ATG - blimps

Peter Lobner, updated 13 September 2023

1. Introduction

The UK firm Advanced Technologies Group (ATG), headed by Air Marshal Sir John Walker, is best known for two advanced airships:

- A hybrid, heavy lift airship known as the Sky Catamaran, or "SkyCat" for short, started in about 1999.
- A stratospheric High Altitude Platform (HAP) named "StratSat," for delivering communications and surveillance services from geo-stationary positions in the stratosphere, started in 2001.

Both advanced projects led to the development and flight testing of sub-scale prototype airships and advanced designs for full-scale airships. ATG developed the design for the pilot-optional Condor high altitude surveillance airship derived from the SkyCat. They also offered a range of conventional, non-rigid blimps, including:

- **AT-04**: Large, multi-mission, 52 passenger blimp with an envelope volume of 14,200 m^3 (501,468 ft^3)
- **AT-10**: Small blimp for advertising, surveillance and pilot training applications. Envelope volume 2,500 m^3 (88,287 ft^3)
- **AT-12**: Mid-size, multi-mission blimp, with an envelope volume similar to an Airship Industries Skyship 600 @ 6,666 m^3 (235,400 ft^3) and 2 x 261 kW (350 shp) Centurion diesel engines.

These blimps incorporated some design features from the US Navy's Sentinel 1000 blimp, which was designed by Roger Munk and his team from Airship Industries before ATG was formed.

ATG only built one AT-10 blimp before the firm went into administration in 2005. No AT-04 or AT-12 blimps were completed.

ATG's hybrid airship and blimp businesses were acquired first by SkyCat Group in 2006 and then in 2007 by Hybrid Air Vehicles

(HAV), which currently holds the design rights for the AT-10.

This article provides an overview of ATG's AT-04 and AT-10 and a newer AT-10 version that reportedly was being developed by HAV.

2. The AT-04 large blimp design concept

The AT-04 was designed as an advanced, large, multi-mission blimp that could operate with minimal ground crew in a range of civilian and military applications. FlightGlobal reported that Chief Designer Roger Munk claimed, "Traditionally, airships need large groundcrews, all of whom have to be fed and watered. Our development of vectored-thrust engines, which can turn through 90°, led to a lot of military contracts early on. We have now combined that with a bow-thruster system that only cost us $5 million to develop and which allows us to ground-handle an airship for the first time ever without a groundcrew - and that absolutely transforms airship operating economics."

ATG AT-04 configured for passenger service. Note the large gondola with pylon-mounted ducted fans, the X-tail, and the bow thrusters protruding above the nose of the airship. Source: "British Airships in Pictures." p. 108 (1998)

General design characteristics of the ATG AT-04

Parameter	ATG AT-04
Type	Non-rigid, blimp
Length	81 m (265.7 ft)
Diameter, max	Estimated 18.3 m (60 ft)
Height, overall	About 21 m (70 ft, “7 stories tall”)
Volume	14,200 m^3 (501,468 ft^3)
Envelope	• Multi-layer fabric with UV-blocker, 10-year operating life • Composite battens and fins • Envelope manufactured in the U.S.
Aerodynamic controls	X-tail
Flight control system	“Fly-by-light” optical flight control system with auto-pilot

Propulsion & maneuvering system	• 3 x Zoche diesel engines rated at 260 kW (350 shp) maximum & 185 kW (252 shp) continuous
	  ○ 2 x engines driving thrust vectoring (±90°), reversible pitch, ducted fans cantilevered on pylons from the gondola
	  ○ 1 x engine driving a tail-mounted, reversible pitch, ducted fan.
	• Bow thrusters installed above the nose of the airship

Payload	More than 6,000 kg (13,228 lb) (more than double the payload of a 600-series Airship Industries Skyship)
Accommodations	• Flight crew • Configurable gondola, up to 52 passengers
Speed, cruise	45 knots (83.3 kph) on the stern engine alone
Speed, maximum continuous	75 knots (139 kph) on all three engines
Fuel capacity	3,000 liters (792 gallons)
Range	Transatlantic without refueling

The AT-04 prototype

A prototype of the AT-04 was under construction at Cardington in mid-1997, with an anticipated first flight in summer 1998. At the time, it would have been the largest existing airship in the world and the largest airship built in the UK since the pre-WW-II R.101 rigid airship.

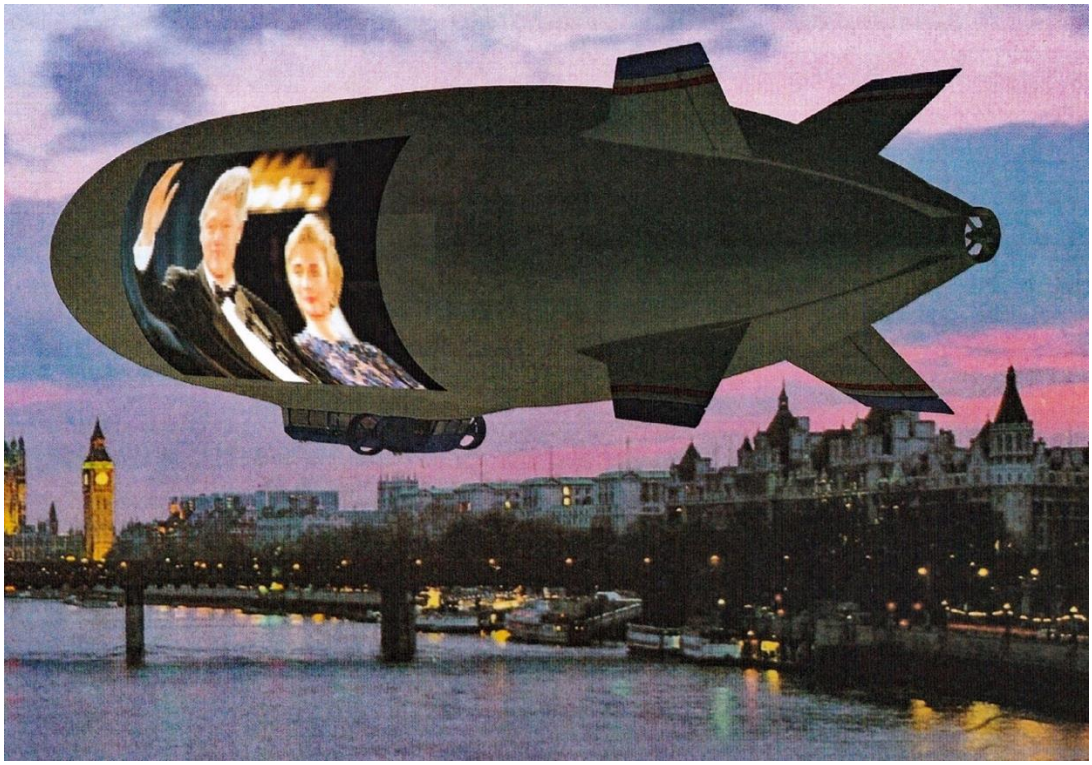
The prototype was not completed.

Civilian configurations

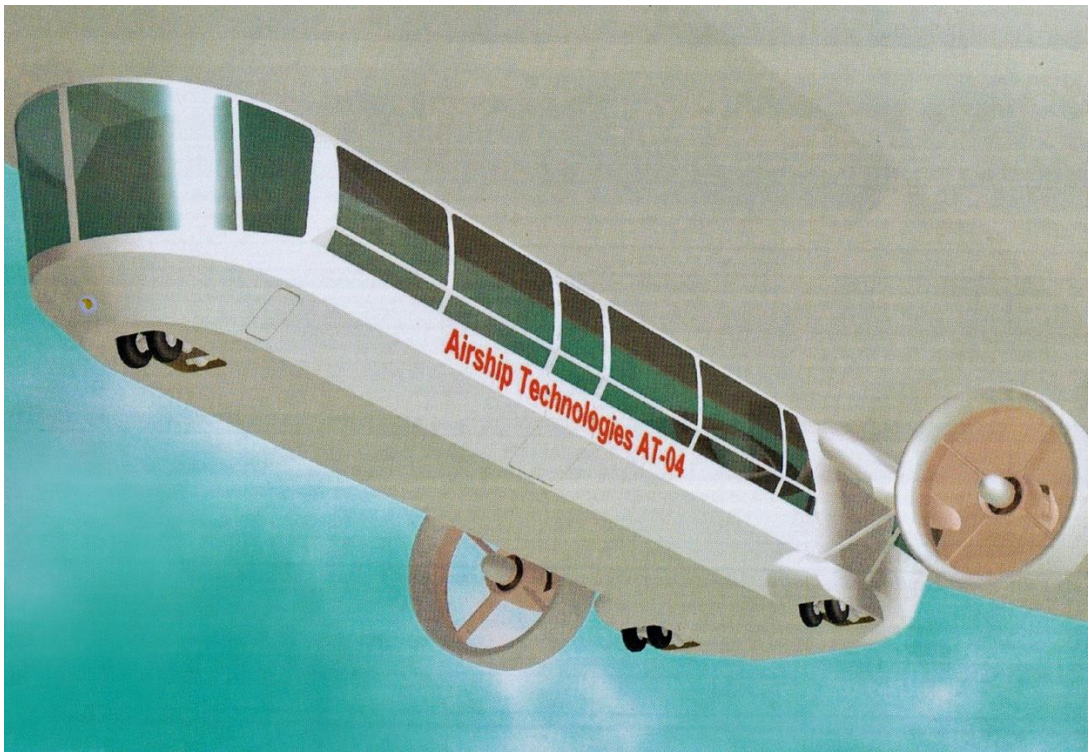
Potential civilian applications included for the large blimp included:

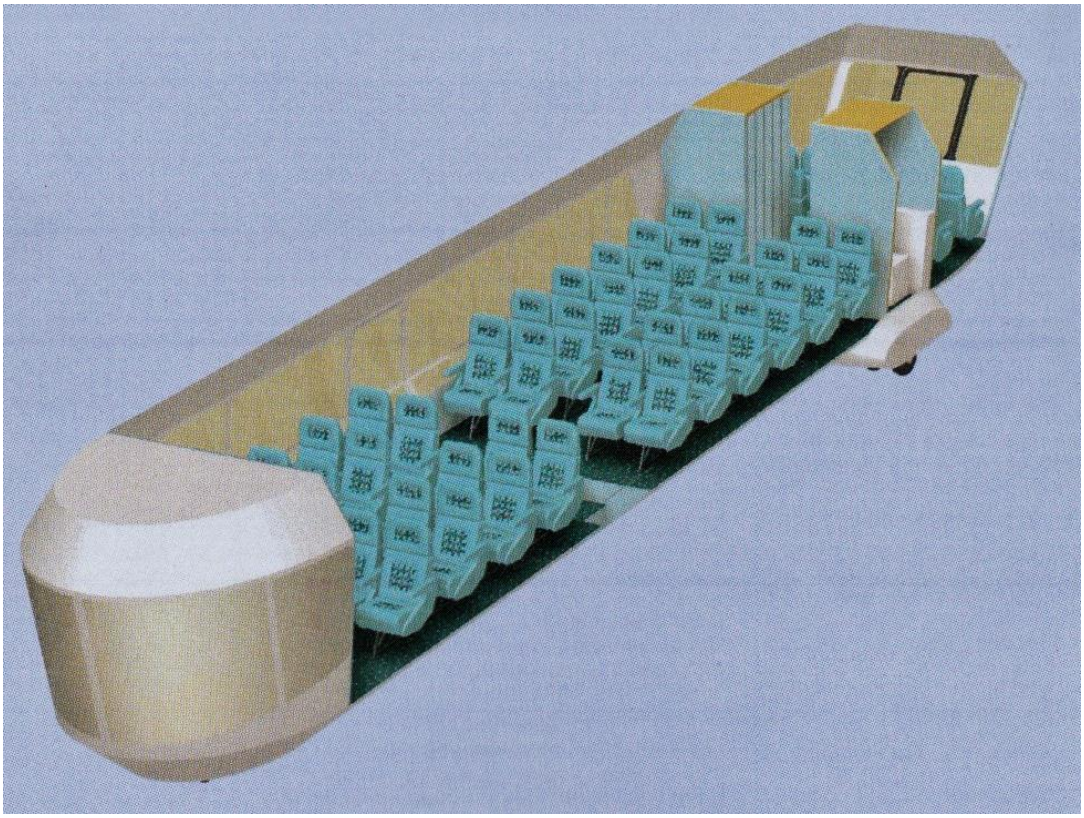
- Passenger service, carrying up to 52 passengers in 4-abrest seating in a 18.3-m (60-ft) long gondola, which included a small stowage compartment and a toilet.
- Camera platform for aerial photography / videography
- Airborne advertising with large, flank-mounted video panels

Much of the AT-04 manufacturing work was to be subcontracted. Initially, the AT-04 envelope was to be built in the U.S., the engines in Germany and the gondola in the UK at Cardington. Final assembly was to take place at an ATG facility in the U.S., at a former blimp base in Weeksville, North Carolina. Completed airships for European customers would be ferried across the Atlantic. ATG planned to work with the U.S Federal Aviation Administration's (FAA) office in Atlanta, Georgia for U.S. type certification of the AT-04.



Rendering of an ATG AT-04 flying along the Thames River in London with a large color video advertising panel. Note the two pylon-mounted ducted fans on the aft end of the gondola and one more at the tail.
Source: "The Great Airships," p. 95 (1999)





ATG AT-04 gondola configured for passenger service. Note the partially-retracted landing gear & two thrust-vectoring, pylon-mounted, ducted fans. Source, both graphics: "The Great Airships," p. 93 (1999)

Military Configurations

In 1997, FlightGlobal reported, “In its military configuration, the AT-04 will be able to stay on station for two or more days - a distinct advantage over helicopter operations, where, for example a Westland Sea King helicopters can be flown 230 km (425 nm) and stay on station for only 2 h before returning.”

One possible military role for the AT-04 was to carry internally a large radar antenna and serve as an airborne early warning platform. FlightGlobal reported, “ ….the AT-04 can accommodate the 30 m^2 (323 ft^2) Westinghouse ASSR-1000 parabolic elliptical reflector within its envelope, with room to spare.”

3. The original ATG AT-10 small blimp

The original AT-10 was a sophisticated, highly-maneuverable small blimp that incorporated several notable features, including “fly-by-light” optical flight control system, X-tail, and the first use of diesel engines on an airship. The passenger compartment behind the flight deck allows seating for four passengers with a single large door entrance. The passenger seating configuration can be rearranged for flexible location of equipment.

Rendering of ATG AT-10. Source: ATG

General design characteristics of the ATG AT-10

Parameter	ATG AT-10
Type	Non-rigid, blimp
Length	41.4 m (135.8 ft)
Diameter, max	10.7 m (35.1 ft)
Fineness ratio	3.9
Volume	2,500 m^3 (88,287 ft^3)
Envelope	• Laminated translucent fabric hull • External catenary collar system for supporting the gondola and distributing loads into the envelope • Single ballonet
Aerodynamic controls	X-tail
Flight control system	"Fly-by-light" optical flight control system with auto-pilot and pneumatic actuators
Propulsion	2 x aero diesel engines, each rated @ 74.6 kW (100 shp), each driving a thrust vectoring ducted fan cantilevered on a pylon from the gondola
Gondola	Single structural module
Accommodations	• Cockpit with two pilot stations with side stick controls • Passenger compartment for up to 4 passengers
Speed, cruise	96.6 kph (60 mph)

The AT-10 made its first flight at Cardington on 22 March 2002. During flight testing thru early 2004, it demonstrated effective controls with excellent stability and low speed handling.

European type certification by EASA (European Union Aviation Safety Agency) was in progress in 2004. However, difficulties in certifying the first diesel engine ever used on an airship delayed the certification process. ATG ran out of funds and European certification was not completed. The owner of the AT-10 packed up the airship and took it to China.

AT-10 emerging from a Cardington hangar.
Source: Trevor Monk / Airship Heritage Trust

The AT-10 at Cardington during EASA certification, circa 2004.
Source: Hybrid Pilot Services, Ltd.

AT-10 flying over the Cardington hangars, 25 March 2004.
Source: Trevor Monk / Airship Heritage Trust

AT-10 in flight. Source: Trevor Monk / Airship Heritage Trust

AT-10 flying at Cardington. Note the shadow of the single ballonet on the envelope and the exterior catenary collar & suspension system for the gondola. Source: Trevor Monk / Airship Heritage Trust (31 March 2004)

AT-10 in flight. Source: Airship & Blimp Resources – Airship News (May 2002)

4. The “new” HAV AT-10

In an undated article, likely circa 2012, Hybrid Pilot Services Ltd., reported that Hybrid Air Vehicles (HAV) was developing a new, slightly larger “Mk. 2” version of the AT-10 for use as a training airship for pilots who will fly the much larger hybrid airships that HAV was developing.

Use as a training platform would take advantage of the original AT-10’s demonstrated good stability and control characteristics. In the training role, the AT-10 Mk. 2 would have a small flight simulation computer integrated with the digital flight controls and engine throttle controls to simulate in flight the control response and momentum of a much larger hybrid airship. Bow thrusters would be fitted to the AT-10 Mk. 2 to improve the fidelity of the flight simulation and reduce the ground crew requirements. The use of the AT-10 Mk. 2 as a training platform for the large HAV hybrid airships would be approved by the UK Civil Aviation Authority (CAA).

The Hybrid Pilot Services Ltd. article reported that the US Coast Guard and Navy expressed interest in the AT-10 Mk. 2 as a patrol airship for detecting drug smugglers in the Caribbean. On patrol and surveillance missions, the AT-10 Mk. 2 has accommodations for two pilots (or pilot and trainee) and two equipment operators for surveillance with electro-optical / FLIR (forward-looking infra-red) systems that would be mounted in the passenger compartment. The cabin can be configured for up to four passengers.

Hybrid Pilot Services Ltd. reported that the AT-10 Mk. 2 would be powered by an already certified aero diesel engine. Two candidates were identified: the 4-cylinder, turbocharged Centurion 2.0 diesel rated at 155 shp (115.6 kW) and the 4-cylinder, turbocharged Austro Engine E4 (aka AE 300) diesel rated at 170 shp (127 kW). The diesel engines would give this new airship an endurance of about 30 hours and a range of about 1,000 nm (1,852 km).

HAV expects their first production Airlander 10 to be flying by 2024. There has been no recent word on HAV developing the AT-10 Mk. 2 training blimp.

5. For more information

AT-04

- "Thoroughly modern airship," FlightGlobal, 20 May 1997: https://www.flightglobal.com/thoroughly-modern-airship/2502.article
- Patrick Abbott & Nick Walmsley, "British Airships in Pictures – An illustrated history 1784 – 1998," p. 108, ISBN 1-899863-48-6, House of Lochar, 1998
- Mike Flynn, "The Great Airships," pp. 92 – 95, ISBN 1-85868-717-9, Carlton Books Ltd., 1999

AT-10

- "AT-10," Airship Heritage Trust: https://www.airshipsonline.com/airships/AT_10/Index.htm
- "B08 - Airship Flight Test Development at ATG Cardington," The Airship Association: http://www.airship-association.org/cms/node/193
- "Centurion Aero Engines," Experimental Aircraft Information: https://www.experimentalaircraft.info/homebuilt-aircraft/aircraft-engines-centurion.php

Videos

- "AT-10 Airship Takeoff - Without Thrust Vectoring," (0:20 minutes), 23 April 2011: https://www.youtube.com/watch?v=jpoFdHERAbQ
- "AT-10 airship – Thrust vectoring," (0:20 minutes), 23 April 2011: https://www.youtube.com/watch?v=EyxR0Kldh9k
- "AT-10 airship on an early test flight, landing at Cardington, then being brought onto her mast" (6:37 minutes), 2 August 2011: https://www.youtube.com/watch?v=rt9kz5aykUM

Other *Modern Airships* articles

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

    - Airship Industries - Skyship blimps
    - US Navy - YEZ-2A - Westinghouse - Airship Industries (WAI) Sentinel 1000 & 5000
    - Advanced Technologies Group (ATG) – SkyCat & SkyKitten
    - ATG StratSat
    - ATG / Hybrid Air Vehicles (HAV) - Condor
    - HAV - Airlander 10 prototype
- *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/