EERM - Dinosaure

Peter Lobner, updated 8 March 2022

1. Introduction

Feasibility studies for a small meteorological research airship were carried out jointly by ONERA (National Office for Aerospace Studies and Research), SNIAS (National Aeronautical and Space Company) and the Zodiac aerospace firm. Based on these studies, a French consortium led by EERM (Établissement d'études et de recherches météorologiques) initiated a program in 1977 to develop a small, remotely-controlled airship capable of carrying a two metric ton payload for use in atmospheric research (mini-dirigible de surveillance météorologique).

The remotely piloted airship and its instrumentation package were intended for exploring the atmosphere in three dimensions, from low altitude to 3,000 m (9,843 ft), using all available sounding techniques (i.e., conventional, photometric, radiometric) and transmitting data in real-time to a ground station. One particular application of interest to EERM involved persistent monitoring at a fixed altitude to support pollutant diffusion studies.

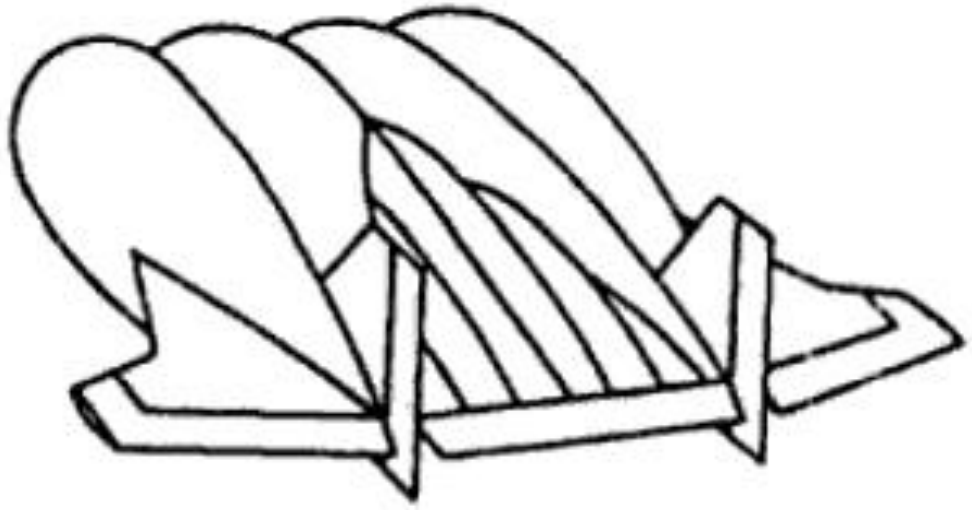
2. The Dinosaure hybrid airship

The consortium developed an airship design named Dinosaure, which was a hybrid, multi-lobe, non-rigid airship with an airfoil-shaped hull that generated significant aerodynamic lift in forward flight. To maintain its shape, the hull was pressurized to slightly more than atmospheric pressure.

As a hybrid airship, Dinosaure was semi-buoyant (heavier-than-air) and made short takeoffs and landings (STOL) under the combined influence of aerostatic and aerodynamic lift.

The airship had an aircushion landing system (ACLS) with two air cushions, one under each main hull lobe. The system was used in air cushion mode for maneuvering on the ground, during take-off and for soft landings. By reversing the operation of the ACLS fans, a suction

was taken on the air cushion chambers, which then functioned to secure the airship when on the ground.



Dinosaure viewed from above the rear quarter.
Source: Khoury, Airship Technology, Fig. 15.8

General characteristics of the full-scale Dinosaure

Parameter	**Dinosaure**
Airship type	Hybrid (semi-buoyant) non-rigid airship
Length	26 m (85.3 ft)
Height	8 m (26.2 ft)
Width	31 m (101.7 ft)
Lift gas	Helium
Envelope volume	3,350 m^3 (118,304 ft^3)
Propulsion system	2 x Lycoming piston engines @ 150 hp (112 kW) mounted in a push-pull configuration on a central nacelle.
Aerodynamic controls	2 x rudders and elevons along the trailing edge of the aerobody hull.
Operating altitude	Very low altitude to 3,000 m (9,843 ft)
Maximum payload	2,150 kg (4,740 lb)

The full-scale Dinosaure was not built. However, a 1/3-scale model was built and flown in 1978.

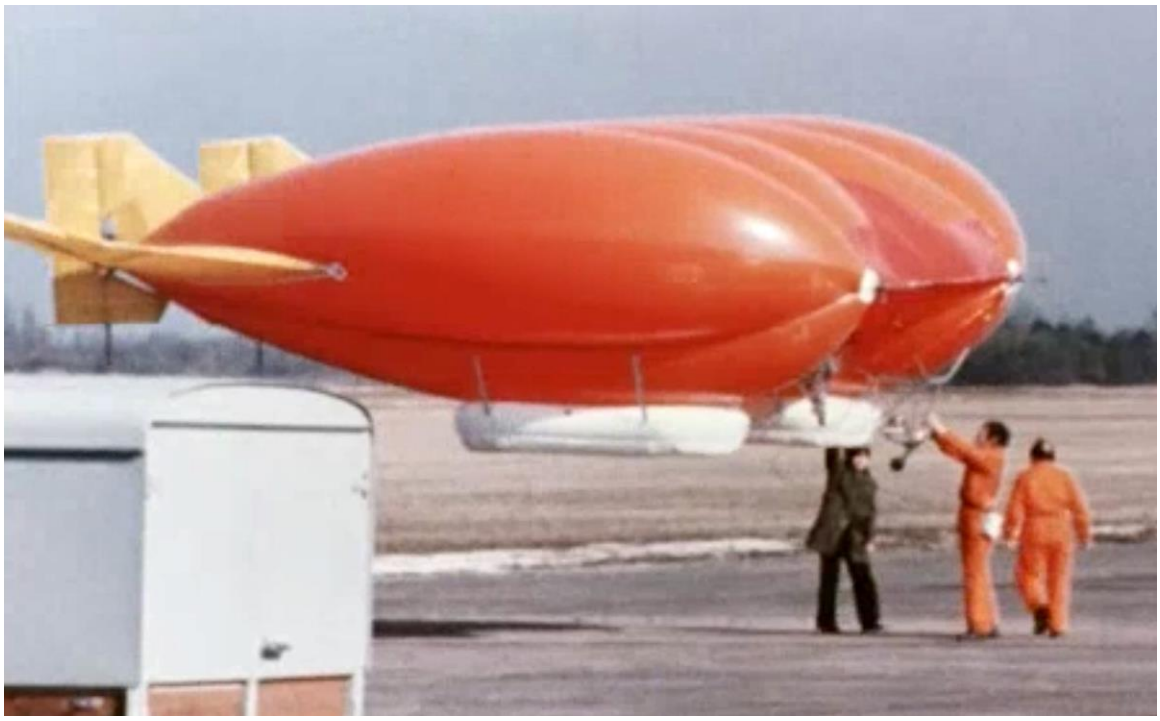
The Dinosaure project ended in 1980.

3. The sub-scale Dino 2

In June 1978, a 1/3-scale, remote-controlled hybrid airship named "Dino 2" was produced. A series of flight tests at Brienne le Château (Aube) were carried out with winds reaching 10 m/s (36 kph, 22 mph). These tests confirmed that Dino 2 had good flying qualities and good resistance to gusts. The craft was equipped for atmospheric research and made a total of 70 flights before the Dinosaure program ended.

General characteristics of the 1/3-scale Dino 2

Parameter	**Dino 2**
Airship type	Hybrid (semi-buoyant) non-rigid airship
Length	7.6 m (25 ft)
Width	6.9 m (22.6 ft)
Lift gas	Helium
Envelope volume	47 m^3 (1,660 ft^3)
Propulsion system	A single 7 hp (5.2 kW) chainsaw engine

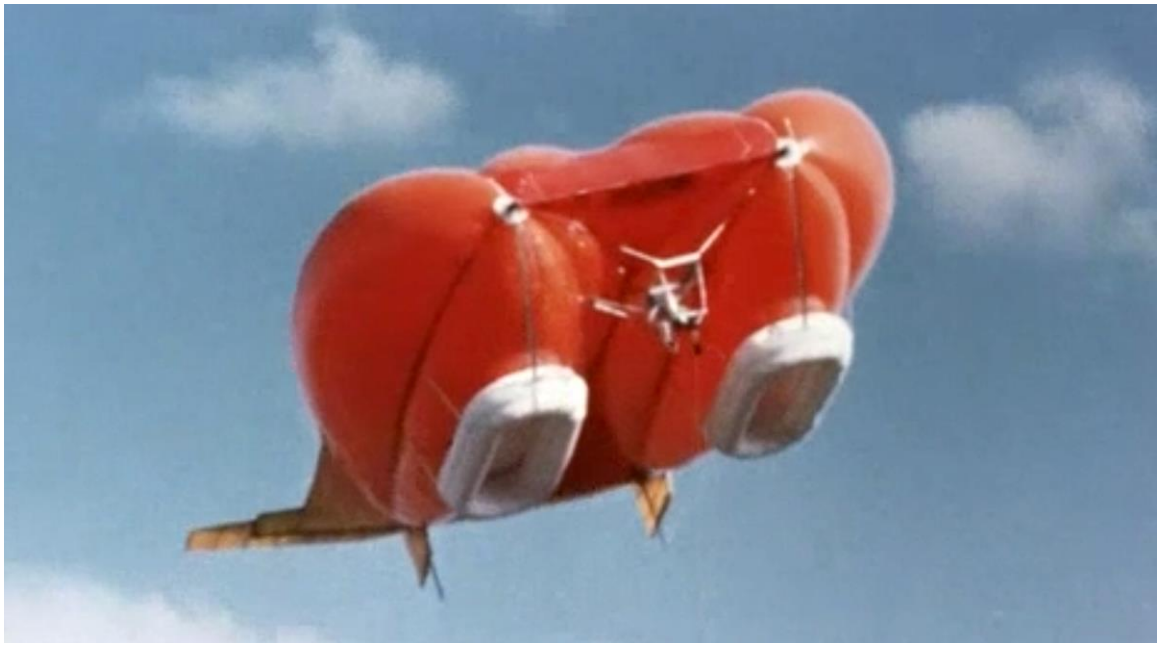


Dino 2 ready to launch.
Source: Screenshot from EERM video

Dino 2 liftoff.

Underside showing the white ACLS pods, the engine positioned at the front of the central "tunnel" and the rear wing and control surfaces.

Source, both images: Screenshots from EERM video

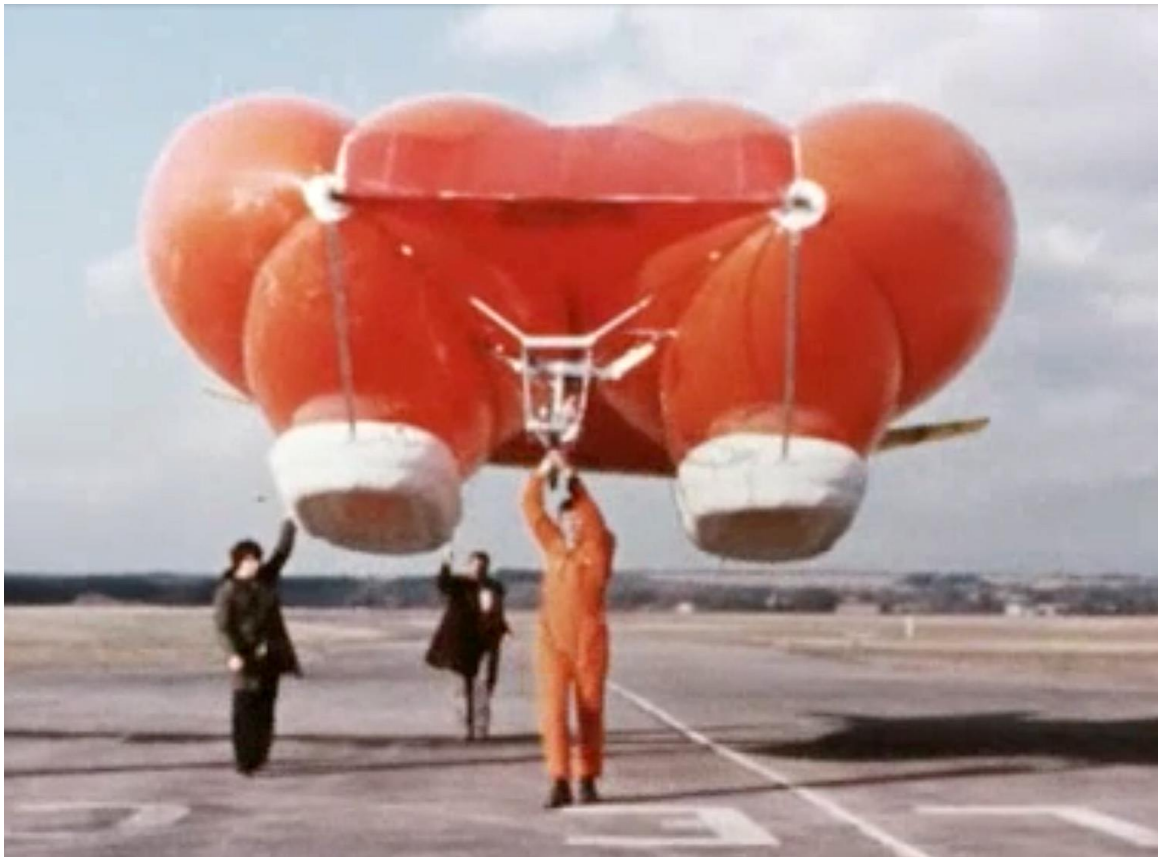


Dino 2 in flight.

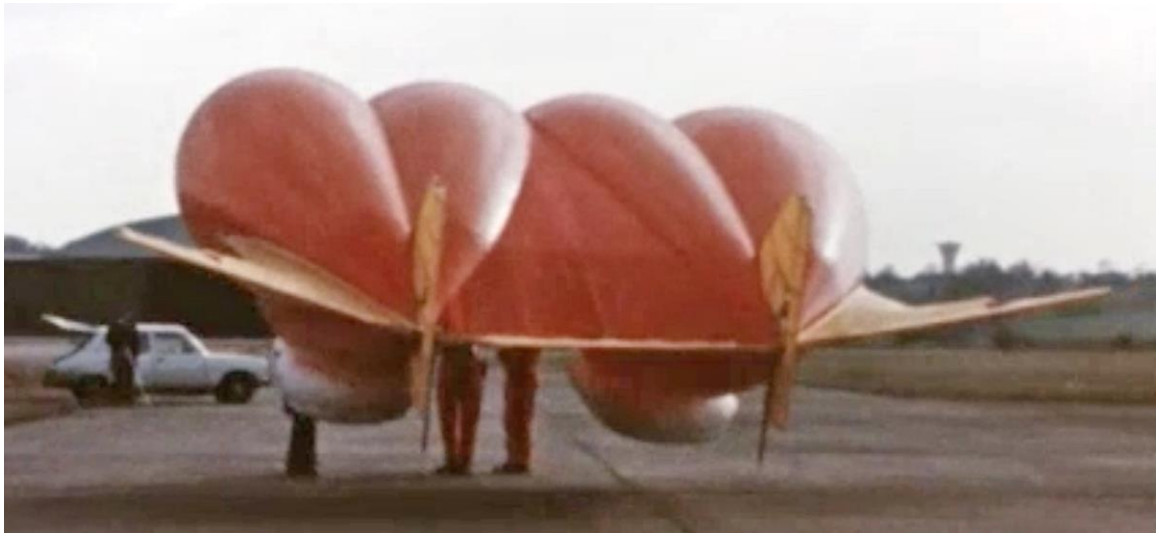
Engine installation in the tunnel between the catamaran hulls.

Aerodynamic control surfaces.

Source, all images: Screenshots from EERM video



Bow view highlighting the catamaran hull and the ACLS pods.



Stern view highlighting the upper lobes on the catamaran hull.

Source, both images: Screenshots from EERM video

4. For more information

- "Le projet: Dinosaure," Aerall: http://aerall.org/Principaux-Projets-depuis1975.htm
- G.A. Khoury & J.D. Gillett, "Airship Technology," Cambridge Aerospace Series, Cambridge University Press, ISBN 13: 9780521430746, 2002
- Anthony J. Dolman, "Current and Possible Future Developments in Lighter-Than-Air (LTA) System Technology," Section 4.4, United Nations Industrial Development Organization (UNIDO), 1987: https://open.unido.org/api/documents/4793600/download/CURRENT%20AND%20POSSIBLE%20FUTURE%20DEVELOPMENTS%20IN%20LIGHTER-THAN-AIR%20

Video

- "Test flights of the DINOSAURE airship in March 1979. Extracts from a silent film," (Video Dino_2coupe.mp4, 9:25 minutes), Météo-France (the original silent film was produced by EERM / National Meteorology), 22 March 1979: http://phototheque.meteofrance.fr/meteo/media/44894;jsessionid=3B9ECD2EDDA8E85B221114A9C82A7543

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