SkyCat

Peter Lobner 1 May 2019

Background

The UK airship firm Advanced Technologies Group (ATG) began development in 1999 of a hybrid, heavy lift airship known as the Sky Catamaran, or “SkyCat” for short. This name referred to the two-lobe design of the broad lifting gas envelope, which at the time was unique, but has become commonplace in hybrid airship designs.

After ATG went into administration in 2005, its assets were acquired in 2006 by an Italian–British consortium and the new business was named SkyCat Group, which fared no better, going into administration itself in 2007.

A new firm, Hybrid Air Vehicles (HAV), acquired the assets of SkyCat Group in 2007. The subsequent HAV airship designs are based on the SkyCat airship designs developed previously by ATG and SkyCat Group. HAV is in operation today and is developing the production version of its Airlander 10 hybrid airship after concluding prototype flight tests in 2018.

Throughout this tumultuous period, the historic airship facilities at Cardington, Bedfordshire (formerly the Royal Airship Works and RAF Cardington), were used as a base for test flying and an assembly site for some of its airships.

Basic characteristics of the SkyCat

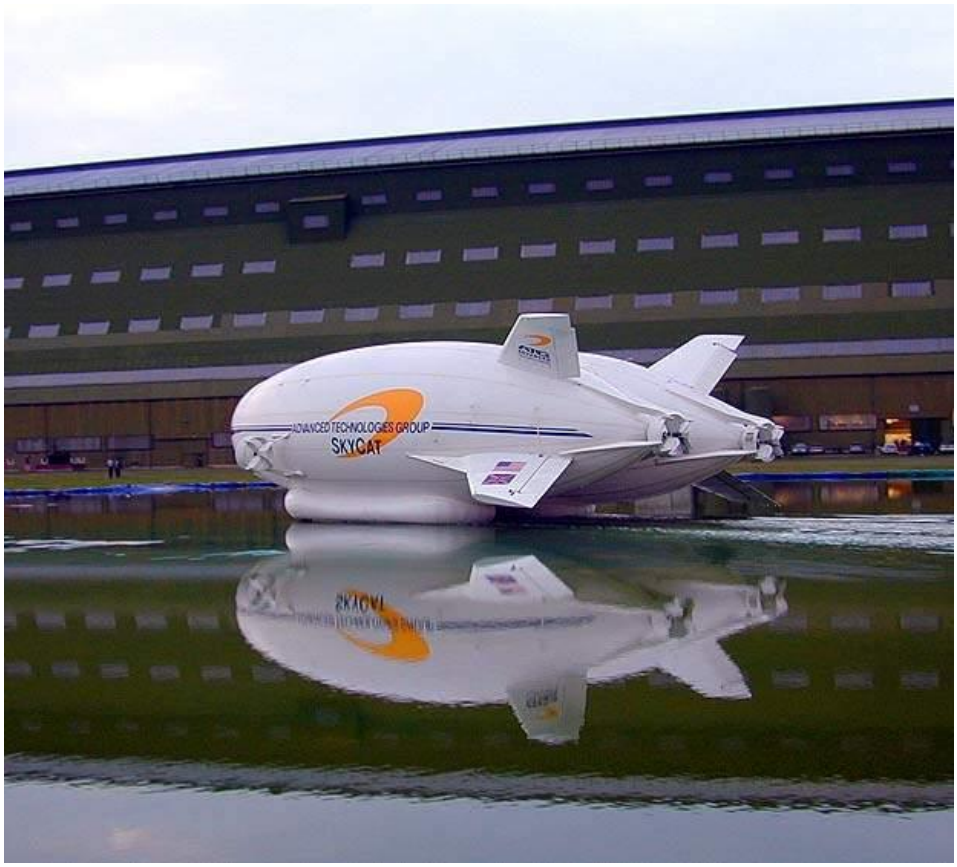
As a hybrid airship, SkyCat is semi-buoyant, but still heavier-than-air. Aerostatic lift from helium provides a large fraction of the lift needed for flight. The balance is produced by propulsive lift from four vectored thrust propulsors and, during forward flight, by aerodynamic lift from the shaped fuselage and short wings. The SkyCat is designed for short takeoff and landing (STOL) operations to generate aerodynamic lift before takeoff and during the landing approach. The SkyCat was not designed for vertical takeoff and landing (VTOL) operations.

To become airborne, the SkyCat activates its air cushion landing system (ACLS), which lifts the airship off the ground on a cushion of air and enables the propulsion system to taxi the airship and make a short takeoff run. To land the airship, the SkyCat makes a short landing approach and uses the ALSC to cushion the landing and taxi to a parking spot without the need for typical airship ground support staff and infrastructure.

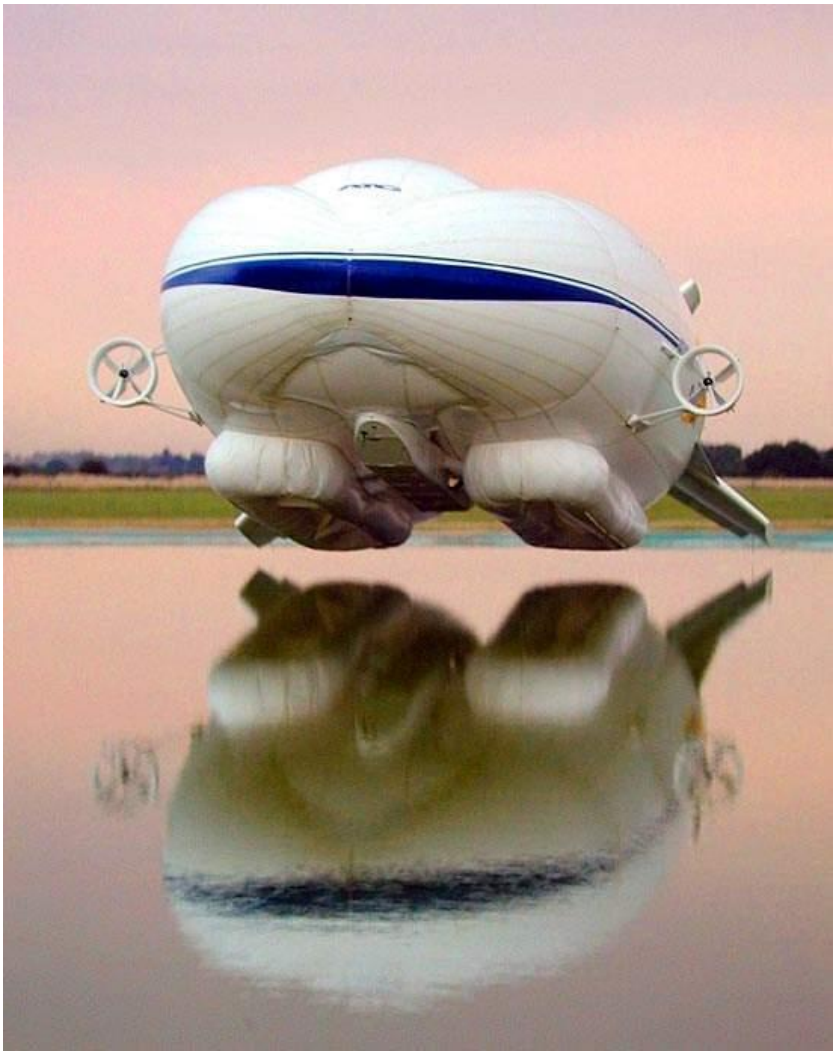
The ALCS allows the SkyCat to operate for almost any type of surface, including flat or uneven land, grass, swamp, snow or on water, giving the vehicle fully amphibious capability.

The SkyKitten technology demonstrator

The 12.2 meter (40 foot) long SkyKitten was a one-sixth scale, remote-controlled model of a planned SkyCat hybrid, heavy-lift airship design. SkyKitten was flown from Cardington in 2006.



The SkyKitten technology demonstrator at Cardington.
Source: https://www.aerospace-technology.com/projects/skycat/

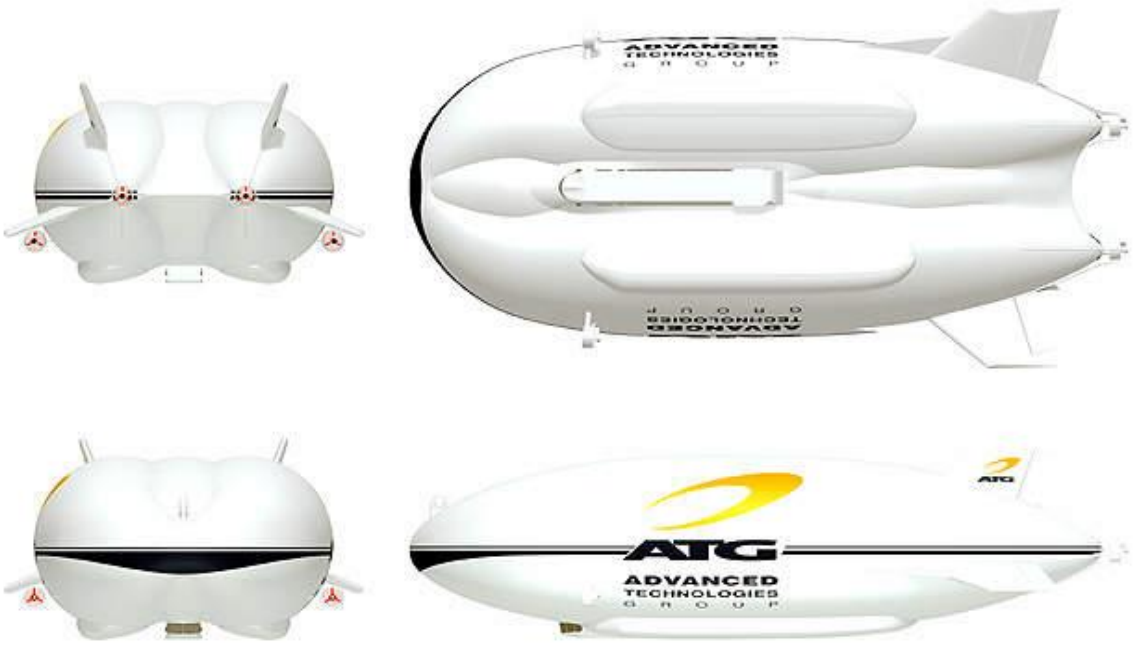


The SkyKitten technology demonstrator airborne at Cardington.
Source: https://www.aerospace-technology.com/projects/skycat/

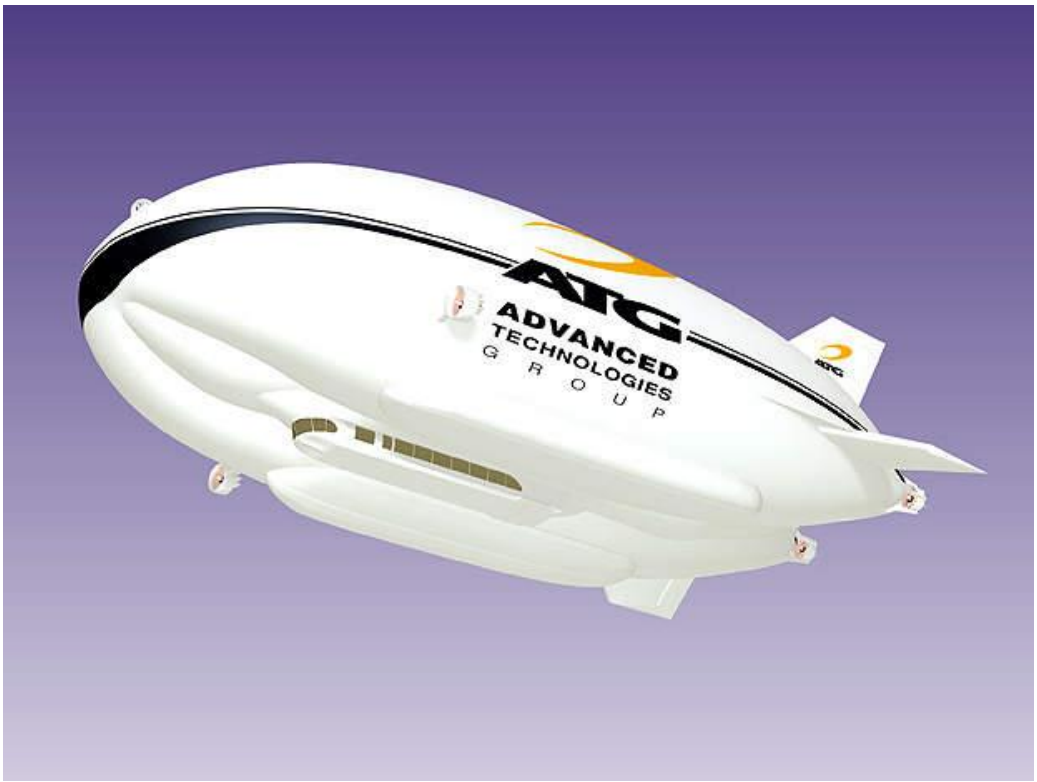
The SkyCat

The SkyCat design was similar to the sub-scale SkyKitten. One important change was the addition of a bow thruster that provides lateral thrust to precisely point the bow at low speed.

The initial variant planned for development was the SkyCat 20, which was designed to handle a 20 metric ton (20,000 kg; 44,092 lb) payload. The cruise and maximum speeds are 130 kph and 148 kph (81 and 90 mph), respectively. The maximum range with a full payload is 2,250 km (1,398 miles). Maximum operating altitude is 2,745 m (9,000 feet).



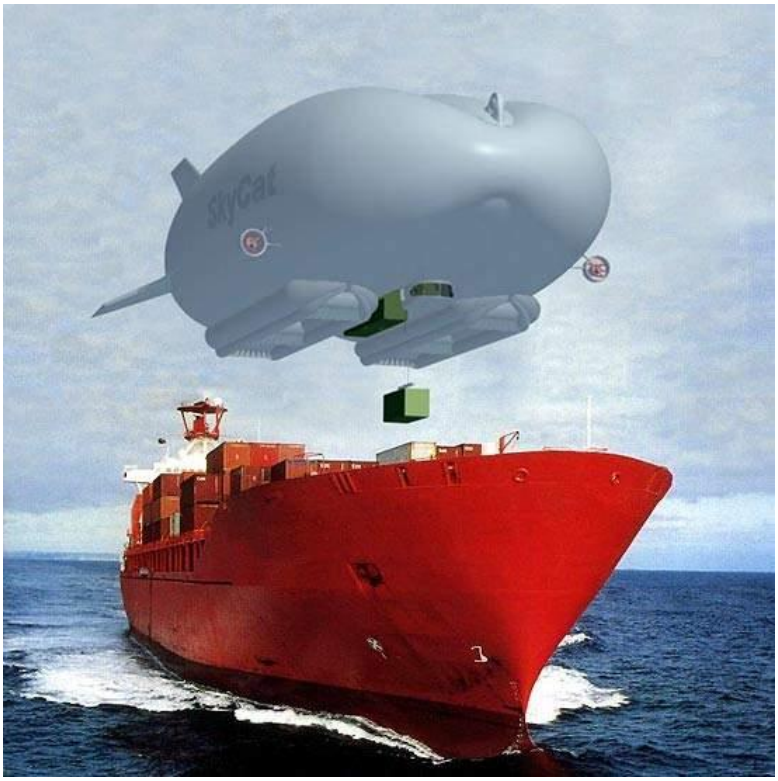
SkyCat 4-view drawing
Source: https://www.aerospace-technology.com/projects/skycat/



Concept drawing, SkyCat in flight.
Source: https://www.aerospace-technology.com/projects/skycat/

The SkyCat's laminated fabric envelope contains the helium lifting gas and separate air volumes (ballonets) that can be used to adjust buoyancy and pitch and roll trim. There is no rigid structure inside the envelope. The rigid payload module is attached under the envelope, along the airship's centerline. An catenary structure inside the envelope supports the weight of the payload module and distributes that load via internal diaphragms into the upper surfaces of the envelope. The diaphragms can be used to compartmentalize the internal volume of the envelope.

Larger variants, the SkyCat 200 and SkyCat 1000 were planned, with payload capacities from 200 and 1,000 metric tons, respectively, carried in an internal cargo bay. The load exchange process for loading or discharging heavy cargo likely involves an exchange of ballast in order to maintain airship gross weight within certain limits. While its not clear how airship buoyancy is controlled during an inflight load exchange, the SkyCat was portrayed as making an inflight exchange with an underway ship at sea.



Concept drawing, SkyCat making an in-flight load exchange.
Source: https://www.aerospace-technology.com/projects/skycat/