ZEPHYR
THE FUTURE IS STRATOSPHERIC
AALTO will deliver a stratospheric future for all

Our vision is to reimagine connectivity, to create a new frontier for communications and earth observation solutions, and to define a stratospheric and green future, starting today.
Recent technological breakthroughs in other industries, such as Electric Vehicles, have had an accelerating effect on HAPS making it now technically and commercially viable for the first time.
Our Zephyr HAPS Platform

- **200 day Endurance target** (aiming for more)
- **> 60,000ft** operating above
- **75kg weight**
- **25m wingspan**

Zephyr has unbeaten stratospheric credentials that enable it to connect new customers and their data generating new value for all in its ecosystem.

**Designed to Stay in the Stratosphere**

- **100% Solar power** means Zephyr is environmentally sustainable.
- **64 Continuous days and nights** of precise operations demonstrated in the stratosphere, during our 2022 flight campaign.
- **No. 1 Multiple world records** Including the longest ever unrefueled flight in the history of the Humankind.
- **20+ Years and more** of research, design, prototyping and flying development activities.
Zephyr Has Unique Economic and Technical Characteristics in a Multi-Orbit Environment

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**Coverage**

- **GEO satellite**
  - Continental stationary coverage
- **LEO satellite**
  - Wide coverage
- **HAPS**
  - Wide reach, stationary, persistent, and real-time
- **Terrestrial networks**
  - Local coverage: infrastructure heavy

**Connectivity**

- **GEO satellite**
  - Proprietary sat tech to sat terminal
- **LEO satellite**
  - Proprietary sat tech to sat terminal LEO I2D misaligned I2C approach
- **HAPS**
  - 5G D2D, B2B seamless integration into MNO network
- **Terrestrial networks**
  - 5G Direct-to-device

**Latency (milliseconds)**

- **GEO satellite**
  - 50+ ms
- **LEO satellite**
  - 5 - 10 ms
- **HAPS**
  - 0 - 5 ms
- **Terrestrial networks**
  - 0 - 5 ms

**Coverage cost**

- **GEO satellite**
  - $$$
- **LEO satellite**
  - $$$
- **HAPS**
  - $ - $$
- **Terrestrial networks**
  - $ - $$

**Earth Observation**

- **GEO satellite**
  - N/A
- **LEO satellite**
  - N/A
- **HAPS**
  - Trade-off between high-resolution or revisit rates
- **Terrestrial networks**
  - N/A

**Trade-off**

- Requires inefficient constellation

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Unique Characteristics Deliver Compelling Use Cases and Diverse Revenues

1. **Connectivity**
   - Bridging the digital divide for the 3.9 billion unconnected and the hundreds of millions underserved, with 4G/5G low-latency direct-to-device services, and IoT and platform mobility solutions

2. **Earth Observation**
   - Persistent, 24/7, high-resolution (up to 18cm GSD) images and high-quality video solutions for detection and management of forest fires, precision agriculture, increasing crop yield and food security, amongst many other applications

3. **Government**
   - Multiple payload possibilities, to support military, federal, regional, and civil government institutions, deliver national defense, border protection, coast guard, law enforcement, and disaster management applications
Zephyr’s reach is equivalent to that of up to 250 ground towers.

A Zephyr is price competitive in any region that requires more than 40 towers to cover or where the population density is below 1.5m.

- **Flat terrain:** cost range $30-100K+
  - 80 towers
  - Mixed (flat and mountainous) terrain: cost range $30-130K+
  - 150 towers
  - Mountains / difficult terrain: cost range $50-$150K+
  - 250 towers
Regulatory Issues

- Departing point: The international rules for use of HAPS/HIBS have already been established (WRC23). The rules for satellite Direct-to-Device (D2D) to be discussed under WRC-27 Agenda item 1.13.

- **Harmonized Licensing Frameworks.** Flexible and streamlined approach to HAPS, including use of self-coordinated light licensing to enable efficient coexistence between incumbent ground-based fixed service and HAPS.

- **Fees.** HIBS will be part of the MNOs networks, so no additional fee should be required - MNOs have already paid the license fee for the ground base station.

- **Use of Mobile Service licenses.** Allowing MNOs to use their service licenses to provide services via HIBS, which will facilitate the rapid deployment of IMT systems into rural and remote areas that currently lack connectivity.

- **Streamlined Customs and Type Approvals.** Adoption of import pre-approvals and streamlined customs clearance, especially for equipment that may be used for disaster communications. Accept Supplier’s Declaration of Conformity (SDOC) to clear TA requirements.

- **Flexible Service Definitions to Support Innovation.** Regulators should take a flexible view toward HAPS definitions and mobile network regulations to cover stratospheric operations.