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under 2,000 words

WINGS AND A PRAYER

Glenna Holloway

It's a long way from Iowa prairie to the steamy Peruvian wilderness. Bush pilots call the South American rain forests "telephone pole jungles" for the tall unseen tree spikes supporting the lush canopy. Since the '50s and '60s when he flew with JAARS (Jungle Aviation and Radio Service, the air arm of Wycliffe Bible Translators) Carl Mortenson has pursued one goal. It ultimately settled him and his family in Orange City, Iowa, near the small airport. The airport is essential because Carl has designed and built his own specialized twin engine airplane.

"But it's really God's plane," Carl emphasizes. "Today, missionaries fly mostly light, single-engine aircraft to get to remote places. If the engine fails over the jungle there isn't much chance of getting out alive in spite of the survival training. I believe the Lord meant for me to do something about that."

Carl's dedication stems from two close encounters with

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death. "My appendix ruptured when I was a kid. They didn't have wonder drugs back then. A couple of times the doctors told my parents I wouldn't live through the night. When I made it-- after nine months and five operations-- I was sure the Lord had a reason. I thought maybe He wanted me to preach. Later it was obvious I wasn't cut out for the pulpit."

The second encounter reinforced his commitment. Shortly after his arrival in Peru with Wycliffe he was stricken with bulbar polio. He knew if he lived he would likely be confined to an iron lung. "I told the Lord I'd rather die than live that way but if He still had some use for me, I'd accept His will."

Six months later, Carl Mortenson passed his flight physical.

But during his recuperation he designed an airplane in his head-- the answer to a bush pilot's prayers-- STOL capabilities, (short take-off and landing) easy repair and maintenance in the field, extra cargo space and that lifesaving second engine.

In 1965, with no engineering experience, he put his design on paper and named it the Evangel. Eventually, eight of them were built by a small corporation. All but one are still in service. Financial problems halted production with

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three orders unfilled.

Despite disappointment, Carl realized the Evangel was just a forerunner. There was much he could improve.

"The truth is, God wouldn't let me quit. Newer aerodynamic technology had come along-- like full-span flaps for maximum lift, spoilers instead of ailerons to control roll. The Evangel was a boxy-looking workhorse. Streamlining also boosts efficiency."

In 1972, Wycliffe granted Carl and his wife, Alice, an extended leave of absence to work on the Evangel's successor. Over 950 drawings and 11,500 hours of engineering went into the tedious phase of design. It was completed Christmas night, 1976.

It was painfully slow. Cash was and is a constant problem. Some people shook their heads. Working in his basement and garage, Carl went from stacks of paper to ribs, dies, moulds, angles and jigs-- to aluminum and fiberglass which materialized into an airplane called the Angel.

Sleek and sophisticated with its rear mounted pusher engines, the red and white Angel looks like a jet. It debuted at the world's largest air show at Oshkosh, Wisconsin in 1985 where it attracted potential customers and proved a great crowd pleaser.

"Angels are God's messengers," Carl tells admirers. "This

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plane is being developed to spread God's Good News to those 'uttermost parts of the earth.' Cheaper, faster and more safely than ever before".

Mission outposts are often hundreds of miles from the supply base. In Peru, the nearest is 90, the farthest is 600. The average range of a single-engine light plane is 350 miles. The Angel can fly 1600 miles without refueling. It cruises at 200 mph. It can carry over a ton of cargo, eight people or four 55 gallon drums. It can land and take off in 600 feet. It doesn't require a specialized mechanic to maintain it and safety is a top priroty throughout.

"The Angel's feet are as important as its wings," says Carl. "A missionary's air isn't any rougher than anyone else's but his landings sure are." He designed the landing gear to handle soft, uneven ground, keep the wheel from caking with mud, and deflect rocks. No other light multi-engine plane being produced has all these features.

The project is funded entirely by donations. Money is accepted through a simple organization of trustees called The King's Engineering Fellowship in Orange City, Iowa, and the Back To The Bible Broadcast in Lincoln, Nebraska. The largest donors have been missionary pilots themselves. Some have given many hours of labor as well.

"Airplanes are like pelicans," Carl often says, "they

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come with big bills." Lack of manpower was always a problem, too. His sons were good help but they had educations to complete and had to work at paying jobs.

"But each time things reached the impossible stage, the Lord provided. Sometimes unexpected money-- sometimes special people for short periods-- a retired aeronautical engineer from American Rockwell, an interested Pan Am pilot, another pilot-mechanic from JAARS between assignments, a retired electrical engineer, college kids, even a high schooler. Whatever we needed most always arrived."

The most difficult part of the plane, the Angel's 40 foot, 600 pound wingspan was completed on Good Friday, 1979, along with the tooling for future production.

That summer, Carl's oldest son, Ed, his middle son, Evan, and two of their friends worked on the tail and flaps. In the fall, the fuselage jig was built, the frames positioned in it, the aluminum skin applied. The basement was jammed. They prayed for an airport shop location in which to assemble the basic structure.

At length, a local builder, a financial co-op and plumbing and electrical tradesmen helped construct a hangar-shop at the airport for completion of the Angel and its future descendants. In snow and below zero weather, Carl turned from aeronautics to carpentry. By spring of

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1981, the miracle was accomplished. Evan's idea for a lexan window for the hangar door provides economical solar heat for the whole shop.

Evan began working on flight controls, Ed on the nose cone mould and windshield forms, and youngest son, Dan, on the formidable paper work.

The Federal Aviation Association cleared the Angel for flight testing in January, 1984.

All experimental aircraft are full of bugs. Even big manufacturers with large engineering staffs sometimes lose their planes and crews during flight testing. The Mortensons asked for special prayers for safety, skill and good judgement. They also prayed for (and received) good runway conditions-- no icing, no deep snowbanks on either side. Many short, low take-offs and landings were necessary for checking stability and controlability.

The Angel flew. Of course there were problems, but it flew. With Ed in his final year at Iowa State University, they were able to use ISU's wind tunnel to select a better design for the nacelle, the fiberglass skin enclosing each engine. The new shape increased speed. "The benefits gained by a 5-MPH cruising speed increase passed on to 50 Angels that fly 5,000 miles each could yield 7 million extra miles at no extra cost. We think things like that are worth pur-

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suing while we're testing," said Carl.

When Ed graduated from Iowa State, his professors voted him the most likely to succeed as a design engineer. In spite of the highly paid opportunities avaliable, he elected to invest his talents in the Angel. "So instead of making the most money, I'll make the least. But this is the job and these are the people I love. I don't feel I'm making any sacrifice at all."

"The plane should have commercial appeal in Alaska and the developing countries," says Carl. "We'll be able to provide a free missionary plane for each four or five planes sold on the general market. That's why we're keeping it a simple do-it-yourself fellowship. No stockholders, no corporate structure. The profits will be passed on to fly more Angels to more people who don't know Christ."

Evan has been Carl's most continuous right hand and is now the test co-pilot. He will be the future instructor to missionary users of the plane.

One day as Carl and Evan put Angel through some of its paces, a severe rudder flutter caught them by surprise: "We were shaking violently," Carl recalls. "I had chopped the throttles but the nose pitched up about 80 degrees in half a second, shot up 1,000 feet in 4 seconds, and the left engine quit! The accelerometer registered 6.5 Gs.

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"Then the shaking stopped and we were amazed to see the wings were still with us. We couldn't see the tail and didn't know what we had to work with or what would stay with us. For a few long seconds we fully expected to roll over and dive straight into the ground. Then we recovered and found the plane was actually flying quite well. Maybe the Lord sent real angels to support us during that violent maneuver!

"We made a routine single-engine landing. On inspection, we discovered the top of the rudder had broken above the hinge and folded over, letting its heavy balance weight flutter. Nothing was wrong with the left engine. I had inadvertently hit the feathering control when I grabbed the throttles during the shaking. The only damage was a few easily repaired skin wrinkles-- the plane's," Carl grins. Of course, we immediately re-designed the rudder."

Carl Mortenson is 55, a low key man with blue eyes, a warm smile and an incurable fondness for puns. He's also single-minded, or as his family says, stubborn.

Does he ever wonder if he's crazy? Get disgusted? Make wrong decisons?

"Sure, but like the psalm says, the Lord preserves the simple. And yes, I do get frustrated when we run out of money and everything goes on hold. Cash flow is a

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wearer-downer. But God's clock is different from ours. Sooner or later He always moves His people to respond."

"Dad's work motto is: Do it. Do it right. Do it right now!" says Dan. "But he also loves music, softball, humor and making funny noises. The humor is never far away. He and Mom are just two ordinary people who have given themselves completely to God's service. And because of that they have a very fulfilling life."

Carl's wife, Alice, says, "People are always asking me what it's like to live with an airplane. But we've done it so long it seems perfectly normal to us. Oh, I get impatient to get things repaired around the house. Here's all this mechanical know-how and I can't get a lamp fixed! But planes have always been part of the picture. Carl was rebuilding old planes when we married. He donated a rebuilt Stinson to JAARS in Ecuador and we delivered it on our way to Lima."

Does she worry when her husband and sons are flying an experimental aircraft?

"No," she answers softly. "I trust God. He's demonstrated His presence and His will in this many times."

The Mortensons believe one of the things that keeps them unified is their suppertime devotional. Every family member takes a turn at leading it. Long ago Carl also established a tradition of daily devotions in the shop.

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The prototype Angel is now ready for structural testing, the last requirement. A duplicate airframe must be built and tested to destruction in the shop for final FAA certification before going into production. It will be a cost-intensive phase.

"Recently an executive from Cessna told me that no company would consider designing and building a new aircraft for less than $15 million on hand, not including production tooling which The King's Engineering Fellowship already has," said Carl. "To date, we've spent only half a million. To us that seems like an awful lot."

Carl sighs. "So how dare we expect to finish a task like this? But we do, you know. There's only one way. With God's help. Look how far we've come! But it's not what we've done-- we're just instruments in His hands. We've had hundreds of people praying for us all these years. And hundreds of people making donations large and small. We've never been alone."

The target date for producing the first new Angels is early 1990. Some say it's impossible. Carl Mortenson has heard that word before.

But his faith has passed all its flight tests.