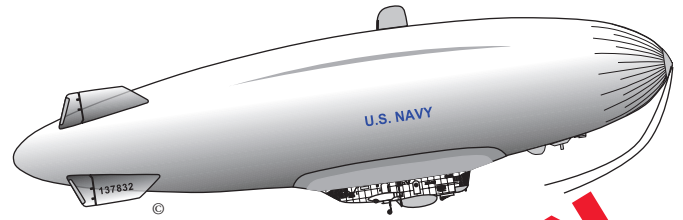
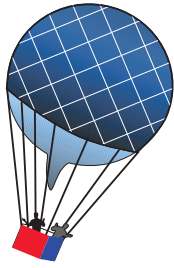


THE

# NOON



# BALLOON



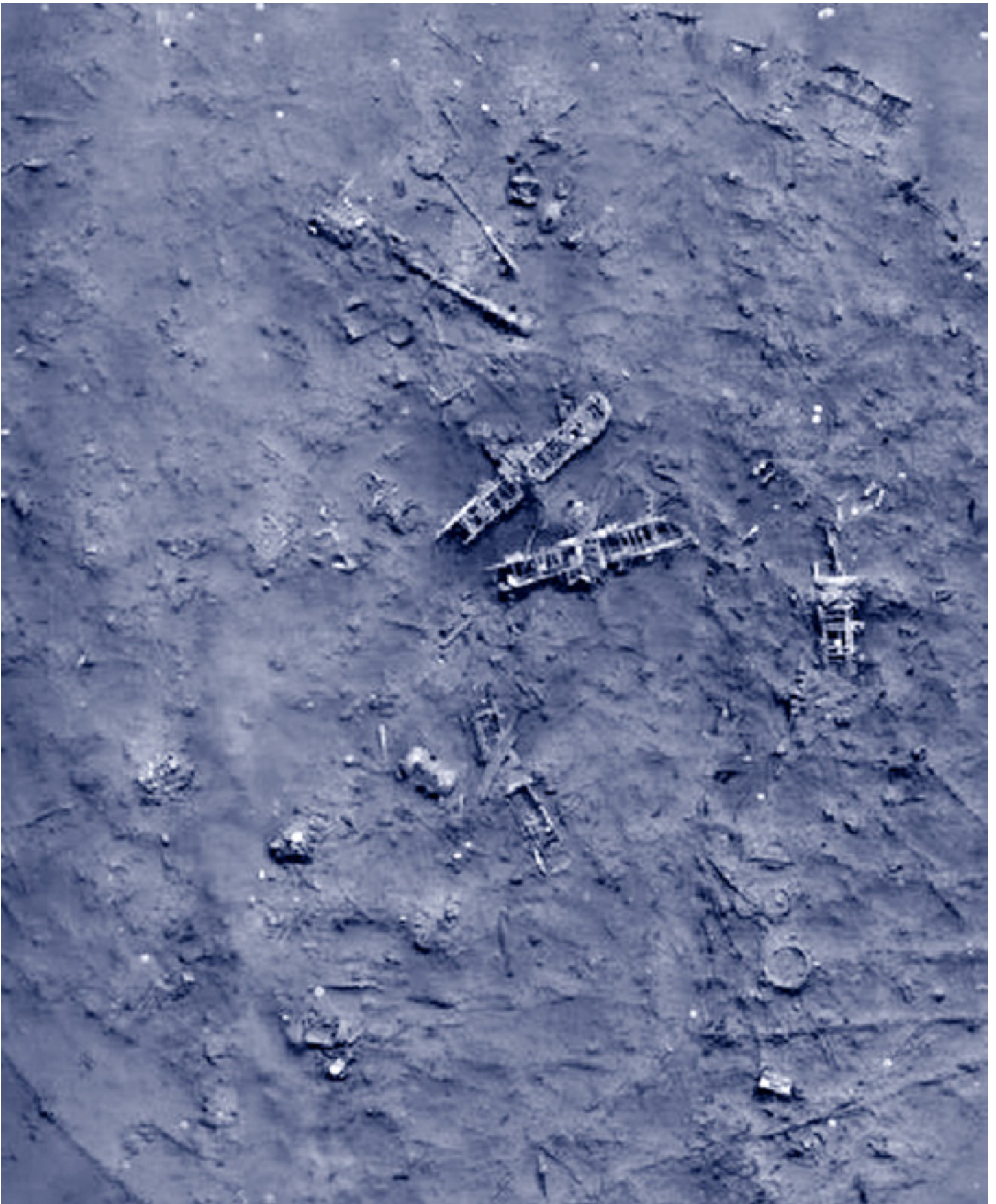
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Winter 2016



## WINGFOOT TWO CHRISTENED



The USS *Macon* (ZRS-5) in her final resting place, 1,500 feet below the surface near Point Sur. This amazing image was created by NOAA computer tiling hundreds of individual close-up photos together, a view not possible in the depths.

# THE NOON BALLOON

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ISSUE #112

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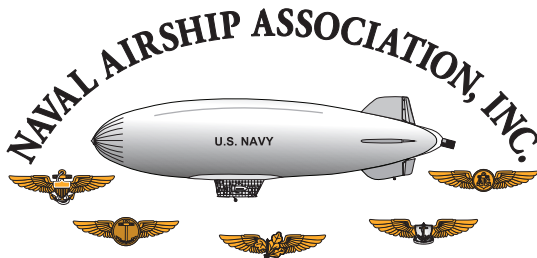
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"Thank you for sending me a copy of your book; I'll waste no time reading it." - Moses Hadas ☺

On the Cover: The second Goodyear-Zeppelin airship *Wingfoot Two* is christened, October 21, 2016.



THE NOON BALLOON

Newsletter of the NAA

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## EDITORIAL

R. G. Van Treuren, Box 700, Edgewater, Florida 32132-0700, rgvant@juno.com

Owing to unavoidable complications our team was quite late with the Fall issue. Whenever this happens to the magazine, which is rightly or wrongly the most visible indicator of the health of our organization, members can't help but be suspicious – and put off sending in their dues. Snowballing into our Father Time induced membership depletion, and we soon slip below the number necessary to sustain a quality, if old-fashioned, print magazine. If that happens, yours truly wants no part of an internet-only e-newsletter.

So happily we are continuing to take steps to remain vital. There has never been a more important period, this most exciting time of LTA innovation in half a century. First, we welcome two activists to the Exec Council: Juergen Bock as our new Tech Chair and Steve Kozlovski, our liaison to the NMNA's Library. You'll read Juergen's introduction on page 11 and you'll see a small part of Steve's work beginning on page 13. We hope you'll join in with your unique knowledge. Perhaps you don't have the strength to write and illustrate an entire memoir, but if you can help i.d. a person in a photo, or write down what a formerly classified piece of equipment in a photo was all about, you're preserving something that would otherwise be lost forever.

Sending in your dues is a vital step for each member, of course, and if one stops there without purchasing a membership for a spouse, offspring or honoring a departed loved one, you are still doing more than many of "our" folks out there who are more or less uncommitted to LTA, past or present. The harsh realities of the bottom line, however, require yet more.

So, your slate of officers have been searching for solutions continually and, beginning with next issue, we are going to try an experiment to increase the magazine's quality while sharing the challenges of creation, printing and distribution. Your Spring issue will likely come as a new, combined magazine, probably entitled "The LTA News, Incorporating THE NOON BALLOON and CARDINGTON CHRONICLES. CC is the excellent magazine of the British Airship Museum, and its Editor, Paul Adams, is a blimp pilot and longtime LTA enthusiast. By sharing the expense and avoiding wasteful duplication of reporting the same developments, we strengthen both our organizations. This is an enormous first step, long proposed and repeatedly refused by other sister organizations. They probably had felt a joint publication was a sign of weakness, a loss of distinct identity, a loosening of quality standard, a surrender of control,

or all the above. (Perhaps they just didn't like your old Ed.!) Either way, let's try to make load-sharing work. If necessary we can go back to duplicate magazines as long as we can afford same.

Both NAA and BAM have the desire to preserve LTA expertise and allow the current generation to, if they choose to participate, learn from past experience. As our book review volunteer CP Hall says on page 34, the information will be offered... and potential investors will immediately be aware if proposals have been "reality checked."

Speaking of which, there are two new translations by BAM member Alastair Reid, who e-mailed about one of his new books, "The cover photo shows it being patched up after an emergency landing at Ahlhorn. After 24 hours the airship was then flown the 6 miles to Wildeshausen for repair - in this condition!"



As readers may know, later the L-49 literally fell into Allied hands after French defenders fired so many bullets into it – many of them incendiary – to exhaust the airship. Then the crew naively fired flares into the nearly pure hydrogen cells thinking they'd catch fire and destroy the ship. Of course, without any air inside the cells, the shells were snuffed, and the French ran up to capture them all. The reverse-engineered plans lead to improvements in the re-energized British rigid airship effort, and eventually the US Navy's ZR-1.

Then as now, working together made LTA happen. We can do this. We have this one, single chance. We should do this. If we do not, you can be sure no one else will.

– Richard G. Van Treuren

## View From The Top: PRESIDENT'S MESSAGE

A lot has transpired since my last message. I took two very important actions at the September 29, 2016, Executive Council Meeting. First, after very careful discussion, I appointed Steve Kozlovski as Liaison to the Emil Buehler Library at the National Naval Aviation Museum in Pensacola, Florida, and member of our Executive Council. Steve works in the library as well as serving as a tour guide. He did a great job organizing and leading our tour during the past reunion and has been working closely with Richard Van Treuren on sorting and identifying hundreds of airship photos stored in the library. He has a strong interest in LTA and will be a valuable asset to our efforts at the NNAM, working closely with Mort Eckhouse.

Second, I appointed Juergen Bock as the Technical Committee chairman and Executive Council member. Juergen comes with (two) pages of technical qualifications and as many professional working relationships, including Adm. Rosendahl, Cdr. Charles Mills, Gordon Vaeth, our own Norman Mayer and a huge list of German airship experts. Juergen is also spearheading the German to English translation of a German airship text book for Atlantis Productions as Richard Van Treuren talked about at the Reunion. I have more details that I can share.

I thank both gentlemen for their efforts and time they are volunteering towards our efforts. Page 1 shows our updated list of Executive Council members and committee chairs.

From the responses we received from members it looks like a two-year reunion interval is recommended. Akron won as the preferred next location and we are actively pursuing an interesting and full schedule of activities. We hope to get some good cooperation from our friends at The Lighter-Than-Air Society, including some interesting and relevant visits and possibly a joint banquet at the close of the reunion. Venues being discussed include the airdock in Akron, the airship facility at Wingfoot Lake (possibly with a new Goodyear NT blimp depending on its availability and schedule), visit to the MAPS Museum at the Canton-Akron Airport (a really nice museum including a fully restored Goodyear blimp car), and some free time for personal side trips.

As noted before, we have presented certificates to some Past Presidents to acknowledge their commitments to our association. However, we still need help in getting current addresses for these men or their survivors: M. Eppes, L. Prost, W. Moore, F. Kleinberg, H. Biedebach, and R. Ashford. A surviving relative might be of help for those



who have passed. Please help us get contact information so the certificates can be delivered. I think it is very important to acknowledge their contributions. Please contact me if you know of any contact information.

A very dramatic discussion was held regarding The Noon Balloon. We have been approached by the publisher of the Cardington Chronicles to work toward a single, international airship magazine rather than having several, all covering the same news and stories. It possibly will be called The Cardington Chronicles, including The Noon Balloon or LTA News incorporating both original titles. It's an interesting concept and could prove economically sound in a number of ways and possibly expose the NAA to a larger audience of potential members. You would still receive all the same material you currently receive in The Noon Balloon, but it would also include some new and fascinating British airship history. We do not foresee any increase in our current dues or delivery time to you. We are currently exploring a trial format or two to start out with the upcoming spring issue. You will receive a note with more details once we finalize the trial period.

Finally, as noted in the last issue, my idea for an LTA Hall of Fame got postponed from lack of commitment. It is not dead and I am actively pursuing help in getting it restarted. I have formed a committee to screen any and all applications submitted and recently made an overture to an LTA association to propose a joint effort with us.

I think we are very close to finalizing an agreement and will be up and running soon. More details to come. I firmly believe in this project and will do everything necessary to make it a reality.

Thank you for your continued support of the Naval Airship Association and hope to see you at the next reunion; date and hotel location to be announced soon thanks to your input.

– Fred Morin, President

## **TREASURER'S STRONGBOX**



The Executive Committee of the Naval Airship Association, Inc., met on September 29, 2016, at the home of Richard and Deborah Van Treuren in Edgewater, Florida. The meeting was called to order at 0912 by President Fred Morin leading the Pledge to the Flag. Others present were, past Vice President Anthony Atwood; Secretary-Treasurer, Deborah Van Treuren; Newsletter Editor Richard Van Treuren; Newsletter Publisher and Small Stores Director, David Smith; Members-at-large, Lorraine Madden and Paul Adams.

The Minutes from the Council Meeting in May 2016, were read and accepted. A motion was made by Fred Morin, Seconded by Anthony Atwood and accepted and carried by all present.

Discussion surrounding a "National Airship Hall of Fame." A committee of three would screen applicants. Suggestions for those members were, Wick Elderkind - for knowledge; Don Keiser - our desire for him to be more involved; and Richard Van Treuren - for knowledge. David Smith came in a little later on this - it is to be a joint effort with The Lighter-Than-Air Society. The goal is to induct four persons to the Hall of Fame. Dave is on the Board of the LTAS, which meets once per month. The president of that organization often has schedule conflicts that preclude his attendance, so not much gets done, so the National Airship Hall of Fame would be a present by the NAA.

Questions were asked as to whether we have the expertise to also vet foreign airship experts. Dave Smith suggested we also include the British LTA organizations as well. The Hall of Fame will be virtual. A committee of 12- 4 from each organization- British Airship Museum, NAA and the LTAS. First Inductions will be at the next reunion. Fred will produce a Memorandum of Understanding between NAA and LTAS to commence working together on this. A short break followed.

**Treasurer's Report:** read and accepted.

First Choice for the 2018 Reunion is Akron, Ohio. Richard Van Treuren read out a note from Bill Wissel regarding suggestions for hotel choices. Dave Smith recommended the Quality Inn on Chenoweth and asked for a vote.

### **Historical Committee:**

Rich Van Treuren read a report on the Historical Committee prepared by Mark Lutz.

**Anthony Atwood:** gave a report on three items.

- 1) Bud DeLong, long-time member cancelled his membership because at 98 years old can no longer see to read.
- 2) *Macon* in-flight photo poster
- 3) Miami Military Museum update: Completion is nigh. He needs a letter from us to the HIPO for endorsement on historicity of HQ Bldg at the Museum. Motion made, seconded and carried to write a letter.

### **Tech Committee Report:**

Juergen Bock was nominated to be Tech Committee Chair following the vacancy left by Norm Mayer.

Education Program on LTA- General Information Brochure on Airships. Need a sponsor for printing.

Following a short break there was discussion about Pensacola as a default Repository for LTA historical items. The Board is considering new member Steve Kozlovski as our Emil Beuhler Library liaison.

D and O Insurance (Director and Officer): Bill Wissel had mentioned this at the Board meeting in May. He feels it is imperative that we do this. A motion was made for him to pursue this for more info. It was seconded and passed. NAA will cover the cost.

### **1200-1320 Luncheon Adjournment 1320 resume:**

The ExCom deliberated as to whether Steve Kozlovski and Juergen Bock should be appointed to the Council.

Paul Adams suggested that we combine printing The Noon Balloon and the Cardington Chronicles into one professional publication with a section for each group to cut down on costs of printing. This could be a vehicle that we use to appeal to persons with a casual interest.

The meeting adjourned at 1510. Minutes respectfully submitted by

– **Deborah Van Treuren, Secretary Treasurer**

## PIGEON COTE

With a nod to our "Flying Carriers" last Winter's issue, Ross Wood sent this along:

With the invasion of Sicily the Army soon realized that their fleet of observation L-4 Pipers and L-5 Stinsons were out of service until airfields could be captured or built. Transportation Corps Captain James H. Brodie sketched out a design for a boom and line system with a release that could hold a small aircraft fitted with a corresponding hook along the top of the wing roots.



With the boom, the plane could be lifted into the air, the engine worked up, and, when rpms were high enough to be reasonably sure of lift, released to fly away. To land, the system worked in reverse, capturing a passing hook-equipped Grasshopper by wire and allowing it to spin down. That's where the Navy came in.



The Navy had enough LSTs to allow the Army to use a few of them in 1944 as tiny aircraft carriers. Eight ships received the conversion, though not all of them used the Brodie system.

Too bad the different departments were not aware of the Navy's previous efforts or even the concurrent development of deploying a spotter airplane from an M-ship. This is the M-1 flying out of Lakehurst.



Had more emphasis been placed and resources been available, carrying a spotter plane might have evolved into launching a standoff ASW capability. Carrying a BT-13 type airplane equipped with a skyhook was part of the "O" ship design proposal. Ω



Bill Walker e-mailed, "A friend showed me what a town in Latvia is doing with their old hangars. Riga Central Market is Europe's largest market and bazaar with four buildings in Riga, Latvia. It is one of the most notable structures from 20th century in Latvia and has been included in UNESCO World Heritage Site list together with Old Riga in 1998. Made me think of a use for Tustin surrounded by Irvine Company agricultural properties and residential communities. Having lived in Newport, this would be an excellent use assuming a preservation program has not been determined. Maybe you know of someone in CA who can make a proposal or maybe it would be a good Noon Balloon article?" Ω

Quite a bit of e-mail discussion concerned the HAV incident. Al Robbins wrote, "I hope that HAV is able to get authorization and sufficient funds to start a real flight-test program. We haven't begun to learn how to rapidly control trim on a fairly large airship (adjusting ballonets can't possibly handle it) even at nearly constant weight and under zero wind and clear sky conditions. The large airship will have great inertia, but they'll have to learn which variables are going to require close monitoring, and the time-lags at various altitudes and loadings. I still worry about their lack of vertical thrust capability near the bow.

A number of young aerodynamicists, sensors and computer scientists should be able to earn their PhDs as HAV's program progresses. I doubt if you're going to be hearing much from Lockheed Martin. Their effort is/was funded through marketing and IR&D funding. (Independent Research and Development - Government authorized money from their various DoD contracts.) The DoD isn't particularly interested in getting involved again. Essentially they're peddling the old Lockheed reputation and gossamer dreams. Someone with a very long view, extremely deep pockets, and control of government agencies must support their team. We've gained a great deal since the ZPG-3Ws were aborted: Invention of advanced structural composites, digital computers, digital communications systems, sensors, reliable electric propulsors, etc. The next generation crews won't need Radiomen, Navigators, or most watch standers, yet will have greatly enhanced navigation and timely weather information. Unfortunately, none of the current generation of flight and maintenance crews (gliders, rotary wing or airship have ever seen a large airship, let alone worked with one. No ship is being constructed - or modified - to train any pilots or to develop an appropriate syllabus.

Did anyone ever simultaneously measure wind velocity at the top of the Height Finder Radome and at the nose wheel while a ship was moored out? We might have information for the three locations, Akron, Lakehurst, and S. Weymouth." Ω



Another hybrid airship discussion exchange between other members ended, "...the fundamental lesson learned from traditional airship construction practice that LTA craft exceeding 30,000 cubic meters should be designed as rigid airships. Today's glossy papers show exclusively non-rigid hybrid "heavy cargo" carriers, as if present seagoing freighters would be designed as inflated rubber floats. It is ignored that the successful performance of the NT Zeppelin is partly due to the rigid design where only the three longerons provide the dispersion of incurring loads." Ω

Mike Caddy e-mailed, "Most current airships are designed for low altitudes and therefore have relatively

small ballonnet volumes compared to total hull volume. If your mission requires high altitude operation then ballonnet volumes increase greatly. The LEMV/Airlander was designed to operate at 20,000 ft. With this requirement and adding margins, the ballonnet volume is over 50 percent of the hull volume. Another example is DARPA ISIS which operates 65,000 to 70,000 ft. The ISIS airship is an extreme example where most of the airship weight is hull fabric and ballonnet. In this regard the ISIS design was to integrate the structure with sensors to reduce empty weight as weight and payload drives hull design volume.

LEMV/Airlander integrates the ballonnet volume structure into internal load carrying curtains to save weight. The assembly of multiple thick fabric layers was challenging and subject to more than normal leakage rates. It is very difficult to find and fix small leaks in a very large ballonnet volume. This ballonnet structural integration needs more consideration and analysis before I would recommend it in future designs.

With the high altitude design requirement there is a lot more ballonnet fabric that is loose and flexing at low altitudes. This can have a significant effect on moment in positive and negative pitch. Ballonnet design can help reduce this effect. The Lockheed P791 was designed for risk mitigation of hybrid flight control systems and risk mitigation of the air cushion landing system. It was to be a demonstrator, risk reducer for DARPA Walrus. The ballonnet was sized for very low altitude. The first flight of the Lockheed P791 in takeoff showed a pitch over rotation from ballonnet sloshing, apparent mass, and others. The first flight also showed some lateral instability in landing. The P791 went through several rewrites of the flight stability control system to fix these issues. The final airship was able to start engines in hangar and taxi out on its own power.

Additionally a full simulator was developed, tested and validated with P791 flight test data. In the flight simulator the stability augmentation could be turned off and on to show the significance of stabilization in the simulator. I saw the simulator in operation. It was reported that some of the "dynamic inversion" flight system control techniques proven in JSF F35 were used in the P791 FCS.

The Air Force Blue Devil airship also had a flight stability control system planned. The control of airships in low or zero wind is difficult because the surface controls are ineffective. Vector thrust systems are required.

Finally, a hybrid airship LEMV/Airlander has a lot of control effectors: four engines, four sets of vector vanes per engine and front engine pitch vector. Add four throttles (propeller pitch was engine controlled in LEMV). A flight stability control system is really needed. The pilot



work load for one pilot is just too much. A flight stability control system is expensive to develop, test, validate and certify with flight test and simulation, but it is required for safe low-speed flight operation. Up and away flight would use the normal aerodynamic fin surfaces. The complexity of this total system may exceed some fixed wing aircraft. The time and cost to develop this system was under estimated.” Ω

CP Hall noted, "In the September 2016 issue of PROCEEDINGS is an eight-page list, complete with photos, under the heading "U.S. Navy, Marine Corps, Coast Guard, Customs & Border Protection (CBP) and National Atmospheric Administration (NOAA) Aviation Order of Battle as of 31 July 2016". It was compiled by Lieutenant Jim Dolbow, U. S. Coast Guard Reserve. On the sixth page is the comment:

"Note: VXS-1 operates and maintains two uniquely modified NP-3C Orion aircraft, one RC-12, the Navy's only airship, the MZ-3A, and numerous unmanned ScanEagle, UAV's, that are used as airborne research platforms. I can remember, not so long ago, when USN LTA did not rate so much as a mention in a footnote; especially in a list titled "Aviation Order of Battle". Thank You LT Dolbow! Ω



Curt Westergard e-mailed, “Here attached (above) is a fixed-wing drone mockup attached to our aerostat. We towed this in a pattern over the NUWC exercises off the coast of Newport, RI. We were tasked to find autonomous submarines. We found three rather quickly with our high resolution 9-Eye optics cluster. The drone launch and recovery from the balloon was not permitted since the airspace was already congested. It, like this photo was notional proof of concept.” Ω

Louis Pearlman, 62, passed away on August 19th. He was best known for creating boy bands such as the

Backstreet Boys and \*NSYNC; but earlier, Pearlman was president of two airship operating companies: Airship Enterprises Ltd. and Airship International Ltd. Pearlman's airship companies operated blimps for clients such as Jordache, McDonald's, SeaWorld, MetLife, Budweiser, Pink Floyd, Tommy Hilfger, and several more.



While the list seems impressive, Pearlman managed to make as much, if not more, money from insurance proceeds than advertising contracts. Pearlman's airship companies had many suspicious accidents starting with the 1980 crash of the Jordache blimp at Lakehurst, New Jersey. The Jordache blimp's envelope was a Goodyear-made V-balloon built for logging operations. A California stunt pilot tried unsuccessfully to make it into a small advertising blimp. When Airship Enterprises failed to import a German-built blimp for Jordache, Pearlman pulled a switcheroo and tried to fool both the client and insurance carrier. The blimp crashed on October 8, 1980. This was an embarrassment for the client. The insurance company also learned of the switch and fought hard to keep from paying Pearlman any money. The boy band/Ponzi scheme creator actually told the insurance company that they were to insure airship N5499A, an American-built blimp. The WDL airships had "D" numbers. Pearlman won the lawsuit to the tune of \$2.5 million in 1988.

Airship International Ltd. operated advertising blimps for about a decade. During this time, the Company suspiciously lost several airships resulting in large insurance payments. These mishaps included the WDL MetLife blimp, a MetLife Skyship, and a WDL GULF blimp. Pearlman eventually lost interest in blimp operations when he entered the music industry with the Backstreet Boys. Unfortunately, he also created a \$500 million Ponzi scheme. Pearlman died in a Miami federal prison while serving a 25-year jail sentence for his Ponzi scheme. The cause of death was an infection resulting from heart valve surgery. – Alan Gross Ω

Ross Wood remembered the Dilbert Dunker: “ZW-1 went up north once to do a refresher survival course at their big indoor swimming pool. They had a "Dilbert Dunker" there, just like the one at Pensacola. Basically, it was an SNJ section of fuselage, including the cockpit, mounted on a track, at a 45 degree angle, going into the deep end of the pool. They strapped you in to the cockpit, wearing a seat pack chute, helmet, radio cords, etc. You went down the track and when you hit the water, the aircraft flipped upside down, and still on a section of track, sank to about four feet from the bottom. When the aircraft stopped moving, and the bubbles cleared away, you popped your seat belt/shoulder harness, unhooked the radio cords and exited the cockpit, swimming to the surface. They had survival instructors laying on the bottom of the pool with air masks on. If you screwed up, they would pull you out, before you drowned! I did it twice at Pensacola, and swore I would never do it again. It was a total surprise!” Ω



### **Flying The Flag For An Airship Revolution**

The rise of freight airships could go down like a lead balloon with traditional aircraft companies but could also represent a new high for Asian companies seeking to exploit new ways to reach world markets, according to research published in the International Journal of Aviation Management.

Barry Prentice of the I.H. Asper School of Business, at the University of Manitoba, Canada and Yui-yip Lau of The Hong Kong Polytechnic University, in Kowloon, Hong Kong, and currently working alongside Prentice in Manitoba, explain how the reinvented technology of airships has come apace in recent years and is a far cry from the trial-and-error methods and primitive materials used to build the giant Zeppelins of yesteryear. They have thus developed a new conceptual model, which they refer to as the value-density cargo pyramid, to help them analyze dedicated cargo airplanes, sea-air logistics, sea containers and transport airships, through the busy trade corridors between Hong Kong and Europe and North America.

The benefits of airships over "conventional" freight vehicles - airplanes, ships, trains and trucks, for instance, is that they can fly over land and sea, access coastal ports, airports and reach remote inland regions too. "The transport airship is a disruptive technology that has the potential to modify freight transport markets, change geographical advantage and alter world trade patterns," the team explains. They point out that these advantages coupled with relatively low costs and a smaller carbon footprint might make airships the freight transport choice of the future sooner than the conventional couriers anticipate.

However, airships could simply fill a niche rather than out-competing conventional aircraft. Airships are slower than airplanes, but have much bigger capacity and loading doors and so could reduce the economic barriers for the carriage of low-density and low value-perishable cargoes that are usually sent by even slower marine routes. "This is a sizeable market, and one that does not necessarily erode the markets of established carriers," the team points out.

"Both technical and economic reasons lie behind the 80-year delay in the commercialization of large freight carrying airships, but in the 21st century no obvious technological barriers remain. The race is on to create this new transportation mode and the first-movers will have an advantage," the team concludes. We are looking forward to the day when someone will actually be able to calibrate the value-density pyramid. Ω

(Prentice, B.E. and Lau, Y-Y. (2016) 'Market potential for transport airships in service to Hong Kong', Int. J. Aviation Management, Vol. 3, No. 1, pp.68-83)

NAA received an e-mail request from one Peter J. Holloway, a former Royal Navy rating: "I served on the America and West Indies station 1953/4 aboard HMS *Cygnets*. During that time I observed blimps flying majestically overhead and greatly envied them. I belong to a gliding club in Sussex England and I should like to write an article about the blimps of that period, and I went on line for some technical information. However, it is not clear to me exactly which craft were operating over the Caribbean at that time, and whether they were used for anti submarine detection? Perhaps you would be good enough to spell out the details for me."

Ed. responded, "A short summary of USN postwar LTA operations is found on the NAA site at:

<http://www.naval-airships.org/page-993560>

Likely you would have seen the K-type airships, built in WWII but updated two times before their retirement. ASW was their primary mission. A restored example of their final configuration, which you might have seen, is ZP3K-47 at the Pensacola museum. If you have any specific questions please contact our history chairman. Love to have you as a member of the NAA." No response was received. Ω

Dr. Barry Prentice had yet another interview broadcast, and e-mailed Ed., "The impact of the broadcast that I sent you is still working its way through the system. It is amazing how many people still find the idea of using airships again to be so novel. I did not really appreciate the *Hindenburg* footage in the interview, but as they described 66 people surviving, it might have helped to put the event in its proper perspective.

I am still dealing with a wall of silence from Ottawa, but as our message reaches more and more people who are living with high food prices in the North, the idea of trying airships is going to be raised by a wider range of people. We will just keep adding straws to the camel's back....

The global climate is definitely changing. We have a drought in Nova Scotia where one has never been recorded in 200 years of observations. Here the weather stay mild longer and longer. When I moved to Winnipeg, a killing frost was regularly seen just after Labour Day. We are still eating tomatoes from the garden, and they will all likely ripen on the vine. You likely read that the first big cruise liner made it through the Northwest Passage in August. The passengers were disappointed because they never saw ice. And how is the hurricane season in Florida? In any case, there is no more denying climate change here. We need to start adapting to it. Not so hard in Winnipeg - we can take a few degrees warmer in the winter - but a

many places are going to become in crisis. This morning the radio reported that some 34 million Africans are at risk of starvation because of the long drought and crop failures. The need for a lower carbon transport is rising, and this will help promote airships, too. Ω

Janet Estes, who published her late father Don Venton's memoir of WWII blimp piloting, sent along a magazine article which her grandmother had sent to her dad while he was at pre-flight school, writing, "I thought his written-in captions made for an interesting and humorous commentary on what life was really like during training."



[One is reproduced above. Don had penned in, "Lord knows why we made them, we never got to use them."] "Also, a letter I found was addressed to my dad at NAS South Weymouth in March 1945. This would have been four months after the K-34 crash. I didn't know if you had heard of the Sea Squatter's Club but I found it to be interesting. I don't think my dad joined because I still have the application that was sent to him."



Janet also wrote, "The photos are of my dad's plane that I was telling you about at the reunion. Dad is the one in the white sweatshirt and khaki pants, or as our family and friends used to say, "his uniform." Ω





Sandie Hart, from the family of the late Bob Plyler (see Black Blimp, last issue) organized a scrapbook of images from Bob's long Navy career and kindly donated the book to NAA. We've scanned the material and will be working it into future issues as possible. (Above, the rollout of NADU ZPG-2 "Snow Bird" at South Weymouth.) At the same time, author Marc Frattasio has provided photos and created a synopsis of NADU sized for practical NOON BALLOON use, and it begins on page 25.

Marc explains: There is much more to the Naval Air Development Unit's story than could possibly be told under the space and content constraints imposed by this monograph. If you are interested in learning more, obtain a copy of the book "NADU: The Forgotten Naval Air Development Unit of NAS South Weymouth", which was put together a few years ago by the late John Yaney with my help. John was a long-time member of the Naval Airship Association who had a lifetime fascination with NADU and NAS South Weymouth. He spent many years researching and documenting as much of the history of NADU as could be determined.

Unfortunately, NADU existed during a relatively short period of time when naval commands were not required to maintain official histories. Because of this, the Navy has very little information about NADU in its own archives. The Naval History Office really wanted to help with John's book, but had little to offer. This had nothing to do with classification, the Naval History Office literally had nothing in their files regarding NADU except for a few photographs. They were thrilled to receive the book since it filled a significant gap in the historical record.

The same was true with the Lincoln Laboratory and MIT. They were very enthusiastic and offered to help in any way that they could. Both conducted exhaustive

searches of their archives. Unfortunately, so much time had passed and the technologies involved were so obsolescent, that most NADU related documentation had been thrown away. Luckily, the Lincoln Laboratory and MIT were able to provide introductions to a few key scientists who had worked on various projects with NADU, among them the late Dr. William Ward, and these people proved to be invaluable sources of information.

The secretive nature of much of NADU's work, combined with the almost paranoid Cold War security environment in which it operated, resulted in the peculiar situation of former NADU personnel typically knowing very little about the work they performed. For example, when former NADU commanding officer CAPT Edward Rogers was presented with a draft manuscript of the text of John's book to review, he expressed astonishment at many of the things that NADU had been doing while he was in command. CAPT Rogers told us that in most cases he was merely informed by the Lincoln Laboratory that a certain type of aircraft was required for a certain period of time, with no further explanation. Civilian scientists and technicians would subsequently come to the base and work with NADU personnel to install black boxes in the aircraft. Then, NADU would be told to fly the aircraft in a certain pattern and off they would go, often with civilians operating the equipment that had been installed. According to CAPT Rodgers, NADU personnel, even at the highest levels, were often not told what the equipment they were tasked to help test was for, and they usually did not ask too many questions.

This is not to say that no NADU related documentation exists. It's just that what exists has been scattered around or is sitting somewhere un-cataloged, waiting for somebody to discover it. For example, there are hundreds, if not thousands, of un-cataloged Office of Naval Research project reports stored at the National Archives branch in Waltham, Massachusetts. John and I found a number of very interesting NADU testing summaries among the files at Waltham. Undoubtedly there's more of this material at Waltham, and probably elsewhere too, waiting for somebody with the time and interest to find it.

Copies of John Yaney's NADU book can be obtained on-line via a link on the "geedunk" page of the ANA Patriot Squadron's web site at <http://www.anapatriotsquadron.org>. All proceeds from the sale of this book benefit the ANA Patriot Squadron's Shea Naval Aviation Museum, which is dedicated to preserving the history and heritage of NAS South Weymouth and its predecessor NAS Squantum. Ω

## Meet your new Tech Committee Chairman

Juergen K. Bock, Dipl.-Phys.

At the age of six years I saw the *Hindenburg* aloft and was much impressed. Fortunately my father was an engineer and chief of the department "Gas Generators" in a Bremen company that – among others – supplied hydrogen gas to Friedrichshafen, both as lifting gas and as a component of the "Blaugas" which was used as fuel for LZ-127 *Graf Zeppelin*. This was my early encounter with lighter-than-air.

After the war, airships had been still under discussion as economical carriers, especially for long distance operation. When I was a student of physics at the University of Heidelberg in the 1950s, I got knowledge of Albert Simon's amphibious airship project and his concept of insulating the ignitable hydrogen by means of an outer hull of nitrogen and CO<sub>2</sub> gas. I criticized this concept because of the inevitable gas diffusion of the practically semi-permeable properties of the hull and internal gas cell. I proposed therefore to use the dried and purified exhaust gases of the engines as a continuous source of inert gas for flushing the protective hull, thus rarefying the potentially escaping hydrogen to a safe level. During my engagement as a career physicist at the US-Army's Aberdeen Proving Grounds in Maryland, I got knowledge of the Aereon Corporation in Trenton, N.J., a small development group which constructed a hybrid test airship consisting of a configuration of three side-by-side small zeppelins, thus acting like a buoyant wing. This concept fascinated me, and in 1964 I became a consultant to this company. In 1966 I became chief engineer and developed the "Lifting Body Airship", based on the reentry vehicle experiments of NASA, however as a subsonic configuration. The company suffered from lack of funding, although the concept of combined aerostatic and aerodynamic found interest by the Forrestal Institute of the University Princeton by several researchers. I gave a presentation on the concept and had access to a wind tunnel. The results encouraged a group of scientists to support Aereon and I started to build a manned 8 meters long and 6 meters span model for the demonstration of the aeromechanical properties. This experimental model called "Aereon 26" was successfully flown in 1971 and is described in the book "The Flying Pumpkin Seed" by McPhee, whom I unfortunately never met in person.

Valuable contacts during that period of time were Admiral Charles Rosendahl, a strong supporter of the rigid airships and friend of Eckener. I met Commander Charles A. Mills, who received the Harmon Trophy by President

Eisenhower for Foul Weather Flights. He also developed the methods for safe take-offs and landings of overloaded airships at high winds and gusty conditions. It has to be emphasized that these priceless experiences have never been considered by present designs, despite of numerous accidents and set-backs. Charlie Mills and I founded "SLTA," a private consultants group. Further contacts were Gordon Vaeth and Norman Mayer whom I met the last time 1999 in his home in Alexandria, VA.

An earlier contact was Capt. Alfred Zeuse, Hamburg, who was navigator on board of LZ-127 *Graf Zeppelin* who gave a thorough insight of the flight planning of the airship operations. Upon his advice, I joined the DGLR "Lighter than Air" committee in 1977 and developed the concept of a research laboratory airship on the basis of a modernized zeppelin. A valuable contact at that time was Professor Dr. Ing. Walter Brockmann who owned a sizeable library about rigid airships and who was known for his numerous presentations on zeppelins. We proposed a flying research laboratory zeppelin for the protection of the European Seas within the EUROMAR project as an oil spillage monitor.

The DGLR-LTA com-mittee was re-founded in 1992 by the merger with the East German LTA group under Professor Dr. Berthold Knauer. I served my eight-years-term as the chairman of the Committee. Since 1993 we have had regular annual conventions or workshops with a sizeable bibliography of documentations. At the occasion of the International Airship Convention 2000 in Friedrichshafen, Prof. Knauer proposed a textbook which reflected the contemporary LTA status. 37 authors made their contributions. Leichter als Luft, Transport und Trägersysteme, Ballone, Luftschiffe, Plattformen Verlag Frankenschwelle By Jürgen K. Bock, Berthold Knauer, published 2003. The book is looking for a translator to finish an English version, and we must rewrite of major parts of the book. At the Friedrichshafen AA/DGLR Convention, I discussed for the first time the use of hydrogen instead of helium and the obvious operational advantages. This applies especially when hydrogen will be optionally used as a lifting gas and as a fuel gas ("Green Aviation"). The technology of prevention of fire hazard will thus be a major challenge for future development. As a member of the DGLR (German Aerospace association) I am presently a member of the technical committee under the chairmanship of Professor Uwe Apel of the Bremen University of Applied Sciences. Present investigations concentrate on the development of cargo airships, especially for inaccessible terrains or otherwise. Ω

## SHORE ESTABLISHMENTS

### **Akron (Cover Story)**

On Friday, October 21, Goodyear's second Blimp NT was christened by Akron native Savannah James, mother, businesswoman, philanthropist and wife of LeBron James of basketball fame. Mrs. James has a lifelong passion for philanthropy and has been an active volunteer for the LeBron James Family Foundation since it was founded in 2004. In 2013, she turned her commitment to her local community into the I PROMISE Makeover, an annual event that empowers and inspires young women.

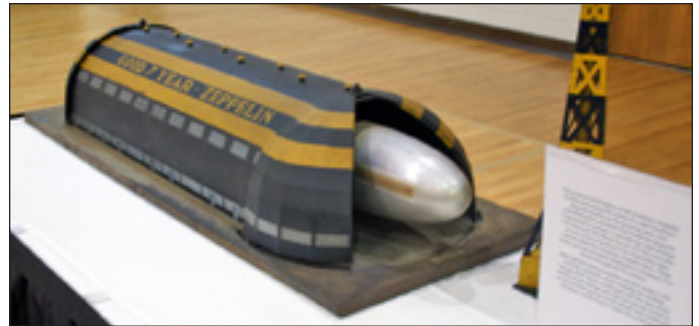
Left to Right: Pilots Kristen Arambula, and James Kosmos, Savannah James, Richard Kramer (CEO of Goodyear) and Robin Roberts shortly after Mrs. James christened *Wingfoot Two* with a bottle of champagne.



The event attended by Goodyear employees and a limited number of guests was held at the Wingfoot Lake Blimp Base which is currently home to the *Wingfoot Two* airship. Among the invited guests, and joining Mrs. James on the podium was ABC's "Good Morning America" co-anchor Robin Roberts who christened the *Wingfoot One* airship in 2014.

The Lighter-Than-Air Society held its 64th Annual Banquet on Saturday, October 29, at the Greek Community Center in Akron. This year's guest speaker was record-setting balloonist Troy Bradley. Troy, a full-time balloonist with over 6,800 hours aloft is a prolific record-setter and is the only three-time recipient of the highest international award in ballooning: The Fédération Aéronautique Internationale's Montgolfier Diploma. Troy's presentation was about his January 2015 "*Two Eagles*" balloon flight from Japan to Mexico along with Russian pilot Leonid Tiukhtyaev that set new distance and duration records for helium-filled balloons: 160.6 hours aloft and 6,656 miles. The pilots jointly received The Lighter-Than-Air Society's Achievement Award in 2015.

A model of the Akron Airdock with opening doors and an airship that slides in and out. These displays were commonly seen in Goodyear Tire distributorships in the early 1930's.



This year's Ren Brown Lifetime Achievement Award went to Wayne Buchanan. Wayne has had a lifelong fascination with airships, having grown up near the Akron Airdock. He has been a member of LTAS for over 20 years, and is currently a member of the Board of Trustees and co-Chair of the Artifacts and Collections Committee.

As is now customary, there was a fund-raising Silent Auction which included a flight for two aboard a Goodyear Blimp as well as a golf package and a number of LTA related items. There were also two tables on which members displayed items from their personal collections.



Items on display at the banquet included (from left to right): Cover of the August 1931 issue of *Boy's Life* that featured an article titled "Lighter Than Air" by Cmdr. C. E. Rosendahl; a book featuring a dedication to Doctor A. Dale Topping by the author, Malcolm Forbes, which was recently donated to LTAS; an old Goodyear advertisement; piece of a girder salvaged from the USS Akron; the base of a trophy awarded by Goodyear in an airship-themed sales contest. Ω

– Alvaro Bellon

### NMNA

Our new Emil Buehler Library Liaison at Pensacola, Steve Kozlovski, has been painstakingly scanning LTA photos in their collection and sending them along to Ed. for identification/checking. Sometimes there are no captions, others have incomplete or captions in need of correction, but all are being kindly shared for possible future use in this magazine. We have often needed to lean

on member's expertise to help figure out what's in a photo. Ed. e-mailed this one around and the following help came from Andreas Horn:



"I know the picture, it is from volume I of the famous "Welfahrten" trading card albums published by the cigarette manufacturer Greiling... In the book it reads "Kielgang" what has been translated correctly, but the picture does not show the keel gangway - or only a very small portion of it. The word "unten" had been inserted so people do not glue it in their albums the wrong way around - as other pictures in some new books... The picture shows a view along the side catwalk between two gas cells from an exit to the engine gondola (in the back of the photograph) down towards the keel gangway.

I attach another picture of the same area without the disturbing (useless!) bags. On both pictures you can see the gravity fuel tank. And this is definitely the LZ-120, according to the girder type and the missing king posts on the main rings. No such pictures exist - as far as I know - from the LZ-121. If you should find some, let me know!"



Reference #2016-08-31-I is obviously Italian but is a real mystery. Ed. does not remember reading about any such attempt to "turn swords into plowshares" by re-purposing ASW airships into passenger haulers as the French did shortly after WWI. Anyone know what was going on here? (above)

Ref #2016-11-02L (below) is another mystery. According to James Shock's book US NAVY AIRSHIPS, there was only one B-stretch configuration, the B-18. B-18 is listed as having been lost at sea? Were there two?





2016-08-31B - the last flight of a K-ship, ZP3K-43 (much like the Museum's ZP3K-47 on display). Both enlisted pilots, we have only one name - Nye. Can you i.d. them?

2016-10-26K (right)... these postwar officers must me recognizable to one or two members out there in Noon Balloon land... we haven't a clue who they are.



2016-08-17C is the only photo we've ever seen of what might be the first mechanical mule. Who made it (them)? What lessons were learned to contract Goodyear for the larger, heavier tractor-types? (see "Lighter Side")

Can you help with any of this? Let us know! Ω



2016-08-31D - We're pretty sure that's CAP Brewster on the extreme left... who are the other fellows who've just delivered this old ZP3K to be sacrificed to the atomic test at Yucca? Know the guys inside?



## Hybrids Roundup - HAV

The first two flights of *Airlander 10* demonstrated the capabilities and efficiencies. Over the past two months the team at Hybrid Air Vehicles Ltd. have been conducting a rigorous investigation into events that led to the heavy landing. These events are now well understood. A smooth take-off was conducted from Cardington at 08.12GMT. For the next one and a half hours HAV's Chief Test Pilot and Lead Flight Test Engineer conducted a successful flight test program during which the basic handling qualities and performance of the aircraft were exercised and assessed. The chief test pilot reported that throughout this phase of flight, "The aircraft flew well and all systems performed as expected" and that "Overall impression was that the controls were responsive and the workload was light". Having completed a number of turns, climbs and descents at airspeeds of up to 35 knots the pilot returned to the airfield to land into wind on the same heading as employed for take-off. Following a successful landing there was an issue with the mooring mast that required the pilot to take-off a second time and circle the airfield while the mast was repaired.

During the second take-off, the nose mooring line dropped free and this 150ft line trailed beneath the aircraft. As a result of this, the pilot had to make a higher than desired approach to its second landing of the day to reduce the likelihood of the trailing line snagging on the fence or trees to the south of the airfield. During this approach, the mooring line did contact a power line on the approach but this caused no damage to the aircraft. This necessarily high approach resulted in the aircraft coming to a halt at the right location over the airfield but positioned in a hover at approximately 120ft above the ground. Hover is outside of the normal operating envelope of the aircraft as currently configured but the pilot was able to maintain control and establish a descent to the planned landing point. During this descent the nose dropped resulting in a low speed impact of the flight deck floor with the airfield during which damage to the cockpit area was sustained. The aircraft then settled into a level

condition on the ground, the crew shut down the engines and systems and exited the aircraft allowing the ground crew to recover the aircraft onto the mast. This procedure is harder to accomplish without a pilot on-board, and a small amount of damage was sustained to the hull fabric structure during the recovery process which was quickly addressed with the ground-handling team effecting a temporary field repair. The mast and aircraft were then pushed back to the main mooring circle and secured. No one was injured during the impact or recovery process and the aircraft remained at the mast overnight with no issues. The following day *Airlander* was returned to the hangar to effect repairs.

Once the formal investigation and repair program have been completed *Airlander* will recommence its flight test program. The damage to the flight deck and fabric structure have already been assessed by the original equipment manufacturers and HAV specialists and the repair program has commenced. Extensive testing of all aspects of the *Airlander* continues throughout this period. While the aircraft is in the hangar, HAV will take advantage of the opportunity to embody a number of modifications due for later phases of flight test. Flight test by its nature encompasses risk and while HAV, like all aircraft developers, runs robust processes to mitigate these risks, events such as this do occur. Despite the hard landing at the end of flight two, HAV are very encouraged by the capability of the aircraft demonstrated in its initial flight tests, and by the performance of all aircraft systems throughout all flight operations to date.  $\Omega$



## Lockheed Hybrid Airships Are Coming To Alaska

PRL Logistics Teams with Straightline Aviation plan to bring world's first game-changing aircraft to the region. PRL Logistics Inc., a leader in remote site logistics, announced on 30 AUG 16 a strategic partnership with UK-based Hybrid Airship owner and operator, Straightline Aviation. This partnership will introduce the world's first heavy-lift Hybrid Airships – the LMH-1. Developed and built by Lockheed Martin the LMH-1 has the ability to land on virtually any surface including snow, ice, gravel and even water. These football field sized airships will provide low cost and environmentally friendly solutions for moving freight and personnel to the most isolated regions of Alaska and Northern Canada.

“Lockheed Martin would be proud to have its Hybrid Airships operating in Alaska,” said Rob Weiss, executive vice president and general manager, Lockheed Martin Advanced Development Programs (Skunk Works®). “Alaska is an ideal location for the Hybrid Airship to operate. The airship enables access to Alaska’s most isolated regions, and is designed to protect the sensitive ecological environment.”

Hybrid Airships combine the technology of lighter-than-air aircraft with airplanes, helicopters and hovercraft. Helium provides 80 percent of the lift, and the remaining lift comes from the aerodynamic shape of the aircraft and its four thrust vectoring engines. The airship also features a unique hovercraft-like Air Cushion Landing System that facilitates taxiing and holds the craft firmly on the ground.

PRL Logistics is founded, owned and operated in Alaska, offering a variety of project services and comprehensive logistics solutions including: project management, project planning, modeling, safety, procurement and field execution. PRL serves a broad range of projects and clients in the oil and gas, mining, defense, industrial, construction and environmental industries.

Ron Hyde, Founder and CEO of PRL Logistics, Inc.: “PRL’s understanding of the complexities of working in Alaska’s extremely remote sites, our partnership with Straightline Aviation, whose airship operating experience is unparalleled, means this will be a true game changer. It affordably opens up many projects currently inaccessible without the development of the costly infrastructure required by traditional modes of transportation.”

Mike Kendrick, Founder and CEO of Straightline Aviation added, “We are equally thrilled to enter into this alliance with PRL and merge our understanding

of airship operations with their unique knowledge of logistics, working in some of the most unforgiving terrain and conditions on the planet. Together we will usher in a new environmentally friendly age of air transport.”



U.S. Senator from Alaska, Dan Sullivan, also a former Commissioner for the Alaska Department of Natural Resources: “I am pleased to hear this announcement. Alaska is a storehouse of immense natural resource wealth. This combination of technology and innovation will enable access to resources and provide needed benefits to our infrastructure. It is an example of a company operating to provide a transportation solution to meet Alaska’s unique challenges.” Peter A. Micciche, Senator - Alaska State Legislature, District O: “The key to the success of the economy of our great state has always been dependent upon innovation and efficiency. The PRL strategic partnership with the UK’s Straightline Aviation serves as a prime example of such innovation. Although airships are not new technology, new generation heavy-lift, hybrid airships provide the potential to dramatically reduce the cost of moving critical components to remote locations like those inherent with Alaskan projects. I am excited by the potential of a Kenai Peninsula business leaping forward with creative, cost-saving solutions in the oil & gas, mining, construction, disaster management and emergency response sectors in Alaska.”

For Alaska, airship operations will be based at the PRL Logistics Operations Center in Kenai, Alaska and supported by other PRL locations throughout the state. PRL’s premier Kenai Facility has overland, marine, and aviation access and will also be the base operations center for the Hybrid Airship.

Pat Porter, Mayor of Kenai, Alaska says, “I am extremely proud and excited about the possibilities that exist for Alaska and the community of Kenai with this amazing new airship coupled with PRL Logistics’ Kenai Logistics Operations Center, their comprehensive logistics campus and remote project expertise.” Ω

## 2016 Gordon Bennett (Inside Back Cover Story)

by Peter Cuneo

Twenty-four competition hydrogen gas balloons launched on Sunday, September 18, 2016, from Gladbeck, Germany, for the 60th running of the Coupe Aéronautique Gordon Bennett, the FAI world long-distance gas balloon championship and the oldest, active aviation contest worldwide (<http://gordonbennett.aero/>). An additional eight non-competitive, 'Fiesta' gas balloons also launched that evening, making this the most balloons to ever launch in a single Gordon Bennett. The competition was organized by Wilhelm Eimers, his sons Sebastian, and Benjamin, his daughter Fritzie, and his wife, Claudia. The German Aero Club and Willi's long time co-pilot Matthias Zenge also helped. It was really a family operation and encompassed everything from booking hotel rooms for the participants to dealing with the media, caterers, the aviation officials, the fire marshal, and an approximately countless list of others. Major sponsors included Breitling, Air Liquide, Kerel and Blaser. The sole goal of the competition is to achieve the longest great circle distance from launch in a non-stop flight of a 1,000 cubic meter volume gas balloon.

For the first time in several years, the U.S. fielded the full complement of three teams. This was definitely due to the great assistance provided by the local organizers in supplying loaner oxygen, batteries and avionics systems (most of which are almost impossible to ship internationally) plus help completing the required paperwork and permissions to fly in a foreign country.

The impressive opening ceremony and the drawing for launch order were held at the historic Gasometer in nearby Oberhausen on Thursday evening, September 14. The launch window opened the next evening but weather conditions caused the launch to be delayed two days until Sunday evening. A surface low pressure to the south battled with a higher altitude high pressure system to the north to produce a dynamically changing 'split flow' between the two pressure centers. Filling with gas finally started mid-afternoon Sunday, with the hydrogen supplied from an underground pipeline that runs directly to the launch site and the first balloon was airborne at 21:54 UTC. The launch had been delayed yet a few more hours to avoid interfering with Dusseldorf airport traffic but still, all the balloons were required by Air Traffic Control to stay below 2,500 ft. MSL until well past Dusseldorf and Koln. Over time, the balloons were released to higher altitudes as they moved out of the congested airspace. First to 3,500MSL, then to 6,500 MSL, later to 12,000 MSL and finally



unlimited. Since the desirable winds above 12,000 MSL were rapidly dissipating, this caused some problems for the later launching balloons. Several balloons struggled for many hours to find strong winds to the south that no longer existed.

The direction of the higher winds was generally to the south toward the Swiss Alps and the balloonists who reached those altitudes early enough struggled through a cold (single digits in degrees Fahrenheit) night to achieve crossings at altitudes of 15,000 to 18,000 feet MSL in the corridor between Mont Blanc and the Matterhorn. The moon was four days past full and as it rose, later in the night, it illuminated an almost surreal landscape that was at once both stunningly beautiful and awesomely threatening.

Several other balloons made an early decision to stay lower and moved more south west. Three of these balloons were caught by a surprise military exercise on Belgium and were forced to land prematurely to avoid entering the exercise area. Three other balloons (Swiss 1, Swiss 2 and Spain 1) chose the highest altitudes and went almost straight south out over the French Riviera and on to the Mediterranean. This eventually proved to be the successful strategy. These three continued south over water, paralleling the west coast of Italy before curving eastward over the very southern tip of the boot of Italy where Swiss 2 and Spain 1 chose to land after approximately 50 hours aloft. Swiss 1, piloted by Kurt Frieden and co-pilot Pascal Witprachtiger, continued on to a victorious landing in Stavros, Greece, after 58 hours and 1,803 kilometers in the air. USA 1 managed a fourth place finish, landing in central Italy near the town of Perugia after 41 hours and 1,032 kilometers aloft.

The choice faced by the three leading teams to either cross the Adriatic and land in Greece, or to land in southern Italy was undoubtedly complicated by multiple considerations.



Switzerland's Kurt Frieden and Pascal Witpraechtger, Gordon Bennett winners, show off their new Breitling watches. Benn Blaess photo.

Earlier in the week, deteriorating weather had been forecast for this area at this time. Also, after roughly 50 hours in the air supplies of ballast and oxygen must surely have been significantly depleted. Oxygen would be required since the necessary winds only existed above 15,000 feet MSL. To make things even more interesting, Greek air traffic controllers had no experience with gas balloons as none had ever entered their airspace before, and probably because of this they refused entry into their airspace as the balloons approached even though the race organizers had obtained written permission from Greek aviation authorities long before the competition launched. (Author's photo: *USA-1* landed near Perugia, Italy.)

Finally, the unforgettable memory that in 2010



Richard Abruzzo and Carol Rymer Davis had perished after suffering a lightning strike over the Adriatic was surely present. Only Swiss 1 made the choice to fly on and land near the town of Karditsa in central Greece as the weather stayed mild and controllers were persuaded to grant entry permission.

A Welcome Home Party on Friday evening and an Awards Banquet on Saturday, also hosted by the Eimers, concluded the truly impressive event. Ω

## **The 2016 America's Challenge Gas Balloon Competition**

by Peter Cuneo

The 21st America's Challenge Gas Balloon distance competition launched from Albuquerque on Thursday, October 6, 2016, with a small contingent of five teams competing. As always, the goal was to take whatever path and time aloft was necessary to land as far away, as the crow flies, from the initial launch spot. The organizers slipped the opening of the launch window from the usual Saturday to the following Wednesday to allow several competitors time to return with their aircraft from the Gordon Bennett which had occurred in Germany ten days earlier.

A sixth team of Mark Sullivan & Cheri White was registered to fly in the event, but a troubling ear infection that Mark had come down with at the Gordon Bennett forced the grounding of team Sullivan/White. This was especially unfortunate as Mark was the original inspiration for this event and has guided it through its 21 years and had flown in all 20 prior events.

Wednesday's forecast for downwind thunderstorms to the east forced an additional one day delay. Thursday's forecast for fireworks in the area as part of the big hot air special shapes balloon glow further delayed the launch until almost midnight, but eventually all balloons launched and drifted slowly to the southwest towards the Albuquerque airport. The teams now had to choose between a) staying low and moving off the west south west; b) going up to about 11,000 ft. MSL and moving slowly north-north east and c) going up to 14,000 ft. MSL and

moving rapidly east. The French team chose a) and had a short but delightful flight to just over the New Mexico border into Arizona where they were welcomed by a local Navaho family and invited to a coming of age ceremony for a daughter. This was truly unique experience for Benoit Pellard and his co-pilot, Laurent Lajoie, for their first flight in America. They have a great story to tell back home and have promised to return for next year's event.

The other team visiting from Europe, the Polish team of Krzysztof Zapart and Bazyli Dawidziuk and chose option c) and was into Texas by midday on Friday, later stretching their lead over the field to better than 300 miles. The three U.S. teams each chose slight variations of option b), with the team of Bert Padelt and Noah Forden rising just high enough to head northeast over the Sandia mountains to the east of Albuquerque with decent speed. The married team of Peter Cuneo and Barbara Fricke chose to stay lower and move very slowly north up the west side of the Sandias. Unfortunately, the last U.S. team of Phil Bryant and Mike Emich suffered an equipment malfunction and were forced to land at sunrise on Friday on an Indian reservation just north of Albuquerque.

The competition that now developed was classic tortoise and hare. The Polish were leading the way to the east followed by team Padelt somewhat more north and west, with team Cuneo even more north and west bringing up the rear. For reference, east and north were the desirable directions to put the most miles between the balloon teams and Albuquerque. All three teams flew through the second night and by Saturday morning, the Polish team was still some 300 miles in the lead but was starting to curve the south, feel the effect of a high pressure system building to their west. Team Padelt chose to execute a gentle, stand-up landing Saturday morning in south central Kansas, while team Cuneo continued to meander east over Kansas.

As the day progressed, the Polish team's path was more strongly influenced by the high and took a south to even slightly southwest track. They were now faced with the options of a) flying on into Mexico and being disqualified because Mexico was off limits; b) flying out over the gulf, if they could find proper winds, and being disqualified for a water landing (and also getting themselves and their expensive equipment very wet); and c) landing. The chose to land on Saturday afternoon with a total of just under 38 hours and 671 miles aloft. This was obviously a good decision as their track was now running almost perpendicular to the line between them and their launch spot in Albuquerque and continued flight would not have

increased their credited total miles.

This left only the flying Team Tortoise to plod on, with a distance made good that was still several hundred less than the, now grounded, Polish team. As team Cuneo approached Wichita, flying at about 11,000 ft MSL they were heading into a high pressure system with light winds that would likely have stalled any further progress. Their meteorologist recommended a descent to about 3,000 ft. MSL to allow the lower winds to circle them clockwise around the high, rather than staying high and penetrating into its calm heart. The descent was accomplished after some discussions with Wichita airport's Approach Controllers and the flight progressed towards Kansas City. Now the goal was keep moving but avoid entering KC's Class B airspace since Air Traffic Control (ATC) would most likely not have granted permission. Again three choices would arise: a) enter without ATC permission and be disqualified (and get in trouble with the FAA); b) expend precious ballast to go up over the top of the Class B airspace; or c) land short of the Class B. The best option was to avoid the airspace entirely by finding just enough left turning winds to clear it to the north. After some anxious hours this was accomplished and the flight proceeded into Saturday night, a third night aloft.

At some point during that night, they eclipsed the Pole's distance and chose to make an uneventful landing on Sunday morning, heading to the southeast near Monroe City, Missouri after just under 55 hours and 866 miles aloft. Continued flight was considered briefly to enjoy a landing in Illinois after crossing the Mississippi River (always a nice goal for this event), but the prospect of possibly dealing with yet another Class B airspace at St. Louis and the fact that enough miles were in the books to call the flight a success, made the decision easy. Especially easy, since the chase truck which had driven out from Albuquerque was circling below and the drive back home would only get longer as the flight progressed. A stand-up landing in a fallow field produced one final surprise. A hot air balloon chase vehicle (not chase team, Cuneo!) pulled up alongside and announced that they had been at the Albuquerque hot air event, were on the way home to Michigan, and had decided to make a small detour after seeing on the live tracking website, that a landing was eminent. They stayed to help with the pack up and for a quick team lunch at the best (only?) diner in Monroe City.

Thus ended the 2016 America's Challenge. The Polish team was second and team Padelt was third in the final standings. Congratulations to all the teams for a safe and entertaining event. Ω

## JP Aerospace Launches

### Subscale Prototype in its Airship to Orbit Project

The *Ascender 36* airship made its first flight from JP Aerospace's launch facility in northern Nevada on Sept. 12. The V-shaped helium airship reached an altitude exceeding 13,500 ft. at an average climb rate of more than 580 ft./min. - beating the goals set for the first shakedown flight.

The design goal is to provide affordable access to space using lighter-than-air vehicles. The airship is also the prototype for a telecommunications platform the company is developing for UK startup Avealto.

The *Ascender 36* - each arm of the V is 36 ft. long - is "being used to test the new inner structure and the helium management system. Helium is pumped between inner cells to control pitch and roll," JP Aerospace President John Powell says. "The first flight was just a shakedown, but everything went really well. We will fly this vehicle a few more times before moving to the next vehicle, the *Ascender 100*, which is also a sub-scale vehicle, with 100-ft. arm length," he says. "The *Ascender 100* is about half complete and will fly this time next year."



Avealto's High Altitude Platform (HAP) concept is a solar-powered lighter-than-air vehicle that can stay on station in the stratosphere at 60,000-70,000 ft. for months at a time. Each HAP would be able to provide communications services to a terrestrial footprint 200-450 miles in diameter.

Under JP Aerospace's Airship to Orbit concept, meanwhile, the full-scale *Ascender* would be the first stage in a three-part system. The atmospheric airship would climb vertically to 140,000 ft., where it would dock with an inflatable suborbital space station. The third stage would then launch from the 2-mile-wide station, using buoyancy to reach 200,000 ft., then hybrid electric/chemical propulsion to slowly accelerate and climb to orbital velocity—a concept not everyone is convinced will work. Ω



### Hydrogen Fuel Cell Powered

#### HY4 Aircraft Records Successful First Flight

On the 29th of September, the HY4 aircraft successfully completed its "first official test flight," flying out of Germany's Stuttgart Airport. The aircraft took off at 11:15 AM and flew for an estimated 10 minutes, before landing back at the airport. According to researchers from the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt, or DLR) the aircraft is the world's first four-seat passenger aircraft powered by only a hydrogen fuel cell system. Experimental aircraft manufacturer Pipistrel, one of the many collaborators on the design of the aircraft, said officials at the airport "stopped all the other air traffic, so the spectators could hear the almost-completely-silent flight of the HY4." The HY4 aircraft is capable of flying without any emissions.

The hydrogen fuel cell powertrain consists of a hydrogen storage system, low-temperature hydrogen fuel cell, and battery. According to DLR, the fuel cell converts hydrogen directly into electrical energy, which is then used to power the aircraft's electrical motor, and the only waste product from the process is water. In addition, a high-performance lithium battery pack works to cover peak power loads during take-off and when climbing, and can also be used as a backup energy system in case the hydrogen system fails, giving the aircraft about 15 minutes of endurance.

The airframe, built by aircraft manufacturer Pipistrel, consists of two fuselage sections capable of carrying two passengers each connected by a common central wing which the aircraft's electric motor rests on. The estimated 104-hp motor has the propeller in front and three low-temperature hydrogen fuel cells behind. The hydrogen supply for the aircraft is carried in two high-pressure carbon fiber tanks, located in each of the two fuselage sections, just behind the passenger cabin, with the auxiliary battery pack located behind the hydrogen tanks. Ω

## **SHORT LINES**

**Latest Boeing P-8A Poseidon Enhancements Include “Minotaur” Software** Flightglobal (8/11) reports that the US Navy awarded Boeing a \$60.8 million contract on August 5, as part of the Increment 3 Block 2 upgrades for the P-8A Poseidon aircraft. The new enhancements include new software developed by the Johns Hopkins University Applied Physics Laboratory that “ingests data from various sensors and disseminates the information to aircraft.” The software, known as the Minotaur Track Management and Mission Management system, includes “surface radar tracking, sensor bias correction, data correlation, mission replay, sensor control, sensor display and track management.” Ω

**Global Helium Summit 2.0 expresses concerns over helium supply security** BLM Field Manager Robert Jolley told the September Summit attendees in New Jersey that “after 2018 we will just be delivering to federal end-users and refineries... once we sell off the facility in 2021, there will be a need to rewrite regulations” to insure NASA and DOE got their needed helium. Consultant Phil Kornbluth said “In my experience and career, there never have been more companies trying to start up helium production projects than there are now; there is a lot of activity and it’s keeping things interesting... The world is not running out of helium any time soon, that is total fiction. There is a tremendous amount that isn’t being exploited yet because of economics.” Reps from Air Products and IACX discussed new extraction ideas, with Dr. Vince White stating, “With the price of helium going up, what wasn’t attractive suddenly becomes attractive.” Ω

**Expanding Use of Hydrogen in the Electronics Industry** Dr. Jean-Charles Cigal of Linde penned an article for Gasworld magazine detailing hydrogen’s growing employment in annealing crystals, epitaxy of films, deposition of silicon films and stabilizing of electronics-critical chemicals. The article mentions Linde’s recent introduction of their “Hdroprime,” a H<sub>2</sub> generator that delivers 99.999% hydrogen at 13.8 bar, eliminating the need for compression in many electronics industry applications. Ω

**FAA Issues Airworthiness Directive For “Unsafe” Hot Air Balloons** The Hill (8/22) reports that the FAA is “stepping up oversight” of the hot air balloon industry in the aftermath of a recent balloon crash in Texas that killed 16 people. The article explains that the FAA has issued an airworthiness directive, “effectively grounding dozens of ‘unsafe’ hot air balloons until it fixes potentially dangerous burners.” In its directive, the FAA wrote, “We have no way

of determining the number of hot air balloons that may need the replacement, but we estimate that it will affect no more than 60 hot air balloons.” The FAA predicts the repair costs will be about \$272,000. Meanwhile, the Balloon Federation of America’s Safety Focus Committee has developed an action plan that was shared with the FAA on August 26, 2016. In it are outlined 16 important steps in creating a stronger, more widespread, and documentable safety culture within the balloon ride industry. Ω

**ITM Power launched its third public access hydrogen refueling station** Actually the second HRS in London, it is located at the Centre of Engineering Manufacturing Excellence (CEME) in Rainham, The station is the first



of its kind using solar energy from a solar PV array at CEME to make renewable hydrogen on-site and is the second of three UK stations to be deployed as part of the pan European HyFive project, which was funded by the European Fuel Cell and Hydrogen Joint Undertaking and the Office of Low Emission Vehicles. In the US, following a long drought, DOE has invested \$30 million in various hydrogen and fuel cell research projects. Also, Air Liquide has announced plans to work with Toyota and others to create a Hydrogen Fueling Infrastructure in the Northeast, much like the California hydrogen highway initiative. In 2017 stations are to be opened in Massachusetts, Connecticut, and NYC. Ω

**Infinity Awarded NASA Contract For Advanced Fuel Cell Development** Infinity Fuel Cell and Hydrogen, Inc. announced August 30 that NASA Glenn Research Center will fund further development of air independent fuel cells for a possible Space Launch Systems (SLS) vehicle application, more specifically for potentially powering the Exploration Upper Stage (EUS). Infinity will utilize this follow-on Small Business Innovative Research (SBIR) Phase III funding in support of advancing its patented Non Flow Through (NFT) fuel cell stack as well as improving its Advanced Product Water Removal (APWR) technology. Ω

## HISTORY

### Seahawk to the Rescue!

By Herman G. Spahr, CDR, USN (Ret)



Above: The last seaplane Curtiss would manufacture, an SC-1 Seahawk sits on the NAS Jax ramp in 1946.

A young Ensign serving as a pilot on the USS Miami headed for Japan when the war ended, I was put ashore at Pearl Harbor for stateside return when I suddenly decided to go Regular Navy. The USS Vincennes (photo below) arrived with no pilots for her onboard SC-1 Seahawks, so orders were cut and I was aboard for Operation “Magic Carpet,” the shuttling sailors and marines back to the west coast. When the ship sailed to Noumea, New Caledonia, she became the flagship for Commander, South Pacific Forces. That October RADM Paul Hendren set off on an inspection tour, so we took in Guadalcanal, the Russells, Tulagi, Espirtu Santo, and Efate.

We’d been back at our New Caledonia main operating harbor for a few months when we were asked to assist in the search for two missing Army officers. The Army had a couple C-47s (DC-3s) and tugboats in the search, and the Navy already committed a half-dozen minor vessels to join a number of French small craft also looking for their missing Higgins boat. Before dawn on 16 FEB 46, SC-1 BuNo 35770 was lowered into the water. I fired up its 1,350 hp Wright R-1820-62 Cyclone and took off from Noumea Harbor.

I proceeded south to Amedea Light House and searched my assigned area. I then reasoned the men might have headed in an unexpected direction, so I turned northward along the outer reef. Sure enough, at 0625 I spotted the missing launch, partially sunk, run up on the reef four miles south of Dumbea Passage. I turned on my IFF and gained altitude so the radarmen on Vincennes could pinpoint the position, and a Higgins boat was dispatched.

It took about a half hour heading northward to locate a rubber life raft with two occupants, who threw out a dye marker. Again using IFF, Vincennes plotted us five miles north of Dumbea Passage. I was granted permission to try a rescue as one of the Army aircraft arrived to circle

and report. There was about twelve knots of wind, but the waves breaking in the shoal water made the sea quite rough. I proceeded carefully in toward the coral reefs, but the exhausted occupants weren’t making much headway against the wind and the waves. I managed to use flaps and throttle to keep the plane steady as they approached but the survivors found no hand holds. The SC-1 had been designed as a scout that could stand against fighters; a heaving line wasn’t included. I got out on the starboard wing to help, but the wind slammed the float down so hard I thought the raft was going to capsize. The raft was thrown forward and the survivors shoved off to avoid the prop.

Trying again, I taxied over the reefs and stopped the prop, raising flaps to slow the drift. I got the airplane’s ladder into its sockets, but had to catch it when the waves knocked it loose. The survivors tried to grab the water rudder cable, but I was forced to start the engine and get back over the reef. On my final attempt drifting in, I broke off an antenna and tried to use the wire as a rescue line; it sank. Meanwhile the survivors got back to their raft and held on to the water rudder cable as we drifted. I reached in and started the engine, then locked my arm on the canopy and my other arm around the ladder. Substituting the ladder as a line, one survivor grabbed it, the other held on to the rudder cable, and we taxied over the reef.

Once clear of the reef, I was able to get the ladder firmly planted in its sockets. The Seahawk’s aft compartment was barely big enough for one person, but we managed to get both on men aboard. With more than 500 pounds of people and 150 gallons of avgas the SC-1 was a reluctant bird. After a long right-rudder, wing & nose-down, 45” of manifold pressure takeoff run—and with a couple touch and go’s -- we were aloft at 0720.

Turns out I’d picked up Colonels Thomas B. Burgess and I. B. Thomas, New Caledonia Area Commander and Infantry Commander, respectively. Back on the ship, my promotion to LTJG came through that afternoon. A written “well done” from the Army was accompanied by a case of Canadian Club, which obviously had to be consumed within the V division exclusively. Ω





**“Durand Committee” Reports**  
**THE METAL-CLAD TYPE OF AIRSHIP**



(For more detailed description of this type of construction reference may be made to the American Society of Mechanical Engineers, AER-SI-36)

Late in the nineteenth century an Austrian named Schwarz built, in Berlin, a rigid airship covered with thin sheet aluminum. This ship was 155 feet long with a maximum diameter of 44 feet and a volume of about 130,000 cubic feet. On its first flight in 1897, due to serious gas leakage and trouble with the crude belt engine drive, the ship, without power, drifted under the wind to a forced landing in a forest. The ship was badly damaged and the effort to develop further this type of construction was abandoned.

Later in the United States, in 1922, a start was made in Detroit, on the basis of better engines, better materials, and improved methods of fabrication, to again test the possibilities of thin sheet aluminum as an outer envelope for rigid airships. After several years of research and development work, an order was given to the Aircraft Development Corporation by the U.S. Navy for a small ship to be built under these plans. The ship was completed and delivered in 1929 and is still [1936] in good flying condition at Lakehurst, New Jersey.

This airship, known as the ZMC-2, has the following principal dimensions and characteristics:

Length of hull.....	149 ft. 5 in.
Diameter of hull (max.).....	52 ft. 8 in.
Fineness ratio.....	2.83
Displacement of hull .....	202,200 cu. ft.

Thickness of skin .....	0.0095 in.
Total fin area.....	440 sq. ft.
Total elevator area.....	190 sq. ft..
Total rudder area .....	95 sq. ft.
Engines (Wright Whirlwind J-5) .....	2
Power at 1800 r.p.m .....	440 hp.
Gross lift.....	12,242 lb.
(100 per cent inflation with 92 % pure helium at 60 deg. Fahrenheit and 29.92 in. Hg)	
Weight empty.....	9,115 lb.
Useful load .....	3,127 lb.
Range with 250 gal. (cruising speed) .....	680 miles
Maximum speed at 440 hp .....	62 m.p.h.
Cruising speed at 220 hp .....	50 m.p.h.
Static ceiling .....	9,000 ft.

In this type of construction, the entire structure may be said to consist simply of a supporting framework and a metal outer covering or skin. In comparison with the Zeppelin type of construction, the metal envelope thus substitutes for and performs the functions of the following layers of structural material:

- The outer fabric covering
- The system of shear wiring
- The gas-cell network
- The gas cell itself

The thin metal skin cannot, naturally, be expected to carry a load other than in tension—that is, having the form of a closed envelope it cannot be expected to carry a resultant external pressure load. Hence the pressure within the envelope must always exceed the external air pressure, usually by an amount represented by 2 to 2.5 inches of water.

Under these conditions the shear stresses, and to a large extent tensile stresses are carried by the metal hull covering. Actually, as shown by test, the metal covering, under a slight defect of pressure within the envelope, retains its form supported by the inner framework but with some slight wrinkling or bulging inward between the framework supports. Under all normal conditions of operation, however, it is assumed that the condition of the metal covering will be that of a thin curved membrane subjected to a gas-pressure load on the concave side.

The inner framework of the ZMC-2 comprises 12 stiff frames disposed fore and aft, and 24 equally spaced

longitudinals running from the bow to a frame located near the stern, and 16 longitudinals from this frame to the stern.

Of the frames, those located successively at 12, 36, 47, 76, and 82 per cent of the length from the bow are of heavy built-up type, the remainder being of simple triangular cross section. The main frames take primarily all concentrated loads such as those due to car attachments, handling lines, fin loads, etc. They are diagonally wired



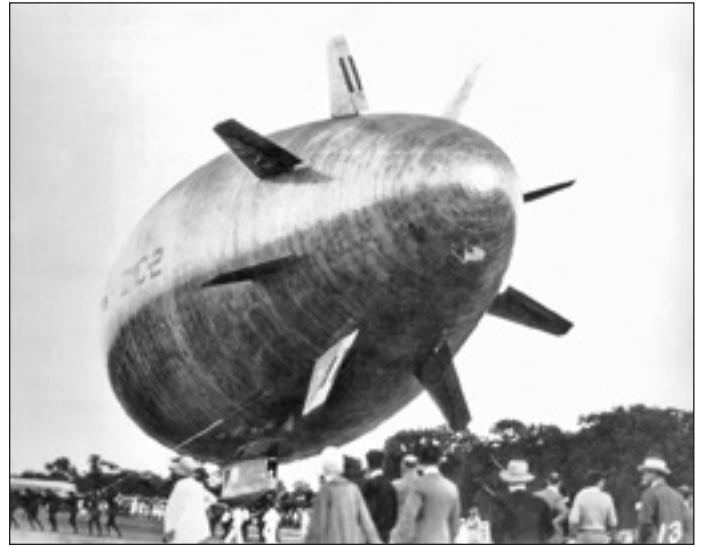
with hard-drawn aircraft wire and tie rods. The frames are continuous, while the longitudinals are interrupted at the frames and are connected through them by special straddling splices of formed sheet aluminum.

In addition to the main longitudinal and transverse structures, rigid diagonals are fitted at places of special shear stress, and auxiliary ribs where special stiffness is desired, as on the bottom of the hull.

The largest unsupported area of hull covering occurs at the maximum diameter and is 6 feet wide by 15 feet long. The ship is fitted with a single car for personnel hung from eight points of attachment to the hull framework. The power plant consists of two radial-type engines of 220 horsepower each, carried on tubular outriggers attached to the car.

The condition of positive pressure within the hull is obtained through the action of ballonets into which air is forced by the action of scoops when under way. An auxiliary hand blower is provided for slow-speed or landing conditions.

In larger construction, such blowers would be power driven and the entire condition of pressure within the hull would be under sensitive automatic control.



For control of the ship, eight fin surfaces are provided, with 45 degrees spacing around the circle, the vertical and horizontal control planes bisecting four of these spaces. The movable surfaces comprise four elevators attached to the fins lying nearest the horizontal central plane and two rudders attached to the two fins located on either side of the lower center line.

Respectfully submitted,  
A. V. De Forest  
William Hovgaard  
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## NADU LTA OPERATIONS

By Marc J. Frattasio, AW1 USNR (Retired)



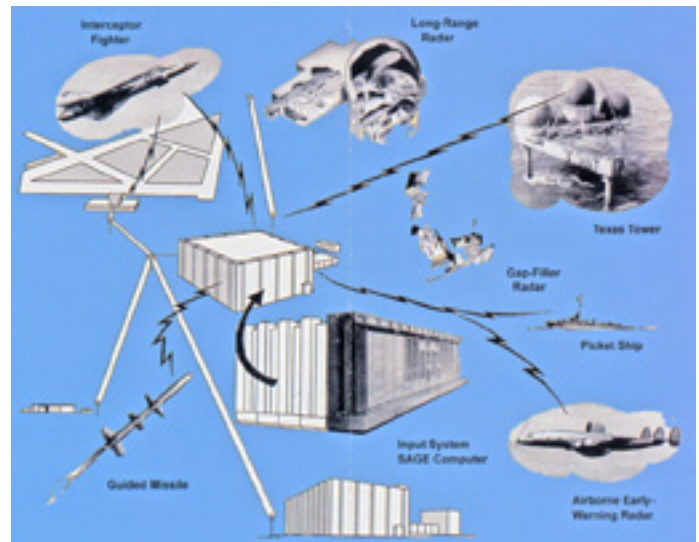
The beginning of the Cold War came as a shock to most Americans, who had come to perceive the Russians as friendly allies during the Second World War. Unfortunately, the wartime alliance between the United States and the Soviet Union had actually been a temporary alliance of convenience. Most people did not know the awful truth that the Russians had been on the Nazi side of the conflict until Hitler double-crossed them, since this important fact had been carefully concealed by wartime propaganda. After the Second World War ended the Russians soon returned to the business of instigating communism around the world.

A series of events including the erection of the so-called "Iron Curtain" between eastern and western Europe, the Berlin blockade, the communist takeover of China, the development of a Soviet nuclear bomb with the help of American communist sympathizers, and then finally communist North Korea's invasion of democratic South Korea, convinced many Americans that the Cold War was just the first stage of what would eventually become a full-blown Third World War between the United States and the Soviet Union.

Americans were terrified that the Third World War would start with an atomic Pearl Harbor. To protect the country from attack by Soviet long-range bombers armed with nuclear weapons, the Department of Defense organized Project Lincoln in 1951. Project Lincoln was a monumental research and development effort to implement an integrated air defense system to protect the continental United States from air attack. The basic concept underlying Project Lincoln was that radar data from a variety of ground, offshore, and airborne stations would be fed into a computer system in real time to provide defense planners with a picture of what was in the airspace over and surrounding the United States. The

computer system would also provide targeting data to anti-aircraft defenses and interceptor aircraft. The ultimate goal of Project Lincoln was to put an impenetrable shield around the country, armed with multiple layers of anti-aircraft defenses, through which no enemy aircraft could pass.

Project Lincoln was managed by the Lincoln Laboratory in Lincoln, Massachusetts, in association with the famous Massachusetts Institute of Technology (MIT) in Cambridge, Massachusetts. The operational air defense system developed by Project Lincoln was called the Semi-Automatic Ground Environment or "SAGE" system. The SAGE system had Air Force, Army, and Navy aspects that each had to be thoroughly tested. The Air Force and the Navy shared the responsibility of providing airborne radar coverage for the SAGE system. For its part, the Navy was expected to provide long-range aircraft that would operate hundreds of miles offshore and transmit radar data to the SAGE computers back on land.



The Navy intended to provide its share of airborne radar coverage for the SAGE system using Lockheed WV-2 Warning Stars and radar-equipped blimps. Although specialized airborne early warning (AEW) blimps did not exist when the SAGE system was conceived, ultimately Goodyear ZPG-2W *Reliance* and Goodyear ZPG-3W *Vigilance* blimps were developed for this purpose. The WV-2s were intended to operate in conjunction with radar picket ships on barrier patrols about 300 miles out to sea. The blimps were intended to operate in the area between the WV-2s or the radar picket ships and the coast.



At first, the Navy tasked the Naval Aircraft Torpedo Unit (NATU) based at NAS Quonset Point, Rhode Island, to provide flight testing support for the naval aspects of Project Lincoln. This activity began during the second half of 1952. However, the amount of work required for Project Lincoln threatened to detract from NATU's primary mission of supporting the Naval Torpedo Station at NS Newport, Rhode Island. Thus, by the late summer of 1953 the Navy had decided to establish a new command called the Naval Air Development Unit (NADU) completely dedicated to providing flight testing support for the naval aspects of Project Lincoln and for other research projects associated with the Lincoln Laboratories or defense contractors working for the Office of Naval Research.



The Navy always intended to put NADU at NAS South Weymouth, which was located about 15 miles south of the city of Boston and convenient to the Lincoln Laboratory, MIT, and the various technology firms that had sprung up around Route 128. However, at that time NAS South Weymouth was in the process of being reconstructed to serve as the new home for the Navy and Marine Air Reserve training program in New England. NAS South Weymouth was not expected to be ready for use as an active military airfield until late 1953 or early 1954.

The traditional home of the Navy and Marine Air Reserve in New England was NAS Squantum, which was located adjacent to Boston in the city of Quincy. NAS Squantum was only four miles away from the Boston (modern Logan International) Airport. The dramatic expansion of commercial aviation that occurred after the Second World War resulted in increasing instances of airspace conflicts between civilian airliners flying to and from the Boston Airport and reserve aircraft from NAS Squantum. Also, as the end of the 1940s decade approached plans were being made to transition the reserve fighter squadrons to jets, and the runways at NAS Squantum were too short for routine jet operations. The

runways at NAS Squantum had been made as long as the available land permitted, and since the base had been built on a triangular peninsula that was almost completely surrounded by water, it was not really practical to make them longer.

By the end of 1950 the Navy had decided to close NAS Squantum and transfer the reserve training program to NAS South Weymouth. NAS South Weymouth, which was a blimp base built during the Second World War, was in caretaker status at that time. NAS South Weymouth was far enough away from the Boston Airport to minimize airspace conflicts between airliners and military aircraft. There was also enough land available on NAS South Weymouth to build runways that were long enough for jets. In its original Second World War format NAS South Weymouth only had a gravel or cinder covered turf airfield, since this was adequate for the wartime ZNP-K type blimps. The conventional heavier-than-air reserve aircraft, especially the jets, required paved runways. So, between 1951 and 1953 three paved runways were built at NAS South Weymouth. The shortest of these was longer than the longest runway at NAS Squantum.

No aircraft of any kind could operate from NAS South Weymouth while the new runways and other supporting facilities such as taxiways, parking ramps, and a control tower were under construction. Since the need to transition flight testing support for Project Lincoln from the Naval Aircraft Torpedo Unit to the Naval Air Development Unit was immediate, NADU was established at NAS Quonset Point on September 1, 1953. The intent was for NADU to operate from NAS Quonset Point only until NAS South Weymouth was ready, and that because Squantum's runway length. This was expected to be about six months' time at the most. To speed the transition from NAS Quonset Point to NAS South Weymouth, NADU detached some personnel to NAS Squantum. The NADU detachment at NAS Squantum ordered furniture and supplies and prepared the hangar, office, workshop, and barracks spaces that had been allocated to the command at NAS South Weymouth in preparation for the move.

On December 4, 1953, NAS South Weymouth was re-commissioned as a Naval Air Reserve Training Command base. NADU moved from NAS Quonset Point to NAS South



Weymouth soon afterwards. It was, in fact, the only major regular Navy command that was ever based at a Naval Air Reserve Training Command establishment. NADU was

headquartered in NAS South Weymouth's LTA Hangar One. Two gigantic blimp hangars, or lighter-than-air (LTA) hangars, were built at NAS South Weymouth during the Second World War, LTA Hangar One and LTA Hangar Two. LTA Hangar One was mostly made of steel while LTA Hangar Two was predominantly of wooden construction. LTA Hangar Two was demolished in 1951 to make room for the new runways but LTA Hangar One lasted until late 1966.



LTA Hangar One was a gigantic structure. It was 965 feet long, 298 feet wide, and 191 feet high. The hangar was so big that it had its own internal microclimate. Under certain weather conditions water vapor would condense high up on the internal steel framework causing it to rain inside the hangar while it remained dry outside. LTA Hangar One was identical to the steel hangar built at NAS Weeksville, North Carolina, during the Second World War and it was similar in shape to the famous Goodyear Airdock at Akron, Ohio. Aside from its enormous size and streamlined shape, LTA Hangar One's most striking features were its curved sliding "orange peel" doors and the control towers situated on top of either end.

NADU was assigned hangar deck space, offices, and workshops in the western half of LTA Hangar One while the Navy and Marine Air Reserve were put into the eastern half of the hangar. Initially, NADU bachelor enlisted personnel were billeted in Barracks 76, a three-story cinderblock structure built when NAS South Weymouth was reconstructed. However, in later years as Project Lincoln was winding down NADU vacated Barracks 76 and moved into two-story cinderblock Barracks 75. NADU bachelor officer personnel were billeted on the base in the Second World War vintage wood-frame BOQ. During the 1950s married quarters were in short supply on NAS South Weymouth so most married NADU personnel were provided with government housing at Squantum Gardens and Naval Terrace on old NAS Squantum or they fended for themselves in the civilian housing market.

A variety of different types of aircraft were assigned to NADU over the years. However, the main types that were used to support the development of the SAGE air

defense system were McDonnell F2H Banshees, Douglas F3D Skyknights, Douglas F4D Skyrajs, Lockheed WV-2 Warning Stars, and Goodyear ZPG-2 Seafarer blimps. To test the naval aspects of the SAGE system's airborne radar network, NADU WV-2s and ZPG-2s served as flying radar stations while F2Hs, F3Ds, and F4Ds served as interceptors. Typical testing scenarios had NADU WV-2s or ZPG-2s feeding radar contacts to the SAGE computers while Air Force bombers conducted simulated attacks on cities in the Boston area. The radar data was used to guide the NADU F2Hs, F3Ds, and F4Ds in to intercept the bombers.

The first blimp assigned to NADU was a Second World War vintage Goodyear ZPM, sometimes referred to as an "M-Ship." Circumstantial evidence suggests that it may have been the M-3, Bureau Number 48241, since this one was fitted with an experimental search radar system tied into an on-board combat information center that would have made it potentially more useful for NADU's mission than the other three blimps of this type. The ZPM was intended to serve with NADU only until the then-new ZPG-2-type blimps became available. Most likely the ZPM was only used to provide pilot, radar operator, and ground crew proficiency training and it may not have been employed for actual SAGE system testing purposes.



The ZPM [similar to above photo] arrived in September 1953 while NADU was at NAS Quonset Point. Since NAS Quonset Point was not equipped to handle blimps, the ZPM operated from NAS Squantum instead. Although it is not widely known for having been a blimp base, during its later years NAS Squantum had at least two Type II mobile mooring masts and a small cadre of station keepers trained in lighter-than-air operations to support reserve airship patrol squadron ZP-911. The members of ZP-911 used to borrow ZNP-K-type blimps from the Naval Air Reserve Training Unit (NARTU) at NAS Lakehurst, New Jersey, and fly them to NAS Squantum and back on their monthly drill weekends. Since NAS Squantum did not

have a hangar large enough to house a blimp, the NADU ZPM was moored outdoors on the airfield.

The ZPM moved to NAS South Weymouth in late November or early December 1953, a few days before the base was officially re-opened. Soon after it arrived, a routine inspection exposed significant deterioration to the catenary curtains that carried the blimp's articulated three-unit car on the gas bag. The ZPM was grounded while temporary repairs were made that were just sufficient to permit a ferry flight to the airship overhaul and repair (O&R) facility at NAS Lakehurst. The blimp left NAS South Weymouth before the start of the New Year.

NADU was initially assigned Goodyear ZPG-2 Seafarer blimps. The ZPG-2s were equipped with the ubiquitous AN/APS-20 radar system, which could provide range and bearing on a plan position indicator scope that provided a map-like display to the operator. Although the ZPG-2s were not equipped with a height-finding radar system, the AN/APS-20 radar antenna could be tilted up or down to determine if an airborne contact was flying above or below the blimp. Thus, although limited in precision, an approximation of a radar contact's altitude could be provided.



NADU received its first Goodyear ZPG-2 Seafarer blimp in January 1954. This aircraft, Bureau Number 126718, was practically new since it had been delivered to the Navy just a few weeks previously in November 1953. NADU got a second ZPG-2, Bureau Number 126719, in April 1954. This blimp was also in almost new condition since Goodyear had delivered it to the Navy in January 1954. It is worth noting that these blimps were only the third and fourth ZPG-2s off the Goodyear production line, which shows how highly NADU's mission was valued by military planners at that time. Two or three blimps were normally assigned to NADU at any given time. On

occasion blimps from other Navy commands came to NAS South Weymouth, sometimes to operate with NADU and on other times to operate independently.

The blimps that were ultimately intended to serve with the SAGE system were Goodyear ZPG-2W Reliance and ZPG-3W Vigilance blimps. These were to be specially equipped for the AEW role with two independent radar systems, one to provide range and bearing and the other to provide the altitude of airborne contacts.

As mentioned previously in this monograph, reserve airship patrol squadron ZP-911 was based at NAS Squantum when NADU was established at NAS Quonset Point. Since NAS Squantum did not have a hangar large enough to house blimps, ZP-911 personnel had to borrow a blimp from the NARTU at NAS Lakehurst on drill weekends. If the weather forecast was favorable, a ZP-911 crew went from NAS Squantum to NAS Lakehurst on board a Douglas R4D Skytrain on the Friday night of their monthly drill weekend. On Saturday morning the crew checked a ZNP-K type blimp out from the NARTU and then flew it up to NAS Squantum. The blimp spent Saturday night at NAS Squantum parked out on the open on a Type II mobile mooring mast. On Sunday morning another ZP-911 crew flew the blimp back to NAS Lakehurst and then returned to NAS Squantum on board an R4D.



When ZP-911 moved to NAS South Weymouth in December 1953, the Navy had intended to assign a ZNP-K type blimp to the reserve aircraft pool on the base since NAS South Weymouth, unlike NAS Squantum, had a blimp hangar. However, despite the fact that NAS South Weymouth was a Naval Air Reserve Training Command facility and its primary mission was reserve training, the work that NADU did for Project Lincoln was considered to be so important to national security that a reserve blimp was never assigned to the base. When NADU moved to NAS South Weymouth nobody knew what the command's long-term aircraft requirements might be, so the Navy

chose not to risk taking up space inside LTA Hangar One for a reserve blimp when that space might be needed for Project Lincoln. By the time Project Lincoln's needs were better defined and space could have been allocated in LTA Hangar One for a reserve blimp, the Navy had decided to phase-out the reserve airship squadrons. This is why ZP-911 had to continue to borrow blimps from NAS Lakehurst while it was operational at NAS South Weymouth.

A significant amount of NADU testing for Project Lincoln was intended to prove out the all-weather capabilities and endurance of blimps. This was important because the blimps utilized in the SAGE air defense system would have to perform radar barrier patrol missions in all weather conditions and they might have to remain on station far out to sea for several days at a time. Since the most likely route for Soviet bombers to take to attack the United States would have been from across the North Pole, it was vital to demonstrate that blimps could operate reliably in the cold and stormy weather experienced in the northern latitudes in the winter.



Some of the earliest blimp testing performed by NADU involved operations under severe icing and snow conditions. In January 1955 NADU ZPG-2 Bureau Number 126718 was fitted with cameras (motion picture and closed circuit TV) and instrumentation to monitor and record the accumulation of ice and snow on various parts of the blimp under a wide variety of conditions in flight and on the ground. A series of ice and snow accumulation tests were conducted using this blimp during the winter months between January 1955 and January 1957. As a result of these tests, various anti-icing and snow removal methods for blimps were developed and introduced into service.

After the three-year icing and snow condition test series concluded, and the necessary remediation had been put into place, NADU conducted a practical demonstration

of routine blimp flight operations under severe winter weather conditions. Over a ten day period between January 14th and January 24th, 1957, five ZPG-2 and ZPG-2W blimps from NADU and from ZW-1, an airship early warning squadron based at NAS Lakehurst, maintained a continuous simulated SAGE radar barrier 200 miles off the northeast coast. The five blimps operated in relays, generally relieving each other after spending a 24-hour period on station, with each flight normally lasting 40 or more hours including transit time between NAS South Weymouth or NAS Lakehurst and the assigned patrol areas. One blimp actually remained on station for 32 hours with a total flight time of 52 hours. The simulated SAGE radar barrier test took place during some of the worst winter storms experienced in the northeast with freezing rain, fog, high winds, sub-zero temperatures, and blizzard conditions. For several days during the testing period most commercial and military aircraft were grounded all across the northeastern section of the United States, but the blimps did not scrub a single mission. After this successful demonstration, ZW-1 began to fly operational radar barrier patrol missions using ZPG-2Ws in July 1957.

Following the successful completion of the all-weather operations tests, NADU turned to testing the endurance of blimps. On March 4, 1957, NADU ZPG-2 Bureau Number 141561, which was named "*Snow Bird*", took off from NAS South Weymouth and headed east on the first leg of a non-stop flight across the Atlantic Ocean and back.



The blimp's crew sighted the coast of Portugal on March 7th and then turned south towards Africa. The blimp passed the fabled city of Casablanca in French Morocco on the 8th and then turned east, passing the Cape Verde islands on the 9th. The blimp landed at NAS Key West, Florida, on March 15th after 11 days in the air and covering 9,448 miles. The "*Snow Bird*" set a world's record for the longest duration non-stop unrefueled flight, an achievement for which the blimp's pilot in command, CDR Jack Hunt, received the Lighter-Than-Air Society Achievement Award in 1957 and the 1958 Harmon International Trophy for Aeronauts in 1958.

About a year after successfully demonstrating that a blimp could spend nearly two weeks in the air if necessary, NADU sent a ZPG-2 on a flight above the Arctic Circle to show that blimps were capable of operating in the vicinity of the North Pole. The blimp selected for this test was ZPG-2 Bureau Number 126717, which was named “*Snow Goose*”. The “*Snow Goose*” was supposed to fly from NAS South Weymouth to an Arctic research station called “Drift Station Bravo”, which was jointly operated by American and Canadian military and scientific personnel and situated on a large ice floe in the Arctic Ocean designated “Ice Island T-3”. Unlike the non-stop transatlantic flight of the “*Snow Bird*”, the “*Snow Goose*” was intended to make brief stops at the Royal Canadian Air Force bases at Churchill in Manitoba and Resolute Bay in the Canadian Northwest Territories on the way to and from Drift Station Bravo. In early July 1958, NADU personnel carried on board the command’s WV-2s erected expeditionary mooring masts or “stick masts” at RCAF Churchill and RCAF Resolute Bay in preparation for the “*Snow Goose*” flight.



The “*Snow Goose*” had high-visibility International Orange markings applied to its nose and tail fins to make it easier for rescuers to find the blimp in the event that it went down on the polar ice cap. The original plan was to paint a big orange Maltese cross on the blimp’s nose. However, NADU personnel found this shape too difficult to mark out so a less complicated design that conformed to the stiffening battens and other features on the blimp’s nose was used instead. (See *inside back cover*)

At 22:22 local time on July 27, 1958, the “*Snow Goose*” took off from NAS South Weymouth on the first leg of its journey to Drift Station Bravo. Unfortunately, the blimp’s crew encountered trouble soon after takeoff. Due to a temperature inversion, the blimp’s ballonets emptied out at only 300 feet and the gasbag’s safety valves began to automatically release helium as it climbed higher. Due to heavy fog that had rolled in after takeoff, the visibility at NAS South Weymouth had dropped to such an extent that it was not possible for the blimp to return to base. In an

effort to find cooler air, the “*Snow Goose*” turned south and proceeded along the coastline heading towards New York City. The plan was to turn north over New York City and then fly along the Hudson River Valley towards Canada. However, as the blimp approached New York City air traffic controllers refused to grant clearance to proceed due to local radar and weather problems. Because of this, the “*Snow Goose*” spent most of the night in a holding pattern over the eastern end of Long Island. So much fuel was consumed in this wasted activity that early on the morning of July 28th the crew decided that it was not possible to make it to the first planned stop at RCAF Churchill, so they proceeded to nearby NAS Lakehurst to take on more fuel.

High air temperatures aloft kept the blimp on the ground at NAS Lakehurst until 06:20 on July 30th. Later that day the “*Snow Goose*” advanced into Canadian airspace almost as far as Kingston, Ontario. However, temperature inversion conditions again caused a significant amount of helium to be automatically vented from the gasbag due to thermal expansion, reducing static lift and forcing the engines to work harder to generate enough dynamic lift to keep the blimp in the air. Again, the crew determined that high fuel consumption would prevent the “*Snow Goose*” from reaching RCAF Churchill. A decision was made to turn around and go to Akron, Ohio, which being the site of the Goodyear Aircraft Corporation’s airship manufacturing facility was equipped to handle blimps.

The “*Snow Goose*” landed at Akron at 08:10 on July 31st and remained there until 13:33 on August 3rd. Due to the unexpectedly high rate of fuel consumption experienced during the two failed attempts to go directly to RCAF Churchill, plans were made to land the “*Snow Goose*” at the Lakehead Airport (modern Thunder Bay International Airport) near Port Arthur and St. William in the Canadian province of Ontario to take on additional fuel enroute. Since there was no mooring mast at the Lakehead Airport and no time to erect one, a group of NADU personnel flown in by one of the command’s WV-2s, assisted by some U.S. Air Force personnel who also happened to be there, held the blimp on the ground while it was refueled by the expedient measure of holding on to its landing lines. The “*Snow Goose*” finally arrived at RCAF Churchill at 08:30 on August 4th.

High wind conditions kept the “*Snow Goose*” grounded at RCAF Churchill until August 7th. At 10:00 the blimp took off bound for RCAF Resolute Bay, which was 1,200 miles away. At 21:17 that same day the “*Snow Goose*” made history by being the first non-rigid airship to cross the Arctic Circle. The blimp landed at RCAF Resolute Bay at 07:30 on August 8th. Resolute Bay, which is 500 miles north of the Arctic Circle, is one of the coldest inhabited



places in the world. With an average daily temperature of only 2.4 degrees Fahrenheit, Resolute Bay was considered to be the northernmost point in North America capable of supporting LTA flight operations.

The “*Snow Goose*” took off from RCAF Resolute Bay bound for Drift Station Bravo, located 520 miles further north, at 01:34 on August 9th. The blimp arrived on top of Drift Station Bravo at 11:00 that same day. Unfortunately, the research station was covered by a low fog bank when the blimp arrived. Although the blimp’s crew were able to pick out a few structures through occasional holes in the fog, the poor visibility made touching down on the ice impossible.

Drift Station Bravo was located only about 800 miles from the North Pole. Although there had been some consideration given to proceeding on to fly over the northernmost point in Canada on Ellesmere Island and perhaps to fly over the North Pole itself, both actions were considered to be too risky to undertake. The blimp circled the research station for 47 minutes at an altitude of 300 feet, dropped sacks of mail and some pieces of equipment, and then turned back towards RCAF Resolute Bay.

In contrast to the voyage north, the return trip to NAS South Weymouth was trouble-free. When the “*Snow Goose*” arrived over RCAF Resolute Bay at 21:20 on the evening of August 9th, the crew determined that they had enough fuel on board to continue on to RCAF Churchill without stopping. The blimp landed at RCAF Churchill at 21:20 on August 10th, and after refueling took off at 22:40 for the last leg of the return flight back to NAS South Weymouth. The blimp arrived home at 08:26 on August 12th.

Although the Navy publicly announced that the “*Snow Goose*” flight above the Arctic Circle was a success, in fact the actual results were mixed. NADU had certainly demonstrated that a blimp could operate in the polar region. However, weather related issues had substantially delayed the mission and gave skeptics reason to doubt the overall dependability of blimps. The “*Snow Goose*” mission was supposed to have taken only 12 days, but it actually took 17 days to accomplish. Perhaps for this reason, subsequent proposals for NADU blimps to undertake additional flights to the Arctic were not approved by the Office of Naval Research.

In October 1957 NADU received one of the new specialized AEW blimps, ZPG-2W Reliance Bureau Number 141563. Goodyear built a total of five ZPG-2Ws. NADU’s ZPG-2W was the last delivered to the Navy and it was configured differently than all the others. A standard ZPG-2W was equipped with an AN/APS-20 radar antenna in a somewhat saucer-shaped radome mounted under the car to provide range and azimuth data for radar

contacts and it also had a “nodding” AN/APS-69 height finder antenna contained within a thimble-shaped radome mounted on top of the gasbag. NADU’s ZPG-2W was different in that it was fitted with the AN/APS-70 search radar instead of an AN/APS-20. The AN/APS-70 radar antenna, which was 40 feet long, was contained entirely inside the blimp’s gasbag instead of in a separate radome. The huge radar antenna, which was literally the size of a school bus, was suspended from the underside of the top section of the rubberized fabric gasbag and rotated in a 360 degree circle.



NADU’s ZPG-2W was built to serve as the electronics test bed for the four ZPG-3W Vigilant AEW blimps that were under construction at that time. The ZPG-3Ws were also intended to have AN/APS-70 radar antennas inside their gasbags. The ZPG-3Ws were not only the last operational (as opposed to experimental) blimps acquired by the Navy, they were also the largest non-rigid airships ever built. The ZPG-3W was 403 feet long and 117 feet high while a ZPG-2W was “only” 343 feet long and 108 feet high.

After a little over a year of testing, NADU’s ZPG-2W was accidentally deflated at NAS South Weymouth on January 9, 1959, when it was thrown against one of the orange-peel shaped hangar doors by a strong gust of wind while it was being moved inside LTA Hangar One. The blimp was so badly damaged when it collapsed to the ground that it was never repaired.

In late August 1959, one of the gigantic ZPG-3W Vigilant blimps, Bureau Number 144243, arrived at NAS South Weymouth from NAS Lakehurst. This specialized AEW blimp was not assigned to NADU, but was operated by a detachment of personnel from the Airship Test and Evaluation Department (AT&D) from NAS Lakehurst. The blimp was the second of four ZPG-3Ws completed by Goodyear, and had been delivered to the Navy at NAS Lakehurst only three months previously. The ZPG-3W

had been sent to NAS South Weymouth for NADU to assist the AT&D personnel in evaluating its radar systems and other electronic devices. Like NADU's unique ZPG-2W, the four ZPG-3Ws were each fitted with an AN/APS-70 radar antenna inside the gasbag and an AN/APS-68 height finder antenna mounted on top of the gasbag.



On February 13, 1960, the ZPG-3W was accidentally deflated when a strong gust of wind threw the blimp against one of the hangar doors as it was being brought inside LTA Hangar One. The blimp's gasbag was destroyed and its radar systems were badly damaged. A replacement gasbag was fitted to the blimp at NAS South Weymouth and it was flown to NAS Lakehurst on May 5, 1960. The blimp's radar systems, which were not refitted at NAS South Weymouth, were supposed to have been restored by the airship O&R facility at NAS Lakehurst. However, upon inspection at NAS Lakehurst, it turned out that the replacement gasbag was defective and needed to be replaced. Since the Navy was winding down the LTA program at that time, the gasbag was never replaced and this blimp never flew again.

Blimps were not the only LTA craft operated by the Naval Air Development Unit. In July 1957 a Goodyear ZF-type free balloon was assigned to NADU. ZFs were typically used to instruct student airship pilots in basic aerostatics at the Navy's LTA flight training school at NAS Lakehurst. NADU's ZF was primarily used to flight-test experimental electronic devices that had to be completely isolated from sources of electrical interference, as would be the case if such devices were installed on board an aircraft with operating spark plugs, generators, power inverters, radios, instrumentation, etc. The ZF was also used during special events such as dependent's days and air shows to provide tethered flights inside LTA Hangar One. It is not known how long NADU had custody of the ZF, but it was at NAS South Weymouth at least until September 1959.

NADU also used "Skyhook" type balloons for at least one project. These large transparent polyethylene balloons were often used by the Air Force and CIA between the

late 1940s and early 1960s to carry reconnaissance cameras at very high altitudes over the Soviet Union and Communist China. They were also notorious for being misidentified as UFOs. The NADU "Skyhook" type balloons were employed during the latter half of 1960



to test airborne recovery methods for the "Stratoscope II" project. "Stratoscope II" was a joint effort of the Office of Naval Research and the National Science Foundation to photograph interstellar gas clouds, the rings of Saturn, the cloud bands of Jupiter, and (it was hoped) the surface of Venus using telescopic cameras carried into the stratosphere by "Skyhook" type balloons. NADU launched several "Skyhook" type balloons fitted with dummy instrumentation packages to test a recovery hook carried by a helicopter. NADU never operated any helicopters and it is not clear where the helicopter that was used to test the special recovery hook came from or operated from. The hook dangled from the helicopter and was used to snag the balloon in flight after enough gas was released to cause it to descend to a lower altitude so the telescopic cameras could be recovered.

Major elements of the SAGE air defense system began to come on line during 1959. As the SAGE system development effort approached completion, Project Lincoln began to wind down and NADU found itself looking for other means to justify its existence. During NADU's final few years, anti-submarine warfare (ASW) related projects began to assume a greater share of the command's workload. One important ASW related project was called "Clinker". Highly classified at the time, very little is known about the details of this project even today. It involved the use of extremely sensitive airborne thermal detection equipment to find and track submerged submarines. Although some people have stated that the "Clinker" equipment was intended to detect the heat from

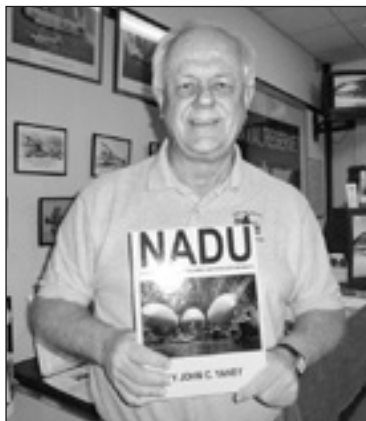
a submerged submarine's nuclear reactor, others have said that the equipment was actually intended to detect water that had been slightly heated frictionally by coming into contact with a submerged submarine's hull.



The "Clinker" equipment was installed on board NADU ZPG-2 Bureau Number 141561 sometime during 1960. This blimp was formerly named "Snow Bird" but had been renamed "Falcon" by that time. The "Clinker" equipment included, among other things, a thermal detector that was installed inside the AN/APS-20 radome on the bottom of the blimp's car. For this purpose the radome was modified with a flat section on the bottom to accommodate the downward-pointing thermal sensor. NADU detached the "Falcon" to NAS Key West, Florida, for a time in 1960 and sent it to MCAS Santa Anna, California and Kindley AFB in Bermuda in 1961. The blimp operated away from NAS South Weymouth under the cover story that it was participating in a civilian oceanographic research project.

The "Falcon" wound up being the last LTA craft operated by NADU. It was transferred from NAS South Weymouth to NAS Lakehurst on August 2, 1961. The Naval Air Development Unit itself was disestablished two months later on October 1st. At this point the Navy could no longer justify NADU's continued existence with the SAGE system basically complete. NADU's spaces in LTA Hangar One, Barracks 75, and at the BOQ were taken over by VS-911 and VS-733, which were Naval Air Reserve Grumman S2F Tracker squadrons activated for the Berlin Crisis. Ω

The author gratefully acknowledges the research and assistance of the late John Yaney, (right) author of the book NADU. It is available at: <http://www.anapatriotsquadron.org>



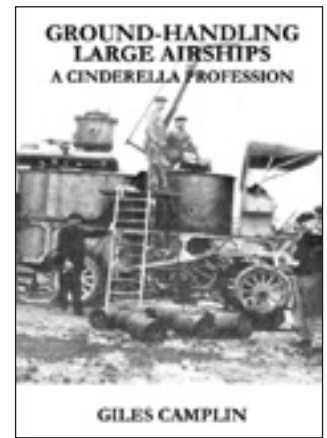
## MEDIA WATCH

### GROUND-HANDLING LARGE AIRSHIPS

A Cinderella Profession

By Giles Camplin

Reviewed by C. P. Hall II



One of the shortcomings of LTA craft is the difficulties encountered in dealing with such a large, buoyant vessel

on the ground at the beginning. GROUND-HANDLING LARGE AIRSHIPS is to define the problem(s), to break them down into itemized tasks for the edification of someone building such an aircraft allowing the designers of such aircraft to grasp the scope of the challenge; rather than to solving the problems, either for a specific craft, or as some sort of generalized solution.

Between 1998 and 2002, Camplin was employed by the CargoLifter project in Germany. The concept of the corporation was that their craft would fly to a manufacturer's plant site, land and attach to a large, finished piece of equipment, lift off and deliver it to a remote location with poor alternative ground transportation options. There seemed to be a corporate lack of concern regarding the ground-handling of a vessel capable of such an undertaking!?

Camplin pointed out that ground-handling methodology would have to be pre-determined as there would be multiple aircraft design elements dependent upon this decision. The problems would tend to grow in scope and number with the size of the aircraft. There exists a history of practical experience with large airships from the 1920s and 30s; however, it would have to be researched as the practitioners were now deceased. He was assigned this project which he describes as less than half complete in 2002, however, "the author had by that time amassed sufficient material for him to be able to complete the academic study independently and to present it in this volume as a guide for anyone interested in ground handling of hitherto unrealized large airship concepts such as the proposed new 'transport category' and 'cargo carrying' types." In 2007 this was submitted as a Ph.D. thesis, the details are in the "Preface", and it is now offered as a reference work to anyone who is interested.

The book contains 228 pages of text followed by 12 lettered appendices, a truly useful list of references, and a page and a half long "key of abbreviations". The book defines the boundary between small and large airships as something larger than one million cubic feet, something less than two million cubic feet; most non-rigids are

not 'large' but the ZPG-3Ws, at 1.5 million cubic feet, are 'large'. There is a great deal of information regarding history and techniques of handling large airships. There is a tendency to first define in general, then break down and categorize, followed by definition and explanation at the category level; some readers may find this repetitive. There is a good deal of information regarding the operations of historic airships (PGVLA or Previous Generation Very Large Airship) interesting diagrams, unremarkable photos, and just a smidgen of CargoLifter history. After 108 pages, the author has laid the groundwork to define "GROUND CREW" and to itemize the functions of "Ground Handling Equipment and Ground Support Infrastructure."

GROUND-HANDLING LARGE AIRSHIPS is hard cover and, I believe, the page size is what is known in the UK as A-4. The cover photo is a WW-1 vintage French mobile hydrogen generator which was used to inflate airships and observation balloons on site, close to the Front. GHLA is a comprehensive study of the problems, the history, and the modern day options with suggestions toward possible future development without attempting too many definitive conclusions. While it may not be the book that one takes to the beach for a vacation, it is an informative read about an often under-rated, frequently ignored, but nonetheless indispensable aspect of lighter-than-air operations. GHLA is available, either from the publisher, [www.newgeneration-publishing.com](http://www.newgeneration-publishing.com), or from Amazon.

One day, a promoter will contact a financier and ask for an appointment to explain his idea for a lighter-than-air craft endeavor. The financier will agree but insist upon meeting at the promoter's office. On the day of the appointment, the financier will enter the promoter's office and examine the promoter's book shelf. If the books thereon do not include, PRINCIPLES OF AEROSTATICS – The Theory of Lighter-Than-Air Flight, by John A. Taylor and GROUND-HANDLING LARGE AIRSHIPS – A Cinderella Profession, by Giles Camplin, then the promoter's lack of seriousness will be evident and it is unlikely that funds will be forthcoming. Ω

MILITARY magazine Vol XXXII #11 carried "Navy Blimp Saga" by one Perry K. Lewis, recalling a low-fuel incident with a ZPG-2W of ZW-1 under Command Pilot Saniuk. NAA would like to have him as a member. Ω



TIMELESS NBC TV Series October 2016 premiere episode opens with a digital dramatization of the LZ-129 accident, showing details of the rubber-liferaft-like gas cell puncture flapping leak hissing gas, the steel handrail-like structure arcing electricity, and the dirigible exploding in bright hydrogen flames. Plot then unfolds with the villain stealing a time machine and going back to May 6, 1937. Heroes chase after him in another machine to find he prevents the Hindenburg accident by stopping the landing ropes from taking up enough water to become conductive.



Once the villain's purpose is fulfilled, he later fires a single ordinary bullet which completely destroys the airship. Below is a freeze-frame from that pilot episode in which one of the heroes struggles with a time paradox, i.e. allowing a sweetheart to die in the accident in order to preserve the space-time continuum.



The producers probably figure not a single person in the audience will care about details more than they do, so we see sloppiness like facial hair on a sailor, to scrambled eggs missing from "Rosendahl's" visor instead appearing on the Zeppelin Captain's visor. Nonetheless Ed. is saddened when more money and resources are expended to do it wrong than need be to achieve suspension of disbelief. Since the LZ-129 interior has undoubtedly the most well-published airship interior images in history, their more expensive and elaborate – looking sets were perhaps a simple re-dressing of something built for another project. Generally their work was no worse than some other TV. However, their least defensible features are those when the project disagrees with itself. For example, when "radio reporter Morrison" records saying "nose ropes" were dropped, the computer-graphics dirigible is then showing lines let down from mid-ship...! Ω

– R. G. Van Treuren

## NAS SOUTH WEYMOUTH: THE DEFENDER OF FREEDOM

By Marc J. Frattasio, AW1 USNR-R

Reviewed by C. P. Hall



This book is a comprehensive history of the Naval Air Station at South Weymouth, MA, from its opening in the 1940s to its closure in the 1990s. By comprehensive, I mean 739 pages 8½ X 11 with numerous black & white photos throughout; it is the size of a major, metropolitan phone book for those of you old enough to remember phone books. There are eight numbered chapters and seven lettered (Alfa thru Golf) Appendices. While it is obvious from the anecdotal nature of much of the text that the author had access to the base newspaper(s), it is also obvious that when further research was called for, he was not adverse to the challenge.

NAS South Weymouth was originally a blimp base but later became a naval air field and research center. As a result there is ample content for those interested in Naval Aviation HTA and LTA. Sticking to the LTA aspect, the author's emphasis is on the base, its equipment, and operations from the base. This means that, while there is little detail regarding the mechanical details of blimps, there are considerable details regarding the two blimp hangars, much is offered about bases facilities and equipment such as the Hortonsphere used for helium repurification and actual flight operations are covered in considerable detail. He covers a substantial number of specific flights. He is not averse to revealing the down side of LTA covering accidental deflations, accidents and strange occurrences.

This is the third book which covers LTA operations from South Weymouth that I have reviewed this year. I now have three explanations of the Hortonsphere. Each is consistent about the general purpose of this equipment and each varies slightly but significantly in the details of the functional operation.

The final flight and loss of the K-14 is well researched and I come away more knowledgeable of the record of events than I was before, yet no more satisfied that I know what happened than I was before. There are interesting omissions and contradictions within the record which Marc cites. Marc makes no mention of reported gunfire damage to the envelope. The control car is neither damaged by gunfire, nor damaged by proximate explosions of two depth charges if jettisoned, or lost, when the K-14 hit the water as opposed to being dropped on a U-boat before K-14 went down. The mystery remains.

I recommend NAS SOUTH WEYMOUTH to anyone interested in naval aviation from the Second World War through the end of the Cold War. Most readers of

this variety will find something of interest in about 30% of the content which is about right for a volume of 739 numbered pages. A few enthusiasts will find enjoy a greater percentage on multiple topics. The book is available from [www.lulu.com](http://www.lulu.com) which means the text is well done and the photos are good but reproduction quality is second best. The volume is soft cover. Ω

## BLACK BLIMP

Robert Ashford, 92, Past President NAA, passed September 7th, 2016. His 30-year Navy career included some of LTA's most memorable developments. After USN LTA was retired Bob worked with TCOM. As NAA President, Bob oversaw the transition from Mr. Ed's printing to your current team. Ω



Florence Hoblit Magoto, 94, passed 28 MAY 16. Born in Greenville, Ohio, she graduated its High School in 1939 and married Marion Magoto in 1940. Florence ran an antique business for 33 years and was very active in local history work. She donated the Lansdowne Memorial Monument, many other items and much time toward preserving the memory of the Navy's first Rigid Airship, the USS Shenandoah (ZR-1), and its crew. Florence is survived by numerous nieces and nephews. Ω

Charles Henry McDougall, Jr., 94, passed October 3, 2016. He studied Geology at the California Institute of Technology in Pasadena until WWII interrupted his education. Charles married Jean Herzberger of Pasadena, on August 20, 1943. Piloting blimps off the coast of South America, Charles often recalled his Navy career with profound fondness. (He recorded with The Library of Congress Veterans History Project.) Charles is survived by a son, daughter, grandchildren and great-grandchildren. Ω



## READY ROOM

In the Fall Issue we incorrectly reported Richard Shively Jr.'s school. Shively was a graduate of USC. We regret the error.

5-9, June 2017 Denver, CO; AIAA Aviation and Aeronautics Forum and Exposition (AIAA AVIATION 2017) includes LTA TC presentations.

Airship Association Conference & Model Regatta  
19-21, OCT 2017, Bedford, UK

## LIGHTER SIDE



"He has no enemies, but is intensely disliked by his friends." - Oscar Wilde ☺

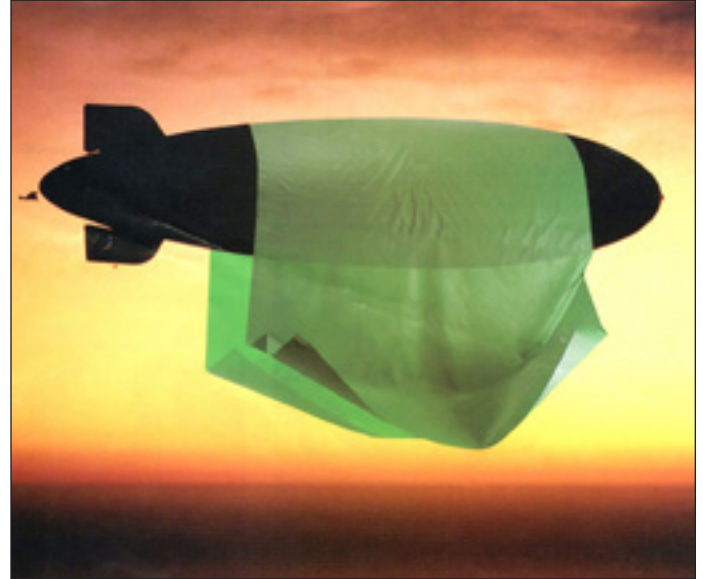


Victory can only be assured through eternal vigilance. ☺

George Bernard Shaw to Winston Churchill:

"I am enclosing two tickets to the first night of my new play; bring a friend if you have one."

Winston Churchill in response: "Cannot possibly attend first night; will attend the second, if there is one." ☺



## **Massive Hang Over**



E-mail fraud alert: Subject: Make the best rigid airship Establishment modern airship company.

Message: Dear Mr ,Ms , Warm regards and best wishes. Excuse me whether you are interested to build the best airship. The principle of science, modern materials, ingenious and perfect design, Make the best rigid airship. Cooperation and common manufacturing the advanced? practical?safe?comfortable?convenient?quiet??effective?reliability?stability?aesthetically pleasing rigid airship. Energy conservation, environment protection, I recommend the establishment of green aviation industry, Manufacturing modern airship, The development of tourism industry. The creation of profit? to achieve sustainable development to a virtuous cycle .Innovation optimize and improve: Make the best rigid airship. Thanks· regards! Han Wen Wei Guangzhou, China.



NADU's ZPG-2 "Snow Goose" (See page 25)



60th Gordon Bennett (See page 17)

Time lapse view of the tracks of all 24 competitors is available online at: [https://www.youtube.com/watch?v=QTf\\_Htrou6EI](https://www.youtube.com/watch?v=QTf_Htrou6EI)

A short video of scenes from the launch and race is available at: <https://www.facebook.com/Course.Gordon.Bennett/Penny.Bierman>