



### Left Seat: Change of Seasons



Fall brings colorful leaves, less daylight, and some of the best flying days of the year. In the often tranquil days between the end of summer's heat, and the onset of the cold Canadian air masses spilling south, there is a time when having

the ability to fly over our region is a special treat. There is usually a brief period of a week or two when Tennessee's forested hills look like a bowl of multicolored Trix cereal seen from a few thousand feet up. We hope you'll take the opportunity to go to a Saturday morning fly-out breakfast, or take friends or family out for a 'fifty dollar hamburger' (or is that a hundred now?) to enjoy the Fall skies.

The Chapter's 2009 programs are winding down, and will culminate in our annual December holiday party. Between now and then is an important community service event, which will be a Young Eagles/Boy Scout Aviation merit badge day at Smyrna airport on Saturday, November 21.

The Board of Directors is already working on an entertaining and informative 2010 schedule of meetings, programs and events. We've had good success with an initial hands-on metalworking skills

workshop (see "A Riveting Event", this issue) and plan more of the same kind of opportunities in the coming year.

Stay safe and have fun while you exercise your privilege to fly in our beautiful region of the country.

Dan Masys

### On the Horizon: calendar of events

EAA Chapter 162 meets on Wednesday evenings--generally the third Wednesday--of each month.

Date	Topic	Location
November 18	Hangar Flick: "Fly Away Home"	JWN
November 21	Young Eagles event	MQY
December 11	Chapter Holiday Gathering	Calhoun's

For more details see [www.eaa162.org](http://www.eaa162.org).

### Living Happily With Modern Avionics

The current generation of avionics—glass panels, moving map navigators, etc.—are amazing devices. We owe the majority of this capability to the addition of computing technology. Like most technological advances, the benefits come with some undesirable side effects we have to learn to live with. In this discussion I'll use Garmin as an example, but the subject applies to all vendors. Here are two side effects I've identified.

First modern avionics systems require much more careful study than we are used to if we hope to reliably master their capabilities. We also need regular practice using their functionality. Failure to do so can leave us in an awkward, even dangerous situation. Flight currency today includes currency in operating the avionics.

The second side effect has to do with software problems. Avionics has always had a shakedown period where design issues were identified and resolved, but few pilots encountered them. By the time we got them, they worked as advertised. With the computerized boxes we have today that's no longer true. The software that runs systems like the Garmin GNS430W NavCom may not be as buggy as Microsoft Windows, but there are bugs and they can cause us real grief if we're not aware.



In my opinion Garmin does a pretty good job with the software in its systems. I'm only aware of one AD on the GNS430/530 and it was early

in the product life. However, there have been many less serious problems. A good example was the WAAS upgrade software. Months after it was released it was discovered that WAAS approaches to letter-number airports like M54 (Lebanon) don't work. I discovered this the hard way, trying to fly the LPV approach to M54. I was convinced it was a problem with how I was pushing the buttons. Not so, it was a software problem. Garmin fixed it in a later release.

The problem with software bugs is that they are obscure and difficult to detect. You can be sure vendors do extensive testing both in the lab and in the air before releasing new software. But they don't catch everything, and just like in the PC world, it's not long before service alerts start to appear warning us of problems.

Is it you or the box? The operation of these new systems is not always intuitive and several times

I've felt I was doing something wrong only to discover later it was a system design problem. For example, my autopilot-GPS setup will fly a complete approach including the procedure turn. But on a GPS approach, the procedure to arm the glideslope is a mystery. Knowledgeable people say I need to push the approach button twice and they have an explanation for why. Sometimes it works for me, sometimes it doesn't. I suspect the full cause is unknown and is a software problem and I'm not surprised when I end up hand flying the approach.

The net of all this is that we need to treat the software in our avionics as a critical piece of aircraft equipment and test it thoroughly when it changes. When we have major work done on our airframe or engine we always do a test flight as a release from maintenance. The same needs to be done for new software.

Be aware that testing avionics software is very difficult. The best we can do is check it out the ways we typically fly. This will take some time. Then for the next few hours in the air, be suspect of its integrity until it has proven to be stable and trustworthy. Be on the lookout for things that don't work right. And just because it works for others is no guarantee it will work as well for you.

Keep up to date on manufacturer's service alerts. If they don't provide automatic notification, you can often get a heads up by participating in type club online forums. Garmin is now posting safety alerts on their website. I look forward to the day they offer automatic email notification.

We can expect the software bug situation to get worse in the future. As new functionality gets added to our magic boxes, the potential for bugs grows and grows. Don't go launching into a trip with new software until you've given it a thorough flight testing.

Peter Cassidy

### An Absolutely Riveting Event

On Saturday, October 24th ten stalwart members of chapter 162 undertook a group adventure in working with aircraft sheet metal. With Dan Masys

and Brian Southerland as the team leaders, hangars 443 and 444 at John Tune were transformed into a metalworking classroom and shop. Each attendee began by unwrapping the components of a project kit developed by Van's aircraft that develops a variety of skills necessary to build a metal kitplane, and results in a fine compact aluminum tool box with hinge, handle and latch, and all of its pieces riveted in place. Along the way, the builder is introduced to drilling rivet holes, deburring operations to remove rough edges that contribute to stress points in aluminum, dimpling of parts for flush rivets, and cutting parts to rough and final dimensions.



The class learned both manual methods of setting rivets with a hand squeezer, and the finer points of specialized air-driven tools for drilling and riveting. A natural affection develops quickly for industrial tools that make quick work of sheet metal chores. Why cut a hinge with a hacksaw when a bandsaw can do it in a second with greater precision? Why build hand strength with a manual rivet squeezer when a pneumatic one is three times as fast and twice as much fun?



Some aspects of the workshop were unexpectedly like the real experience of building an airplane from

a kit. The time it took to complete the toolbox kits was about twice as long as expected, and most everybody had to undo and redo something along the way – drill out a rivet or two, or recut a piece and try again. Luckily the toolboxes did not have an engine, avionics or need upholstery and paint, or it could have gotten really out of hand! At the end of the day, every student also got to experience a little of the joy of homebuilding: after persevering through a challenging and sometimes tedious set of tasks, there was a fine and useful product of their labors to admire and keep.



*Rick Spencer in the role of happy builder shows off his finished product.*

The skills learned during the workshop are useful for owners of factory-built airplanes, too. Appendix A of FAR Part 43 includes a list of 32 types of preventative maintenance an aircraft owner can do, and on that list is “Making small simple repairs to fairings, nonstructural cover plates, cowlings, and small patches and reinforcements not changing the contour so as to interfere with proper air flow.” And we know that even if the workshop participants never pick up a rivet gun again, they will have a much more discerning eye for the sheet metal work done in the course of maintenance on any airplane they happen to meet.

The hands-on metalworking workshop was a definite success. If you have ideas for other skills you would like to see the Chapter put together, drop an e-mail to [eea162@gmail.com](mailto:eea162@gmail.com).

## Van's RV-12: Hitting the "sweet spot" again

Aerodynamicists and test pilots alike have often written about the fine combination of performance and handling of the Van's aircraft kitplanes. More than one has noted that the two place RV's – models 4,6,7,8 and 9 – have wing lengths and aspect ratios that put them in an aerodynamic 'sweet spot' with respect to handling and the ability to fly both fast and slow. They are also noted for their control harmony and are the *de facto* standard against which kitplane handling characteristics and performance are benchmarked these days.

Being about 25% of the way through building the new RV-12 kit, I have had some time to reflect on its design features, cost, and building experience relative to the RV-7A and RV-10 that I completed before. I don't know yet about the performance characteristics, since I haven't flown an RV-12, though others have remarked that they are gratifyingly 'RV-like.' But what I do know makes me think that Van's has another colossal hit on their hands, a gem of an airplane that is in the early stages of being discovered by a lot of potential future buyers. I am pretty sure the RV-12 hits a sweet spot that has nothing to do with flying qualities, and everything to do with utility, cost and building experience.



One might ask why an RV-10 owner, who has a bird capable of vaulting over the entire continent with four aboard, 170 knot cruise speeds, and a

20,000 foot service ceiling, would want to have a light sport aircraft that is limited by FAA regulations to 120 knot max speed and two seats. For me, the answer is that my wife and I recently purchased a home in a residential airpark out west. The house has access to the community runway and a nice garage built for a Class A motorhomes (with two bays 12 feet high and 45 feet long), but no hangar. So I needed (well ok, I would like...) an airplane with foldable or removable wings that will fit through a standard 9 foot wide garage door. I looked at the Glastar Sportsman 2+2, with its great carrying capacity, 150 knot performance and folding wings. But alas, the horizontal stabilizer of the Glastar is 11 feet wide and won't go through a garage door.

The RV-12, on the other hand, has an all-flying stabilator specifically to keep the horizontal stabilizer width to 8 feet so the airplane can be trailered and stored in a garage without any undo work or special arrangements. The wings are removable in 5 minutes (with some videos on Van's website to prove the point), and the wingtips even have handles built into them to facilitate the job. So far so good. Definitely in the ballpark for aircraft configuration. But what really seals the deal for the RV-12 is that as an Experimental Light Sport (E-LSA) Van's has designed and kitted every single detail of the finished aircraft, including new engine, prop, avionics, and upholstery. The total fly-away price of the completed (unpainted) RV-12 is currently \$52,000 – less than half of the store-bought price of most of the current new LSA designs. And the critter runs happily on either 100LL or autogas, sipping 5 gallons per hour.

I hear you saying, "but you gotta build it!", and that is the last and delightful piece of the 'sweet spot' puzzle. Compared to any of Van's flush-riveted, high performance kits, the RV-12's ease of construction can only be described as shocking. Even the time honored ritual of deburring both sides of all holes prior to riveting is optional for the holes punched by Van's CNC presses. And for the first time in RV kit history, the holes come from the factory pre-punched to final size, immediately ready for inserting pulled ("pop") rivets that make up the vast majority of the airframe fasteners.

By way of comparison, the completion of the empennage and tailcone of my first RV, the RV-7A, took 300 shop hours. For the RV-10, it was 200 hours. For the RV-12, the completed empennage and tailcone section shown in the photo took a total



of 65 shop hours, and more than a third of that was spent prepping and priming the internal pieces with a Boeing-style two-part epoxy primer, which is entirely my preference (since this bird will live very close to salt water in a marine climate). Many builders can and do dispense entirely with priming, and get long-lived airframes just by riveting the parts together as they come out of the box.

They say that the hours spent flying aren't deducted from the total you are allotted on this mudball, but as the rest of those hours accumulate there is the possibility that a few of us might not be able to renew our class III or higher medicals, but still be safe to fly. Having the keys to a light sport aircraft 'in your pocket' seems like a nice insurance policy against a rude health-related surprise that suddenly makes owning your own aircraft an irrelevant expense. You still have to be safe to fly, but there is definitely a space in there where a light sport aircraft could be a fine way to extend one's flying opportunities.

The proof will be in the experience of flying the RV-12 when all of its components are installed, using Van's superb instructions and illustrations. But I am pretty sure already that Van's may have hit the sweet spot not only of flying qualities, but of cost of ownership, utility, and ease of construction. Which already has me sporting another 'RV grin.'

Dan Masys



### Sightings



*I just hate it when the airshow ends with this routine...*

*Anonymous  
Air Force Thunderbird pilot*

**EAA CHAPTER 162  
MEMBERSHIP INFORMATION FORM**

*PLEASE MAKE ANY CORRECTIONS*

DATE \_\_\_\_/\_\_\_\_/\_\_\_\_

WHAT NAME WOULD YOU PREFER ON YOUR BADGE? \_\_\_\_\_

NAME \_\_\_\_\_  
LAST FIRST M INITIAL SPOUSE / SIG OTHER

ADDRESS \_\_\_\_\_  
STREET / BOX CITY STATE ZIP

PHONE \_\_\_\_\_  
HOME PHONE CELL PHONE WORK PHONE

E-MAIL \_\_\_\_\_ DATE OF BIRTH \_\_\_\_\_

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CHAPTER RECEIVES A REBATE IF YOU LIST EAA 162 AS YOUR SPONSORING CHAPTER - PLEASE DO THIS WHEN YOU JOIN NATIONAL -- THIS HELPS THE CHAPTER.

FAA RATINGS  STUDENT  PRIVATE  COMMERCIAL  A&P

OTHER \_\_\_\_\_  GLIDER  IFR  ME  ROTO

FLT ENG  RADIO REP  CFI  CFI I

AIRCRAFT PROJECT UNDERWAY \_\_\_\_\_ % COMPLETE

AIRCRAFT NOW OWNED \_\_\_\_\_

SKILLS WOULD LIKE TO CONTRIBUTE \_\_\_\_\_

CHAPTER  YOUNG EAGLE  NEWSLETTER  FLY-OUTS  BOY SCOUTS

MGMT OR  BOARD  MEMBERSHIP  TECH COUNSEL  WARBIRDS

ACTIVITIES OF  LIBRARY ARCH  PROGRAMS  WEBSITE  HERITAGE  
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**MAIL TO --  
EAA CHAPTER 162  
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**ANY OTHER INFORMATION YOU WOULD  
LIKE TO SHARE OR PROGRAMS YOU WOULD  
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