Review on Loon Technology

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***Abstract*— Now a days the Internet is one of the most transformative technologies of our lifetimes. But in our society out of 100% people only 60% can be able to use the internet facilities. Remaining 40% cannot be able to use internet facilities due to lack of towers in terrestrial areas like jungles, mountains, remote areas, etc. because of cost challenges Some cellular networks are does not like to build any type of towers.**

Solving these problems is not simply a question of time: it requires looking at the problem of access from new angles. So "PROJECT LOON" is the one of the solutions for above mentioned problem. The major part of this system is balloons which are equipped with solar panels, satellites, Antennas. These balloons are possibly constructed from materials like metalized Mylar, a highly flexible latex or rubber material, like chloroprene. These balloons are placed at the height of 80km from earth surface. So, the balloons can provide the internet access for nearly 15km. The advantage of the Loon Project is there is no distraction in signals even though natural calamities occurs in that areas. By these balloons, the internet speed will be up to 1.5mbps. As a result, they hope balloons could become an option for connecting rural, remote, and underserved areas, and for helping with communications after natural disasters. The signal travels through the balloon network from balloon to balloon, then to a ground-based station connected to an Internet Service Provider (ISP), then onto the global Internet. The system aims to bring Internet access to remote and rural areas poorly served by existing provisions, and to improve communication during natural disasters to affected regions. The signals from one balloon to another is transmitted by Antennas provided in balloons. By this way also India will be developed more.

***Index Terms*— Loon, ISP, Mylar, Satellites**

I.INTRODUCTION

After more than 40 years of development has created a revelation in communication for humans because it allows people to access and exchange information efficiently. But Internet facilities are using by 60 - 70%. Of people in India. Therefore, the idea of providing Internet Connections via Wireless networks has become more and more popular In wireless Internet, mobile users Can connect the Internet service provider (ISP) through base Station (or) access points- However, deployment of base Stations for every location on earth seems to be impossible. Therefore, the idea of Providing Internet from the sky introduced. The early version is based on Satellite which suffers from high cost and long transmission now the loon project was proposed foe cheaper cost and faster alternative. For faster net facilities like 4G or 5G. We have to place the balloons at 80km or above from earth's surface. The balloons will travel around the earth.

In this paper we will cover working and designing of balloons, the loon's technology its advantages and future scope of loons

II. LITERATURE REVIEW

Project Loon Past few years, Google x has launched fabulous projects, including Google drone for delivering products, self-driving car, Google watch android wear, Google glass and project related to neural networks. Nowadays everyone uses smart phone. Few years ago, nobody has predicted that the mobile will become an important part. Everyone having internet on their smart phones for education purpose or surfing. But there are many cost challenges. Also, there are ground challenges such as jungles, mountains for internet connectivity. Project Loon is developed for the solution of this challenges. Google decided to provide internet for the peoples through balloons. Project loons provide high speed internet with less cost for those peoples who are unable to use the internet because of many problems. Facebook Aquila Today, around 2.7 billion people can access the internet, which is only a one third of the total global population around the world. Expanding to the internet

and its access to the areas where there is no internet availability can drastically change the view of the world. For example, it could raise another 140 million new jobs, lift around 160 million people out of poverty and decrease the rate of child mortality. For this reason, Facebook with other private service provider connected to an application "Internet.org" has launched these techniques of a Solar Powered DRONES which was named as AQUILA.

III. PURPOSE OF PROJECT LOON

Many of us think that the internet as the global community but 2/3 of the world ‘s population does not yet have the internet facility. In Project Loon, balloons float in the stratosphere as twice as high as airplanes. People connect to the balloon network using a special internet antenna attached to their building. The signal bounces from balloons to balloons then to the global internet back on earth. Each balloon is equipped with a Global Positioning System (GPS) for tracking its location. Entire earth can communicate using Internet Provided by GOOGLE BALLOON.

- It can improve communication during any disaster to affected regions.
- It will be available at all places, even in Sahara Desert.
- It can improve Internet usage in developing countries in region such as Africa and Southeast Asia that cannot afford underground fibre cable for providing internet connectivity.
- It is fast, efficient, and more reliable than wired broadband Connection

Project Loon now a days uses ISM bands that are available for anyone to use. The industrial, scientific, and medical (ISM) radio bands. Radio bands reserved internationally for the use of radio frequency (RF) energy for industrial, scientific, and medical purposes other than communications. By moving with the wind, the balloons can be arranged to form one large Communications network.

IV. COMPONENTS OF LOON

ENVELOPE: The inflatable part of the balloon is called a balloon envelope. Loon’s balloon envelopes are made from sheets of polyethylene plastic, and they measure fifteen meters wide by twelve meters tall when fully inflated. When a balloon is established well to be blown out of service, gas is released from the envelope to inflate the balloon down to Earth in a controlled manner. In case forbidden, the balloon drops too quickly. a parachute attached to the top of the envelope is deployed.

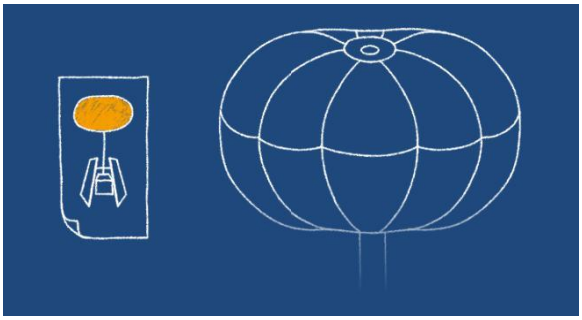

Figure.1. Envelope

SOLAR PANELS: Each balloon’s electronics are Powered by an array of solar panels. The solar array is mounted at a steep angle to effectively capture sunlight on short winter days at higher latitudes. The array is divided into two parts facing opposite directions to each other which allow us to capture energy in any orientation as the balloons spin slowly in the wind. The panels produce approximately 100 Watts of power in full sunrise, which is sufficient to keep Loon’s

Electronics running along with this it also helps in charging of the battery for effective use in the night hours. By moving along with the direction of the wind and getting charged in the sun, Project Loon is able to power itself using entirely renewable energy sources.

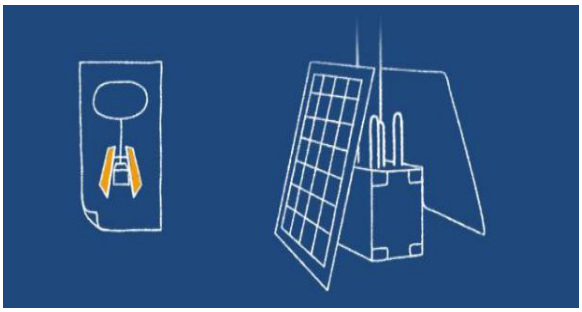

Figure 2. Solar Panels

ELECTRONICS: A small box containing the balloon’s electronics hangs underneath the inflated envelope, like the basket carried by a hot air balloon. This box holds circuit boards that control the system, radio antennas to establish communication with other balloons and with Internet antennas on the ground, and

lithium ion batteries to store solar power so the balloons can operate throughout the night.

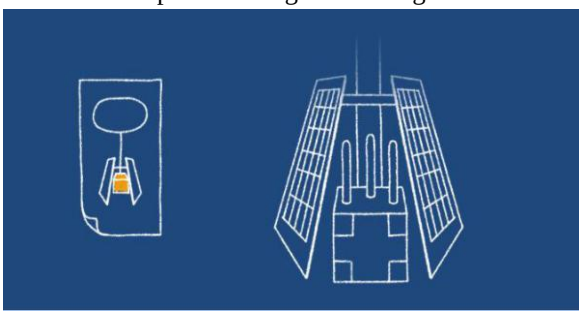

Figure 3. Electronics

V. HOW LOON WORKS?

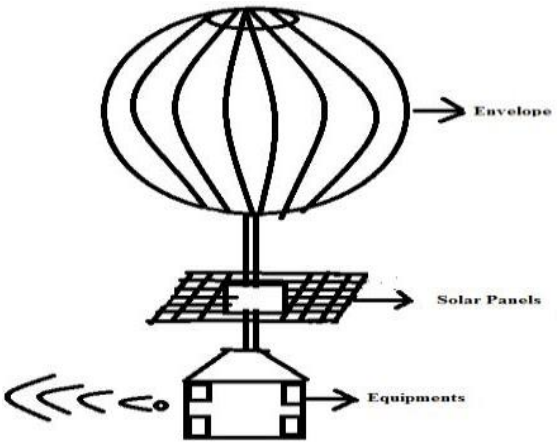

Figure.4. Design of Project loon

People can connect to the internet using internet antenna which is attached to their building. The signal will bounce from balloon to balloon and then back to earth.

- Each balloon can provide connectivity to a ground area about 80 km in diameter with 4g speed
- For balloon to balloon and balloon to ground transmission, the balloons use antennas equipped with specialized radio frequency technology.
- Project loon currently uses ism bands (specifically 2.4 and 5.8 Ghz bands) That are available for everyone to use

VI. ADVANTAGES

Availability of Information: Assuming all the mechanisms of the project are functioning as planned, every single person who has access to some device that has Wi-Fi access would be able to search for almost any form of media online. Farmers in remote corners of third world countries would be able to research and analyze multiple techniques that could increase their yield, a father would be able to stay in touch with his daughter no matter which township either one of them lived in, villagers across an country would be able to transparently examine the country's political scenario and vote appropriately.

Education: With millions of uneducated children across the world, this program might be able to successfully provide schooling through online classes on topics ranging anywhere from disaster management to literary analysis.

Health and Medicine: With globally available data on disease outbreaks and medical breakthrough, the entire population will be able to adjust to epidemics or adopt new drugs or medications.

Use of Renewable Energy: This will greatly influence and inspire future projects as well. Creating interplay between solar energy to keep proper functioning of the balloon while using wind energy to define its motor controls will help reduce the burden on coal, petroleum, and other non-renewable energy sources.

Collaboration: Collaboration between people across the globe will become much easier with the constant connectivity to each other through the internet, allowing newer more complicated projects to arise.

VII. DISADVANTAGE

1. This project is labor intensive and provides the limited internet speed.
2. Balloons can work only for 100 days.
3. Hardware failure cannot be reached at the intended location.
4. The safety of people.

VIII CONCLUSIONS

After detail study on the topic, we can conclude that The Internet connectivity has become very popular and basic need for the people to get all the information required in day to day life But the two third of the population in the world is still not able to get the internet access so we came up with this project named as loon The main aim is to connect everybody to the world using cheaper cost of internet with high speed range As per the experts there would be great Success for this Project in Future. And we hope balloons could become an option for connecting rural, remote, and

underserved areas, and for helping with communications after natural disasters

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