VariaLift Airships
VARIALIFT A NEW HORIZON

VARIABLE LIFT WITH CONTROLLED BOUYANCY

AIR TRANSPORT
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, 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
System for controlling the lift of an aircraft
Système de contrôle de la force ascensionnelle d'un aéronef

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

Priority:
- 27.04.2004 GB 0405314
- 02.06.2004 GB 0412220
- 16.06.2004 GB 0413437

Date of publication of application:
02.11.2005 Bulletin 2005/44

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References cited:
- WO-A-2003061680
- FR-A-1 601 319
- FR-A-768 327

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: 請證明下述標準專利於今日批予：

Name and Address of Proprieter 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. 专利编号 : HK1083614 Application No. 申请编号 : 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
專利註冊處處長謝伯方

Please see the important notes overleaf 請細閱背頁的專利所有人須知

IP 126
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.
Balance of Industrial and Academic background

- Most staff have considerable industrial experience

Aircraft Design Centre
Cranfield University

- Conceptual design
- Preliminary design
- CAD
  - CATIA
- Aircraft structural analysis
- Airworthiness and Certification
- Aircraft Loads analysis
- Aircraft structural layout
- Detail Stressing
- Finite Element Analysis
  - NASTRAN/PATRAN
  - Strand
- Manufacturing issues
- Environment and other aerospace issues
- Design methodologies and optimisation
- Influence of design on Costs and other business considerations
- Aerodynamics/Performance
- Life cycle issues
- Environment issues
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

VariaLift Airships

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.
ALUMINIUM HAS BEEN AROUND FOR A LONG TIME

David Schwarz all aluminium airship flown in 1897
Varialift Airships

- open potential windfall gains

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

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

* Airbus Industrie
** IATA October 2011

Varialift Airships tel. 07753 420565
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**

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

* European Environment Agency
** CDC Climat Research
*** European Commision, 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

1 LABURNUM STREET, WOLLASTON, STOURBRIDGE, WEST MIDLANDS, DY84NX , ENGLAND.

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