

# **Conrad Airship Company – CA220 & CA80**

Peter Lobner, 24 August 2021

## **1. Introduction**

Clarence “Clare” Conrad, an electrical engineer and private pilot from Spokane, Wash., relocated to the Mesa, AZ area in 1969, where he soon founded Conrad Airship Company and began to design a modern rigid airship patterned after the dirigibles of the 1930s. He started his first design in 1969 for a 20 foot (6.1 meter) airship.

Unable to gain financial support for his efforts to build a dirigible, Conrad decided to undertake the effort himself. He moved to Higley, AZ, in the “East Valley” just east of Chandler, to open an electrical contracting business to support his work on the dirigible. His son, Darwin, who had been studying electrical engineering at Brigham Young University, interrupted his education to move from Utah to help his father.

Clare Conrad anticipated the following applications for the dirigible:

- Passenger transport
- Cargo transport
- Police surveillance
- Advertising
- Aerial survey ship (geological survey, real estate viewing)

He estimated that a passenger airship could offer a Phoenix-to-Los Angeles airfare of \$10 for a 2-1/2 hour flight. His long-range goal was to build a 700 foot (213.4 meter) dirigible that could transport 700 passengers across the US in 24 hours for the same price as a bus ticket.

## **2. The Conrad’s 1<sup>st</sup> airship, the CA220 (1974 – 1975)**

Work on the CA220 (“Conrad Airship, 220 feet”) started in March 1974 at a construction site on a field near Williams Air Force Base, east of Chandler, AZ. Today the airfield is the site of the Phoenix-

Mesa Gateway Airport. Since Clare Conrad ran an electrical contracting business by day, the father-son team and volunteers did most of their work on the CA220 at night and on weekends and building and flying subscale models to validate the design. In 1975, the Conrads were working full-time on their airship.



*The Conrad CA220 dirigible hull early in construction.  
Source: Darwin Conrad via MakeHigleyHistoric*



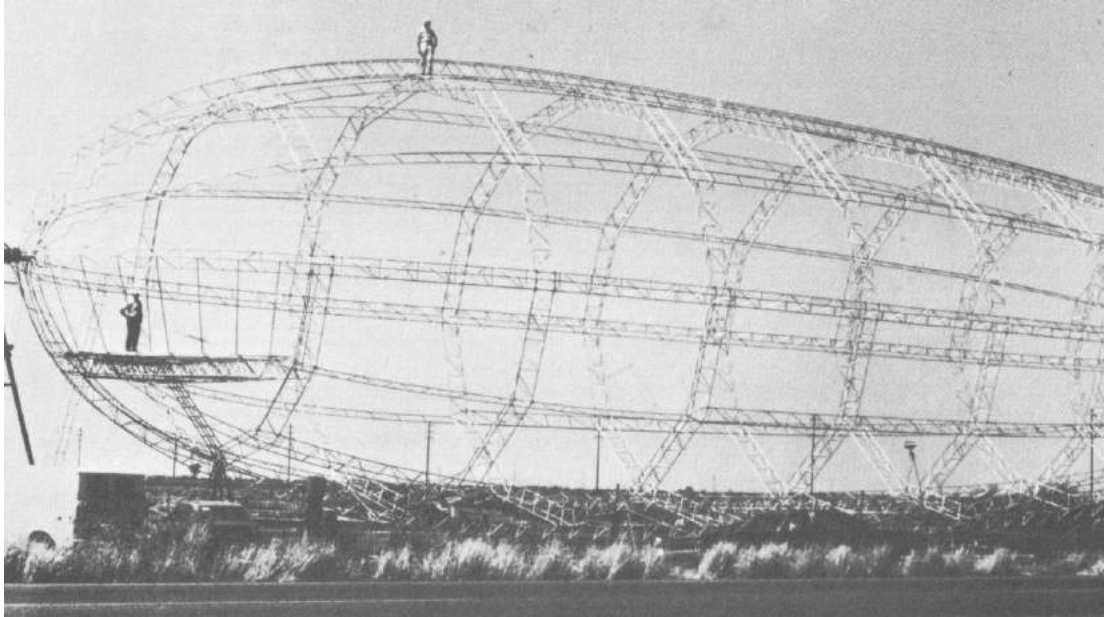
*The Conrad CA220 dirigible, profile view of the rigid hull during construction. Source: Darwin Conrad via MakeHigleyHistoric*



*The Conrad CA220 dirigible hull under construction at night.  
Source: Darwin Conrad via MakeHigleyHistoric*

### CA220 general characteristics

Parameter	CA220
Airship type	Cylindrical, rigid, aluminum truss frame, aluminized fabric (Mylar) skin
Length	225 ft (68.6 m)
Width	50 ft (15.2 m)
Lift gas	Helium in 10 laminated nylon gas cells
Envelope volume	295,000 ft <sup>3</sup> (8,353 m <sup>3</sup> ), estimated
Accommodations	4 x crew. Number of passengers varies by source, ranging from 25 to 30 passengers
Propulsion system	2 x V8 automotive engines with a total of 900 hp (671 kW) mounted "on the rear of each side" of the gondola
Speed, cruise	80 mph (129 kph)
Speed, maximum	90 to 100 mph (145 to 161 kph)
Range	3,000 miles (4,828 km)



*The Conrad CA220 dirigible hull under construction.  
Source: Airships for the Future (1976)*

With the hull framework virtually complete and ready for installation of the Mylar skin, a severe windstorm on 15 July 1975 dislodged the airship's rigid frame from its mooring, rolled it about 100 yards (183 meters), and severely damaged the hull framework. Parts of the frame were recovered, but work on the CA220 stopped and it was never completed. After nearly three years of work, the Conrads had nearly \$40,000 invested in the CA220. In 1976, Clare Conrad estimated that the completed CA220 would have cost more than \$250,000.

### **3. The Conrad's 2<sup>nd</sup> airship, the CA80 (1975 – 1977)**

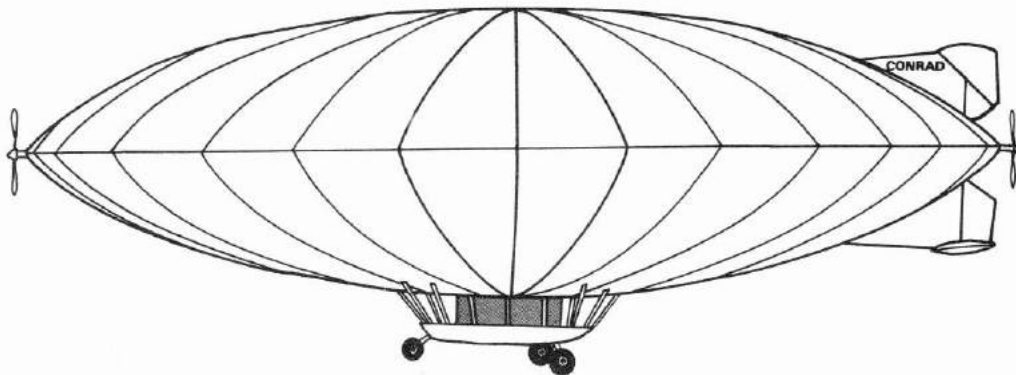
After suspending work on the damaged CA220, the Conrads began working on a more exotic 80 foot (24 m) diameter lenticular (saucer-shaped) rigid airship known as the CA80.

Clarence Conrad contacted Michael Walden and inquired about the geodesic, composite monocoque hull construction Walden developed for lenticular airships being designed by his firm, Lighter Than Air Solar (LTAS) in Las Vegas, NV. Conrad decided instead to the more conventional "spoke-and-rim" type hull frame with aluminum truss construction.

## CA80 general characteristics

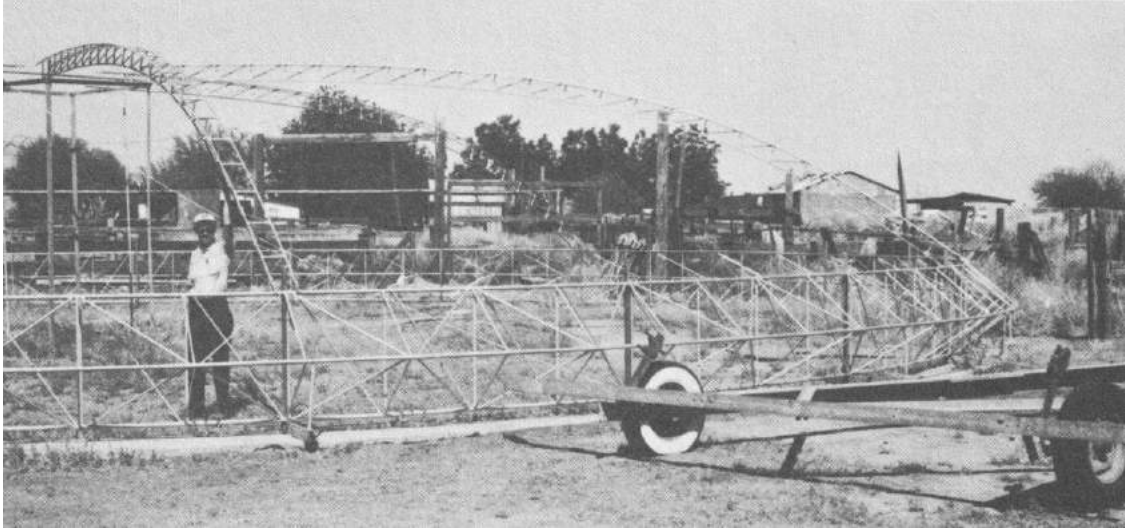
Parameter	CA80
Airship type	Lenticular, rigid, aluminum truss frame with large diameter tubular support
Length	80 ft (24 m)
Width	80 ft (24 m)
Height	27 ft (8.2 m)
Envelope volume	70,000 ft <sup>3</sup> (1,982 m <sup>3</sup> )
Lift gas	Helium in mylar gas cells
Gross weight	4,500 lb (2,041 kg)
Accommodations	2 x crew and up to 8 x passengers
Propulsion system	2 x Evenrude outboard engines @ 130 hp (97 kW) each, one mounted on the nose and one on the tail of the envelope.
Vertical dynamic lift	1 x Mercury outboard engines @ 150 hp (110 kW) powering a lift fan in the central duct
Speed, cruise	35 kts (40 mph, 64 kph)
Speed, maximum	65 kts (75 mph, 121 kph)
Range	1,200 miles (1,931 km)
Operating altitude	1,000 to 5,000 feet (305 to 1,524 m)

*Source: adapted from Air Progress*

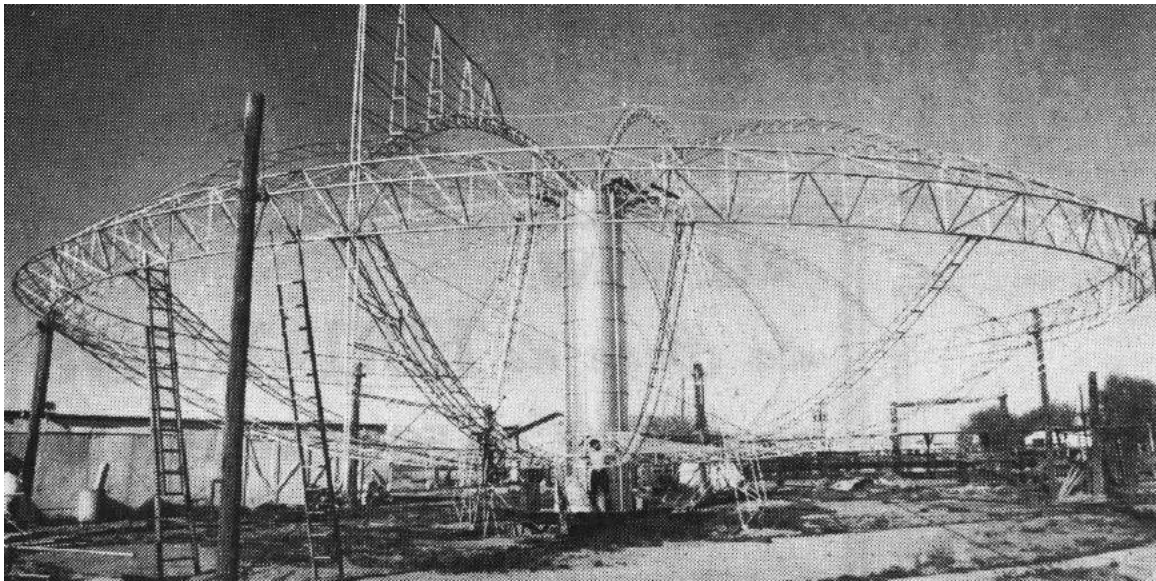


*General exterior layout of the Conrad CA80 lenticular airship.  
Note the fore and aft propeller locations.  
Source: Airships for the Future (1976)*





*Early in the construction of the upper half of the CA80.  
Note the curved structural spoke frames connecting to the rim.  
The finished airship will have 48 arching frames.  
Source: Airships for the Future (1976)*



*Rear quarter view of the CA80 "spoke-and-rim" truss frame hull  
structure, including the large diameter central duct that  
supported the frame, the single dorsal fin, the less visible ventral fin,  
and the structure at the rim of the saucer-shaped hull.  
Source: Mesa History (2014)*



*Another rear quarter view of the CA80.  
Source: Secret Projects: Flying Saucer Aircraft (2006)*



*Profile view of the CA80 lenticular airship hull under construction.  
Note the dorsal and ventral fin structure, left.  
Source: Darwin Conrad via MakeHigleyHistoric*

After investing more than \$50,000 and 12,000 hours over six years, the Conrads never did get their ambitious projects airborne and ultimately abandoned their efforts entirely in 1977.

Clarence Conrad died in 2002. Darwin Conrad moved back to Spokane and went on to a successful aviation and aerospace career.

#### 4. Postscript

Michael Walden reported, “In the early 2000s my associate Kent Bingham recreated a version of the center lift fan Conrad Saucer airship, using the ‘spoke-and-rim’ construction. He built an R/C model of it that flew fairly well.”



*Kent Bingham's flying model of the Conrad Airship.  
Source: Walden Aerospace*

#### 5. For more information:

- John Fialka, “Father and son try to bring back airship,” St. Petersburg Times, 27 May 1975:  
<https://news.google.com/newspapers?nid=888&dat=19750527&id=8QgOAAAAIBAJ&sjid=VnkDAAAAIBAJ&pg=7357,2885559>
- “There’s Still Hope – Dirigible Will Be Aloft by Christmas,” The Kingman Daily Miner, 22 December 1975:  
<https://news.google.com/newspapers?nid=932&dat=19751222&id=SBYPAAAAIBAJ&sjid=84IDAAAAIBAJ&pg=7044,5563769>
- “Father and son work on airship,” Boca Raton News, 7 November 1976:



<https://news.google.com/newspapers?nid=1291&dat=19761107&id=6dwPAAAAIBAJ&sjid=V40DAAAAIBAJ&pg=6967,763093>

- William J. White, "Airships for the Future," pp. 129 - 130, Sterling Publishing Co., Inc., New York, ISBN 0-8069-0090-3, 1976
- "Mr. Conrad's Airship," Make Higley Historic, 16 September 2009: <http://makehigleyhistoric.blogspot.com/2009/09/mr-conrads-airship.html>
- Jay Mark, "Mesa History: Father, son tried to build flying saucer, The Republic, 25 June 2014: <https://www.azcentral.com/story/news/local/mesa/2014/06/26/mesa-history-father-son-tried-build-flying-saucer/11368359/>
- "Conrad Airship CA 80," Wikipedia: [https://en.wikipedia.org/wiki/Conrad\\_Airship\\_CA\\_80](https://en.wikipedia.org/wiki/Conrad_Airship_CA_80)
- "Big Boom in Gas Bags," Popular Mechanics, pp. 131 – 132, July 1977: [https://books.google.com/books?id=tOIDAAAAMBAJ&printsec=frontcover&source=gbs\\_ge\\_summary\\_r&cad=0#v=onepage&q&f=false](https://books.google.com/books?id=tOIDAAAAMBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false)

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- Walden Aerospace / LTAS - Lenticular, toroidal, variable buoyancy airships