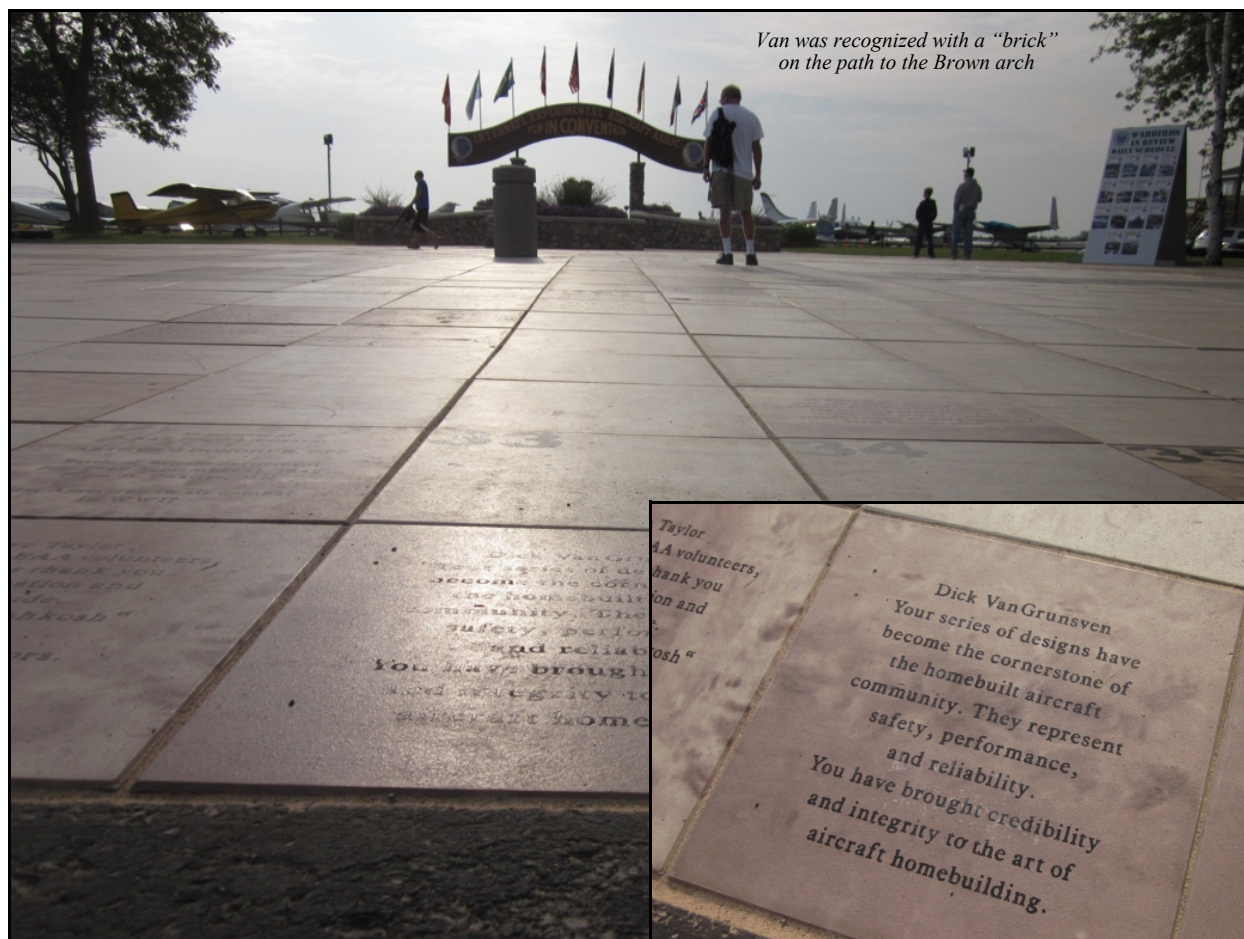




*Bernhard Daenzer and Alex Lichtensteiger built the first RV-7A to fly in Switzerland. The expressions on their faces tell the whole story.*



## OSHKOSH AWARD WINNERS

Several RVs won awards at AirVenture:

### Custom-Built

Dan Hall, Aliso Viejo, California

2001 RV-6A, N670SB

Cor Wester, Delaware, Ontario

2010 RV-7, C-FZEY

### Kit Champion - Bronze Lindy

Robert Gibbons, Sumter, South Carolina

2010 RV-8, N58RG

Jim Gray, Evergreen, Colorado

2008 RV-8, N747JG

Matthew Greenway, Medway, Massachusetts

2007 RV-6, N447MG

John Nystrom, Placitas, New Mexico

2009 RV-3B, N3NU

### Reserve Grand Champion Kit Built - Silver Lindy

Wayne McMaster, Greenville, Indiana, 2010 RV-7, N767WM

Two other RV builders took home major awards, but for airplanes other than RVs: Rick Gray, Vincent, Ohio, took the Gold Lindy for Grand Champion Kit Built F1 Rocket N251RG. Chuck Brietigam, Louisville, Kentucky, received the Stan Dzik Memorial Award for Outstanding Design Contribution for his CT Cruiser.



## **GETTING THERE**

Oshkosh was only a month ago – but the way time goes by, a review seems more like a bit of history than a current event. Every year has its identifying event (“remember the guy in the bar...?”) but this year’s “event” occurred before the show opened. For the preceding week, the area was soaked with heavy rains that turned the grass parking and camping areas into lakes, puddles, streams and swamps. There was probably a quagmire in there too, somewhere. The unfortunate volunteers tasked with parking the thousands of inbound aircraft had a real problem – parking or taxiing on the grass was impossible and there’s only so much pavement available, even on an airport as vast as Oshkosh.



As the departure dates approached, we read about field conditions and watched stormlines on our computers as they drifted across the upper Plains between Oregon and Wisconsin. Finally there was nothing else to do but take off and deal with conditions as they came. The set-up squad, consisting of Daryl and Joe in the RV-9A and Gus, ensconced in lonely splendour (spelling deliberate in honor of his British heritage) in the front of the RV-8A, left on Friday. They flew through and around some rain and turbulence, but, pushed on by killer tailwinds, they arrived in good time...only to find the booth space under several inches of standing water. They managed to purloin some plywood and pallets and, when the truck arrived with the supplies, they were able to set up the booth without sinking knee deep into the mud. Slogging around in the soup, surrounded by swarms of mosquitoes, the job wasn’t much fun.

Ken Krueger flew the RV-12. He found conditions much the same enroute, racking up a photographically-proven 160+ KNOTS groundspeed at times. His wife Susan and daughter Amy arrived on a commercial flight and everyone pitched into getting the airplanes cleaned up and the booth presentable. Van and I were assigned the RV-10, so we left Sunday morning. Sterling Langrell, a Van’s welder, all-around shop-hand and relatively new pilot, rode along in the back seat. “If you work at Van’s, going to Oshkosh is pretty easy,” Sterling noted. “You just ask every day for about seven years, and finally Scott Risan says yes.” Sterling’s last trip took him to Alaska in a modified Maule, traveling at 80 mph and about 200’. Going to Oshkosh at 200 mph seemed like a picnic to him.

Amazingly, the weather I’d been obsessively checking for days cleared out and we had one of the easiest trips ever. We didn’t see a cloud until we reached Minnesota. On days like this, RV-10 traveling is pretty relaxed.

Climb out, point it east, level at 13,500 or 15,500, turn on oxygen, engage autopilot, lean to about 10.6 gph and sit back. The fast airplane and following wind had us clicking off 185-190 knots and soon enough I put us down on the big runway at Laurel, Montana. Two or three times, I put us down...you’d think that, just once, I could make a decent landing with Van in the airplane.

Van flew the next leg into Hutchinson, MN, and emptied his wallet when we found that, despite the cardlock keypad and sign, they could only accept cash for fuel. Why? The story we got was that the state had never purchased the software to make the cardlock installation function. “We got rid of our idiot governor,” said one of the locals, “but we’ve got plenty more.”

From there, I took over again and on we went toward Ripon and an uncertain future. About fifty miles out, the powerful ATIS transmitter (new –and most welcome – this year) gave us the news that only airplanes with guaranteed paved parking places were being accepted. The controllers were talking with individual airplanes, making phone calls to verify what pilots told them, then selecting which they could permit to land. Traffic was light enough to permit this, but those guys were still working hard. About forty out, I called: “Yes, we’re an exhibitor airplane, yep, we’ve got a hard spot to park at our booth, Scout’s honor, youbetcha. I figured if I could just get us on the ground, Jeff Point and Gert Van der Sanden (RV builders who’ve manned the northern corner of 36 Left for years) would take care of us.

## **FINALLY THERE**

We reached Ripon without drama, established ourselves at the right airspeed and altitude and followed the railroad to Fisk, all the while keeping a wary eye out for this year’s Wayward Cherokee. Sure enough, there he



*We exhibited a "trial balloon" RV-12 QB kit. We're still evaluating the concept and its reception...*



8A sat largely ignored and casting baleful glances at the "new kid" stealing all the attention. Mitch Lock brought his RV-12 "New Blue" from Maryland and we flew it almost every day. Our red RV-12 stayed on the booth, keeping company with the new, proposed, maybe-someday RV-12 SuperQB kit – more about that anon. Five or six builder-built examples were sprinkled around the airfield – one on the Rotax booth, three or four in with all the other RVs. I saw another in homebuilt camping as I taxied down to the south

*RV-12s took their rightful place among all the other RVs, parked row by row.*



was, except he was an Ercoupe this year. He slid beneath us, flying right over Fisk, following the railroad tracks exactly...but at 500' and going SOUTH. The controllers couldn't raise him and kinda forgot about us for a minute as they tried to figure out what to do about an uncommunicative airplane flying head-on into traffic at the world's busiest airport. It didn't matter. I knew where I was going and I could see it from the cockpit. I managed a reasonable landing, taxied to the far end, and there was Gert with a big smile, waving us to a parking space alongside the other company airplanes.

The airport was a recovering swamp. Nothing was parked along the south side of 9/27, an area that normally holds at least a thousand airplanes and their occupants. We could only imagine the scramble the parking volunteers were enduring, trying to park arriving aircraft in places where they wouldn't sink in to the wing-tips. Our hats were off to those guys – they were given an unprecedented situation with an unknowable outcome and dealt with it well.

### **LET THE SHOW BEGIN**

By opening morning, we were in good shape. A trip to Lowe's resulted in some astroturf mats we put around the airplanes. They did a good job of keeping the mud under control. Over the next few days, the grounds dried out and the show became... the show.

Foot traffic was very good, and we quickly ran short of T-shirts and sold out of hats. The star of our booth was quite obviously the RV-12 – at times two or three of our staff were explaining the airplane to interested people standing three deep, while the RV-9A and RV-

*Gus runs the RV Banquet...*







*Above: Ken Krueger, with wife Susan and daughter Amy, received EAA's August Raspit award.*

*Top right: Paul Dye kept the crowd riveted (if we can say that...) with tales of Shuttle missions. Paul was visibly disappointed about the approaching end of the Shuttle program.*

*Middle Right: a farmer in Oregon shared Paul's emotions and showed it by cutting this tribute to the program one of his fields. Van spotted it while flying his RV-12*

*Lower right: even very young kids got a chance to experiment with airplane construction at KidVenture. Even better, teenagers were teaching them?*



end of 36 for a demo ride. It was a very good turn-out, considering we shipped the first kits a little over two years ago. (I remember when we introduced the RV-12, the big "internet" question was would the Rans S-19 whup it in the marketplace. I didn't look everywhere, but the only S-19s I saw were the two on Rans' booth. I wouldn't have been surprised by more, because it really is an attractive little airplane – but it looks like the market has spoken. We've shipped over 400 kit starts.) I wouldn't be surprised if 30 or 40 Twelves showed up in 2011. Note to Jeff Point: must find more parking just for them.

On Tuesday, we filled the pavilion in the Nature Center to overflowing for our annual banquet. The evening got off to a great start when MC Gus introduced EAA's Adam Smith, who was there to present the very prestigious August Raspit Award to Van's engineer Ken Krueger. Ken was specifically recognized for his contributions to the matched-hole production processes that have made metal airplane kits so accurate and so buildable. The list of previous recipients includes John Thorp, Burt Rutan, John Roncz, and Van himself (in 1980), so Ken found himself in some pretty rarified company. Van was smiling...he'd known about the award for some time, but for most of us it was a very welcome surprise.





*Rotax used Larry Geiger's RV-12 as an example of a good 912ULS installation.*

### **BANQUETS AND BUGS**

After the applause died down, it was time to eat. Food service was timely and plentiful, so everyone was well fed (including the mosquitos) by the time Paul Dye gave his presentation. Paul is a mission controller for NASA and has spent his adult life in positions of increasing responsibility for Space Shuttle missions. He gave some special insights into what it takes to successfully operate the fastest, highest flying aircraft ever built. You could almost feel his regret when he spoke about the fast-approaching end of the program. By the time he was done, there was a roomful of pilots who *really* wanted to try that plummet-and-flare approach!

I spent Wednesday in a painful fog. Something small and venomous bit me during the banquet and by the next day my foot was so swollen that getting it into a strapped sandal was impossible. Yeah, it hurt. By mid-day I was down at the medical tent where the doc took one look and ordered up a course of antibiotics. It was delivered to the field within two hours (for five bucks!) and by the next day, I felt much better. If you spoke to me Wednesday and I seemed a bit distracted, I'm sorry. Rough day.

Meanwhile, Van went over to the KidVenture tent, and was rewarded with the sight of crowds of kids busily learning

to build airplanes. We'd donated a lot of the parts they were working on and it was very gratifying to see the delight and pride the kids took when they put parts together and they stayed together. A few of those reading this can relate, I think.

### **FLYING AND FORUMS**

Thursday was forum day. We gave two, one about the RV-12 and another aimed at those thinking about building an RV. Both were well attended, and generated some good questions. I did my stint as demo pilot, flying rides in the RV-12. As usual, there were complications. Some poor soul in a Bellanca Viking had his nosewheel extend at right angles to his direction of travel and when it touched the runway, there wasn't a thing he could do. The airplane ended up in the ditch alongside the runway and everybody in the taxi queue stopped their engines (to allow rescue vehicles to go where they needed to without worrying about spinning props), opened the canopies and sat back. It took an hour and fifteen minutes to fly that one ride.

### **A CHANCE TO LOOK AROUND**

Afterwards I limped down to the Antique section to visit with my friend Jeff Paulson. Jeff had just finished building, of all things, a Stinson Model O. Never heard of it? Don't worry. There were only ten of them built and nobody's seen one for over sixty-five years. I'll let you look it up, or read it about in an (ahem!) upcoming article in another publication, but suffice it to say: if you're struggling to complete an RV QuickBuild, spare a thought for the guy who's scratch-building a very big and completely extinct airplane from twenty photographs – nothing else. Jeff and his small crew managed the task in 28 months and the result is wonderful. It flies like a Greyhound bus (Jeff gave me a chance to try it from the back seat), but when you fire up the round Lycoming and taxi out, you know you're in some-

*That RV QuickBuild seem tough? Try this! The Stinson Model O, resurrected from twenty photographs and nothing else.*



thing special. It was a fine thing, seeing it at Oshkosh, fitting in perfectly with airplanes of its (original) era.

I spent the evening wandering around, looking at old airplanes – something that interests me much more than the Lt. Dan band. Probably the most impressive one I saw was the Caudron racer replica. I'll bet that was interesting to fly, with its big inline engine, long nose and tiny wing. Getting into the minute cockpit is sort of like putting a cork in a wine bottle. A snake would have to grease its hips to fly this thing. (How big was Michel Detroyat, anyway?) After two and half hours, my foot cried uncle and I took the bus back to the dorm, exhausted but satisfied. There really isn't any place like Oshkosh if you like to walk through living history – in the space of one day, I'd had my hand on an Anderson-Greenwood, a Caudron, a Mitsubishi Zero, a Sabre and a Stinson Model O. Too cool.

Saturday dawned IFR, if that makes any sense. We had to wait two or three hours before we could launch our first ride, and playing catch-up kept Mitch and Mike Seager plenty busy. Meanwhile, the crowd at the booth was steady all day. We didn't stay for the night airshow.

### HEADED HOME

Sunday we awoke, fully expecting a reprise of the morning clag. We were pleasantly surprised to find a sunny morning with decent visibilities. The RV-10 was fully fueled, so by 8:30 we were airborne and headed toward home. The headwinds were steady but not vicious, so after fuel stops in Pierre, SD, and Bozeman, MT, we found ourselves at 12,500' over northern Idaho. This is usually the time I start peering at the far horizon, trying to find Mt. Hood. If we can see that, we know

we're on the homestretch. It usually appears as a tiny white cloud, way out at the edge of visibility. Not today. Haze, a bit of smoke and dust obscured the mountain until we were only about forty or fifty miles away... practically on top of it. We swung by the southern face at 8,000', sliding our right wingtip just over the scree and snow, craning our necks to see the peak three thousand feet above us. We flashed over the ski lifts and then suddenly we were past timberline and over the forests of the Cascade range on a long fast slant for Aurora. We taxied in, quiet and tired. We put the airplane away. Sterling threw his leg over his Harley Sportster, Van climbed in his RV-12, I slid down into the seat of my RV-6. Half an hour later, we were all home, tired of butt and ear, but ready to do it all again. Next year.

### SIDEBAR

**Ted Millar**, one of the principal backers of the TeenFlight project and our airport neighbor at Aurora, was also at Oshkosh. Ted is in the fortunate position of flying his own Citation, and as we prepared for the trip home, we were envying him his rapid return to Aurora. I mean, fast, cool and high, and home for lunch...what's not to wish for?

When we arrived, Ted was already here, of course...but he didn't beat us by as much as you might think. The Citation cruises about 335 knots true, but being a jet it has to fly high to be efficient. Ted used 37,000', I think, but at that altitude the headwinds were almost 100 knots. Seeing ground speeds of 230 knots in a twin-engine jet must be a painful experience! Worse, you're stuck with it because if you go low enough to get out of the wind, you burn even more fuel, land at least once more, and actually arrive later.

Made me think twice about putting my deposit down on that D-Jet.

*Nothing better than seeing Mt. Hood emerge from the haze...*





## **WHICH WAY DID HE GO, GEORGE, WHICH WAY DID HE GO?**

SCOTT MCDANIELS

One of the few “flight” instrumentation requirements we have for certifying aircraft in the Experimental Amateur Built category is the requirement for a Magnetic Heading Indicator (MHI). Note that this wording does not say “Magnetic Compass.”

Technically, any device that you choose to mount in the cockpit that indicates magnetic heading by deriving its information from the magnetic field of the earth meets the requirement. These days it is becoming rather un-common to see an actual magnetic compass in a light aircraft, particularly Experimentals. Some of our younger pilots may have never even seen an airplane with a “whiskey compass”. Far more common is instrumentation that contains a MHI as part of an Electronic Flight Instrument System (EFIS). The heading indication is derived from information provided by a magnetometer sensor that is typically located remotely outside the cockpit so as not to be effected by any magnetic fields that could be generated by the aircraft electrical equipment or systems.

Like a lot of electronic devices, particularly ones with sensors detecting something as weak as the earth’s magnetic field, there is a calibration procedure that needs to be done on the MHI to ensure that the displayed heading is correct. Even the traditional aircraft “whiskey compass” requires calibration (compensation adjustment) and uses a very similar process -- the only difference is that the adjustments are done mechanically instead of with software.

The best tool to use when doing a MHI calibration is either a Master Compass or a Compass Rose. A Master Compass is simply a compass that has been factory calibrated to have zero error, and is mounted in a sighting device (similar to a rifle) so that it can be accurately aimed to align with the aircraft heading as it sits on the ground. A Compass Rose is simply a grid painted on the ground and used to precisely align the aircraft at specific headings. The challenge is that few of us have a Master Compass available, and airports with a Compass Rose are harder and harder to find.

We do have a tool that in the past wasn’t available...it is called GPS. The modern GPS receivers that we are now using in the cockpit (panel mount and portable) have an amazing level of accuracy. More than enough to do a satisfactory job of calibrating a MHI.

The general process is actually quite simple though the procedure you use will depend on what type of MHI you actually have.

First, verify that the GPS receiver you will be using is adjusted so that the track indication displays as a magnetic heading. Generally, any GPS receiver being used in aviation mode should do this because magnetic heading is what we use for our heading reference. (If you are using a hiking or automotive GPS, they typically do an internal compensation for the variation value where you are located so that the heading indica-

tion is based on true north, not magnetic. If you intend to use one of these you need to see if the auto variation function can be turned off.) When taxiing on the ground, the ground track should be the same as the aircraft magnetic heading, as long as there are no misalignments of the landing gear. So, if you are able to taxi on a precise track is displayed by the GPS, this should produce a pretty accurate calibration of the MHI.

Become familiar with the calibration process as described in the equipment manual. At least one of the currently popular EFIS systems only requires you to position the airplane accurately on four headings, 0/360 deg., 90 deg, 180 deg, and 270 deg., for the calibration procedure.

To do the calibration, start the airplane and taxi to a large open ramp area on your airport. With your GPS set up so that it is displaying your ground track (TRK) as a magnetic heading, slowly taxi northbound a crossed the ramp area while operating all of the electrical equipment that is normally turned on in flight. Make small steering corrections until you see the proper ground track displayed over a travel distance of 40 feet or so. You may find it necessary to wait for a day with little or no wind to make precise heading control easier.

Carefully come to a stop without changing the heading, and register the first heading sample as directed in the equipment documentation.

Repeat the above two steps for all headings that need to be referenced.

If you are doing a compensation of a magnetic compass, it will require that you taxi on a lot more track values to do the compensation adjustments and the after completing the adjustments, reading all of the actual values to record on the compass deviation card.

For a magnetic compass you first position on a track of North and using a nonmagnetic screwdriver (brass, aluminum, etc.) adjust the North/South compensating screw so that the compass indicates North.

Change heading so that the track indicates East. Adjust the East/West compensating screw on the compass to make the compass indicate East.

Change heading so that track indicates South and note the amount of error in the actual reading. Adjust the North/South compensating adjustment to remove half of the error (if it says 176 degrees, adjust it to say 178).

Change heading to West, and once again remove half the error using the East/West compensating adjustment.

It is a good idea to repeat the process a second time on all four headings because there can be a slight interaction between adjustments on N/S and E/W, especially if large adjustments were necessary.

Once you are satisfied with the calibration, repeat the process with all of the other 30 deg. intermediate headings so that you have the readings to fill in on the compass deviation card.



# **'ROUND THE WORLD IN AN RV-7**

KEN SCOTT



Partners Liliana Tagliamonte and Detlef Heun plan to cross every line of latitude and longitude in their RV-7.

Last week Scott Risan stuck his head around the corner and asked "Are you aware of a couple flying around the world in an RV-7?"

As a matter of fact, something about that had drifted by...a European couple were on their way around and I'd seen tidbits on the internet. Why do you ask?

"They'll be here in half an hour," he said. Sure enough, half an hour later a white RV-7 covered with sponsor decals taxied up to the hangar and that's where we met Liliana Tagliamonte and Detlef Heun.







*Detlef Heun spent an Oregon afternoon in Advanced Flight Systems' hangar, where president Rob Hickman helped install software upgrades*

The tiny dark haired woman and the stocky German by her side aren't people who'd stand out in a crowd, but they are a pair of true adventurers. They met, believe it or not, when they *both* posted classified ads, looking for a companion on a long flying trip! Detlef says he pinned Lili's ad to his desk for two months before he answered it. At the time, she was in the Canary Islands and he was in Germany. Finally, after exchanging emails for a few weeks, he boarded a jet to the Canaries. "I was just coming off a divorce, and really was not looking for another relationship. But I got off the airplane and Lili was waiting and that was that." The time they've spent apart since that day could probably be measured in hours.

The tale of their travels would take many more hours. It is outlined on the vertical stabilizer and rudder of their airplane. After completing their RV-7 in Florida, they flew south through the Caribbean, down the east coast of South America to Cape Horn. There, they rounded the corner and headed north along the west coast of Chile to Peru and Ecuador. A long over-water flight took them to the Galapagos Islands, then on to Costa Rica, the Yucatan Peninsula, back to Florida and across the United States. So far, the RV-7 has operated with no major, or even minor, glitches and their biggest difficulties have been bureaucratic.

Their intention is to continue their trip until they "cross every line of latitude and longitude on the planet."

Think about that for a minute.

Crossing all the lines of longitude is easy – simply point the airplane east or west and keep going until you get back to where you started. Reducing it to its simplest, if you were near one of the poles, you could cross every line of longitude by simply flying a circle around the pole itself. Latitude is a different story. If you're going to cross every line of latitude, you must actually reach both the South and North poles. Which they intend to do – in fact, they've already arranged a delivery of fuel to Antarctica.

One of the first questions that occurs to everyone they meet is "how can you afford it?" Sponsorship, as evidenced by the logos covering the airplane, helped with some of the initial expenses, but those are nothing compared to what travelers encounter on the road. "We realized very early that the biggest expenses would be lodging and restaurant meals," Lili explained. "So we bought a very good tent and a small cooker. We camp and prepare our own food at most places. Sometimes we are offered places to stay, and we appreciate a real bed and a hot shower more than we can say!" Sometimes they choose their destinations based on offers of accommodation, sometimes accommodation comes to them. "When we landed in Ecuador, we camped on the airfield the first night, but then the police came and said we couldn't," Lili recalls. "Other people saw us being forced to leave, and offered us a place to stay. When we got back to the airplane the next day, there were notes taped to it, offering us more places to stay and eat. It was very nice!"

While they were here, they visited with us and with the folks at Advanced Flight Systems, where founder Rob Hickman updated their dual displays (both are pilots – Lili flies from the left seat, Detlef from the right) with his latest features. Then they headed to the Oregon Coast for a few days of camping and relaxation. After that, it's back across the USA and eventually to their winter home in the Dominican Republic. Next year they will continue their quest.

You can read more about Detlef, Lili, their RV-7 and their adventures when you visit their website <http://www.flight-around-the-world.org/route.html>. Better yet, if you can convince them to stay, you'll enjoy an evening with a pair of people who have seen and done more than most of us ever will, and can share their experiences with you in any of five languages. You won't forget, or regret, the invitation.



## FLYING AN ELECTRIC AIRPLANE — REALLY, FLYING IT

VAN



*Van is one of the higher time electric-airplane pilots in the world, having spent more than 400 hours in an airplane like this one: an Antares 20e.*

A year ago, following AirVenture 2009, I wrote an article on electric powered airplanes from my perspective as an owner/operator of one. I compared and contrasted my actual electric aircraft operating experience with the reports and projects being published. Since then, the “press release” news has continued, and I have continued operating my electric self-launch Antares 20e sailplane. Since June of 2009, I have logged over 400 hours of flight time. Just 15 hours of this was “under power”, usually five or ten minutes at a time. This practical application experience has put me in a different position than most people writing or talking about electric airplanes.

In our field of interest and endeavor, the calendar year runs from “Oshkosh to Oshkosh”. This year, again, there were a lot of talks and programs about electric airplanes, but not much action.

Yuneec had another very interesting POC airplane on display. With a low wing and fixed tractor powerplant, it would normally be classed as a motorglider. It featured a single retractable landing gear and a folding prop to minimizing drag for soaring rather than motor flight. It really looks more like a self-launch sailplane than a general purpose sportplane or motorglider. I don’t mean this to be a bad thing, but rather a concession to the realization that electric technology is not ready for prime time GA; certainly not ready to power an airplane like the Cessna 150 or Katana. Neither of the Yuneec airplanes flew at Oshkosh this year. I heard that they had a system failure of some sort which prevented them from being able to fly.

One of the leaders in electric airplanes has been Randal Fishman with his ‘Electraflyer’ aircraft. Starting with a weightshift trike several years ago, he advanced to the Electraflyer C — an electric motor powered Moni airplane in which he flew demonstrations at Oshkosh and Lakeland for a couple of years. He had a very nice looking Electraflyer-X prototype on display at Airventure

2009 but hadn’t flown it by Sun’N’Fun 2010, where it was on static display. I did not see or hear of it at Oshkosh this year, so don’t know what its current (pun intended) status is. The last entry on his website is dated July 2009.

My friend Dave Nadler had his Antares electric sailplane on display at Oshkosh again this year and performed flight demonstrations during the airshow on two days. I’m not aware of any other electric airplane flying there this year, so the Antares sailplane still appears to be the industry leader. There are about fifty of them operating worldwide in the hands of private owners. Some have been in operation for five years or more. This would indicate that their system obviously works well, demonstrating that they have achieved a good level of operational reliability.

Interestingly, the Antares does not get much attention from the aviation press, probably because it is a single seat, special purpose, quite expensive airplane. Why can’t the Antares electric motor system, or a similar level of technology be incorporated into a more general purpose airplane like the Yuneec or Electraflyer?

It probably can, but I assume that these folks are working through the teething problems that the Antares people struggled with 10 years ago. It’s also possible that the folks at Yuneec, et al, are trying to develop a more affordable package, and thus not able or willing to “buy” the expensive components that have contributed to the success level that the Antares has demonstrated.

Since the aviation press is not yet able to treat us to pilot reports of operating electric aircraft, here’s a few words about my experience.

According to the factory information, the Antares has enough battery power to climb to approximately 9000 ft. at my normal operating weight. I have never verified this, and do not feel that it could be done in a single “open the tap and go” motor run. My experience

has been that the indicated battery power starts to drop more rapidly after about 3000 ft. of climb. Normally, the motor is stopped and retracted at about this time; the start of a soaring (or gliding?) flight. After a few minutes following motor shut-down, the battery power indication will rebound by 10-15%. I have also found that by reducing the power to just enough to sustain level flight (about 25% output), the battery power will rebound somewhat and then drop slowly, commensurate with the low draw.

It would seem that the batteries need to be “rested” periodically to re-balance themselves, either by shutting them off or operating them at a much lower continuous power draw like the “low cruise” mode.

On an ideal flight, I would launch, using battery power to take off, and contact a thermal within a mile or so of the departure end of the runway. I would center the thermal, reduce power to 50% or less and establish that a positive climb rate is probable with no power. At that point, somewhere between 1500 and 2000 ft. altitude, I would stop the motor and retract motor pylon. The high-performance airplane would continue to climb and soar for hours without need to use motor to remain aloft. Total battery use would be 10-15%.

A sample flight for a “poor” soaring day might be: Take-off and climb at about 80% power to 3,000 ft., at which time the power meter will be indicating about 60% or less. After turning the motor off and retracting it, the power level will rebound to about 70%.

At a later point in the flight, I might find myself running out of thermals, altitude, and ideas. I extend the motor and climb about 1500 ft. in the process of getting to another thermal (or getting enough altitude to glide back home). In the process, the power meter may drop to around 35-40% and then rebound to about 50% as the batteries re-balance themselves. Tallying up, I would have climbed a combined total of 4500’: half of the specified performance capability, and used about half of the battery energy. My real world experience has basically validated factory claims.

In the real world, I am rarely climbing in stable air. While climbing in sinking air, often unavoidable while trying to reach the area of the “house thermal” energy goes away quickly as the altimeter slowly winds upward. The reverse is true when the thermal gods smile on me, so the above examples are based on averages.

During a long soaring flight, the flight instrumentation and radio will use about 2-4% of the battery energy, not enough to seriously deplete the energy available for a “save” if needed.

Another characteristic of my system is that the motor should not be operated at high power (high battery discharge) when any of the battery temperatures are below 20 deg. C. When soaring at higher altitudes (low outside temps.), the battery temps can easily drop below 20 deg. C. To assure that the motor can be used if needed, there is a built-in battery heating system. The batteries draw from their own energy to heat them-



selves. This obviously reduces the available energy by a small amount. Normally, I do not activate the battery heater unless the flight is not going well and I feel that I may need to use the motor in the next 5 minutes or so. I do not waste energy keeping the batteries warm during an entire flight.

If I should be distracted with the challenge of soaring flight and overlooked heating the batteries, I can still run the motor at low power (level flight or slight climb) while the batteries are heating. The problem is that cold batteries do not deliver energy well and may be damaged by attempting to draw high output when cold. This is true for other common type batteries as well. This is why your car may not crank well, or at all, in really cold conditions.

Most of the general purpose electric sportplanes being developed or proposed quote flight duration available from their batteries. Its safe to assume that these flight times are based on low power settings and “economy cruise/ loiter” speeds. However, unless one is to cruise at an altitude of 10 ft., a fair amount of energy is needed to reach even a modest cruise altitude. In the case of my Antares, normal climb rate of 5-6 hundred fpm requires a power draw about 4 times that of level flight. So, a large percentage of the available energy is used just getting to altitude. I suppose that at the end of the flight, gliding back down to landing with the motor throttled or shut off, some of this can be offset. Still, it’s a factor to consider, as would be traffic pattern delays at the end of a flight.

The bottom line is that, from my experience, electric aircraft operation is not necessarily as “plug-and-play” as some advocates would like you to believe. In some respects, it is. For instance, operating the motor is as simple as pushing a lever forward---the equivalent of ignition, primer, starter, throttle, mixture control, etc., all in one operation. On the other hand, there are concerns such as the limited energy (range) available, and the battery temperature issue. We can continue to hope for breakthroughs to alleviate these concerns, but in reality we probably must not expect more than incremental gains in the near future.



# **SAFETY, FLIGHT ADVISOR, AND TECHNICAL COUNSELOR PROGRAMS**

TERRY LUTZ

*RV-8 builder and Airbus 380 test pilot Terry Lutz spoke at AirVenture. His remarks merit careful consideration, so we're re-printing them here.*

The EAA Designee program was created in 1965 and the name was changed to EAA Technical Counselor when the FAA began using the term "Designee". The Flight Advisor program began in 1994, with the goal of improving the overall safety record of newly completed or restored aircraft in the early phases of flight. Overall, the emphasis was on being sure that the airplane was ready for inspection prior to first flight, and that for the first flight itself, the pilot was prepared with the necessary skills to handle the demands of flying and at the same time deal with a large set of failure possibilities.

I recently completed the condition inspection on my amateur-built RV-8, and decided to have the engine inspected by a mechanic at a local maintenance facility. When I removed the cowl, the first thing he said was: "That's what we like to see". It was not an endorsement of my abilities, but an endorsement of the many hours Technical Counselor Roy Thelen spent with me as we prepared the engine for flight. Roy made the difference. Left to my own resources, "TLAR, or "that looks about right" would have been the rule, but certainly not the safest approach to preparing the engine for first flight.

For my airplane, the proof of the Technical Counselor concept has been that very few changes have been required since I first began flying the airplane in 2006. Overall, the Technical Counselor and Flight Advisor programs have made a significant difference in the quality of amateur-built aircraft and have noticeably reduced accidents in the first 40 hours of flight. EAA member Ron Wanttaja reports that during the period 1998-2007, 6% of total amateur built accidents occurred on first flight, which is a 0.75% probability of having an accident. This is about the same as the annual overall accident rate, and just what we want to see. However, the probability of having an accident during Phase I testing is about 3 times greater than the overall probability. So while progress has been made, more work needs to be done.

When I was in the Air Force in the 1980s, the accident rate for fighter aircraft was just over 5 Class A accidents per 100,000 flight hours. Better training, newer aircraft, and additional emphasis on safety, reduced the accident rate to under 3 accidents per 100,000 flight hours. Third generation fighters like the F-16, with fly-by-wire flight controls and angle of attack limiting, had a profound effect on reducing loss of control accidents. When I joined Northwest Airlines in 1989 and began doing volunteer air safety work, the commercial accident rate was beginning to decline, largely because of effective strategies to eliminate accidents by cause factor. You may recall the December 1974 accident near Front Royal, Virginia, where the crew of a B-727 de-

scended early on a VOR approach and hit the side of a hill. It was the accident that began development of the Ground Proximity Warning System. You may also recall the mid-air collision over Cerritos, CA where an MD-80 collided with a light airplane. That spawned development of TCAS, the Traffic Collision Avoidance System.

But these changes were not enough. In the middle 1990s, it was predicted that with traffic growth as projected just 10 years into the future, worldwide there would be a hull loss accident every 2 weeks - an unthinkable prospect. As a result, in 1997 the Commercial Aviation Safety Team was formed, with the goal of reducing accidents by 80% in 10 years. Interim FAA Administrator Mr. Robert Sturgell announced last year that as a result of the efforts of the people and organizations involved in CAST, commercial accidents have declined 57%. CAST identified 65 safety enhancements, defined as adoption of a procedure, improved training, or installation of equipment that will eliminate the cause of an accident. For this unprecedented effort, in 1999 the CAST team was awarded the prestigious Collier Trophy. The CAST team joins names that are giants in aerospace history: Neil Armstrong, Scott Crossfield, Kelly Johnson, and Burt Rutan, just to name a few. The importance of preventing accidents has been written in gold on the Collier Trophy.

To put the numbers in perspective, the commercial accident rate has declined from .285/100,000 flying hours to .139/100,000 flying hours in 10 years. In contrast, the general aviation accident rate during the same period has varied slightly from 6.81 in 1998 to 6.47 in 2007 and during that period it has never been below 6.0. Now do the math: the GA accident rate is three times greater than the rate for military fighters, and 40 times greater than the commercial accident rate. Compared to the success of the military and commercial aviation to reduce accidents, the current GA accident rate is completely unacceptable. While we can discuss the impact an amateur built accident has on the overall GA accident rate, the message to everyone should be obvious: we are not doing enough to reduce accidents in the amateur built community.

One of the pilots I provided guidance to as a Flight Advisor experienced an engine failure on his second flight in the airplane. Fortunately, we had flown together and discussed in some detail the emergency landing sites near the airport. He was able to glide to a safe landing on a trap shooting range. While he was both really lucky and mentally prepared, what's important is to know the cause of the engine failure and prevent another from happening. In that particular case, it was an automotive engine application. There was an overspeed sen-

sor in the electronics of the automobile design that detected an overspeed and shut down the engine.

My point is that it is no longer enough for Flight Advisors to simply prepare pilots for first flight in their amateur built aircraft. It is no longer enough for Technical Counselors to inspect an airplane and deem it ready for the FAA required inspection. The bar **MUST** be raised. Organized and wide-ranging follow-up work must be accomplished, at least to the end of the Phase I test period. The lessons learned must be compiled and communicated. And yet we must go further. I challenge EAA, the Flight Advisors and Technical Counselors here today, and everyone involved in building, flying, and supporting amateur built aircraft to do the difficult work to reduce the accident rate attributed to amateur built aircraft by 50% in the next 10 years.

Major cause factors need to be identified and effective strategies developed to eliminate those cause factors, using the same spirit that leads us to innovation in amateur built design. For example, if stall/spin were identified as a major cause factor, then as Flight Advisors and Technical Counselors we could insist that each new airplane be equipped with a fully operational audible and visual stall warning system. We can put angle of attack limiting systems in FBW airplanes, but a good warning may be needed in amateur-built aircraft. There is enough talent right here at AirVenture to develop a low-cost stall warning system that could be adapted to any amateur built airplane. It could be plans built, or a kit that could be adapted to any configuration.

In the world of sport aviation, we shed tears with every loss. Look how far we have come in 75 years: from building Pietenpol Air Campers to Glasairs and RVs. Now it's time to put the energy we use to create airplanes into an effort toward preserving life. By doing so, we will take a huge step toward preserving our sport aviation way of life.

#### **Dick VanGrunsven comments:**

Terry Lutz is very informed, motivated, and dedicated to promoting aviation safety. The one theme running through his speech was that of identifying safety problem areas and concentrating efforts toward minimizing the problems. While his examples involved highly organized groups such as military and airlines, I feel that we must strive to find way to bring the same safety approach to our less formal and less organized building and flying activities. With the help of such tools as the internet, our RV building and flying community should be able to continue to enjoy our freedom of expression and flying opportunity and do so with an increasing level of safety. With a little effort, we can become a model for the rest of the homebuilt community.

Terry's comments and proposals dealt mostly with the hardware side of the safety equation; the aircraft and its systems. We intend to help promote his and related suggestions through these pages. Also, we need to address the perhaps more difficult part of the equation, the matter of pilot competence and proficiency. The overworked adage of the chain being only as strong as its weakest link is very true in our phase of aviation. The safety of an otherwise structurally and mechanically perfect aircraft can be fatally compromised by the operator of that aircraft.

We intend to write more on this subject in future issues. Not necessarily in the manner of "hellfire and brimstone" sermons, but hopefully from the perspective of educating and motivating. We have a wealth of very experienced and skilled pilots in our fraternity, many of whom can communicate very effectively. We will be calling on them for their help.



#### **OUT OF AFRICA**

Seventy years ago Alex Henshaw set a record, flying a Percival Mew Gull racing aircraft from London to Cape Town, South Africa, and back in 4 days, 10 hours, and 6 minutes. In 2009, Charles "Chalkie" Stobart broke Henshaw's record by flying a GP-4 from Cape Town to London and back in 3 days, 15 hours, 17 minutes.

Now, an RV-7 has made the trip in an even shorter time. British pilot **Steve Noujaim** set the new record during the first days of September. He took time out from his whirlwind schedule to send a short note, which we really appreciated:

*I am writing to thank you for designing such a versatile and fantastic little aeroplane. Last Friday I returned to London with my RV-7 G-IIXF, having left only 3 days, 11 hours, and 15 minutes earlier. We endured the most arduous of tests, including the transit of the most treacherous equatorial thunderstorms for 5*

*hours — at night. We were battered and soaked, but still managed to average 231.5 kph over 19,272 km. We flew 6 legs averaging around 11 hours each and she ran like a sewing machine. Based on my experience of Thursday night I am convinced that most certified GA aircraft would have been returned to G-IIXF's original kit form status. The most satisfying part was spotting a street on the airway axis moving underneath and cruising at a steady 185 knot average all at 9.4 gph. That and getting home safely of course.*

*Steve Noujaim*

*PS: Don't worry! The Long Range Tanks are coming out. Overweight operations are most definitely over!! Not that she ever gave me a moment's trouble...*



## **WHAT WE LEARNED WHEN WE PAINTED OUR RV-12**

JOHN SWANSTROM & KEVIN QUIRK

In the introductory section of the RV-12 building instructions, it states that building an airplane is a learning experience. This is so true, and we have learned many things. We'd like to share our experience with painting our RV-12 with those of you who are contemplating how to paint your own aircraft.

### **THE PAINT JOB WE DESIRED & ENVISIONED**

We have been around airplanes long enough to know that the first impression you have of an aircraft is often determined by the paint job more than anything else. We wanted to have a quality paint job that matched the design and craftsmanship of our airplane.

When we began pricing paint jobs, the traditional aircraft paint shop seemed rather expensive compared to the cost of automotive paint jobs. With the easily removable wings of the RV-12, it seemed an ideal candidate for painting in an auto body spray booth. There are lots of auto body shops in our community, and they all deliver quality paint jobs on metal cars, and the RV-12 is just a different type of metal vehicle, so we thought there was a good likelihood that we could get a quality paint job at a significantly lower price.

### **DISCUSSIONS WITH AUTO BODY PAINT SHOPS**

We knew of a couple good auto shops where we had good prior experience with car paint jobs. We approached one and asked if they would be interested in painting an airplane. They said that they had never painted an airplane before, but they had years of experience painting automobiles, and were sure that they could also paint an airplane. Pride and ego run deep in this business. They gave us an estimate of "about \$6,000." This seemed better than the \$12-\$14K we had previously paid at aircraft paint shops, and fueled our expectations of saving considerable money by using an auto paint shop.

### **THE AUTO BODY SHOP EXPERIENCE**

We decided to test the auto body concept with the horizontal stabilizer. However, the first auto body shop we choose had difficulty painting the horizontal stabi-

lizer. After a second unsuccessful attempt we choose a different auto shop. The second auto shop was successful with the horizontal stabilizer, so we took a wing to this auto shop and received a quotation for \$1,500 for painting the wing. We visited this auto shop daily, and we were impressed with their painting knowledge, skill, pride, craftsmanship, attention to detail, and passion for quality. We felt confident we would get the quality paint job we desired.

When we picked up the painted wing we discovered that the shop had put more time and materials into the painting of the wing than they had estimated. This was a moment of decision for us; do we go forward using this auto shop knowing that the cost to paint the airplane would be significantly more than the original estimate? We liked the look of the painted wing, and liked the quality of work we were getting from this auto shop. Therefore we were confident that we'd get the quality



paint job we desired, but also realized we were going to have to pay more than originally expected. We made the decision to proceed.

### **THE FINISHED PAINT JOB**

When we were finished painting the RV-12, the bill for painting the entire airplane totaled \$11,000 (we have not installed or painted the wheel fairings yet). We were not surprised, as we knew early on that this would be more expensive than we had planned, but we were also committed to getting a paint job that matched the design and craftsmanship of the completed airplane. And we did get a quality paint job! When we recently exhibited our airplane at our local air show, we were part of an LSA exhibit of seven different airplanes. There was no doubt that we had the best looking paint job of the group. We had achieved our goal of having a paint job that matched the quality of the design and build craftsmanship.

## WHAT WE LEARNED

While auto paint shops can consistently deliver quality paint jobs for cars, they do not have experience in painting airplanes, or in estimating the costs associated with painting airplanes. There is also some concern about minimizing the weight of the paint that they will apply. We also learned that not all auto paint shops can successfully paint an aircraft. While we got a very good paint job that we are happy with, using an auto shop is probably more of a risk than using an aircraft paint shop. The auto shops just don't have the experience painting aircraft. Aircraft paint shops have lots of experience estimating and painting airplanes, and you likely will have a better chance of getting an accurate price estimate, and a quality paint job from an aircraft paint shop.

## THE FINISHED AIRPLANE

When we were showing our new airplane to another pilot at the local air show, he commented on how nice the paint job looked, and asked who did it and how much it cost. When I told him it cost more than we had expected he said "when you pay for quality you only flinch once when you write the check; when you get a poor paint job you flinch a little bit every time you look at your aircraft." So we only flinched once, and now we are very happy every time we walk up to our airplane.

## OUR NEXT AIRPLANE...

We've just taken delivery of an RV-9A quick build kit. While it will be a couple years before we'll be taking it for painting, we likely will take it to an experienced aircraft paint shop, and get a firm fixed price quote in writing.

**International Be Kind to Van's Employees Day** fell on August 11 this year. At least a few people noticed...we received a nice email from **Bob Foutz** and **Theresa Knox**:

"We love our RV-9A, all painted in Buckeye colors. It is our magic carpet to the world. Our RV-9A resides in a hangar at the New River Valley Airport in Blacksburg, VA and we've started an RV-10. We think you all are terrific and appreciate the quality of the kits and the outstanding support. Thank you, Van's Aircraft!"

Even better, a box full of carmel corn showed up on Scott's desk, send by **Chris and Indira Kleen**. We enjoyed that.

Our thanks to these, and others, who enjoyed our little joke on the calendar and took the next step. Made our day!



*If you feel the need to be truly humbled, try flying the Wright Flyer simulator the National Park Service brings to Oshkosh. You fly it prone, with the elevator control in your left hand. Roll, such as it is, is controlled by throwing your hips one way or another, and moving the hip cradle. It does NOT fly like any airplane you've ever tried, and it's a complete wonder that Orville and Wilbur mastered the thing.*

*It took a bit of persuasion to get Van to try it. You can see the concentration on his face.*

*Would it surprise you at all to know he flew it better than most?*