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SKYRIDER HAPS FOR INTEGRATED APPLICATIONS

Abstract

This is a follow-up to IAC2017” Astronomy observatory in Stratosphere” presentation and IAC2019 “HAPS Observatory in Stratosphere“ presentation. It will present the continuous effort and achievements of developing SkyRider HAPS that will find several use cases in integrated applications.

SkyRider is HAPS (High Altitude Pseudo Satellite), lighter-than-air platform flying at an altitude of approximately 20km for weeks to months. SkyRider can fly missions up to 6 months with payloads up to 10kg and with 5 kW energy budget dedicated for payload power consumption. It can keep geostationary position in stratosphere in winds up to 15m/s. Project was created with purpose to develop and commercialize unique long time position keeping HAPS for Telecommunication, Navigation, Earth Observation, Natural disasters and Space Astronomy for academia and government.

Telecommunication: Extending mobile signal (2G to 5G) coverage over areas without ground equipment or to increase temporary/permanent data throughput. Furthermore, the platforms are capable of station keeping and can provide information about their mutual positions in real time. This capability can be combined with optical data links to make a low-latency data link.

Navigation: The precision and reliability of GNSS positioning is proportional to the number of satellites which are in direct sight of the receiver, while any reflections are detrimental to the precision. In urban canyons (cities with high buildings), a constellation of several HAPS augmenting the GNSS signal could significantly increase the reliability and precision.

Earth observation: Two main ways of Earth observation which are used today are satellites and aircraft observation. The satellites operate mainly from LEO. Placing the sensing camera to significantly lower altitude at 20km can dramatically increase the resolution of obtained image.

Natural disasters: The previously mentioned earth observation and telecommunication capabilities can be used for managing natural disasters - both quick restoring of telecommunication infrastructure and real-time monitoring if the platform will be deployed above the afflicted area.

Space astronomy: There is unused potential that stratosphere provide us for exploring our universe because atmosphere block out most of infra-red wavelength. The advantage of stratosphere observation is that space sky can be observed without most of IR wavelength being blocked out.

SkyRider can radically change the way aerospace looks. Thanks to huge improvements in high-performance materials, electronics, accumulators, and solar-energy systems all the applications mentioned above can benefit from HAPS platform that will enable implementation of technology to stratosphere that all of us can use in our everyday lives.