

# Cambridge Consultants building the world's largest commercial airborne antenna

## Breakthrough for Stratospheric Platforms Limited will beam 5G connectivity from the stratosphere

**November 02, 2020** - Cambridge Consultants, part of Capgemini, today announces a stratospheric breakthrough, revealing its role in a visionary program to realize the dream of superfast 5G for everyone and everything across the globe. Working in collaboration with Stratospheric Platforms Limited (SPL), Cambridge Consultants' remarkable technical achievement is a wireless antenna unlike anything seen before, delivering affordable connectivity from a fleet of zero emissions aircraft, airborne at an altitude of 20,000 meters for more than a week. Operating at a fraction of the cost of building and maintaining terrestrial infrastructure, and with minimal environmental impact due to its zero-emission hydrogen power system, such a fleet could rewrite the economics of mobile broadband.

With the proof of concept now complete, the ultimate antenna is set to be powerful, huge, and yet lightweight. At three meters square and weighing just 120kg, it will take flight to become what's expected to be the world's largest commercial airborne communications antenna.

The proof of concept antenna is the culmination of a four-year project with UK-based start-up SPL. Also headquartered in Cambridge, UK, SPL is developing a High-Altitude Platform (HAP) and communication system operating in the stratosphere to bring affordable, fast connectivity to every corner of the world. A single HAP will provide coverage over an area of up to 140 kilometres in diameter, equivalent to deploying hundreds of today's terrestrial masts. A fleet of around 60 HAPs could blanket the whole of the United Kingdom with connectivity, providing even geographic coverage of peak 5G speeds in excess of 100 Gbps in aggregate. With radically cheaper costs, this new platform has the potential to connect the unconnected in the developing world, to fill gaps in coverage across the developed world and to ensure rural areas aren't left behind anywhere across the globe. In addition, the hydrogen power system creates a long endurance, low environmental impact aircraft, with low noise, zero CO<sub>2</sub> and zero NO<sub>x</sub> emissions.

As first announced on October 19 2020, SPL completed its first successful test trial during September 2020<sup>1</sup>. Rollout of the first commercial service is anticipated to begin in Germany during 2024.

### **A feat of engineering**

Cambridge Consultants has one of the world's largest independent wireless development teams and this antenna is amongst their crowning achievements. Sitting at one eighth of the intended full size, the proof of concept is a feat of engineering. It has overcome the key technical challenges within simulated flight conditions and proven its modular design can scale seamlessly. Advanced calibration across the four tiles of the prototype deliver beams with astonishing accuracy, maintaining laser-like performance during flight motion and paving the way for the huge 32-tile commercial array to now be developed.

Each antenna produces 480 individual, steerable beams, creating patterns that can be 'painted' onto the ground to cover specific areas such as roads, railway lines or shipping lanes. The ability to produce hundreds of beams enables the antenna to reuse spectrum ensuring fast and even coverage across the entire covered area. A unique, wholly digital beamforming capability gives massive flexibility in how services are deployed, allowing in-flight reconfiguration to deliver services beyond the reach of conventional fixed terrestrial networks. This includes following mobile users, including trains and autonomous vehicles, and providing coverage exactly where required, for example ending at national borders.

Commenting on his company's collaboration with Cambridge Consultants, SPL Chief Executive Officer Richard Deakin said: "This unique antenna is at the heart of SPL's stratospheric communications system. It was essential that we overcame significant technical challenges in the design of the antenna to enable us to deliver massive data rates in a unique environment where power was limited, where weight was critical and where cooling in the thin, stratospheric air was difficult. The development and testing of the antenna has met or exceeded the design criteria and working with such a talented team at Cambridge Consultants has been one of the highlights of the program to date. We look forward to continuing the journey as we progress to the production-standard antenna."

Tim Fowler, Chief Sales Officer at Cambridge Consultants, added: "Four years ago SPL approached Cambridge Consultants with an ambitious vision: to revolutionize the telecoms experience by beaming connectivity from the sky. Our role, to design and build this 'mega cell tower in the stratosphere', has seen us make breakthrough after breakthrough and we're excited to build on these innovations with SPL, on the path to commercial deployment."

Cambridge Consultants became part of the Capgemini Group [in April 2020](#). Capgemini recently announced its first set of [Intelligent Industry](#) offerings that leverage the Group's pioneering capabilities in data, digital and industrial technologies. Focused on 5G and Edge, the new services will enable

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<sup>1</sup> <https://www.stratosphericplatforms.com/news/announcements/>

Communications Service Providers, Network Equipment Providers and Enterprises across industries to implement [5G and Edge technologies](#) at scale.

### Notes for editors

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