

21st Century Airships Voyager airships

Peter Lobner, 3 April 2021

1. Introduction

Hot air balloon and airship entrepreneur Hakan Colting founded 21st Century Airships, Inc. in 1988 in Newmarket, Ontario, Canada, with an original goal of developing a non-rigid airship that was simpler to operate with a smaller ground crew than contemporary blimps.

His early efforts focused on a spherical airship design concept, which he patented in Canada and the US, and with which he set several airship altitude records, some of which still stand in 2021. 21st Century Airships licensed Techsphere Systems International LLC (TSI) in 2002 to manufacture spherical airships. TSI built several large prototypes under their trademarked name AeroSphere™ and conducted flight tests for potential commercial (Sanswire), government (Department of Homeland Security) and military (Navy and Army) customers. No version of the spherical airship entered production. TSI was acquired by Cyber Defense Systems, Inc. on 20 September 2005.

In 2004, Colting and 21st Century Airships started development of a more conventional-looking, non-rigid airship design that they had patented in 1994. By 2007, they had built and flown a sub-scale prototype to validate the design of their Voyager non-rigid, 19-passenger “next generation” sightseeing airship.

In November 2009, E-Green Technologies (EGT) acquired 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, successfully flown 14 prototypes that demonstrated various features of their airship designs, and had an advanced design for the full-scale, non-rigid Voyager airship.

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

appears that work on the Bullet-series of airships stopped in 2011 followed by EGT closing shop in about 2012.

However, the experience gained from the Bullet prototypes and the design of the full-scale Bullet airships 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.

In this article, we'll take a look at Colting's Voyager airship. See my separate articles on 21st Century's spherical airships, the E-Green Technologies Bullet, and Flying-Yacht, Inc. for more information on Hokan Colting's airship projects.

2. Voyager airship patent

The original design concept implemented in the Voyager airship is described in patent US 5294076A, "Airship and Method for Controlling Its Flight," which was filed on 23 July 1992, granted on 15 March 1994, and assigned to 21st Century Airships. You can read this patent here: <https://patents.google.com/patent/US5294076>

The following figures from that patent illustrate key features that were incorporated in the Voyager non-rigid airship design.

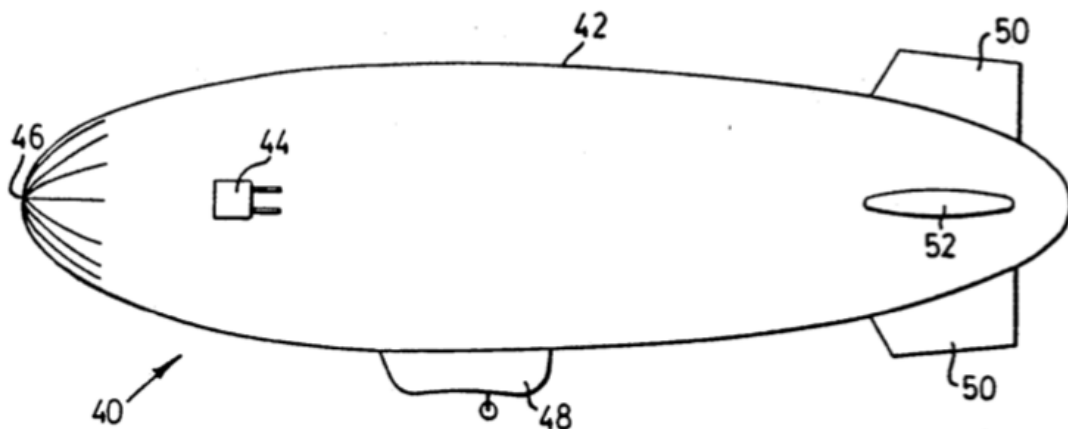
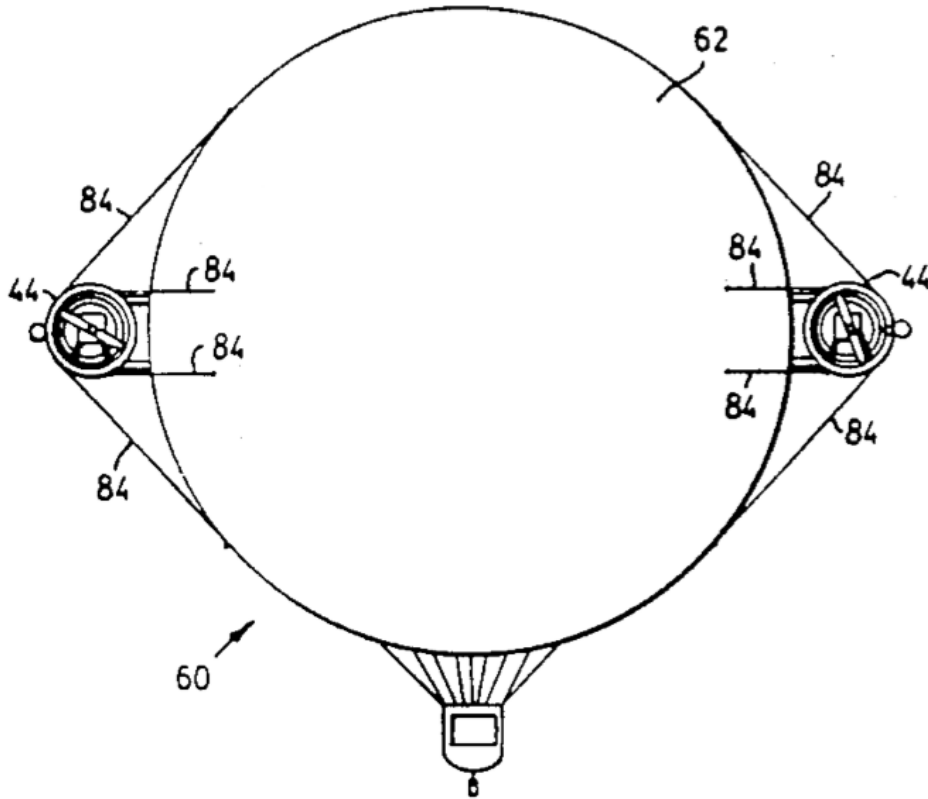
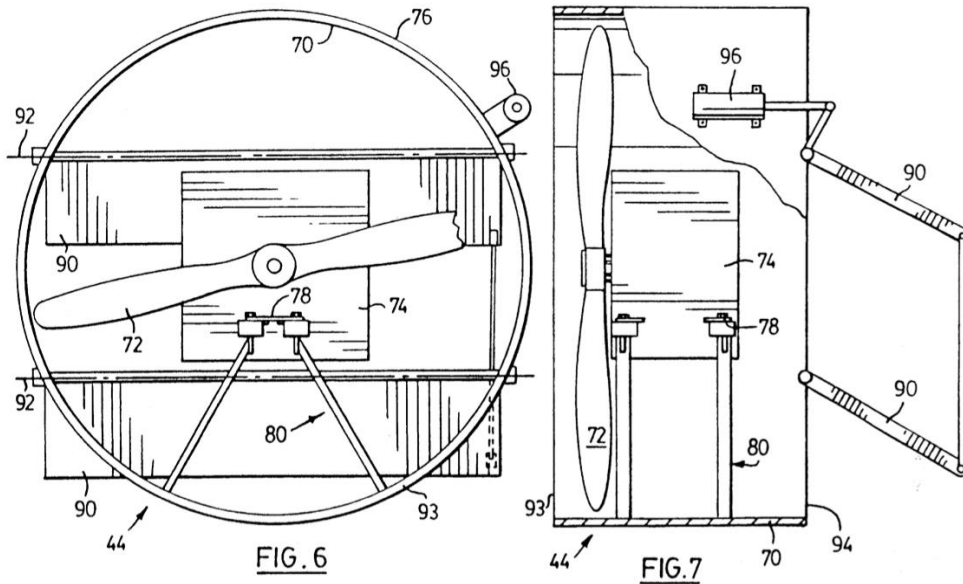


FIG. 2

Side view shows one of two shrouded propulsion units (44). The stabilizing fins (50 & 52) are fixed.



Shrouded propulsion units (44) are attached at the mid-plane of the Kevlar aeroshell (60) with a combination of fabric, straps and cables.



Each shrouded propulsion unit encloses an internal combustion engine or motor (74) driving the propeller (72). Horizontal, movable flaps (90) control the vertical deflection of the exhausting airflow.

3. 21st Century Airships Voyager sightseeing airship



*19-passenger Voyager sightseeing airship concept drawing.
Source: 21st Century Airships via Airshipworld Blog, 31 Oct 2007*

The Voyager design incorporates several novel features. For example, although this airship has stabilizing fins, there are no moving surfaces such as rudders and elevators. Steering and altitude controls are managed by directed thrust from engines mounted along the horizontal mid-plane of the airship (along the flanks of the aeroshell). The main advantage of this new system is that it enables the airship to be highly maneuverable at any speed from zero to full speed and there is no aerodynamic pitching moment when engine power is changed.

Voyager is designed for vertical take-off and landings (VTOL) operations. This airship has no elevator wheel or rudder pedals. Instead it is simply controlled with a joy-stick.

- Direction (yaw) of the airship is controlled by varying the relative thrust of the propulsion units on each side of the airship.
- Altitude can be changed by collectively varying the deflection of the thrust from the four propulsion units. Pitch and roll can be controlled by differentially varying the deflection of the thrust from the four propulsion units.



Above: Voyager port bow quarter view.

Below: Port stern quarter view.

Source: 21st Century Airships via NAA Noon Balloon, Fall 2007



4. The Voyager sub-scale prototype

To validate this patented design concept, 21st Century Airships built a two-passenger sub-scale, non-rigid Voyager prototype and conducted test flights near Newmarket during the summer of 2007. The pilot is housed in a small gondola under the gas envelope.

21st Century Airships reported that the Voyager prototype airship was extremely maneuverable and capable of VTOL flight. The prototype also demonstrated low pilot workload while using a joystick for steering and altitude control. After the initial test flights are completed in September 2007, 21st Century Airships used the prototype for demonstrations as well as for collecting data for their planned Type Certification of the 19-passenger Voyager.

You'll find a short (1:34 minutes) video that shows what I believe is a summer 2007 test flight of the sub-scale Voyager prototype (title says Bullet 125, but this is incorrect) here:

<https://www.youtube.com/watch?v=xZBhh8qcKoU>



*Sub-scale Voyager prototype being prepared for flight.
Source: 21st Century Airships via Airshipworld Blog, 31 Oct 2007*



*Sub-scale Voyager prototype in flight.
Source, three photos: Screenshots from YouTube video*



5. Acquisition by E-Green Technologies (EGT)

In November 2009, E-Green Technologies (EGT) acquired 21st Century Airships. Under new management, the Voyager prototype was rebuilt as EGT's Bullet 125 sub-scale prototype. The full-scale Voyager was redesigned as EGT's Bullet 580 airship. For more information, see my separate article on EGT and the Bullet airships.

6. Beyond E-Green Technologies

It appears that work on the Bullet-series of airships stopped when EGT closed shop in about 2012. However, the experience gained from the Bullet prototypes and the design of the full-scale Bullet airships 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. For more information, see my separate article on Sky-Yacht.

7. For more information

- Roland Escher, “21st Century Airships,” Airship and Blimp Resources, 1995 - 2003:
<http://www.myairship.com/database/21century.html>
- Author Achmed Khammas has written an historical overview of 21st Century Airships. The original article in German is in Teil C (Part C) of *Buch der Synergie*, which you will find at the following link: http://www.buch-der-synergie.de/c_neu_html/c_11_17_solarluftschiffe_04.htm

8. Additional patents

- Patent US7552893B2, “Airship & method of operation” (multiple volumes for better control of lifting gas in cylindrical high-altitude airships), Inventor: Hokan Colting, Filed: 28 June 2005, Granted: 30 June 2009:
<https://patents.google.com/patent/US7552893B2/en?q=US7552893>
- Patent US 2007/0102571A1, “Airship for lifting heavy loads & methods of operation” (aerostatic lift carries part of the load, with the balance handled by powerful vectored thrusters that reverse during and after unloading), Inventor: Hokan Colting, Filed: 20 October 2005, Granted: 10 May 2007:
<https://patents.google.com/patent/US20070102571A1/en?q=US+2007%2f0102571A1>