

AEROSTAT



NO LIMITS!

The ash cloud has a silver lining for balloonists

Also – Into The Unknown: The first overnight flight by a cluster balloon

Dark night aloft

American **Jonathan Trappe** attempts the first overnight flight using a cluster balloon

On April 10, 2010 we attempted a flight that had never been completed successfully before. Since 1937, when the first cluster balloonist went into the skies, nobody had ever remained aloft all night, greeting the dawn from the skies the following morning.

Our launch window was near the spring equinox, so we would have a rather long night in front of us: more than 11 hours. There were some legitimate concerns: we were launching in North Carolina, so could we stay aloft all night, and yet stay inland of the Atlantic Ocean? Winds aloft at mid-levels took us straight to a restricted military airspace at Pope Air Force Base, where they were doing live firings. Would we be able to steer clear of that airspace? Overnight temperatures on the surface would be in the 40s; how would the balloons (and the pilot) react?

I was thinking of these factors, and many more, as I weighed the decision to go. Together, as a team, we achieved success. I watched the sun set, traversed 109 miles over my home state, and welcomed the sun upon its return the following dawn. After nearly 14 hours in the silent skies, I returned to earth.

Going up

We made the decision to stand the cluster balloon system during the middle of the day. As any balloonist will tell you, this is a terrible idea. There is thermal activity mid-day that will pick up a balloon, whirl it around, and push it back down against the ground very hard— all of which makes



Gassing time: Jonathan's balloons are filled and ready to go, thanks to the EAA and the local flying club

for a rather uncomfortable inflation.

We did have our reasons. Our launch site was within easy range of the Atlantic, and we didn't want to go in the drink. Surface winds were forecast to be calm, but in the early part of the day winds aloft were forecast to send us right out to sea. So the plan would have us inflate mid-day, in order to launch once winds aloft had fallen off.

Another concern was the military area directly to our south. Mid-altitude winds were forecast to head directly towards Pope Air Force Base.

The trajectories for low-level flight,

1,000 to 2,000 feet, had us heading to the north west. This would be good; away from the coast and the restricted area! Except, we couldn't really fly that low, especially at night. There are large towers and other obstructions! We needed to be higher.

The next set of trajectories had us heading south, towards the restricted area. Not so good. Then the high-level trajectories had us heading to the coast, too fast. We'd make it to the water before dawn.

So I would have to use a combination of these altitudes to steer away from the



verboten areas, avoid the towers, stay high enough above the cities, and remain over dry land through the night.

The winds were “calm”— if you ignored the thermals that blew through! We had an outstanding group of people help stand this cluster, and a number of them were left holding full balloons, waiting to add them to the system as the thermal activity leaned the partially assembled cluster like the tower of Pisa. If the tower of Pisa were made of balloons. And leaned more.

So, our team, made up of local members of the Experimental Aircraft Association (EAA) and the Wings of Carolina flying club, patiently held the balloons; the thermals blew through, then died down. After about 30 minutes of that, the winds came back to calm and we had an outstanding inflation.

This was to be the inaugural flight of our cluster balloons as a US federally registered aircraft. After much work, the FAA issued an Airworthiness Certificate to our cluster balloon system. This gives us greater access to the national airspace

system. In addition, the airworthiness certificate allows us to do some very interesting things, such as apply aviation lights and fulfill our long-held dream of flying underneath a silent cluster of balloons into the still of the night.

On the airfield, the system was built and ready to fly. It was a proud moment

“**It’s like the people are holding their breath. Actually, some of them are.**”

as the N-number settled into place above my head, while 50 feet of balloons towered above us.

For this flight I was launching from the Raleigh Executive Jetport at Sanford, though on this occasion I wouldn’t actually be using any jets on the cluster. (Woah, that sounds like a project!) My girlfriend gave me a kiss goodbye, and I moved into the air in absolute silence. There were many dozens of people gathered, but it seems that this is the way we always launch. No matter the crowd size, there is a near complete silence as the balloon moves from earth to sky and flight begins. It’s like the people are holding their breath. Actually, some of them are. Then, somebody bursts into applause, and then everyone joins in, and then cheers as I float into the quiet skies.

Our friends at the EAA had sent out an

aviation photographer and a photo-plane pilot. The name of the system we flew that day is The Spirit Cluster; it was named in honour of the EAA and its motto, “The Spirit of Aviation.”

As I launched, my crew chief and one crew member ran to the waiting Cessna 210. With Bruce Moore as the pilot, they gave chase through the skies.

The next two hours of flight were awesome. The chase plane would make passes above, below, and on each side. Sometimes I could feel vibrations from its engine reverberate in my balloons. I climbed to about 7,500ft, and then brought the system back towards earth.

At launch, one little girl kept calling out to me: “Byee! Byee!” In the video of the launch, I’m several hundred feet in the air and I can still hear the girl calling out: “Byeeee!” As I climb through 590ft, I can still hear her calling up to me.

In a separate video, taken from the ground, you can hear another little voice ask “How will he get down?” What a great opportunity to sow dreams of flight. I know the children on the airfield will remember this flight; I know their parents will remember it as well. I do hope that the child’s question was answered and I do hope they will go aloft as pilots one day.

As the evening grew long, my chase plane made its final passes and the question came over the aircraft radio: “Are you going to land...or ...attempt to stay up through the night?”

I had run that question through my mind a thousand times on this flight. I had



personally sampled the winds up to 7,500ft; I verified that the real-world conditions were in line with the forecasts. The trajectories indicated I should be able to stay clear of the coast, even staying aloft all night.

Everything seemed to be lining up. I had dreamed of this. I reached into my flight bag, and deployed the aviation lights that would accompany me into the darkness: hanging below me the steady white light, and the flashing red light, to notify others that here flew a manned aircraft.

Into the unknown

I'd done my homework but this was still unknown territory. When the night comes, the balloons cool. As that happens, they contract, and lift is lost. I argued that I should be able to offset the night-time cooling by releasing ballast. Sure, any gas balloonist would tell you that. But, we didn't know how much ballast I would need to drop. And, if you don't have enough ballast to survive the night, it means attempting a night-time landing, which is serious. I brought the ballast I thought I would need. Even so, I entered the night with genuine trepidation.

I've worked on ways of handling the hot-fire type of fear, like panic or sudden terror. Mantras; breathing; task prioritisation and focusing techniques. If you are putting yourself at 18,000ft in a small harness, you had better have given some thought to these things in advance. If you are a pilot and don't have calming and focusing techniques that you have practiced using when calm, I argue that it is something you may like to investigate.

But, this was a different fear; it was a calculated concern, something I had given thought to. It was a cold apprehension. After I was committed to the night, my balloons floated over a marsh area; the waters were alive. Frogs called so clearly, and I could hear geese as they flew below me. As I climbed, the sounds of the marsh receded and I was left with silent flight; my immediate gondola became surrounded with complete darkness. There was no moon to accompany me into the night.

What I did have were the innumerable lights below me of the surrounding communities. I climbed up to 2,500ft and started to layer on all of my cold weather gear — I put on everything, and it was not even 10pm; it would get much colder before the night was out.

After nightfall, I maintained a comparatively low altitude — around

2,500ft. This had me going to the north east. That was good — away from the restricted area, and away from the coast. I was tracking my position using my aviation sectional map and handheld gps, marking my location on the sectional as I floated to the north.

Near Fearington, I called up Raleigh Approach (to Raleigh Durham International Airport, or RDU) on the aircraft radio and identified myself and gave my location. The controller came back: "Eight Uniform Papa... say again your aircraft type?"

"I am a gas balloon, similar to a hot-air balloon, but filled with helium."

The controller: "Uh, ok squawk 4096 and ident..." or whatever 4-digit code he read to me. That is, he wanted me to enter that code in my transponder, so that I would show up on his radar. The code he gave me didn't matter; I didn't have a transponder.

I informed the approach controller of this, and he indicated that he would prefer I stay clear of the Class C airspace. I informed him that I could climb above it — which would mean going to at least 4,500ft — up into the cold night. I needed the permission of the controlling authority to overfly a Class C without a transponder. In this instance, they gave permission, as long as I remained clear of the actual Class C.

If I'd stayed at 2,500ft, I might have slipped by the Class C without entering it. However, by climbing, I caught winds out of the west, which gave me a huge right-hand turn, and my track changed — straight towards the international airport.

At first the tower couldn't see me very well: I was mixed in with the stars. I connected my aviation lights to a fresh battery, then I flashed the tower with my spotlight. He saw the spotlight instantly.



Up high: Jonathan before nightfall

It was awesome working with this controller. He invited me to stay on the tower frequency as long as I wanted; he had no airplanes within 80 miles. Nobody within 80 miles of Raleigh airborne, but me.

In addition to my aircraft radio, I carry a crew radio. Some enterprising HAM radio operators decided to try to track me down. My crew radio has a privacy code but being the enterprising amateur radio HAMS that they are, they just tried all the privacy codes! There are about... 52 of them.

My radio woke up and I heard their voices. I was very surprised to hear them calling me; it was awesome, actually. The night had grown very cold a mile up in the air, and I was very happy to hear their voices break the quiet. They let me know that they were tracking my flight, and that it was being covered on WRAL, the local CBS affiliate.

One of the HAMS happened to be an experienced commercial pilot, a 737 captain. Before I'd reached RDU airport, he telephoned the tower and briefed them on my flight, pointing the controller to our website and tracking information. It was this 737 captain that suggested I flash the tower with my spotlight, so they could get a fix on me. It worked! Thanks to that airline pilot, the tower also had my





tracking information from this website and could track me. This interaction with the HAM community was a welcome surprise, and the help of that 737 captain added a substantial safety factor by giving the tower an idea of what kind of aircraft I was, plus the tracking info.

As 2am approached, my time flying over my home city was drawing to an end. I had passed the lights downtown and was heading back to the still of the countryside. The aircraft radio had been quiet for some time, and I got some final calls as I drifted out of the airport's range. The tower controller called me, and I could hear him on the aircraft radio. "You still out there in the balloon, south east of Raleigh?" I could hear him, and I responded. But I was out of range; he couldn't hear my reply.

He called again, asking if I could hear his transmission. When he didn't hear my reply, he requested that I flash the tower with my spotlight. I took the spotlight from its bag, and looked back towards the airport. The city was receding into an indistinguishable sea of lights. I could no longer tell where the airport was; all of the individual lights blended into a single stream of light. I flashed the entire horizon behind me, back and forth. At a distance of over 20 miles, he saw the light, and acknowledged the flash over the radio.

This would be the last communication I would have with anyone for five hours. I moved into dark, open countryside as the temperature continued to drop.

After the last call from the tower, I departed from all direct connections to everything and everyone below me. I had blown out my crew radio talking with the HAMS; it had no more battery. The aircraft radio still had charge, but I couldn't raise the crew on it.

All alone

The temperature continued to drop. On the ground it was in the 40s but it was below freezing aloft. My aircraft was still high, due to the climb I initiated hours ago, to climb over the Class C. That was way back in Raleigh—before Raleigh, actually. I didn't want to release helium to come down (into warmer temperatures) because it would mean using a flight resource. I only had so much ballast to last the night; I only had so much helium in my balloons. I did not want to use up my resources, and use up my options.

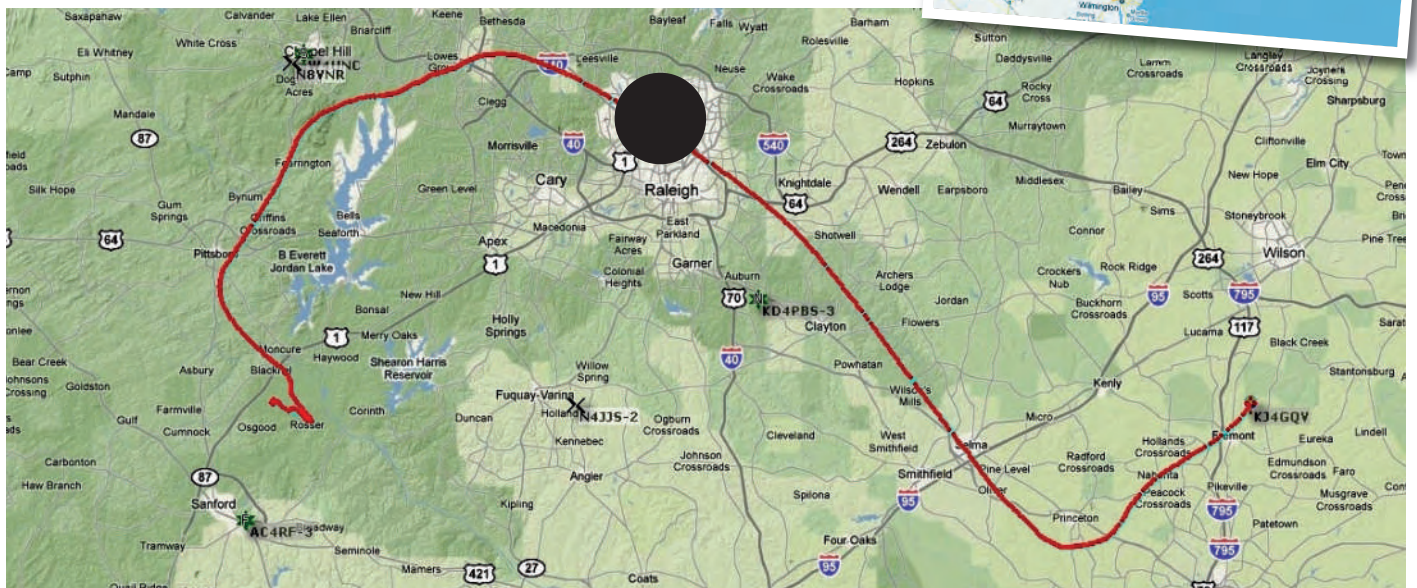
Instead I opted to let the system descend with the continued temperature

decline. But the decent rate was glacial; in an hour I had descended from 4,700ft to 4,400ft. That's roughly 5ft per minute, a rate so close to level that it doesn't even show up on the rate-of-climb indicator.

There were various arrays of towers, far below me, far off to the side. I was out into open countryside, pointed back towards the ocean. By 3am, 4am, I had ...bad thoughts. Not dreams — I wasn't sleeping, trust me. But the thoughts were like dreams. Thoughts that came without me calling them. They didn't really make sense, but I worried about my rigging.

I was connected to the system only by two 1 in straps; the idea is that I can cut those two pieces of nylon very easily, and be free of the system if I need to be (if, for example, I'm on the ground and dragging towards an obstruction, like power lines.) But I became distrustful of those 1 in slivers of material. I kept thinking I would have to hold on, wrap my arms around my ballast bags and try to hold on. I kept banishing those thoughts. Language is important. You will notice that I said "kept banishing" the thoughts. That means they kept coming

Oh, Carolina! the lower map shows the track (left to right) while the insert shows Raleigh comparative to the coast



back, and had to be quieted again.

Extending my track out in front of me on the aviation map I could see Emerald Isle, Atlantic Beach, North Topsail Beach; you can tell by the place names that the coast was coming. It was 4am, 5am. Those last ribbons of sand were still distant, out in front of me; 40 miles, perhaps. And my speed was low.

Into the light

I longed for the return of the sun. I wanted the warmth to come again. I wanted to brush treetops with my feet. I wanted to know that my crew, who had been awake all night, were okay. I'm sure they wanted to know I was okay. I longed for the return of the sun.

And, as it does, the sun returned. There were rumours of light, in the beginning.

Then, rumours turned to promises, and promises delivered light to the sky. Still the sun hadn't come, but as the horizon faintly started to light, my descent rate increased. Temperature regularly continues to drop until after dawn. It doesn't warm when the sun first crests; it has to be up for a little while, to warm the air.

I pulled a balloon to me, and opened a cell. Cold gas came streaming out. My hands eventually tired of holding the balloon, and she escaped to the skies. That is fine, good in fact. It increased my descent back to the earth.

I came lower, lower. Then, large fields underneath me. I could take these fields. Direction made a sharp turn; not quite a U-turn, but a substantial change in direction at the surface. Speed actually picked up to 18, 19 knots. Then, through a clearing in the trees I could see a vehicle, with a hint of something behind it. It could be... could be my car, my crew, my girlfriend, with our tiny trailer behind.

I flew an approach profile, coming very low — tree level. The sun was now up. Oops, a little too low — the trees could brush me, or brush my balloons. If the trees touched my balloons, they could pop, and this would all end very ungracefully. One cell would pop, making me heavier, pushing more balloons into the trees, making more balloons pop — a cascading effect would end with me hanging from the trees, or plunging down through them.

Ballast — one more ballast — to bring me just above tree level. I made it to that road — and it was my crew! They were there! They were there all night! The sun had returned, the earth was near me, my crew were at hand as I crested the treeline — with a small corner of a field in front of me. It was time; I chose this time to again touch the earth.

One balloon was away, descent rate taking me into my field, crew were out of the vehicle coming across the ground to me as I approached earth. I ballasted as I came down, so that I didn't return to earth with too much of a jolt. Ten feet above the ground I closed the ballast tank; the earth greeted me gently, and I was down.

Nearly 14 hours in the sky, and I was down. We survived the night, flew over my city, my state, with my girlfriend and crew with me throughout the night.

Jonathan is on standby in southeast England to fly the Channel as we go to press. We wish him luck and hope to have more adventures to report next time. Meanwhile see his website at clusterballoon.com



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