

This is a story about "Reach for the Stars", a balloon with a heart and a balloon with a mission. It is the second FAA certified wheelchair accessible balloon in the US, with Serena's Song being the first. Through Reach For The Stars, Inc., a not-for-profit foundation we are currently establishing, we hope to make hot-air ballooning available to special need children around the world.

Concept

The idea for the Reach for the Stars balloon started with our summer visits to a week-long camp for children with cancer called Camp Reach for the Sky. It is located in the mountains east of San Diego. Ten years ago, I started as a volunteer to support the computers and printers provided to the camp by my company Hewlett Packard. I soon realized there was enough room to bring my balloon to the camp. The following year, we offered the kids tethered rides in the morning and before sunset each day. The balloon was a huge success and the kids loved it. Since then, it has been a part of that camp and has now grown to another camp, Camp Ronald McDonald in Idyllwild. Last summer, we attended 7 camp sessions and provided over 750 children with rides. At every camp session, some of the children were in wheelchairs. With the Balloon Works 4.9 basket, it was nearly impossible to accommodate these children. We had to do something different.

At the '93 Temecula Wine and Balloon Festival, we met the Serena's Song balloon team. Here was our answer! They inspired us to create our own wheelchair accessible basket for the kids at camp. In 1996, we committed to our dream and created a project plan that detailed the different stages and milestones, the expected schedule, and proposed budget. I never realized it would take 3 more years to complete!

Hurdles to Overcome and Design Considerations

Some of the challenges we faced were: acquiring insurance, figuring out the best way to adapt a basket for wheelchair use, lack of experience consistent with being a pioneer in the field, reliance on volunteers, and balancing the cost and schedule with my family life.

Insurance--To take our project beyond the dream phase, we had to have insurance. We were disheartened to find that, with the exception of IMC, none of the major insurance carriers were even willing to consider us. No wonder there aren't more people working with the disabled! Because IMC felt this kind of project was good for society, they offered insurance for Reach For The Stars. Not surprisingly, they also insure Serena's Song. Having cleared that major hurdle, we proceeded with preliminary designs for the envelope and the basket.

Basket Choice--The basket 's design and implementation took the longest time to complete. We tried to find the biggest basket we could put under a 105 balloon and have room for the pilot, the wheelchair passenger and up to two more standing adult passengers. We also did not want to start from scratch because of the huge task of getting a new basket design approved through the bureaucracy. Instead, we wanted to perform a 337 modification to an existing basket, which focused on the changes we made, rather than duplicate the entire process. Fortunately, to the north of us, Dave and Kim Lynch were selling a 60 x 72 Galaxy basket and were gracious enough to extend financial terms that allowed me to obtain it. Although Galaxy Balloons, like most businesses we encountered, did not want to risk any liability and wanted to stay clear of the project, they were kind enough to share some of their basket drop test information. That helped convince us that this basket was a good choice.

Wheelchair Decisions/Designs--After contacting pilots in the US, Canada, and Europe as well as medical professionals, wheelchair suppliers, and wheelchair

van conversion businesses, we found a wide variety of opinions as to the "right" method to use for safely flying wheelchair bound people. With all this information, we decided on the following simple design path. We would take the people up in their own wheelchairs. In most cases, their doctor configures their wheelchair to them. By not moving them from one chair to another, we could prevent accidentally injuring them. This also means we have to limit our flights to very calm conditions that would allow standup landings with the crew present. Because of this choice, we could also finalize our wheelchair securing system. Over 90% of wheelchairs in current use, rely on their lower frame rails for their major structural support. We bolted four quick release tracks into the basket floor. These tracks are similar to those used in aircraft and in wheelchair van conversions. Mike Prentice made four custom sets of quick release tie downs that secure the wheelchair rails to the tracks in the floor. We also replaced the standard 1" basket support poles with 4" wide oak boards. This allows us to push the wheelchair against the oak boards, apply the wheelchair brakes, and attach the straps. The wheelchair is secured in all possible axes of movement. Flight passengers are responsible for their own support (such as a seat belt) to secure themselves to their wheelchair. For tethers, we provide a wide, soft, foam belt that attaches around the passenger and their chair with Velcro.

Since lifting a wheelchair over the side of the basket was out of the question, we needed some sort of door or entry. Because the floor of the basket is only 1.5" off the ground, we felt a ramp would be unnecessary and cumbersome. We elected to go with a 45.5" wide panel that is easily removed out of the way for passenger loading. The panel has two guide pins on the bottom for positioning and it is secured at the top with two quick release pins. We kept the panel height low (35") to ensure maximum visibility and enjoyment of the flight by a person sitting in a wheelchair.

The final test of this design was the mandatory free fall drop test required by the FAA. We had to drop the fully loaded system 3 times, first with a basket angle of 0 degrees (flat drop), next at 15 degrees, and finally at 30 degrees. With our basket dimensions, the final drop was done with the low side 36" off the ground and the high side 6 ft. off the ground! This last drop was the most terrifying for me. I knew we'd done a great job in the design and engineering, and that the Galaxy basket had passed drop tests loaded with 5000 pounds, but I'm not a manufacturer who has more of these baskets sitting in the wings. I was afraid it would turn out like those airbag commercials on TV where the car is totaled, but it passed the test. You should have heard the shouts of victory when we passed without a single problem!

Volunteers--To help keep the cost down, I tried to use as much volunteer help as possible. I'm very proud of and thankful for the people who assisted with this project. But, I quickly learned that volunteers, no matter how well intended, often don't have as much time to help as they initially think they will. So, in working with volunteers, I learned that 1) a project will take longer than expected, 2) that I will have to learn to do a lot more of the work myself than initially planned, and 3) increase my budget, so I can pay to have some of the work done.

Balancing It All--Life is always a juggling act, but anybody who has tried to balance a full time job, marriage, and a 2 year old along with a project of this scope, knows that I was doing an awful lot of juggling! Many thanks are due to my wife Carol and son Riley.

Uncharted Territory--Since the FSDO did not have the time or technical expertise to handle a project like this, Mike Prentice, of Pacific Southwest Aerostats, worked with them to locate a highly respected and trusted aviation

engineer, Hillyear Prentice (no relationship to Mike). It was obvious by going through these initial steps that we were in uncharted territory. No one involved had ever been through this type of project before, but all were enthusiastic about making it happen. The three of us worked together to develop the basket designs with Mike and Hillyear approving them before any construction or modifications were performed. There was a mountain of paperwork covering the design changes, test plan and results, and new flight manuals. With Mike's excellent guidance, we were able to submit the final documents with only one minor alteration.

Envelope Design and Manufacturer Selection--The envelope design was developed from a black and white drawing by a Camp Reach for the Sky camper, Robbie Medina. He created a young boy in high top tennis shoes, shorts and shirt reaching into the sky grabbing a star. Our request to use his design on our balloon was enthusiastically endorsed. Fortunately, I work at Hewlett Packard and had access to some great equipment to help me colorize Robbie's drawing. Through a contest I held at work, co-workers and their families helped develop the color scheme using stock, primary colors. The winner got a free balloon ride. From Robbie's artwork, I also created a figure of a young boy in a wheelchair and now the two boys adorn opposite sides of the envelope. Since we assumed we'd be doing a lot of balloon glows, it was important that the artwork be inlaid rather than over-laid to allow the true colors to show through. Because of limited space at a lot of the camps, we decided on a maximum envelope size of 105Kft³. David Bradley of California Dreamin' and the U.S. UltraMagic distributor, helped tremendously in making recommendations that would enhance the life of the balloon and in getting the most value for my limited dollars. We then sent drawings and specifications out to the major balloon companies and requested a quote for a complete system. The best pricing and value came back from a company that was yet to be certified in the US, UltraMagic of Spain. As an engineer specializing in quality and reliability testing, my standards are fairly rigorous. I decided to check out the operation first hand. A visit to the UltraMagic manufacturing facility outside of Barcelona left me thoroughly impressed with their people and products. I considered them a great value and decided to take the risk that they would receive their US certification by the time my new balloon would arrive. As it worked out, our balloon was the first non-commercial UltraMagic balloon in the US. The envelope is a M-105 and is 100% hyperlast fabric with two turning vents and the FDS deflation system. The conventional basket is a C-4, high top with MK-10 burners. We cried when we first inflated the balloon. Ultra Magic built it exactly as we planned and dreamed!

How the System Functions

The system is designed to operate in free flight or tether.

Flight--The first priority is always safety. As noted previously, the individual will come in his or her own wheelchair. They must have their doctor's permission for the flight and must also sign a waiver provided by the insurance company.

Our local preferred flight area is the wine country of Temecula; Ca. We'll only fly in the mornings when the calm winds provide us with a stand up landing. Since most wheelchairs don't have cushions or spring to them, this sort of landing will be a necessity. The basket will easily carry the wheelchair passenger, one or two passengers, the pilot, and 40 gallons of fuel.

Tethers--The main difference for tethers is the removal of most of the fuel. All my tanks are 10 gallon tanks with quick disconnects. They are easier to handle than the larger tanks and with the quick disconnects, easier and safer to remove

during tether operations. Our center divider panel is open to allow the easy handling of fuel tanks. The envelope is attached to the basket through the Galaxy tether harness. The tether ropes (4) are then attached to this tether harness. We operate with only one burner for tether operations.

Summary

I know some of you are interested in the cost figures. Our envelope with custom artwork and two complete baskets came to ~ \$55,000 I'm still paying for it! It has been quite a journey - but the real beauty of the trip is just starting. We hope that our Reach for the Stars Foundation will allow us to make the balloon available to special need children's organizations everywhere. The joy Reach for the Stars brings to the kids makes all the time and hard work worth it. I'd do it again in a heartbeat.

The best way for me to end this story is to thank those that helped make this dream come true. It could not have been completed without out the help, ideas, and inspiration of many people. First and foremost is my wife Carol and young son Riley. Thanks for sharing this dream and sacrificing the time and money to make this happen. Thanks to the many children from Camp Reach for the Sky that inspire us with their daily lives. Thanks to Robbie Medina for his uplifting spirit and talented artwork that now graces the side of the envelope. Thanks to the special team of "Balloon Doctors" of Pacific Southwest Aerostats, Mike and Brenda Prentice for their time and uncompromising dedication to quality and the spirit of ballooning. Thanks to Hillyear Prentice for his thoroughness and engineering judgment. Thanks to Kim and Dave Lynch for helping me to obtain the basket. Thanks to IMC for their foresight, their commitment to doing the "right thing for society" and providing insurance for the project. Thanks to Serena's Song and her team for breaking the ground in this area and providing us their encouragement. Thanks to Dave Bradley and the fantastic UltraMagic team in Spain that turned a dream on paper into an airborne reality. Thank you all!

The Author

Pat Murphy is a Systems Engineer and has been with Hewlett Packard for 20 years. He became a commercial lighter-than-air pilot in 1992. He met his wife Carol while both were volunteering at Camp Reach for the Sky. They live in Encinitas, California with their young son Riley. You may contact Pat through www.reach4thestars.org or by writing: Pat Murphy 433 Villa Blanca Court, Encinitas, CA 92024.