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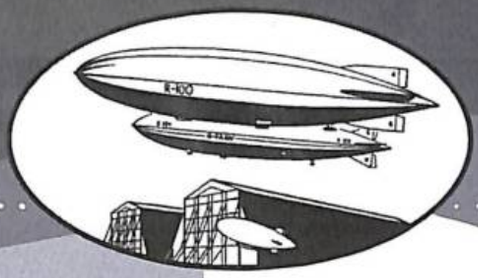
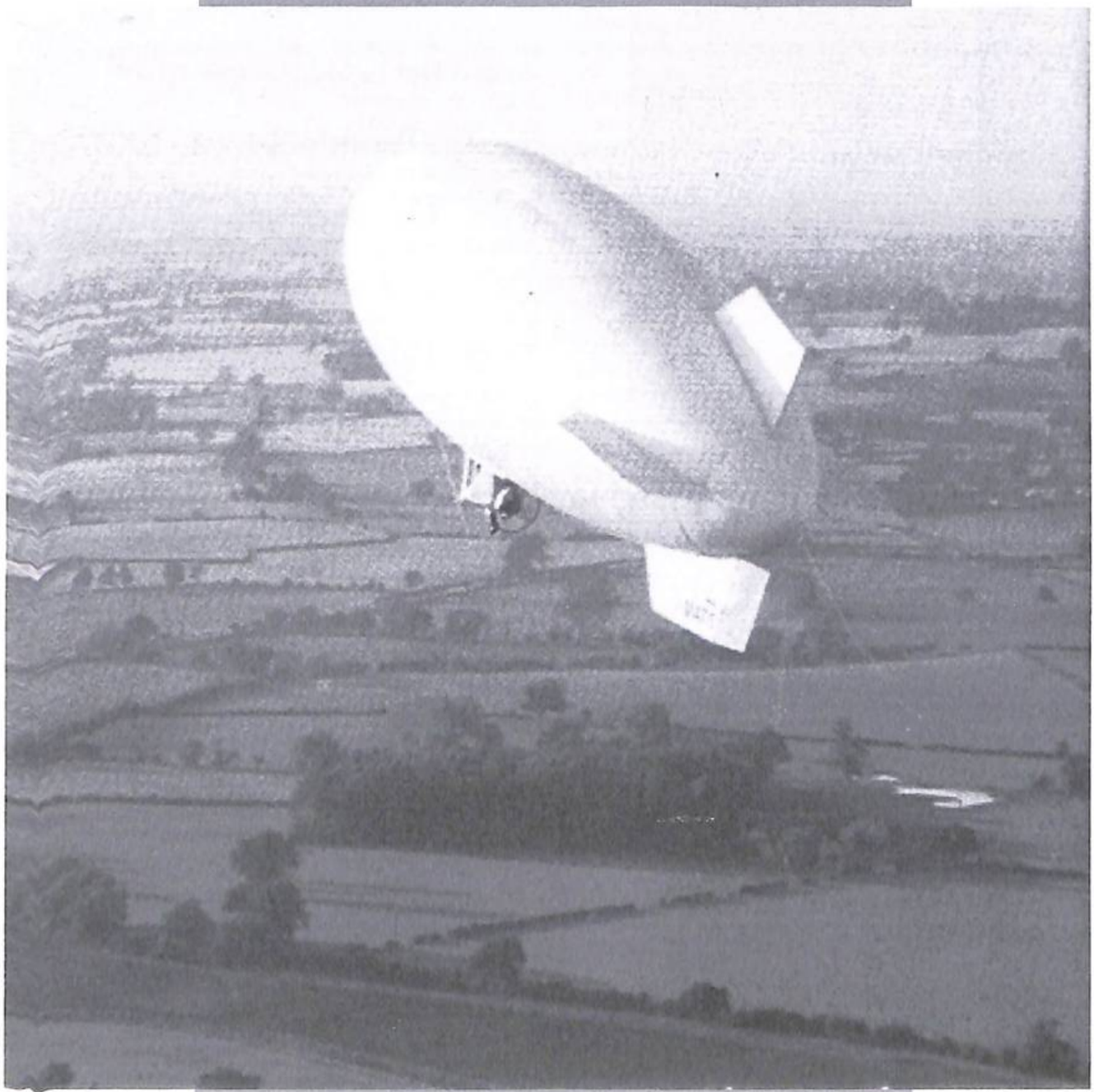
Dirigible



A BLIMP AND A 'BLIP'



AND A HELICOPTER HYBRID

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FRONT COVER – The Lindstrand GA42 blimp in flight – see page 18

BACK COVER – Advertisement for A.E. Gaudron from 'Ballooning and Aeronautics' magazine dated 1907.

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***Dirigible* is the official journal** of the Airship Heritage Trust. It is published by the Trust three times a year and is distributed free to all current members. Hard copies of back numbers of *Dirigible* are available for sale to the public at the Trust's discretion.

The Editor of *Dirigible* is pleased to consider for inclusion in *Dirigible*, articles, correspondence and other contributions (also 'review copies' of new publications and journals) on all matters concerned with the preservation and the history of airships and of subjects relevant to the science of lighter-than-air flight.

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EDITORIAL

REMEMBERING PAST EVENTS

There have been a few suggestions of late that one thing *Dirigible* might like to do on a regular basis is to celebrate or mark in some way notable events from airship and LTA history such as anniversaries or centenaries.

For instance, the past year, 2024, is the 100th anniversary of the completion and subsequent delivery of the German Zeppelin *LZ126* to the United States. Here it was rechristened as the *USS Los Angeles* and renumbered as the *ZR3*. For the record she made her first flight in Germany on August 27, 1924, departed on her trans-Atlantic flight to the USA on October 12, 1924, and arrived at her new home in the Naval Airship Station (NAS) at Lakehurst on October 15, 1924.

These are noteworthy dates because the *USS Los Angeles* went on to become the longest lived and arguably the second most successful 20th Century Zeppelin; second only to *LZ127 Graf Zeppelin*, based upon the length of actual flying career. The *Los Angeles* was scrapped in December 1939.

Closer to home but much further back in time, we find that 2024 is also coincidentally the 240th anniversary of the birth of LTA flight in the UK. On September 15, 1784 an Italian diplomat's secretary named Vincenzo Lunardi, ascended in a hydrogen-filled balloon from the Artillery Ground of the Honourable Artillery Company in London to make the first manned balloon flight over England. He travelled in a northerly direction towards Hertfordshire and was famously accompanied by a dog, a cat and a caged pigeon. After touching down briefly in a cornfield in the parish of North Mymms to release the cat which had become unwell, he flew on to land finally at Standon Green End. Today stone monuments that record the date stand on both spots where he landed. More details can be found online at:

https://en.wikipedia.org/wiki/Vincenzo_Lunardi

And the same website also records another first of similar vintage, one that is equally worthy of remembrance and celebration. It occurred in the following year, on June 29, 1785, when Lunardi's assistant, a Mr George Biggin, ascended in Lunardi's second balloon from St George's Fields, in south London. He was accompanied by Mrs Letitia Anne Sage making her the first English female ever to fly in England. Next year, 2025, will see the 240th anniversary of that historically important 'first'.

So much for commemorating events worthy of celebration. But there are plenty of others that deserve to be remembered too and noted for rather different reasons. I refer of course to the tragedies and disasters.

On which topic, going back across the pond and staying with the year, we find that 2025 will see the centenary of the crash of the American-built *ZR1 Shenandoah*, which broke up in flight during a storm on September 3, 1925 and came to ground in several pieces in Ohio. There were 29 survivors but 14 people lost their lives.

On a less depressing but also sad note, back in the UK, next year there is another centenary which might deserve mention. In July 1925 Britain's first 'streamlined' rigid airship, the Barnes Wallis-designed, Vickers-built *R80*, was dismantled and sold for scrap. Compared to the previous airships in Britain's building programme, *R80* was both longer-lived and faster having been built in 1920 and attaining a recorded air-speed of 65 mph. This touches on another whole category of historically important LTA events which perhaps deserve to have their anniversaries etc., remembered - the record breakers. There is a long list of them.

However, the burning question under-lying all this is how exactly these triumphs and disasters could, should or ought to be remembered? There doesn't seem to be anything *Dirigible* can do by way of answering this question other than to publish articles and pictures that detail the events in question. And we are more than happy to do this in close proximity to the relevant dates.

BUT, as I have often pointed out in the past, we can only publish material that is submitted to us. I edit the content. I don't and can't write it all. *Dirigible* is dependent on the AHT membership supplying its content. So if you want to see past events celebrated or marked in these pages then start researching and writing or persuade a chum to do it! We are not averse to commemorating such events, in fact we are very much in favour.

And speaking for the AHT Council, I am sure they are similarly keen to mark historically important events. But when it comes to organising street parties or arranging Church services and wreath-laying ceremonies they have a problem. They are desperately short of personnel – see box below.

GILES CAMPLIN – EDITOR

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VACANT SEATS

Webmaster's Assistant – Previous knowledge of airship history is not vital as help is mostly needed at a technical level. It includes time-consuming but non-time-dependent tasks such as:

- Checking and maintaining extant content.
- Preparing text and keeping information up to date.
- Proof-reading new content to expand our online library.
- Platform management – we would welcome new ideas for our 25-year-old platform.

The more volunteers we have the more we can do.

Social Media Manager – Volunteers are needed who are able to:

- Provide short content for our Facebook Group.
- Manage and edit posts.
- Assist with content for our YouTube channel.
- Write and edit scripts.
- Edit post-production videos.

We need similar help with our other social media.

If you have a little time to spare or skills to share please contact: AHT Webmaster Alastair Lawson (Tel: 07900 692 804) **alastairlawson1@gmail.com**

AIRSHIP NAVIGATION *

Part 2 - 1918 – 1939 [continued from last issue]

By Terry Hayward

R34 leaving her shed in Scotland

THE *R34*

In 1918 Great Britain had only eight rigid airships. These were smaller than the German Zeppelins but they were developing bigger and more efficient airships and were determined to beat the newly emerging German Zeppelin industry to complete the first crossing of the Atlantic by air. Their dream came true. At 2.00am GMT on 2nd July 1919 the *R34* left East Fortune en route for New York. It had unfortunately just been beaten by Alcock and Brown for the first crossing of the Atlantic but its commander Air Commodore E M Maitland was determined to complete the first East-West crossing and then make the return flight back to the United Kingdom. The Captain was Major G H Scott and it carried a designated Navigator Major G H Cooke DSC and a meteorological officer Lt G Harris.

The *R34* was known affectionately by the crew as *Tiny* but it was as large as the largest Dreadnought of the time. She was 643 feet long, 79 feet wide and 92 feet high; designed to cruise at 45 mph she actually achieved a cruising speed of 55 mph. Her navigation equipment indicates the developments made since the 1913 report mentioned above and the lessons learned from the apparent shortcomings of Zeppelin navigation [*see Dirigible 101*] and deserves mention in detail:

2 Marine Sextants – one in the forward car and one on the roof of the ship
Bubble Sextant
Battenberg Plotting Board – a special type of Mk 1 for aircraft
Beck's Bomb Sight for measuring groundspeed and drift
Open Drift Sight – with groundspeed scale
Aircraft Compass in forward car – American type
Standard Compass – on top of hull
3 Chronometers
One 'Hack' or Deck Watch
Star Globe
Inman's Nautical Tables
Birdwood and Davis's Nautical Tables
Nautical Almanac
'Pilots' – various
List of Lights and Time Signals
Off Shore Distance Tables
Davis's Star Azimuth Tables and Supplementary Azimuths
Sun's True Bearing and Azimuth Tables
Dip and Distance Horizon Tables
Marconi Communications Charts
Holmes Lights – for use as flares
One set of Atlantic Charts, B1 and for North America
Two books on Meteorology and Cloud Studies

The original navigation plan was to map read across Scotland and then to fix the airship's position by means of 'Directional Radio Bearings' for as long as possible and thereafter to rely on drift and speed observations backed up by Astro fixes. In the event the wireless bearings did not prove successful; only one fix was received from Clifden on the Irish Coast. Cooke estimated that there would be an error of some 50 miles when using cloud horizon rather than the actual sea horizon. There is an interesting note in his log where he observes that he was unable to take an observation on the sun with the bubble sextant because '*the sun being too high*', presumably because it was hidden by the body of the airship. He did however take astro observations from the gun platform post on top of the ship and comments that the coxswain could fly the ship so accurately that he used the sextant using a distant cloud horizon with the cloud/mist up to his neck – a disembodied head giving a passing seagull a nasty shock! In total he took only 17 astro observations in the 108 hours crossing and only three of those with a sea horizon. Navigation was in the main a track crawl using drifts and ground speeds found by use of calcium flares, smoke floats or pieces of flotsam. There is no note of the accuracy of their landfall but

* Originally published in *Air Navigation from Balloons to Concorde* by Walter Blanchard : Woodfield Publishing (Jun. 2006)

once made they fixed their position and continued thereafter by map reading.

An accurate measurement of height was essential. After setting their barometer at East Fortune they were able to update the setting from passing ships. When no ships were available they tried lowering a barometer on the end of a rope to sea level. When this proved unsuccessful Major Scott solved the problem by using a sextant to measure the angle subtended by the ship's shadow. Use was made of meteorological reports from ships and the experience of the meteorological officer to interpret cloud formations to forecast possible weather ahead of the ship and thus anticipate the likely wind to select the best course to fly.

After 3130 nautical miles and 108 hours 12 minutes *R34* reached New York only to find that the landing party was still on the way back from Boston where it was thought that the *R34* would be diverted because of an anticipated shortage of fuel. Nothing daunted Major J E M Pritchard parachuted onto the airfield to supervise the inexperienced American ground crew. He thus became the first man to reach the United States from Europe by air.

The return flight of 3314 nautical miles to Pulham in Norfolk using the same navigation techniques but with the help of favourable winds took only 75 hours and 3 minutes. By happy chance their landfall on the west coast of Ireland was the same as that made a few weeks earlier by Alcock and Brown.

FIRST POLAR FLIGHT

Many history books still record that the first flight to the North Geographic Pole was by Admiral Byrd (US Navy) and his navigator Lincoln Ellsworth but recent research suggests that due to a navigation error and possible lack of fuel they turned back before they reached the Pole. If this is correct then the laurels must go to Roald Amundsen and Lincoln Ellsworth in the airship *Norge*, for their flight from Norway across the Pole to Alaska. Even then this is not strictly true because the ship was commanded by an Italian, Colonel Nobile and the navigator, First Lieutenant Hj Riiser-Larsen (Norwegian Navy). They were assisted in their efforts by Finn Malmgren, a Norwegian meteorologist.

The navigation to the Pole was by means of astronomical observations and observations of drift and groundspeed. For the latter observations they used a Goerz combined drift and speed measure. It was not very efficient at night but '*it is the best I knew for use during the day*' according to the navigator. Like the *R34* navigators he used smoke cartridges or fixed points on the ground and '*white horses*' over the sea.

Once again the knowledge of an accurate altitude was difficult to gain and unlike the *R34* they had no passing ships with which to check their aneroid setting. To overcome this problem they used an ordinary infantry range-finder with a 70cm base. The use of the ship's shadow was less successful because the low angle of the sun did not provide a sharp enough shadow. They used magnetic compasses combined with carefully calculated and drawn variation charts and equally carefully calculated deviation tables to take into account the deviations due to the ship's structure and equipment. In addition to this they also attempted to take into account the varying co-efficients of the horizontal and vertical fields of the earth's magnetic field. In his account of the flight Riiser-Larsen explains that whilst a small amount of deviation will have little effect when the horizontal co-efficient is strong at lower latitudes it will have a far greater effect when the co-efficient is weak at higher latitudes.

They had left Italy with five compasses but at Pulham they had discarded two of them and installed an English aperiodic compass as the main steering compass with a German Ludolph compass as the back-up. The former infuriated the navigator because of the length of time that it took to settle on a particular heading and the latter because of its constant and rapid fluctuations. To quote Riiser-Larsen:

It is still impossible to say that one is better than the other. We can, on the other hand, say that the two types complement each other for use there in the North. As a matter of fact, they do not, as a rule, go wrong at the same time. The difference is this, that the aperiodic compass takes a long time to come back to the course if the compass-card has swung out too much on one side, and then stops on the course without the least oscillation, whilst the Ludolph compass comes back rapidly. On the other hand, the latter compass oscillates a long time back and forwards on both sides of the course before it comes to rest. Both are equally troublesome when one has little time. The aperiodic compass turns back so slowly that I, in the belief that it had stuck, could have planted my fist on the glass and angrily entreated the compass-card to kindly set itself in motion. Another time I could have clenched my fist at the widely oscillating Ludolph compass and just have angrily begged it to stop its polkas. All airship compasses ought to be provided with a gimble suspension with option to lock the rings.

In addition to the magnetic compasses they also carried a German Goerz sun-compass. This used a clockwork motor to turn a periscope towards the sun. The reflection of the sun was cast down on a dull glass plate, on which there was a wire cross marked. When the compass was adjusted for the course required, the steersman's duty was always to keep the reflected image in its place. The task of maintaining heading was difficult and it was much easier to steer by the sun-compass than by a magnetic one. Adjustments were made for the sun's declination and a change of latitude and the axis of the periscope kept parallel to the axis of the earth. If properly adjusted the navigator could use the instrument to determine latitude when the declination and longitude were known.

On the use of observations on the sun Riiser-Larsen is rather vague. He merely records that he used a German sextant with an artificial horizon, which was easy to manipulate, and gave surprisingly accurate results. He wrote that it was one of the best sextants that he had ever used. As to chronometers, Amundsen and Ellsworth had made careful comparisons between them for a fairly long period before the flight. They were kept during the flight preserved at the same temperature as on land. (It is not recorded how this was achieved.) Throughout the flight they were updated by time-signals received by radio. Mercator projection charts were used right up to 80 degrees on the journey to the Pole and after 75 degrees on the journey from the Pole to Alaska. Between these latitudes they used Gnomonic projection charts. In addition they carried special charts for coastal regions around the polar basin in case they were obliged to seek the nearest land.

The exact position of the Pole was found using observations on the sun. Amundsen's record explains the work involved.

In the chart room there prevails indescribable industry. The second-in-Command is taking astronomical observations, observations of drift and speed, which are constantly altering the position on the chart. This goes on incessantly and leaves no time for sleeping, eating and drinking. Ellsworth keeps calm and quiet, always ready to read off on the chronometer each time Riiser-Larsen takes an observation of latitude.

They arrived at the Pole on Ellsworth's 45th birthday.

As we neared the Pole the work of the Navigator became more and more intense. He must endeavour to find the point as accurately as possible.

On this note it is interesting to hear at first hand how Riiser-Larsen used the sun to navigate in regions close to the Pole: *Provided the Greenwich apparent time of the observation is known, then by observing an altitude of the sun it is possible to define one's position as being somewhere on a circle of equal altitude which has as its centre the point on the earth's surface at which the sun was in the zenith or directly overhead at the moment of observation. The radius of this circle is equal to the complement of the observed altitude, in other words, the zenith distance. When in polar regions it is very easy and requires no computation, to plot this position line on a chart, because the meridian which the sun was crossing at the time of the observation is known and the distance from the pole along this meridian to the point where the circle cuts it is equal to the difference between the sun's declination and the observed altitude. If the altitude is larger than the declination, this point is between the pole and the sun, but if the opposite is the case then the point lies on the opposite side of the pole to the sun, and the meridian on which it lies will be, obviously, 180 degrees apart from the sun's meridian. The circle of equal altitude must cut the sun's meridian at right angles, and consequently if a curved ruler of the right radius is placed against this point on the chart so that its tangent is at right angles to the meridian, the position line can be simply drawn across the sheet of paper. This is in effect what is actually done.*

As the sun is so near the equator and the observer's position so near to the pole, the radius of the circle of equal altitude will always be large. Also, curves of varying radii having a common tangent converge slowly from one another. Consequently, it has been found sufficiently accurate for the purposes of plotting position lines in polar regions to construct only ten curves of different radii on a sheet of celluloid. The particular curve most suitable for the occasion may be determined from a special table, using the declination and observed altitude as arguments. By choosing the right curve the greatest displacement of the true position line will be about 1.5nm, and this is only on the extreme edges of the chart when the sun's hour angle is about 6 hours.

The plotting of this position line will give the observer an independent check of the accuracy of his dead reckoning while flying and when on the ground if the altitude of the sun is observed twice or more at the same position with intervals of three or four hours between observations, then more than one position can be plotted, and where they intersect on the chart will be the position of the observation.

When, by whatever means, the position of the observation has been plotted on the chart, it is then possible to obtain direction from the sun. Now, in high latitudes the bearing or azimuth of the sun (measured from S. by W. in north latitudes and from N by W in south latitudes) is very nearly the same as the sun's hour angle, (the hour angle is the difference in time or longitude between the observer's meridian and the meridian which the sun was crossing at the time of the observation). Consequently the most convenient way to determine true north in its relation to the sun is to first determine the sun's hour angle and to this apply a small quantity dependent on the latitude and declination. This quantity is the difference between the hour angle and the required azimuth and may be obtained from tables.

The sun's hour angle is obtained in arc, provided the observer's meridian and the sun's meridian are indicated on the chart, by measuring clockwise from the former to the latter along the scale on the perimeter of the chart (presumably a Polar Gnomonic?). Then in northern latitudes and when the sun is west/east of the meridian of observation, add to/subtract from this hour angle 180 degrees and the quantity extracted from the tables. Again, when in southern latitudes, when the sun is east/west of the meridian of observation add to/subtract from the hour angle 180 degrees and the quantity extracted from the tables. In both cases the result will be the sun's azimuth measured clockwise from the pole.

After the Pole they flew to the coast and by '*coast hugging*' with Amundsen leading the map reading navigated to their destination in Alaska.

AIR NAVIGATION TECHNIQUES

It may seem strange that in spite of the fact that airships were being used in America, Germany and England there appears to be very little attention paid to the outstanding needs of air navigation. It may be that the fact the airships flew low, avoided the poor weather conditions whenever possible and relied on a track crawling method of navigation based on observed drift and groundspeed and that aircraft were still not generally flying long distances at high altitudes the need was not fully recognised.

In the early 20s there were a number of simple devices that did not rely on charts, parallel rules, dividers, etc., which gave position not in latitude and longitude but with reference to a base or ship. These were of little use for the long-range airships but were useful for coastal patrols and naval co-operation. All were based on the naval Battenburg Course and Distance Indicator.

In 1924 the Germans had experimented on their new airship the *ZR3* with '*time sounding waves*' this was a similar device as the sonar used by mariners to find the depth of water. It was reported that by pressing three buttons the return echo of explosions recorded on a time recorder indicated height against a scale. In 1925 a report on the *LZ126* airship said that '*with its instrumentation of a Ground Speed and Drift Indicator, Course and Speed Calculator, Bearing search-light for ascertaining altitude otherwise than by barometric means and a Range Finder the crew of the ZR3 had the means for the first time whereby the navigator could be aware of signs of approaching disturbances even by night, and navigate the ship accordingly.* It went on to say that the equipment allowed the navigator to solve the two most important problems of aerial navigation: to find wind direction and speed and to obtain altitude independently of the altimeter.

Also in 1925 the *USS Los Angeles* (originally the *ZR3*) experimented with an Anschutz gyrocompass. This consisted of a master gyrocompass with a transmission system to remote indicators. This was found to be unreliable over sea and also experienced fluctuating voltages because of a propeller driven generator.

THE *R100*

THE ATLANTIC CROSSING

Despite the fact that Sqn Ldr Johnston had presented a paper on *The Practical Implications of Navigation* to the World Engineering Congress in Tokyo in 1929 the Air Ministry's Press Section in a briefing to the Press on the future of aviation made no reference to navigation. Even the specification for the *R100* released in November 1929 made no mention of navigation equipment. It is sobering to recall that as late as January 1931 a debate held under the auspices of the Guild of Air Pilots and Air Navigators could still consider two systems of coded light beacons. The First Officer of the *R100* commented that '*the system would put rather a discount on*

navigation and would quickly unfit a man for long distance work over the sea'. Perhaps it should be remembered that there had recently been a ploughed track across the desert to Baghdad to facilitate easy navigation.

In July 1930 the *R100* carried out a most successful Atlantic crossing to Montreal and returned. During the trial flights around the English coast, which lasted 54 hours and 50 minutes, navigation was checked by W/T bearings from Croydon. The position being obtained every half-hour. The method used was as follows: *the airship transmitted and the signal was received by stations at Croydon, Lympne and Pulham. All measured the direction of the signanl and the sub-stations sent theirs to Croydon where the position of the intersection was plotted. The position was then transmitted to the airship.* This system proved very quick and relatively accurate. There was only one major error when with the *R100* off the South West coast of England its position was relayed as over Guildford. The airship commander's response to Croydon was '*Sea very rough over Guildford'*. Although the W/T direction finding facility was found to be '*relatively accurate'* concern was expressed over the calibration of the equipment. Concern was also expressed about the calibration and operation of the Fultograph. The Fultograph was a means of transmitting weather charts and forecasts by radio. It had been first demonstrated in March 1929 when a photographic transmitter at Cardington had sent weather charts and forecasts to the Royal Meteorological Society's meeting in London. It was the forerunner of FAX. After a year's development although the system produced excellent teleprints on the bench at Farnborough it continued to disappoint in the air and was discarded for the actual Atlantic crossing.

The *R100* was still using calcium flares dropped into the sea on which to take back bearings, now with the new Hughes periscopic drift sight. This was repeated on a different course and then drifts were plotted on a chart marked with Course and Speed to find wind velocity – the '*double drift*' method. At night and in cloud track was found by using three W/T bearings at short time intervals from a single station. The three bearings were then laid off from a point representing the station and through this point a perpendicular was drawn to the middle bearing. On this perpendicular the time interval between the bearings was marked off at a convenient scale and from these points perpendiculars were drawn down to cut the first and third bearings. A line joining the intersections was then drawn - this line was parallel to track. If groundspeed was known then a good indication of position could be found. Use was also made of lightships and lighthouses.

The flight planning for the flight to Montreal included careful study of the pressure patterns to determine the most favourable winds. Like the *R34* the *R100* carried a specialist meteorological officer, M A Giblett, in order to ascertain best headings to make use of favourable winds and to avoid the worst weather.

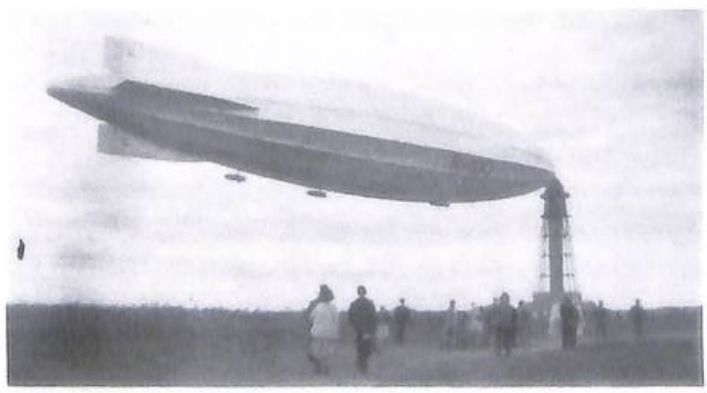
In order to maintain communications with England and then with Canada and America the airship carried both short-wave and long-wave radios. In the event they maintained communication for all but 600 miles, some 9 hours, in the middle of the northern Atlantic. The system was used as much by the newspaper reporters on board as for its prime purpose so much so that a regulatory system had to be introduced.

The watch officers on the *R100* consisted of its Captain, Sqn Ldr R S Booth, and its two navigators Sqn Ldr E L Johnston and Captain G Meager thus placing a heavy load on the three specialist officers especially the Captain. This problem had already been recognised by both the Germans and the Americans. The *Graf Zeppelin* carried three airship pilot watch keepers and three navigation watch keepers in addition to the captain and the US airship *Akron* neither Captain nor Chief Executive Officer kept watch - it carried three flying watch keepers and three navigation watch keepers.

On 29th July 1930 the *R100* cast off from Cardington en route to Montreal. It was to be the eleventh airship crossing of the Atlantic and the twenty-sixth by any sort of aircraft. The principal navigation equipment differed very little from the *R34* eleven years earlier. It comprised:

Dead-beat compass (A Hughes according to Johnston but a Sperry according to Meager's report of the trip)
Turn Indicator (Schilovsky-Cooke)
Periscopic drift sight (Hughes)
Electric Air Log
Air-speed indicator with a trailing pitot-head
Seamarkers (Aluminium dust for day, calcium phosphide for night)
Mk Vll RAE bubble sextant with Mk V as backup.
Air log Marine chronometer and deck watch
Goodwin's Alpha, Beta and Gamma Tables

After map reading until clear of Ireland and a final back bearing on outbound coast to check the correct course Sqn Ldr Johnston describes the method of navigation as follows: *The course was set and the track maintained by observations of the drift whenever the surface was visible. At two-hourly periods, or more frequently when necessary, double drift sights were taken on sea markers to determine the wind direction and speed, and the ground speed. At hourly periods or whenever the engine speeds were altered, the airspeed was checked on the air log, and whenever the ship's shadow was in a suitable position the groundspeed was checked by timing it over a point. Astronomical sights were taken on the prime vertical for longitude, which were a valuable check on the speed made good; ex-meridians for latitude were a check on northerly or southerly drift; and whenever possible position lines were determined to fix a position. Very reliable checks were obtained from D/F W/T bearings from merchant ships, and one cannot speak in high enough terms of praise for the whole-hearted cooperation of the Merchant Navy. It is a happy augury for the future that there is a very great bond of brotherhood between the seamen and the airman. On the outbound and homebound flights there were long periods when the surface was not visible, and course had to be altered from positions determined by astronomical observations, and it is particularly interesting to note that although at times the intercept* (he was using the Marc St Hilaire method of obtaining position lines) *was as much as 79 miles from the DR position, the ultimate landfalls confirm the accuracy of the observations.* All astro observations were taken simultaneously by Johnston and Meager and both sextants proved equally reliable.



R100 on the mooring mast in Canada

Whist in Canada the crew had the opportunity to discuss and view other navigation equipment. In his report to Hughes, Johnston records:

An opportunity was afforded to discuss with Commander Rosendahl of the U.S.N. the merits of the gyro compass, and he agreed that comparisons between the magnetic and gyro compass had been made with an inferior type of magnetic compass. From his experience he considered that, with the exception of the gyro repeater, which could indicate course changes to within 1/10 degrees, there was little or no justification in having a heavy gyro installation in a stable ship. This confirms our opinion.

It is quite apparent from the notes available that Johnston provided Hughes with much valuable insight into what was required for air navigation and that Hughes's company set out to use this advice to produce suitable equipment not only for airships but also for aircraft. Hughes also credits Johnston with the preparation of a special volume of 'astro' tables which he made by cutting out a number of tables from other books and in this way gave the first inkling of the need for special air tables. It was not until 1938 that Astronomical Navigation Tables (ANTS) devised specifically for air navigation were introduced.

In a demonstration flight around Montreal they also had the opportunity to fly trials with radio beacons giving a steady signal when on a predetermined beam (course) but a varying signal when the airship moved left or right of that course. (The Americans had introduced 'radio ranges' the year before.)

The ill-fated *R101* had a similar navigation fit to the *R100* with the exception that it was due to carry a sonic altimeter, presumably similar to that already tested by the Germans, but this was discarded before the flight in order to save weight. Sadly Sqn Ldr Johnston's expertise was lost when he died in the disaster that overcame the *R101*'s maiden voyage after its test flights.

ASTRONOMICAL NAVIGATION

Throughout the 1920s and 1930s numerous attempts had been made to simplify the solution of the astronomical triangle (the PZX triangle) by graphs, tables and numerous electro-mechanical machines. The Zeppelins carried one which when used on Spec N and GD Aero Systems Course Polar flights in the 60s and 70s proved exceptionally accurate and easy to use. The quest is highlighted in a rather poignant hand-written letter from Air Commodore Maitland, who commanded the *R34* flight to Sqn Ldr Booth in 1931.

Dear Booth (in rather a hurry) 21.11.31

As far as I know the Navy still sticks to the Sumner method of working sights taught in our youth and are I think content to do so.

The Bygrave Slide Rule is supplied in the RAF but owing to the fact that it is possible to slip from one line of readings to the one below it is not particularly popular. We are trying ordinary Alt/Az tables with a simple interpolation table and that I think is much less liable to large working inaccuracies as it is easy to check the approximate altitude and bearing.

Personally I should prefer to use alt/az tables assuming a convenient latitude for my DR position and so providing some interpretation in finding the calc altitude. In actual fact sextants are rarely used in the RAF as few flights justify their use. I enclose a copy of the latest chit on the alt/az table method but I haven't got a spare copy of the actual interpolation tables.

I was so sorry to see airships hit such a heavy blow. I suppose we shall allow Germany and America to develop them.

Yrs sincerely

THE END OF INTEREST IN THE AIRSHIP

And so it was. After the *R101* disaster the *R100* was broken up and the development of airships in Great Britain ceased. American interest waned when they experienced their own disaster with the loss of the *Akron* but the Germans continued to develop the Zeppelins until the *Hindenburg* disaster in New York in 1937.

In their attempts to highlight the potential of the airship as a long distance passenger carrier the *Graf Zeppelin* was used on many high publicity flights including round the world flights. On all of these flights the basic navigation techniques used by Cooke in the *R34* and Johnston in the *R100* and *R101* were still used. Perhaps at the speeds and flights flown there was little need for progress.

An interesting footnote, which is, perhaps, loosely connected to navigation, concerns a flight by a Zeppelin in the summer of 1939. During the 2nd to 4th August a Zeppelin flew across Freisland to a point in the North Sea opposite to Wells and then round to a point opposite Great Yarmouth from there it flew to abeam Aberdeen and then to the Orkneys and returned on the same route.

The ship flew at a distance from the coast so that it could not be visually observed. The assumed purpose of the flight was to assess the range and accuracy of the new British early warning [radar] chain. The airship was intercepted by a *Magister* and an *Anson* from Dyce and although photographs were taken the Germans denied that the flight had taken place. However, the whole flight had been followed on radar from when the ship approached the North Norfolk coast and on its return journey an alert officer of the watch was tempted to give the Zeppelin a false position. [*see next article*]

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Acknowledgements: My thanks to the late Den Burchmore who allowed me to rummage through the contents of the Airship Heritage Trust's Library.

THE WRONG "BLIP"

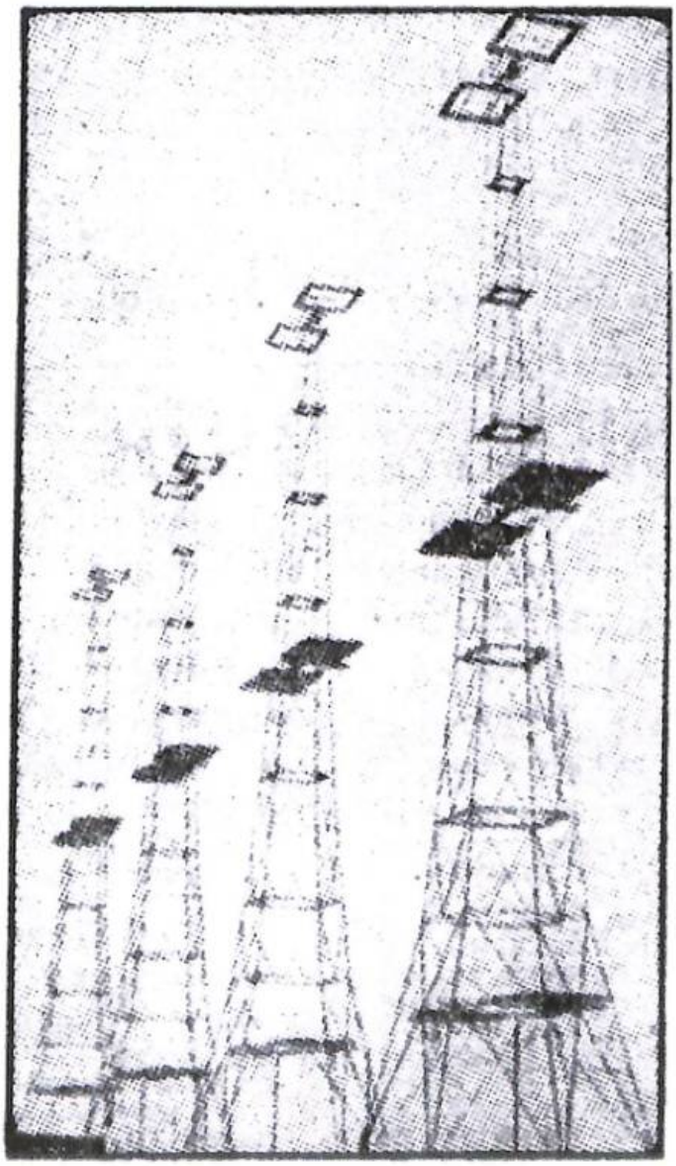
On Wednesday, September 6, 1961, *The Daily Telegraph* newspaper published the following article as part of their series entitled "BATTLE OF BRITAIN : 21 YEARS AFTER". It contained an error that is a classic case of mistaken identity.

How a Zeppelin Lost the First Round

By Derek Wood and Derek Dempster

In the spring of 1939 the giant airship *L.Z.127 Graf Zeppelin* was presumed to be in honourable retirement in its shed at Frankfurt-am-Main after nearly eleven years of flying. Instead it was being prepared for the first military electronics reconnaissance in history, 21 years before the American U-2 hit the headlines with its crash in Russia.

General Wolfgang Martini, head of the Luftwaffe signals organisation had for many months been interested to discover whether Britain possessed a workable radar for detecting aircraft. German firms were busy developing such equipment, and his suspicions had been heightened by the appearance of unusual 350-foot-high aerial masts round the south and east coasts of England.



The kind of masts that aroused German curiosity

When the first masts had gone up at Orfordness in Suffolk the German Air Force maps labelled them as belonging to a radio-transmitting station. Then Bawdsey showed similar towers and these were followed by others at Dunkirk and Dover in Kent and Canewdon in Essex. By early 1939 masts were up, or in process of erection, from the Isle of Wight to the Orkneys.

Martini urgently required to know the state of British radar, its wavelength and the number of sites operational.

The tall masts with their crossed lattice aerials appeared, however, to be unsuited to the wavelengths which German scientists had deemed best for their own secret Freya and Wurzburg radars. Accordingly, at a meeting with Goering, Milch and other air force commanders, Martini proposed that twelve airships be made available for high-frequency "research".

At first the assembly was hostile to the idea, but began to show a more helpful attitude as Martini explained his purpose.

He could not, he pointed out, use an aeroplane, as it was too small. lacked endurance and could not remain motionless in the air. With an airship he would have all the space necessary, many hours flying time and the ability to stop and take readings where necessary. Finally, however, it was agreed that Martini should use the two existing Zeppelins, *L.Z.127* and *L.Z.130*.

ONLY CRACKLING

Work was immediately started on converting, *L.Z.127* into an airborne radio interrogation station. A number of new high-frequency receivers were installed and an aerial array rigged underneath the gondola.

Towards the end of May, 1939, preparations were completed. Under cover of night the 776ft-long airship slipped her moorings at Frankfurt and headed out over the North Sea.

... Gen. Martini himself was on board for this trial run, which was mainly concerned with testing the receivers. Off Bawdsey, *Graf Zeppelin* turned north and flew parallel to the British coast. The operators and technicians in the gondola anxiously waited for some response from the radio receivers but each set emitted a loud crackling noise and nothing else.

On the ground at Canewdon and at Bawdsey the staff were amazed to find the largest "blip" they had ever seen, travelling very slowly across the cathode-ray tubes. Fighter Command filter and operations rooms immediately began tracking on the map tables.

It became evident that the strange visitor, because of its size and speed, could only be an airship. From its course along the coast it was correctly deduced that some sort of radar interrogation was in progress.

One by one the east coast Chain Home radars picked up *Graf Zeppelin* as it progressed northwards. Over the Humber estuary the airship transmitted a position report back to Germany. This was picked up by British radio intelligence who informed Fighter Command that the German "fix" was a few miles off the coast of Yorkshire.

At the Bentley Priory operations table this news caused considerable amusement, as *Graf Zeppelin*'s correct position had just been established, in cloud, over Hull itself - well inland. Air Marshal Pretty (then a flight-lieutenant on radar duty at Fighter Command) recalls that "*We were sorely tempted to radio a correction message to the airship but this would have revealed we were actually seeing her position on radar, so we kept silent*".

Off the north-east coast *Graf Zeppelin* turned for home, having picked up nothing but an appalling noise in the receivers. … It was assumed that the interference was due to an installation defect and reflections from the airship's envelope. Modifications were made to the sets and to the aerial and further trial runs were made over Germany.

MORE FAULTS

Finally, all was ready for a second run up the east coast. … At midnight on Wednesday August 2, 1939, the *Graf Zeppelin* again slipped her moorings and steered for the North Sea. … The night had been chosen for its poor weather and low cloud which gave adequate protection against sighting from the land. … Once again no transmissions were detected and more faults developed in the receivers. …

… *Graf Zeppelin* cruised on up to the Scapa Flow base, catching glimpses of British warships through the clouds. In the early evening she turned back to Germany empty-handed. …

THE DAILY TELEGRAPH was quick to report the airship's appearance over the islands. … On the following day, August 4, a highly amusing official communiqué was issued concerning the reconnaissance flight. Berlin denied that the *Graf Zeppelin* had intentionally left the Reich or had approached the coast of England. The statement went on: "*The airship cannot leave Germany without special permission. There can be no question of an intention to fly over or near British territory. There have, however, been severe storms during the last day or two and it is possible that the airship could have been blown off her course over the North Sea*".

So ended the Zeppelin's career in radar survey. … Neither side realised that the opening round of the air war against Britain had been fought and lost by Germany.

However, the authors of the *Telegraph*'s article had made one enormous but very understandable error. The airship that carried out the radar research flights in 1939 cannot have been the *Zeppelin LZ127*. Because, as was mentioned in the first paragraph of the report, the *Graf Zeppelin* really had been honourably retired in 1937. It is well documented that she was permanently withdrawn from service shortly after the infamous *Hindenburg* disaster (7 May 1937) and that on 18 June 1937, she made one last flight (the 590th) which took her to Frankfurt-am-Main, where she was deflated, suspended from the roof of a hangar and exhibited to visitors thereafter. It continued in this state until 1940 when it was destroyed on the orders of Hermann Goering who wanted to salvage the metal for his Luftwaffe.

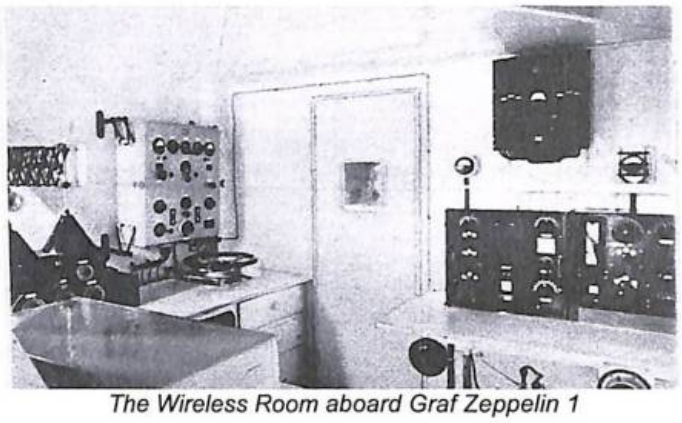
The historical literature also records that another airship was destroyed at the same time and here we have the clue to the *Telegraph*'s error. The second ship was *LZ130* a sister ship, identical in design to the *LZ129 Hindenburg*. And the *Telegraph* author's mistake is entirely understandable because this ship had also been named *Graf Zeppelin*. Doubtless this was because *Graf Zeppelin I* was no longer operational but the naming of *LZ130* as *Graf Zeppelin II* has created confusion for unwary historians ever since.

But there can be no doubt that the radar raider that made the clandestine flights along the British east coast in 1939 was *LZ130 Graf Zeppelin II*. Here, as evidence, is what Wikipedia has to say on the subject:* "*Flight 24 – Espionage*

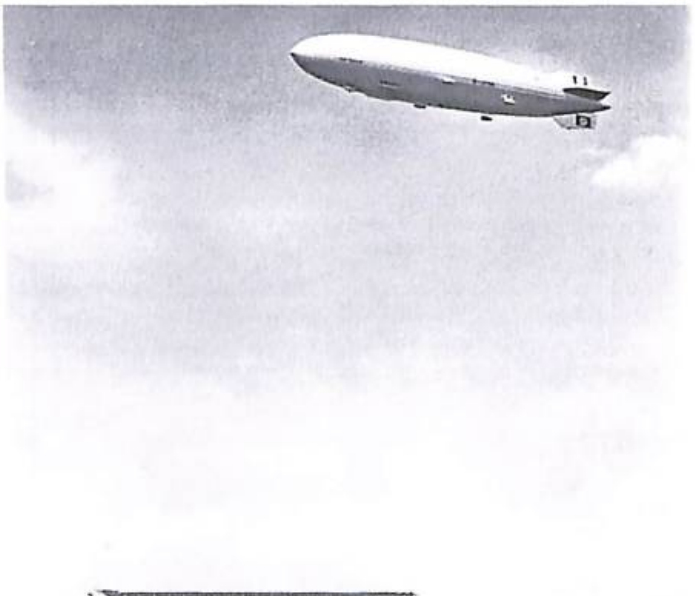
24. The "espionage trip" of 2 to 4 August 1939, taking over 48 hours and covering 4,203 km (2,612 mi), was the longest trip the LZ 130 made. The main goal was to secretly collect information on the British Chain Home radar system. To do this the airship flew northwards close to the British east coast to the Shetland Isles and back. As well as the 45 crew, 28 personnel engaged in the measurements were carried. Lifting off was around 20:53 on 2 August 1939, it overflew Hildesheim at 23:38, seen by very few people."

* https://en.wikipedia.org/wiki/LZ_130_Graf_Zeppelin#Flight_24

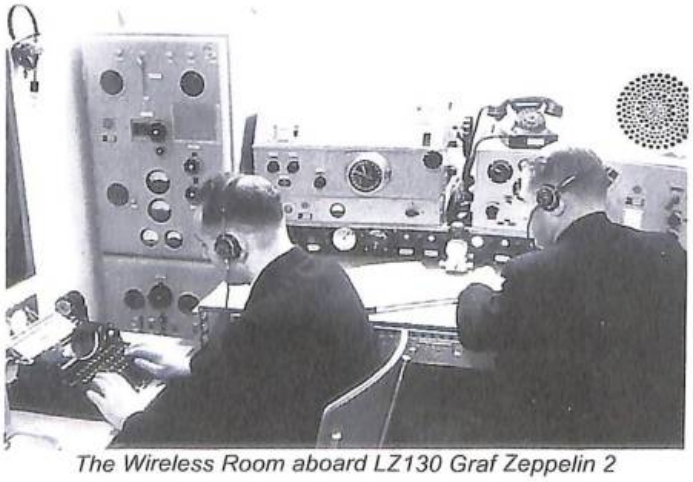
The Graf Zeppelin 1 (LZ127) - on a visit to Britain



The Wireless Room aboard Graf Zeppelin 1



Graf Zeppelin 2 (LZ130) flying over its home base



The Wireless Room aboard LZ130 Graf Zeppelin 2

HYDROGEN AS AN AUXILIARY FUEL IN COMPRESSION-IGNITION ENGINES (Part 3)

By Harold C. Gerrish and Hampton H. Foster

NACA REPORT No. 535 (Pub. 1935) submitted by Richard van Treuren
Found on **https://ntrs.nasa.gov/citations/19930091609**

SUMMARY

An investigation was made to determine whether a sufficient amount of hydrogen could be efficiently burned in a compression-ignition engine to compensate for the increase of lift of an airship due to the consumption of the fuel oil. The performance of a single-cylinder four-stroke-cycle compression-ignition engine operating on fuel oil alone was compared with its performance when various quantities of hydrogen were inducted with the inlet air. Engine-performance data, indicator cards, and exhaust-gas samples were obtained for each change in engine-operating condition.

... CONTINUED FROM *DIRIGIBLE 101* ...

Analysis of indicator cards. - The indicator cards taken during the power tests were used to obtain information concerning the evolution of heat in the combustion chamber. Figure 12 shows the pressure-time diagrams for six different fuel-oil quantities obtained at a compression ratio of 15.6, the broken lines being for fuel oil alone and the full lines for equal fuel-oil quantities with hydrogen added to the intake air. The curves show the corresponding amounts of fuel required to be effectively burned. By "effective fuel burned" is meant the combustion of the quantity of fuel required to produce the change in enthalpy (total heat) recorded on the indicator diagrams and does not include that dissipated as heat losses. In all cases the combustion pressures were higher and the areas of the cards greater with the composite fuel than with fuel oil alone.

A thermodynamic analysis of all the indicator cards taken during the power tests has been made and the results plotted in figure 13 to show the effective equivalent fuel oil burned up to 4°, 8°, 16°, and 30° after top center. The curves show that the addition of hydrogen with the smallest fuel-oil quantities is less effective than an equivalent amount of fuel oil in raising the pressure in the combustion chamber and this effect is more pronounced at the lower compression ratio even though it is possible to utilize a greater amount of hydrogen.

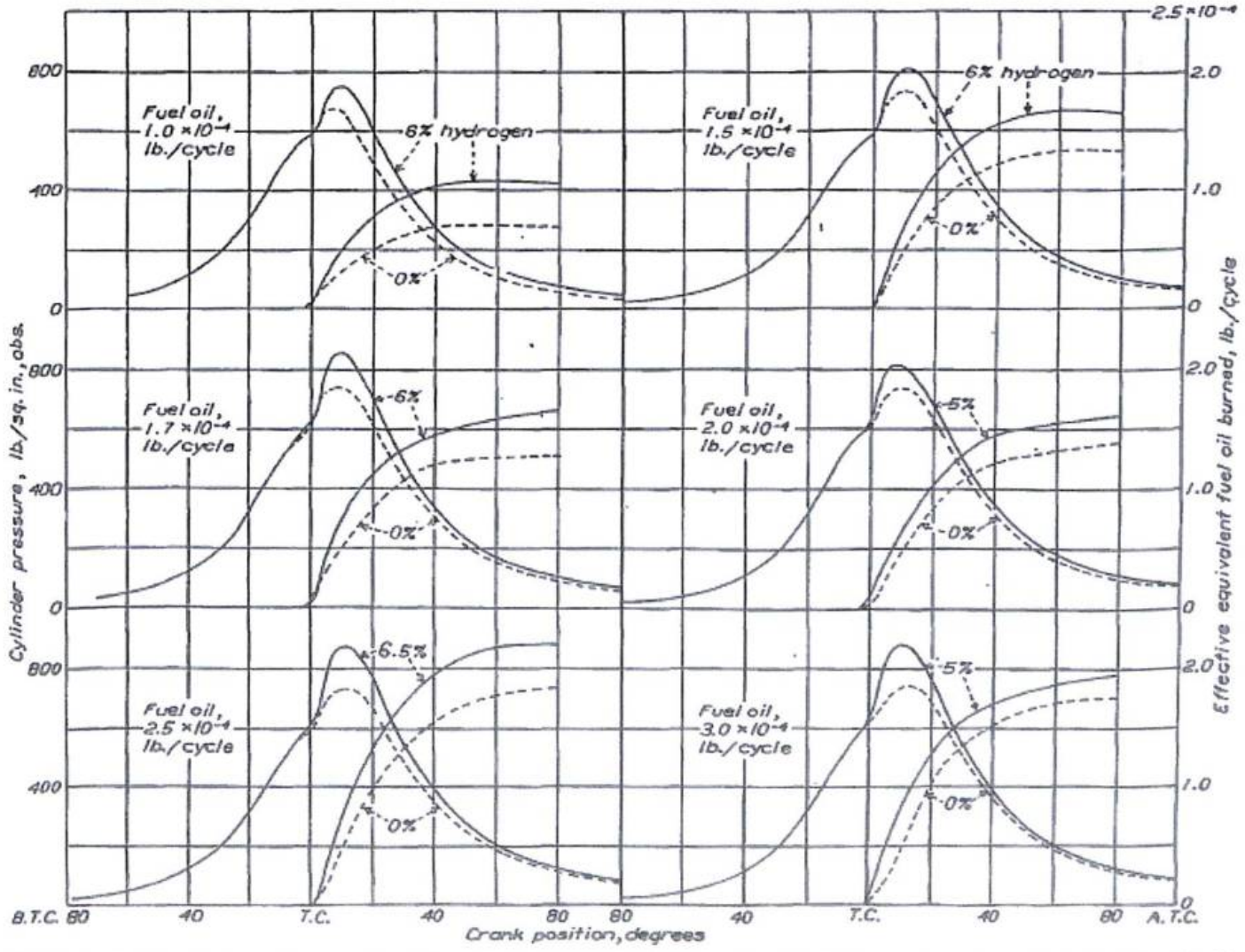


FIGURE 12.—Pressure-time diagrams for compression-ignition engine burning fuel oil and mixtures of fuel oil and hydrogen. Compression ratio, 15.6; injection start 10° B. T. C.

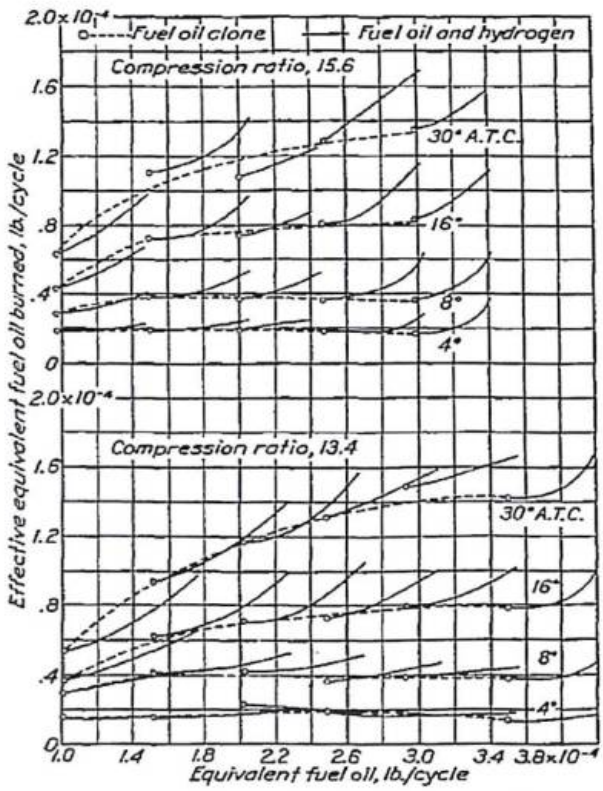


FIGURE 13.—Effect of hydrogen on combustion as deduced from indicator cards.

At 4° there is little difference between the curves for the fuel oil and for the composite fuel, indicating that the hydrogen plays little or no part in the ignition of the combustible mixture and has a negligible effect on the first part of the burning process. Mucklow (reference 2) found that the gas had no effect on the point in the cycle where combustion begins; Helmore and Stokes (reference 3) found no need for altering the injection advance angle when hydrogen-cum-oil gas was used in conjunction with fuel oil.

The most noteworthy feature of the curves for the composite fuel is that in the cruising range the smaller additions of hydrogen are about as effective as an equivalent amount of fuel oil; larger amounts of hydrogen show a comparatively greater increase in effective combustion. The characteristic increase in slope of the lines for the composite fuel indicates that combustion is accelerated as the hydrogen-air ratio reaches the range of inflammability. The lower and upper limits of inflammability, according to Bone and Townend (reference 8), are approximately 4 and 71 percent, respectively, depending upon the temperature and pressure of the mixture.

Information concerning the combustion of small quantities of fuel oil and large quantities of hydrogen in a compression-ignition engine was obtained from tests using only enough fuel oil to ignite the hydrogen-air mixture. Figure 14 shows indicator cards taken when motoring the engine and when operating with the igniting charge of oil and with increasing amounts of hydrogen. The first diagram shows both compression and expansion pressures when the engine was motored; the others show the end of the compression line and most of the expansion line. The diagram following the motoring diagram was taken with the igniting charge of oil and shows but slight difference from the motoring diagram. The diagrams with increasing amount of hydrogen show the scattering of pressure points, which indicates the irregularity of combustion from cycle to cycle that is usually associated with spark-ignition and carbureted mixtures..

The indicator diagrams of figure 14 and the curves resulting from their thermodynamic analysis, as well as those obtained at a compression ratio of 13.4 under similar conditions, are shown in figure 15. The analysis for both compression ratios shows that the period of burning (period from start to maximum amount burned) was increased by the addition of small quantities of hydrogen. For larger quantities (9 to 12 percent hydrogen for the 15.6 compression ratio and 9 to 14 percent for the 13.4 compression ratio) the period decreased and finally reached 40 crank degrees at the higher compression ratio and 60 crank degrees for the lower compression ratio. The reduction in the burning period with large quantities of hydrogen is opposite to the effect obtained with an increase in the fuel-oil quantity. (See fig. 12.)

The change from slow to fast burning with increasing

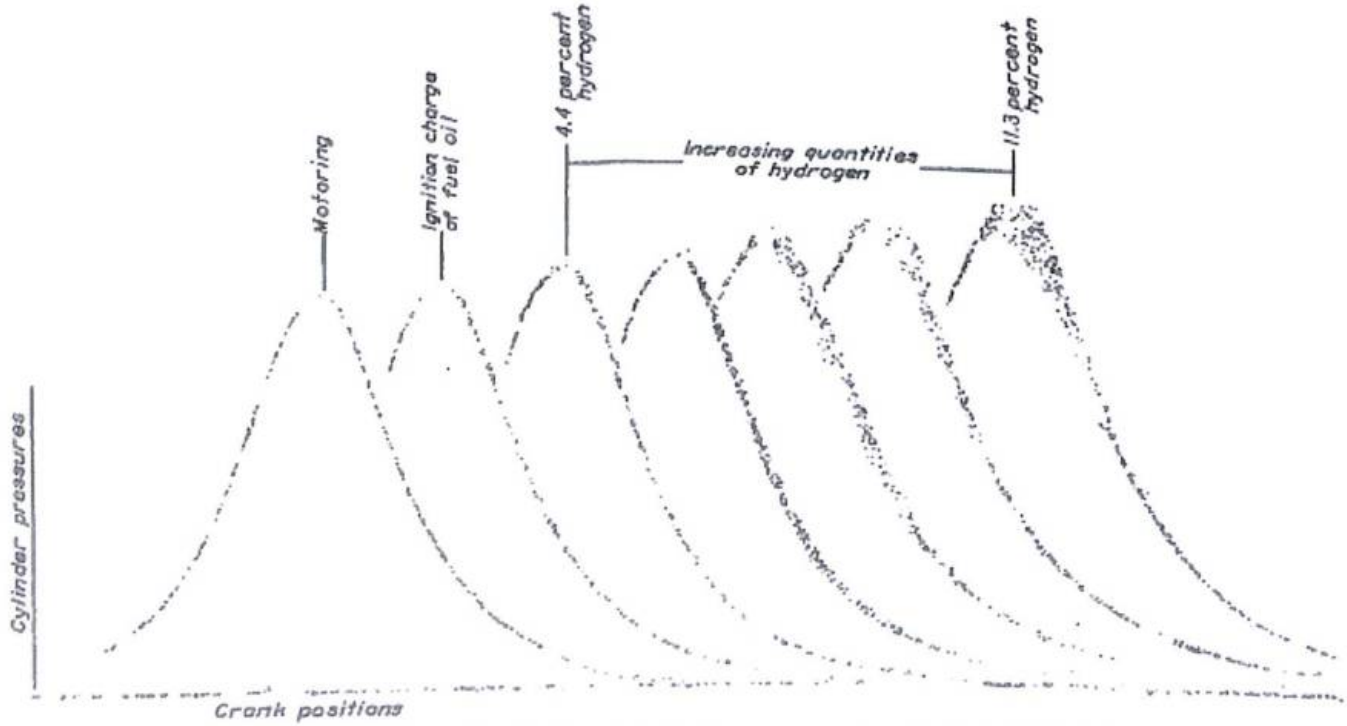


FIGURE 14.—Contact prints of indicator diagrams obtained with hydrogen-air mixtures. Compression ratio, 15.6; 0.000007 lb./cycle fuel oil used for ignition.

hydrogen is probably due to the change in mixture strength from below to within the range of inflammability. A similar effect is shown in figure 15 but, instead of a change in mixture strength, the range of inflammability was increased on account of the increase in temperature of the mixture (reference 8) with compression ratio. In the range of inflammability the combustion of the hydrogen-air mixture is similar to that with a carbureted mixture of gasoline and air in that combustion is completed early in the expansion stroke.

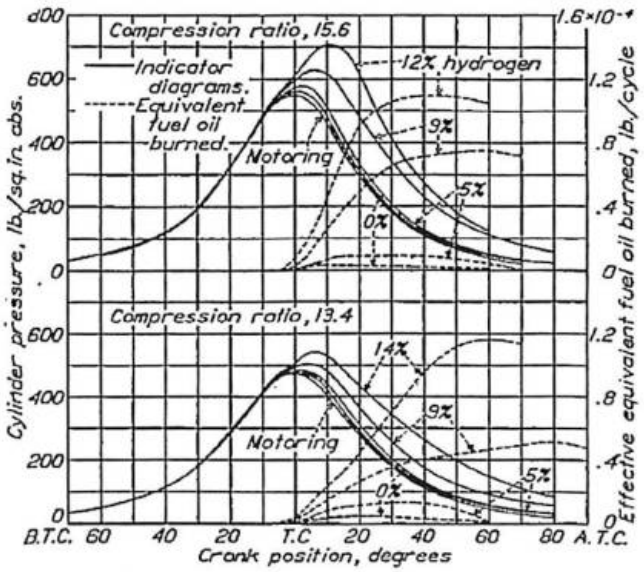


FIGURE 16.—The effect of hydrogen on combustion when 0.000007 lb./cycle of fuel oil is used for ignition.

Figure 16 has been prepared to show the difference in the effective burning of hydrogen, fuel oil, and the composite fuel at the same total heat input equal to approximately one-third full-load (excess-air coefficient of 2.5 for the 13.4 compression ratio and 2.9 for the 15.6 compression ratio). The amounts of hydrogen in the composite fuel was 1.5 and 3 percent for the 15.6 and 13.4 compression ratio, respectively.

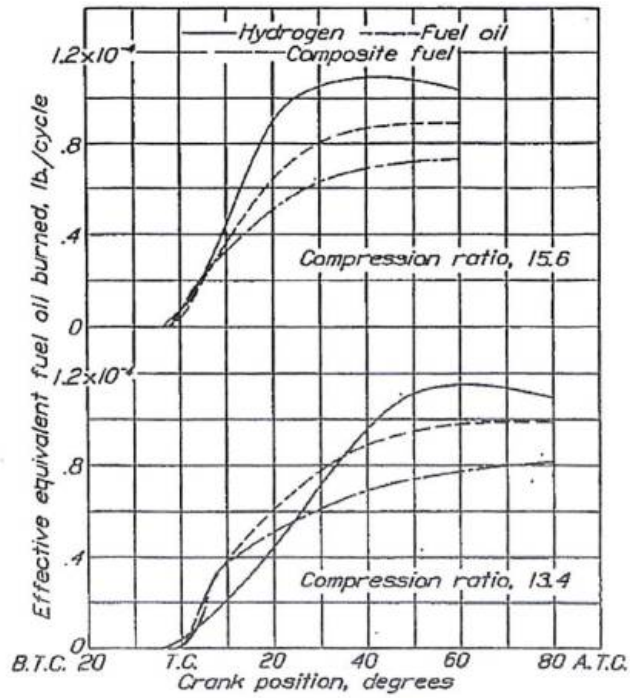


FIGURE 16.—Comparative combustion of hydrogen, fuel oil, and composite fuel with constant heat input.

The burning curves for hydrogen have been reproduced from figure 15 and the curves for fuel oil and the composite fuel have been obtained from a cross plot. The figure shows the same timing of the start of combustion for the three fuels and also approximately the same rate of burning at the start. At the higher compression ratio the hydrogen is more effective in raising the pressure throughout the entire burning period; at the lower compression ratio the combustion of the hydrogen lags behind that of the fuel oil for a considerable portion of the burning period. At both compression ratios, however, the total amount of heat evolved is greater for the hydrogen than for the fuel oil. The composite fuel is less effective at both compression ratios than either the hydrogen or the fuel oil in raising the pressure throughout the burning period. The difference is due to less fuel oil being injected and to the inefficient combustion of small amounts of hydrogen with small amounts of fuel oil, as has been previously discussed. Although it was impossible to burn very large quantities of hydrogen (over 14 percent) and thus make it possible to compare the rates of burning of the three fuels at larger loads, it is believed that at loads greater than cruising the effective-fuel-burned curves for the composite fuel will lie between that of hydrogen and that of fuel oil. (See fig. 13.)

APPLICATION OF RESULTS

ADVANTAGES OF BURNING HYDROGEN IN AIRSHIP COMPRESSION-IGNITION ENGINES

From the results of these tests on a single-cylinder four-stroke-cycle compression-ignition engine operating at compression ratios of 13.4 and 15.6, it is concluded that hydrogen in sufficient quantities to maintain the static equilibrium of an airship can be satisfactorily burned along with the fuel oil at all loads up to and including cruising. For loads greater than cruising, the static equilibrium could be maintained only when operating at the lower compression ratio. Hydrogen could be burned in greater or less quantities than that of the aerostatic equivalent of the fuel oil burned, thus making a very adaptable system for controlling the buoyancy of the airship. The thermal efficiency for the combustion of the composite fuel was approximately the same as that for fuel oil.

The burning of the hydrogen in the engines not only makes it possible to control the equilibrium of the airship but also makes it possible to reduce the quantity of fuel oil required for a given flight, increase the pay load carried, or increase the still-air range of the airship. It is interesting to determine the reduction in the quantity of fuel oil required for a flight when burning hydrogen in the engines instead of valving it to maintain static equilibrium. In this case it is only necessary to consider that the hydrogen is pure. Any impurity, such as air, in the hydrogen would cause the density of the mixture to increase with a resultant decrease in its lifting power and a greater quantity of mixture would be required to lift a given weight, although the quantity of hydrogen present would be the same. Taking the specific weight of pure hydrogen and air as 0.0053 and 0.0763 pound per cubic foot, respectively, the lifting force will be the difference in these values, 0.0710 pound per cubic foot. The aerostatic static equivalent x of 1 pound of fuel oil burned will be equal to the specific weight of pure hydrogen divided by the lifting force, or 0.0746 pound per pound of fuel oil.

As the fuel oil y required for the flight when burning hydrogen together with the fuel oil plus the fuel oil equivalent of the hydrogen burned must equal the original quantity of fuel oil w required for the flight when valving the hydrogen:

$$y+\frac{52,800}{18,300}\,xy=w$$

$$y=0.823w$$

where 52,800 and 18,300 are the heating values of hydrogen and fuel oil, respectively, in British thermal units per pound. It is seen from this computation that the burning of the hydrogen in the compression-ignition engines to maintain static equilibrium, instead of valving it, results in a reduction of 17.6 percent for the weight of fuel oil required for the flight.

If the two fuels cost the same per heat unit, the full line in figure 8 [*see Dirigible 101 p20*] would give an indication of the cost. These fuels vary considerably in their cost and figure 17 has therefore been prepared to show the comparative cost of power with the composite fuel on a basis of the actual cost.

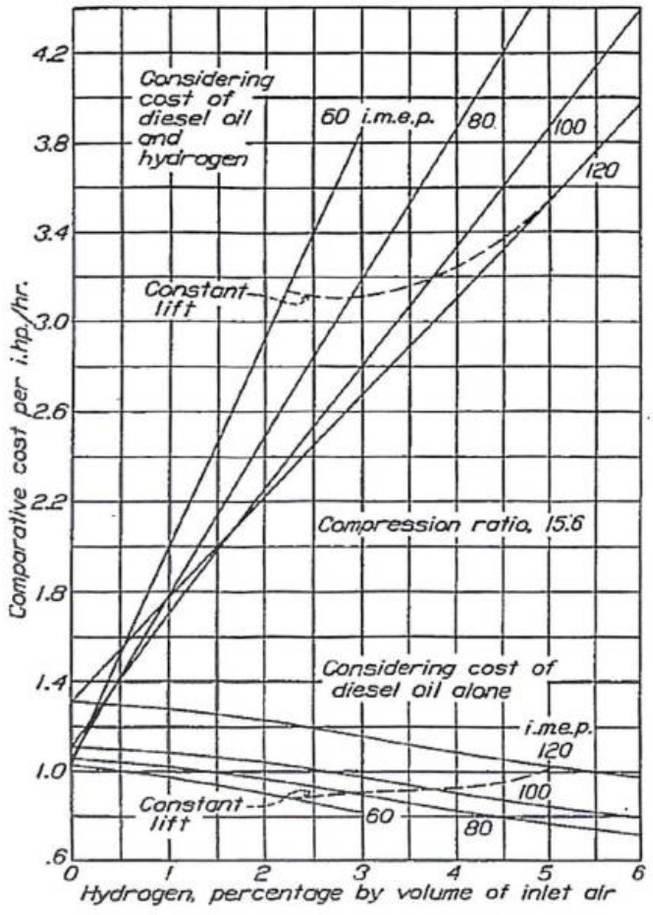


FIGURE 17.—Comparative cost of fuel oil and composite fuel.

The figure shows that for constant lift with hydrogen at $1.50 per thousand cubic feet and fuel oil at $0.06 per gallon, the cost of power is tripled when the cost of hydrogen is included; but, when the hydrogen is considered as costing nothing, as would be the case for constant lift if it were burned instead of being valved, the cost of power would be decreased approximately 17 percent.

The pay load is an indication of the commercial value of an airship. It is interesting to determine how the pay load of an airship is affected by using different inflation gases and two types of engines. The following five arrangements have been taken for comparison and in each case the over-all dimensions, total gas volume, and total engine power are the same.

Airship A is assumed to be inflated with helium, to be fitted with spark-ignition engines burning gasoline, and to be fitted with water-recovery apparatus.

Airship B is assumed to be the same as airship A but to be fitted with compression-ignition engines.

Airship C is assumed to be fitted with dual gas cells: The outer cells are to be inflated with sufficient helium to support the fixed weight; the inner cells are to be inflated with hydrogen. The compression-ignition engines are assumed to burn hydrogen along with the fuel oil.

Airship D is assumed to be the same as airship A but to be inflated with hydrogen.

Airship E is assumed to be inflated with hydrogen and to be fitted with compression-ignition engines burning hydrogen along with the fuel oil.

It is further assumed that static equilibrium is maintained in all the airships by recovering water from the exhaust gases or by burning the hydrogen aerostatic equivalent of the fuel oil burned in the engine.

The information necessary to make a detailed tabulation of the weights of the various items in the airships is not available. The use of hydrogen in a secondary cell of airship C would, however, increase the weight of the gas cells and would also add some weight in the form of restraining and steadying suspensions. It would also be necessary to provide ducts by which the hydrogen would be led to the engines. It should not be necessary to provide blowers to feed the hydrogen from the cells to the engines.

The water-recovery apparatus of airships A, B, and D not only increases the dead weight but also the drag. According to Fulton (reference 7) the weight of the water-recovery apparatus, bags, and piping of a (6,500,000 cubic-foot airship would be 16,000 pounds and, for a 6-day endurance flight, the increase in fuel consumption due to the increased drag would be approximately 9,000 pounds. For such a flight in freezing weather approximately 12,000 pounds of antifreeze material would also have to be carried.

The assumption that the dead weight of the five airships would be the same is believed to be in error only in making airships C and E somewhat heavier than they actually would be. In this assumption the fuel tanks are considered to be the same for all airships and the weight-power ratio of the compression-ignition airship engine is considered to equal that of the spark-ignition airship engine.

The results of the computations are shown in the following table. It may be seen that airship E can carry approximately 80 percent more pay load than airship A; whereas airship C can carry 53 percent more pay load than airship A. If airship C attempts to compete commercially with airship E, it might obtain the more valuable pay load on account of the additional safety of the helium blanket and even with the handicap of 17 percent less pay load might be a greater commercial success. Airship B is the most desirable of the proposed types because of the decreased fire hazard but, owing to its small pay load, may be undesirable as a commercial airship.

... TO BE CONCLUDED ...

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ASCOT RACE TRAFFIC SURVEILLANCE FROM *R36*

Was it a Success?

by Kent O'Grady

The Air Ministry (AM) hoped to offload the large expense of rigid airship operations and maintenance upon free enterprise during the period of great fiscal restraint after WWI. The London Metropolitan Police (LMP) expressed interest in aerial reconnaissance, thus the AM made *R33* available for traffic control at Epsom Downs on May 31st, 1921. Viscount Curzon then contacted the Home Secretary about using an airship for the Ascot Races and LMP duties in general. [i]

R36 was superior to *R33* for police work due to more spacious passenger quarters, making aerial observation less physically taxing. The AM agreed to operate *R36* at the Ascot Races on June 14th. In reality, these rigids were too large for LMP use. Still, the hope was that by combining separate roles into one demonstration (passenger carriage and aerial surveillance), concurrent with press coverage, interest among prospective operators would be generated. This was the sole *R36* flight where journalists were permitted on board, making it the flight most noted in the press.

There were 25 passengers and 37 crew for a total of 62 on board. Noteworthy observers included Arthur Bassom, OBE KPM, the C/O of traffic at Scotland Yard, along with his friend and colleague, Frank L. Elliott, the Assistant Commissioner of LMP. Bassom was a pioneer of traffic policing, and Elliott had introduced one-way streets and traffic lights to London. Two other unnamed officers represented the Berkshire and Surrey police forces.

R36 Moored to the Pulham High Mast. June 1921

An early departure was scheduled from Pulham on June 14th. Several arrived the previous day, overnighting at *The Magpie* or at *The Swan* in Harleston. Some may have stayed at the *Crown Inn* at Pulham Market or at the *Half Moon* in Rushall. The following morning breakfast was served at the officers' mess at 6:00 am. W. H. Sayers, technical editor for *The Aeroplane*, complained: "*little notice was given to Pulham of...a large number of passengers to be carried*", [ii] suggesting kitchen staff were overwhelmed or did not have enough food. But other accounts described breakfast as hearty, indicative of contradictory reports filed by journalists throughout the flight. The *Glasgow Herald* reporter had breakfast at *The Magpie*. The proprietor served a generous meal, "*on the grounds that we would have little enough in the course of the day*". [iii]

The High Mast

Passengers were driven to the mast for departure. The *Glasgow Herald* reporter was awestruck: "*The R36 was a glorious sight sheening yonder in the morning haze...*" but strict rules and the confiscation of all matches "*...brought us with a sad jolt from the ethereal to the intensely practical*". Journalists were aware that boarding required climbing the mast ladder 120 feet before crossing a gangway into the bow. It was explained that the Pulham mast was built for military purposes and commercial airships would utilize passenger-friendly lifts. All guests knew what the mast climb entailed and could have declined the invitation if they did not have the stomach for it. Still, this did not prevent melodramatic reporting:

[An]...important matter for the attention of the Air Ministry is the provision of proper appliances for lifting passengers and bringing them down from the mooring mast. If the Air Ministry desire to damn airships once and for all let them continue to make the climbing and the descent of a 120-ft. vertical ladder an essential to embarkation and debarkation [iv]

This sensationalist bark by Sayers was ridiculous given that he knew commercial masts would have proper lifts, but this didn't stop him from turning the Pulham mast into a great obstacle. Other reporters were brief: "*...shortly after 7.00 the party of guests faced and conquered the ascent of the mooring mast*". Journalist John Yoxall from *Flight* walked to the mast with Colonel Pace. He stated: "*a certain amount of nerve [was] required to tackle [the mast]*"; a more accurate and professional take on feelings participants had. [v]

Despite the drama, everyone was seated in their cabins shortly after 7:00 am. An early departure was chosen in case of headwinds as *R36* was expected near Staines by 10:30. Engines were warmed up in succession between 7:20 and 7:30, then the ship was released at 7:31, rising to 1,000 ft. The *Glasgow Herald* correspondent reported: "*...commencement of flight was imperceptible. The field began to glide backwards. Prometheus was unbound*".

Flight to Ascot

The course was set SW at 1,500 ft in good visibility at 47 mph. *R36* passed over Sudbury at 8:11 with a 10 kt wind blowing. She was over Enfield at 09:05, continuing towards Wembley. Sayers reported: "*The morning was hazy, the wind more or less on the beam most of the way, four wing engines throttled were used during practically the whole trip*". [vi] She flew over Ealing at 09:28 then White City and over Hammersmith. Following the river Thames *R36* then flew over

Hounslow reaching Staines by 9:47. Staines Reservoirs were part of the three mile patrol zone.

The Assignment and Life On-Board

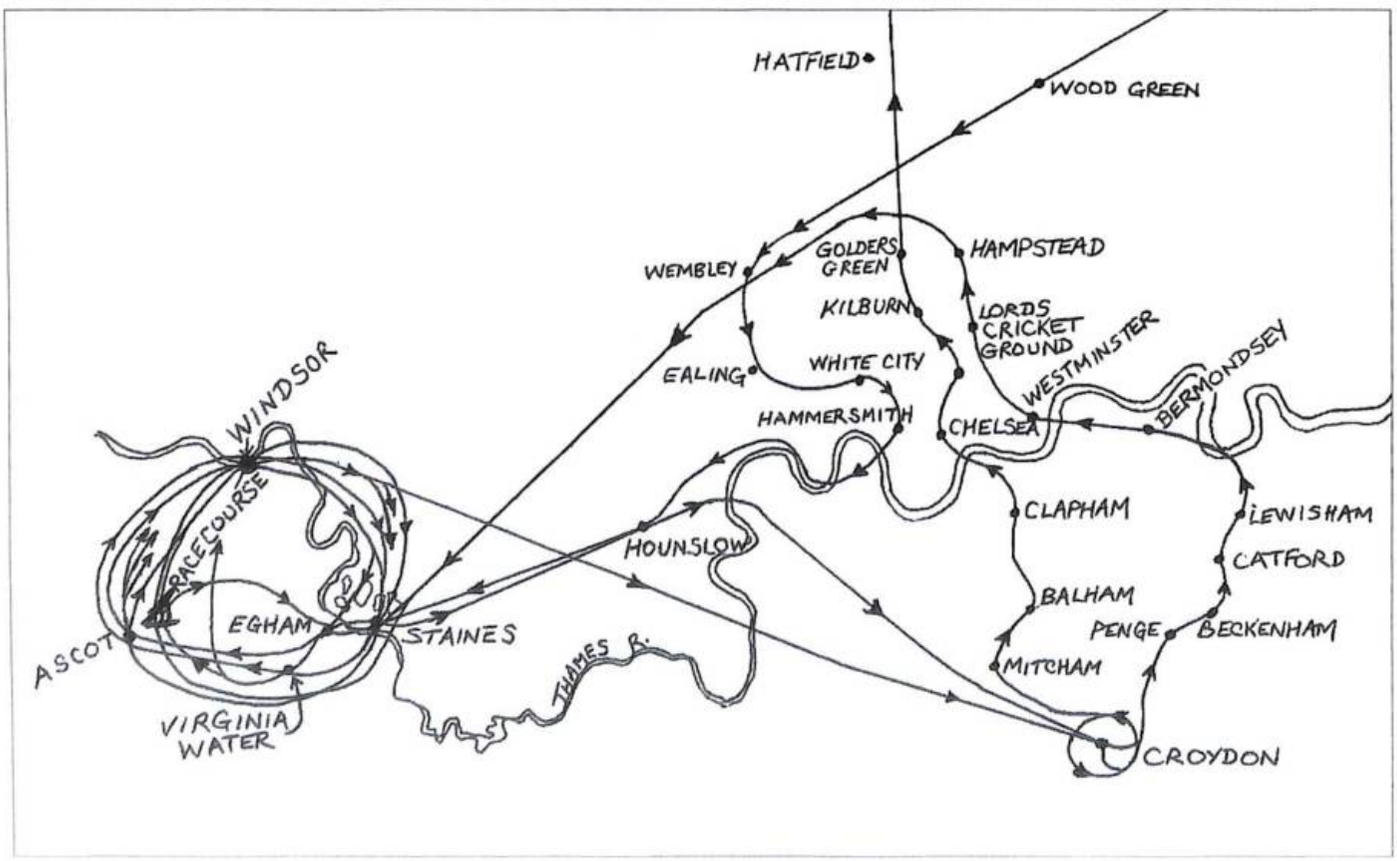
Traffic duties started with attention paid to Windsor and Staines Roads. *R36* was not flown over the race course itself until late in the day, out of fear that it would spook the 22 horses running. Sir Victor Goddard commented that police officers on board had radio-phone apparatus to provide ground-based traffic managers with an overall picture of traffic flow, in theoretically a timely manner. [vii] Information was also sent via W/T to the Police Station at Staines. Sayers noted: "*...it was possible to observe the traffic with great ease, and to see it as a whole and not piecemeal*". Meanwhile, journalists typed descriptions of the flight. The beat assigned was a circle around Staines, Egham, Virginia Water and Windsor which continued from 10:00 until roughly 13:30. Sights included Hampton Court Palace and the Windsor deer park, but the same territory was covered in many large circles. The repetition led to some reporters chafing. Others were more positive, such as the one from *The Glasgow Herald*:

To say [we are] feeling a sensation of awe and elation as we look down upon the patchwork far below, would be somewhat coarse. There is a sublimity in our conditions which demands happier expression ... In this millennial adventure we are punctiliously supplied with cake and lemonade, and there are blue curtains here to gladden our eyes when they are tired of watching England gliding away.

After a few circuits, journalists were given copies of *Airship Mail*, the first in-flight airship newsletter in Britain, claiming to have "the world's highest circulation". Its news was not welcome because the first item conveyed England's loss in cricket at Lord's. Several groans were heard as the newsletter was put down, although most finished reading it later. [viii] After flying over Windsor Castle for the fifth time, one reporter noted no traffic congestion and some wondered if the airship was "on a false errand". But no one considered orderly traffic might have been due to the traffic officers' directions, based upon data supplied from *R36*. Universal Service Staff Correspondent Robert J. Prew expressed his initial belief that the airship was probably not essential for traffic management, but also noted "certain classes of unauthorized traffic" detected by observers led to errant vehicles being diverted in under five minutes. [ix] Traffic volumes increased, and Prew became contradictory, stating: "*...Scotland Yard experts aboard today efficiently controlled the immense traffic on the jammed roadways to the Ascot track*". [x]

Soup was served at 11:00 and judged excellent by John Yoxall. At noon a lunch of ham, tongue, salad, bread, butter, fruit salad, biscuits, cheese, and beer was served. This cold-fare was due to pending kitchen oven repairs. Despite the reporter from *Flight* commending the food service, Sayers from *The Aeroplane* complained about a lack of food during the flight. The latter's claim seems exaggerated; Bryn Elliott notes in *Police Aviation: A History*, the editor and some staff of *The Aeroplane* had a surprisingly negative, cynical outlook on aeronautics. [xi] Sayers' comment is thus best taken with a grain of salt (no pun intended).

After lunch the airship left the Ascot circuit for Croydon amid increasing turbulence. She flew over the aerodrome at 2,300 ft. at 14:00, dropping parachutes from the bow with cast iron sinkers and journalist reports. A couple of "hundredweight" sinkers detached from the parachutes and hit a tennis court, but no one was hurt. Reporter J. Bone said a parachute descended softly, hitting a tree then a wall before impacting the ground. A Croydon worker retrieved it. [xii]



Approximate flight path over London neighbourhoods during the Ascot Traffic Control Flight. A minimum of eight circuits over the patrol area between Staines, Ascot and Windsor were mentioned in written accounts, and the undertaking of several more was noted but not quantified. R36 left the patrol area twice to drop press reports via parachute at Croydon.

At 14:21 *R36* made for Beckenham before heading to Catford, Bermondsey, and Westminster. The flight continued over Lord's Cricket Ground at 15:07, then Hampstead, reaching Wembley at 15:15.[xiii] Surveillance resumed at 15:40 as traffic began leaving Ascot. King George and Queen Mary watched an unlikely contender, *Illuminator*, owned by E. Short, win the Hunt Cup. *Glammerin*, owned by Lord Londonderry, came in second, and *Beauregard*, owned by F. Hardy, came in third. [xiv] *R36* flew directly over the race-grounds as the final event wrapped up and there were few spectators left. Traffic congestion was rapidly growing. *R36* police officers relayed to Staines: "*Omnibuses and heavies are not being diverted at Egham from Basingstoke Road, as arranged, towards Windsor. Please communicate and report reason*". Reply: "*Staines to R36: Egham police on way to remedy this at once*".

Yoxall commented that airship travel was a cure for lost appetite and insomnia. He tested a berth for "forty winks" and found it comfortable. Tea was served at 16:00 accompanied by food which some declared on par with lunch. But the absence of dinner was disappointing for others and probably the basis of Sayers' complaint.

Bryn states several journalists were of the belief the flight would meet a "published 11-hour flight schedule" and expected to be back at Pulham by 18:30, but:

...the inexorable will of the weather ensured that all the fine words parachuted down upon Croydon at noon had turned into untruths by tea-time. The large craft undertook a somewhat meandering return trip to the vicinity of Ascot and took up traffic observation duties as the crowds started to leave for home at 1600hrs. All this airborne time was beginning to tax the passengers. [xv]

While some passengers no doubt found the length of the flight taxing, it is questionable that the total duration was unplanned. If any schedule was published, it has not been located. On the one hand it is claimed weather held up *R36,* but reference was also made to an unhurried meandering return to Ascot to conduct further observation duties. It is doubtful this return to Ascot was unplanned; she flew over the race course area at least three more times.

Traffic congestion occurred between 16:00 and 17:20, then improved. *R36* left following the Egham-Staines-Hounslow roads amid haze. Final observations were made along London Road; it is possible this latter surveillance was agreed to at the last minute. Another visit was made to Croydon, where more press reports were parachuted at 18:10.

Return to Pulham and Mooring

The airship flew over Mitcham, Chelsea, Kensington Gardens, Paddington and Golders Green. Course was set for Knebworth at 18:52, the route due north to just east of Hatfield and Welwyn, arriving there around 19:35. *R36* then turned northeast at 19:55, skirting Knebworth.

It was only as the *R36* turned east that it was confronted by any headwind; the log reveals it was 7 kts. This was not a strength that would cause a major weather delay as suggested by Bryn. The final part of the flight took the airship two miles east of Bury St. Edmunds and Pulham was visible at 21:08. Mooring lines were dropped at 21:38, but gusts led to a difficult approach. Two searchlights flood-lit the mast to ensure visibility. There was a 90° shift in wind direction between an altitude of 400 ft (122 m) and the mast-head, amid turbulence. Nevertheless, the mooring cone was locked in by 21:58. The last passenger was on the ground by 22:30. The flight lasted 14 hours and 27 minutes. [xvi] Approximately 580 miles (933 km) were flown that day.

Sayers stated: "*...apparently they [the Pulham ground crew] were not advised as to how late the ship would be kept out by the police authorities*" but did not clarify how this affected matters. [xvii] Not surprisingly, Yoxall saw things in a more positive light: "[it was]...*the end of a perfect day for the reporter. The ship left [him] in awe*". [xviii]

It was stated by Nick Walmsley in "*R.36 – Harbinger of the 1924 Airship Programme*" that this mooring was a testament to Cpt Irwin's skill at handling the airship. [xix] This is an interesting claim given that, apart from one single flight in *R29* on Nov. 30, 1918, Irwin did not have any previous rigid airship flying experience, let alone command of a rigid, before *R36*. Although a Captain with North Sea airship experience, Irwin was still learning rigid handling and had considerably less experience than Maj. Scott. Irwin became Captain only after the originally designated captain of *R36*, Victor Goddard, suffered serious injury in a car accident. Moreover, it was Scott who designed the high mast and who would have kept Irwin's handling of *R36* under close observation. This is not to deny Irwin's capability or role; rather, to put things in context. Journalist Yoxall stated in "Long Look Back: RFC and RAF Experiences, 1913-1962" in *Flight International* that Scott was the senior officer on this flight and credited him with the skilled landing. [xx] Which version is correct? Although these two views seem contradictory, there is truth to both. Although Scott was the senior officer, protocol dictated the new Captain in training, Irwin, would oversee the landing subject to input from Scott. Neither, however, would physically handle any controls. Rather, they would issue commands to the Coxswain and other crew members. **... TO BE CONTINUED ...**

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[i] "Traffic Control by Aircraft" in *The Observer*. London, Jun 5, 1921.

[ii] Sayers, W. H. "On Travelling by Airships" in *Aeronautical Engineering: Supplement to "The Aeroplane"*. June 22, 1921, p. 367.

[iii] "A Day on R36: Impressions in the Airway; The Ascot Traffic Control" in *The Glasgow Herald*. June 15th, 1921, p. 11. The name of this reporter is unknown.

[iv] Sayers, 367.

[v] "A Day Out in the R.36" in *Flight*. June 23, 1921. P. 420.

[vi] Sayers, 367.

[vii] Goddard, Robert Victor (Oral History). Imperial War Museum Catalogue Nr. 3189. (London: IWM, 1978. **https://www.iwm.org.uk/collections/item/object/80003175**

[viii] The newsletter may be found online in the AHT website at **http://www.airshipsonline.com/airships/r36**

[ix] Prew, Robert. "This Story Dropped from Clouds Over Race Track" in *The Times* Shreveport, LA. June 15, 1921. Also: "Giant Aircraft Easily Directs Traffic on Way to Ascot Races" in *San Francisco Examiner*. June 15, 1921.

[x] Prew, Robert J. "Britain Goes to Race Course at Ascot in Gas Bag with Cabin" in *The Akron Beacon Journal*. June 15, 1921.

[xi] Bryn, Elliott. *Police Aviation: A History*. 2004. Accessible online at: **http://www.policeaviationnews.com/Acrobat/index/PoliceAviation-ahistory.pdf**

[xii] Bones, J. "On an Air Liner: Ascot View from Above" in *The Manchester Guardian*. June 15, 1921.

[xiii] Sayers, 367. (It appears Montague accidently entered "Wimbledon" in the log instead of Wembley. A flight path diversion to Wimbledon seems too far.)

[xiv] "50 to 1 Shot Wins Ascot Hunt Cup" in *Asbury Park Press*, June 15, 1921.

[xv] Bryn, 19.

[xvi] Flight length varies with sources as 14 hrs 9 min, 14 hrs 22 min, or 14 hrs 27 mins. The log entry has been used.

[xvii] Sayers, W. H. "On Travelling by Airships" in *Aeronautical Engineering: Supplement to "The Aeroplane"*. June 22, 1921, p. 367.

[xviii] "A Day Out in the R.36" in *Flight*. June 23, 1921. P. 420.

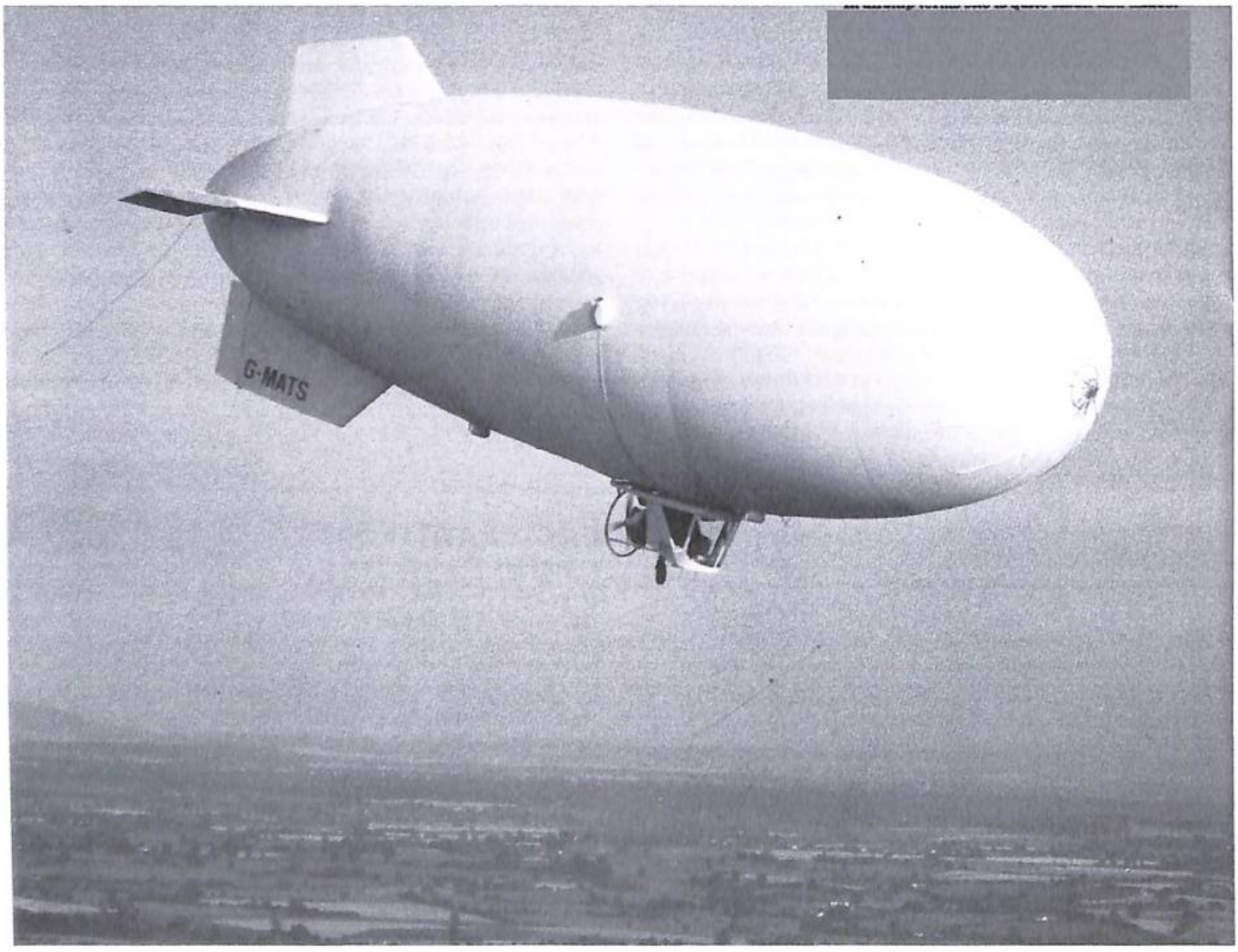
[xix] Walmsley, "R.36 – Harbinger of the 1924 Airship Programme" in *Dirigible. Vol. XI*, Nr. 1, p.7.

[xx] Yoxall, John. "Long Look Back: RFC and RAF Experiences, 1913-1962" in *Flight International*. 17 May 1962. P. 777.

THE *GA42* BLIMP

Extracted from *PILOT MAGAZINE* (Vol 23 No.1) January 1989

"*Flying an airship is a very gentlemanly way of committing aviation*" observes Jonny Seccombe. "*You benefit from spectacular views, a comfortable cabin with lots of leg room and a feeling of total security. . .*" Thunder & Colt's *GA42* is intended as an economical two-seat flying advertising billboard and camera ship.



"In airship terms she is quite small and almost huggable!"

Most gas airships look the same to the unpractised eye, a fat white sausage with fins at the back and a cabin underneath. On first acquaintance the *GA42* seems to match this sweeping generalisation, but once you get to know her a little better you find that she differs from other airships by being smaller, mostly low technology and only costing £200,000. Now that may be a lot of money to some people, but when you consider that the nearest rival, the *Skyship 600*, opens the till at $6 million, getting on for twenty times the price, then the accountants amongst you had better open up a whole new spread-sheet and take another look at the economics of airship operation.

The *GA42*, standing for Gas Airship of 42,000 cubic feet capacity, is the latest brainchild of the Thunder and Colt Balloon company at Oswestry, them of Virgin Atlantic Challenger fame. The ship came about as a logical response to the demands of the advertising and promotion industry, which itself has fuelled the growth of commercial hot air ballooning over the last ten years. The advertisers have always been concerned that the display of their message has been at the whim of the wind and the weather, and that hot-air balloons, once free launched, expose a message of ever decreasing size as the envelope sets off on its journey down wind.

First attempts to solve this problem resulted in the construction of hot air airships which were capable of holding their own against a 15 mph wind. As even the best of these ships can only muster the aerodynamic qualities of a blancmange, it was almost inevitable that Thunder & Colt should sooner or later take the next major step to a full-blown gas airship. The experience gained from building first sporting hot air balloons, then special shapes of ever increasing complexity and sophistication and finally forty hot air airships of up to 105,000 cubic feet, meant that the company was a long way up the technical learning curve when it decided to embark on the *GA42* project.

The contract to build the ship was signed in August 1986 and in May 1987 G-MATS was rolled out of her shed to be first flown by Mats Backlin, the project designer, in

September. Certification to Section Q is anticipated soon with a full Certificate of Airworthiness for Aerial Work.

I was offered the chance to fly her on her 29th test flight, and joined Per Lindstrand and the crew at Rednal on an overcast windless autumn afternoon.

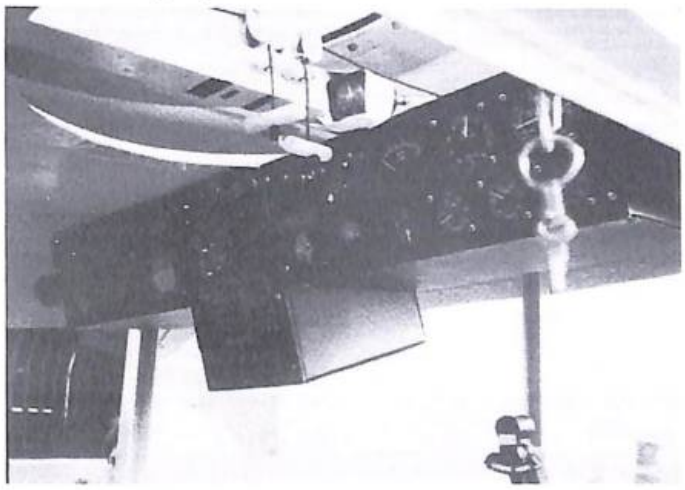
First impressions of G-MATS, lurking in her shed, suggest a big ship, but in airship terms she is actually quite small and almost huggable. Unlike an aeroplane that sits forlorn and lifeless in a hangar, she is alive and active all the time. ... ...

... Modern airships have an air bag called a ballonet at each end of the ship. These bags, which can occupy as much as a quarter of the 42,000 cubic feet capacity, are inflated, either by an engine driven fan, or by an auxiliary electric fan if the engine isn't running. By keeping up the pressure in the ballonets you maintain the internal pressure and therefore rigidity of the airship. The proportional size of the ballonets and the capacity of the gas in relation to the empty weight of the ship determines the maximum pressure altitude of the airship. The theoretical pressure altitude of G-MATS is around 10,000 feet, but in practice she will seldom climb above 5,000 feet and the normal operating altitude will be in the 1,500 to 2,000 feet band. There are safety valves for both ballonets and the helium bag which will blow off automatically at pre-determined pressures if the pilot is inattentive.

The aluminium semi-monocoque cabin, built to withstand a 9g landing, is suspended at four points from two catenary curtains attached to the roof of the bag. There are seats for pilot and one passenger and behind them a fuel tank of 170 litres capacity conferring an endurance of 7.5 hours at normal cruise. Production airships will be fitted with a water ballast tank beneath the floor.

The instrument panel is attached to the roof of the cabin above the normal eyeline. G-MATS has extra instrumentation for test flying, but recognisable features include a fuse panel, rev counter, altimeter, VSI, engine temperatures and pressures, ASI, DI, compass and OAT. Additional gauges indicate fore and aft ballonet pressure, the helium pressure in the main envelope and a superheat gauge - the difference between ambient and envelope temperatures.

On the roof of the cabin are two levers to open or close valves known as 'dampers' that allow air into each of the ballonets. Next to them are two toggles that will open each of the outlet valves of the ballonets to reduce pressure of the bag. During most phases of flight the ballonets will look after themselves. There is a third toggle controlling the helium venting valve on the starboard mid-point of the ship, and outside the cabin, within reach of the pilot, a rip cord to the rip panel for emergency deflation.



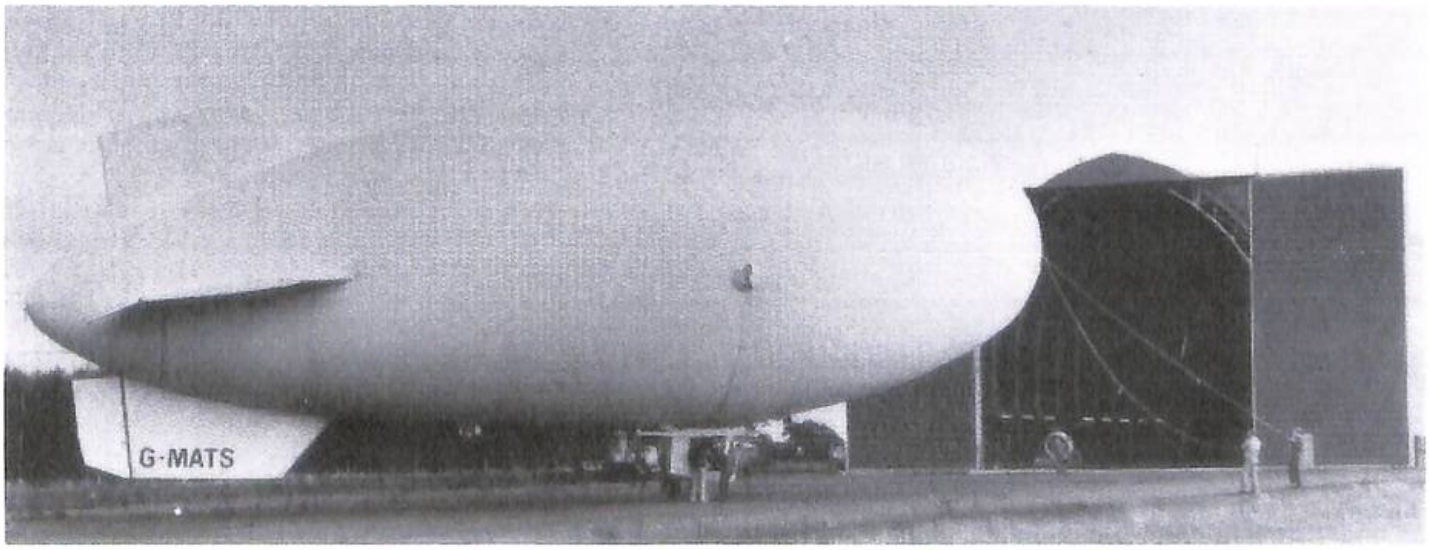
The high-level panel gives the crew an almost unobstructed view. A unique feature is the fly-by-wire control system, with very light stick forces and positive stability.

Mounted on the back of the cabin is a standard *Rolls-Royce Continental 0-200B* driving a four-bladed *Hoffman* pusher propeller. Above the engine are two belt-driven fans, one supplying cooling air for the engine and the other ambient air for the ballonets. This is all very basic stuff for your local FBO; there are none of the ducted fans and adapted *Lynx* gearboxes that are a feature of the advanced *Skyship* technology.

The four tail fins are identical in design and composite GRP .construction. The elevators are interchangeable, but the prototype's rudder on the lower fin has an increased cutaway.

There is no rudder on the upper fin because, being outside the propeller airflow, it would add expense and problems of maintenance out of proportion to its effectiveness. Each fin is attached to the hull by eight lashing points and four rigging wires. The fins are entirely independent of each other and can push and twist against the flexible hull to relieve stress. This is especially important for the lower fin, whose tail-wheel runs along the ground during take-off and can transmit considerable stress to the hull.

The unique feature of G-MATS is her fly-by-wire control system driving DC electric linear actuators attached to each of the three control surfaces. Arranging mechanical controls on the continually flexing hull of an airship is an engineering nightmare, and accounts both for the saw-tooth



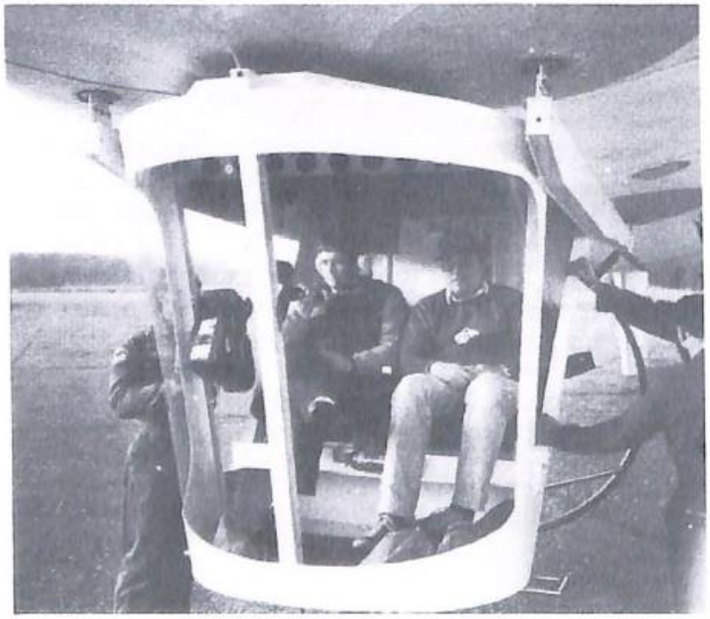
Only six ground crew are required to manoeuvre her out of the shed - a modest number by airship standards.

flight path that conventional airships often adopt in any sort of turbulence, and airship pilot's bulging biceps developed over hours of wrestling with large, directly driven control surfaces.

... Before taking the airship out of her shed the engine is started in order to pressurise the envelope. The ballonets are fed air from an engine driven fan until the difference in pressure between the helium and the outside ambient air reaches thirty millimetres (mm) water gauge (WG). Imagine the pressure generated by a small tumbler of water; that is the internal differential pressure of the envelope.

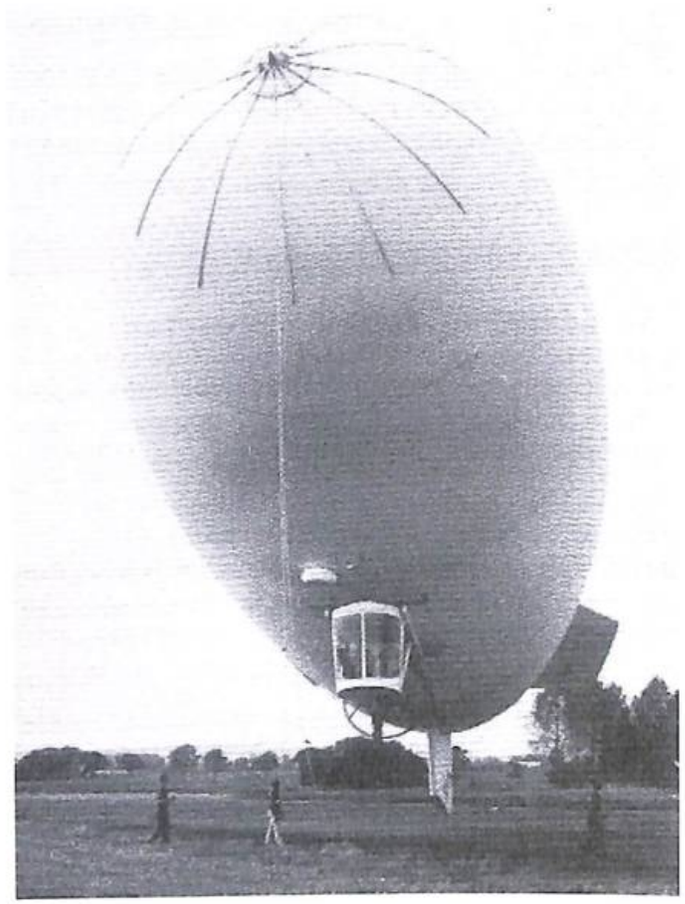
G-MATS is led out of her shed by the six ground crew who are careful to ensure that both main wheel and tail wheel stay on the centre line painted on the concrete. She is turned into wind and as the twenty kilogramme ballast bags are removed, Mats climbs into the right-hand captain's seat and I into the left-hand passenger seat. Together we weigh 190 kilogrammes. Four bags of ballast remain on board, the fuel load is forty kilogrammes, leaving another forty kilogrammes available before maximum heaviness of 100 kilogrammes. Airships are always flown 'heavy' to assist dynamic control and facilitate landing. It is always cheaper to dump excess ballast than to vent excess lift.

We strap into full harness and start the engine. There is no perceptible vibration, but the noise level on this prototype is high; work on the silencing system will come later. With the high level panel, engine controls between the seats and the stick on the right side mounted on a swing-down control box, we can lounge about with legs crossed enjoying the unparalleled unobstructed visibility afforded by the cabin. ... ... For ease of access during testing G-MATS flies doorless, but production ships will have removable doors and cabin heating as standard.



Being sixty kilograms heavy and lacking vectored thrust, we rely on dynamic lift to get us airborne. For that we need either 15 mph of wind or the equivalent in forward motion. On a still day like today we could in theory motor down the runway like an aeroplane, but standard airship practice is to bounce the ship into the air.

With a man on each of the two nose ropes to steady us, four hefty ground crew gather round the cabin. What follows reminds me of birthday 'bumps' at school. At a command from Mats, the crew press down on the sprung main wheel and then lift the cabin floor up to chest height. Down again once more and then up, as they literally throw the ship into the air above their heads. Mats applies full power and everyone leaps for their lives as the ship gathers speed, dipping towards the ground before eventually entering a climb, fourteen seconds and 150 metres after power application.



Sixteen seconds later we are climbing away at 600 fpm on 2,600 revs at 39 mph. The helium pressure is 60 mm WG. In the climb the maximum pitch angle read from the fore-and-aft inclinometer is thirty degrees. At 1,100 feet and climb power of 2,400 revs we are going up at 900 fpm with 26 mph on the clock. At 1,600 feet Mats levels out and reduces power to 2,200 revs which gives 38 mph in an OAT of 8°C. With the horizon about three inches below the top of the windscreen the view below and all around is spectacular. I can just see the lower part of the envelope like an overhanging cliff ahead of me. The nose ropes, swept back in the airflow, are dangling down in front ...

... The horizon is swinging round at a measured rate three turn, which at 30 mph translates into a turning circle of 250 metres. In winds between 15 mph and 46 mph the ship is capable of hovering for aerial observation purposes, but in winds below the minimum control speed of 15 mph it is necessary to orbit in order to maintain station. The ability to turn tightly in an almost level attitude at low speed and with no discomfort to the occupants is an important unique attribute of an airship. ...

... Preparation for landing includes checking the pressure of the ballonets to ensure that they are within 1mm WG of each other. If the nose ballonet is more inflated than the aft one it will force more helium to the back of the ship, causing it to be nose-heavy, an embarrassing state to be in when back on the ground. Static balance is less important in dynamic flight.

The approach is flown at 25 mph at an angle of three degrees nose-down. The picture is very much what one would expect in a *Cessna 150* with full flap. On the first approach Mats judges us to be fifty feet too high and applies full power for a go-around. At approach speed the response to pitch-up is immediate, and we climb away for a second circuit.

The next approach brings us nicely over the hedge and Mats throttles back and then cuts the engine at about ten feet. There is no point in trying to flare an airship because it will only continue at the same descent rate with the nose pointing up in the air. We level the nose before the main wheel touches, compresses and bounces us back into the air again. It is at this moment that I appreciate the importance of landing the ship heavy rather than light. You must calculate your ballast arrangements such that you are still heavy even after burning off fuel.

We are about fifty kilograms heavy and therefore resume contact with terra firma. The pilot and passenger sit there quietly, helpless spectators, as the ground crew scamper around trying to get a grip on the unwieldy beast which is charging across the stubble field at 20 mph. It seems very strange first time for the uninitiated, especially as there is no engine noise to drown the shouting as the nose crew duck and weave, trying to grab one of the two dangling ropes. ...

... The four experienced ground crew have run up alongside and grabbed the cabin and slowed us down. ...

... operating costs of airships have to recover the expense of a permanent skilled ground crew who not only have to service the ship but are essential to every departure and arrival. ... ...

More technically advanced airships like the *Skyship 600* have vectored thrust to facilitate take-off and landing. In any reasonable wind the *GA42* will touch down at a sensible speed and then, engine off, will score points over the larger ships because she requires fewer ground crew to handle her in stronger winds. The normal ground crew complement is expected to be five, against sixteen for the *Skyship 600*. Open ground (preferably reasonably smooth grass) is all that is required for airship operations.

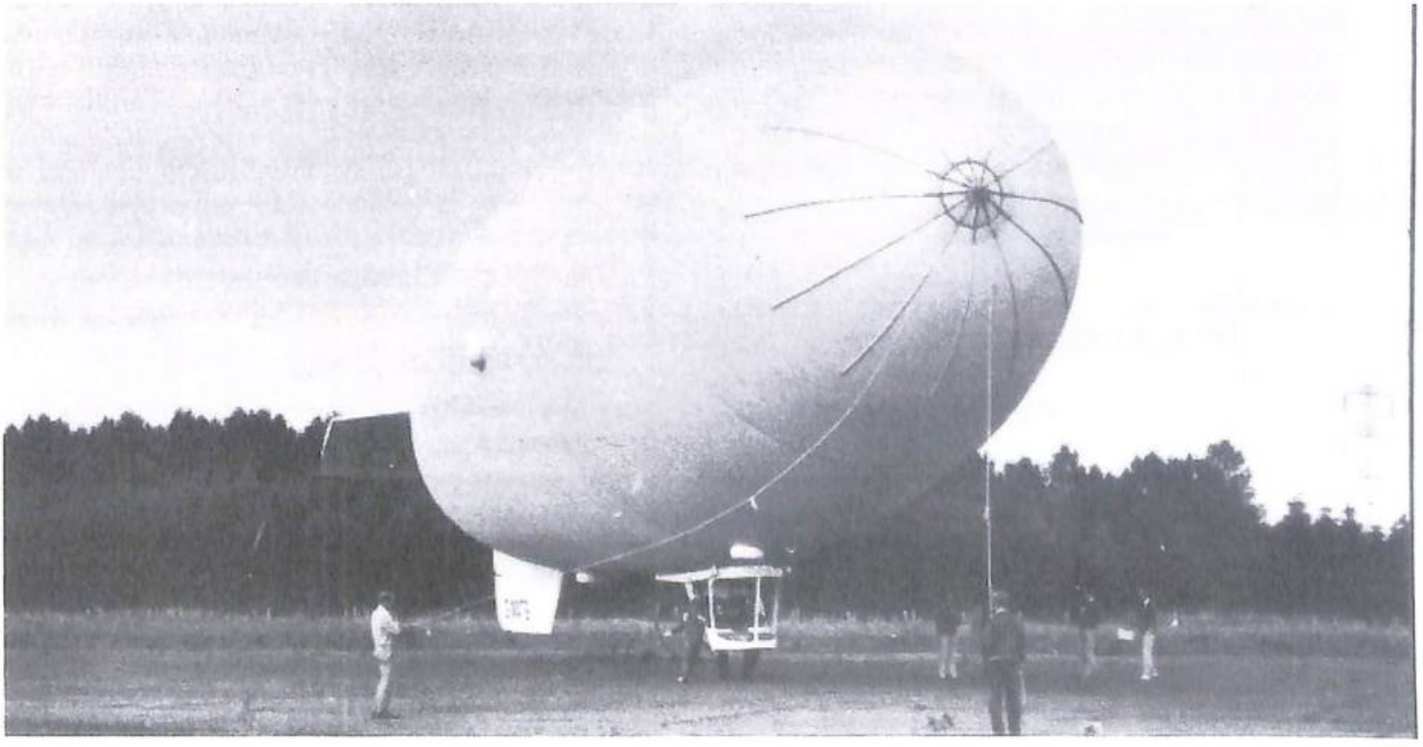
The ground roll against a negligible wind proved to be 125 metres. When enough bags of ballast had been loaded to counter my weight I was allowed to disembark ...

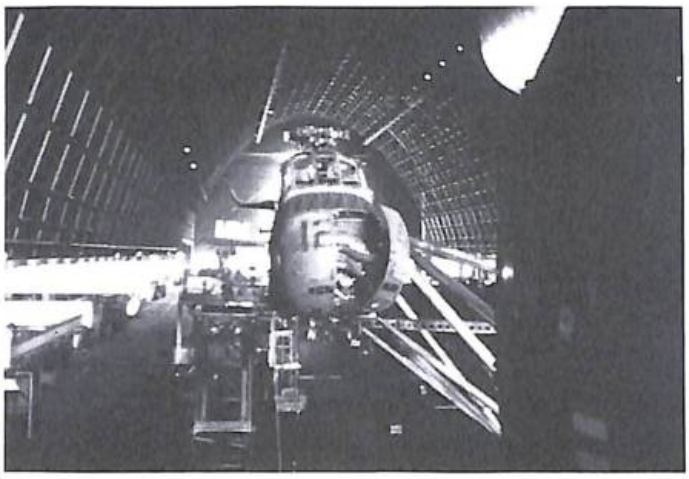
The design of the *GA42* has been tailored to meet the needs of the advertising industry as an aerial billboard and to operate as an aerial camera platform. '*Keep It Simple*' has been one of the design philosophies, exemplified by the prototype being equipped with a second-hand engine. Only in the field of the control system has major new ground been broken and that seems to have paid off handsomely.

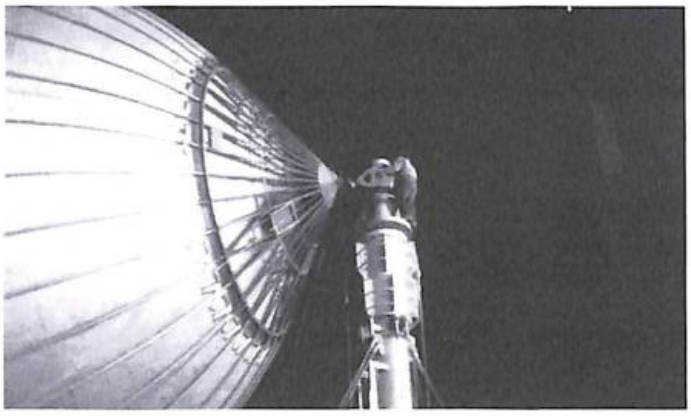
The ship is ridiculously easy to fly, cheap to maintain and small enough to live in a grown-up aircraft hangar if one of the purpose designed £100,000 sheds is not available. Operating charges are expected to be about one-third those currently quoted by *Skyship 600*. There is no passenger carrying capacity nor Public Transport Certificate of Airworthiness planned, but as a relatively low cost advertising medium the *GA42* has no comparable competitor. As a camera ship it will provide a small but adequate platform suffering from far less vibration than a helicopter. ... ... Hourly operating costs have as yet to be evaluated, but it is not inconceivable that the *GA42* may one day be operated on a 'club' basis, taking its place on the flight line as the *Cessna 150* of airship aeronautics. ♣

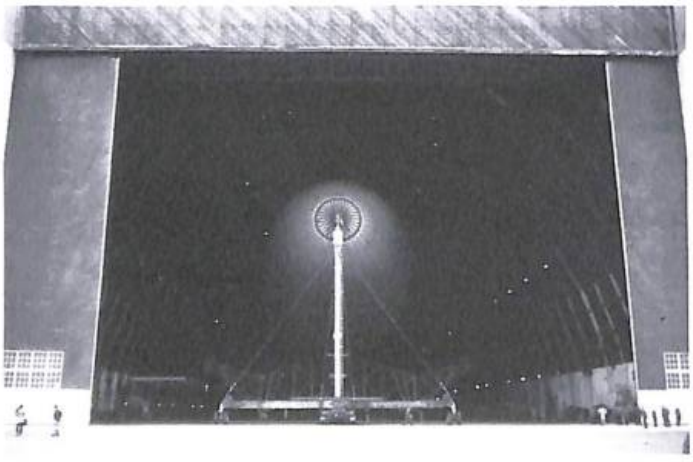
GA42 Airship

Dimensions	*GA42*	*Skyship 600*
Gross envelope volume	42,000 ft^3	235,400 ft^3
Length	90.2 ft	193.6 ft
Diameter	30.2 ft	49.9 ft
Height	39.4 ft	66.6 ft
Tailspan	33.6 ft	63.0 ft
Empty weight	650 kg	5,800 kg
Performance		
Cruise	30 knots	50 knots
Maximum level speed	40 knots	
V_{ne}	48 knots	
Minimum control speed	13 knots	
Payload	350 kg	1,280 kg
Endurance	7.5 hours	
Banner size		
— height	23.6 ft	
— length	44.0 ft	
Price	£200,000	$6,000,000









THE PIASEC

By Nig

… The famed Piasecki Aircraft Corporation (PAC) had been formed by Frank Piasecki after he sold his original helicopter company to Boeing. Piasecki had a long, highly esteemed history in helicopter vertical takeoff and landing (VTOL) development, dating back to 1943 … He had long considered the options for heavy-lift aircraft capable of VTOL flight, and had obtained patents in the 1950s for a hybrid combined rotor and balloon aircraft.

The *Helistat* was envisaged as an advanced VTOL vehicle comprised of a large streamlined aerostat combined with helicopters. … The static lift of the aerostat would support the full empty weight of the entire assembly. The helicopter rotors would lift the payload and control propulsion about all axes. It was hoped existing helicopters, with no new technology, could lift payloads of ten times the capacity of a single unit and considerably more than any lighter-than-air vehicle built up to that date.

The vehicle [as originally] described was to have lifted a 75tn (165,346.69 lbs) payload, based on four *CH-53D helicopters* and an aerostat containing 3,600,000 cu ft (101,940.6 cu m) of helium. Each helicopter was to be [attached] to the extremity of a lateral cantilever beam that joined the inboard fuselage structure of the helicopter to the bulkhead or keel of the aerostat. …

The helicopters' control systems were described as being interconnected so they would respond to [a single] set of controls in the aft, portside helicopter, designated as the master control station. This interconnection was to be accomplished through the existing automatic flight control, already an integral part of the large helicopters chosen for the

KI *HELISTAT*

el Caley

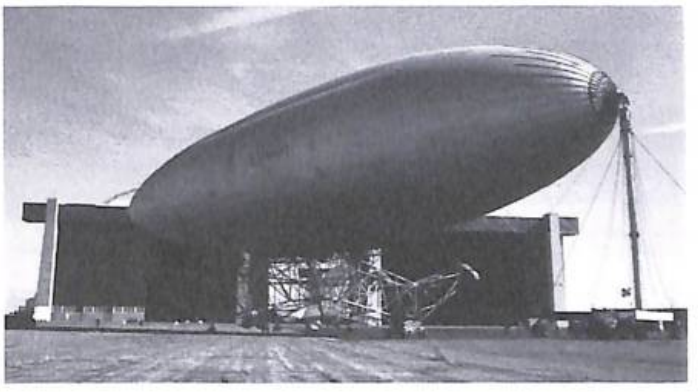
Helistat vehicle. The electrical connecting wires were to be fed into a mixing console that activated each helicopter servo-control system as required by the vehicle commander. It was this system that was to prove the undoing of the *Helistat* prototype.

Piasecki Aircraft were awarded a large contract in spring 1980 by the US Naval Air Development Center (NADC) to "*Construct, test, and demonstrate a vertical air-lift system*". Funding of $10,700,000 had been sourced from the Forest Service of the US Department of Agriculture to demonstrate the economic harvesting of timber from areas economically unreachable by traditional logging methods. As the allocated funding was not generous by any means for such an ambitious project, Piasecki were forced to make cost-cutting compromises. This was nowhere better seen than in the materials used in the construction of the demonstrator vehicle.

Using one of the US Navy's big airship hangars at the Lakehurst Naval Base, four surplus army *H-34* helicopters were mated to a 20-year-old envelope for a Navy *ZPG-2W* airship that had been kept in storage at the base since the cessation of Naval airship operations in 1962. The 1,000,000 cu ft (28,316.8 cu m) of helium were to lift the entire weight of the *Helistat*, leaving the thrust from the rotors to carry a cargo of up to 20 tons (44,092.45 lbs).

Unfortunately, the connecting framework between the helicopters was rather heavier than had been anticipated, and instead of achieving neutral buoyancy, the vehicle weighed some 6 tons (13,227.7 lbs).

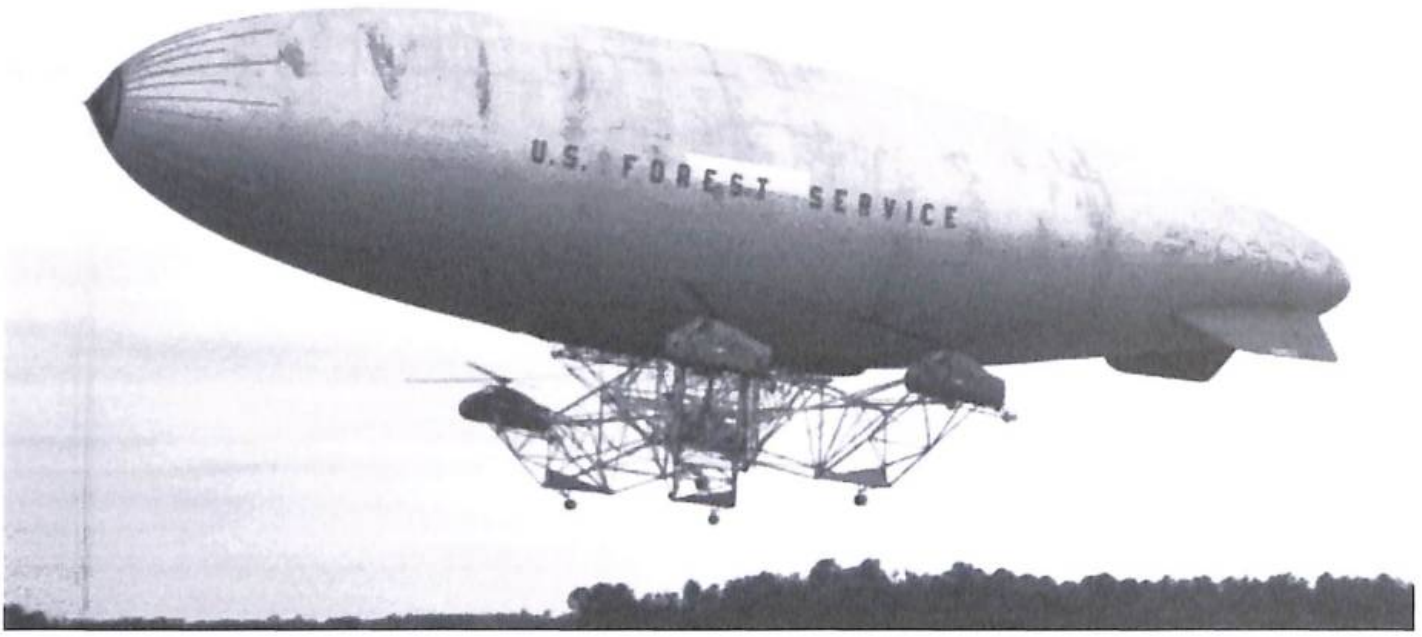
The *Helistat* therefore actually required the helicopter thrust both to takeoff and then remain in the air, and all four rotors would have to be perfectly coordinated or the vehicle would become seriously unbalanced. It was just such an imbalance that led to the destruction of the demonstrator and the loss of one helicopter pilot's life. ...



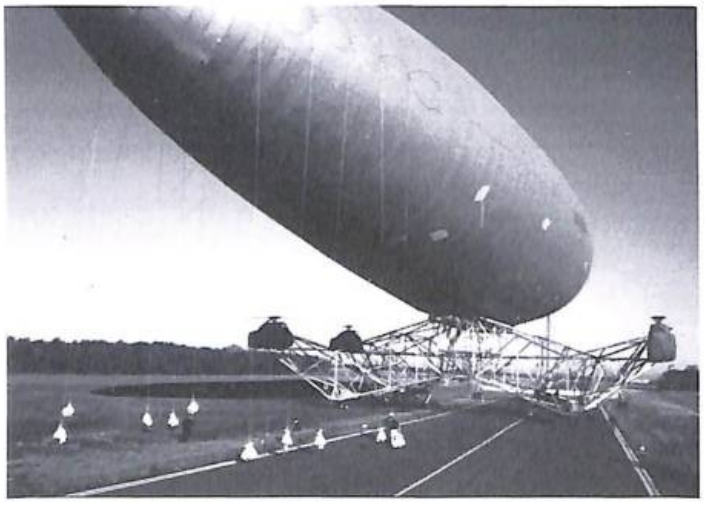
... On July 1st, 1986 the *Helistat* was undergoing a series of flight tests at Lakehurst.

Following a four-minute hovering flight, the *Helistat* landed and made an eighty degree turn before taking off again. ...

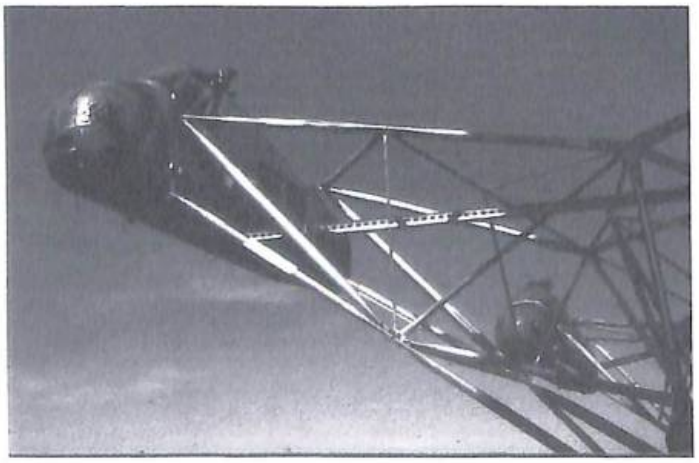
CONTINUED OVERLEAF ➔➔➔



Within seconds the starboard rear helicopter had lost substantial power, resulting in serious instability. The structure began to shimmy, the rear starboard helicopter broke away from the connecting framework and with this the entire vehicle began to disintegrate.



Fragments of rotor blade apparently pierced the envelope which folded and came to earth as the fuel tanks ruptured and fire ignited. Four of the five crewmen onboard suffered minor injuries whilst the fifth, who had been piloting the helicopter that lost power and initiated the destruction sequence, was killed.



This extremely public spectacle, unfortunately filmed at the same location as the loss of the *Hindenburg* almost fifty years previously, marked the end of any actual prototype development for the Piasecki *Helistat*. The Forest Service rightly judged the programme a failure, and no further funds were forthcoming.

However, the company did not abandon the concept immediately and for sometime after the loss of the demonstrator vague plans were circulated for a *Helistat II*. Despite the merit of the basic proposition, PAC turned their attention thereafter to more conventional helicopters in which the company had a wealth of developmental experience.

Matters Arising

From Previously Published Editions

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RE: CHARLES FREDERICK PAGE

Dirigible 102, Correspondence p.29-30

I read with interest the story about the 1906 airship patent of Charles Page, a Black American. Then, I downloaded his patent from the U.S Patent Office website* and read it. I am attaching it for your perusal [*see below*].

Basically, Mr Page's airship resembles a sailing ship with the masts and sails replaced by two pear-shaped balloons which protruded out of the deck. One end of a cable running over the top of the balloons is attached to the ship's stern and the other end is attached to the ship's bow. An engine turns the aft-mounted pusher propeller that is needed because there are no sails anymore. The ship's deck is made of cables and fabric.

One does not need much engineering knowledge to know that such an airship would have needlessly high aerodynamic drag and be susceptible to crosswinds and gusts, besides many other problems.

Even in 1901, Mr Page's airship would have been a joke, I am sorry to say. I think that he may have realized this after supposedly building and testing his airship. This probably explains why the airship never made it to the St. Louis World Fair. It is sad that the inventor supposedly spent his life savings building his deeply flawed design.

As you know, by 1901, several more realistic airship designs, a few of them somewhat successful, had flown in Europe, e.g., Santos Dumont's award-winning airship flight around the Eiffel Tower in his *Airship No.6*.

Thus, it is hard to believe the claim made by Mr Page's present-day supporters that a black man's invention was suppressed and erased. I myself protested against apartheid during the 1980s, but as an engineer, I cannot accept politically correct Afrocentric claims like this one.

Sundar Narayan, Ph. D, P. Eng

CHARLES F. PAGE, OF PINEVILLE, LOUISIANA.

AIR-SHIP

No.817,442 Specification of Letters Patent.

Patented April 10, 1905.

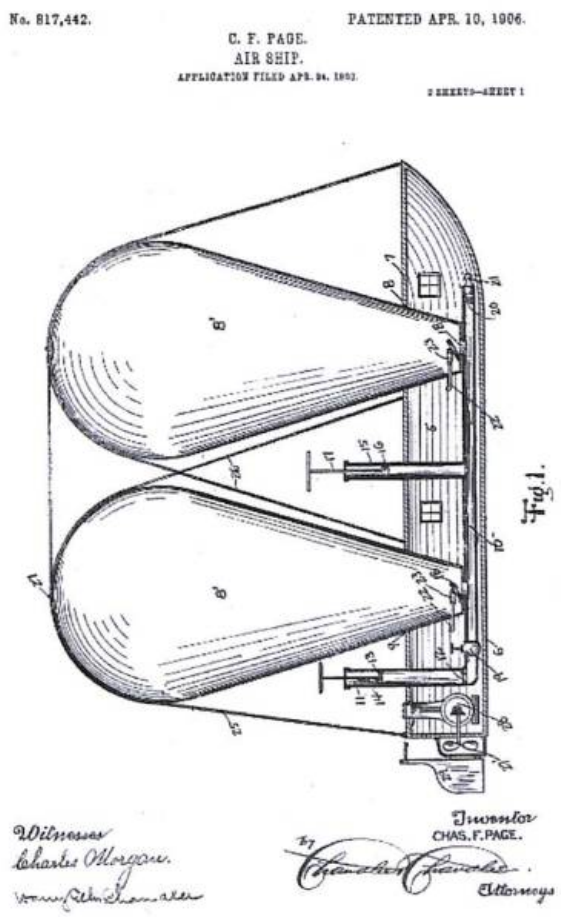
Application filed April 24, 1903, Serial No. 154,045.

To all of whom it may concern:

Be it known that I, Charles F. Page, a citizen of the United States, residing at Pineville, in the parish of Rapides, State of Louisiana, have invented certain new and useful Improvements in Air-Ships; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This intervention relates to air-ships; and it has for its object to provide a simple and readily manufactured construction where in the dead-weights will be buoyed and the buoyancy may be varied to cause the ship to ascend or descend, as desired. Other objects and advantages of the invention will be understood from the following description.

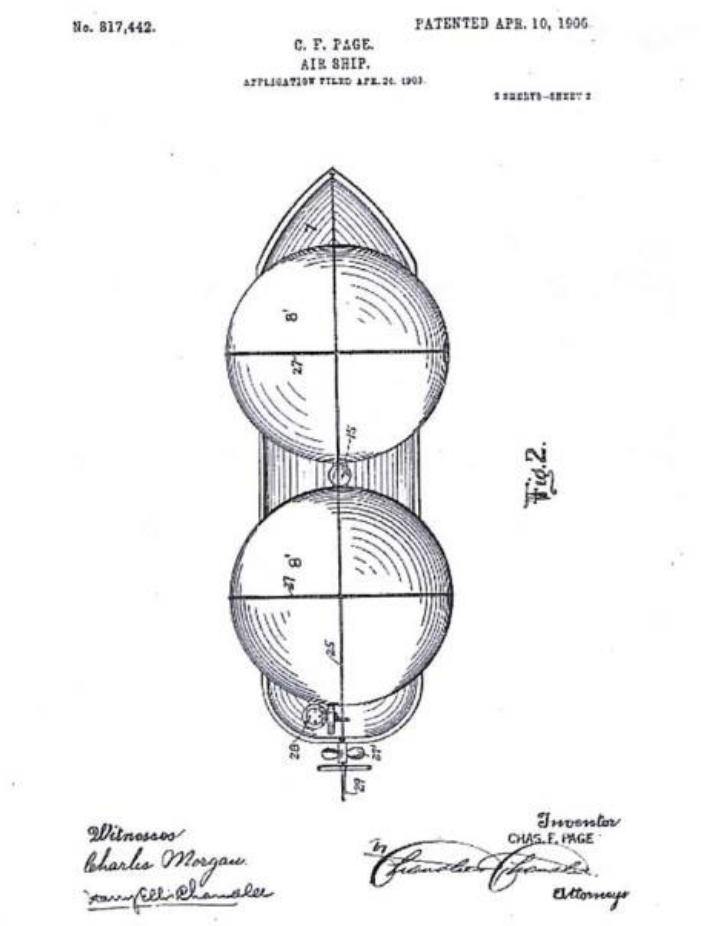
In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in both the views, Figure 1 is a vertical section of the ship. Figure 2 is a top plan view of the ship.



Referring now to the drawings, the present ship comprises a hull consisting of a framework of wire, shown at 5, and upon which is stretched a covering 6, of oiled canvas or similar material, the deck being formed in the same manner.

In the deck 7 there are two circular openings 8 and 9, one of which is at the bow of the boat and the other at the stern, and in each of these openings is disposed the lower reduced end or neck portion of a pear-shaped bag 8', which projects downwardly into the hull. Connected to the lower ends of the gas-bags is the pipe 10, which extends longitudinally along the hull and has an upturned rear end, to which is connected a pump 11, having therein an upwardly-opening valve 12 at its lower end, above which is a piston 13, having an upwardly-opening valve 14. Thus as the piston is reciprocated the pump acts to exhaust from the pipe and from the gas-bags, so that the gas in the bags may be reduced in quantity to decrease the buoyancy of the bags.

Connected to the pipe 10 at a point between the gas-bags and extending upwardly through the deck is the barrel 15 of a second pump, having a piston 16 therein and a rod 17 connected to the piston and projecting from the upper end of the barrel. At the lower end of the gas-bags are inlet-valves 18, and between the bags and the exhaust-pump is a cut-off valve 19, so that when the valve 19 is closed the piston 16 may be operated to draw gas into the pipe 10 and then force it into the bags, said pipe having an inlet-valve 20 at one end and having also a plug 21 beyond the valve, so that the pipe may be sealed. The valves 18 normally act free; but when the gas is to be exhausted from the bags they are raised and held in a raised or open position. The valves are operated by means of sliding rods 22, which are connected with the valve by means of links 23, so that the valves may have lost motion with respect thereto, while said rods may be operated when desired to raise the valves and hold them in raised position. There is thus provided means for charging the gas-bags and also means for reducing the charges, so that the buoyancy of the bag maybe readily varied.



Connected to the bow and stern of the hull of the air-ship are the ends of a cable 25, which passes over the gas-bag and holds them against displacement longitudinally of the ship when filled, there being other cables 26 extending from the tops of the gas-bags between them to the deck and crossed between the bags. Additional cables 27 are attached to the first-named cable and pass downwardly at the sides of the bags, where they are attached to a deck.

A propeller-wheel 27' is provided and is driven from a gas-engine 28, located in the hull of the vessel, and there is also a rudder 29 for steering the vessel.

Suitable windows are provided for the hull, and it maybe otherwise equipped for comfort and efficiency.

What is claimed is -

An air-ship comprising a closed hull having means for propelling it, means for steering the hull, the top of the said hull having openings therethrough, gas-bags having their lower ends reduced and passed through the openings into the hull, a tubing arranged longitudinally of and within the hull near the bottom thereof an upwardly-directed pipe passed through the top of the hull and communicating with the said tubing, the bottom of the said bags having a valve for registration and for operation with corresponding openings in the aforesaid tubings, a valve arranged within the tubing at the juncture between the longitudinal tubing and the upwardly-directed pipe, the latter having a piston mounted for operation therein, a pump communicating with the tubing intermediate its ends and extending upwardly through the top of the hull between said bags, and ropes connected with the hull and passing over the said bags to hold the latter rigidly with respect to the former.

In testimony whereof I affix my signature in the presence of two witnesses.

Charles F. Page.

Witnesses: David Gunter, Lawson Ibs.

Source:

* https://patents.google.com/patent/US817442A/en

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RE: *GRAF ZEPPELIN* 1931 FLIGHT QUERY

Dirigible 101, Correspondence pp.34/5.

I did a fast and dirty review of several volumes looking for references to such a flight. I found no specific confirmation … I did assemble a few relevant details which may offer alternative explanation or further inquiry.

Graf Zeppelin did make a 'test flight' in 1930. It flew from Friedrichshafen to Spain, then on to Brazil. Second leg was from Brazil to United States. Last leg from U.S. to Germany. This so-called 'triangle flight' tested the waters to South America which was under-served, compared to Europe/ North America, by ships capable of 12-15 knots.

The Zeppelin Book by Hans von Schiller * reveals that *Graf Zeppelin* made a flight from Germany to Iceland via Holland, England, Scotland and Scapa Flow. The flight took place in July, 1931 lasting three days and 43 minutes. Having returned to Friedrichshafen, the ship was modified for the well-known Arctic expedition in August, 1931.

Returning to Friedrichshafen, the passenger accommodations were restored. As Hans von Schiller put it: *Now it was a matter of reconfiguring the airship back into the passenger role as quickly as possible, for we had plans for a regular commercial service to South America for the rest of the summer.*

He declares one scheduled trip per month (August, September, October) to be the first ever routine scheduled commercial air service between two continents.

The standard route to South America was west across the Rhine to France, south to the Mediterranean, then south west to Spain and the Atlantic. However, on the April 18, 1932 departure with Ralph Booth on board, *Graf Zeppelin* flew west across France to the Bay of Biscay to find more favourable weather so as to proceed around Portugal over the Atlantic.

Which flight flew over the UK in which month? … … I wonder if the problem is the date; either Duncan Armitage's date or Hans von Schiller's? … An interesting addendum to von Schiller's version of the flight over UK. Under the heading *Mid July 1931* he states: *We only carried out one longer flight to Iceland again, this time via Holland, England, Scotland, past Scapa Flow, the graveyard of the German Fleet, where*

*they had just finished salvaging the battleship 'Hindenburg', and on to Shetland and the Faroes.**

Last major flight before Arctic expedition. The flight lasted three days and 43 minutes. The flight is described as taking place in mid-July, 1931 and the *Graf Zeppelin* flew to Berlin on 24 August on the way to Leningrad and the Arctic.

SMS Hindenburg was a battle-cruiser (Grossen Kreuzer) not a battleship (Linenschiffe) and one suspects that "salvaging" means re-floating in anticipation of towing to the breakers? But I have a book on German battle-cruisers which states that *SMS Hindenburg* was scrapped in 1930?!

* *The Zeppelin Book* by Hans von Schiller (Translated by Alastair Reid)

C.P. Hall

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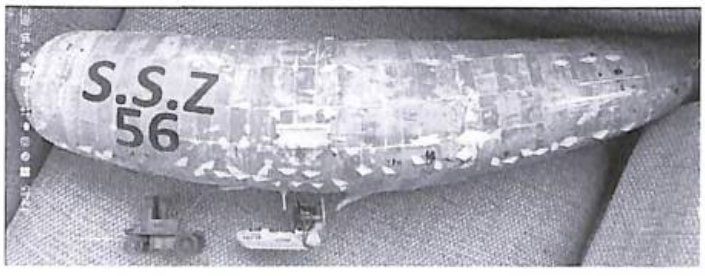
RE: WEXFORD PROJECT

You may recall my model of the mobile hydrogen gas generator some months back? Well here it is again, as a reference in scale (1/72), in comparison to my model of the *SSZ56* airship (W.I.P.)

Any information you can find in relation to the operations and staff of the airship mooring out station in Wexford would be very much appreciated.

Eddie Taylor



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RE: *DIRIGIBLE* 102

The cover photo struck me as odd as I was an 'Akronite' in my early years and I did not remember windows on the door of the Akron Air Dock. A photo of the Air Dock confirmed my doubts.

I went searching and found a book which I reviewed some years ago: *NAS South Weymouth* by Marc J Frattasio, p.209. The caption under the same photo reads: "*ABOVE: The K-61 deflated on a mooring mast in front of the western entrance to LTA Hangar One on December 14, 1944. National Archives*". ...

... My congratulations to Peter Davison regarding the discovery of the article comparing *R100* and *R101*. The comments regarding *R100*'s cover were remarkably insightful.

... Regarding Richard Van Treuren's photos, I have a question. Page 33, upper right photo of 'spy car'. Richard says something is stencilled, in English, on its side. I can see it but cannot find a magnifier that allows me to read it. Can you read what it says on the original photograph?

C.P. Hall

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AN OPPORTUNITY

Webmaster's Assistant – Previous knowledge of airship history is not vital as help is mostly needed at a technical level. It includes time-consuming but non-time-dependent tasks such as:

- Checking and maintaining extant content.
- Preparing text and keeping information up to date.
- Proof-reading new content to expand our online library.
- Platform management – we would welcome new ideas for our 25-year-old platform.

Social Media Manager – Volunteers are needed who are able to:

- Provide short content for our AHT Facebook Group.
- Manage and edit posts.
- Assist with content for our YouTube channel.
- Write and edit scripts.
- Edit post-production videos.

We need similar help with our other social media.

The more volunteers we have the more we can do.

Digitising Project - Here again previous knowledge of airship history is not vital although help from expert historians would be welcome. Vacancies exist for people with a little time to spare who can:

- Compile indexes and keyword databases.
- Carry out research to track down source material.
- Help with photo identification and authentication.
- Catalogue newly scanned material.
- Liaise with other organisations such as the British Balloon Museum & Library to avoid duplication and share information with their Virtual Museum.

If you have a little time to spare or skills to share please contact:

AHT Webmaster
Alastair Lawson (Tel: 07900 692 804)
alastairlawson1@gmail.com

Letters Pages

Welcome to the AHT members letters and email page

This is your forum for exchanging information and views, commenting on items in *Dirigible* and generally sharing information with fellow members.

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Email – 31 October 2023

Leviathans of the Air

I thought that you would wish to be alerted to the Fall 2023 issue of *Air & Space* quarterly magazine. Inside is an article by Mark Piesing *Leviathans of the Air.* I fear that the sub-title, '*One hundred years after the first U. S. Navy airship took to the skies, zeppelins and blimps are poised to make a comeback*', may be a clue to the article's shortcomings, however, the photos seem to focus on *ZR-1* and *ZRS-4*. There are photos of the Cargolifter hangar and of *Pioneer 1* at its mobile mast in its hangar ...

C.P. Hall

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Email – 16 April 2024

***Graf Zeppelin* Airship Facts**

I note this online article is in error by saying that *Hindenburg* crashed on its 'maiden' flight...

Arnold Nayler

https://simpleflying.com/graf-zeppelin-airship-facts-list/

5 Things You Didn't Know About The World's Most Successful Rigid Airship

The *LZ-127 Graf Zeppelin* is remembered as the most successful Zeppelin ever made. Over its career, the giant airship flew over a million miles on 590 flights and carried over 34,000 passengers without a single injury. Before aircraft, it was Zeppelins flying passengers across the Atlantic Ocean to the United States.

The *Graf Zeppelin* was withdrawn from service after the disaster of the *Hindenburg* airship that catastrophically burst into flames in Lakehurst, New Jersey on its maiden flight.

1 A Zeppelin of firsts

The *Graf Zeppelin* was the first to cross several aviation milestones, including offering the first commercial transatlantic flight. First Atlantic Crossing: October 11-15, 1928. First: regularly scheduled, nonstop, intercontinental airline service. First: to fly a scientific mission over the North Pole. ...

2 First round the world flight ("weltfahrt")

The *Graf Zeppelin* flew around the world in a flight taking 57 hours and 31 minutes. Date: August 7, 1929 to September 4, 1929. Distance: 21,250 miles. ...

3 The gondola

The *Graf Zeppelin*'s gondola boasted a lounge and 10 twin-bed private cabins. ... The 98-foot-long gondola was luxurious - a level of luxury arguably unmatched in air travel today ...

4 World's longest and largest airship

At 776 feet long, the *Graf Zeppelin* was the largest airship until the *Hindenburg* was built in the mid-1930s. Volume: 2,600,000 cu feet. ... The *Graf Zeppelin* did not remain the world's largest airship for long. In 1936, the even larger *Hindenburg* class took flight (there were two airships in the class - the *LZ.129 Hindenburg* and the *LZ.130 Graf Zeppelin II*). These giant airships were almost 804 feet long and 135 feet in diameter.

5 Retirement

On hearing the news of the *Hindenburg* [disaster], the *Graf Zeppelin* completed its flight the next day and never carried another paying passenger again. Last passenger flight: Brazil to Germany. Retired: 7 May 1937. ... She was broken up by order of Hermann Goering's Luftwaffe in March 1940.

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Email – 17 June 2024

Swiss *Skyships* Still For Sale

The companies "Skyship Cruise AG" and "Skycruise Switzerland AG" are in liquidation. The following options remain in the current situation:

1. takeover by and exhibition in a museum

These two *Skyships* of "Skyship Cruise AG" [*N-601SK* and *N-605SK*] are the last remaining of their kind in their original condition. It is therefore a unique opportunity for a museum to exhibit one of these one-offs. ...

2. re-commission for passenger transport

For obvious reasons, this is our preferred option. ... an important prerequisite is that operations are established at a touristically attractive location with sufficient passenger volume, weather conditions allowing safe operation throughout the year and that a hangar is available for periodic maintenance ...

3. conversion to electric or alternative propulsion

This variant is intended as an additional variant to point 2, such as commissioning one ship and converting the second. In addition to the existing applications – the most interesting of which are still tourism and sightseeing flights – there are also potentially promising further developments. Electric engines or alternative hybrid,

hydrogen or fuel cell drives should actually be of great interest today, and the *Skyships* in particular with their specific construction structure (engines in the nacelle) can be converted with relatively little effort.

4. sale of the ships for other purposes

Of course, there are many other possibilities for further use, e.g. for event gastronomy, in theme parks, in the film industry, in research, for security and surveillance purposes, etc.

5. future-oriented, realistic ideas

And last but not least, we are open to all your other innovative ideas.

Are you interested? Then get in touch with us and express your interest in a takeover. Our idea of a fair selling price (for both ships) if bringing them back into operation is CHF 2 million (Swiss francs). For information: The ships were insured for USD 5 million each during operation. ... ...

Important: A takeover with removal of both or a single ship should take place as soon as possible. We will report here in due course on what happens to the ships.

www.skyship.ch

Christian Schulthess

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Email – 28 June 2024

Historical Training For Airship Pilots

One of the EASA rule-makers, Stefan Fischer, has become aware that airship pilots used to start on balloons and has asked whether there is any detailed history of that accessible anywhere. Any clues please?

I can think of odd mentions in things such as *Airship Pilot Number 28* but nothing extensive. ...

Andrew Barber

Richard Van Treuren of the US Naval Airship Association responded:

Yes indeed free balloon training was step one in most cases, though US Navy sometimes did not decide on Lighter than Air (LTA) for a candidate until after pre-flight in *Cubs* and the like, or in later cases actually take Heavier than Air (HTA) pilots and retrain them in LTA.

As far as text, the only one that comes to mind is Don Venton's memoir: *Lighter than Air: A Navy Airship Pilot in WWII and The Crash of the K-34* – By Donald P. Venton, CDR USN (Ret). Available on the *Airship History* website:

https://airshiphistory.com/wp/lta-a-navy-airship-pilot-in-wwii-and-the-crash-of-the-k-34/

Rather than them purchasing a book and shipping it across the Atlantic, I will contact the copyright owner (Don's daughter) and ask for permission to clip out that portion of the book and e-mail it to them ... Meanwhile, the Navy itself made a training film about the whole process, *Navy Blimp Training - Brazilians Included*, which includes free balloons. Here is the link:

www.youtube.com/watch?v=lEmRGPh8AqE&t=17s

Hope this helps ...

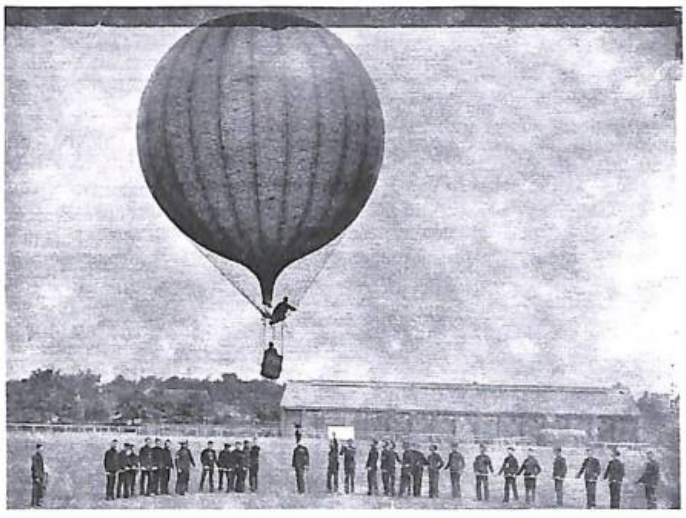
And Dirigible Editor added a few suggestions that have mention of pilot training therein:

Meager, G. (1970) *My Airship Flights 1915-1930* (London : William Kimber).

Williams, T.B. (1974) *Airship Pilot No.28* (London : William Kimber).

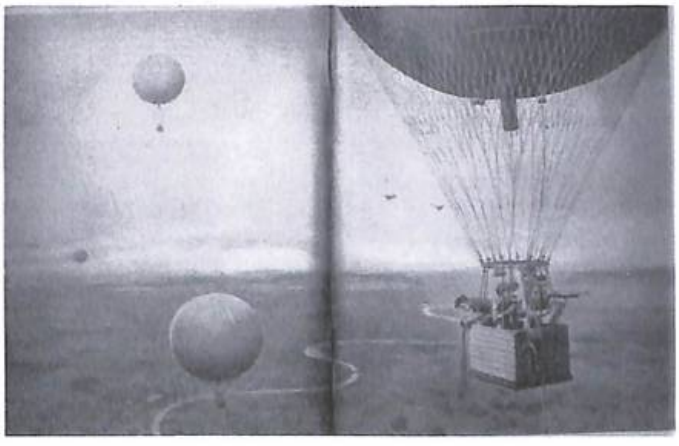
Hodges, G. (1972) *Memoirs of an Old Balloonatic* (London : William Kimber)

Initial training was also done in tethered balloons which were known as '*rubber cows*'. This started with the military observation balloons - see pics.



Royal Engineers Observation Balloon at Aldershot

1914 Military Pilot Training from Roehampton



Military Balloon Landing in Holborn in 1917

One week later Andrew Barber discovered another source of information:

This week I got lucky and found in a bookshop *Airships in Peace and War* by J A Sinclair. A 1934 first edition in decent condition for a reasonable price. Anyway, attached are a couple of pages which are relevant to Stefan's recent question:

The establishment at Cranwell was ready. Officers were entering the service direct from civil life—at any rate, the vast majority did so—and after a short training in squad drill at Crystal Palace, they went to Wormwood Scrubbs for a free-balloon course. The time spent there largely depended on the weather and the activities of the enemy raiding London.

While waiting to carry out their balloon flights, Probationary Flying Officers were instructed in knotting and splicing rope and wire as used in the construction of airships. The weather and the enemy being favourable, the P.F.O.s were taken to Hurlingham, where the balloons were ready for flight. They left the ground in parties of four accompanied by the instructors, Squadron-Commander Pollock and Flight-Lieut. Vickers.

Three such flights were carried out, and then the P.F.O. would pilot the balloon under the watchful eye of the instructor and land where and when instructed to do so. Having successfully accomplished this, he was then qualified to attempt his first "solo," and in a small balloon he left

the friendly mother earth for the first time "on his own." He had to pilot the balloon for two hours as it carried along with the wind, and then land. By that time, he had learned, among other things, that he must land as near a railway station as possible, and away from crops, so as to save an unnecessary and perhaps long ride in a farm wagon and excessive transport and expense to his country.

Having completed his solo, and one necessary night flight, the P.F.O. not unnaturally felt his wings sprouting, and impatiently awaited the day when he might feel the controls of an airship in his hands. He had then completed his balloon course, which, as can be seen, was hardly enough to give him an idea as to how to keep an airship aloft in the event of engine failure, and how to land her without the help of that engine.

If he considered himself something of a pilot, he soon discovered on his arrival at Cranwell that he was very small fry indeed. He was not permitted to touch an airship for a month. He had to attend numerous lectures on a variety of subjects.

For that first month his day began at 7.30 a.m., when

Stefan Fischer responded:

Thanks for those two pages, which reiterate my previous feeling, that we cannot compare today's training to the past.

And Richard Van Treuren added:

While I agree much of the old-time training would have to be extensively modernized, the laws of aerostatics have not changed.

I looked beyond the somewhat dated mechanical slide rule in the attachment I am sending here. I had presented an electronic version of this slide rule (itself based on the British slide rule, not unlike the one that got the *R-34* across the Atlantic in 1919 and is on display at the RAF Museum) at an Airship Association Conference several years ago.

Looking underneath the mechanical slides we see a sound scientific understanding of operations in our atmospheric oceans. I hope this is of some use to you in your work.

"Report on an Airship Slide Rule

Developed by Gas Chemistry Section National Bureau of Standards : Washington DC

April 12, 1921

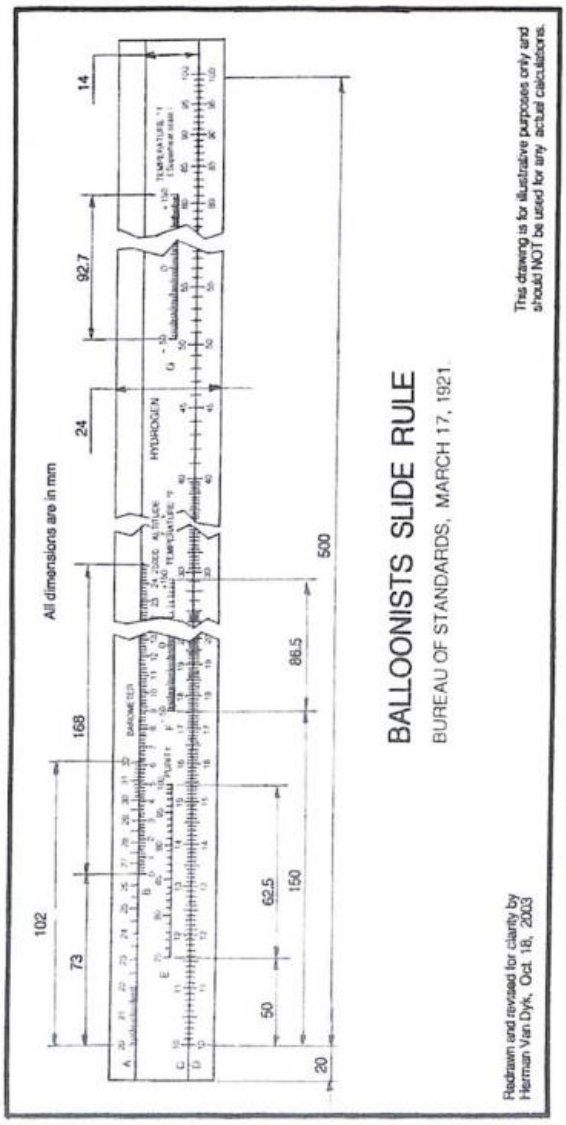
Introduction

"The airship slide rule described herein was developed by the gas chemistry section of the Bureau of Standards, at the request of the Bureau of Engineering of the Navy Department. It is intended primarily to give rapid solutions of a few problems of frequent occurrence in airship navigation, but it can be used to advantage in solving a great variety of problems involving volumes, lifting powers, temperatures, pressures, altitudes, and the purity of the balloon gas.

This report is divided into three parts. In the first part, following a brief discussion of the construction of the rule, our statements of a few of the most common and important problems which can be solved by the use of the rule, together with directions for solving them. In the second part is a discussion of the theory of the rule and a considerable number of less common problems which are intended to illustrate the many possible useful applications of the rule. The third part contains detailed directions for laying out the scales.

The rule is graduated to read directly in the units actually used in making observations, constants and conversion factors being taken care of by the length and location of the scales. In order to simplify, as much as possible, the manipulation of the rule, absolute accuracy has in some cases been sacrificed to convenience. Generally this has only been necessary in those cases in which the data upon which the computations will be based are not subject to accurate observation.

It is thought that with the rule practically any problem likely to arise in this class of work can be readily solved after the user has become familiar with the operation of the rule; and that the solution will, in most cases, be as accurate as the data warrants. … … …"



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Email – 04 July 2024

WW1 Barrage balloon idea ...

... taken up by a Russian defensive anti-drone system . Hmm!

Arnold Nayler

www.newsweek.com/russia-zeppelin-drones-ww1-1919945

Published July 02, 2024 at 7:10 AM EDT Updated July 02, 2024 at 11:51 AM EDT

Russia's New Drone Defense 'Inspired' by WWI-Era Zeppelins

By Brendan Cole

"A company in Russia says it has designed a defensive anti-drone system inspired by the century-old technology of Zeppelin airships, according to the country's state media.

The development called 'Barrier', which uses balloons armed with nets deployed over targets, was reportedly revealed at a conference in St Petersburg on Monday where technologies for countering drones were being discussed. ... ... A Russian company says it is using technology inspired by Zeppelin air ships to combat UAVs. ...

The company 'First Airship' has created a system in which a network of balloons can hover over a target that needs to be protected, state news agency *RIA Novosti* reported. When UAVs are detected approaching the target, the balloons rise into the air and "catch" the drones with a net suspended from it which can hold a load weighing up to 70 pounds. After the net separates from the balloon, which can reach heights of 900 feet, a new net is installed.

Polina Albek, general director at First Airship, said developers had been inspired by what happened during the First World War when airships with chains suspended from them were used for defensive purposes, RIA reported.

During the First World War, the German military made extensive use of Zeppelins both as bombers and as aerial reconnaissance. ... Russian media widely reported the development described at the drone detection and countermeasure technology conference held in St Petersburg on Monday and Tuesday, without referring to which objects would be protected nor the war in Ukraine.

Newsweek has contacted the Russian defense ministry for comment. ..."

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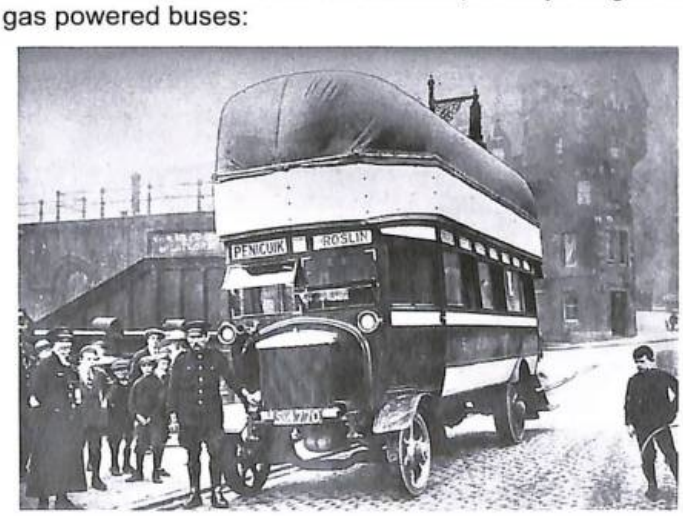
Email – 08 July 2024

Old Pictures and Blimp Mail

Here is another one of those impossibly dangerous gas powered buses:



And who is this civilian guest fellow? Too young to be Willows?

Just finished a short video about the last blimp mail flights. It is narrated by the world's leading expert in airship mail, Dr. Cheryl Ganz, PhD, who has chronicled the story of the mail that was carried on the last flights made by US Navy airships.

Richard Van Treuren

https://youtu.be/a0CRnNZvS_s

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Email – 26 July 2024

Aeronautical Sheet Music

I have just been alerted to this amazing archive of aeronautical sheet music. Whilst airships are included, the period covers an era when the word was also still sometimes applied to aeroplanes too. Fun nevertheless. Sadly no links to any of the tunes being played or sung.

Nina Baker

https://library.si.edu/digital-library/collection/aeronautical-sheet-music

"The Bella C. Landauer Collection of Aeronautical Sheet Music is one of the treasures in the National Air and Space Museum Library. The earliest known aeronautical song was published in 1785. Entitled *Chanson sur le Globe Aerostatique*, it depicts a Montgolfier balloon ascending from the Tuilleries in Paris. This piece was followed by countless musical compositions dealing with all phases of aeronautics. "Wrong-Way" Corrigan had his bard, no less than Lindbergh. And there was always someone to opine musically about such disasters as the wreck of the dirigible *Shenandoah* or the *Hindenburg*. Most of the music

written in the early 19th century until the age of the airplane, fell into three categories: songs expressing the author's desire to fly to distant lands or even to the moon, comic songs about ballooning mishaps, or purely romantic songs. … "

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Email – 26 August 2024

A Commemorative Roundabout?

I was recently driving up the A5120 between Flitwick and Ampthill and when I reached the junction with the A507, I noticed a sign referring to it as the '*One-O-One Roundabout*'.

I'd driven that way several times before but this was the first time I had noticed the sign and the name.

There wouldn't have been a roundabout there in 1929/30 but do you think the name could be, in any way, airship-related?

Paul Ross

Google Maps Street View

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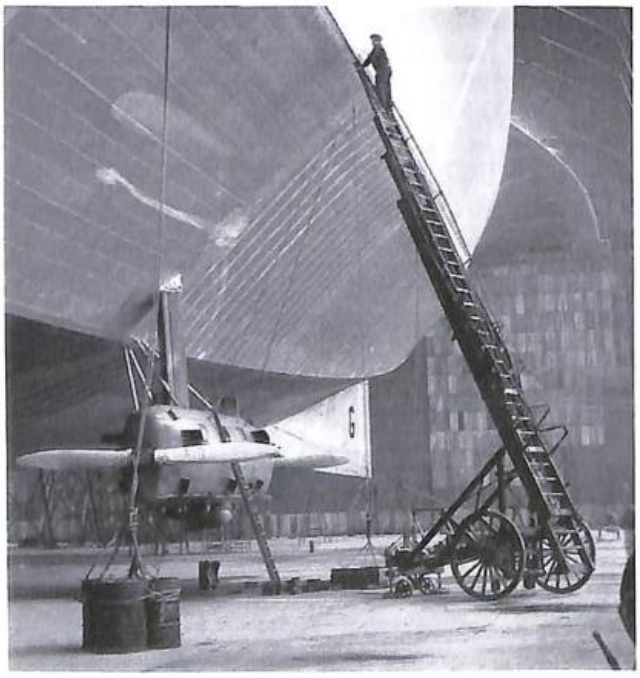
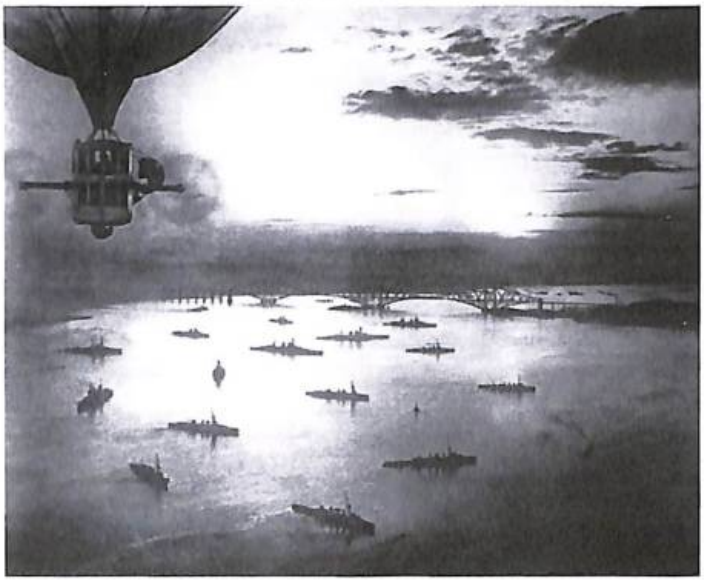
Email – 09 September 2024

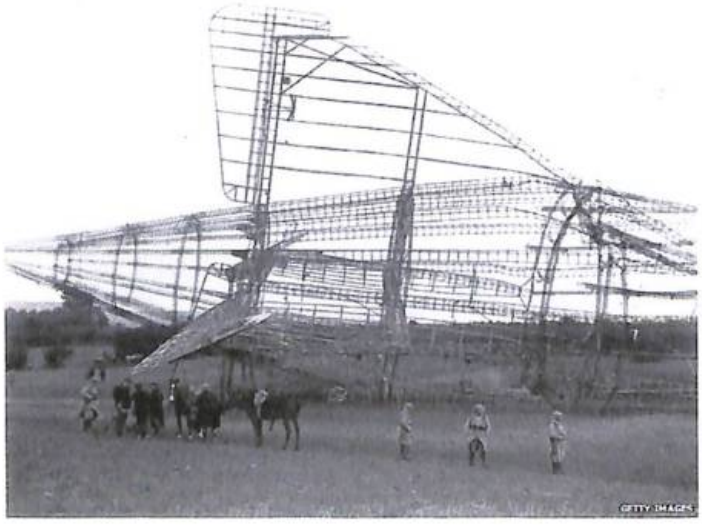
Old Images Resurfacing

Here are some more images that surfaced on the sharing sites. My pal sends me links from time to time.

Richard Van Treuren







C.P. Hall commented on Richard's pictures:

I don't believe I've seen these photos before. Richard has some interesting sources.

Dining room photo - Judging from crowd and attire, I suspect the Parliament visit of 1928?

Photo of ships - Richard correctly identifies airship as a *23-class* rigid. I suspect *R26* based upon visible engines and keel? Since it has a keel, cannot be *R27* or *R29*. I suspect The Battle Cruiser Fleet at Rosyth in 1918 though I believe that this task force was called something else by 1918. Light Cruisers in foreground; Battle Cruisers closer to the bridge.

The last photo had me baffled for a moment until I realized that it was taken from *R100*'s starboard engine car.

An *R100* fin cover was shredded over the St. Lawrence River. There was no hangar in Canada, only the Montreal mooring mast [pictured]. USN Admirals Moffett and Rosendahl were present for the arrival. They saw the fabric damage which was quite similar to *Graf Zeppelin*'s fin in 1928, and offered to repair it in Lakehurst Hangar. The Brits declined. Looking at this outer cover one can see why they did not want repair personnel swarming over their "brand new airship"!

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Email – 09 September 2024

Australian Auction

According to a report on the *7NEWS Australia* television channel, a piece of *Hindenburg* history will be going under the hammer in Melbourne later this month. A letter found in the ashes after the *Hindenburg* disaster 87 years ago will be auctioned in a rare opportunity for a 'cashed-up collector'. Estimated price 30-40,000 dollars.

David Owen

The news report can be found online at:

https://youtu.be/z_QZDQZXITk

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Email – 01 October 2024

***R101* Memento Information Wanted**

The disaster that befell the *R101* airship, in the early hours of 5 October 1930, shocked the nation. A series of elaborate public funerals, both in France and in England, attended the victims as they made their way from Allonne to their final resting place in Cardington.

Since then, like the contemporaries of the disaster, historians and aviation experts have traditionally focused on trying to answer the all-important question of why the airship came to earth on that fateful night?

As part of my PhD research, I am investigating a different question, less pressing to those who sought to explain the disaster, but of considerable significance to those families who were affected by the events of 5 October 1930: how have the airship and its dead been remembered at a personal level?

Public memorials were erected and annual rituals developed around them, and these were of course important, but much of the work of remembering the crash and its victims was done away from the public eye, in the privacy of their homes.

The less public nature of such mementos makes them harder to trace in the historical record, yet the role they played in keeping memories alive was significant.

I hope now to complement my work on the public monuments by exploring ways in which the *R101* and its victims were remembered by their families through more intimate physical artefacts. Things such as photographs, commercially-produced postcards and memorial cards, purported pieces of the airship itself, and, of course, personal effects and items belonging to, or associated with, the passengers, officers and crew?

I am now trying to find examples of such items being used to remember the *R101* and the men associated with it. Doing so, however, would require learning about such items directly from the families or individuals that still hold them.

If you or your family possessed or still have any such mementos and you would be willing to contact me with details of them or happy to talk about them, I would be very interested to hear from you.

Jonny Allard
Postgraduate research student
University of Birmingham
jxa284@student.bham.ac.uk

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DISCOVERING ZEPPELIN HISTORY IN BAVARIA

By Stephan Niemeyer

A recent business trip unexpectedly turned into a search for the location of the first Zeppelin airship landing in Bavaria. I was visiting a production plant in a small town about 60 miles northeast of Munich. Since I was traveling alone, I took the latest issue of *The Zeppelin Brief* (the club magazine of the Friends of the Zeppelin Museum in Friedrichshafen) with me to read in the evening. As I sat leafing through it in a beer garden while enjoying a "Helles" and waiting for my schnitzel, an article by Rosina Löffler caught my eye. It was about the *LZ3* airship (also known as the *Reichsluftschiff Z1*), which made a journey to Munich from Friedrichshafen in 1909 in honour of Prince Regent Luitpold. Graf Zeppelin had promised the Prince Regent a year earlier to visit Munich in an airship.

Luitpold received a telegraph on March 31st 1909 informing him that the Graf had kept his promise and would be arriving the next day. According to Rosina Löffler's account, April 1st was a very stormy day. Strong gusts of wind caused the airship to travel much more quickly than expected, which meant that it would have arrived at its destination much earlier than scheduled. So the captain, Georg Hacker, decided to circle over the city of Munich before landing at Oberwiesenfeld, which would later become the location of Munich's first airport.

Hacker steered a zigzag course to buy some more time before landing, but the crosswinds were so strong that they drove *LZ3* further and further to the northeast. Landing at Oberwiesenfeld was no longer possible.

LZ3 over Landshut 1909. Source: Landshuter Zeitung

As the *LZ3* passed over Landshut, 45 miles from Munich, Hacker could see the vast darkness of the Bavarian Forest on the horizon. He now knew he had no choice but to land. Rosina writes that an escort team had successfully followed the airship up to that point and found a suitable landing site in a field on the northern bank of the Isar river, between Niederviehbach and Loiching.

LZ3 on the field near Loiching. Source: Kulturheimat.de

The airship landed safely in the field. While the crew had to spend a chilly night on the Zeppelin, the higher-ranking crew members were able to find accommodation at a nearby mill. This event left such an impression on the locals that they erected a stone monument at the edge of the field to commemorate it. After all, this was the first time a Zeppelin had landed on Bavarian soil.

But now back to the beer garden. The place name Loiching sounded familiar to me, so I did some research and found the village in the immediate vicinity of my hotel, just three miles away. Unfortunately, it was already too late for an expedition there, so I made plans to find the monument and the landing site before returning home the following day. So, after work, I made my way to Loiching with the article beside me in the car to help me find the stone.

I began by looking for people in the village who I thought might know something about it. Having drawn a blank there, I ended up in the town hall, where I eventually found a man who remembered seeing an article about the 115th anniversary of the landing in the local newspaper. In no time at all, he was able to show me the exact location of the monument on a map.

It was only later that I discovered that it is actually listed on Google Maps. But the old-fashioned method of asking the locals was much more fun! My visit to this historic site was the perfect end to an otherwise ordinary business trip.

The inscription on the stone reads:
ZEPPELIN 1 – LANDUNG DES ERSTEN LENKBALLONS in BAYERN – 1. IV. 1909
(Zeppelin 1. First Landing of a Dirigible in Bavaria. 1. IV. 1909).

During a subsequent internet search, I found photographs on local press websites documenting the event before and after the landing. Two of the pictures show the Zeppelin over Landshut and two more after it landed in the field. Just in case you're wondering, the *Zeppelin LZ3* (*Z1*) made it to Munich the day after and was greeted at Oberwiesenfeld by a huge crowd.

Photos S. Niemeyer – The memorial stone

Postcard of LZ3 on the field near Loiching (small top left); (large bottom) Dingolfing from the West. Loiching is part of the Dingolfing district and the nearest larger town. Source: Kulturheimat.de

NON-FICTION

AIRSHIP OF DREAMS:
The Man Who Rode the Titanic of the Skies

Book 1 of
THE VALIANT HEART TRILOGY
by C.M.S. Thornton

Publisher: Quillpen Pty Ltd.
(11 Dec. 2023)
Hardcover: 430 pages
ISBN-10: 0987575449
ISBN-13: 978-0987575449

PRESS RELEASE

'Airship of Dreams' is a true story that ... describes William Palstra's extraordinary life, which ended in 1930 when His Majesty's Airship R101 exploded in flames, ...

An Air Force pilot and decorated hero, Palstra returns to Australia in 1919, at the end of the First World War. Then follow his marriage and family, his role in the early years of Melbourne University, and his rise through the ranks of the newly-formed Royal Australian Air Force (RAAF).

The decade of the 1920s was the 'Golden Age of Airships and Zeppelins'. The stuff of dreams, these enormous, cigar-shaped aircraft glided slowly and majestically across the skies, like fantastic creatures from legend. ...

'Airship of Dreams' is Book #1 of the 'Valiant Heart' Trilogy. Books 2 and 3, 'The Call to Arms' and 'Blood and Fire', deal with Palstra's life before 1919. In other words, they tell his life story leading up to the events recounted in Book 1. Reading them is optional: 'Airship of Dreams' can stand alone.

REVIEW

What would you do if you found a large collection of documents in a secret drawer in an old desk that had belonged to your grand-parents?

Especially if a lot of them turned out to be huge hordes of letters and diaries hand-written by your grandfather who later died in one of the world's most infamous aeronautical disasters?

What the author did in these circumstances was to carefully compile the drawer's contents into a detailed biography of her grandfather. And, as reconstructed biographies go, this is a tour-de-force. It is also a hefty tome. The published volume is eleven inches tall, nine inches wide and an inch-and-a-half thick. I actually found it uncomfortably heavy to hand hold for long but 430 pages are certainly value for money.

My only criticism is one that some readers may see as a positive advantage. The text is very widely spaced. It is thus easy to read.

As explained in the author's Press Release the book details Palstra's life after he returns to Australia in 1919 and ends with his untimely death in the crash of *R101*. On the way it imparts a great deal of information about the evolution of the British Airship Programme and about airships in general. Consequently, I would highly recommend *Airship of Dreams* as a Christmas present for beginners who are keen to start learning about airship history. But the numerous previously unpublished contemporary photos also make it a must for the book-shelves of dedicated aficionados.

Giles Camplin

REVIEW

Those of us interested in lighter-than-air flight both modern and historic tend to have, at least, a limited knowledge of the 1924 Labour Airship Programme. Just as *Hindenburg* is better known than *Graf Zeppelin*, so is *R101* better known than *R100*.

Specific to *R101*'s final flight, the persons on board fall into three categories: The flight crew, officials of Cardington Royal Airship Works, and passengers. Of the six listed as passengers, four have rated some degree of biography in the available literature while two are, often as not, names on a list on the third page of Appendix 14. They are: Sqn. Ldr. W.H.L. O'Neill (Deputy Director of Civil Aviation, India) and Sqn. Ldr. William Palstra M.C., B.A. RAAF (representing the Australian Government). *Airship of Dreams* aims to correct this regarding the author's grandfather, Sqn. Ldr. Palstra. There are three topics running through this volume:

1. A biography of William Palstra based upon family records and diaries, all well-illustrated with family photos; 2. An abbreviated history of *R101* which I believe the reader will find touches many cogent points; again, well-illustrated with vintage photos and illustrations; 3. A fascinating collection of stories and articles from Australian newspapers and periodicals of the era about both of the subjects above.

These articles are an informative addition to the larger story in the form of then current anticipation of airship progress and expectations of a future service.

I believe that it was Dr. Robin Higham who observed that RAW personnel going to the Colonies were admonished not to get hopes up regarding how soon an airship service would commence. Here are suggestions in the Press that *R101* could arrive as soon as next year!

Contrarily, there is candor to be found as well. The standard line is that *R101*'s accommodations '*rival the luxury of an ocean liner*'. The special correspondent of *The Sydney Morning Herald* described his impressions during the Press tour of *R101*. He speaks well of the main lounge and promenades, however, "*Corridors are narrow, the sleeping cabins are small, the rooms where the wash basins are installed are not large enough to be comfortable ... It was impossible to understand how 50 passengers could ever live for a fortnight in these quarters ...*"

Of course the point of an airship service was not to spend a fortnight enroute to Australia. ...

A simple biography of a military officer who died in a peacetime aviation accident would be a book of interest to a limited audience. Because the author delves into detail of the *R101*'s development and its tragic end; and because of the unique Australian perspective, as seen in contemporary news reports, *Airship of Dreams* deserves to find a larger, appreciative audience.

C.P. Hall II

MUSEUM NEWS

A VISIT TO THE Y.A.M.

The Yorkshire Air Museum at Elvington have an entire building dedicated to LTA with some impressive photos/objects including a large sheet of the *R100*'s outer cover. This is excellent as Howden [where the *R100* was built] has no dedicated Museum and is relatively nearby.

During a quarterly Members' Meeting of AHUK I spent around twenty minutes with the YAM director Jonathan Brewer and discussed some ideas to mark the upcoming centenary of the *R100*'s trans-Atlantic flight.

Raising public awareness of the airship's immense size is the message and I suggested painting a full size outline on the external hangar side wall. (see photo) ... I doubt it is large enough to show the whole length.

The main advantage would be to take the story into the open air and facilitate a comparison with the nearby large exhibits, Nimrod and Victor and utilise this vacant facade. The director thought that aiming to have it in place by the Summer of 2030 might work to highlight the centenary. Naturally, as a volunteer run museum with limited resources and numerous priorities this is a concept rather than a plan but the seeds were well and truly planted.

Peter Davison
AHT Curatorial Advisor

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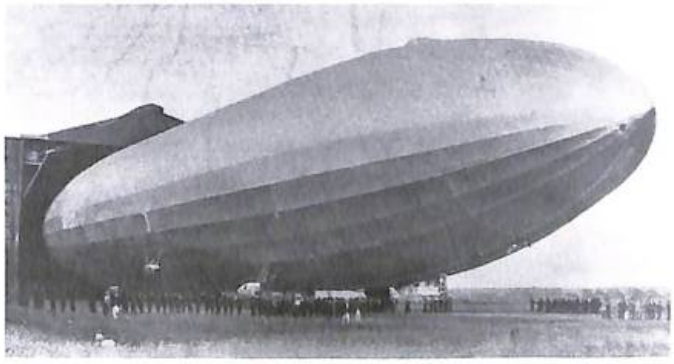
OLD WARDEN AND CARDINGTON

I visited Old Warden recently and it seems that the Shuttleworth Collection are intending to re-vamp several of the displays in the hangars, including the airship material.

A new item that they've acquired (as a donation) is a compass from the *R38*.

There was an article about it in our last AHT Newsletter, July 2024. Here is an excerpt from it that explains the back story of the compass:

R38/ZR2 AND THE STORY OF A COMPASS



Admiralty Class A ship: R38 emerging from the Cardington shed

Bob Hattersley contacted us by letter with a fascinating story about how he had come to acquire the ship's compass from the *R38* airship. Bob's grandfather, Dr William Impey Baker, was educated in England and qualified as a GP doctor. He set up his medical practice in North Lincolnshire in the area between Scunthorpe and the river Humber, ... Dr Baker built a formidable reputation in that area ... and was instrumental in persuading Parliament to install sewage treatment plants and fresh water supplies to the local area.

In 1921 the *R38*, now registered as the *ZR2* prior to being sold and transferred to America, was returning to the RNAS Howden after an abortive attempt due to dense fog, to fly to Pulham. Tragically, the *ZR2* exploded and broke up over the Humber estuary.

Dr Baker was one of the nearby spectators in South Ferriby where he was known in the small harbour office. Almost immediately, he was asked to accompany a rescue party that sculled out to the wreckage to attend and help the injured crew members. Sadly, only four crew members survived the loss of the ship.

For his valiant work in helping the injured crew members, Dr Baker was presented with the *R38*'s compass salvaged from the wreckage, in recognition of his unpaid rescue efforts on that day.

The compass shows a three-dimensional airship attitude and direction. It was restored by Barry Phillips of Southampton who is a specialist compass expert. You can see more of the compass on a YouTube video Bob Hattersley has created:

https://youtu.be/TAauRUSxP_8

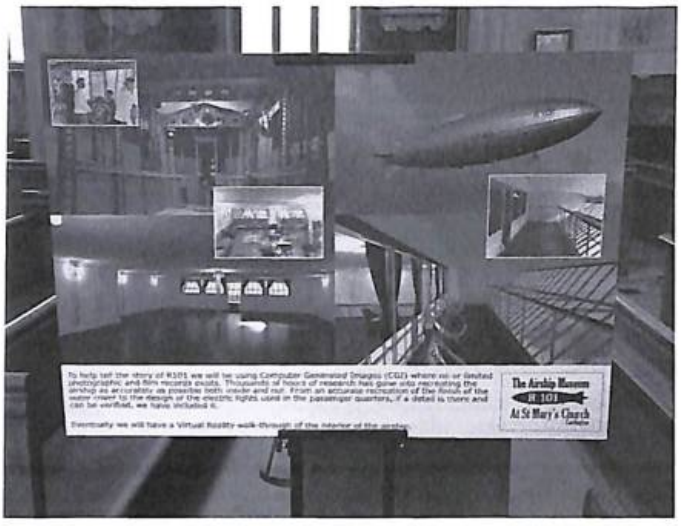
And here's a link to the Shuttleworth news item about the compass:

www.shuttleworth.org/2024/10/15/shuttleworth-receives-h-hughes-son-navigational-compass-from-r38-airship/.

The compass was in one of the display cabinets but with no explanation about the *R38* and its fate. A photo is attached (apologies for the reflections) and there's a photo of the handover on the Shuttleworth Facebook page.

I then went on to Cardington where I took the opportunity to visit St Mary's Church to look at their little 'Airship Museum'. They have assembled a few interesting exhibits and display panels (including a standard lamp that looks to have been made from a section of *R100* tubing) – see photos overleaf.

Paul Ross



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AHT NEWS

NEWS FROM THE AHT OFFICE

Over the summer months, Roger Allton and Alastair Lawson have been hard at work managing and sorting through some of the recent donations of documents and collections that have been generously given to the Trust. Their efforts have brought AHT closer to organizing our growing collection, and there's still plenty to do! We're currently focusing on sorting through the library of books and scanning the many photos and slides that have been tucked away in boxes for years.

As we continue this work over the coming months, we're excited to finally be able to see what we have in the archive. The next step will be to assess which items can be digitised, preserving them for future generations and making them more accessible to all.

A special highlight in August was the visit of airship historian and AHT member, Nigel Caley. Nigel brought with him a fascinating selection of unique airship photos from his personal collection. These rare items have already made their way into our digital archive, thanks to Nigel's generous offer to let us scan them for preservation. Some of the photos and documents were truly one-of-a-kind, and we're so grateful to Nigel for sharing them with us.

Roger, Nigel and Alastair

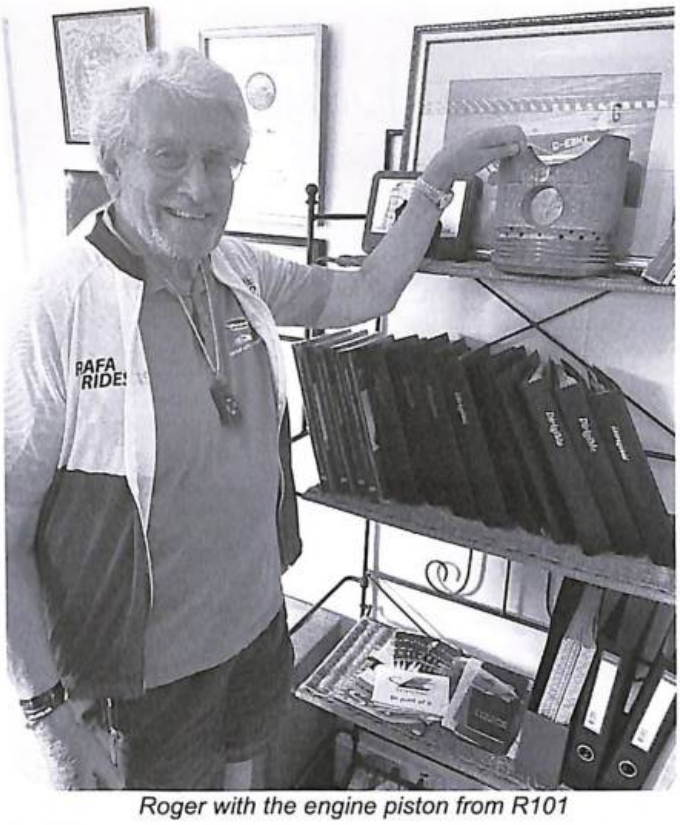
NEW DISPLAY CABINETS

After some careful consideration and a bit of elbow grease, we've recently added three brand-new display cabinets to our office space. These stunning additions have transformed the way we display some of our most recent donations and key items from our growing collection.

The new cabinets not only help us show off these wonderful items in a more organised and accessible way, but they've also given our exhibits a fresh, polished look. We're absolutely thrilled with the results!

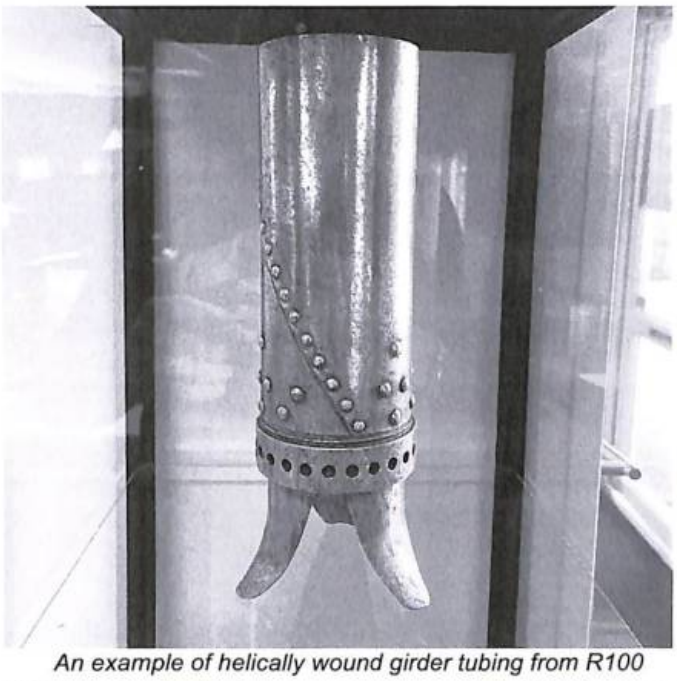
If you're curious to see the new setup, we'd love you to come check it out in person. Roger and Alastair are more than happy to arrange a visit, so just reach out to either of them to schedule a time.

Alastair Lawson
AHT Chairman



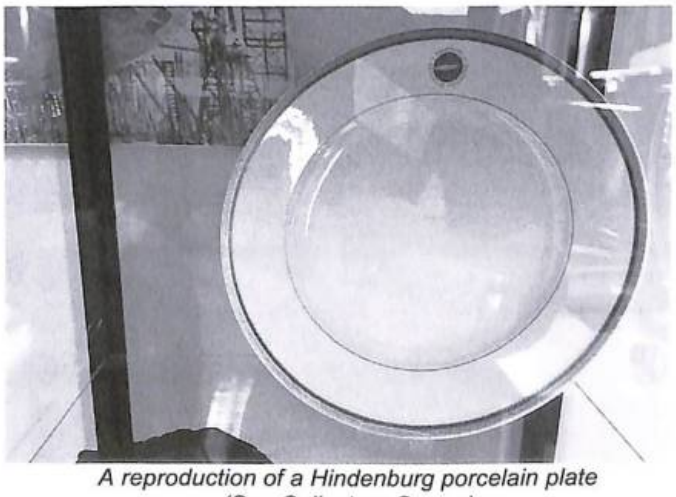
Roger with the engine piston from R101

An authentic Skyship Model made by Atom Models, and sold in the Airship Industries "Skycruise" giftshop 1986, with a wooden box made from the Cardington mast lift car dated 1943



An example of helically wound girder tubing from R100

Souvenirs made from airship metal



A reproduction of a Hindenburg porcelain plate
(See Collectors Corner)

A Skyship Jigsaw from 1984, with other Skycruise gift items, and the First Flight ceremonial tankard.

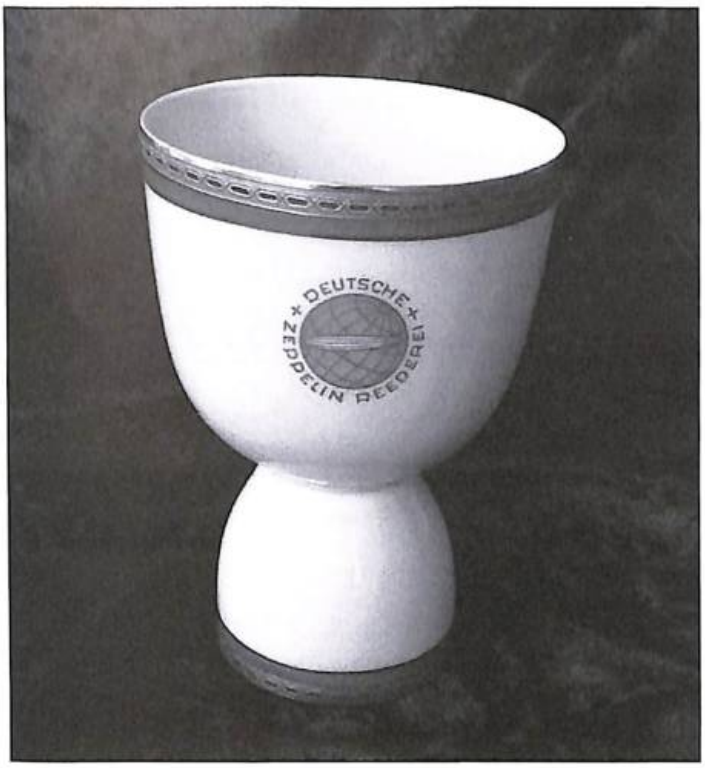
ORIGINAL PORCELAIN FROM THE *HINDENBURG*

Those tired old reports of the spectacular crash of the *Hindenburg* at Lakehurst, which are seemingly endlessly repeated in today's news media at every mention of the word 'airship', seldom include the fact that between its first flight in Germany in March 1936, and the end of last one with the infamous incident in the USA in May 1937, the gigantic airship had made more than 60 successful trans-Atlantic crossings.

Moreover, during these voyages the ship safely carried hundreds of passengers between Germany and the Americas, both north and south. And this select band of well-heeled folk, who had each paid $400 for the high-speed flight over the ocean (approximately $10,000 today), had travelled exclusively in luxurious comfort.

In addition to the breath-taking views from the promenade decks they also enjoyed a library, live music and five-star meals in a top-quality restaurant served on the best quality porcelain. The elaborately decorated and finely crafted, ivory-coloured dishes with their blue-gold decoration came from the famous Bavarian factory "Heinrich" in Selb, and were designed specially for the Deutsche Zeppelin Reederei airship fleet.

Surprisingly, there were sixty-three pieces of the original china which somehow survived the crash and they are now in the hands of collectors.


DEUTSCHE
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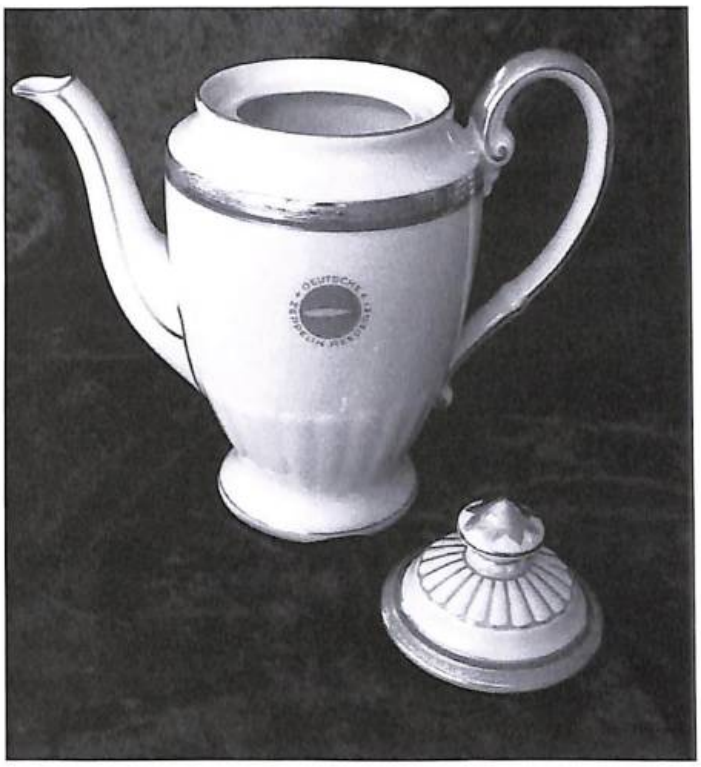

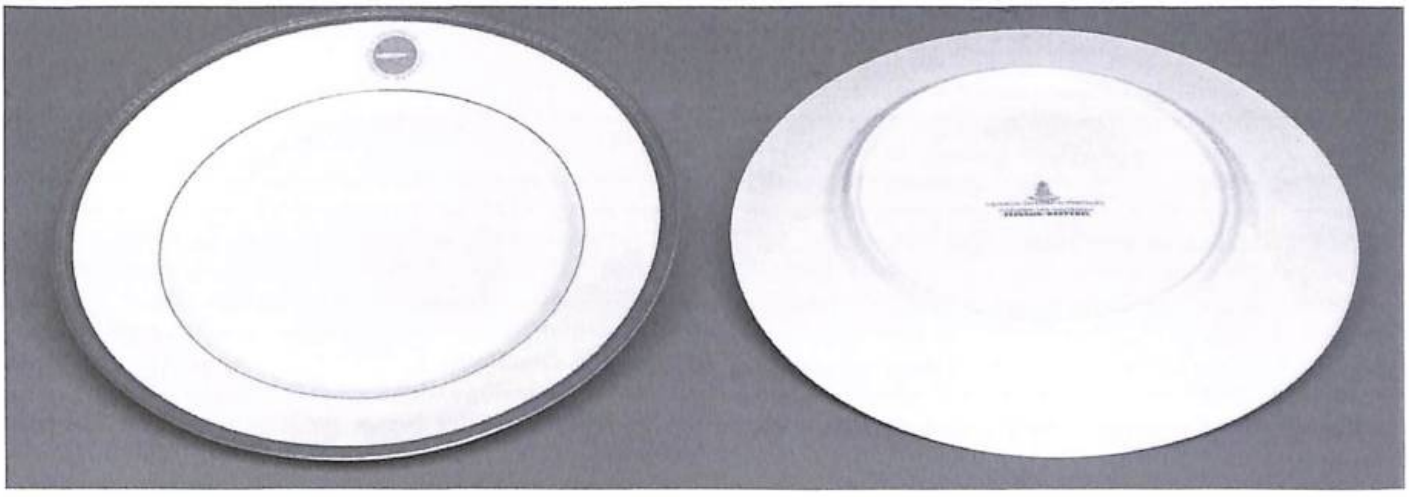

ARRIVALS, TRANSFERS, DEPARTURES

(Or, for the less aeronautically obsessed – BIRTHS, MARRIAGES and DEATHS.)

DEPARTED

---ooo000ooo---

ROSS FRANKLIN WOOD Jr.

Ex-President of the Naval Airship Association
07 December 1933 to 17 June 2024

Ross Franklin Wood Jr., a man of adventure, intellect, and compassion, passed away peacefully on June 17, 2024, while under hospice care in Surprise, Arizona, after a brief illness. He was 90 years old.

Born on December 7, 1933, in Los Angeles, California, his upbringing took him across the western United States, as his father's work with Standard Oil of California led the family to live in various cities, including Los Angeles, Honolulu, Phoenix, Tucson, Portland, Salt Lake City, and Seattle. He graduated from Roosevelt High School in Seattle and went on to attend college at the University of Washington.

At the University of Washington, Ross met the love of his life, Ileana Oliver, in an economics class. They married in 1957, at Glynco Naval Air Station, where Ross received his wings as a naval aviator. Ileana had the honor of pinning those wings on his uniform before they exchanged vows.

Ross's naval career was impressive. He learned how to fly fixed-wing aircraft, prior to becoming an Airship Commander, flying *ZPG-2W* and *-3W* naval airships (blimps). These were the largest non-rigid airships ever built, and were used for Airborne Early Warning (AEW) on the Atlantic coast. He left active duty in 1960, but continued flying as a helicopter pilot in the reserves until he resigned his commission in 1965. In later life, he went on to serve as President of the Naval Airship Association, and stayed actively involved with them until his passing.

Transitioning to civilian life, Ross became a stockbroker with Dean Witter in Seattle. Later, he moved to Spokane, where he worked for Merrill Lynch, eventually rising to Vice President in the local branch. His financial acumen was matched by his commitment to community service. Ross actively participated in numerous charities, fundraisers, and served on the board of the Spokane Symphony, even holding the position of board President. He was also President of the Spokane Club in the early 1970s. He remained active as a member of the board of directors for the Hagan Foundation until his death.

https:// www.legacy.com/us/obituaries/name/ross-wood-obituary?id=55654568

CHARLES DONALD "DON" LEE

Wartime Airship Pilot
06 September 1924 to 09 June 2024

Charles Donald "Don" Lee, age 99, of Holts Summit, Mo. passed away peacefully Sunday, June 9, 2024, at SSM Health St. Mary's Hospital, with his family by his side.

Don was born on September 6,1924 on a farm near Ludlow, Mo. to Bryon and Mildred (Williams) Lee. He enjoyed typical farm life during his younger years and attended a one-room country schoolhouse in Bryanville, Mo. until eighth grade and high school in Ludlow, Mo.

After high school graduation in 1941, he attended Central Methodist Collage at Fayette, changing to William Jewell College in Liberty in 1942. He then enlisted in a college "V-5" program for Naval Aviation Cadets on December 2, 1942, entering active-duty Naval Service from college on March 10, 1943. ...

Serving in the Naval Aviation Cadet program in Kansas, California and New Jersey, he was commissioned an Ensign Naval Pilot Airship in March 1944. During World War II, he piloted airships in the Caribbean Area and in California on anti-submarine patrol and photographic missions. Later in the War he trained in planes in anticipation of the invasion of Japan during 1945 at Grand Prairie NAS, near Dallas, Tx.

Upon the surrender of Japan, he left the Navy in December 1945, and entered the University of Missouri at Columbia on the G.I. Bill in January 1946. He completed his college degree gaining his Bachelor of Journalism in Advertising.

Working as an ad salesman and manager for radio stations in Kansas and California, he married Dorothy Jane Bailey on December 8, 1951, and they settled in San Jose, Ca. During this time, he rejoined the USNR Active Naval Reserve, becoming a "weekend warrior" in an Organized Naval Reserve Unit from 1950 through 1958. He was promoted to full Lieutenant while serving in the Naval Reserves. ... ... [in 1998] Don retired with Dorothy to their ten acre "farm" in Holts Summit, Mo. ... ... His life and legacy will be remembered and cherished by all who were blessed to know and love Don.

https://www.legacy.com/us/obituaries/name/don-lee-obituary?id=55311042

STANDING ORDER RENEWAL REMINDER

2025 MEMBERSHIP SUBSCRIPTION PAYMENTS

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For members who pay by annual Standing Order, please remember to update your Standing Order to the rates shown above. Standing Orders normally go through automatically on 1st January. Standing Orders are different from Direct Debits as they are controlled by the account holder. The AHT cannot make changes to Standing Order payments. Please contact your bank to check the correct payment to the AHT. If you access your bank account online, you can alter payment to the new subscription rates that way. Please contact your bank in person in case of any difficulties.

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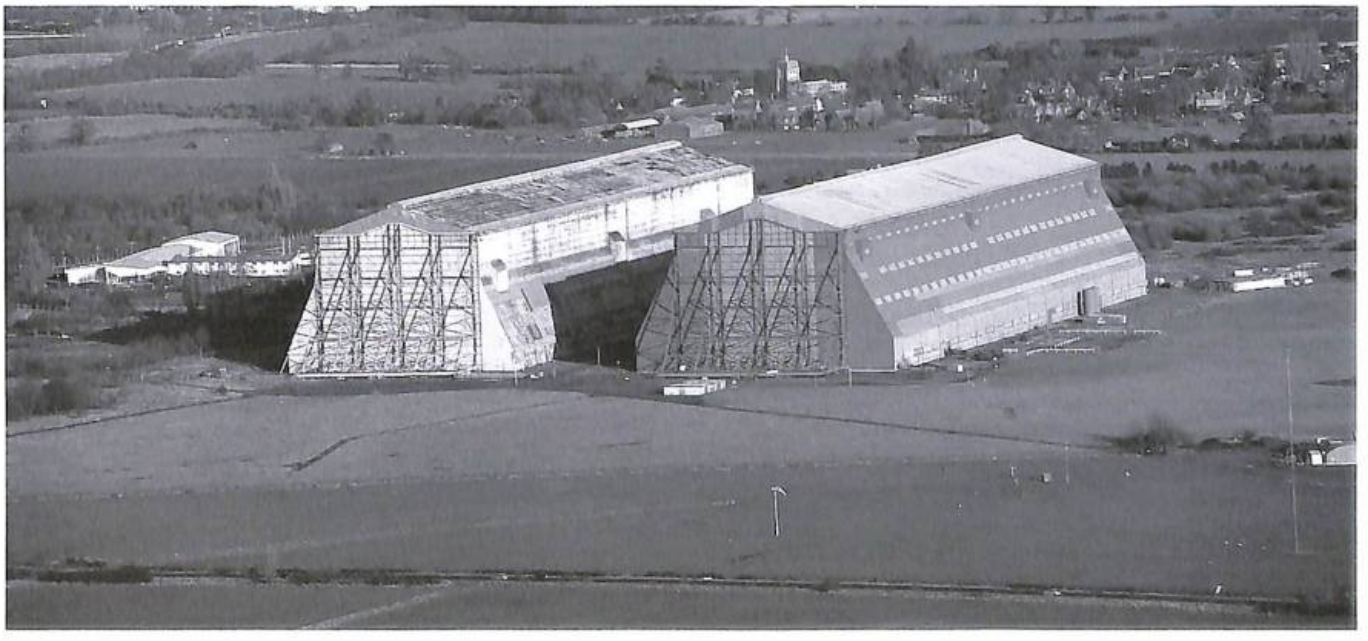
Brian Harrison, 9 Quaggy Walk, Blackheath, London SE3 9EL

Enquiries: **membership@airshipsonline.com**

The Airship Heritage Trust is a charitable, not for profit, voluntarily run organisation based in the U.K. It aims to promote interest in and study of the history of airships and lighter than air travel, and encourage the preservation of Cardington Airship Station and its principal buildings.



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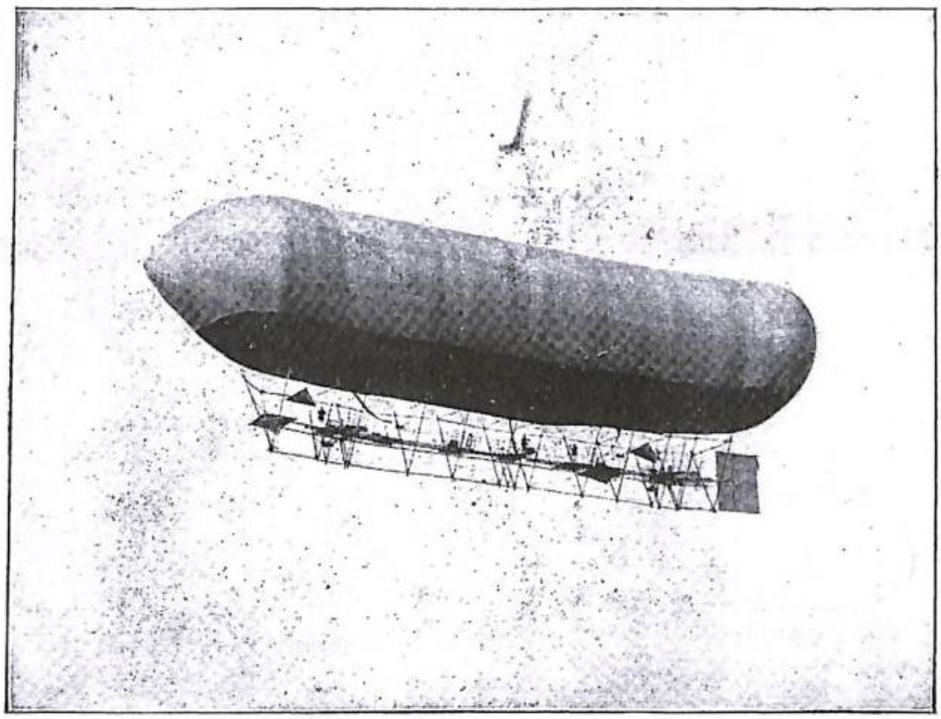

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An advertisement found in "Ballooning and Aeronautics" magazine dated 1907