was building a network of high-altitude balloons to blanket the world's poor, remote, and rural regions with 4G LTE signals beaming down from the skies to anyone with a 4G device.

A report in Wall Street Journal states that Google is in talks with telecommunications companies in India to enable balloon-based Internet in rural and developing areas as well. WHAT IS PROJECT LOON?

It is research and development project being developed by GOOGLE with the mission to provide Internet all over the world via a ring of balloons floating in the sky, about 20 kilometres above the ground. The basic idea behind this project was that they will fill up multiple high-altitude balloons that will go above the clouds without human i.e. around 20Km above the ground level in Stratosphere.

On the arrival of the Project Loon in India in 2016, the Project Loon balloon can prove to be beneficial to rural areas in India.

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## Literature Review

Around ten years back, nobody would have thought that smart phones would turn out to be such an essential piece of how we lead our lives or that internet would encourage such a solid impact in instructive straight forwardness and social incorporation over different landmasses. A whole class of employments has emitted on the internet in the course of the most recent decade, huge numbers of which are based exclusively around spreading information. YouTube, for instance, has a large number of "how to" recordings. With internet getting to be accessible to a huge number of internet detached individuals, there will be an extreme surge of these recordings. In these recent years, Google X has discharged various incredible projects, including Google Glass, Self-Driving Cars, and in addition different activities related to neural networks. It provides the facility from no internet to the high speed internet for everyone as many of the Indian as well as the small villages and the towns are unable to enjoy the benefits of the internet due to some or the other reasons. So it decided to provide the technique of the internet through balloon to connect many areas by providing the internet. This will become helpful to connect many areas hand will also help to share new ideas and techniques for the development of countries. For this reason Google has launched the technique of Google Loon which was named as PROJECT LOON. Through this there will be no disconnection of the internet but a continues connectivity of the internet.

## Existing Loon Technology

We've come quite a ways since our first tests in New Zealand in 2013, where our goal was to connect to real users for the first time. Our balloons are lasting longer—our record so far is 187days aloft!

We recently successfully travelled a group of our balloons a total distance of 10,000 kilometres, and came within one kilometre of our target destination.

We're working with several Telco's around the world to test integrating Loon into their existing networks and operations.

### How Loon Moves –

Project loon balloons travel around 20kms above the earth surface in the stratosphere

Winds in the stratosphere are generally steady and slow moving at between 5 and 20 mph, and each layer of wind varies in direction and magnitude

Project loon uses software algorithms to determine where its balloons need to go, then moves each one into a layer of wind blowing in the right direction

### Methodology and Design –

- Envelope
- Solar panel
- Equipment



### 1. Envelope –

The circular part of the balloon is called envelope. Each super pressure balloon is made of polyethylene plastic material and filled with helium

When fully filled gas, the balloon height is 10m and its width is 20 m.

A parachute is attached to the top of the envelope, which is used for bringing down the balloon safely.



### 2. Solar Panel –

Each unit's electronics are powered by an array of solar panels that sits between the envelope and the hardware.

By moving with the wind and charging in the sun, Project Loon is able to power itself using only renewable energy sources.

In full sun, these panels produce 100 Watts of power enough to keep the unit running while also charging a battery for use at night.

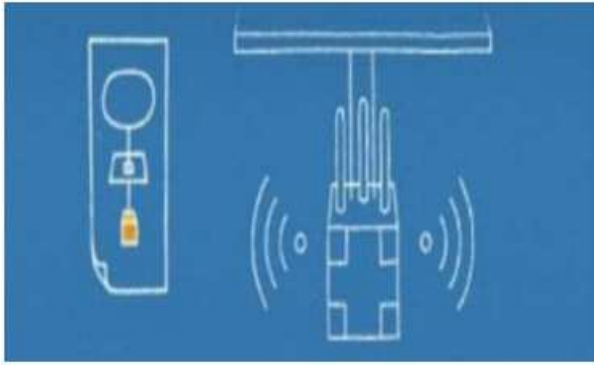


### 3. Equipment –

A small box containing the balloon's electronic equipment.

Radio antennas to communicate with other balloons and with Internet antennas on the ground.

Batteries to store solar power so the balloons can operate during the night.

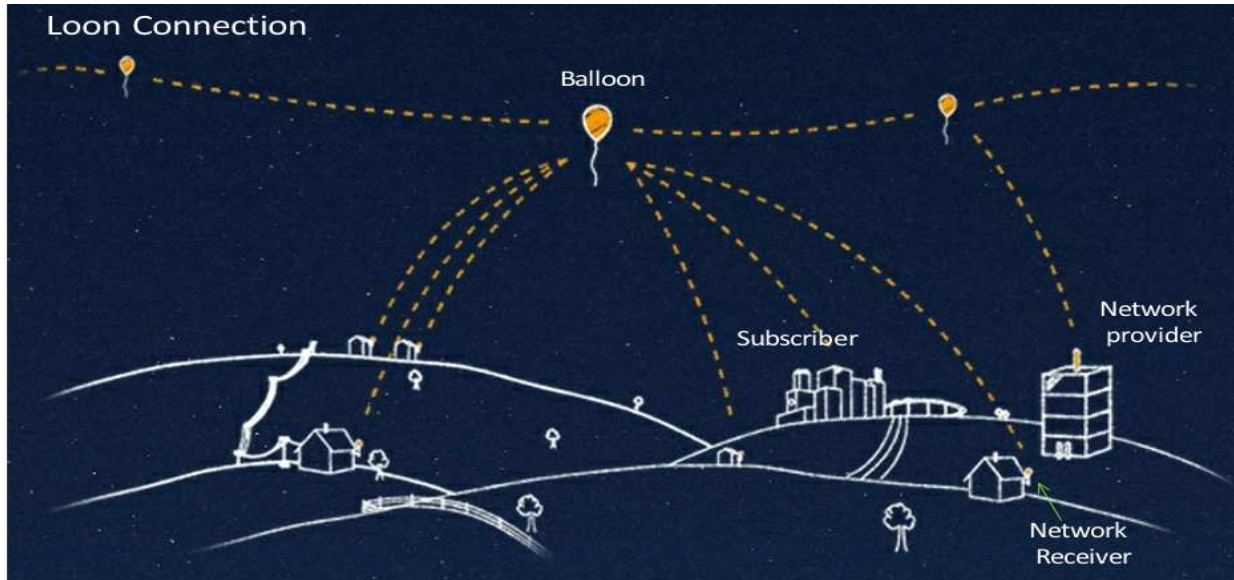


### How Loon Connects -

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 claim that each balloon can provide signal connectivity to a ground area about 40km in diameter and able to deliver 4G comparable speeds (up to 15 mph).



### Ground Antenna -

The specialized internet antenna on the ground sends signals to a balloon. Then signal hops forward from the balloon to neighbouring balloons.

Signals from the balloon reach a groundstation which is connected to a local internet provider, or preexisting internet infrastructure which provides service via the network of balloons.



### Issues (Problems) -

The main problem with launching any hardware project is the certainty of eventual hardware failure.

If a Loon balloon fails, it can either remain up in the air floating, making it difficult to bring down or it might go down in unwanted areas.

Another concern over this project is internet privacy.

### Major benefits of loon -

Loon is a network of balloons traveling on the edge of space, delivering connectivity to people in unserved and underserved communities around the world.

Loon partners with mobile network operators globally to expand the reach of their LTE service.

Together, we help expand coverage to places that lack it, supplement existing networks, and provide expedient coverage after natural disasters.

### Conclusions and Future scope -

Internet connectivity and communication become one of the basic needs in modern human daily life. An innovative and scalable idea like the Google™ Project Loon would aid and benefit remote areas of the world as well as population to reap the benefits of modern communications. It would also provide backbone communications during and after natural disasters when ground infrastructure is scarce or destroyed.

Project Loon is an ambitious project and the world will highly benefit from it.

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