CON Assginment 1

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1 Google LOON

1.1 Introduction

Google patented an awesome technique to control altitudes of balloons for its project LOON. Project loon is a global network of high -altitude balloons to connect people in rural and remote areas who have no internet access at all.

1.2 Working

This model can be thought of roads in air. Just like towers are connected with wires, in this project the balloons are connected through LTE connectivity. These balloons are near about 20 km from the ground and are sometimes even not visible with naked eyes. They use radio frequency for communication and the way of communicating is through stations in ground. The balloon use wind for their movement as they constantly have to move from one location to another, and that is the exact job of wind. By this balloons form a large network which helps the connection to be strong. There are high level algorithms which help to make the decision that where should the balloon go depending upon the needs. There are many different ways by which Google controls the height of these balloons. One such way is that, every balloon is made up two balloons. Each is filled with helium which helps the balloon to go up. Whenever the balloon wants to go down , the inner balloon consumes air due to which the weight of the system increases and thus a downward movement happens. Also as the winds blow in different directions at different heights, the upward and downward movement also helps the balloons to navigate horizontally. Another way is that, balloons use the light from the sun for their movement. As we know that black color absorbs sunlight, so the balloons are painted with different colors on both sides. After absorbing sunlight, the balloon gets warmer and rises upwards.

1.3 Future

Google expects project loon to rake 10 billion dollars every year. The company aims to tap the market of 4.5 billion people who have no access to Internet.

1.4 Problems

• Price Points: The main problem which Google has to overcome is the competition with the current service providers. As if LOON has to become the medium of communication, it has to be low-cost and should provide high speed of connection. So Google is working on ways on how to make the connection cheaper.
• Power Wattage: As the project is completely in air, the only source of energy is the sunlight. Balloons use 100 watt of energy for their working and soon there will be a barrier on this which will make the viability even more challenging.
• Subscriber Density: As the system is new for many and many people don't know about this project. Making people use this LOON system is difficult as a majority of people don't trust such new projects and are highly dependent upon the current sources. So if Google does not profit from the project, it cannot expand it any further.
• Operational Obstacles: As the balloons have to be controlled by algorithms, Google has to create efficient and highly accurate algorithms so that the working is smoother and better. Also they have to come up with a good strategy to defend against bad weather conditions and interference in the air.

2 SpaceX STARLINK

2.1 Introduction

Imagine you are in a forest in the middle of nowhere, there's no Wi-Fi, cell phone service or any way to communicate with the outside world. There's not much you can do about it until now. SpaceX has been launching Starlink satellites into orbit since 2019. Its Elon Musk's ambitious project to provide high speed internet anywhere even to the most remote locations in the world. The goal is to connect the planet by delivering Internet to places where its unreliable expensive or just not available.

2.2 Working

SpaceX is using its Falcon-9 rocket to launch about 60 satellites at a time. The satellites are stacked on top of each other and put in a capsule. The satellites are places at a relatively low altitude in space because the closer you are to the Earth,the lower the latency. Latency refers to how much time it takes for a signal to reach its destination. StarLink is targeting a latency of less than 20ms , that's faster than cable internet and comparable to fibre optic broadband.

2.3 Future

1000 satellites will be enough for basic service but SpaceX wants to get 12000 for these satellites into orbit. Why so many? Because the satellites are so

much closer to Earth , they cannot be stationary. They have to move faster to maintain their orbit and help the whole world.

2.4 Problems

• Light Pollution- Because of how much closer the satellites are, they are bright enough to see without a telescope.
• Safety- StartLink is control with a device whose size is near to an pizza box. The terminal will look like a round UFO with a stick. Its not so easy to use for those in country where internet is censored. The most famous example is The Great Wall of China.
• Threat- Countries like China can also destroy the satellites if they have a problem . Elon Musk himself said "If they get upset with us, they can blow all satellites."

References

Youtube and Google.