



VariaLift Airships

VARIABLE LIFT A NEW HORIZON

VARIABLE LIFT WITH CONTROLLED
BOUYANCY

AIR TRANSPORT

The United States of America



The Director of the United States Patent and Trademark Office

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, or importing into the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

John Doll

Acting Director of the United States Patent and Trademark Office



US007568656B2

(12) **United States Patent**
Handley

(10) **Patent No.:** US 7,568,656 B2
(45) **Date of Patent:** Aug. 4, 2009

(54) **SYSTEM FOR CONTROLLING THE LIFT OF AIRCRAFT**

5,368,067 A 11/1994 Cook, Jr.
5,538,203 A * 7/1996 Mellady 244/97
6,131,851 A * 10/2000 Williams 244/58
6,648,272 B1 * 11/2003 Kothmann 244/97
7,275,569 B2 * 10/2007 Hobbs 141/97
2002/0179771 A1 * 12/2002 Senepart 244/97

(76) Inventor: **Alan R. Handley**, 1 Laburnum Street, Wollaston, Stourbridge (GB) DY8 4NX

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 470 days.

FOREIGN PATENT DOCUMENTS

(21) Appl. No.: **11/115,554**

DE 4112621 A1 10/1992

(22) Filed: **Apr. 26, 2005**

DE 4233768 A1 10/1993

(65) **Prior Publication Data**

FR 768327 8/1937

US 2005/0236519 A1 Oct. 27, 2005

FR 1601319 8/1970

GB 2196919 A 5/1988

WO 2005/019025 A1 3/2005

WO 2005/081680 A2 9/2005

(30) **Foreign Application Priority Data**

Apr. 27, 2004 (GB) 0409314.2

Jun. 2, 2004 (GB) 0412220.6

Jun. 16, 2004 (GB) 0413437.5

* cited by examiner

Primary Examiner—J. Woodrow Eldred

(74) *Attorney, Agent, or Firm*—Fulbright & Jaworski LLP

(51) **Int. Cl.**
B64B 1/02 (2006.01)

(57) **ABSTRACT**

(52) **U.S. Cl.** **244/24; 244/30; 244/97; 244/98; 244/99**

A system for controlling lift of an aircraft comprises an inflatable compartment for containing a gas which is lighter than air. A receiver receives and stores the gas in a compressed condition. Means are provided for compressing the gas and transferring it from the inflatable compartment into the receiver thus reducing the lift force on the aircraft.

(58) **Field of Classification Search** 244/30, 244/97, 98, 99, 24

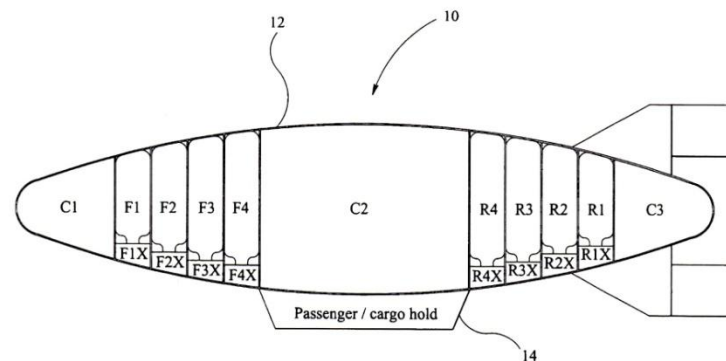
See application file for complete search history.

(56) **References Cited**

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21 Claims, 3 Drawing Sheets



URKUNDE

Es wird hiermit bescheinigt, dass für die in der Patentschrift beschriebene Erfindung ein europäisches Patent für die in der Patentschrift bezeichneten Vertragsstaaten erteilt worden ist.

CERTIFICATE

It is hereby certified that a European patent has been granted in respect of the invention described in the patent specification for the Contracting States designated in the specification.

CERTIFICAT

Il est certifié qu'un brevet européen a été délivré pour l'invention décrite dans le fascicule de brevet, pour les Etats contractants désignés dans le fascicule de brevet.

Europäisches Patent Nr.

European patent No.

Brevet européen n°

1591356

Patentinhaber

Proprietor of the patent

Titulaire du brevet

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Alison Brimelow
Präsidentin des Europäischen Patentamts
President of the European Patent Office
Présidente de l'Office européen des brevets

München, den
Munich,
Fait à Munich, le

24.12.08



(11) **EP 1 591 356 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
24.12.2008 Bulletin 2008/52

(51) Int Cl.:
B64B 1/62^(2006.01) B64B 1/06^(2006.01)
B64B 1/40^(2006.01) F04B 45/04^(2006.01)

(21) Application number: **05252627.4**

(22) Date of filing: **27.04.2005**

(54) **System for controlling the lift of an aircraft**

Luftfahrzeugsauftriebs- Steuerungssystem

Système de contrôle de la force ascensionnelle d'un aéronef

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU MC NL PL PT RO SE SI SK TR

(72) Inventor: **Handley, Alan Roy**
Stourbridge DY8 4NX (GB)

(30) Priority: **27.04.2004 GB 0409314**
02.06.2004 GB 0412220
16.06.2004 GB 0413437

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(43) Date of publication of application:
02.11.2005 Bulletin 2005/44

(73) Proprietor: **Handley, Alan Roy**
Stourbridge DY8 4NX (GB)

(56) References cited:
WO-A-20/05081680 FR-A- 768 327
FR-A- 1 601 319 US-A- 5 368 067
US-A1- 2002 179 771

EP 1 591 356 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

CERTIFICATE OF GRANT OF PATENT

批予專利證明書

Patents Ordinance (Chapter 514)

專利條例 (第 514 章)

STANDARD PATENT 標準專利

I hereby certify that a standard patent with the following particulars has this day been granted 茲證明下述標準專利在今日批予:

Name and Address of Proprietor 專利所有人姓名或名稱及地址:

Handley, Alan Roy
1 Laburnum Street, Wollaston
Stourbridge DY8 4NX
UNITED KINGDOM

Patent No. 專利編號 : HK1083614 Application No. 申請編號 : 06103808.0

Title of Invention 發明名稱 :

SYSTEM FOR CONTROLLING THE LIFT OF AN AIRCRAFT
控制飛機上升的系統

Term of Standard Patent 標準專利有效期 :

Twenty years commencing on 27.04.2005
由 27.04.2005 年起計 20 年

Dated this 14th August, 2009

二零零九年八月十四日



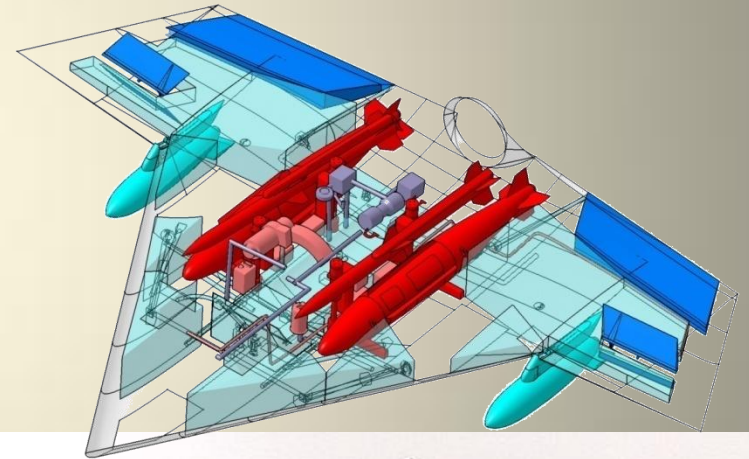
Stephen Selby
Registrar of Patents
專利註冊處處長謝肅方

**Patents Registry
Intellectual Property Department
The Hong Kong Special Administrative Region
香港特別行政區知識產權署專利註冊處**

Aircraft Design Centre Cranfield University

An independent centre for research, design and consultancy applied to the development and application of aircraft, aerospace technologies and life cycle, operational and environmental issues.

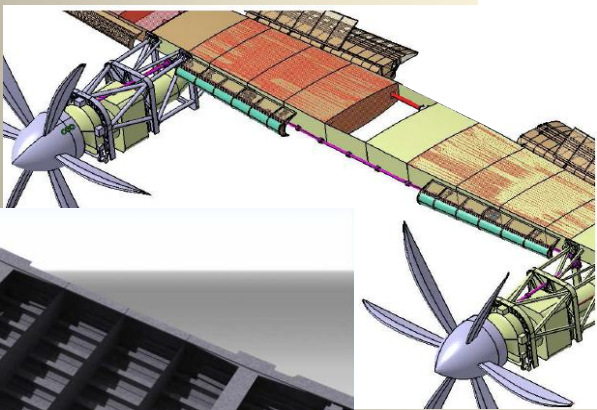
A comprehensive capability for the cost effective design and evaluation of technology including demonstrators for risk reduction.



Aircraft Design Centre Cranfield University

Balance of Industrial and Academic
background

- Most staff have considerable industrial experience



- Composite and metallic Design and Analysis
- Structural Stability
- Aeroelasticity
- Structural integrity
- Fatigue and fracture
- Advanced Composite Structures
- Structural repairs
- Structural Testing

- Avionic systems
- Electronics design
- Flight deck systems
- Advanced Navigation Systems
- System safety assessment
- Airframe systems
- Propulsion
- 'More electric' technology
- Systems integration
- CFD
 - Fluent
- Design for Vulnerability and survivability
- Design for Low Observables
- Reliability and Maintainability

**HISTORY SHOWS THAT TO CARRY HEAVY LOADS OVER
LONG PERIODS OF TIME AND DISTANCE
A STRONG ROBUST VEHICLE IS REQUIRED**

AS DEMONSTRATED:

 ***SHIPS AT SEA***






 ***RAIL TRAVEL***

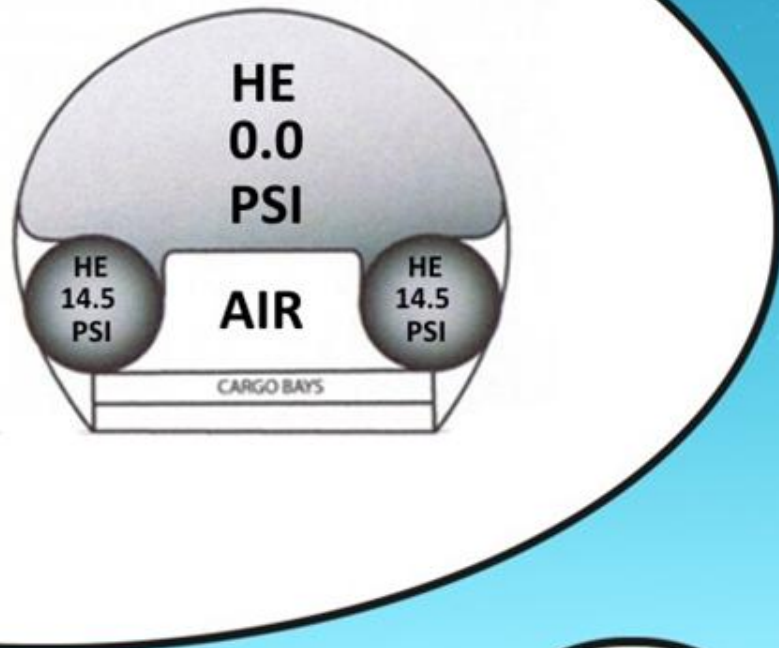
 ***AEROPLANES***

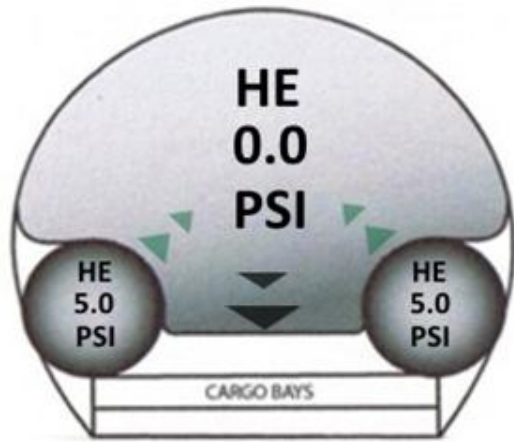
**ALL THE VEHICLES USED HAVE ENDED UP BEING
MANUFACTURED FROM VARIOUS METALS**

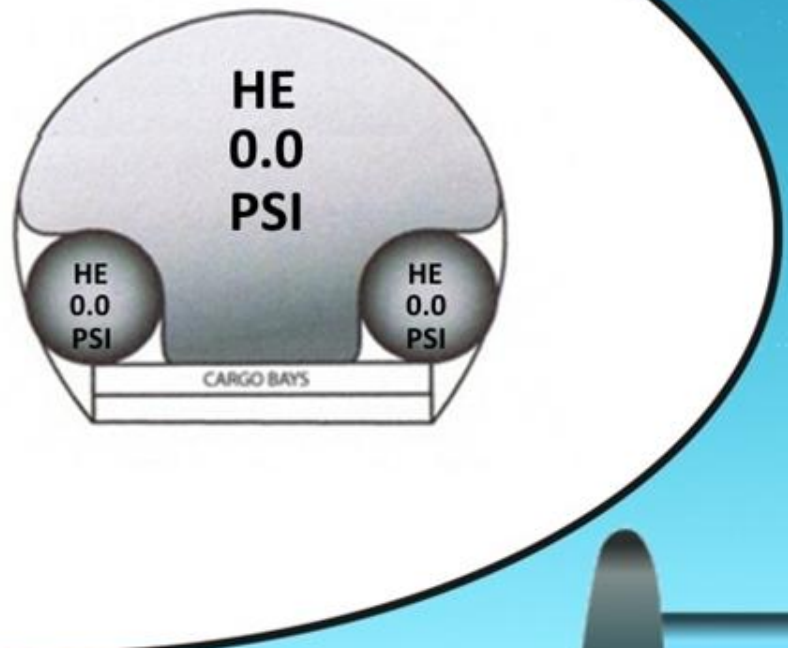
NOW WITH VARIABLE BOUYANCY ITS THE AIRSHIP

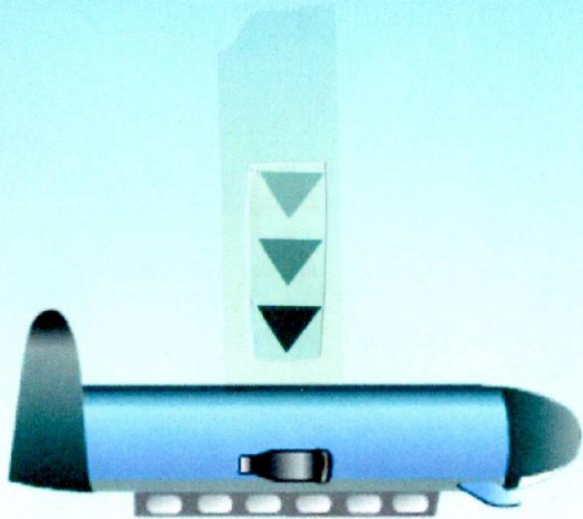
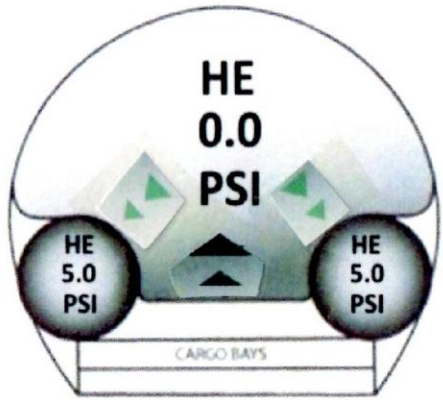
ALUMINIUM IS IDEAL FOR CONTAINING HELIUM

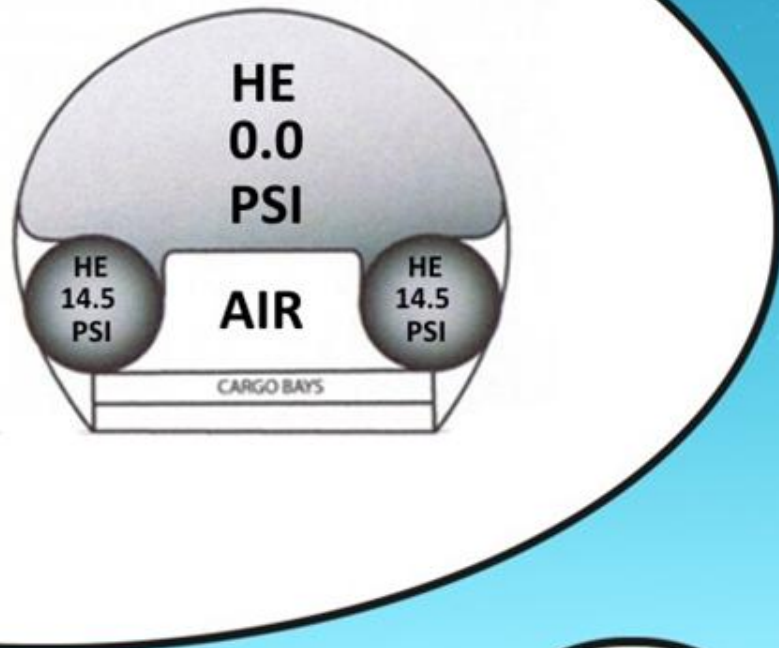
-  **MINIMUM LOSS OF HELIUM**
-  **LONG WORKING LIFE**
-  **REPAIR AWAY FROM BASE**
-  **WELD WITH MIG OR TIG**
-  **RECYCLE AFTER A LONG LIFE SPAN**











VARIALIFT AIRSHIPS PLC
THE TECHNOLOGY DEMONSTRATOR
Construction now completed



PROTECTED BY

USA PATENT No 7568656

EUROPEAN PATENT No 1591356

HONG KONG PATENT No HK 1083614

THE REASONS FOR CONSTRUCTING A TECHNOLOGY DEMONSTRATOR



Construction and testing of receivers

- Methods of fabrication
- Find new ways to weld thin aluminium



Design and construction

- To insulate the envelope to improve control
- Evaluate design configurations

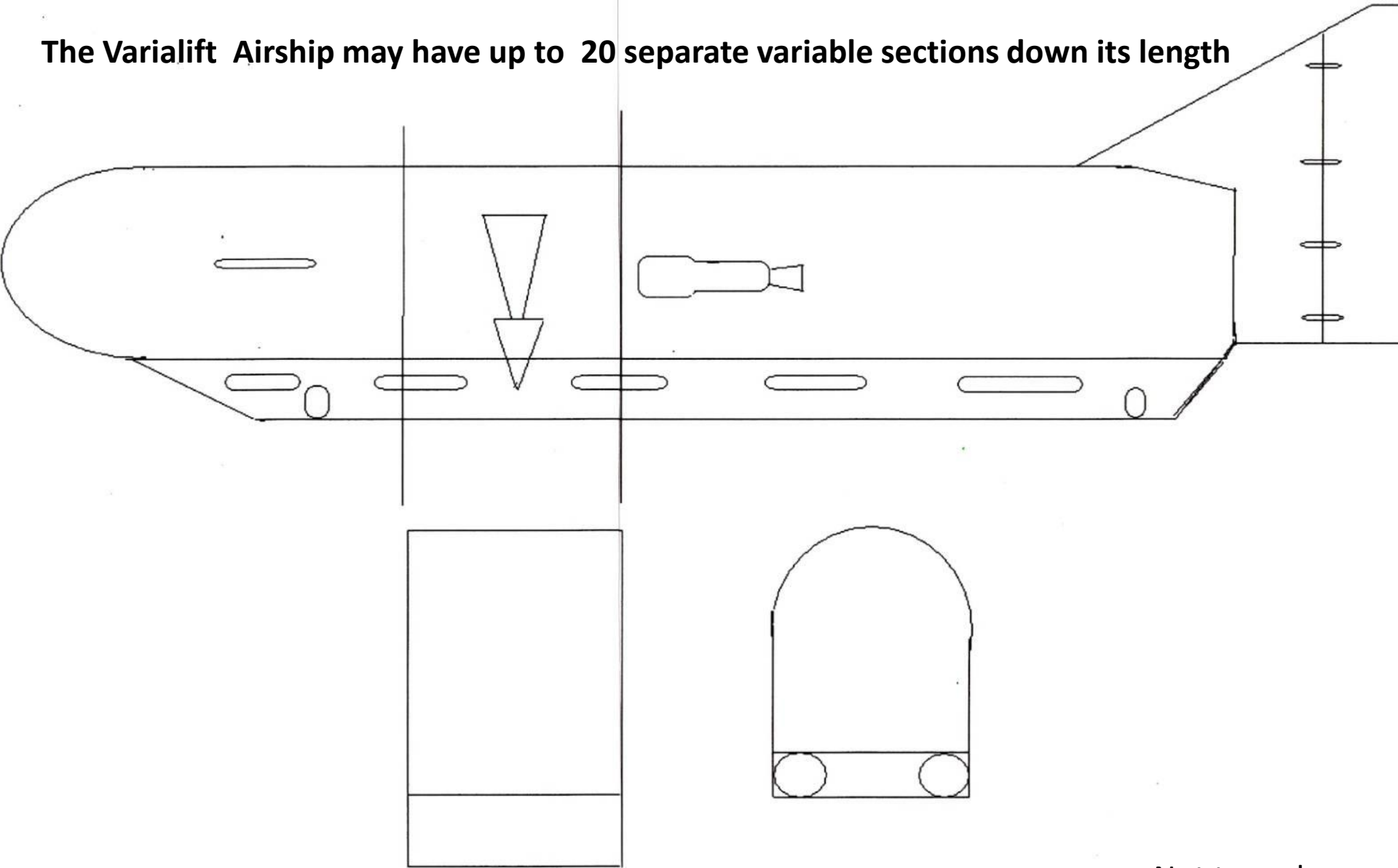


Lower the unit costs in real terms

- Improve and test in real outside conditions
- Find new ways to speed up manufacture

WE CAN NOW DEMONSTRATE THE PRINCIPLE OF THE VARIABLE LIFT

The Varialift Airship may have up to 20 separate variable sections down its length



THIS VARIALIFT SECTION CONTAINS
3 VARIABLE LIFT UNITS

Not to scale















**PROTECTED BY
PATENT NUMBERS**
USA :- 7568656
EUROPEAN :- 1591356
HONG KONG :- HK 1083614







NO ENTRY

SITE SAFETY
Safety helmets must be worn
Safety boots must be worn
No mobile phones

VariaLift Airships
tel. 07753 420565



Varialift Airships

- open potential windfall gains

Improved fuel consumption efficiency leads to substantial reduction in costs, improved profits and opening of new markets

Aircraft Type	Payload	Fuel for 1500 Nm Flight	Fuel Cost ** @ 311.0 cts/gal	Fuel cost If 100 x 1500 Nm Flights
Fixed –Wing BelugaA300-600ST*	39.3 Tons	9095 US gal.	28,285 USD	2.83 Million USD
Varialift ARH50 Airship	50 Tons	2314 US gal.	7,197 USD	0.72 Million USD
‘39.3 Ton’ Varialift Airship	39.3 Tons	1819 US gal.	5,657 USD	0.57 Million

* Airbus Industrie

** IATA October 2011

Varialift Airships

- **diminish air transport CO2 emissions**
- Carbon Credit generation or Carbon Tax reductions
- Greenhouse Gas emissions in transport sector are substantial and expected to grow
- Many Companies have started implementing measures to reduce emissions, either on voluntary basis or under a regulated scheme
- Improved Corporate Social responsibility

Varialift Airships

- Carbon Credit/offset revenue creation potential

Aircraft type	Fuel Used in US gal.	Fuel Saved in US gal.	Fuel Saved in Tons	CO2 Tons Saved (Fuel Tons Saved x3.15*)	Carbon Credit/offset @ 20USD/Ton** for one 1500Nm Flight in USD	Carbon Credit/offset generated in 100 x 1500 Mn Flights
Fixed –Wing BelugaA300-600ST	9,095	None	- 34	-108	-17***x 20 = -342	- 34,200
Varialift ARH 50 Airship	2,314	9,526	36	113	2,268	226,800
'39.3 Ton' Varialift Airship	1,819	7,276	27.5	87	1,740	174,000

* European Environment Agency

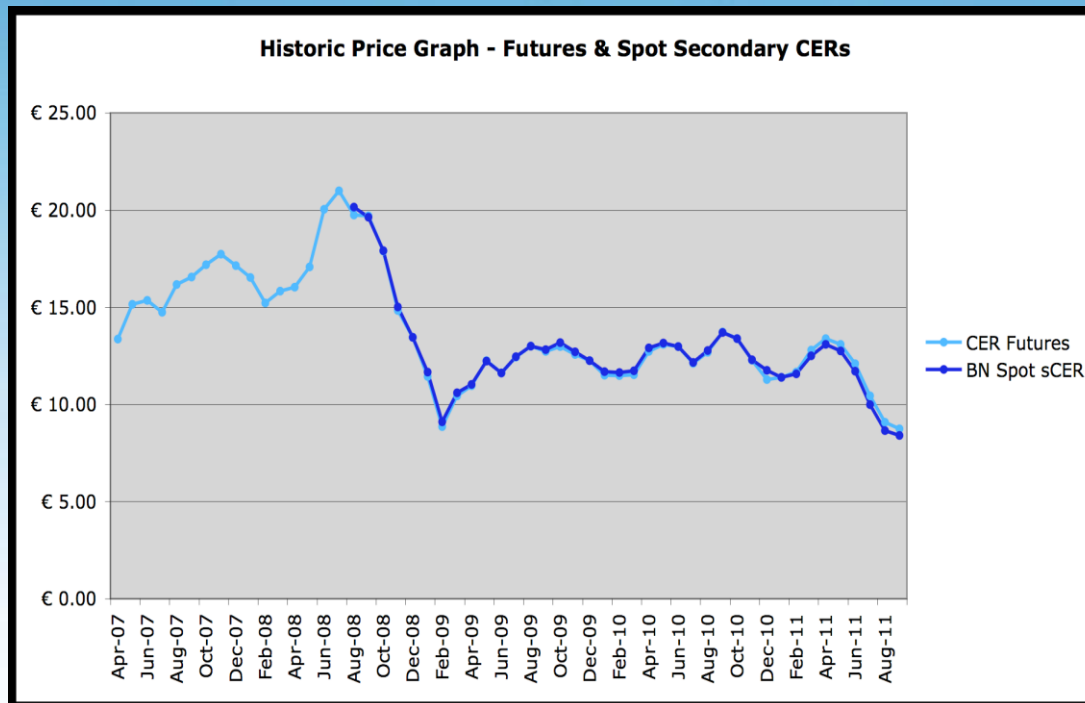
** CDC Climat Research

*** European Commission, September 2011



Varialift Airships

- Carbon Credit/offset revenue creation potential



CDC Climat Research, BlueNext and MetNext. Tendances Carbone, selected issues, accessed 15 October 2011



VARIALIFT AIRSHIPS PLC

VARIALIFT AIRSHIPS PLC HAVE THE EXCLUSIVE WORLD WIDE LICENCE

FROM

ARH HOLDINGS

INVESTMENT OPPORTUNITIES NOW EXIST

FOR SINGLE OR MULTIPLE INVESTERS

The Workhorse in Heavy lift Cargo Airships

All Aluminium

Low cost

Green

Varialift Airships PLC

**A name forged from variable
buoyancy and heavy lift**

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VariaLift Airships