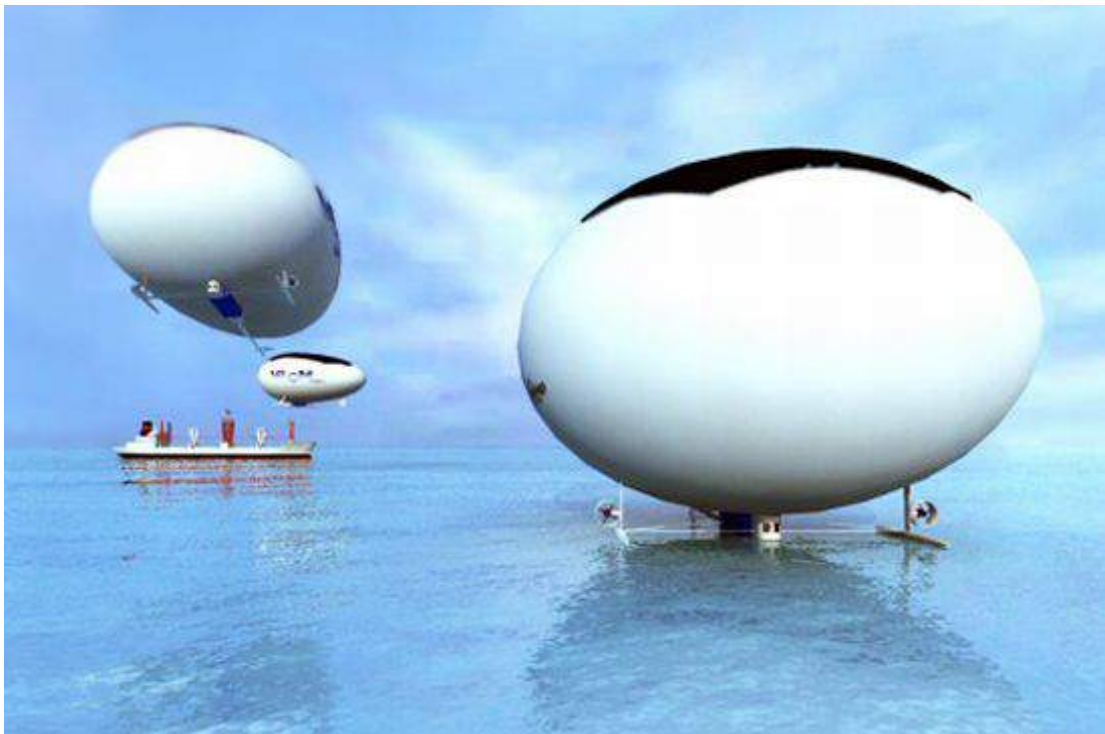


SolarAirShip / Helios Airships - High-Speed Solar Airship (HSSA)

Peter Lobner, updated 19 June 2023

1. Introduction

The High Speed Solar Airship (HSSA), also known as the model C60, was a 2010 concept by the firm SolarAirShip, later renamed Helios Airships (<https://www.facebook.com/HeliosAirships/>), for a cost-effective means to haul cargo in an airship using off-the-shelf components and a large solar array on the hull to generate electric power for propulsion and airship systems. High-speed flight was possible by operating the airship at high altitude (9,144 meters / 30,000 feet), where thinner air enabled higher airspeed and the jet stream could boost speed on west-to-east routes to about 293 kph (182 mph) during the day and about 266 kph (165 mph) at night when propulsion power was reduced. At its high operating altitude, the HSSA would be flying above most of the bad weather, minimizing enroute shipment delays. In 2010, Helios planned to produce the C60 within the next two years.



HSSA (C60) airship. Source: Inhabit (2010)

2. HSSA (C60) design

The semi-rigid HSSA airship had a length of 97.5 m (320 feet) with a helium gas envelope volume of 56,633 m³ (2,000,000 ft³). Helios claimed the airship was designed to carry 54.4 metric tons (60 tons) of cargo, with load exchange being accomplished with water ballast.

The HSSA was electrically-powered by 2,230 m² (24,000 ft²) of thin-film solar cells in an integrated array on the top of the gas envelope, generating 62.7 kW at sea level. At an altitude of 9,144 m (30,000 ft), the solar cells were expected to generate about 30% more power (about 81.5 kW) due to the greater intensity of sunlight and colder temperatures at higher altitudes.



A production HSSA was estimated to cost \$5 million in 2010. No full-scale prototype was developed.

*HSSA (C60) bow quarter view.
Source: Inhabit (2010)*

Based on large hybrid cargo airship scaling work done during DARPA's Project Walrus (2003 – 2006), a 56,633 m³ (2,000,000 ft³) gas envelope could reasonably be expected to carry about one-half of the cargo load projected for the HSSA and operate at a much lower altitude (i.e., 2,745 m / 9,000 feet for ATG's SkyCat hybrid cargo airship).

The current FAI Class B (airships) absolute world altitude record was set in 2006 and stands at 8,180 meters (26,837 ft). In comparison, the 9,144 meter (30,000 feet) operating altitude with a full cargo load proposed for the C60 seems unrealistic



*HSSAs (C60s) flying over scenic destinations.
Source, both graphics: <https://www.facebook.com/HeliosAirships/>*



HSSA at high altitude.

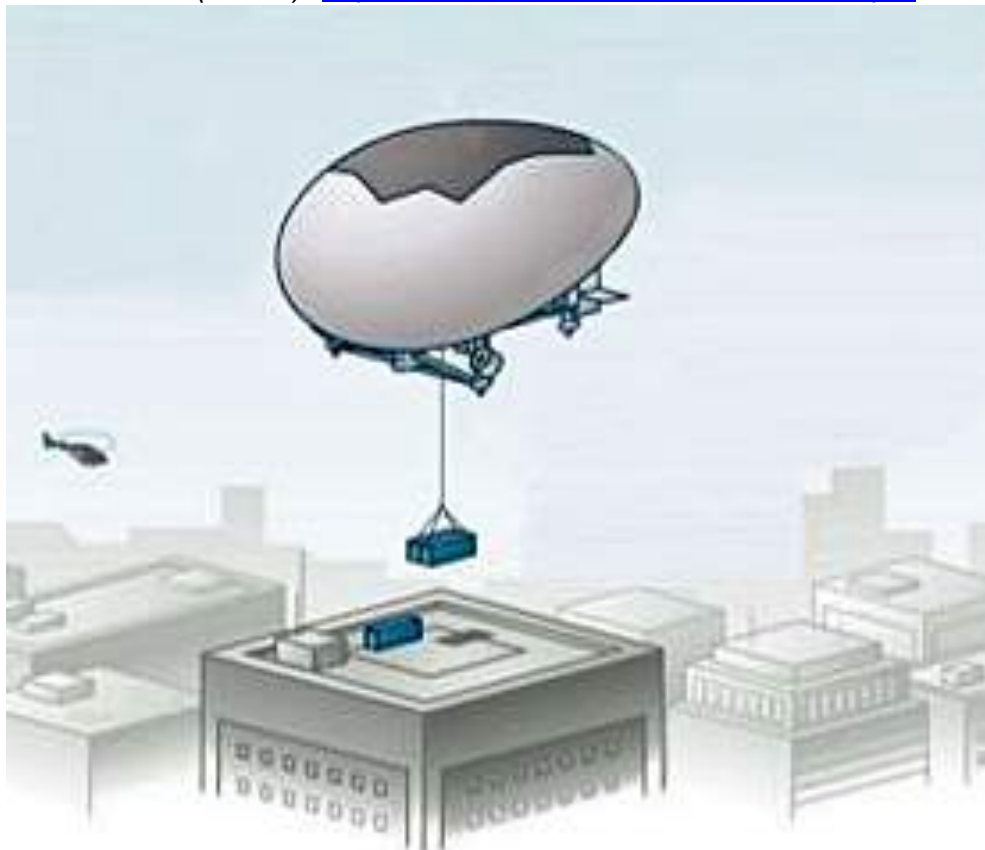


HSSA after a water landing with large cargo container.

Source, both graphics: <https://www.facebook.com/HeliosAirships/>



*HSSA (C60) making a point-to-point delivery to a roof-top.
Source (above): <https://www.facebook.com/HeliosAirships/>*



Source : Innovate – Age of the Airship

3. Subscale concept demonstrator

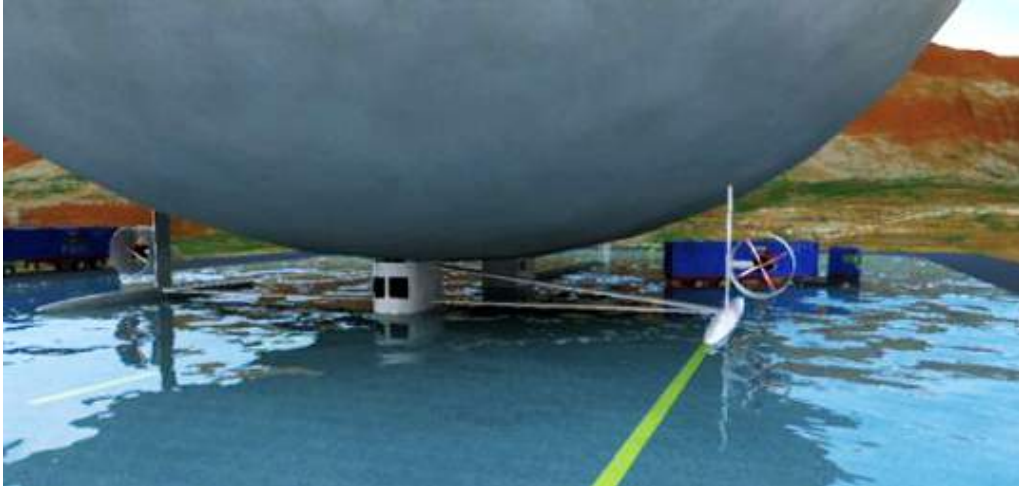
SolarAirShip did limited flight testing with a 1:20 scale HSSA model.



1:20 HSSA model in flight. Source, both photos: Inhabit (2010)



*1:20 HSSA model carrying a scale model cargo container.
Source, both photos: Inhabit (2010)*



1:20 scale HSSA demonstrating a water landing. Source: Inhabit (2010)

4. For more information

- Yuka Yoneda, “Solar-Powered Airship Could Offer Emissions-Free Cargo Hauling,” Inhabit, 13 April 2010: <https://inhabitat.com/solar-powered-airship-could-offer-emissions-free-cargo-hauling/solarairship-ed07>
- “High Flying Demand of Bust,” Air Cargo World, pp. 34 – 39, July 2011: <https://aircargoworld.com/wp-content/uploads/2016/03/AirCargoWorld2011-07.pdf>
- “High Speed Solar Airship HSSA,” Naval Airship Association, Noon Balloon, #93, p. 24, Spring 2012: https://650a8e8c-0be3-466b-9728-1ece39a725e3.filesusr.com/ugd/fbd712_8cb63fdac49947709daed3bf979c1ea2.pdf

Other Modern Airships articles

- *Modern Airships - Part 1*: <https://lynceans.org/all-posts/modern-airships-part-1/>
- *Modern Airships - Part 2*: <https://lynceans.org/all-posts/modern-airships-part-2/>
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