

Hybrid Air Vehicles (HAV) - Airlander 10 prototype

Peter Lobner, updated 12 February 2022

1. Introduction

Hybrid Air Vehicles (HAV) was formed in the UK in 2007 after a series of business failures by its predecessor firms, Advanced Technologies Group (ATG) and SkyCat Group Ltd. In the process, HAV acquired the rights to ATG's hybrid airship and blimp technologies dating back to about 1999. The HAV website is here: <https://www.hybridairvehicles.com/about-us>

HAV's Facebook page here:

<https://www.facebook.com/pg/HybridAirVehicles/posts/>

The Airlander 10 prototype airship is the commercial reincarnation of the HAV-304 LEMV airship with minor modifications to improve its performance, including larger upper fins with leading edge extensions and shorter side strakes.



A model of the Airlander 10. Source: The Verge, 8 July 2014

2. The Airlander 10 prototype

After removal of all military equipment and systems, HAV was able to purchase the HAV-304 airship as scrap at a price of \$301,000, gain an export license and ship it to the UK. In early 2015, HAV re-inflated a gas envelope with pressurized air inside a Hangar at Cardington.



Front quarter view of the former HAV-304 inflated with air in Hangar 1 at Cardington.



*One of the flank-mounted diesel-powered vectoring thrusters.
Source, both photos: The Verge, 8 July 2014*



Left: The cockpit is at the front of the elongated payload module suspended under the centerline of the gas envelope.

Right: The pilot and copilot stations.

Source: The Verge, 8 July 2018



Close-up view of the assembled Airlander 10 prototype in 2016 showing a flank-mounted vectored-thrust propulsor and one of the landing skids. Source: Philbobagshot / Wikipedia



Stern quarter view of the Airlander 10 prototype sitting on its inflated skids in Hangar 1 at Cardington. Source: The Airship Heritage Trust



Bow-on view of the Airlander 10 prototype sitting on its inflated skids in Hangar 1 at Cardington with the rigid mission module being attached to the aeroshell. Source: Philbobagshot / Wikipedia

General design characteristics of the Airlander 10 prototype

Parameter	Airlander 10 Prototype
Type	Semi-rigid, hybrid
Length	302 feet (92 m)
Width	143 feet (43.5 m) at its tail fin tips
Height	85 ft (26 m)
Gas envelope volume	1,342,000 ft ³ (38,000 m ³)
Gross weight	44,100 lb (20,000 kg)
Payload	3 metric tons (3,000 kg, 6,612 lb) payload to an altitude of 10 - 14,000 feet (3,048 – 4,267 m)
Powerplant	4 x 4-liter V8 turbocharged diesel engines @ 325 hp (242 kW) each
Maximum speed	80 kts (148 kph)
Maximum altitude	16,000 feet (4,880 m)
Maximum mission duration	Five days

3. Airlander 10 prototype flight tests (2016 – 2017)

The Airlander 10 prototype made its first two flights on 25 August 2016 from Cardington Airfield. The first flight went well.



Profile view of the Airlander 10 prototype sitting on its inflated skids before first flight. Source: The Airship Heritage Trust



Close-up of the cockpit and one flank propulsor.



*Close-up of one stern propulsor.
Source, both photos: The Airship Heritage Trust*



Airlander 10 prototype first flight, 17 August 2016.
Source: <https://www.ainonline.com/aviation-news/>



Airlander 10 prototype first flight.
Source: CNNMoney.

The second flight on 25 August 2016 ended with an inauspicious soft crash landing with some damage to the airship and cockpit, but no injuries to the crew.



*Airlander 10 prototype soft crash landing after second flight.
Source: Sky News*

The Royal Aeronautical Society's report on the first half of the Airlander 10 testing program indicated that the all-weather capability of the Airlander 10, including anti-icing, would be tested in the second half of the test program. The report suggested that the commercial Airlander 10 may have a more powerful thrust vectoring system that will enable a (limited) VTOL capability. You'll find this report, "*Expanding the Envelope*," at the following link:

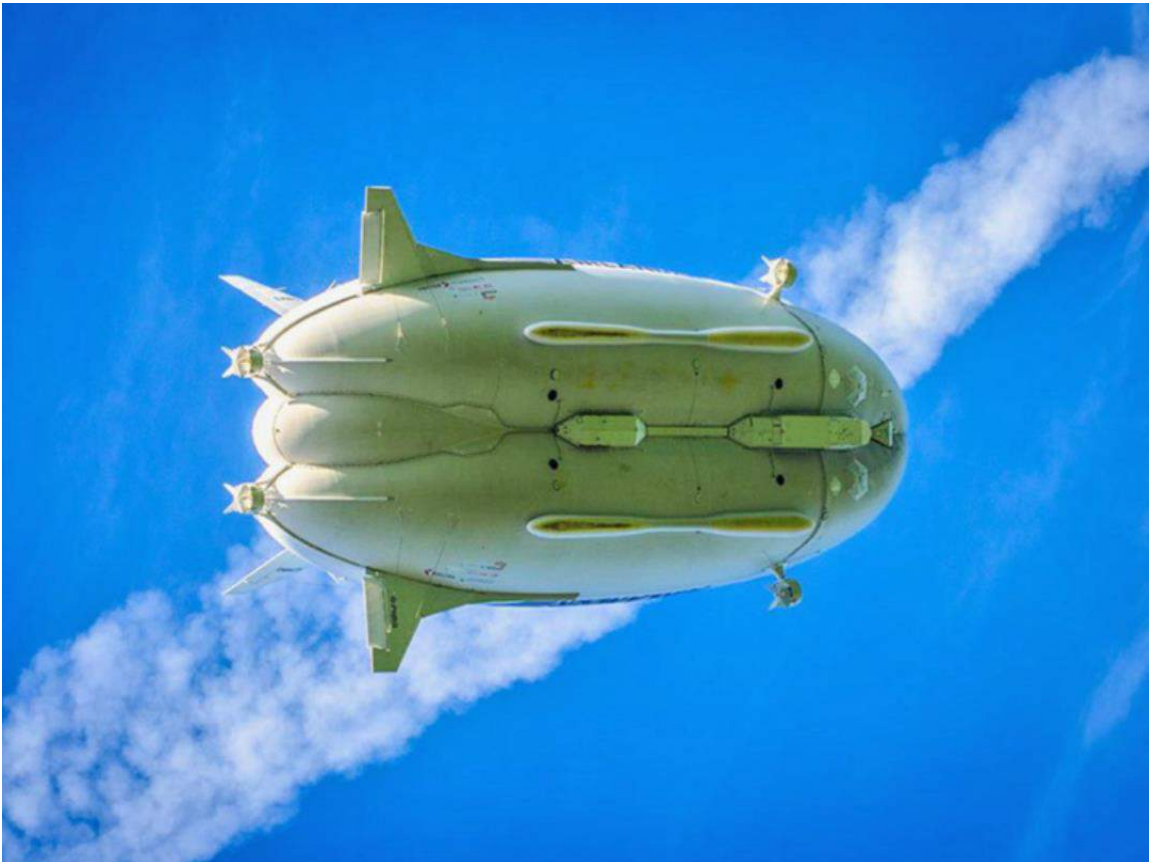
<https://www.aerosociety.com/news/expanding-the-envelope/>

HAV carried out six successful test flights between 17 August 2016 and 17 November 2017. You'll find a summary of these flights on The Airship Heritage Trust website here:

<https://www.airshipsonline.com/airships/HAV%20Airlander/index.html>



*Airlander 10 prototype over the Hangars at Cardington Airfield.
Source: HAV*



*Airlander 10 prototype viewed from below.
Source: Naval Airship Association Noon Balloon, Summer 2017*



*Bow-on view of the Airlander 10 prototype in flight.
Source: Philbobagshot via Wikipedia (7Aug2012)*



Stern view of the Airlander 10. Source: Wired UK (18Aug2016)

On 18 November 2017, the Airlander 10 prototype broke free from its mooring at Cardington Airfield, triggering a safety feature that deflated the gas envelope. The airship envelope had significant damage. The Airlander 10 prototype did not fly again.



*The deflated Airlander 10 prototype at Cardington Airfield.
Source: SBNA via BBC.com (18 November 2017)*

4. Prototype Airlander retirement

In June 2018, the salvaged remains of the Airlander 10 prototype, including the largely intact gondola, were moved from Cardington Airfield to a new HAV facility in Bedford.



*Airlander 10 rigid fuselage being transported from Cardington Airfield.
Source: <https://www.bbc.com/news/> (June 2018)*

The British Broadcasting Corporation (BBC) reported on 13 January 2019 that HAV had retired the Airlander 10 prototype. Since its first flight as the HAV-304 on 7 August 2012, this hybrid airship was the largest aircraft in the world until its retirement.



*Original prototype's rigid gondola at the HAV facility in Bedford.
Source: Tom Jamieson via Financial Times (11 October 2019)*



Cockpit flight simulator.

Source: Tom Jamieson via Financial Times (11 October 2019)

5. For more information

- Gordon Taylor, “A Green Solution to Canada’s Transport Challenge,” ATG, presented at Airships to the Arctic V” Symposium, Calgary, Canada, October 2009: <https://isopolar.com/wp-content/uploads/2013/03/Gordon-Taylor-presentation-Hybrid-Airships-A-Green-Solution-to-Canadas-Transport-Challenge.pdf>
- Vlad Savov, “Airlander 10: Up Close With the Gigantic Airship the US Army Wanted,” The Verge, 8 July 2014: <https://www.theverge.com/2014/7/8/5880061/airlander-10-photo-essay>
- “Airlander 10: World's longest aircraft collapses at Cardington,” BBC News, 18 November 2017: <https://www.bbc.com/news/uk-england-beds-bucks-herts-42037832>
- “Hybrid Air Vehicles AIRLANDER 10 Prototype,” The Airship Heritage Trust, circa 2017: <https://www.airshipsonline.com/airships/HAV%20Airlander/index.html>
- Chris Pocock, “Hybrid Aircraft Puts Brave Face on Setbacks,” AINonline, 13 July 2018: <https://www.ainonline.com/aviation->

[news/aerospace/2018-07-13/hybrid-aircraft-puts-brave-face-setbacks](https://www.theguardian.com/news/aerospace/2018-07-13/hybrid-aircraft-puts-brave-face-setbacks)

- Matta Busby, “Airlander 10: prototype of world's longest aircraft retired,” The Guardian, 13 January 2019:
<https://www.theguardian.com/world/2019/jan/13/worlds-biggest-aircraft-airlander-10-retired-from-service>

Other *Modern Airships* articles

- *Modern Airships - Part 1*: <https://lynceans.org/all-posts/modern-airships-part-1/>
 - Advanced Technologies Group (ATG) - SkyCat & SkyKitten
 - ATG / HAV - Condor high-altitude surveillance hybrid airship
 - Hybrid Air Vehicles (HAV) / Northrop Grumman - HAV-3 and HAV-304 (LEMV)
 - Hybrid Air Vehicles (HAV) – Airlander 10 & 50 (production models)
- *Modern Airships - Part 2*: <https://lynceans.org/all-posts/modern-airships-part-2/>
- *Modern Airships - Part 3*: <https://lynceans.org/all-posts/modern-airships-part-3/>