

KNARR™ – cargo airship

Peter Lobner, updated 18 March 2022

1. Introduction

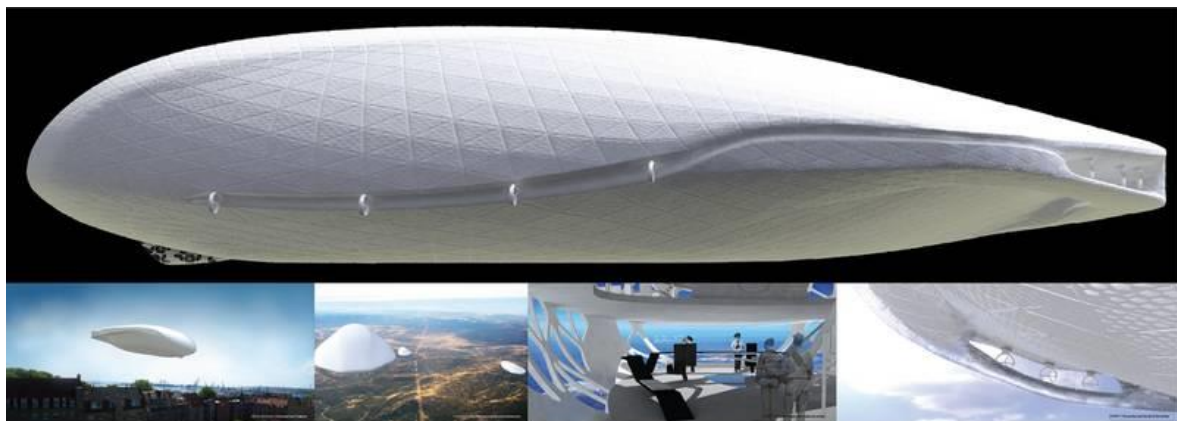
Rune Kirt and Mads Thomsen developed the KNARR™ airship concept in 2008 as their graduation project at the Aarhus School of Architecture in Denmark and produced a thesis entitled “KNARR



KIRT x THOMSEN

Cargo Airship.” After several years working with the wind turbine manufacturer Vestas Wind Systems A/S, the two formed their own architectural design firm KIRT x THOMSEN in early 2011. The firm’s website is here: <https://www.kirt-thomsen.com/company>

Their goal was to design a freight solution using modern airships to reduce the cost and energy consumption of today’s wind turbine freight business and make the logistics for wind turbine freight simpler and more efficient. Their main point is that transportation and installation costs can be up to 60% of the total cost of a new wind turbine, and these activities collectively have a large carbon footprint. Their solution is a modern airship that is designed specifically for transporting very large and heavy wind turbine blades directly from the manufacturer’s factory to the installation site, thereby reducing the transportation carbon footprint and eliminating other environmental impacts enroute.



Renderings of a KNARR™ airship profile view & details.

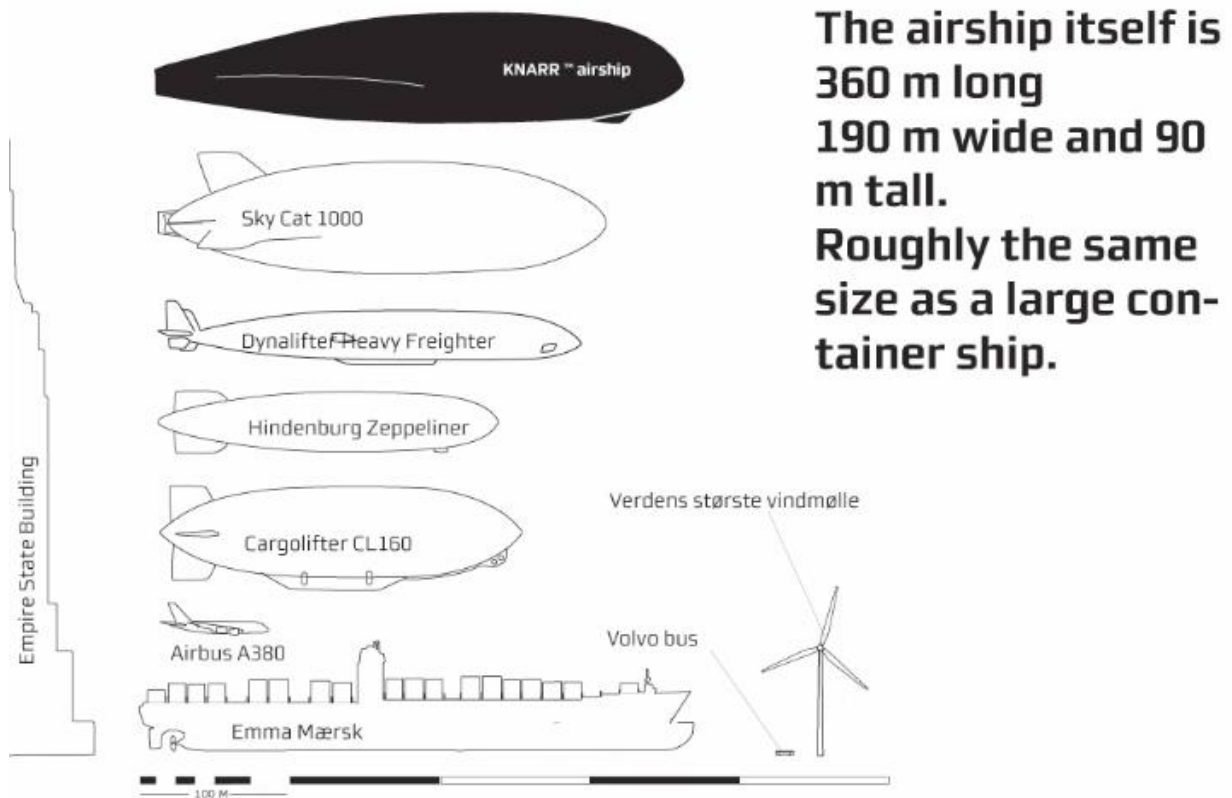
Source: KIRT x THOMSEN

For their work, Rune Kirt and Mads Thomsen were awarded both the Danish Design Center's Special Prize and the 2011 International Core77 Design "Speculative Concept."

2. The KNARR™ airship

The KNARR™ airship is a concept for a very large, conventional, semi-rigid airship that is designed to transport wind turbine blades in an enclosed internal cargo bay. The airship is designed to conduct vertical takeoff and landing (VTOL) operations with a full cargo load. Inflatable landing legs are extended prior to landing. When loading or off-loading heavy cargo, this airship must exchange ballast at the landing site. You can watch a short video on the wind turbine transport application of the KNARR™ airship here:

<https://vimeo.com/21023051>



Relative scale of a KNARR™ airship.
Source: KIRT x THOMSEN



Rendering of a KNARR™ airship in flight.
Source: KIRT x THOMSEN



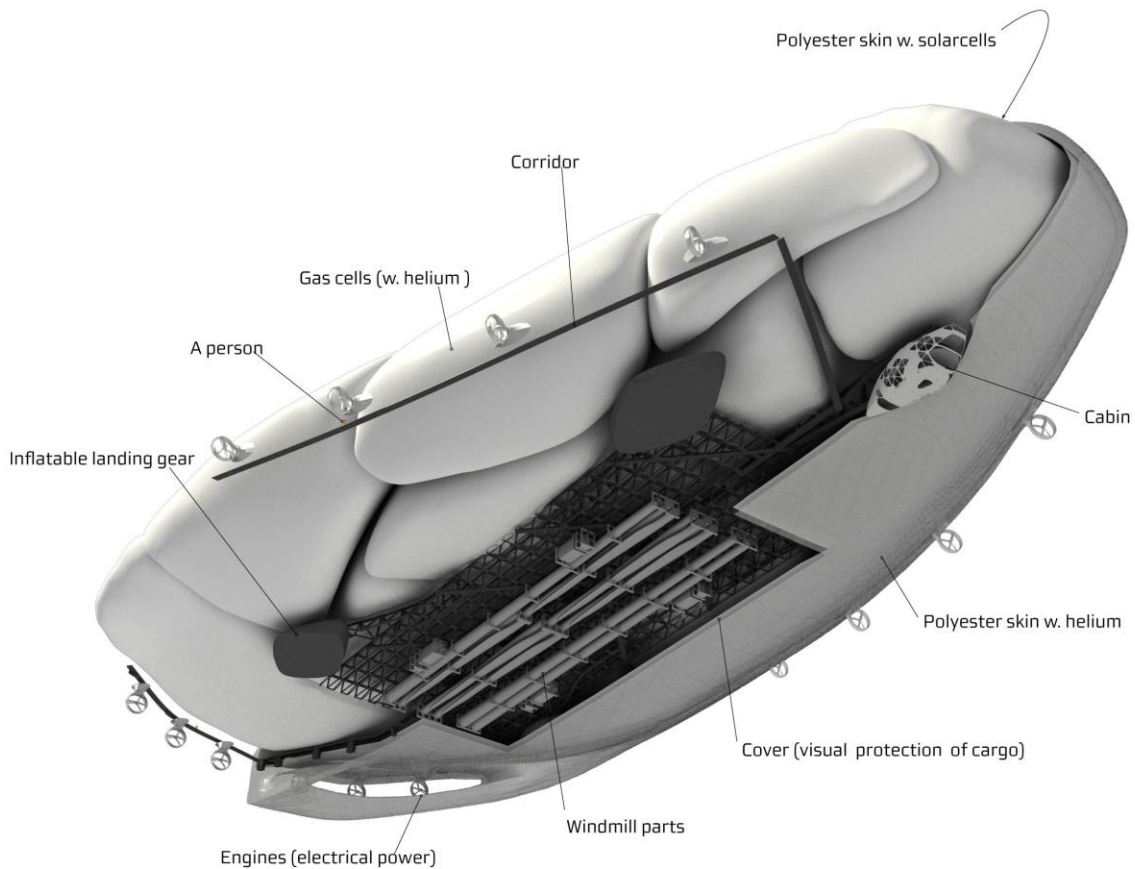
Rendering of a A KNARR™ airship lifts off after making a delivery at a wind farm site. Source: KIRT x THOMSEN



*Rendering of a KNARR™ airship flying over a wind farm.
Source: KIRT x THOMSEN*

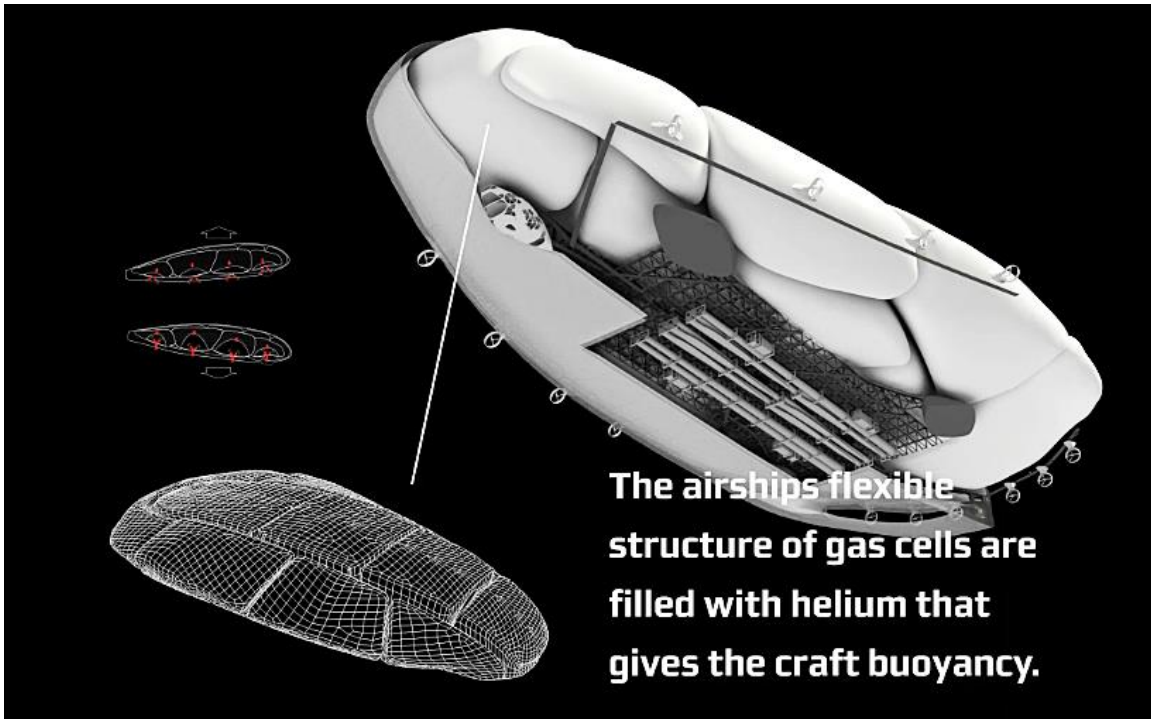
General design characteristics of the KNARR™ airship

Parameter	KNARR™
Length	360 m (1,081 ft)
Width	200 m (656 ft)
Height	90 m (295 ft)
Crew	8
Freight capacity	1,000 metric tons (1,102 tons)
Energy source	Solar cell array on the top surface of the hull (63,062 m ² ; 678,794 ft ²)
Propulsion	14 x 400 horsepower (150 kW) electrically-powered vectorable thrusters; 4 thrusters along each side; 6 stern thrusters
Speed, cruise	140 kph (87 mph)
Speed, max	180 kph (112 mph)
Altitude, max operating	3,000 meters (9,843 feet)
Range	Unlimited



Anatomy of a KNARR™ airship.
Source: KIRT x THOMSEN

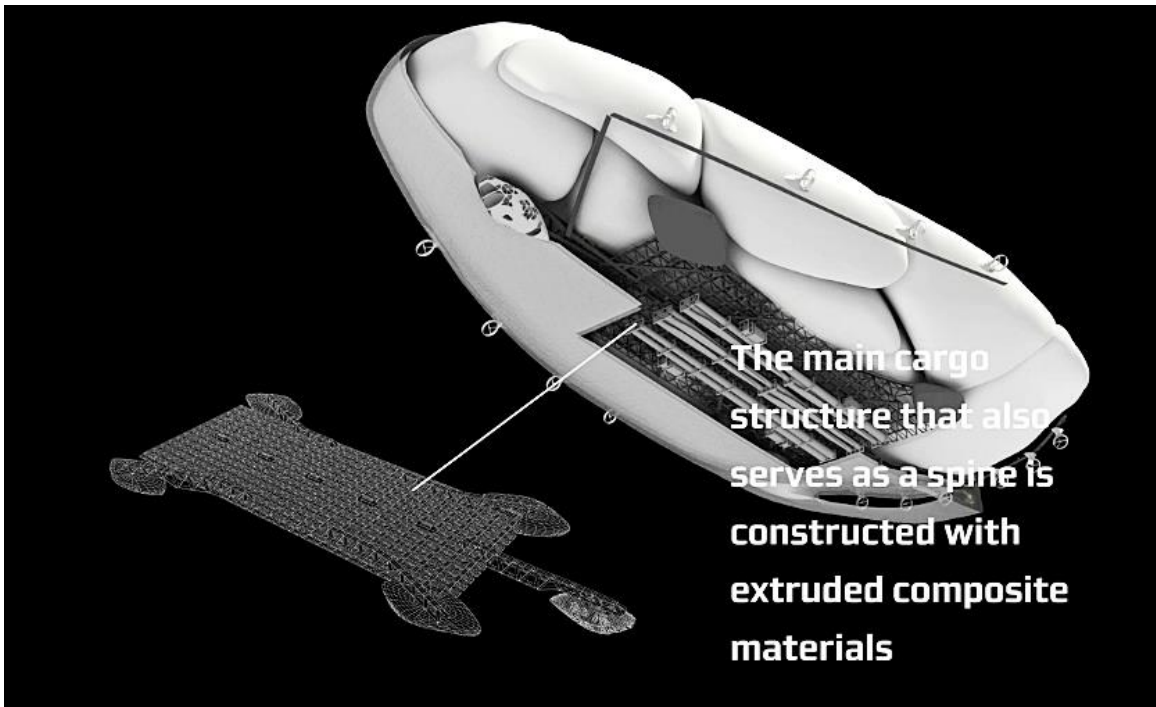
The major elements of KNARR™ airship design are depicted in more detail the following five graphics from: <https://www.kirt-thomsen.com/>



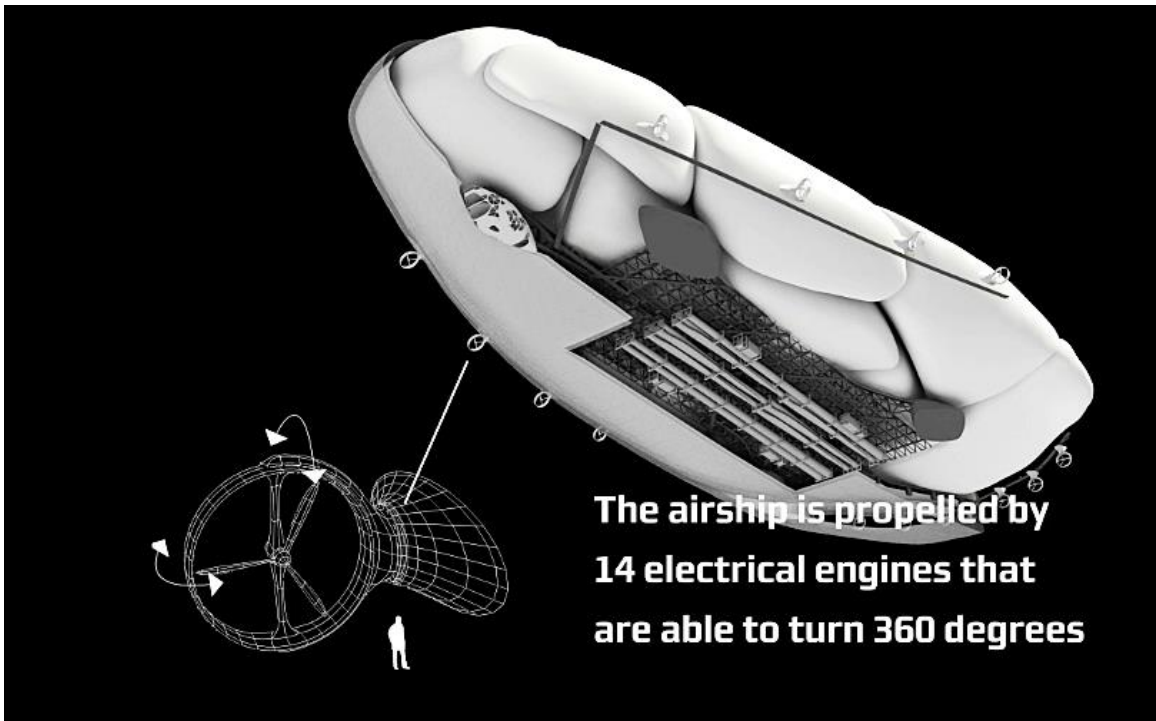
Helium lifting gas cells



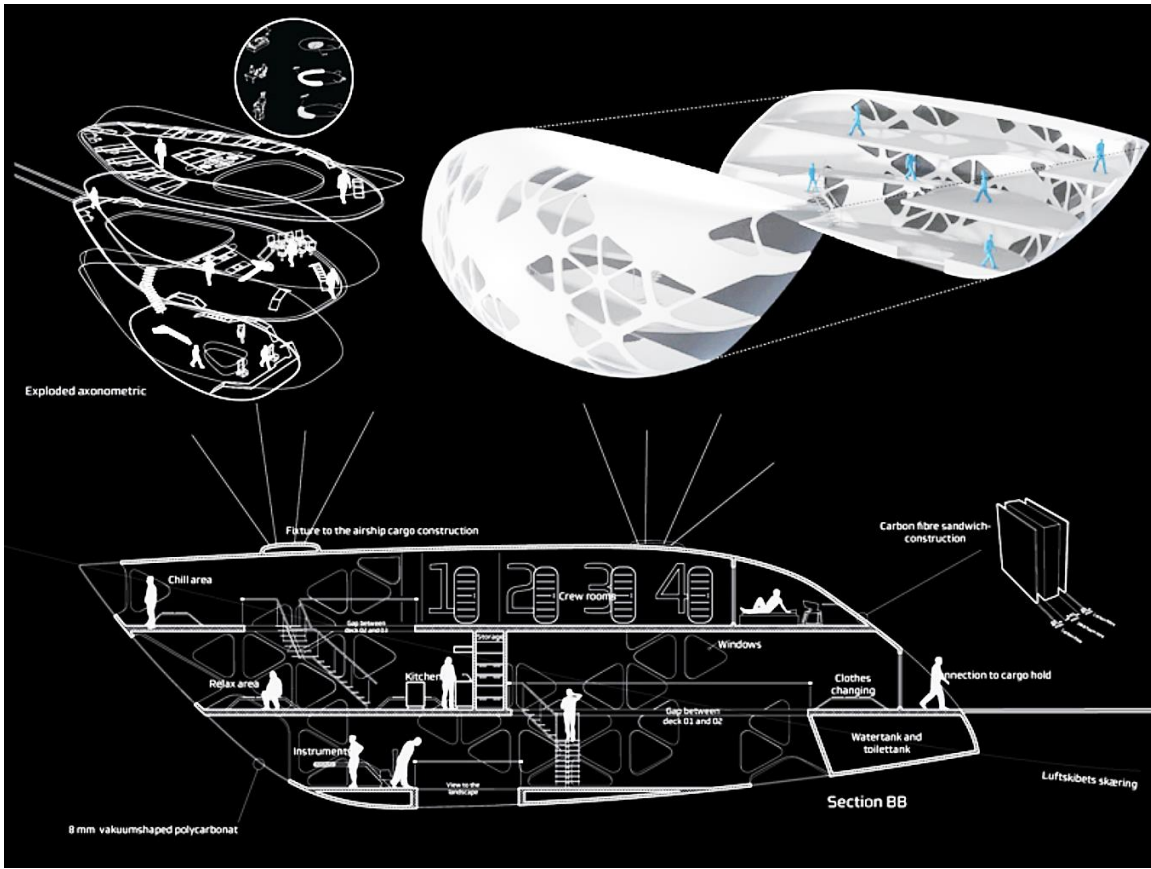
Durable polyester external skin



Rigid structure for the cargo bay



Distributed electric propulsion



Details of the crew cabin



*Rendering of a KNARR™ airship flying over Copenhagen.
Source: Screenshot from KIRT x THOMSEN 2019 video*

3. For additional information

- KNARR initiative: <https://projectknarr.wordpress.com/what-is-knarr/>
- “CASE: KNARR™ Cargo Airship,” KIRT x THOMSEN: https://www.kirt-thomsen.com/case10_airship-knarr
- “Core77 Design Award 2011: KNARR Cargo Airship, Winner for Speculative Objects/Concepts,” 2011: <https://www.core77.com/posts/20263/Core77-Design-Award-2011-KNARR-Cargo-Airship-Winner-for-Speculative-ObjectsConcepts>
- Reena Jana, “A design concept to solve the challenges of transporting wind turbines,” ZDnet, 26 July 2011: <https://www.zdnet.com/article/a-design-concept-to-solve-the-challenges-of-transporting-wind-turbines/>

Videos

- “KNARR™ Cargo Airship,” (5:02 min), Kirt x Thomsen, 2011: <https://vimeo.com/21023051>
- “KNARR_internals,” (0.14 min), Kirt x Thomsen, 2019: <https://vimeo.com/288362337>
- “Airship KNARR in Copenhagen,” (0.44 min), Kirt x Thomsen, 2019: <https://vimeo.com/288362989>

Other *Modern Airships* articles

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