

E-Green Technologies - Bullet airships

Peter Lobner, updated 10 March 2022

1. Introduction

E-Green Technologies (EGT) was founded in 2008. In November 2009, EGT acquired Hakan Colting's firm 21st Century Airships and its portfolio of airship patents. By that time, 21st Century Airships had built a portfolio of 18 issued and pending patents, had successfully flown 14 prototypes that demonstrated various features of their airship designs, including the sub-scale Voyager prototype, and had an advanced design for their full-scale Voyager non-rigid, 19-passenger "next generation" sightseeing airship.



Sub-scale Voyager prototype being prepared for flight.



19-passenger Voyager sightseeing airship concept drawing.

*Source, both graphics: 21st Century Airships
via Airshipworld Blog, 31 Oct 2007*



Under new management, the Voyager prototype was rebuilt as EGT's Bullet 125 sub-scale prototype. The full-scale Voyager was the basis for the design of EGT's Bullet 580 airship.

2. The Bullet 125 sub-scale prototype

The Bullet 125 is a three-engine, sub-scale, non-rigid airship prototype derived from the Voyager prototype aeroshell (both have the same registration, C-FJUI). The aeroshell is 125 feet long (38.1 m). Two propulsors are mounted on the horizontal mid-plane of the airship (on the flanks) and one vectorable propulsor is located in the tail cone.



Bullet 125 prototype. Source: greencarcongress.com, 13 April 2010



*Bullet 125 tail-mounted vector-thrust propeller.
Source: Unmanned Systems, Vol. 27, No. 2, Feb 2009*



Bullet 125 in flight. Source: EGT via The Register, 19 Nov 2010



Bullet 125 pilot's cockpit. Source: Screenshot from EGT video



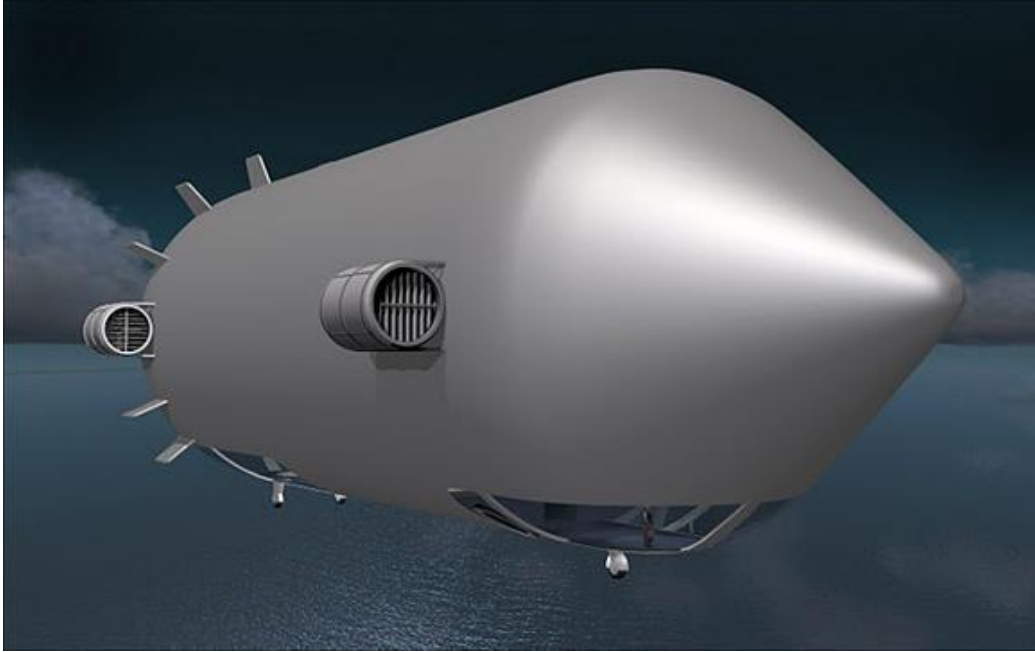
Bullet 125. Source: EGT via AeroNewsNetwork, 16 Nov 2009

You can watch an EGT short video (4:09 minutes) of a 6 October 2008 test flight of the Bullet 125 prototype here:

<https://www.youtube.com/watch?v=mXACHbasOI>

3. The Bullet 580

The 21st Century Airships Voyager became the basis for the E-Green Technologies airship known as the Bullet 580 (or Bullet Class 580), with a strong resemblance to the Voyager prototype.



Bullet 580 general configuration. Source: EGT

The basic physical characteristics of this airship are as follows:

- Non-rigid, circular cross-section aeroshell
 - Envelope material: Kevlar
- Aeroshell dimensions:
 - Length: 235 feet (71.6 m)
 - Diameter: 65 feet (19.8 m)
 - Volume: 580,000 cubic feet (16,464 cubic meters)
- Gross takeoff weight: 22,000 pounds (11 tons, 9,979 kg)
- Lift gas system: Helium in seven expandable lift gas cells within the aeroshell
- Maximum payload: 2,000 pounds (1 ton, 907 kg)
 - Payloads are carried inside the balloon.
 - Payload bays are designed for easy access and modification.
- Maximum altitude (pressure altitude): 20,000 feet (6,096 m)

- Propulsion: Four ducted fans mounted along the horizontal centerline on the flanks of the airship.
 - Each fan has horizontal “slats” in the exhaust stream to deflect airflow up and down.
- Speed: 40 knots cruise; 74 knots maximum
- Power source: Bio-diesel engine-generators with engine exhaust water condensate recovery systems
 - Generators provide a power budget for payloads exceeding 4kW
- Fuel: 5,000 pounds (2.5 tons, 2,268 kg) of algae-based biofuel
- Dual-redundant flight control system for manned and unmanned operation.
 - Ground control systems and data links provide full control during unmanned operation.
- Flight endurance: Initially up to 48 hours; eventually up to a week

The airship is designed for VTOL operations, hovering and long-duration operations at altitude. Berkshire Hathaway described the Bullet 580 mission capabilities as follows:

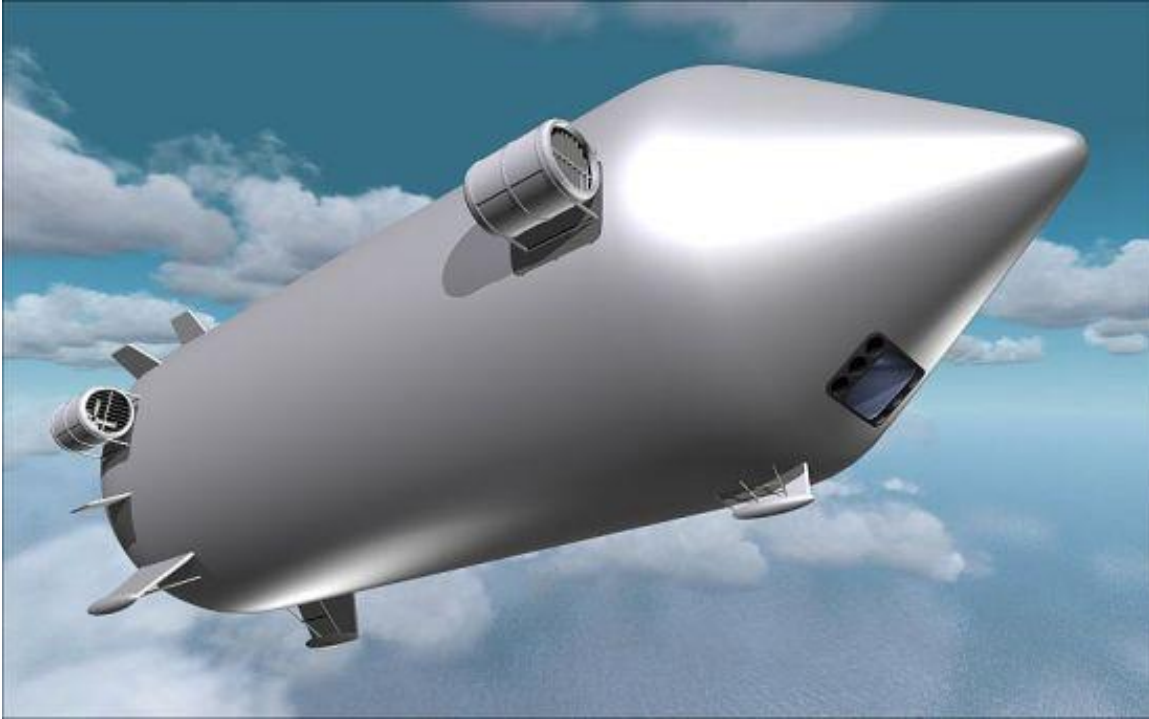
“The Bullet™ 580 is a multifunctional airship intended to serve as a dedicated near-space satellite for communications relays, broadcast communications, missile defense warning, airspace/maritime surveillance and control, position and navigation (GPS), weather monitoring, battlefield environmental monitoring, electronic countermeasures, and weapons platforms as well as geophysical surveys.”

The Bullet 580 likely controls its aerostatic lift with ballonets and dynamic lift with the four vectorable thrust propulsors. For takeoff, the ballonet air would be exhausted and the propulsor exhaust would be deflected downward to provide some dynamic lift.

The engine exhaust water condensate recovery system reduces the loss of mass that occurs when fuel is burned during flight (i.e., by recovering water in the exhaust gas). However, the Bullet 580 will be lighter at the end of a mission than at the start. The ballonets would be inflated with atmospheric air to add mass as the airship

approaches the landing point. Propulsor exhaust would be deflected as needed to fly the Bullet 580 to the landing point.

The price for a Bullet 580 airship is expected to be in the \$8 to \$15 million range and it is expected to rent for about \$500,000 a month.



Bullet 580 general configuration. Source: EGT

Two inflation tests of the Bullet 580 were conducted inside the Montgomery, Alabama Garrett Coliseum; the first was performed on 18 May 2010 and the second test was on 18 November 2010. In these tests, the Kevlar envelope was inflated with air while pre-flight engineering fit checks of various attachments to the Kevlar envelope were conducted. The outer envelope carries all the loads from the solid structures attached to the Kevlar envelope, including the small crew cabin, the ducted fan propulsors, engine, fuel tank, landing gear and stabilizing fins.

You can watch a short (3:31 minutes) E-Green Technologies video, entitled "World's Largest Airship Explained," showing the May 2010 first inflation here: <https://www.youtube.com/watch?v=LByr7ymgjiM>



Bullet 580 aeroshell inflated with air in Garrett Coliseum in November 2010. George Schellenger via AeroNewsNetwork

After the second test in November 2010, the Bullet 580 was packaged into two standard 40-foot shipping containers and sent to NASA's Ames Research Center at Moffett Field in Mountain View, California, where E-Green Technologies had leased 24,000 square feet of hangar space. Moffett Field was intended to become the base for West Coast operations and the site of the first test flight with Allan P. Judd serving as the Chief Test Pilot. The Bullet 580 was delivered to Moffett Field Hangar 2 on March 11, 2011.



Bullet 580 aeroshell inflated in Moffett Field Hangar 2.

Source: Moffett Field Historical Society Museum/Sagar N. Pathak

NASA reported that the Bullet 580 was expected to fly with "a joint NASA Langley Research Center and Old Dominion University payload, the Radar Oxygen Barometric Sensor Project, a remote sensing instrument for measuring barometric pressure at sea level--an important meteorological measurement in the prediction and forecasting of tropical storms and hurricanes."

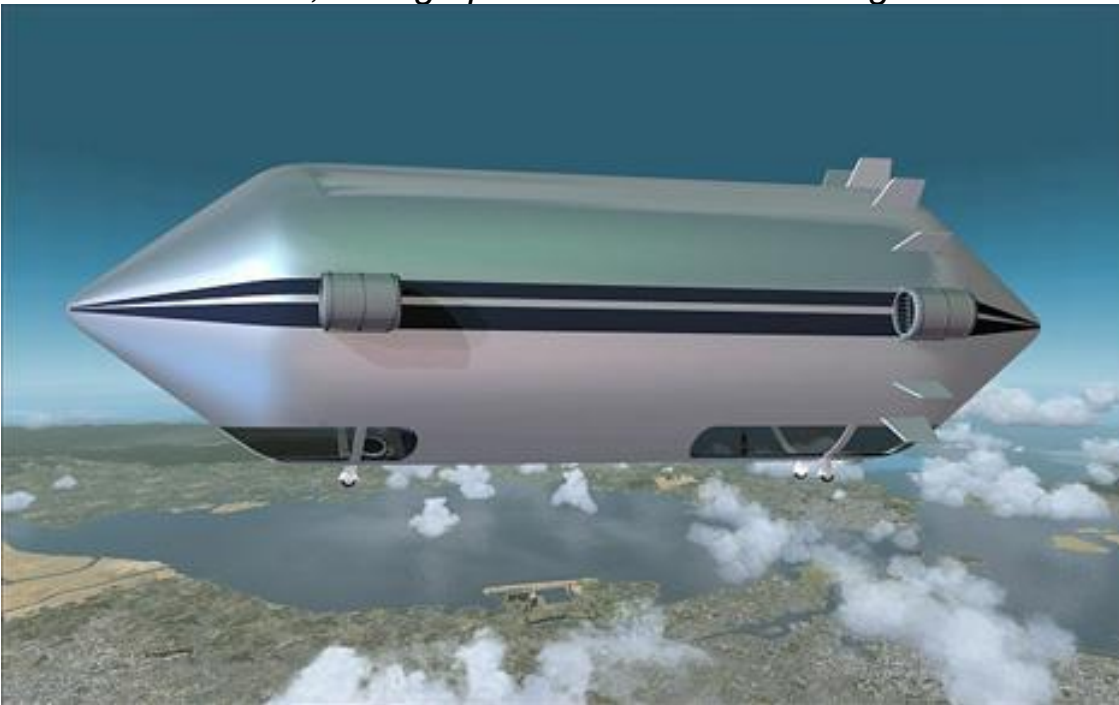
It appears that the Bullet 580 was never completed and never flew.

4. Beyond the Bullet 580

The Bullet 580 was to be the prototype for EGT's future heavy lift and high altitude applications. Following are four EGT concept drawings for a production airship based on the Bullet 580.

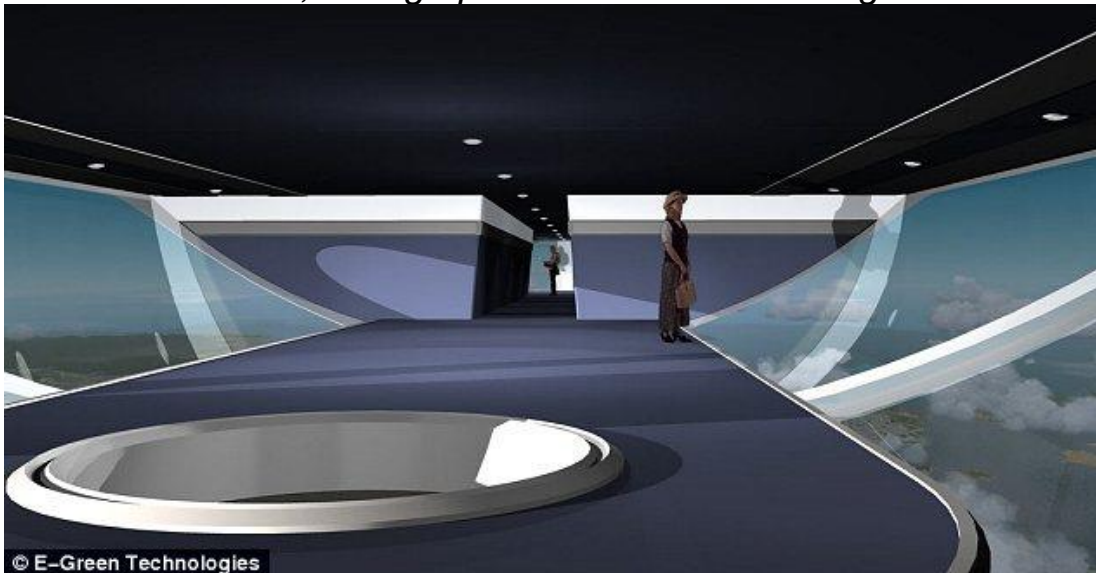


Source, both graphics: E-Green technologies





Source, both graphics: E-Green technologies



EGT had plans for a larger follow-on airship measuring 326 feet (99.4 m) long and 85 feet (25.9 m) in diameter. They also had plans to develop an airship that could fly at altitudes of 40,000 to 60,000 feet (12,192 to 18,288 m).

It appears that work on the Bullet-series of airships stopped when E-Green Technologies closed shop in about 2012. In 2020, EGT's former website domain was still available for sale.

5. Beyond E-Green Technologies

The experience gained from the Bullet prototypes and the design of the full-scale Bullet airship appears to have been recycled by Hokan Colting and his new firm Flying-Yacht, Inc., which was formed in 2012 in Newmarket, Ontario, Canada. The general arrangement of their Sky-Yacht airship concept bears a strong resemblance to the full-scale Voyager and Bullet airships.



Rendering showing the general configuration of a Sky-Yacht, with the passenger deck below the helium gas envelope. Source: octuri.com

See my separate articles on 21st Century Airships and Flying-Yacht, Inc. for more information on Hokan Colting's airship projects before and after his business venture with E-Green Technologies.

6. For more information

- “E-Green Technologies, Inc. Acquires 21st Century Airships,” BusinessWire, 16 November 2009: <https://www.businesswire.com/news/home/20091116005530/en/E-Green-Technologies-Acquires-21st-Century-Airships>
- Daniel Terdieman, “NASA Ames to host world's largest airship,” cnet.com, 8 December 2010: <https://www.cnet.com/news/nasa-ames-to-host-worlds-largest-airship/>
- “NASA Research Park to Host World's Largest, Greenest Airship,” SpaceRef, 8 December 2010: <http://www.spaceref.com/news/viewpr.html?pid=32216>

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/>
 - 21st Century Airships – Voyager
 - Flying-Yacht
- *Modern Airships - Part 3*: <https://lynceans.org/all-posts/modern-airships-part-3/>