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Comparative Study of Project Loon & Facebook Aquila

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Abstract:
This research paper compares and contrasts two technologies for providing broadband wireless Internet access services to the people: Project Loon and Facebook Drone. The former, Project Loon refers to network of balloons travelling on the edge of space that are designed to allow people for connecting to internet in rural and remote areas. The latter, Facebook Drone uses infrared lasers to spread the reach of internet to isolated areas that currently do not have internet access. This research paper also explores the features, working, advantages and disadvantages of both the technologies. The main aim of this comparative study is to represent which one of the technology is better and why is it is better.

Keyword: Envelop, antenna, solar panel, carbon fibre, balloon, drone, aquila, project loon;

1. INTRODUCTION

Project Loon

Many of us think that internet as a worldwide community. But still a two-third population of the world does not yet have internet access. For this, the Google introduces a solution which is "PROJECT LOON". Project Loon is a network of balloons moving on the edge of space, designed to connect people in rural and remote areas. To provide internet around cities and rural areas which is difficult according to present scenario which consumes basic necessities of hardware components , which is found almost scarce when it comes to rural areas this project loon was developed which is under research and development. It is the networks of balloons which works in the stratosphere from there it will provide internet access. The Stratosphere is the layer of the earth's atmosphere which is above of Troposphere. There are various layers of the wind in Stratosphere. In the stratosphere, the direction and speed of the wind vary from time to time. Due to the variation in wind flow there are chances that the balloon may move in different directions. we need no to worry about its manoeuvrabilityas it is deployed in stratosphere which controls the flow of loons present there. Shifting from different layers of stratosphere helps in moving around from left to right and does not need any external push or any technology.
Balloon is deployed into stratosphere at 20km which creates an aerial wireless network upto 4g like speeds. Because of its new and research enhanced features it uplifts the expectations in technology. Each balloon carries and has the ability to transmit the signals to users which comes in and around 5000 square kilometers. Each loon when set for cruising into the sky they are provided with the feature which enables them to communicate with each other. Every balloon is engineered with a solar panel attached to its base which provides energy to the loon. The balloons are filled with gas which helps it to move upto certain height and further work is done by solarpanel. Every balloon is set with an exhaustion time period of 100 days, prior to it the project loon is made to lower the gas through which it descends to its base and from where it is sent for maintenance. Each Service providers will be able to call it own balloons which will match with their respective sim card's frequency and data service will be provided.

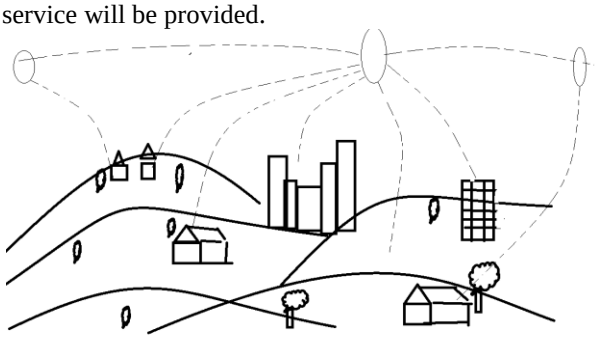

Figure.1. Balloon Powered Internet

Facebook Aquila

Facebook has announce its first comprehensive drone, Facebook plans to use to provide internet access in remote parts of the world. The name of project is "Aquila", It is solar power drone will be able to fly for three months at a time without landing, it will use a laser to beam data to a base station on the ground. The company plans to use a linked network of the drones to provide internet access to large rural areas. However, as with its Internet. org project, Facebook will not be dealing with consumer directly, instead contribute with local ISPs to offer the services. Aquila is made by carbon fiber composite so the weight of drone is less than 1000 pounds and facebook try to make it more lighter. Aquila collects amounts of energy from the sun during the day and it has to be enough to keep its propellers, communications payload, avionics, heaters and light system running when it's dark. Aquila is mostly self-sustaining, but it still relies on a ground crew of about a dozen engineers, pilots and technicians who direct, maintain and monitor the aircraft. Crew control the aircraft through software which allows them to determine heading, altitude and airspeed or send Aquila on a GPS-based route. Then speed of Aquila is 80 mph. In order to

take off, fly and land, Aquila's wings and propellers have to be able to operate both in high, cold altitudes and lower, warmer altitudes where the air can be 10 times denser. Almost half the mass of Aquila will come from high-energy batteries which will put lot of weight on large, flexible wings. Aquila will bring a communications payload that will use lasers to transfer data more than 10 time faster than existing systems.

Figure.2. Solar Powered Drone

2. 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 use smart phone. Few years ago, nobody has predict that the mobile will become an important part. Everyone having internet on there 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 loon 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 technique of a Solar Powered DRONES which was named as AQUILA.

3. HOW LOON WORKS?

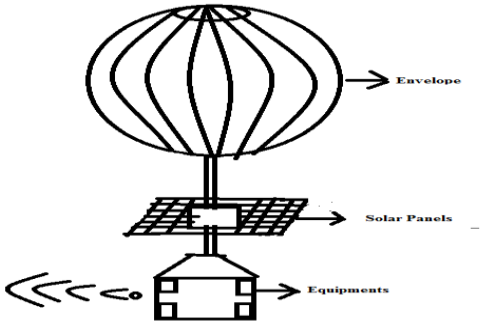

Figure.3. Design of Project loon

People can Connect to the internet using internet antenna which is attached to their building. The signal will bounces 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 currenty uses ism bands (specifically 2.4 and 5.8 Ghz bands) That are available for everyone to use

4. ADVANTAGES OF LOON

- Google will provide free internet for everyone. This may increase the internet usage throughout the world.
- Ground antennas are easy to use and install. No extra underground infrastructure is required; and the equipment is comparatively cheap.

5. DISADVANTAGES OF LOON

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

6. HOW AQUILA WORKS?

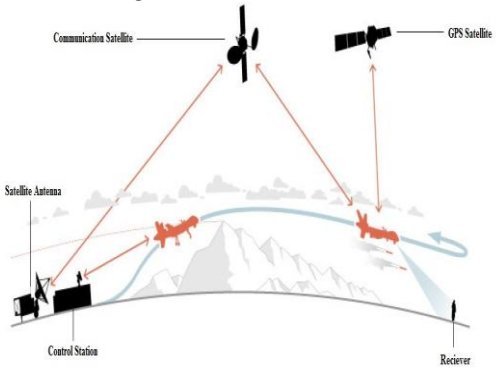

Figure.4. Satellite Communication

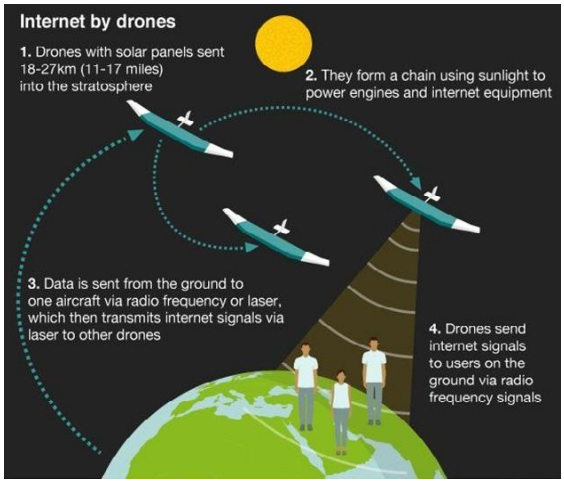

Figure.5. Establishment of internet connection

The helium balloons is released that the drone will be able to increase the maximum height of 90,000 feet, flying at this point in a circle all day and at night the height will reduce to 60,000 feet, where it can use battery power.

Each drone is with a radius of 3 km through a circle and able to provide internet services to an area with a radius of 50 km from flies. Each drone connected to another drone to enhance the skills. From the base station, radio signals are sent to the master Drone. Master drone communicates with other two slave drones, which happens through laser technology. The communication to the end user happens through laser technology.

This internet radio signals for speed 10Gbps over from ISP, these small masts and dishes are used installed to reach ground services to receive signals drones.

In addition, these signals which are converted into a Wi-Fi or LTE network. After this conversion, users access the internet from drones. When laser link drone of the plant, it may be, if it is raining or cloudy experienced a slower connection is required. Large drones capable of a strong signal will be issued, which would cover a large city with an average population density. Darren used harder and longer than the balloon, fly, but also precise control of position.

7. ADVANTAGES OF AQUILA

- No wastage of fuel or intention of spreading pollution in the environment because of using solar energy from sunlight, which is a renewable source of energy.
- Fast internet access due to laser beams.
- It is highly cheaper we don't need to spend more money.
- Internet speed will be fast as it uses laser beams.
- It will not spread any pollution in the environment as it is working by using solar energy.
- As it will be cheaper so most of the people can connect to internet, so people will be able to use the internet facilities, it will provide to rural areas.

8. DISADVANTAGES OF AQUILA

- The main concerns it has is if it get fall from the sky so there will be some serious damage.
- It needs maintenance but the concerns that it is miles away from the earth which is very hard to maintain.
- Similar project has also got carried back in 90's which didn't get successful so this is the main concerns that whether they will be able to made it this time.
- Many countries are avoiding it due to security reasons as this may lead to major concerns like spying which is information will get passed to enemies.

Table.1. Difference between Facebook Aquila and Project loon

Facebook Aquila	Project loon
1) Facebook drone is also known as Laser beaming drone or Aquila	1) Project Loon is also known as Balloon powered Internet
2) Facebook drone can cover more larger area as compared to Project loon	2) Project loon can cover less area as compared to Facebook drone.
3) Facebook drone can fly longer in the air than project loon before coming down for maintenance.	3) The Project loon can fly in air for more 3 months (100days).
4) Facebook drone planning to Deliver 4G services at speed of 10Gigabites per Second which is better than Project loon.	4) The Project loon consist of 2.4 and 5.8Ghz ISM band and can deliver speed as comparable to 3G. .
5)Facebook Drone are in still under the development process.	5) The Project loon has already start providing its services in New Zealand, Srilanka etc.
6)Facebook Aquila drone consist of carbon fibre solar-powered UAV and they are using Helium gas to set drone in the stratosphere.	6) Google loon project consist of balloon filled with has been filled up with Helium gas and also the balloons are fitted with solar panel and hardware for beaming internet.
7) Facebook drone uses infrared lasers for data connection speed of nearing to fiber optic cables.	7) Project Loon uses radio signals to connect balloons to large sized antennas mounted on tops of home ,business.etc.
8)The Facebook drone is slowly down if in case of equipment failure.	8)In Project Loon parachute is attached at the top of the envelope for landing safely if in case equipment failure.
9)floating 60000ft above the ground	9)65000 to 90000ft altitude range in the stratosphere

9. CONCLUSIONS

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 Facebook came up with its first full-scale drone . The idea for developing this technology called solar powered drone or Aquila with an aim to provide better internet access to remote and rural part of the world as compared to project loon. The main aim is to connect everybody to the world using cheaper cost of internet with high speed range The Facebook Drone is faster and more efficient and more reliable and provides high speed as compared to loon. The drones will be able to fly for longer periods of time as compared to balloons, also being able to have their location precisely controlled. Facebook drone will be able to provide internet

service with the larger area which will be more than project loon. By understanding the research mentioned in the paper, it can be concluded that facebook drone will be better and it will provide good solution for all the internet users with high speed access and more security features provided by it and also better alternative in terms of cost factor as it is cost effective. It has not been launched yet but when it will be launched soon in india as well as 21 countries. I hope facebook drone could be server more number of people and it will be easily connect to rural and remote areas people for connect to the whole world. It would be greater success of facebook drone in future.

10. REFFERENCE

[1]. Prof.Mrs.A.G.Andurkar, Miss Prachi Zodpe, "A Review Paper on Project Loons" , *International Journal of Advanced Research in Computer and Communication Engineering Vol. 5, Issue 3, March 2016*

[2]. Ankita Jiyani, "Review Paper on Facebook Drones Technique", *International Journal of Modern Computer Science (IJMCS) Volume 3, Issue 3, October, 2015*

[3]. Manjiree Sanjay Kuvalekar, "Comparative Study of Project Loon & Wi-Fi", *International Research Journal of Engineering and Technology (IRJET) Volume: 03 Issue: 06 | June-2016*

[4]. Aryan Kumar, Asha G H, "Aquila (The Solar Powered Drone)", *International Journal of Industrial Electronics and Electrical Engineering, Volume-4, Issue-10, Oct.-2016*

[5]. Rakesh M. Tiwari, "Study on Google's Loon Project", *International Journal of Advance Research in Computer Engineering & Technology (IJARCET) Volume 5, Isssue 5, May 2016*