

Zephyr conquers the stratosphere: the Airbus solar drone powered by Amprius silicon batteries

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The solar drone **Zephyr**, the flagship of Airbus subsidiary **AALTO**, has recently written a new chapter in the history of high-altitude flight. Thanks to the adoption of innovative **SiCore silicon batteries**, produced by California-based **Amprius**, the aircraft completed a test mission in the stratosphere, exceeding **20,000 meters in altitude**. This achievement is not only a demonstration of mechanical and aerodynamic endurance but above all proof that the energy autonomy of a HAPS (High Altitude Pseudo Satellite) system can reach previously unthinkable levels.

The tests confirmed the drone's ability to fly **for multiple consecutive nights**, maintaining operability even in the absence of sunlight. This is made possible by the combination of energy accumulated during the day and the efficiency of the new batteries, capable of storing and releasing energy optimally. The **CTO of AALTO, Pierre-Antoine Aubourg**, emphasized that

“the platform flew in the stratosphere, night after night, for months: an unprecedented achievement in persistent flight.”

The altitude reached by Zephyr opens up concrete prospects for unprecedented surveillance and monitoring missions: operating above conventional air traffic and the most unstable weather conditions means ensuring service continuity and drastically reducing operational risks.

The revolution of silicon batteries

The true heart of the innovation lies in the **SiCore cells** developed by Amprius. Their peculiarity is the use of **silicon anodes** instead of graphite, a solution that brings energy density to **450 Wh/kg**. In practical terms, this means up to **80% more energy** compared to traditional lithium-ion cells. This feature not only extends the mission duration of drones but also opens possibilities for other applications, such as electric vehicles or advanced stationary storage systems.

During HAPS flights, the solar energy collected during the day powers the drone and recharges the batteries; at night, all operations depend solely on the accumulators. To keep an aircraft aloft for **12 nighttime hours in the stratosphere**, the batteries must be lightweight, high-capacity, and above all reliable. The SiCore fully meet these requirements, demonstrating that the stored energy is sufficient to ensure continuous flight for **weeks or months** without returning to the ground.



Kang Sun, CEO of Amprius, described the delivery of the first batches as “a new milestone in the company's commercial expansion strategy.” The pilot line in **Fremont, California**, is now

ready to ramp up production to meet the demand for high-performance drones and advanced aerospace applications.

This technology is modular: the same cells can be integrated into very different platforms, from long-range solar drones to smaller, more agile aircraft capable of operating in complex operational contexts, such as humanitarian emergencies, search and rescue, or military reconnaissance missions.

Towards the era of “Stratospace”

Airbus AALTO defines the new operational scenario with an evocative term: **“Stratospace”**. It is a frontier zone between traditional aviation and orbital space, an environment where solar drones like Zephyr can remain in service for extended periods, carrying out missions that combine **lightness, autonomy, and operational persistence**.

In terms of surveillance, a HAPS can temporarily replace satellites for earth observation, telecommunications, or environmental monitoring operations. Its operational altitude allows it to cover vast areas at lower costs compared to launching a satellite and with the possibility of direct recovery and maintenance. Moreover, the absence of a crew eliminates human risks and allows prolonged maneuvers even in remote or potentially dangerous scenarios.

The integration of HAPS drones into global telecommunications networks could offer **internet connections in isolated areas**, improve emergency coverage after natural disasters, or ensure secure links in conflict zones. In the scientific field, stratospheric aircraft could monitor real-time climatic phenomena, fires, air pollution, or geological changes, contributing to the collection of valuable data for research and prevention.



The success of the Zephyr test with silicon batteries is therefore not just a technical result, but a clear signal: the combination of **solar energy and advanced storage** is mature enough to support a new era of unconventional aviation. The path towards autonomous flights lasting months, with lightweight platforms, minimal environmental impact, and high strategic utility, is now closer than ever.

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