

RVs, Aerobatics, & You

Here's a piece of information that will be obsolete before you finish reading it: 6,099 Van's RVs have flown since they were introduced in 1973.

It's outdated because the "How-Many-RVs-Have-Flown" meter on Van's website said 6,099 when we started writing this.

By the time we've finished, the number will have increased several times.

Budd Davisson, photos by David and Zan Blundell

Just knowing that 6,100-plus amateur-built airplanes of any kind have taken to the air says a lot about that airplane. It says that the basic design is excellent and easy to fly, because the market weeds out products it doesn't like; there's a very Darwinian aspect to product survival in the marketplace, and only the strong make it. The astounding number built also says that it's a pleasant-looking airplane (pilots don't like being seen in ugly airplanes), but more important, it says that the builders' support from the company is well above average. In short, for a product to be successful in any market, but especially in the homebuilt airplane market, it has to be a good product that tickles your emotions and has a good company behind it. And that pretty well sums up Dick VanGrunsven's RV family. Oh, yeah, one other thing—all but a few of his airplanes are designed to Federal Aviation Administration (FAA) aerobatic category standards. So, what we have here is a huge repository of aerobatic airplanes and their pilots, who may or may not be aerobatic pilots, even though their airplanes are very definitely aerobatic-capable.

Finding Instruction

Of course, given the mindset of those reading this, the obvious question has to be, "What good is having a sprightly handling mini-fighter stressed to aerobatic limits (+6/-3) if you don't know how to aerobat it?" And there, in a single sentence, is part of the rationale behind the International Aerobatic Club (IAC) deciding to put together a database of instructors who are willing to give dual aerobatic instruction in RVs. The concept is that a lot of new owners and builders are going to want to aerobat the airplane, and self-education in a slippery, high-speed bird like the RV can be a bad thing, sometimes, a very bad thing. There is simply no substitute for getting instruction in any airplane, but especially in aerobatic airplanes such as the RV, because its nose-down speed potential is much higher than the airplanes many aerobatic pilots fly (Citabria, etc.). So, safety was one of the reasons why the IAC got on the RV bandwagon: It wanted to help those RV owners who want to safely spend an afternoon looping and rolling, as well as offering guidance to those who actually want to compete in the airplane, as many already do.

"We have already had a number of RV pilots enter IAC events to compete in Primary and Sportsman," says IAC board member and competition pilot Tom Adams. "Just last week a group of RV guys, here in the Tennessee area, met with some of us IACers to find out how they could get involved. They want to expand the areas in which they fly their machines. I would guess maybe one in 10 want to fly competition, while most we

spoke to want to fly Sunday morning loops and rolls just to enjoy the machine."

In order to accommodate this new facet of aerobatic instruction, the IAC is updating the "IAC Acro Flight School" portion of its website.

"When that is completed," continues Adams, "the schools that want to teach aerobatics to RV owners in their own airplanes will be listed as such. Any RV owner who wishes to learn more about basic, safe aerobatics will be able to find out where to go for help."

Tom says they already have a sizable number of aerobatic certificated flight instructors (CFIs) signed up for the RV program. One of those is Steve Johnson, an Advanced competitor and aerobatic CFI based in Nashville (www.StuntPlane.com).

"All the RV training I have done has been in RV-6s and -7s," says Johnson, "which I think is only because those are the most popular models in my area. I have done acro in an RV-4 and RV-10, but only because the owner wanted it done for his logbook, so his airplane would be officially approved for aerobatics."

It should be pointed out that not all RVs are designed to the +6/-3 aerobatic limits, although most are. Early RV-3s, for instance, must have their wings updated to the RV-3B configuration, which includes a new spar. The update kit is included in Van's catalog of neat toys.

"I am the local aerobatic instructor in middle Tennessee," remarks Johnson. "I had several RV pilots ask about getting acro training in their airplanes, so we did. It grew from there into my doing the initial acro flights during the Phase I testing of their amateur-built aircraft."



Tom Adams asked Johnson to meet with RV pilots, teach them about the IAC, show them how to find competent aerobatic training, and then brief them on flying in competition. This work culminated in an RV aerobatic contest in Texas that was featured in a 2008 article of *Sport Aerobatics*.



“That article got a lot of attention,” says Johnson. “Tom has contacted the listed IAC aerobatic schools about their willingness to train pilots in RV aircraft, and there was a good, generally ‘yes,’ response. Some schools want to start the training in a Decathlon, or similar airplane, and then transition into the RV. I don’t have that luxury, so I start in the RV, after I do a very thorough technical inspection of the aircraft.”

Knowing the Limits

Per Van’s website for RV-4s, -6s, -7s, and -8s, the *g* limits are +6/-3. Johnson has never exceeded these limits in flight training and has never really gone more than +5 and -1*g*’s.

“The *g* limits, in my opinion, are fine for Intermediate,” continues Johnson, “though I have not yet flown an RV airframe with inverted systems. I have snapped an RV but not purposely at speed. The snaps have all been at the tops of loops when the student pulled too hard. I have only taught Sportsman-level figures. The accidental snaps at the top do want to develop into a spin, but if power is pulled, and controls neutralized, the spin does not develop.”

“I flew an RV-8 in Intermediate for a season,” says RV competition pilot Lew Shattuck. “It did just fine, although I was cognizant of the *g* limitations all the time. I’m not sure, given the latest Intermediate requirements, that one would be well-advised to fly that category because of the

negative *g* limits of the machine. It could probably be done, but there’s not much room for error. On the other hand, I believe any of the RVs would be fine in the Sportsman category.”

Steve Johnson says his biggest concern is the well-known speed potential of the RV in aerobatics.

“These airplanes accelerate quickly,” says Johnson “If throttle is not pulled or managed appropriately, the V_{NE} or *g* limits can be exceeded. I fly Advanced level competition, so I have no problem with the energy management issues, but a student can get behind in a hurry in nose-down situations, such as on the backside of a loop. Any downhill flight must be managed well to prevent exceeding V_{NE} . Pulling the throttle works great if it is used.”

For spins, whether solo or dual, Johnson flies with full tanks in order to keep the center of gravity (CG) forward. Spin rotation in this configuration is fast, with a 40- to 60-degree nose-down attitude.

“I have done three turns in RV-4s, -6s, and -7s, both directions upright,” says Johnson. “The rudder has plenty of authority throughout the spin with strong feedback against your feet. Stops can be competitive style, but must be practiced a lot to stop on a good heading. Without competition-style practice, the spins stop fine, but not on heading. The elevator has good authority in spins, as well, though I have not tried any accelerated spins or outside spins. All of the RVs I have flown have been other people’s airplanes, so I have not had the opportunity to try more advanced figures.”

Johnson says spin entries, even with full fuel to move the CG forward are easy, but not excessively so. With good footwork, you can hold the stall with no spin, but if you have a wing down, or the ball out, it will want to spin. For incipient spins, the Beggs / Muller system (power idle, hands-off stick, rudder opposite spin) works fine. He hasn’t tried Beggs / Muller for fully developed spins, but the normal opposite-rudder and then forward-stick recovery method works well through three turns.

“Students often ask me how many hours it’s going to take to make them safe while doing acro,” Johnson says. “Not knowing them, it’s hard to give an exact answer. I would say it takes at least five hours to be safe during acro, maybe more for competition. It takes a while to get the pilot far enough ahead of the airplane to manage the energy on downlines.”

Stick forces are light, about like a Pitts S-2B, but with less roll or pitch rate with deflection. Accelerated stalls do occur but are not bad. Under power, the left wing will drop, but if you let off on the stick, flow reattaches fast. There are no sight devices designed for RVs yet, so setting lines can be hard—there are no good sight pictures through the big bubble canopy.

“All of my instruction has been Sportsman level,” continues Johnson. “We start with rolls and then loops. Once we have loops down, I start the spin training, but spins are easy to prevent. I have been able to talk all students through hammerheads and Immelmans without inadvertent spins. I also do competition-style spin training for students who want it. The one thing I emphasize



is safety though altitude. Most of my lessons are in the 4,000- to 7,000-foot range with the field at 500 feet mean sea level. Once a student is competent, I will bring him down to Sportsman acro altitudes.”

Your RV

One of the concerns instructors have about taking on a student in a homebuilt airplane is that they don’t know for sure how well the airplane was constructed. Steve has his own approach to that problem.

“Fortunately, RVs can be easily inspected by removing the cowling, tail fairing, and aft baggage compartment bulkhead,” says Johnson. “I do this inspection for all first-time RV flights. While I have seen some poorly built RVs, I have not yet had a poorly built aircraft offered to

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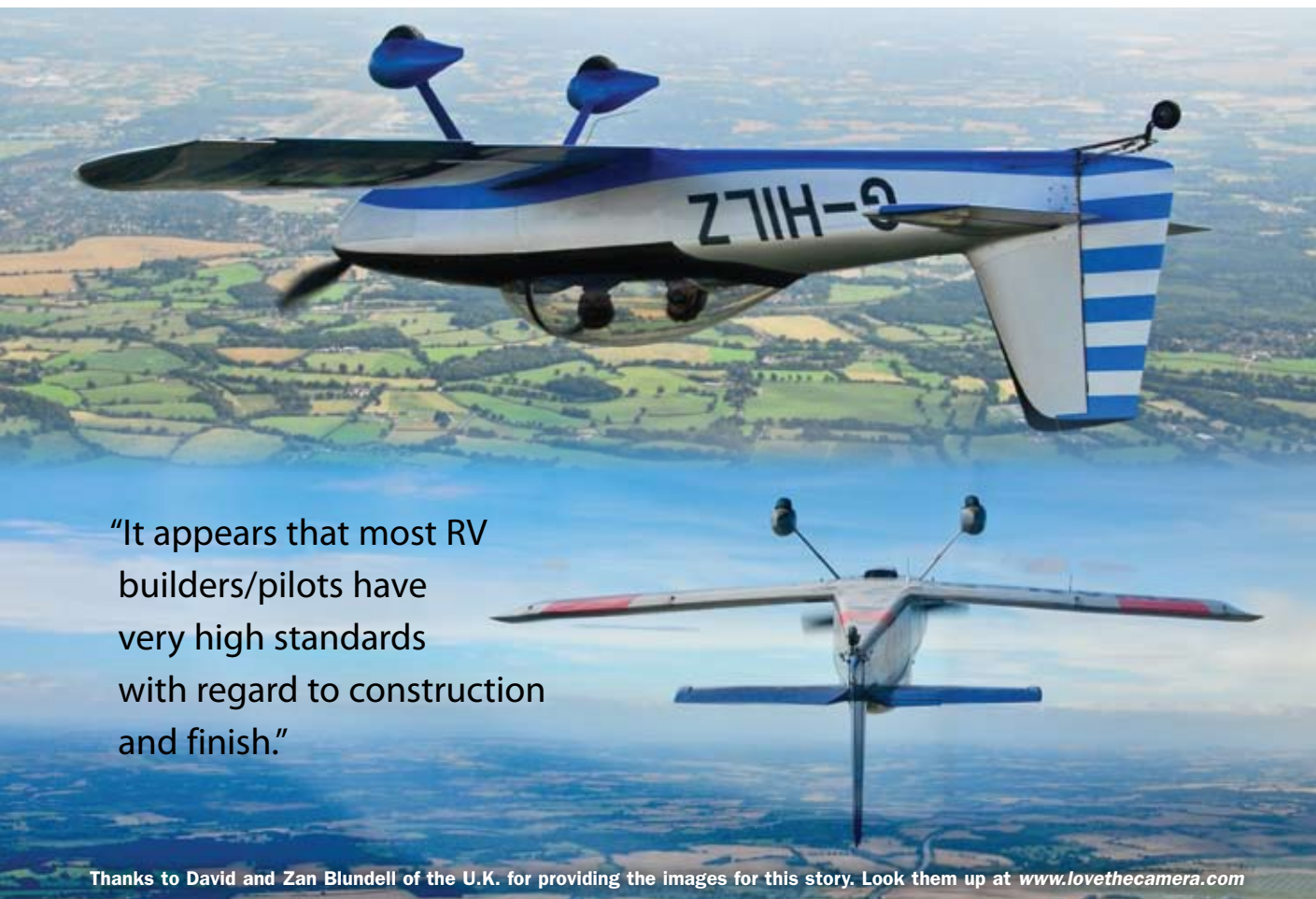


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“It appears that most RV builders/pilots have very high standards with regard to construction and finish.”

Thanks to David and Zan Blundell of the U.K. for providing the images for this story. Look them up at www.lovethecamera.com

me for acro training. I have not found any problems in aircraft regarding aircraft differences or quality of construction. It appears that most RV builders/pilots have very high standards with regard to construction and finish.”

Inasmuch as there is always a large number of used RVs on the market, it goes without saying that if a person is intending on doing any aerobatics in their new purchase, a very detailed prebuy inspection is in order. This should always be the case when buying a new airplane, but in this case, where the pilot will be subjecting it to higher than normal loads, it’s vitally important they know the structure was put together the way Van’s intended.

Since RVs are often equipped to do serious cross-countries, their instrument panels aren’t the stripped-down versions many aerobatic birds tend to use.

“Most RVs I have flown have gyro panels of some sort,” says Johnson. “If the gyros are traditional, mechanical gyros, I explain that acro may damage them. Some owners/pilots have not cared about this or have had all solid-state gyros with no moving parts, so we continue on with the training. Some of those with mechanical gyros have limited themselves to “Sunday afternoon” loops and rolls. This means more gentle inputs and less overall training time for the student.”

The problem of fitting normal-sized pilots and parachutes into little airplanes has haunted aerobatic pilots for years, but modern parachute manufacturers have come to our rescue.

“I use a Long Softie,” says Johnson, “But any newer, thinner backpack would work well. The seat backs are easily adjustable on the stock RVs, and removal of the upholstered seat back cushion is just a matter of pulling it out. This has comfortably given me enough room for the parachute and myself. I don’t think a seat pack would work, as there is not much depth to the seat pan, but a very thin seat pack might work for smaller pilots.”

With so many RVs out there, many view this abundance as a vast untapped source of not only future aerobatic pilots but a lot of fun-flying as well. However, it has to be approached correctly, and certainly flight instruction is the first step.

“Obviously, the IAC would like to increase its membership,” says Tom Adams. “That being said, our primary concern is offering the RV people, who want to fly acro, a venue where they can find instruction that will allow them to do that safely. Let’s face it, as we’ve said repeatedly, the RV can be a fast and slippery acro mount. But with even minimal instruction, it can be as safe as any other airplane in aerobatics.”

The service the IAC is developing for the RV community is coming at the right time, and the whole of sport aviation will benefit from the increased level of safety, proficiency, and fun that will result from their new program. So corral the RV owner on your street (every street has at least one), and invite him or her into the IAC. These RV owners will never regret being exposed to instruction that is tailored specifically to their airplane. 🇺🇸

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