



The AMA History Project Presents: Biography of ELBERT (BURT) RUTAN

Born June 1943

Previous AMA #26035



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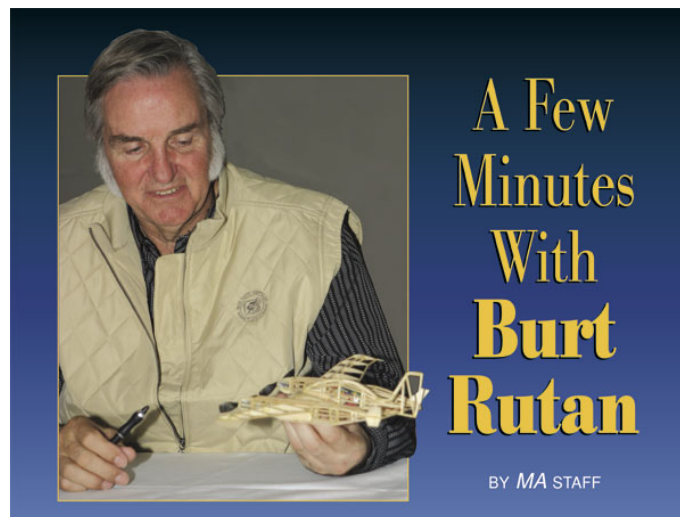
Career:

- 1959: At the Nats, won 1st place, Control Line Flying Scale event, Senior division, with 258 points
- 1960: At the Nats, won 1st place, Control Line PAA Load event called Clipper Cargo, Senior and Junior divisions both, with a load of 36.5 ounces on his model airplane; also won 1st place, Control Line Flying Scale event, Senior division, with 263 points
- 1965: Received a B.S. in aeronautical engineering from Cal Poly
- Worked as a flight test project engineer for the United States Air Force
- Mid-1970s: Formed the Rutan Aircraft Factory (RAF)
- Produced the homebuilt airplanes VariViggin, VariEze, Quickie, Defiant, Long E-Z, Grizzly, Solitaire and Catbird
- 1982: Founded Scaled Composites to develop research aircraft

Honors:

- 1987: AMA Distinguished Service Award
- 2005 Model Aviation Hall of Fame

*The following was written by Model Aviation staff, published online at
<https://www.modelaircraft.org/mag/Rutan/Rutan.htm> in 2006.*



**Burt Rutan admires a Peanut Scale RC version of a
Rutan Pond Racer built by John Gill.**

**Craftsmanship and modeling played an important
part in the life of this hero of aviation development**

AT THIS YEAR'S AMA Convention, held in Ontario, California, in January (which is covered elsewhere in this issue), aerospace engineer/airplane developer supreme Burt Rutan was inducted

into the [2005] Model Aviation Hall of Fame. His qualifications for this high honor are evident in his life's work in aviation design and development, which sprung from his involvement in designing and building model airplanes when he was young. (See page 104 of the October 2005 *MA*.)

Burt came to the induction banquet straight from practicing for the Bob Hope Chrysler Classic golf tournament at the links in Palm Springs, where he played in the Pro-Am event this year.

Burt's accomplishments in aviation engineering are far too numerous to list here, but most recently he created SpaceShipOne and earned the \$10,000,000 Ansari X Prize—an incentive to "jumpstart the space tourism industry." It was offered to the first to build a privately funded and operated rocket craft that was able to carry three people to 62.5 miles.

SpaceShipOne had to fly into and return from space successfully twice within a two-week period to capture the prize. Burt's craft achieved this in one week!

AMA members are proud that Burt was—and still considers himself to be—a modeler. His comments to the banquet attendees were greatly anticipated because his take on our hobby/sport was sure to be insightful.

Before the Saturday-night dinner and Hall of Fame induction Burt was given a quick tour of the convention show floor. Later he opened his remarks with two interesting observations about what he had seen. First, he complimented those who had constructed and finished the many outstanding static-display models, commenting on the superb craftsmanship and finish detailing. He said that is the type of skill he looks for in his employees.

Second, he conveyed his surprise and dismay to see that few, if any, exhibitors were selling balsa wood. This concerned him greatly. Burt competed in the AMA Nats for the last time in 1960, and at that time building models was as much a part of the hobby/sport as flying.

These comments led up to an amazing announcement by Burt. He is preparing to build a large number of spacecraft that will enable routine suborbital flights (and eventually orbital flights) at affordable prices. And to do this, he needs modelers—lots of modelers—to work for him! He wants gifted model craftsmen, not aerospace engineers, to help make these vehicles.

... he needs modelers—lots of modelers—to work for him!

According to Burt, education and age are not factors in his search; he is looking for people who take pride in producing extremely accurate and clean work with their hands. He predicts an even larger call for people with these skills in the near future.

Those of you who have the qualifications for Burt's new vision should consider dropping him a résumé of your modeling experience. Wouldn't that be the job of a lifetime?

After his induction and speech Burt graciously agreed to be interviewed by *MA* staff members. He was on a tight schedule and had only a few moments to chat, but the insights gained from the few questions asked should be of great interest to readers.

MA: *How did you get started in model aviation, and was your love of flight and things that fly triggered by your modeling involvement or was it a product of a pre-existing interest in flight?*

BR: I don't know how I got started. I did pick up pieces of broken airplanes and build different configurations as a kid. I don't remember that; it's just something that my folks told me that I did. My brother [Dick, who is five years older] would build kits and abandon them when they crashed, and I would pick up the pieces and build an airplane.

And I remember that when I would go to a hobby shop that I'd be looking at the balsa wood rack, not at the kits. I wanted to try something different and I don't know why.

I was into model airplanes before anyone in my family had an aviation passion. My dad was a dentist and he went down and learned to fly later. And then he and another doctor and a farmer got together and bought this Cessna 140. But that was long after I had become involved in model airplanes.

As it turned out, all three of us kids went into aviation. My brother was an Air Force pilot and he is an airplane developer, and my sister is a stewardess.

MA: *What type of models did you enjoy building and flying?*

BR: Just everything that I could at that time. We used to go to WAM [Western Associated Modelers] meets up in the San Francisco Bay area. They were all Control Line. I did Stunt, I did Rat Racing, Scale, Combat, and Control Line Carrier.

The radios [RC systems] were so bad in those days and they were expensive too, so I didn't really get into radio control until I ended up going to college. I'm talking about the time period from about, say, 1952 through 1961 when I did all the model airplane competitive stuff.





Guests at the Model Aviation Hall of Fame banquet were thrilled with Burt Rutan's presence. Many young and old in attendance captured a gladly personalized memento.



MA Aeromodeling Editor Bob Hunt acutely interviews Burt Rutan during an exclusive meeting with the magazine staff.

MA: Did you gravitate toward designing your own models, and, if so, were any of these unique compared to the normal models of the era?

BR: Well, they were all unique. I've got a picture of me in what was the Seventh Day Adventist Church equivalent of the Boy Scouts, called the Pathfinders. And in that photo I'm holding a model that I built that looked just like a 707, with the engines mounted on pylons.

That was back in the days when they had the [de Havilland D.H.106] Comet airliner, but before the 707. And I don't know why I did that ... but there was a military airplane, the B-47, with pylons...

MA: We know that you competed with models. What aspects of competition flying were challenging to you?

BR: Well, they are all challenging, of course. There is a picture I have that was taken at either the 1959 or 1960 Nationals in which I have A1 and A2 Towline Gliders, a Payload Free Flight model, a Free Flight Scale model, a Control Line Scale model, and a Stunt model.

I never did get that much into Control Line Speed. That was always more expensive. The guys that flew Speed paid a lot more for their engines than we could afford in those days. I couldn't do the stuff that was expensive, and that's why I didn't get into RC then. And of course everybody knows how all of that affected my career.

MA: Do you still fly models or do your full-scale interests keep you too busy for that?

BR: No. I don't even fly full-size airplanes anymore because I lost my medical [license]. I've got a standby "ignition system": a defibrillator. I can't get my medical ticket back.

I always said that when I retire I'm going to go back and do that [modeling]. And at times I've thought that I really ought to get into model aviation instead of home-built kit aviation because of the liability aspects associated with it.

If I wasn't real busy with building these spaceships right now, I'd be really strongly considering getting into the modeling industry as something to do for the next 20 years. You guys have so much better equipment these days. I looked at all the stuff that you can buy and I just drool about the kind of model I could build now. The problem is that my other interests just keep me too busy.

The only reason that I'm doing golf is that I need some exercise. I need to get out and that's the only thing I could find that interests me. In fact, I've found that taking a 4-iron and hitting a golf ball onto a green is more rewarding than making a good landing in an airplane. And it's more difficult than making a good landing!

MA: *Have you looked at the aerodynamics of a golf ball and tried to improve upon them?*

BR: No, they're way too complex [much laughter].

MA: *Do you find that engineers and/or technicians who were/are modelers are assets to you?*

BR: Absolutely! There are two guys who are in this room [who are great examples of that]. The guy who designed the IFO [Indoor Flying Object]—Dan Kreigh—is one of our best engineers. I hired him because he was a modeler.

And Dave Ganzer, he works at Paul MacCready's company [AeroVironment] now, and he's a very good engineer. I hired him also because he was a modeler.

MA: *What skills would today's aeromodeler need to possess to aspire to a career in full-scale aircraft development and construction?*

BR: Lockheed [for instance] goes out and looks for skills. They are looking for someone who can follow detailed blueprints, not for someone who is a craftsman. And then they train him on how to lay up composites. But I want to start with someone who is a good craftsman.

MA: *You've designed a piston-powered airplane that has flown around the world nonstop, a jet-powered airplane that has flown nonstop around the world, and a vehicle that has flown into space. What is the next challenge for you?*

BR: I've got a lot of stuff going on at Scaled Composites right now. The challenge that I can talk about, just because [Richard] Branson has been talking about it, is that we are developing a commercial, "fly the public" spaceship. And we'll be building a lot of them. This isn't a prototype program; we're going to build a lot of spaceships!

And there will be spaceports all over the place. And their operating cost will be such that it will reach millions of people and enable them to fly outside the atmosphere. So that's a big deal.

MA: *You are certainly a unique, out-of-the-box thinker when it comes to aircraft design. Are there any designers whose work you particularly admire?*

BR: Certainly Wernher Von Braun, [Sergei] Korolev—he was Von Braun's equivalent in

Russia—Kelly Johnson, Howard Hughes. I'm getting the Howard Hughes award in a couple of weeks.

I made a list for *Aviation Week* [magazine]. They asked me to list what were the most important things in the first 100 years of powered flight.

This was the 100th anniversary of the Wright brothers' powered flight. I thought up nine people and wrote them down. And I wrote that article and turned it in. And then I started working on this idea that is not unique, but it really hit me hard that what people do with their lives has a lot to do with what they're exposed to when they're kids from 4 years to 14 years old.

And I looked back at this list and I found out that every single one of those nine people was a little kid when the airplane had blossomed from nothing in 1908, to thousands of pilots, hundreds of airplanes, in 39 countries in only four years. So this thing really blossomed up; out of all the millions of kids, the ones who were inspired were that age.

I was inspired by some phenomenal increase in activity after World War II. I was born in '43. The sound barrier was broken when I was a young kid, and the Jet Age came in, the Missile Age, and all the records and so on just went skyrocketing. I think that my exposure to that had a lot to do with the reason that I've had the courage to go out and try new things.

The problem is kids now are being bored. Cell phones with pictures in them does not really stroke their passion for exploration and creativity. I don't think that does it.

And there are so many kids that can't do anything with their hands and they think that inventing something new is some different piece of software. You look at [Bill] Gates, who has made all his money because he cornered the market on some operating system and, you know, I'm bothered by that. That's not right.

Well, the thing is, you still have kids who go out and do it, but you've got to remember they are the ones that are going to take us to the stars. Not the kids that will only buy something packaged.

MA: In closing, what words of encouragement or inspiration would you like to leave our members with?

BR: You know, try to come up to the [AMA] Nationals. Try to come up with something where you award breakthroughs—new ideas. Try to do that. You can't predict a breakthrough so it's kind of hard to say, but recognize that somebody did something that's a new idea and took the courage to fly it.

MA: Thanks, Burt.

Sources:

Burt Rutan

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A slideshow presentation by Bob Underwood featured this image (by Mark Lanterman) which humorously suggested a design idea to support Burt's latest recreational interests.

The following biography was written by Joe Godfrey and originally published at <http://www.avweb.com/articles/profiles/brutan/>. For a printout of the Web page, see Burt Rutan's file in the National Model Aviation Museum Archives. See the AMA Archivist for assistance.

Burt Rutan

The dictionary defines "visionary" as "one who indulges in fanciful theories," and while Burt Rutan certainly does that, he also turns those theories into flying machines. From canard to composites, his theories have changed the way airplanes look and function. He shares theories, memories, visions and a bit of philosophy in this month's profile.

Elbert Rutan was born in Dinuba, California, in June 1943. After receiving a B.S. in aeronautical engineering from Cal Poly, he worked for the U.S Air Force as a flight test project engineer at Edwards Air Force Base in California until 1972. After two years designing and developing the Bede BD-J5, he formed RAF, the Rutan Aircraft Factory. For the next 10 years, he shaped the landscape of homebuilt aircraft with the VariViggin, VariEze, Quickie, Defiant, Long-EZ, Grizzly, Solitaire, and Catbird. The crowning achievement of RAF was the 1986 Voyager around-the-world flight piloted by Bert's brother Dick.

In 1982, Burt founded Scaled Composites to develop research aircraft. Currently, about 100 employees occupy three buildings on the flight line at the Mojave airport, a few miles from Edwards. The atmosphere at Scaled is part think tank, part-welding shop and both the brainpower and tools to use it are plentiful. The latest Scaled project is the Proteus, named for the Greek god who could change shape to take on any form. The Proteus' configuration can be changed for a variety of reconnaissance and telecommunications missions but perhaps its most intriguing configuration is as a kind of lifting body for sub-orbital space tourism.

Right now, Burt's not adding to his 3,000 flight hours. His latest passion is golf, which he began playing again after a heart attack in April 1998. We talked in the conference room at Scaled about test pilots, the homebuilt designs, the John Denver crash and his vision of our future air transportation system.

Who taught you to fly?

Johnny Banks was a country-western DJ on the local radio station in Dinuba. His daughter was the first Miss Teenage America. A really phenomenal guy, and he taught me to fly. I paid him \$2.50 an hour and the airplane was \$4.50 an hour – the Aeronca Champ in the 1958 to 1959 time period. I soloed after having logged five hours and 45 minutes. We didn't have radios then and had to hand-prop, so there wasn't a lot to learn.

And have you ever taught anyone to fly?

I never taught anyone to fly and never had any ambition to. I've thought about going back to the college where I graduated, Cal Poly in 1965, after I retire. I enjoy talking about design, about engineering and flight-testing to college-type students. I never had any desire to be a teacher, though, like a high school teacher or a CFI. I don't think I'd be very good at that. I don't have the patience or desire.

What were the Rutan brothers like growing up?

My brother and I weren't that competitive because we were five years apart. We weren't playing with the same toys because we weren't the same age and while I was into the model airplanes, he was already grown and wanted to be a pilot. I didn't have any desire to be a dentist, like my dad was, and I was just playing with toy airplanes and it just happened. Our parents didn't tell us what to do and didn't ever discourage us from doing this weird stuff, which was probably the reason they didn't ever try to talk me into being a dentist.

What does it take to be a great test pilot?

Someone who's courageous enough to go out and fly the card. Someone who has the courage to go out and do the mission, but is smart enough to not do something that'll get him killed. It's hard to define that, but you can look around for the ones that survived and say that those were the great pilots.

For example, there may have been a lot of pilots who were braver and more courageous and better than Bob Hoover, but they didn't make it through the war, so you can argue they were

more courageous, but you can't argue that they were as great as pilots because they were not as smart as Hoover was.

How about a good test pilot story?

I used to think that that was a fun, enjoyable, neat thing to do...to go up and monitor the instrumentation and be a crewmember in the backseat of an F-4 for stability tests. I was in a flat spin in the F-4 and didn't have an accident, probably the only time that's happened. The next flight, which was another spin test – I wasn't in it – the airplane did crash, but the spin recovery system worked for mine. The airplane wasn't very stable and I'd come back white as a sheet, feeling awful the rest of the day, taxi off the mid taxiway at Edwards and open the canopy and heave this plastic bag full of vomit far enough away so that the intake wouldn't suck it into the engine and cause maintenance to be mad at you forever, because when that happens, you throw the bag overboard and it gets sucked in the engine, the airplane will smell forever inside.

I'll tell you another one I shouldn't. One of the tests was particularly tough. After doing a series of really kind of harsh maneuvers and sending my stomach contents to a plastic bag, I folded over the top of the bag, lapped it under the strap on my G-suit and held it down tightly with my hand so my right hand was available to turn on the instrumentation and make the notes in the log. And then we went into doublets at very high Q, so you're out there at above 700 knots, making the airplane go through some serious ups and downs and damping out, and I still have the picture in my mind of this bag of vomit – kabam, bam, bam – pounding against the side of my G-suit and the G-suit isn't perfectly smooth, you know, it has some rough edges, and this bag splitting open. Well, at least then I didn't have to hold it for the rest of the flight.

That's the good news...

But the bad news is when I throw it overboard there's nothing in it and so I get back to the hangar with this on one of the coldest, windiest days in winter and I had to move the ejection seat to its highest position, and with a freezing cold wind blowing like heck I had to get under there with nothing but 50 different towels and try to get all of this back from underneath the cockpit of the airplane. That wasn't one of the more pleasant experiences.

[NOTE: A section in the original document here was omitted from this biography. The section talked about how Burt Rutan saw the future of aviation. To read the full transcript, please see Burt's file in the National Model Aviation Museum Archives. Contact the AMA Archivist for assistance.]

How many copies of each of your designs are flying?

There were five homebuilts RAF (Rutan Aircraft Factory) sold plans on – VariViggen, VariEze, Long-EZ, Defiant and Solitaire. There were about 100 sets of plans on the Defiant sold, maybe 20 airplanes out of those.

Eighty people didn't build them?

Well, 10% is a good finish rate on any homebuilt that's built from plans, and Defiant probably is around 20%, so it's twice the normal. The Solitaire was a real failure in the marketplace. It was kitted; it wasn't just plans – you had to buy the completed fuselage in molds – and I don't think there were 20 of them ever even started and only three or four flying. Long-EZ was the biggest one in terms of numbers and the plans were sold by the thousands. The problem is you can't track them because they're not called Long-EZs. My best guess is that VariEze and Long-EZ combined were somewhere around 1,600 to 1,800. You'll see as many as 120 of those at Oshkosh in one year. VariViggen was small numbers, also. I would say that less than 35 VariViggen have ever flown and it was such a lousy airplane we started discouraging it, actually, starting about 1977. I mean, if you take a VariViggen and a Long-EZ, both carrying two people and baggage, both at the same speed – let's say the maximum speed of each – the Long-EZ burns less than half the fuel flow and it's got four times the range. The airplanes have no comparison in terms of utility. VariViggen was a lot of fun. It was like a fighter to fly, but to go somewhere in it – it's an awful airplane.

Who comes up with these interesting names?

Defiant was a contest in the newsletter. I thought, what a great name – Defiant! Anyway, this guy won and then I saw him later at Oshkosh and he says, “You know how I named your airplane? I was up in a cabin on a cold winter night and I had my feet up by the stove and the manufacturer was Defiant.” So, Defiant was named after a wood stove and I never knew it.

I was enamored by the Swedish Viggen fighter and the VariViggen had this reflex control, front-to-back. I was going to call it a MiniValkyrie at one time – name it after the B-70 – but a person I worked with at Edwards suggested VariViggen and it stuck.

Then along came the VariEze – this high-efficiency, all-composite design, which was making the point that instead of taking four years to do, you can do it in four months. At least we did it in three-and-a-half months instead of four years, so the thing was easy to build. I had mentioned that to my sister as one of its qualities and she suggested, “Call it the Very Easy.” So, we spelled it differently and that's my sister's suggestion on that.

I wanted the Long-EZ to be related to the EZ. I wanted to get away from this VariEze name, but EZ kind of struck better in describing the real long range of the airplane because the Long-EZ, to this day, is phenomenal from that standpoint. You can fill up a standard Long-EZ and go up and fly for 24 hours. Anybody. Standard Long-EZ. Fill it up with gas and fly it just above its minimum speed, trim it out there and lean it out real good and you'll fly for 24 hours. Try it! I said that to my brother on the Defiant. I told him, “This airplane will fly more than 12 hours,” and he went up and he flew it for 15.3 hours. A Long-EZ you can fill up and go 2,000 miles if you slow down.

The Pond Racer and the Beech Starship projects didn't turn out as planned. Can you share some lessons learned?

The Pond Racer was something that a person who had a mission wanted a solution to. His mission was to stop all these guys from destroying a Mustang every year and 12 engines every year at Reno and he wanted new technology in the racers so that it would take over and replace this environment that was destroying war birds. By that standard, the project was a failure. You

go up to Reno today and they're all war birds, so his mission and the Pond Racer solution to that failed. One of the reasons that it failed is that the airplane never really flew with its propulsion system putting out the power. We didn't crack the nut on providing that 2,000 horsepower propulsion. Now if he did and that airplane ended up beating the war bird – which it could have if it had had the propulsion working up to the original plan – then, because of competition there would have been a lot of new technology engines and new airframes and today, as early as today, I think you would have seen half or the majority of the Reno racers would not be destroying World War II equipment. But the problem is it failed because it didn't win.

Starship. Yeah. I'm going to skip that one because that's a phenomenal story to tell and it'll be in the book that I plan to write. Let me just say that some of the things that are wonderful things for the autobiography may offend current customers – people that we do business with, and I'm not going to tell that story until I retire – but I am going to tell the inside story. It's fascinating and it's never been told.

Give us a sample of an idea that you scrapped before it was finished.

We built a prototype rocket, two-staged rocket that was supposed to fly for a company who was not yet mature on rocket design. We build things pretty fast around here, but by the time we finished building it, they had discovered that their concept was wrong and that their rocket didn't look anything like what we were building. They came to us and we agreed that there's no benefit in flying this.

How about something in the homebuilt category?

Well, we never kitted the Grizzly. We flew it. It wasn't a good idea because it wasn't a very good bush plane. A bush plane needs to have a high wing, not a low wing, and it can't have the flaps two or three feet off the ground dragging through the bush. For me, it was an experiment to show that I could achieve a high lift coefficient on a tandem-wing airplane and, yeah, it parked so that you had a sleeping bed level in it and whatever. I needed more power and it was pretty early that I understood that I should have gone up and spent more time in Alaska understanding what a bush plane really needs to be. I'd put that in that category.

[Note: A section in the original document here was omitted from this biography. The section talked about Burt's take on the John Denver plane crash as well as who in history he would have liked the chance to fly with. To read the full transcript, please see Burt's file in the National Model Aviation Museum Archives. Contact the AMA Archivist for assistance.]

Is there another homebuilt design coming?

Oh, yeah. I've got what I think is an absolutely fun thing to do in the homebuilt area, just absolutely so exciting – gotta do it – and I am getting bored right now, so I'm not sure when but it's coming. I'm doing a little bit more research to see whether or not to delve into that, but I'm excited. It's not what you think. It isn't just a faster Boomerang or something. I mean, it's not a conventional airplane.

[Note: A section in the original document here was omitted from this biography. The section talked about how Burt Rutan saw the future of aviation including homebuilt spaceships. To read

the full transcript, please see Burt's file in the National Model Aviation Museum Archives. Contact the AMA Archivist for assistance.]

Who's the best pilot you ever saw?

I flew a lot with the Chuck Yeager of the 1960s. Chuck Yeager was from the 1940s and 1950s, right? But, the Chuck Yeager of the 1960s was Jerry Gentry. He flew the first-run fighters; he flew the lifting bodies for NASA; he didn't fly X-15, but he would be one out of five guys that you would say is a candidate to be called the Chuck Yeager of the 1960s, and I did several programs with him. He and I still work together; he's our Washington consultant. Back when he was flying the lifting bodies and flying spin programs on the fighter with us in the afternoon, I took him over to Mojave and put him in a Piper Cub and he'd never flown a tail-dragger and I had to take it away from him three times...or he'd have ground looped. So you say, "Well, is he best aviator?" You can argue both sides of that issue.

Mike Melville is a good stick and rudder guy. He is extraordinarily good – extraordinarily good – and on many occasions, since he and I have known each other, he's made it dramatically obvious to me that I'm not very good compared to him. And the most recent one was the Boomerang's first flight. We did the taxi test together. I thought, "Hey, this is a complicated airplane and I'm going to be in it, but I want him to fly it." And we went out and did a stupid thing. As it turned out, it was all right, but we did our first lift-off of runway flights of this really unusual airplane and in gusting 30-knot wind with a lot of crosswind and he just wired it and did real nice take-offs and landings. And I said, "OK, I want to try one myself," and I was all over the place. And it was then I realized, "You know, he really is a heck of a lot better than me."

My brother's a pretty good stick and rudder pilot, too. He taught Mike how to fly formation and a few other stick and rudder skills. There's a judgment factor, too, but since they're both still alive, you've got to figure they've got pretty good judgment.

[Note: A section in the original document here was omitted from this biography. The section talked about whom Burt would like to fly with and some of his experiences in the Boomerang. To find the rest of the transcript, refer to the website.]

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