Quite a while ago an older gentleman called and reserved a one-hour flight in our DC-3. At 73 years old, he had enjoyed a long and impressive career in aviation. His hands and his pilot certificate were equally well worn, and I wondered how many landings those hands had been through. But he wanted to fly the DC-3, and that is the only reason he was there. So together we flew. Although this was his first time in the left seat of any DC-3, he handled the craft with smoothness and finesse, like this flight was one that he had thought a lot about. Back on the ground and sitting at our table, we talked some more and he produced a thick black logbook, and asked for my signature. The black book was also worn like his hands, but he had all of his totals accurately counted up, representing a lot of flight time, and a lot of history I am sure. I signed the entry line with the date, the N number, and the aircraft type: DOUGLAS DC-3. When I was done writing, he took the book back. With a black pen, he drew one diagonal black line through all the remaining entry lines on the page. Then I watched as he wrote the word "END" in big letters. He closed the logbook and wrapped a rubber band around it, then shook my hand. It was just dawning on me what this DC-3 flight had been about for him. He thanked me for helping him end his flying career by fulfilling a lifelong dream, a dream of flying the DC-3. "I'm all done, it's been a great ride, and I wouldn't change any of it. But it's too hard to keep my medical now, my vision isn't what it was, and there's just no point. There is no better way to end my aviation career than with this flight…" he said.

The Douglas DC-3 isn't getting any younger either. In fact it turns 70 years old on December 17, 2005. With over 13,000 originally built, few are left flyable today. The airframes, the parts, the people, and the resources are just quickly going away. Its not as if the airframe wasn't strong enough, they are just going away. So if you have ever thought about flying the 3 yourself, now is the time.

YOURE INVITED!
My name is Dan Gryder and I own an aviation training and consulting company located in Atlanta, Georgia. If there is anything that we can help you with, please contact us!

Several years ago I had the opportunity to acquire a Douglas DC-3 and to add it to the list of aviation related products that we offered from our company. What a great airplane!

At first the DC-3 didn't do much, but before long we had acquired several good training contracts. There is no such thing as a simulator for the DC-3, so anyone (including the FAA) that needs INITIAL or RECURRENT ground and flight training has to use the actual aircraft for training.

As of today, we are the most active and complete Douglas DC-3 training facility in the world. We have spent a lot of time rewriting the checklists and the training materials and keeping them up to date. If you would like free copies of all of these, feel free to go to either one of our web sites and just click on DOWNLOADS. We wrote all of this material and it is all posted there for free in PDF format. So you are invited. If we can help you fulfill a dream, please contact me to talk about it.

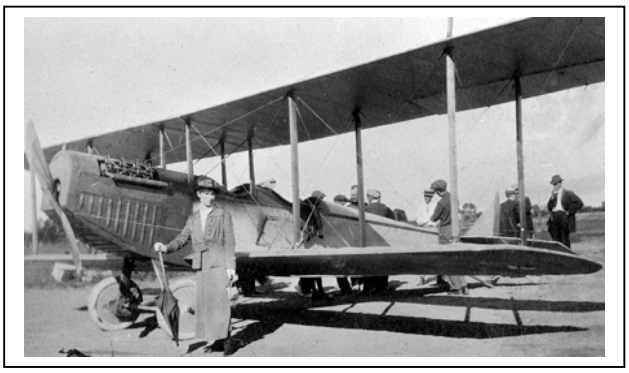
www.TheAviatorNetwork.com

www.TheDC-3Network.com

Thanks for downloading this large PDF file. What follows here is a long story, but if you follow it through to the end, I think that you will find it was worth the read. We have added in enough color photos that I think you will enjoy it.

Together, we flew

by Dan Gryder



Together, some phenomenal efforts were made by brilliant and daring people that blazed a trail for others to follow in the early days of aviation. One of these stories has to do with Donald Douglas, the early days of commercial aviation, and the planes they flew. The way I understand it, charging a fee for passage via air travel was a new concept that had become moderately popular by the mid 1920's. For those who could afford it, air travel was a new and exciting way of travel.

The main problem at the time was that the method and materials used in the construction of the airframes of some of the early airliners needed improvement. Orville and Wilbur Wright had done all of their flight-testing within the realms of wood and fabric as dependable materials. Early aircraft manufacturers still clung to this concept. These materials had one major drawback in that the main support structures of these early aircraft were also made of wood, and we all know what happens to wood over the course of time as it gets wet and dries out over and over again.

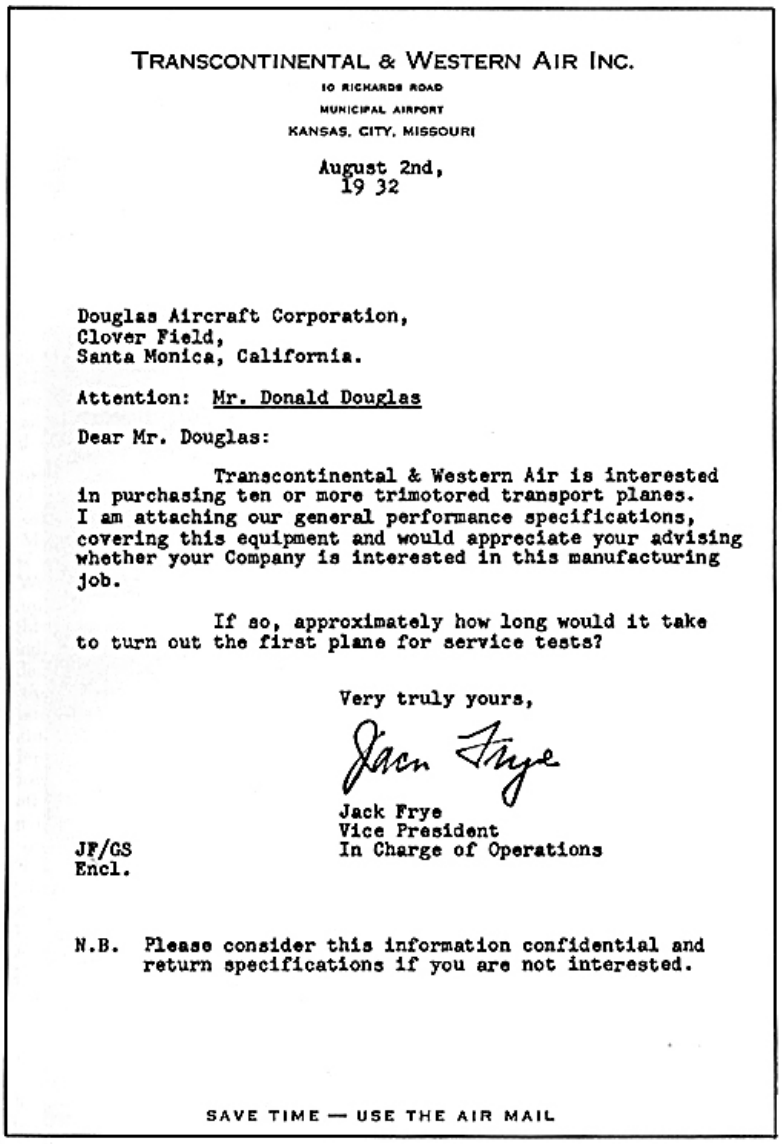
So after several fatal structural failures in flight, it was determined that a revolutionary new material was needed. The new material not so susceptible to failure as wood had to be proven to be reliable. A prominent fatal crash of an airliner on March 31, 1931 caused further national attention to the growing problem. A celebrity figure was killed in the crash and the fledgling CAA stepped in to require airlines to make very costly and frequent repetitive airframe inspections that in essence were not practical. United Airlines at the time was actually a subsidiary of the Boeing Airplane Company. United formed an agreement with the parent Boeing Airplane Company to build the worlds first all metal passenger airplane. The plans were in the works as early as late 1931 or early 1932, just a few short months after the March crash.

The airplane on the drawing boards was a twin engine, all metal craft that would seem to solve all the structural problems. They called it the Boeing 247 and immediately there was high demand for the new craft.

If it flew, United would hold a firm lock on every one of the first 60 production slots of the all-new 247. United would also then rule the skies in terms of revenue passenger air travel. The 247 made its first flight on February 8, 1933.

All of the other airlines found themselves at a disadvantage, being unable to acquire the new Boeing 247. Boeing had dedicated its entire production to only one major carrier, a decision that Boeing would later regret. Either another manufacturer was needed to produce an aircraft of comparable design and reliability, or some of these other commercial airlines would be forced to cease operations. At the time, it was thought that the 247 would be the aircraft that would change the world.

THE LETTER:



TRANSCONTINENTAL & WESTERN AIR INC.
10 RICHARDS ROAD
MUNICIPAL AIRPORT
KANSAS, CITY, MISSOURI

August 2nd,
19 32

Douglas Aircraft Corporation,
Clover Field,
Santa Monica, California.

Attention: Mr. Donald Douglas

Dear Mr. Douglas:

Transcontinental & Western Air is interested in purchasing ten or more trimotored transport planes. I am attaching our general performance specifications, covering this equipment and would appreciate your advising whether your Company is interested in this manufacturing job.

If so, approximately how long would it take to turn out the first plane for service tests?

Very truly yours,

Jack Frye

Jack Frye
Vice President
In Charge of Operations

JF/GS
Encl.

N.B. Please consider this information confidential and return specifications if you are not interested.

SAVE TIME — USE THE AIR MAIL

The young and aspiring airline known as TWA was the first to contact the Douglas Aircraft Company of Santa Monica, California to pursue this need. TWA was interested in a three engine aircraft. Their request was sent via a letter where a surprised Donald Douglas opened up his mail one day and found this letter. It was an open invitation to build an airplane that would compete with the Boeing 247 and solve the problems of TWA. Douglas would later refer to this one letter as the birth certificate of commercial aviation. Could he build something as good or better? As you may know already, the answer to this was "Yes." Douglas took the letter home with him that night. Attached to the letter was a list of requirements desired by TWA. Douglas had said that he studied the letter and the requirements until 2 a.m. and was then unable to sleep the rest of the night. The next morning he called a meeting. In the meeting was a team of experts, each offering an opinion on their area of expertise. This meeting lasted all-day and well into that night.

During the next two weeks the team assembled to argue and debate the new aircraft design and offer their ideas for what would eventually roll out of the hangar. The design eventually capitalized on the best features from several already proven designs. It would have the best wing, the best undercarriage, the best nacelles, and the best power plants. Headed up by a design team led by Jack Northrop, the Douglas team design ended up being a more efficient two engine aircraft with a larger wingspan than normal. TWA tentatively accepted the Douglas proposal and entered into a contract to build one DC-1 aircraft as a test aircraft. This contract with TWA was signed on September 20, 1932, some five months before the first flight of the 247.

Donald Douglas had multiple talented staff from all aspects of the industry, including from both Ford and Fokker. The early sketches showed a twin engine tail dragger type airplane that could carry as many passengers as, but would be faster, more efficient, stronger, and have better performance than the 247. It would even have guaranteed single engine performance in the case of an engine failure at takeoff, another concept that was new to the industry. It would also incorporate the concepts of corrugated sheet metal (from the Ford and Fokker designs) in conjunction with flat sheet metal, something I would soon become intimately familiar with by default.

Starting out behind in a race that had already begun, Donald Douglas and his engineers labored diligently on their own drawing boards. They relied on a teamwork of input that used concepts from a cross section of the industry. Within a very short time period, the new Douglas all metal prototype airplane had been designed and was being assembled as per the drawings. The primary emphasis was to create a super strong center section wing structure, and utilize materials with a goal of maximum durability. Aircraft design testing was indeed primitive at that time and much of the work was completed by trial and error.

Douglas' method of testing the strength of the wing

STRENGTH GREATER THAN THE SUM OF ITS PARTS

The topic of hot debate was method of construction for the airframe. Some wanted a one piece carry through spar. Others wanted spars built in sections that they called "cellular multi-web construction." As they soon learned, the strength of the finished structure was far stronger and lighter in honeycomb arrangement than the carry through concept. The airplane built this way really was far stronger than the sum of all its parts.

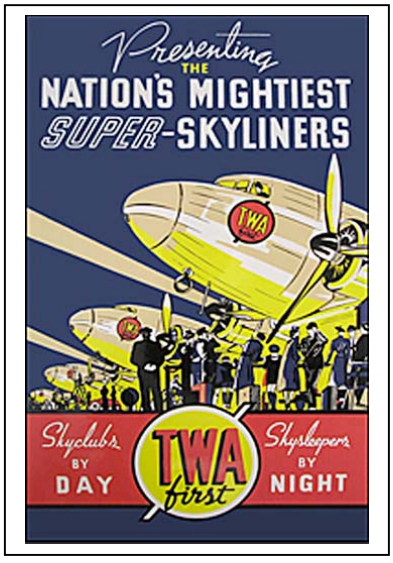
Soon a real aircraft was ready for a test flight. In an amazing feat, the Douglas people completed the project and made their first flight of the DC-1 on July 1, 1933, just 10 months after entering the contract with TWA and only five months after the first flight of the Boeing 247. The race with Boeing had suddenly become very interesting. Douglas had successfully utilized the best of all of his people. The testing proved that Douglas had made a design that was obviously stronger than the sum of all of its parts

The prototype flew well even in spite of some bugs on the first test flight. It was very clear even in the early stages that they probably had a phenomenal design on their hands. Only one DC-1 was ever built. This DC-1 was delivered to TWA and was immediately accepted. Refinements and numerous improvements were made and eventually an improved DC-1 design series of slightly different aircraft was released for service. These aircraft were called the DC-2 series and TWA took them as fast as Douglas could deliver them.

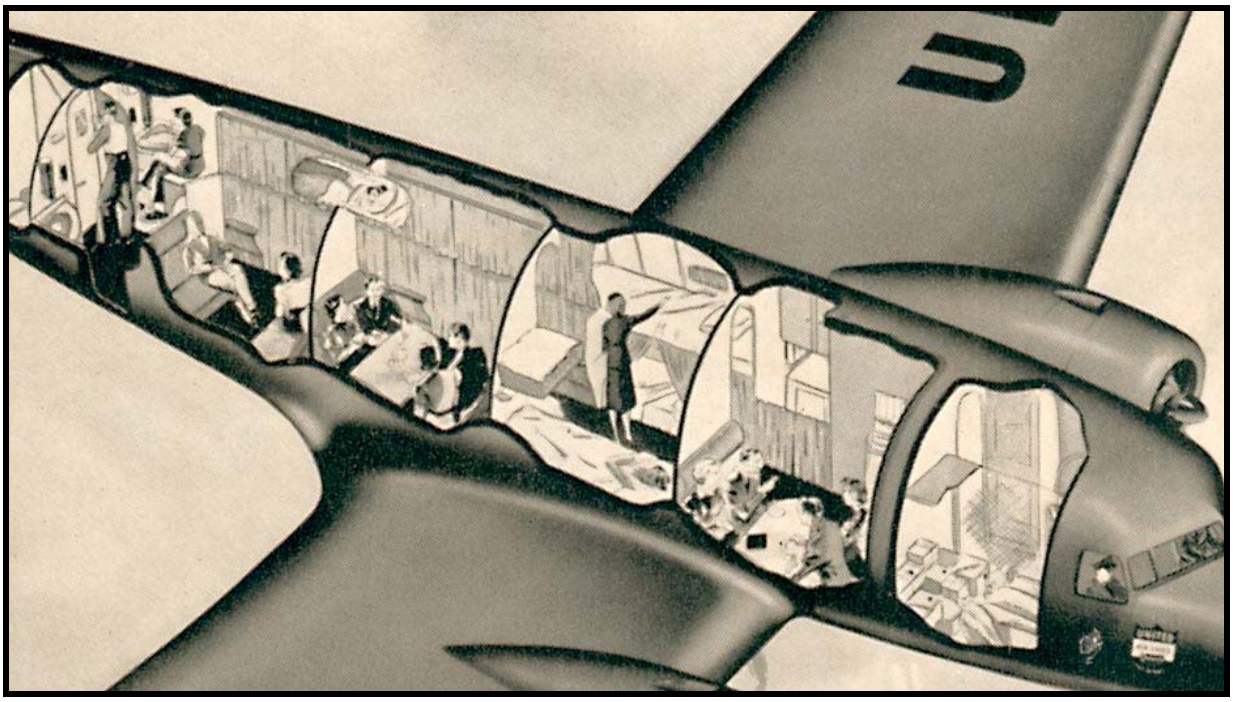
Many other airlines had also placed orders for the DC-2. Numerous copies were soon flying in various liveries in passenger service with outstanding results. The aircraft could sustain record profits for any airline exclusive of government subsidy or mail contracts, a first for the industry. The sale and orders for more aircraft produced the revenue for the Douglas Airplane Company that would fuel the development of the next series, the DC-3. All in all, 198 DC-2 aircraft were built, and Boeing became fully aware of the company that had started so far behind and had gotten so far ahead. In futility, Boeing ceased production of the 247 at 76; there was no more need for it.

THE CALL

By the summer of 1935, the Boeing 247 had all but been erased as a contender, even though some companies were still operating them. Even United Airlines themselves got in line and placed their orders for DC-2 aircraft. The Douglas folks had gone from being the underdog and least noted, to being "King of the Hill" in terms of commercial aircraft.



Donald Douglas Sr. received a phone call from American Airlines that would change the commercial aviation world. American's request was for a sleeper version of the DC-2 series aircraft that would hold a crew of 3, and 14 passengers in a sleeper coach configuration. The concept of passengers being able to sleep in bunk type arrangements while in flight was new, but due to the fact that these flights were very long, it did make sense. However, Douglas was reluctant. Making way for sleeping berths aboard a DC-2 aircraft would require increasing the size of the fuselage, wingspan, and length of the aircraft. The phone call initiated by American's CEO, C.R. Smith, to Douglas is said to have lasted over two hours and cost American $335.50 in long distance charges. It took Smith every bit of those 2 hours to convince Donald Douglas that they could build the new aircraft, that it would be successful, and that there would be demand for it.



Once again, the Douglas people set to work. In record time the first "stretch/widebody" DC-2 was ready for a test flight. It was called a DST, or Douglas Sleeper Transport. The workers who built it thought of it as a "stretch" DC-2. The DST was so different from the DC-2 that it was eventually given a new designation of DC-3, as it had an extra 10 feet of wingspan, it was 30 inches longer, and the cabin was 26 inches wider. It was a new airplane.

It had not been that long since the Wright brothers had made their first flight on the same day back in 1903. Now, just 32 years later, there sat a brand new shiny all metal Douglas DC-3 DST built with new engineering concepts. It had more lifting capacity, cabin space, and reliability crammed into one airframe than the world had ever seen. The date was December 17, 1935 and the test flight was so benign and so uneventful, that not much fanfare was given to the fact that this was indeed the first flight of an aircraft that was truly remarkable.

The first DC-3 was flown that day without incident, and very few were even on hand to witness the flight. I don't think that Douglas himself realized the significance of the flight, as the company did not even request a photographer to document the event. To this date, no photograph of the first flight of the first DC-3 has ever been produced. The sleeper version DST DC-3 was indeed successful, but more so was its airframe. Douglas himself immediately saw the advantage in selling a day version of the DST, an airliner without the sleeping berths, which would allow an increase of the passenger seating to 28.

Before it was over and production had stopped, over 13,000 copies of various types of the now famous DC-3 aircraft would be produced for both civilian and military use. At one time, more than 90% of the world's air travel was being conducted aboard a DC-2 or DC-3 product. This aircraft was so strong and so successful that it soon became a worldwide symbol of commercial air travel.

Somewhere in the height of production, the folks at Douglas were completing an average of three aircraft per day. To the casual observer, this may not seem to be an amazing amount, but considering the times, materials, and methods that were available at the time, and how far behind they started out, this is in all reality quite a story in and of itself.

SERIAL NUMBER 2054

In this early mix of production was our DC-3, N143D, and serial number 2054. It was a "day" version of the new DC-3, built in 1938 and completed in October of that year. It was originally shipped to Swiss Air via ship and re-assembled as one of their first DC-3 passenger airliners in non-sleeper configuration. This airplane flew throughout Europe for many years with a registration of HB-IRO.

This particular aircraft served well for the Swiss, and eventually returned to the states where it also worked day and night helping to build the revenue stream of Ozark Airlines. It was one of the first DC-3's that was acquired by Ozark. In the states it held registration number N143D, the same registration that it bears to this day. Ozark completed its use of the aircraft in the late 1960s and soon thereafter it began a new life as a freight airplane, flying mostly at night on long haul routes in the United States.

Now it was my turn to get to know the old girl. If she could only talk or tell some of the sights she has seen, or the places she has been. One of the first things I did was to name her "Darla Dee" in thanks to my wife for her support and approval of this venture. We use the airplane for flight training, offering type ratings as well as recurrent training, and even familiarization rides for pilots who just want a chance to sit left seat and fly a really great classic vintage airliner.

Now is when things really started to get interesting for us. Here is the rest of the story.

THE OTHER CALL!

It was our turn for our phone to ring sometime in late 2004. Just like the call to Donald Douglas, this was a big phone call for us. On the other end of this phone call was a staff editor from AOPA Pilot magazine. They wanted to talk about DC-3's, what the DC-3 had done for aviation, and the possibility of using our DC-3 for a story for the magazine in time for the 70th anniversary of the first flight of a DC-3. I had planted this idea as a seed months prior with an e-mail sent to AOPA, an e-mail that I thought had long since been lost like a needle in a hay stack. The 70th anniversary of the first flight of the DC-3 would be rolling around in December of 2005.

AOPA wanted to know if we could help with a project that would be of interest to a real cross section of all AOPA members and aviation enthusiasts, both young and old, both new pilots and seasoned. Of course my answer was yes.

In the following months the details were laid out, revised, the requirements were reviewed; the technical aspects of the work were discussed. AOPA wanted digital and film imagery, but they also wanted to research the historical side of the development and the implications of the design.

As it evolved, the project would involve gathering as much information as possible about the original Douglas project, the teamwork that they had, how it was built, and how much of an underdog the company really was to even think of competing against Boeing. The real story to me was the vision and persistence of any young company fighting for a chance to live, grow, and compete in a free society, and the risks taken to make it happen.

By January of 2005, I had spoken with the staff at AOPA enough to get a real good feeling about the project. These folks were sincere about promoting General Aviation, the history of early aviation, and they had a passion for flight.

I was able to learn a little bit about the editor assigned to the story. Her name was Julie K. Boatman and you have probably read some of her work over the years. In talking with Julie, I could tell she was both fascinated and apprehensive. As an accomplished and seasoned pilot herself, she would be doing all of the research and some of the flying for the story. The more I became acquainted with Julie, the more I was impressed with her work and her knowledge of aviation. Julie wasn't just an editor, Julie was a pilot. At my suggestion, why not think about the possibility of her gaining the DC-3 type rating in conjunction with the story? She had more than enough total time, and she was already a multi engine rated pilot with all the necessary pre-requisites already met. By the early part of 2005, we had agreed for her to take the 6-day course. Now I had a job on my hands. I needed to find a partner for her. We always do a DC-3 type rating course two people at a time. I needed just the perfect applicant that could fill this assignment. But who?

We get a lot of inquiries off of our web sites. If you would like to fill one out please do. Just go to:

www.The AviatorNetwork.com

or

www.TheDC-3Network.com

and click on ESTIMATE IT and fill it out. You'll get a personal response from me.

We get four or five of these inquiries a day off these web sites, most all of the people that write in are in love with the great gooney bird. However it takes both a lot of money, as well as a significant amount of aviation experience to complete the 6-day course. Some have the financial capability to complete the course, but no pilot credentials, or just not enough.

On the other hand, some have the world's greatest pilot credentials, ratings, and total time, but like most people, they don't have that kind of money laying around for this training that is not actually required, and doesn't really serve any purpose. Out of the stacks of inquiries are those pilots that have everything they need. I sifted though the stacks of paper. I was looking for a player that had all of the above, but I also needed a pilot that could help with this special project. I needed a person that was a real people person, and a real accomplished aviator as well. Within a few days I had narrowed the possibilities down to just four. Of these four individuals, I had spoken some time prior to this retired guy named Charlie on the phone just once. He had taken the time to call and ask me some good technical questions about the DC-3. During our conversation, one of the things I remembered was Charlie's laugh. I didn't remember much else of the details of his extensive aviation background, only that I had laughed at his jokes, and that he had laughed at mine. This was a good sign.

THE NEXT OTHER CALL

So I called Charlie. Of course it didn't register with me at the time that a 206 area code was way out west somewhere, we hadn't talked about what part of the country he was in. I figured that out when he answered his phone at 9 am Atlanta time in one of those voices that indicated I woke him up.

Once I explained who I was, and what I had going on, he came to life. Did he want to participate? Of course his answer was "Yes!"

So that was it, we finished the rest of the coordination and before you knew it, March of 2005 was here!

Charlie flew in from Seattle a day early to get rested, and Julie arrived soon after. We all hit it off right away. We studied, we flew, and we had our meals together. Lee Davis has been my right hand go to guy on building the comprehensive training program. Lee is not only an accomplished ATP with thousands of flight hours, he is also a DC-3 rated pilot with an extensive knowledge of the plane. I often use him as one of our DC-3 training captains to conduct some of the ground school and to keep the training on track.

Mornings were spent going over systems and operating limitations, and the weather was great. Blue skies and light winds prevailed as Julie and Charlie began their flight training in the 3.

In addition to all of this, we had also coordinated for the FAA to have their own DC-3 in town. Our plan was to get a good photo shoot of both aircraft individually as well as with both aircraft together in formation flight. The FAA agreed to bring in their DC-3 aircraft as well as their pilots.

The FAA has provided significant resources to help promote aviation through the use of their own flying museum. N34 was a flight check DC-3 that saw a lot of use for many years. Now it only goes to air shows where thousands upon thousands of visitors tour it each year, all without any admission charge. Over the past three years I have had the privilege of conducting numerous type ratings and recurrent training for the crews of N34. As part of the training, I also get to conduct training in their aircraft on occasion, a real treat for me.

TOGETHER WE FLY

After several days of ground and flight training, AOPA's staff photographer Mike Collins had flown in and we had a chance to talk more about some ground shots, the air-to-air shots, and the formation flight that was slated for April 2, 2005. The day was April 1, 2005. The three of us had been flying and training together for several days. On this particular flight, we invited AOPA staff photographer Mike Collins on board to ride the jump seat and shoot some in flight cockpit shots while Julie did some touch and go landings. After a while we stopped for fuel at our favorite airport, Thomaston Georgia (KOPN) and Mike got out while we refueled. Our plan was to let Charlie get some more landings while Mike photographed the aircraft from the ground.

THE CRASH

We had completed numerous approaches and landings, and it was time to load up Mike and his gear and head back to our base airport. We briefed for a full stop landing on Runway 12 at Thomaston. Only this landing would really be a full stop. With Charlie at the controls, he made one of the nicest DC-3 landings I have ever seen. I think he just got lucky but the wheels just slid on and rolled like we were landing on cotton. We rolled out and slowed down to almost taxi speed.

The next thing I knew, it sounded like an explosion had occurred right out my open right window. We all felt the airplane fall to the right and I knew the sound I was hearing now wasn't good. That was the sound of the propeller digging up pavement. We were all three shocked. How could this be? No time for that right now. Charlie waited until we had slid to a stop and then called out "Your airplane!" We still razz him about that. The evacuation was orderly and quick. We all had a job to do. Julie was already unbuckling out of her jump seat and getting rid of her headsets.

I grabbed the mixtures, mags, battery and fuel selectors and we all three scrambled to leave the cockpit. Fire was on my mind. We brief and review emergency evacuation procedures before each flight, but no one ever thought that we would actually use them. We scrambled for the aft doors. The tail was still fairly high in the air as we swung the doors open. This didn't stop Julie as she set records for both the high jump and the 100-yard dash at the same time. Charlie and I were right behind her. I fully expected to see a fire that we weren't going to be able to put out. The three of us gathered just off the runway and I was amazed to see no smoke, no fire, and no motion. It was leaking a little oil off the right side, but during the whole process we didn't spill a drop off fuel. The warm engines cooled quickly. It was safe to approach the wreck. For the first minute or two, I was already second-guessing our approach, landing and checklist. Was there something that we did or did not do? Did we fail to latch the gear?

I could not imagine that this was the case. Anyone that has flown with me in the 3 knows what a pest I am on checklist usage and making sure both crewmembers verify "DOWN AND LATCHED, HANDLE NEUTRAL, PRESSURE UP, GREEN LIGHT"

Not that we are not human and fully capable of making a mistake, it just didn't seem right that this had been a crew induced problem.

THE INSPECTION

The first thing we all noticed as we approached the lifeless monstrosity laying crippled on the runway was the piece of material sticking up through the right wing. It slowly dawned on me that we had suffered a pure mechanical failure of the drag strut linkage. We had never heard of such an accident on any DC-3 or C-47 series aircraft.

I crawled back in the same cargo door that we had just come flying out of a few minutes before. I just wanted to be sure. I turned the battery back on and there was a green gear light.
The latch handle was still latched to the floor just like we had left it. I turned the battery switch back off.

The process to remove the airplane off the runway was slow and tedious, but we got it moved within a few hours and stabilized where it would not be in the way.

Wherever we put it, it was obviously going to be for a while. My initial inspection told me that at a minimum we had damaged an engine, prop, gear, tire, oil cooler, right wing tip, and complete center section of the whole right wing. How much damage would be found inside the wing was anyone's guess.

On the exterior, I tried to stay calm and not show how disappointed I was. Actually this all felt pretty devastating. But at the same time, I made it clear that we have to be thankful for what we have, so let's review here. First, no one was hurt. Second, the airplane did not burn.

Third, according to my memory and experience, just about every time something bad happens, there will be something good to come out of it, some way, somehow. From this position, I was having a hard time figuring out how I could make any lemonade out of these lemons, but that is the concept that has never failed in the past. Everything happens for a reason, and maybe someday I will look back and say "I am sure glad we crashed that airplane."

Now the disappointment really began to set in. We had a lot of people in town and logistics in place from all over the country for this project. My airplane had failed in front of the FAA and AOPA. AOPA Photographer Mike Collins had even caught the entire sequence on super high resolution digital imagery.

I knew for sure that this was the end of this project and maybe the end of this particular airplane. We made plans to get everyone to the International Airport to change their flight arrangements. One by one everyone left and I knew that the road ahead would be a tough one. I just didn't fully understand how tough it was going to be.

The last guy to leave town was Charlie. I was still in shock that the famous Douglas airframe known for its indestructibility had actually failed for no good reason. And if it had to fail, why

did it have to fail during this project of all projects? My original invitation to the folks at AOPA had been to help celebrate the timeless and indestructible qualities of the Douglas airplanes 70 years later, and we had just destroyed one for no apparent reason in front of everyone. In my head I was making mental calculations regarding the price per pound of scrap aluminum and how many pounds I now had to offer the nearest soda can collection center. I also knew that I could scrap any hope of a Douglas story actually going in print.

So the next morning I picked up Charlie at our private guest quarters to get him up to the airport. It was 'Oh-Dark-Thirty' but he had this big grin on his face. I didn't see anything worth grinning about. Charlie acted like he knew something. After a few minutes in the car, it all came flying out of his mouth like he couldn't hold it any more. "They're coming back you know... all of them. Mike Collins, Julie Boatman, FAA, AOPA...They have already discussed delaying the entire project for you until you are ready, and still making the press deadline for the December issue." I looked at him sideways.

I couldn't figure why anyone would already be making plans to come back here when we just crashed an airplane with them on board. But to my amazement, Charlie's inside information was not only a little right, it was right on! Not only did they want to come back, the folks at AOPA and FAA turned out to be my biggest cheerleaders. Not finishing the story had never crossed their minds.

As it turns out, that piece of information Charlie provided me was just the shot of encouragement I needed. At the time, it was about all I had. Suddenly, I realized that I was now the underdog and I was pretty far behind, but this race wasn't over yet.

I got on the phone and lined up a crew for first thing Monday morning, April 4, 2005. In the first two days of work we had pulled the prop and engine and I had them secure in my hangar.

Next, both wings came off and we got them to a location flat on the ground where they could stay while we sorted out the rest.

By late Tuesday afternoon, the airplane had the right engine, prop, and both wings removed, and it was up on a jack on the right side. We spent the next several days rigging

a spare gear to re-install where the destroyed right gear had been. This process was tedious, as we had to devise a method of allowing the airplane to roll on its wheels, without the gear folding backwards again. This was easier said than done, as there was nothing to attach a drag strut to on the right side.

But even this hurdle was soon overcome and we slowly and safely tugged the crippled airplane over to a hangar where we could get shop air and electricity to it, something that we had not previously had way out on the ramp.

Next came the process of cutting away all the scrap and bent aluminum. It looked like an explosion had occurred in the center section of that wing. These were long days spent trying to figure out if this was a fixable airplane or not.

In the mean time, most of the key players in my circles were aware of the accident, how bad it really was, and what we were up against. I used the REPLY ALL button on my e-mail more than I ever had, and before you knew it, I was in frequent communication with a lot of people regarding the project as we opened up the wing. Among all of us, Charlie provided a valuable service by serving as a scapegoat, after all he had been at the controls when this thing happened and we made the most of that.

Initially, I had been thinking that one of the main problems here would be finding parts, and making the repairs absolutely by the Douglas books. As it turned out, finding the parts was easy and the Douglas books made it easy to follow the approved methods that they had built the airplane by almost 75 years ago. The only thing I was still sweating was the spar. We all know that a spar carries the bulk of the load in an airplane, and all spars are carry through, right? What do we do about the rear spar that was destroyed?

Here is an e-mail that I sent to Julie, Charlie and Mike in late May of 2005 on the day that this project turned the corner and went from being “impossible” to “simply difficult.”

TO: Undisclosed Recipients
FROM: Dan Gryder
DATE: 5/26/05 09:46:47 pm
SUBJECT: RE:ady for duty, well almost

Hello to all, I have a few photos that I thought ya'll might be interested in looking at...and some interesting details to go with them.

After the wreck (referenced by some as Charlie’s touch and no go) and when we got the airplane stabilized and started clearing away the damage, we made an initial assessment of all the key areas: Top skin, spar, middle skin, fuel tank attach angle, ribs, landing gear, engine, firewall, and prop, lower engine nacelle fairing, oil cooler, and wing tip.

That sounds like a lot, and it is, the only question was whether it was possible. The only item that really looked scary to all was the rear spar. It had a huge 14-inch square hole missing out of it.

We have an SRM (structural repair manual) for the series that provides ample solutions to all except the spar problem.

The only thing the SRM referenced was putting a doubler plate if the hole was small and we could "frame it" with at least 4 inches of spare space around the hole for a double row of rivets. This was not our case as our hole went from real high to real low. We attribute this to Charlie’s landing technique as we think he was wriggling his toes during the landing roll, which set up an unusual vibration. Charlie says he thinks there was a cat walking from back and front during the landing roll.

By April 10 we had a firm plan in place for repairing everything but the wing spar, and no plan in sight. So I took the engine to OKC, the prop went out, and we started ordering all the materials...ribs, rivets, attach angles, landing gear drag strut fittings (2 to be exact...). Most of the material we found new never used as military surplus. The ribs still had original Douglas stickers on them.

By April 25, I was not feeling good about fixing an airplane that could not be fixed, but we pressed on anyway. One of those “cross that bridge when we get to it” things.

Then the prop showed up and it was beautiful. Shortly after the shop called and the engine was ready. I can't say enough good things about both the prop shop and Roy in OKC. He went more than out of his way to help and I sure appreciate it.

We had made good progress on everything, but still we had no clue about what to do with the spar. I had been in about 6 places around the country finding the parts for the DC-3, and all had been secured and were in transit to Georgia. The only thing left to do was to order the 4-foot by 8-foot sheets of stock aluminum that we would need for all the skins and parts that had to be replaced. Mark and I got out the books again and made a shopping list. We got everything except spar material. There was no point in buying spar material that we could not install. I was about to phone in the aluminum order when I got the wild hare, why not just get some spar material anyway, even if we don't know how or if we could use it? Mark took out his micrometer and mic'd it, it came out to around 50/1000. We decided to be more exact and find out what Douglas called for as far as the exact alloy and thickness used in the first place. Out came the SRM again and we tried to find the reference.

The one place I could find it listed showed 3 different materials for each spar (there are 3 spars) and a datum referencing the center of the airplane outward towards the wing tips as inch references for what material at each station. Now this did not make any sense to me. We all know that spars are carry through in each section. Douglas had gone out on a limb and away from convention when they did not have a continuous piece or three spars that went from wing tip to wing tip like the Boeing 247 had, but surely the spars in the center of the aircraft were carry through, weren't they?

So we poured over the pages and were convinced that this was a typo or some kind of mistake when the book was printed. It clearly indicated that the material changed at station 94 and was constant from that point to where the wing attached, but that station 93 was a different thickness of aluminum. We sat there looking at this not quite sure what to make of it.
Is there a tape measure around here? Mark said there was, but finding it could present a problem. But we did find one and in no time we had commenced to measuring (Julie, that's a southern term meaning that the process had begun). I held one end at the exact center of the airplane, Mark stretched out the tape to where station 94 was. What we found buried around the backside of a doubler plate, after scraping away the dirt, grease, and primer, it was obvious… the spars simply butted up against each other at station 94, but they were two separate entities of their own! Now for each spar, there are four independent sections in the center section (excluding the wings) for a total of 12 individual spars all bonded such that we have made a rough estimate that they are probably 20 - 40 times stronger than doing it the other way.

Douglas built the DC-1 prototype when all the chips were down. Boeing had the contract and the orders to build the 247, and they were way ahead of the game. They had to build an airplane that was stronger than the 247, and less weight.

I don't think that they really knew how strong it had to be, or how strong to build it, they just knew that they wanted to place the engineering effort on strength. So the whole concept of the airplane is a common bus system for all the aircraft systems, and a structural concept that gets its strength by

joining the strength of the individual pieces… this turns out to be stronger when bonded, than any stand alone solid piece could ever hope to be.

Whooda thunk!! If our thinking was correct, we should be able to un rivet the pattern all around this broken piece, slide it out like a book off a shelf, slide a new one in, re-rivet it in place, and we are up and running. So today was the banner day! The spar came out like a scalded dog (meaning that the eventual separation was accomplished without strain) and we all got a chance to touch this piece of history that was last inserted in late 1937!

And we all learned a lot. I called around to a few key contacts around the country to get their thoughts on "spars in sections" and no one had ever heard of it, but I can tell you that is the way they were built, and now we know why! We went ahead and yanked the "culprit" piece (the one that had failed) out of the left wing this week and replaced it with a factory new one so that is all done.

The offending drag strut from the right side was ready so it is now installed on the left side. We will finish the magnaflux on the other drag strut Friday and have it ready to go. We still have some intricate cutting and fitting for the top and bottom skin but there are no logistics problems there, just patience and the proper tools.

So that's my update, enjoy the photos, and I just wanted to say a special thanks to you three core folks that were here for the start of this project. I can't tell you how much I appreciate the support, and even the banter via phone and e-mail has helped my fortitude a whole bunch! I will have some more updates here shortly. I am now looking forward to flying this thing again here pretty soon, and having a nice dinner with you guys someplace to celebrate...

Dan

This e-mail really was the turning point in the game for me. If we could solve the spar problem, we could solve any of it. Within days we had a new spar web built that would slide right back in place.

As a note of interest, while the spar web material comes in sections, the spar caps (angled aluminum) do not. The spar caps run from attach angle to attach angle and are one continuous piece. If we had damaged a spar cap in the crash, this project would not have been one that I would have elected to complete.

So how much did the accident miss the spar caps by? It missed by a 1/16 inch on the top, and less than that on the bottom, but not a scratch on either spar cap. This amazing piece of spar web (the damaged one with the big hole in it) is now hanging on my office wall, what a story it has to tell!

Somewhere during all of this, Julie arranged to come in for a day and inspect our progress. I wasn't sure what to expect, her being a renowned editor type and all, but she did show up wearing blue jeans and an old shirt just when we had a lot of riveting to do.

We wasted no time putting her to work and she spent the day forming this special cowling piece that also had been destroyed by Charlie. Did I mention that Charlie is just really hard on airplanes?

By the end of the day, Julie had her clothes dirty, some good dirt underneath her fingernails, and a new piece of material built and riveted together. She also had a big smile on her face as she now had built a piece of this airplane. If you visit us at the airplane, be sure to ask to see that special part that Julie Boatman built!

HERPA JOINS IN

Somewhere in the whole process, something else went right. We had been communicating with a company in Europe for some time about letting them make models of our airplane. Their idea was to design a particular paint scheme for the airplane that would exactly match the DC-3 models that they wanted to produce. It sounded like a good idea to us, especially when they asked us to fly the airplane to an air show.

This company is called HERPA MINIATURE MODELS and they make a lots of scale models of all kinds of cars, trucks and of course, airplanes. Visit their website and see for yourself at http://www.herpa.de

We were now making plans to have the airplane done in time to take it to Oshkosh in late July of 2005, but as fast as we worked, it became apparent by early July that we would not make it to Oshkosh.

Herpa never missed a beat. Viewing the additional time as an asset to make even better planning and promotion of their fine line of models, we simply worked together and moved our time line back to improve and produce the same three scale models, and take the airplane to Sun 'N Fun in Lakeland in Spring 2006.

More refinements were made to their 3 different scale models of N143D so that now their details are in fact very accurate to that of the real aircraft.
The HERPA colors look fantastic on N143D and the airplane will be featured in about 15 different publications worldwide in the next few months.

If you would like to see us in person at the Lakeland air show, you can have a chance to visit and meet in person the folks from HERPA. I will be there as well as the real Darla Dee, and you can even meet and shake hands with Charlie, he's the guy that wrecked the airplane in the first place. Make sure you give him a hard time about his landings. He's a real personable guy and he's used to all the abuse!

The people at Herpa have been extraordinary supporters of the DC-3 and aviation and we are pleased to count them as our friends as they love the old gooney bird as much as we do. The HERPA airplane will be on display during the entire air show at Lakeland and the tours are free; we would love to see you, so please stop by and say HI!

Well next came the top skin repair. Charlie had left quite a mess on the top of that right wing where the drag strut had come through. It was just too bad this wasn't a golf game as we could definitely classify this one as a hole in one.

During my research, I learned that Douglas had hired a lot of people from Ford and Fokker in the early 1930's. I never realized it before, but the main characteristic of both the Ford and Fokker series Tri-Motor airplanes was the corrugated sheet metal used on the exterior of their aircraft.

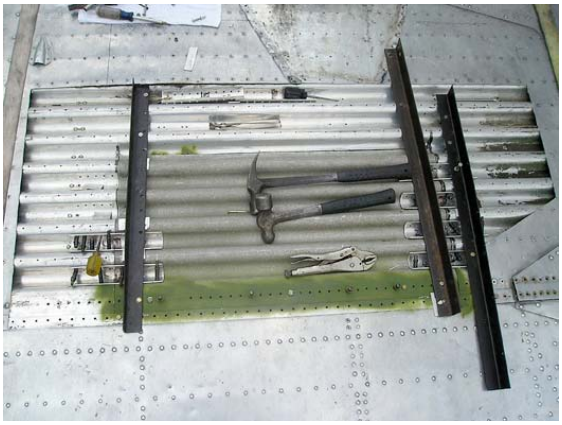
In order to repair the damage on top of the right wing, we had to have some corrugated sheet metal. The problem here was that they don't make this stuff anymore. Fortunately for us, Randy at Basler in Wisconsin had just the piece that we needed. Randy told us that all the DC series aircraft used this same material which is eventually bonded to the flat sheet metal via the use of rivets to form a metal structure that is super strong, and yet, very light weight.

It was just a few days later that this piece showed up in the mail from Basler. We unpackaged it and laid it aside, unaware of the can of worms this repair in and of itself would eventually present.

Out of curiosity, Mark held it up to the airplane's exposed corrugations that were visible at the attach angle of the right wing. It looked exactly

like the right material; only the peaks and valleys did not exactly match up. How could this be? Yes, it was the correct material, it came from the experts, and it is close, but it sure didn't look like it would work to me. After a few more phone calls, we too learned the secret here; the corrugation needs to be compressed to make it match up with the existing corrugation. Apparently corrugation under compression is even stronger than that which is not.

So how do you build an apparatus to compress a 2-foot by 4-foot section of curved aluminum? All I can say is that it wasn't easy. But sure enough, as the foot pounds from our home brew wing mounted compression device started piling on, the corrugated piece not only shrank in height, but it lengthened as the material converted height to travel. Amazingly, with all compression in place, the spliced in piece looked like it was supposed to go there. Every peak and valley was a perfect match.



Now to hold the new piece to the airplane material, the book called for some splices to be used. The Douglas books called for making these splices out of aluminum that would lie in the valleys of the patch. Here was another easier said than done situation. We had to take 80/1000 aluminum and gently bend it into a half moon sections that would lay flat in these valleys. Again, there were no commercial apparati available for this, but we were able to build the tooling to make the pieces. Once the pieces were all in place under pressure, we were able to assemble the entire repair by using machine screws, nuts, and washers. This took an inordinate amount of time but there was a method to the madness. This entire repair was going to have to be riveted in place, we might as well have it screwed in place first and locked down tight before we shot the first rivet. There were over 500 screws used in this piece alone, each one carefully drilled with a template that would insure that the spacing and distance requirements were all exactly as specified in the Douglas books. Now that the entire corrugated piece was mounted and held in place with screws, we were able to remove the compression device that we had built to form the sheet metal top skin.

Everyone watched as that last assembly came off. The entire repair didn't budge at all; I didn't think it would, as my hands were still sore and callused from helping putting in a good many of those 500 screws.

From here, it was time to shoot rivets, one by one the screws came out, and for every place a screw came out, a rivet went back in. Fortunately for us we had two aircraft hardware vendors at our disposal, Aircraft Spruce was just a few minutes away, and my favorite all time airplane hardware store in the world (Freeman's Just Plane Hardware) is on the same field with me.

Now let me tell you about Freeman's. These guys have a warehouse full of airplane specific hardware, they have a good catalog, and they can ship direct. But most of all they are owned by Tom and Butch, two good friends of mine that are also pilots and great supporters of general aviation.

Working everyday in the warehouse is Diane. I know I am going to hear about it from Diane for putting her name in print, but if it weren't for Diane and the help I got from Freeman's, this project would have never flown.

Diane is a walking hardware computer herself; she knows airplane hardware like no one I have ever met. Call them direct at 770-227-2602 if you need any airplane hardware parts.

So we shot about 500 or so of these rivets into this particular corrugation repair and finally, the corrugated part was all done.

From here, we were down to the simple stuff: you know, like replacing the wingtip, replacing the ribs, replacing the flat sheet metal on top of the wing, replacing the fuel tank attach angles, replacing the lower skin, and replacing the lower deck fairing for the landing gear.

This lower deck is called a turtle deck. As luck would have it, I happened to be talking to my Friend Karl Stolzfus at Dynamic Aviation. Dynamic is a huge government aviation contractor and Karl used to operate numerous DC-3's on contracts. I mentioned my plight. As luck would have it, he had a brand new turtle deck still in a box in a warehouse. The price? Free. Karl knew that there are not many of these left anywhere, but he also knew what we had been through. Karl runs a great operation in Virginia and we appreciate his help in getting us flying again.

We worked some really long 14 and 16-hour days outside through the Georgia summer. My wife (Darla Dee) provided the support for the project by giving me the 6-month unconditional yard pass to get this airplane flying again. We installed the new overhauled right main landing gear, and completed a number of gear retraction tests on both sides. We used the 'Armstrong' hydraulic pump for that, which just means that after that many gear retraction tests using a hand pump in the cockpit, I have a really strong arm!

Finally it came time to hang the wings again. It was starting to look like an airplane once again!

It was mid-August and the engine and new prop went back on. We checked and double-checked everything.

We made numerous engine tests, all with satisfactory results. The FAA had already signed off on all the repairs and had given us a big thumbs up to fly.

So now it was time. We taxied out to Runway 12 at Thomaston, Georgia. Quite a crowd had gathered to see what would happen. You can't be around old airplanes and aviation long without suspecting that there might be a few minor problems to sort out after a test flight. I was not suspicious of an engine problem. As luck would have it, right after takeoff and gear retraction, we both noticed that the right engine oil pressure was falling rapidly. We were not in a good position to be feathering an engine, as we were still low to the ground and not as fast as I would like to have been. But the oil pressure continued to fall and the oil temperature began rising rapidly. All the symptoms were all there and we followed the procedures we had learned in training. We each verified the correct button and I mashed it in, the prop feathered within seconds and we were left with a single engine approach and landing.

Fortunately the right engine had failed and we only had to make left turns to return back in to the pattern and position ourselves to land. Under normal conditions, this is not a big deal. It was daytime and the weather was great. Our new dilemma was with the landing gear. If we put it down too early, we would not make it to the field. If we put it down too late and then had any kind of problem, a single engine go around with a landing gear problem would not have been an ideal situation. In fact it could have been catastrophic. So I have to say that this was one green light that came on like clockwork, and we were more than glad to have it. We had extended the gear out on a very short, short final and put the nose down. I heard the gear fall into place with its signature "clunk clunk" and the green light and good hydraulic system pressure gave us good indications that we were not going to die after all.

Now we were back on the ramp. This isn't good. Within a few minutes we had confirmed that the main bearing on the number 2 engine had failed on takeoff and that the right engine needed to come off. It sounds like some more really bad news, but at this point, and in the big scheme of things, an engine change didn't even raise my heartbeat. We just pulled it off and swapped it for a new zero time Pratt & Whitney R1830-92 engine.

Within a few days we were back flying again with the new engine and it felt good to be back in the air again.

In the end, AOPA did come back. And together we finished our flying and our training. We also worked on the material for the magazine. Mike Collins had returned the day before the check rides so that we could finish the air-to-air photos and take some night pictures of the DC-3.

Julie K. Boatman is now ATP Captain Boatman, and Charlie has another type rating to add to his long list of type ratings that he keeps tucked away in his wallet. What he does with those no one knows.

On the evening of the last day, we had flown a lot, and we were all hungry.

We landed for the last time that evening with all of us as a crew. I had a small celebration barbeque dinner waiting for us. We invited everyone who had worked on the airplane and most of the airport community as well. We all stayed out on the ramp with the airplane that perfect late summer evening. We lingered until well after sunset, almost not wanting the sun to go down on us, that airplane, and

and on a chapter of our lives that turned out to be quite a story.

Together, we flew

“Together, we flew” was a special project that spanned 15 months and involved more than 40 individuals from around the country. I would like to extend my heartfelt thanks and deepest appreciation to the AOPA, EAA, FAA, Herpa Ltd. and every one of the people and organizations around the world that helped to make this project a complete success.

The "unscheduled repair" in the middle of the project to restore the aircraft was completed in record time of 27 weeks and included a total of:

2 complete engine changes
2,641 hours labor
2,452 rivets
8,500 individual pieces of hardware