



## Airlander 10: Revival of Airships!

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### History Created at Bedfordshire

*Airlander 10*, a helium filled craft<sup>1</sup> took to air on its maiden test flight at the Cardington Airfield in Bedfordshire (UK) on August 17, 2016. The airship, the size of a football pitch, flew for 20 minutes. Measuring 92m in length and 43.5m in width, the *Airlander 10* is the world's largest aircraft— larger than the Airbus A380. What matters more is the fact that it can carry a 10-tonne payload, comparable with some of the leading heavy-lift helicopters of the world such as the Boeing CH-47 Chinook, the workhorse of the US Air Force. As per the makers of the *Airlander 10*, a hundred of these could be in the sky in the next five years.<sup>2</sup> At £25m, an *Airlander 10* costs less than a tenth of a Airbus A380 (£287m).<sup>3</sup> As airlifters, airships have had a modest past; they went into oblivion after WW II. This flight of *Airlander 10* has revived the interest in this potent but less-recognised means of air-transportation.<sup>4</sup>

### Airships: A Just So Past and Flight into Oblivion

Balloons and airships served as observation posts in the latter part of the 19<sup>th</sup> and the first half of the 20<sup>th</sup> century, and were the first to carry men and material across inhospitable terrain.

However, their influence on either of the two World Wars wasn't so pronounced. The Germans used them to patrol the seas. The US Navy used airships primarily in anti-submarine, reconnaissance and maritime patrolling roles. "*Flying aircraft carrier*" was a daring use of airship—USS *Macon* and the USS *Akron* were used for launching Curtiss Sparrow hawk biplane fighters.<sup>5</sup> Civilian use of the airships was limited to pleasure/luxury air-travel, particularly for cross-Atlantic flights in the 1920s.

A slow speed and the lurking fear of accidental fires due to the use of the highly inflammable hydrogen gas went against both, the military and the civilian use. On May 6, 1937 one of Hindenburg's airships burst

into flames reinforcing the fears. Of the 97 people aboard, 35 died making it one of the most infamous disasters of the 20<sup>th</sup> century. That accident in the media glare pushed the airships into oblivion.<sup>6</sup>

Extensive dependence on fixed wing aircraft including gliders, and the vulnerability of the airships to ground defence, relegated them further to the pages of aviation history. A mooring mast spire atop the Empire State Building is one of the few reminders of the heydays of the

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airships. The research to exploit *lighter-than-air* platforms continued at a snail's pace. Replacement of the highly inflammable Hydrogen gas by an inert gas like Helium did little to wipe the memory of the Hindenburg disaster. The last dedicated military airship went out of use in the early 1960s.<sup>7</sup>

A need for inexpensive airlift platforms with low operating costs and capability to carry heavy cargo has generated renewed interest in airships. A report suggests that in the years 2009-10, the US Department of Defence (DoD) had funded more than \$500 million for projects related to *lighter-than-air* platforms.<sup>8</sup> Some of those projects were dropped when the government slashed military budgets in 2013. Hybrid Air Vehicles (HAV), the company behind the Airlander's development, gleefully bought the lion's share of the airship project, minus the classified military hardware. HAV's chief executive, Stephen McGlennan hopes to rise up to £30m by the year-end. He believes there could be 100 airships in the skies within five years and says there is latent demand for around a thousand in the years to come.<sup>9</sup> McGlennan predicts that at first, 40 to 50% of its use would be military.<sup>10</sup>

### An Eye in the Sky

Airlander can stay airborne for weeks at a time—a capability that bestows upon it the ability to monitor activity on the ground. It can monitor the movement and activity of insurgents for prolonged periods. The mere presence of an airship and the knowledge that there is an eye in the sky can rankle, and at times instil fear among the insurgents (and may be, Maoists in case of India). "You want them to see it," says McGlennan. "It's about surveillance and keeping ground troops safe, but also about changing behaviours rather than catching people in the act." It can fly out of reach of all but specialised ground-to-air weaponry, so militants taking pot shots shouldn't pose too many problems.<sup>11</sup>

### Element of Safety

Much is said about the Hindenburg disaster; most people attribute the loss of so many lives to the

use of *hydrogen gas*. According to Mr Pankaj Som Chaturvedi of TRA Aerospace, it was not the use of hydrogen but the highly inflammable paint applied on the surface of the airship that aggravated the fire and the ensuing loss of lives in the catastrophic accident. Thus hydrogen gas, even if it is used due to cost considerations, need not necessarily be a cause of grave concern.<sup>12</sup> Nonetheless, Airlander is much safer than the airships of yesteryears. It uses helium, an inert gas, rather than the hydrogen used by airships of the past. Its hull is made from three layers of fabric, including Vectran, a material five times stronger than steel. HAV claims it can fly in high winds of up to 80 knots, the highest level on the Beaufort wind scale. It has a top speed of 100mph.<sup>13</sup>

### Developments Across the World

Blimps patrolled the sky during the Olympic Games in Atlanta (1996) and in Athens (2004). In April 2009, they provided surveillance for the 5th Summit of the Americas in Port-of-Spain.<sup>14</sup>

Lately, airships have been used mainly for surveillance and policing. The need for inexpensive airlift platforms with low operating costs and capability to carry heavy cargo has generated renewed interest in airships

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as an alternative to surface transport. Some armed forces have commenced work on manned and unmanned airships. Boeing was to build an ambitious heli-stat—a combination of a blimp and a helicopter. The project was shelved, apparently for want of funds.<sup>15</sup>

As airlifters, airships are being used mainly to carry over-dimensional cargo like the long blades of windmills, which cannot be carried by trailers to locations on hilltops due to the difficulty in manoeuvring through winding hill roads. The US forces have used them in Afghanistan for surveillance in regions not threatened by ground defence. Northrop Grumman and its industry partners have successfully developed the world's largest, most-persistent, lighter-than-air optionally piloted aircraft.<sup>16</sup> It is believed that China has also used (tugged) aerostats in Mongolia for movement of cargo. *Skylifter*, an Australian firm, is developing an airship that will

carry up to 150 tonnes over 1000 kms. According to the firm, once developed, the airship will carry rural hospitals and disaster relief centres to remote areas.<sup>17</sup>

### Some Assumptions

Occasionally even in peacetime, physical shipment by air assumes greater relevance and importance than the speed of delivery. Tonnage airlifted is always a concern. A major portion of the effort is devoted to peacetime transportation of men and cargo and airborne training of the troops. Also, since war is not an ongoing process, airlift takes place in a safe environment free of threat to the airlift platform. Therefore, survivability/ air defence of the airships would not be a grave overriding issue if used under the same conditions.

Further, technologies meant for remote guidance and control has matured sufficiently to be applied to airships.

### Prospects for India

Today, a suggestion to look at the airlift potential of airships might appear to be an effort to put the clock back. But the thought that airlift is a necessity, and that the operational and economic viability of any airborne platform that can airlift personnel and cargo must be considered without prejudice, however presents a different perspective. Some prospects for India are listed here:

- Search, Rescue and Air Evacuation
- Disaster Relief and Airborne Hospitals
- Winning Hearts and Minds (WHAM) through Air Maintenance
- Ferry Across Terrain
- Air-bridge between Island Territories
- Airborne Training
- Exploration and Infrastructure Development
- Fighting Fire in High-rise Buildings and Jungles
- Agricultural Activities

### Expanding the Horizon

Airlift platforms are mere means to an end; their effectiveness depends on their thoughtful exploitation. Helicopters that carried water to douse the fire at the Japan's Fukushima Daiichi nuclear power station (March 2011) were handicapped—they could carry only about three tonnes of water. Their bellies had to be coated with lead to keep off nuclear radiation. Pilots who flew those sorties did so at the peril of their life. Had airships with a capacity of 60 to 70 tonnes,

been available at that time, they would have delivered much larger quantities of water in every lift. They could also have evacuated a large number of people too. Similarly, an airship could have carried hundreds of residents upwind and saved them from the poisonous gases emanating from the

Union Carbide pesticide plant in Bhopal (1984).

Recurrence of situations like the Berlin Blockade that require airlift of tonnes of supplies in a secure airspace cannot be ruled out. On the Easter Parade (April 1949) the Allies airlifted a record 12,941 tonnes into Berlin in 1,398 sorties averaging one round trip for every one of the 1440 minutes in the day.<sup>18</sup> Assuming that Airships with, say 60-tonne capacity had been available; just 216 sorties at the rate of nine sorties per hour would have achieved the same result.

If used as an *airborne aircraft carrier*,<sup>19</sup> an airship would bolster search & rescue, and relief operations. It could save precious time during *Golden Hour Rescue*.<sup>20</sup> Manned/ robotic aircraft shuttling between an airship and multiple sites on the ground could boost relief operations by airlifting casualties, shuttling relief teams, and transporting medicines and food for the victims. Disasters have become common phenomena: their frequency has turned death tolls into mere statistics. The helplessness of the rescue workers and the disaster relief teams in reaching the sites of the disasters and containing the damages comes to the fore with each disaster. Judicious use of airships in the future might help mitigate

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Possibilities are numerous; horizon needs to expand.

*\*Note: This article is based on another article on Airships by the author published in Air Power Journal (Jan-Mar 2013).<sup>21</sup>*

## Notes

<sup>1</sup>Airlander 10 is a *lighter-than-air* flying machine often considered as a hybrid aircraft. In this article, no distinction is being made between the different types of *lighter-than-air* aircraft.

<sup>2</sup>Rob Davies, "Airlander 10: Is this the dawning of a new age of the airship?" *The Guardian*, August 17, 2016, <https://www.theguardian.com/world/2016/aug/17/airlander-10-is-this-the-dawning-of-a-new-age-of-the-airship>, accessed on August 19, 2016

<sup>3</sup>On comparing the catalogue price.

<sup>4</sup>As per media reports and a video post on Youtube, the *Airlander* has had an unusual landing during its second test flight. There has not been a major damage; the crew are safe.

<sup>5</sup>"USS Macon and Sparrowhawk", <http://www.youtube.com/watch?v=IWoeQR18dCs&feature=related>, accessed September 5, 2012.

<sup>6</sup>"Airships: The Hindenburg and other Zeppelins", <http://www.airships.net/hindenburg/disaster> accessed on May 27, 2012.

<sup>7</sup>Keith Hayward, *The Military Utility of Airships* (London: RUSI, 1998), p.1.

<sup>8</sup>"Recent Development Efforts for Military Airships November 2011" <http://www.cbo.gov/sites/default/files/cbofiles/attachments/11-01-Airships.pdf>, accessed August 31, 2016.

<sup>9</sup>Rob Davies, n 2.

<sup>10</sup>Beds, Herts& Bucks, "Airlander 10: Maiden flight at last for longest aircraft," *BBC News*, August 17, 2016, <http://www.bbc.com/news/uk-england-beds-bucks-herts-37111527>, accessed on August 19, 2016.

<sup>11</sup>Rob Davies, n 2.

<sup>12</sup>Helium gas is not only expensive but also sparingly available. Its restricted availability places hurdles in the path of progress for airships.

<sup>13</sup>Rob Davies, n 2.

<sup>14</sup>"Police Aviation" at [http://en.wikipedia.org/wiki/Police\\_aviation](http://en.wikipedia.org/wiki/Police_aviation), accessed on August 27, 2012.

<sup>15</sup> Lewis Page, "Airship 'Sky Tugs' ordered from Lockheed for Canadian oilfields: P-791 military hover suck-blimp gets civil application," *The Register*, March 28, 2011, [http://www.theregister.co.uk/2011/03/28/p791\\_ordered\\_for\\_canadian\\_oilsands/](http://www.theregister.co.uk/2011/03/28/p791_ordered_for_canadian_oilsands/), accessed on August 31, 2016.

<sup>16</sup> "Aviation Defence News," *Vayu*, V/2012, p. 147.

<sup>17</sup> "Giant airship that can carry entire buildings 2000 kms," *The Times of India*, October 6, 2010, p. 21.

<sup>18</sup>Lt Gen William H. Tunner USAF, *Over the Hump* (Washington DC: Office of Air Force History, US AF, 1985), p. 222.

<sup>19</sup>Like the USS Macon and the USS Akron discussed earlier in the article.

<sup>20</sup>*Golden Hour Rescue* is the timely rescue essentially in the first sixty minutes after an accident within which, a patient has the highest possibility of survival if provided with definitive medical care.

<sup>21</sup>Gp Capt Ashok K Chordia, "Airship: A Viable Airlift Option", *AIR POWER Journal*, Vol. 8 No. 1, SPRING 2013 (January-March), [http://capsindia.org/files/documents/APJ\\_-Jan-Mar-2013.pdf](http://capsindia.org/files/documents/APJ_-Jan-Mar-2013.pdf)



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