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Abstract

Stratellites (the concept involves words stratosphere and satellite) are high-altitude, unmanned airships designed to serve continuously for weeks, months, or even years if required.. Their main purpose is to hover over one geographical location and function as a transmitter as well as receiver for radio signals, for broadband, cellular devices, and digital television transmissions. The American company Sanswire along with its corporate allies have developed this idea. A stratellite would hover about 20 kilometers up, above the jet stream and most weather, and could service an area about 320 kilometers in diameter, or about 480,000 square kilometers. Lag times would be many times less than that for orbiting satellites carrying the same type of signals, but would cover a larger area than traditional transmission towers.

Index Terms: Satellite, Stratosphere, Radio Communication.

1. INTRODUCTION

In order to explore new possibilities to get advantage of both terrestrial and satellite propagation the concept of high altitude platforms (HAPs) was put forward.

Due to several reasons, the search for other possibilities have begun to effectively use the existing limited radio spectrum as well as to use the advantages of both terrestrial and satellite propagations and to avoid their drawbacks. Broadband communications by means of high altitude platforms (HAPs) allows such possibility.

HAPs, in its early phase of testing, was termed as UAV (Unmanned Air Vehicles) was Combination of Unmanned Air Vehicles and Balloons with radio communication payload, placed in Stratosphere and providing wireless communication between terrestrial places.

They can serve also as an intermediary between satellites and terrestrial transceiver stations, usually called as

Remote Sensing Stations.



Fig : Stratellite as High altitude Platforms (HAPs)

1.1 HAPs : New trend in Communication

HAPs are accepted globally as new alternative to highly expensive Satellite Technology. Now a days US, Europe, Japan and Korea are conducting new research on this technology to make it cheaper and more efficient.

Japan and America are operating HAPs on commercial basis

In the next parts of this article are listed the main technical aspects of HAPs,

there are also described physical layer, expected utilization, some world HAPs projects and related HAPs Trials

This technology is highly efficient for communication at large cellular coverage area.

1.2 Stratellite

Stratellite:-

Stratellites are actually unmanned Helium based Ballons. The thin-film photovoltaic cells are mounted on their surfaces electricity generation, which ignites propellers enabled with GPS technology to keep the stratellite positioned over one spot on the Earth's surface. A typical stratellite is assumed to bear payloads as much equal 4,000 pounds, and its advanced

versions are assumed to carry over 20,000 pounds of radars and other remote imaging equipment, navigational aids, and telecommunications relays. Stratellites are planned to remain on station for a year at a time and will cost a fifth as much as a comparable satellite

2. Services of Stratellite

At an altitude of 13 miles, each Stratellite will have clear line-of-site communications capability to an entire major metropolitan area as well as being able to provide coverage across major rural areas. "This technology may be revolutionary for those areas where broadband connectivity is not as possible because of the geographical and economical inability to reach by telephone or cable network." "Existing satellites provide uplinking and downlinking capabilities, but a 'two-way' high speed data communication is still a nightmare because of inability to practical implementation.. The Stratellite will allow subscribers an easy transmission and reception in 'both directions' using readily available wireless technology." This means that subscribers can send and receive information using the network, like the current broadband internet system but, without the wires, cables and cellular towers.

2.1 Applications of Stratellite

If a Stratellite network is set up, it will provide a broadband wireless network that will provide voice, video, and broadband internet access across the nation . By creating a network of Stratellites, it will be easy to serve a wireless broadband network across large area. With a Stratellite network, one can get internet at high speed. subscribers can have internet facility throughout the city . This would avoid the disturbances caused due to unavailability of network and slow speeds. Not only for internet ,the stratelite technology is also used for HDTV and other network based services.

2.2 Stratellite and telecommunication

Stratellites offer a wide services of telecommunications. Effectively, a Stratellite positioned over a major metropolitan area could act as a cellular tower thirteen miles high. A Stratellite, equipped with the appropriate transponders, could fulfill the wireless needs of that entire metropolitan area. Transponder access could be rented to broadband users such as Internet Service Providers (ISP's), cell phone companies, television networks, radio stations, various levels of government, and to corporations with large broadband requirements. These consumers could then provide access to end users, for residential Internet access, for example.

None of this type of business or wireless use is innovative, so Stratellite communication is covered by existing regulatory schemes and business models . In fact, Stratellites uses existing spectrum allocations, at least initially, and no expensive bandwidth acquisition is required. By increasing the utility and availability of the type of link that has, until now,

been restricted to satellites, firms can bring broadband links to new areas, provide for increased usage, and service larger markets without any fundamental change in operations.

3. Construction of Stratellite

Let us have a look on first ever made stratellite. It had length of 188 feet , width of 60 feet and height of 42 feet.

A new steering method was used in it in which there is hybrid electric system with large sized , slow turning propellers.

Because of that , it could make up and down as well as side to side movement just like airship helicopter. The outside layer is made up of special type of fabric called 'Spectra'. This spectra fabric was used by NASA in construction of bullet proof vests and diff components of space shuttle.

The arrangement of molecules in spectra is in such a way that it contains 10 times of fibre as compared to steel of equivalent weight also you can not tear it but it can be cut into pieces



The inner layer of stratellite comprises of Mylar, a class of polyester, thin film like structure. It forms envelope like structure from inside.

The inside layer of stratellite is filled with mixture of helium and air. When helium expands, it forces air outward and lifts the airship upward. The process continues until the helium expands completely inside the envelope.

The pressure inside the envelope is very low, hence even if a puncture is made, it would create a very

slow leak , and will take a lot of time to deflate totally.

4. Stratellite Challenges and business opportunities

Despite of their applications, stratellites are still in it's primary stage. This new age technology has some unresolved problematic issues. The presence of large number of stratellites could cause traffic problem in stratosphere.

So many critics questions that how a stratellite can be kept in stratosphere for long period of time. Some questions that ariel life can cause problem to stratellite and vice versa. Soon Stratellites will replace Satellites in terms of radio & television services and internet & cellular services , across the globe

5. CONCLUSION

Stratellite provides wireless facilities more efficiently than ordinary towers. They minimize the cost of communication. If the defects of stratellites are overcome , it will open a new segment in future edge wireless technologies and it will prove

itself as low cost , high capacity transceiver compared to satellite.

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