

Stratosyst s.r.o. - Skyrider

Peter Lobner, 11 February 2022

1. Introduction

Stratosyst s.r.o. is developing a low-cost, reusable High-Altitude Pseudo-Satellite (HAPS) stratospheric platform that is capable of flying at an altitude of about 20 km (65,600 ft) with a modest payload for weeks or months at a time. The company's website is here:

<http://www.stratosyst.com>



The Stratosyst Skyrider. Source: HAP Alliance

Jiří Pavlík, Stratosyst CEO, describes the firm as follows, “Stratosyst is a Czech company based in Prague that was founded (in May 2019) with one single purpose – to make long-term sustainable stratospheric flight a reality. The original idea was to develop HAPS as an astronomic observatory, and the whole concept was presented this way at the International Astronautical Congress in Adelaide in 2017 and in Washington in 2019. We also won a Space Oscar in the Galileo Masters in 2018. However, as our platform, Skyrider, is unique in its universality, we decided to focus more on market demand. Today our main priorities are earth observation and

telecommunication, and the platform can be easily used for GNSS (global navigation satellite system) augmentation or meteorology as well.”

2. The Skyrider stratospheric platform

Stratosyst plans to build a sub-scale, low-altitude flight demonstrator. This is expected to be a toroidal (donut-shaped) vehicle about six meters (19.7 ft) in diameter and designed to operate at an altitude of 3 km (9,842 ft). Key goals are to demonstrate precise navigation and station-keeping capabilities as well as various value-adding mission capabilities that can be executed at low altitude, such as:

- Emergency communication relays
- Emergency airborne search
- Persistent surveillance of large areas
- Long-term airborne meteorology measurements
- Element of the smart city infrastructure and the Internet of Things (IoT)



*Visualization of the scale of a Skyrider demonstrator.
Source: Stratosyst (2020)*

The operational Skyrider will be a modest-sized stratospheric platform with the following general capabilities.

- Payload up to 10 kg (22 lb), requiring up to 5 kW of continuous power
- Station keeping in winds up to 10 m/s (36 kph / 22 mph) & air stream cruising
- Mission duration – up to six months
- Solar-electric hybrid power system enables operation with zero CO₂ emissions
- Recoverable at the end of a mission and reusable



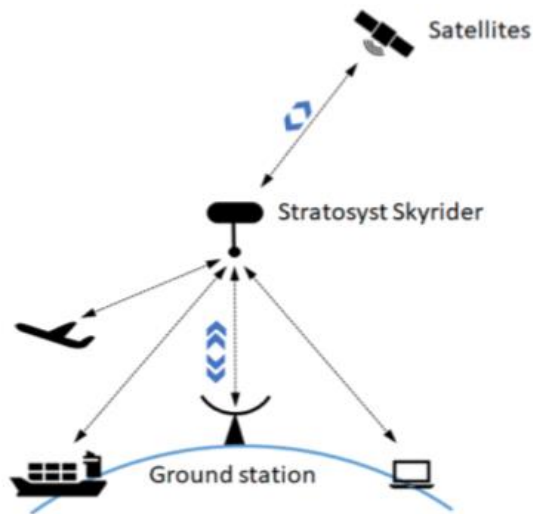
Source: Stratosyst (2021)

Stratosyst provides an overview of their intended stratospheric services here: http://www.stratosyst.com/2021_presentation.pdf

- Earth observation
- Natural disaster surveillance / assessment / emergency communications relay
- GNSS augmentation
- Astronomy & research
- Telecommunications services, such as internet and 5G, including service to currently underserved areas. Basic system telcom architecture is shown in the following diagram.



Overhead view of Skyrider in a somewhat different configuration, showing solar panels. Source: Stratosyst (2020)



Stratosyst Skyrider basic telecom architecture. Source: Stratosyst

The small size of the Skyrider is adaptable for compact packaging. The firm is promoting the Skyrider for packaging on a future interplanetary spacecraft and deployment for exploration missions in the low-density atmosphere of Mars.

3. For more information

- “Stratosyst – HAPS Services From Stratosphere,” Stratosyst public presentation: http://www.czechspaceyear.com/wp-content/uploads/2019/07/8-CUF-2019_DAY2_04_Stratosyst_Jiř%C3%AD-Pavl%C3%ADk_HAPS-Services-from-Stratosphere.pdf
- Galileo Masters, “Stratosyst – a static observatory in the stratosphere,” <https://galileo-masters.eu/winner/stratosyst-a-static-observatory-in-the-stratosphere/>
- “Stratosyst – Long term Presence in the Stratosphere,” AZO Space of Innovation, 29 October 2019: <https://space-of-innovation.com/stratospheric/>
- Anna Koucká, “Vesmírní nadšenci sestavují dron za miliony” (in Czech), “Space enthusiasts assemble a drone for millions,” iNDES.cz / ZPRAVODAJSTVÍ, 12 July 2020: https://www.idnes.cz/ekonomika/podniky/kosmicke-cesko-czechinvest-esa-bic-vesmir-stratosyst.A200709_111029_ekoakcie_kou?galerie

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