

China's *Yuanmeng* (Dream) stratospheric airship

Peter Lobner, 3 April 2021

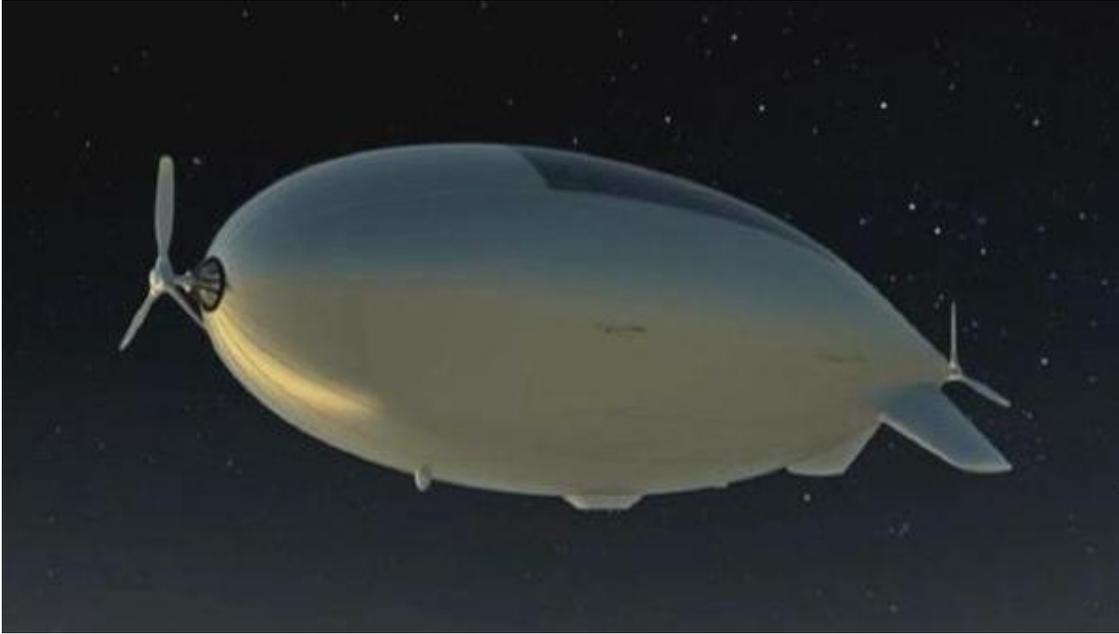
The Chinese Academy of Sciences development plan for the 13th Five-Year Plan period (2016-2020) listed 140 research and development priorities, among which were tasks to develop key technologies and techniques for controllable stratospheric airships and conduct flight tests before the end of 2020. To meet these goals, the stratospheric airship *Yuanmeng* (Dream) was jointly developed by Beijing Aerospace Technology Company and Beijing University of Astronautics and Aeronautics (BeiHang). High strength materials for the airship were developed by Beijing University.

The airship's missions include:

- Wide-band communication, including serving as a military communications platform in the event of a loss in satellite communications.
- High-definition observation, including environmental monitoring and detection of military threats such as stealth aircraft, cruise missiles, and warships from several hundred miles away.
- Space imaging, including stereo imagery of objects in orbit.

Basic characteristics of this airship are listed below:

- Length: 75 m (246 ft)
- Diameter: 22 m (72 ft)
- Volume: 18,000 cubic meters (635,664 cubic feet)
- Operating altitude: 20 km (12.4 miles, 65,600 ft)
- Payload (mission equipment): 300 kg (660 pounds)
- Power source: Photovoltaic cells on the hull for power during the day and battery or fuel cell for power at night
- Propulsion: 2 x large diameter electric motor driven propellers mounted on the nose and tail of the airship and 4 x small maneuvering propulsors along the flanks for the airship
- Mission duration: 6 months



General configuration of China's Yuanmeng (Dream) solar-powered stratospheric airship. Source: CNTV, China



General configuration of a similar US concept for a solar-powered stratospheric airship, circa 2000. Source: DARPA

On 13 October 13, 2015, the *Yuanmeng* made its first test flight from Xilinhot, Inner Mongolia, flying for 22 hours and reaching a peak altitude of 65,000 ft (19.8 km, 12.3 miles). I haven't seen any report on subsequent flights.



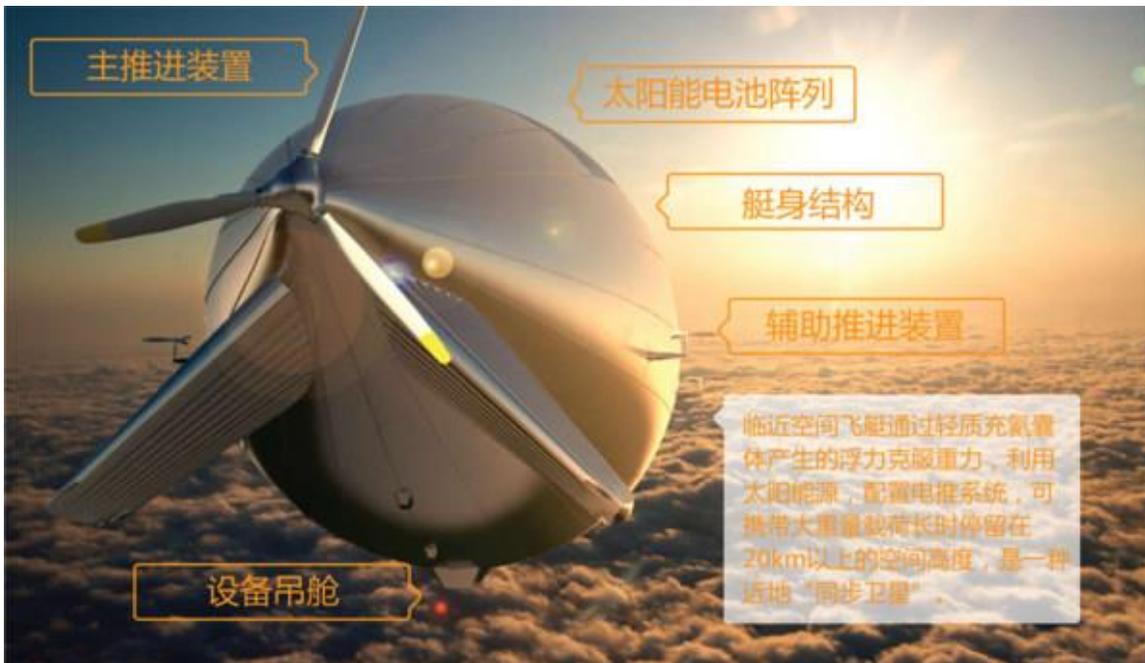
Artist's rendition, Yuanmeng in hanger. Source: CEN



Artist's rendition, Yuanmeng. Source: CEN



*Artist's rendition, Yuanmeng in flight.
Source: CEN*



*Artist's rendition, Yuanmeng in flight.
Source: China Defense Forum*



Solar panels ready to be attached to Yuanmeng once it is fully inflated. Source: NNTV

The *Yuanmeng* program may be the start of China developing a wider portfolio of large airships. China Aviation Industry General Aircraft Co. Ltd. (CAIGA), a subsidiary of China Aviation Industry Group, has partnered with French firm Flying Whales to build heavy airships, with a 60-ton payload cargo airship reported to be their first aircraft.

For more information

- Jeffrey Lin and P.W. Singer, “China Tests Its Largest Airship - Yuanmeng flies at 20km,” *Popular Science*, 16 October 2015: <https://www.popsci.com/china-tests-its-largest-airship/>
- Gabriel Samuels, “Has China created the satellite of the future? Test of nation's first near-space aircraft is a success after solar-powered blimp floats at 65,000 feet for 22 hours,” *Daily Mail*, 8 December 2015: <https://www.dailymail.co.uk/news/peoplesdaily/article-3351193/China-s-near-space-aircraft-test-success-solar-powered-blimp-floats-65-000-feet-22-hours.html>