Velocity News

Spring 2018

Member Spotlight

South African Velocity Student Project

by Jan Rombouts

Fourteen years ago, I wanted to start building a Velocity, but, I thought, "lets first start with building a car, if that doesn't work, properly don't start with an airplane." I built the car from scratch; a look-alike lotus 7; not a kit or from plans, just from a picture. Busy for almost 4 months, day and night. It is complete, certified, and roadworthy.

Unfortunately, after this I became so occupied with the activities at the campus that the whole idea of building a Velocity had to be placed on hold. Now, 14 years later I brought the plans back to the front to accomplish this challenge with help from our students. Since the Information Technology (IT) faculty at my university are already doing projects for Lockheed Martin and Boeing, along with Penn State University in the USA and Catholic University Leuven in Belgium, I proposed an airplane to serve as a platform for testing these projects. I found out as a private pilot during the past 30 years that there is a lot to do to increase safety for General Aviation.

We built a 10-by-14-meter (32' x 45') hanger at the campus and started to search again for a Velocity project. We were looking for an incomplete project rather than building a Velocity from scratch (My time is slowly

In this Issue

Top: A large hangar where students and faculty will experiment with IT projects installed in a Velocity RG.
Bottom: It took 3 months on boats and trucks to ship this project from Florida to South Africa.

running out with my 60 years to start building from zero).

Our major concern was the building quality of an unfinished project. I came in contact with Travis Holland, a former employee from the Velocity factory, who was selling a fuselage and wings that were made for DeltaHawk engines USA in the nineties. They had been developing a diesel engine for GA for several years. Travis and Scott Swing assured us that it was extremely well made.

Originally DeltaHawk was planning to build two airplanes. They only completed one and the second one was stopped after the fuselage and wings were completed. We made a deal with Travis and the plane was sent to the velocity factory where Scott made some modifications (side sticks and toe brakes) before it was placed on transport to South Africa.

The fuselage and wings separated were still too big to go in a container. We had to buy a trailer to mount the fuselage and

Student Involvement

Belgium Campus is a pioneering ITversity in South Africa that helps to raise the bar through its graduates in the Information Computer Technology (ICT) industry. The world is looking to technology for the answers to some of the most fundamental issues and problems we face today, and you can be one of the many individuals who can lead the way in providing these answers.

Exposing our students to innovation projects, like creating flight safety features for a Velocity Aircraft, is a crucial aspect of our Belgium Campus offerings. This is either done during the Academic Leadership program, or as a specific project during their studies. It is here where students work with the community and the real business world and with local and international universities. Some of the collaborative projects Belgium Campus and its students are involved in are with RESNA, Boeing, Lockheed Martin, ArcelorMittal, Atlas Copco, City of Tshwane and Eddict to name a few.

wings on. The trailer had to be loaded on a roll-on/roll-off boat rather than a containership.

There is no direct line from Florida to South Africa. The shipment went first on a boat to Bremerhaven, Germany and from there to Durban, South Africa and then to us. The shipment took more than 3 months.

Within three months a brand new 6-cylinder anti clockwise lightweight ULPOWER 200 HP straight from the factory in Belgium had been installed. By the way, I had the opportunity to see the making of our engine at the factory in Ieper (Belgium). Scott from Velocity and the engineers from ULpower designed an engine mounting for us. The engine is fitted with a three-bladed Whirlwind prop with a Airmaster semi-automatic pitch control (New Zealand).

The avionics and glass cockpit are fitted, the brakes and hydraulic gears checked, and we are almost ready to fit the interior and paint. During this process we received excellent service from the Velocity factory for every detail that we asked.

Small anecdote about the glass cockpit, by doing our research we found the MGL product line. Came in contact with MGL in the United States to find out that this product is developed and manufactured here in South Africa by us in Western Cape. I was feeling a little bit stupid after that conversation!

Top: The 6-cylinder ULpower engine mounted on the aircraft.
Bottom: The EFIS was sourced from MGL, an avionics company that was founded in South Africa.

We opted for the MGL glass panel because it has an open source system since we have IT experts at the University, we can do further development.

We are almost ready for our IT students to start with their projects. For example, one of their projects could save lives. Flying above 12,000 feet, supplemental oxygen is required or be pressurized. But a heavy smoker could be in trouble at 10,000 feet easily. Imagine flying at 11,000 on autopilot and passing out. The

can be created and developed. We already have a list of 8 different projects to reduce the workload in the cockpit providing immediate benefits to improve the safety of flying.

aircraft would probably continue to fly at that altitude until it runs out of fuel and crashes. We are developing a sensor and software that will monitor the pilot. When the system finds that the pilot is not reacting normally, it will bring the plane with the autopilot to a safer altitude and probably save lives (and planes).

We are developing a fully text-to-voice speech checklist for an Iphone or Android cell phone, connected to your audio-panel. The audio check list would go from item to item with a click on the stick or yoke, Allowing the pilot keep concentrating on flying the plane in place of being distracted while reading from a classic checklist? It can even remind the pilot to automatically perform tasks—at intervals programmed by the pilot—such as change the fuel tank selector every 20 minutes.

Our students love these kinds of challenges. Much more can be done in an experimental aircraft to improve the safety of general aviation. These are just two of the many things that

Jan Rombouts is Belgian national who has lived in South Africa, where, 20 years ago, he was involved in starting a new private university near Pretoria. Today, Jan is the Chairman of the Belgium Campus, South Africa's most advanced ITversity dedicated solely to the study of Information Technology (www.belgiumcapus.ac.za). Jan holds has held a PPL license for more than 30 years. He is married with seven children.

License to Learn

Transition Training Why and How

René Dugas

Editor Jeffrey Richmond talks with Velocity-approved flight instructor René Dugas about pilots transitioning from other aircraft to the Velocity.

Editor: Why do you feel transition training is important for Velocity pilots?

René: Velocities are great planes, but they are different—that is part of why we love them. The aerodynamics of canard aircraft are different and must be respected and mastered for safe flight, with particular attention paid to takeoffs and landings.

While learning on one's own Velocity is possible, it can also be expensive (repairs) and dangerous. Transition training lets new Velocity pilots understand the aerodynamics of canard aircraft and learn the techniques that work and get the most enjoyment out of their aircraft. Having an experienced CFI/Builder look over your project can be fun and enlightening too.

The procedures and techniques learned from, perhaps many years of experience in flying tractor aircraft are different. We are not instinctive Velocity pilots any more than we are Space Shuttle pilots. Pilots must learn the Velocity's peccadilloes.

Transition training may be done at the Factory in Sebastian, Florida, at several instructor locations, or even at your home airport in your own aircraft. My recommended approach, if possible, is to fly several days in the well-maintained fixed-gear trainer at the factory with an approved CFI Velocity Instructor. This approach, however, does not meet everyone's needs, so there are several CFI's across the country who also have built and fly Velocity Aircraft and are available for transition training. Contact the Factory for a list the names and contact information for those pilots.

Editor: What makes an easy transition?

René: Simply put - experience flying different aircraft and recent flight experience seem to be primary determiners of transition efficiency. Exposure to different aircraft makes one more attuned to the eccentricities of each different aircraft and confirms an awareness of multiple techniques to manage varying aircraft.

The Velocity is fast, so we must think farther ahead of the aircraft than most pilots are used to

One may think that flying the same aircraft for years is best but that is not born out in fact. Continually challenging oneself with different aircraft pushes one outside their groove of comfort and encourages new techniques and synapses to form making us better.

Personally, I fly five different aircraft most weeks. I can assure you it challenges and changes the way one flies. Frequently hiring a CFI to expand a pilot's abilities is worth the investment in improving your confidence and ability.

The Velocity is fast, so we must think farther ahead of the aircraft than most pilots are used to in their previous flying (military pilot Chris Collins excluded). I've been told it's always best if your "mind gets to your destination before the aircraft does."

Being pushed helps and the right instructor can do that.

Editor: Can any experienced CFI provide the needed transition training?

René: Probably many can, but I recommend flying with an instructor who is experienced in the Velocity is best because of the specific knowledge base and flight experiences that can be shared and demonstrated.

While one is receiving instruction, the transitioning pilot should not be worried about whether the CFI next to

him can fly the plane or get him out of trouble. He should be learning and enjoying the experience.

The CFI should impart new knowledge and explain new techniques specific to your aircraft.

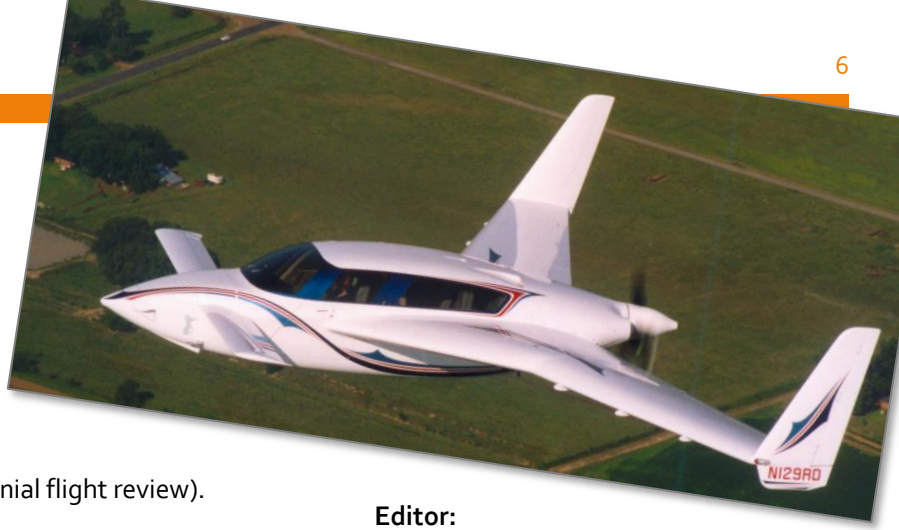
I really enjoy introducing pilots to their new flying machines.

Editor: I assume the place to start is with preflight activities. What are some things to keep in mind when a pilot is preparing for that first flight in a pristine new Velocity?

René: The plane needs to be airworthy and legal in every sense just as with any aircraft.

1. The plane also needs to be legal, including the required paperwork for an FAA ramp inspection—that means the AROW checklist: Airworthiness Certificate, Registration, Operating limitations (Aircraft Operating Manual, placards, and limitations), aircraft log book with all systems inspections up to date, and Weight and Balance data.

2. The pilot must also be current (current medical certificate, current biennial flight review).



3. Is your insurance current and adequate and is it confirmed to have the instructor named or qualified to train in this specific experimental aircraft? VFR or VFR/IFR?.

No one loves this part, but it is part of the process. Instructors can help with some of the details or help you find requirements in the FARs.

4. Perform a thorough preflight inspection and check (walkaround and engine start) following the Pilot's Operating Handbook (POH) or other procedural checklist. Be sure to confirm adequate fuel.

Editor: Are there any aspects of the Velocity where particular attention is required compared to non-canard aircraft?

The transitioning pilot should not be worried about whether the CFI can fly the plane or get him out of trouble.

Are any non-essential panel instruments inoperative? Have they received a placard, a log book entry, and plans made to remove or repair prior to the next inspection? (Remember ATOMATOFLAMES (VFR) and GRABCARD (IFR))

René: Adequate tire pressure is important for takeoff. I recommend 35 to 40 psi. and 15 lbs. washer break out torque pressure with no shimmy dampener and at least 7 lbs. with the dampener (much easier to taxi).

Editor:
How is the Velocity takeoff different from a conventional tractor airplane?

René: Our aircraft have two lifting surfaces unlike tractor planes that have a lifting wing and an inverted downforce tail. The Velocity wing is at almost neutral incidence in take-off stance and will not produce significant lift until the canard rotates the nose up establishing the wing's Angle of Attack up generating lift. If for any reason the canard does not generate this lift the plane will accelerate but will be slow to fly eating up way too much runway.

Rotation failure causes include not enough down elevator (trim or construction error), too much front seat weight or total weight, or surprise causes such as low nose wheel pressure or bent/cracked nose gear, or not enough canard to elevator gap, or elevator down travel.

During takeoff, if failure to rotate occurs one cure is to dramatically but momentarily (one second) pull the throttle on prolonged takeoff roll to decrease the downward thrust load on the canard to encourage rotation then reapply full throttle after rotation. The rudders are active above 30 kt., but be sure NOT to ride the brakes. Rotate no higher than canard to horizon. Maintain Vx to 50 ft. then Vy to above local pattern altitude, then cruise climb (best rate of clime that provides adequate engine cooling).

Editor: Are there any aspects of climb and departure that are unique to the Velocity?

René: Not particularly. Many experimental aircraft have cooling issues especially at high angles decreasing air over the engine cooling fins. Decreasing the climb angle and increasing the speed and even decreasing the throttle should be considered. Remember to look outside even with the beautiful EFIS screens.

Editor: Are there any aspects of the aircraft controls that pilots should be aware of? Are there any limits to the type of maneuvers pilots can perform? Chandelles and lazy-eights are often used to help tractor pilots work on aircraft control and coordination.

René: I teach both of these standard commercial maneuvers in most transitions. Mastery of these maneuvers goes a long way to mastery of the plane. Our planes accelerate VERY quickly so flatten the prop if using a constant speed and pull the throttle early in Lazy-eights and wingovers. I do not recommend acrobatics. Sure, the plane is strong but has no prop wash over the controls at slow speeds, so recovery from many maneuvers will be hampered and therefore can be dangerous. The possibility of stalling the winglets and therefore the rudders in dramatic yawing could make a maneuver unrecoverable especially at low altitudes. Our roll rate is quite slow making it more of an airliner. Let's not roll our 737. Will it? Yes. Should we? No.

Mastery of chandelles and lazy-eights goes a long way to mastery of the plane

Editor: Is coordination in turns and turning flight similar to tractor aircraft?

René: The plane has rudders. We sometimes almost forget. Our planes need very little rudder in flight above pattern speeds of about 110 knots. That does not mean they should not receive rudder input, but they will fly without it with minimal adverse yaw unless rapid aileron input is administered.

Slow speed flight is another matter. Rudder use is critical for good control and high angle of attack. The Aileron effectiveness becomes very sluggish. The key is quick rudder use . . . on and off to prevent over control and excessive yawing back and forth.

Editor: In tractor aircraft, we spend time going through stalls and stall recovery. How is the Velocity different in stalls?

René: The Velocity and the Rutan aircraft were designed to have the canard stall well before the main wing. As the aircraft slows and the nose comes up eventually the canard stalls and the nose drops. The plane may be flown in this conditions with good rudder and sluggish aileron controls as the nose repeatedly rises to a stall and

drops to regain lift. We call this a "stall buck or nod." I believe it is to the owner's benefit to practice the stall at altitude and confirm the speeds of the expected stall with differing CG's and gross weights. Avoid the combination of slow speeds, low altitudes, and skids as with any aircraft recovery can be slow and entail significant altitude loss.

Editor: Describe a typical traffic pattern including speed control and positioning in the pattern.

René: Landing the Velocity is the "The Piece de Resistance."

Fast rudder and elevator inputs by the pilot of short duration provide precise control in slow flight. Practice this at altitudes of at least 3000 ft. at speeds of 85 kt. to improve the landing control. A stabilized approach including downwind, base, AND final is usually predictive of good outcome.

As one flies pattern speeds below 110 knots progressively more rudder is needed. The older style disconnected rudder pedals make this more challenging to get off the unneeded rudder completely. Inadvertent brakes are also a risk. The downwind to base and base to final turns are a great reminder and chance to progressively use the rudder for turns and control. On short final more dramatic rapid rudder application and RELEASE is needed for good final yaw control.

The most common errors I see are prolonged application of rudder causing over-control and back and forth yawing and over use of elevator causing the phugoid pitching motion of Pilot Induced Oscillations (PIO) at low speeds that *mimics* a stall buck.

The key is quick rudder use . . . on and off to prevent over control and excessive yawing

Rudder control should be a rapid and significant application for desired effect and then off again long before the airplane has fully corrected to prevent over-correction and wallowing down final especially just before ground contact.

Editor: Describe final approach from wings level after the turn to final to touchdown.

René:

1. Stabilized Approach

I'm always asked what should my speeds be. My personal choices in my XL RG may be slightly different from others but the goal is adequate speed for optimal control and as slow as possible with vertical and horizontal control on landing. I use 110 knots on downwind and first GUMPS then 90 knots on base decreasing to 80 to 85 on final (second GUMPS). I rotate at 75 to 80 (with my known stall buck being 68 knots solo).

2. Speed Control - Avoid PIO

Beware. If one gets slow on short final, application of throttle does NOT rotate the nose up as it does in the typical tractor aircraft. Throttle pushes the nose over harder and unless the elevator input is increased the nose down effect can be dramatic until aircraft speed actually increases. I recommend a gentle pull on the stick before applying throttle to avoid this drop. Sawing the throttle in and out can make glide slope control very difficult. Remember use a stabilized

airliner approach. Perfect practice makes perfect.

3. Longitudinal control - fast RUDDERS

The rudder inputs should be even more dramatic in and after the flare. Remember quick input then back off the rudder (rudder dancing) decreasing aileron inputs to prevent winglet contact.

4. Pitch control for nose drop-Elevator-fast pull

Flare you say. Everyone who flies a Velocity has Flare. Yes FLARE. I've heard the Velocity should be landed like a Carrier Jet. No. The flare is important and should be separate from the round out. We just do not stall the aircraft. This prevents the nose from dropping too firmly as we bleed off speed. This takes practice. After the round out remember one is in ground effect which will change the lift generated by both lifting surfaces. When the mains contact the ground, the challenge becomes holding the nose up as aerodynamic braking slows allowing controlled contact of the nosewheel on the runway.

Ground contact downward forces on the nose are based on many variables. Some of these factors are downward inertia of all the weight forward of the main tires, downward rotation of the nose from main tire braking effect of being spun up to 70 kt. instantly, forward CG, gross weight, etc. UP elevator trim entered before round-out helps resist this drop.

To "catch" the nose drop, a brisk pull on the stick is required with perfect timing. If the pull is too soon the nose rises and over rotates while still at flying speed. If it is too late the nose slams down very firmly indeed and can cause damage or a shimmy and nose wheel hop. I like to over trim "up" a little so my pull will be helped by the spring. But timing is everything. My plane will carry the nose in the air to about 48 knots with the stick held back and adjusted to hold the nose up. I do not adjust trim settings with the nose in the air after contact.

Now it is just a wheelie like on a motorcycle. Balancing the trust, main wheel friction, and canard lift is the challenge while maintaining directional control with the rudders and brakes. Ease the nose wheel down with diminishing speed. It is a very satisfying sensation and looks good—part of your personal Flare.

5. Brakes as needed.

Use as required. Do not over use because on the ground below 30 to 35 kt. brakes are your only directional control. If one loses a brake, the aircraft almost always leaves the taxiway or runway. Hot brakes can and have caused fires in the grass. Maintain your brakes.

Editor: Is one transition training flight enough for most pilots, or are several flights recommended?

René: No. With a thorough ground school and multi-flight transition one should be able to solo safely very soon. Six to ten flights are generally enough to become familiar and skilled. Your mileage may vary but 5 to 10 hr. in the air is usually required for adequacy and for insurance coverage. Many nuances can be picked up during training so use the experience to make oneself awesome.

Editor: Any additional comments or suggestions?

Feel out your rudder authority. Remove slack in your rudder response primarily by removing slack in the cables. With air loads one will frequently find full rudder excursion is only one-half inch and should be more than two inches.

I teach tail wheel transitions (and basic acro) and encourage the T-W endorsement for those interested in expanding their skills. It is very applicable to Velocity flying. It will reveal how important the rudder is in longitudinal control and how useful they can be. Don't let your feet get lazy. Fly safe.

René Dugas is a retired Otolaryngology-Head and Neck Surgeon of 32 yrs. He is Cajun by birth; Texan by choice. He completed a Velocity XL RG in 2003, and now has over 750 hours in Velocities. Married 42 years with four Grand Children. He owns and flies two experimental aircraft and teaches tail-wheel transitions and acrobatics in the Citabria, Super Decathlon and the Extra 300L. He earned a CFII in the Velocity and is a Factory-approved Velocity transition instructor. He lives in north Dallas, Texas based at (T31) AeroCountry Airport.

The Best of Our Builders

Tale of Two Panels (Part 1)

A case study in the art of unnecessary engineering

by Hiroo Umeno

The version 1 panel

Introduction

This is a story of two panels, one airplane, and a lot of thinking and rationalizing. It is a documentary of the thinking, planning, and the execution that went into updating the original panel I built for the plane. I am writing it down not as an example of how to do it well, nor as recommendations for best practices and recipe for a fine outcome. Rather, it is meant as how one builder took on the task—the process of decision making, including the kind of considerations and trade-offs made, and how the experiences of building, operating, and maintaining the original panel influenced the design and construction of the second. An instrument panel is a very personal item in an experimental airplane. It is both a functional manifestation of the builder's flying missions and an artistic expression of the aesthetic vision. As such, there are no "right answers" and no amount of persuasion or discourse will likely yield a solution that will please everyone. With that, let's get started.

The Airplane

N21HV is an SEFG Velocity aircraft that started life as one of very early "SUV" types with a single door and dual yoke control. I am the original purchaser of the kit and am the builder of the aircraft. The aircraft was modified with a second passenger side door at the request of my wife. While the addition of the door makes the airplane superficially indistinguishable from SEFG, the control system retains the original dual yoke control the kit was originally delivered with. The fast-build kit was purchased in 1999.

When I ordered the kit, I had approximately 60 hours as a VFR private pilot. Most of those hours were in Cessnas and some limited hours on Piper Archers. The yoke control was a very attractive feature for me with the idea that the controls will be most familiar to me. The familiarity with Cessna layout also heavily influenced my panel designs.

The Panel Design

When I started thinking about panel design in late 2000, the concept of EFIS was just starting to take hold with a few companies starting to offer products into experimental market. The now ubiquitous G1000 was still several years away and no certificated GA singles were flying with a "glass cockpit". Sierra Flight Systems was one of the first to offer a full EFIS with features that were not yet even available on commercial aircraft. For example, Synthetic Vision, predictive flight path depiction, terrain and wind corrected glide band, and highway in the sky are all concepts that are now

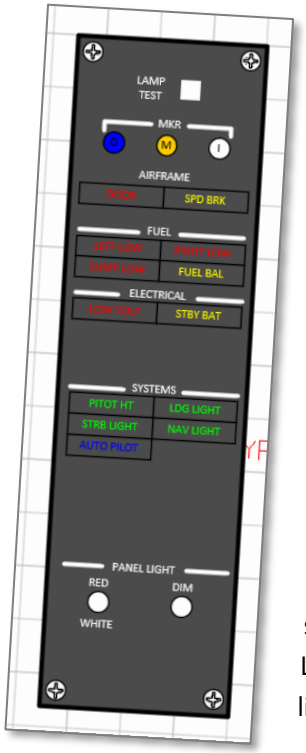
commonplace, but in 2000 were considered "cutting edge."

The entire two-screen VFR setup was priced at around $20,000 in Y2K dollars. When I priced out the cost of all the 6-pack instruments, vacuum system, CDI indicators, etc, it came out to be a competitive offering with substantially more functionality. There were a couple others that were in the field—GRT, MGL, and Archangel are names I recall.

Alongside the EFIS were the 5 "steam gauges." Airspeed, Altitude, VSI, Fuel, and ammeter/voltmeter are installed to backup/supplement the EFIS. I really wanted an electrical 2½" attitude indicator. In 2000, the pricing was prohibitive. As I have made a career in technology, I developed a healthy skepticism for anything running software.

In the center of the stack were the radios that consisted of Apollo SL series. They were SL15 audio panel, SL40 COMM radio, and SL70 Mode C XPDR. Originally, there was no separate GPS or NAV radio as the airplane was equipped for VFR flight only.

Switches and CBs were laid out based on an arrangement I was familiar with from flying Cessnas. Some thoughts were given to the switch arrangements where pre-start sequence went left to right, and spacing of the switches indicated grouping of the functions. The switches were mounted directly onto the panel blank.



I fabricated an annunciation and lighting control box (left) that showed various warnings. The indications were reverse printed on a transparency film and placed under a piece of plastic sheet and a small microcontroller drove a set of glare shield mounted LEDs for panel lighting.

Primer, Starter, and an additional map light switches were overhead along with the magnetic compass. (Photo below.)

Operational Experience

Chelton EFIS

A new kit builder is often warned that they should never buy avionics until they are about to start the engine. A voice of wisdom that is to be heeded. My system was delivered late 2000. I anticipated my build to take 2 years (don't laugh). Incidentally, "21HV" is "2001 Hiroo's Velocity." By 2003, the project was largely stalled, and the first flight did not take place until 2006. By first flight, the Sierra Flight Systems had been bought twice and was owned by aerospace company Cobham. By then, they had largely exited the experimental market to focus on corporate aviation and helicopter installations. Also, by that time, Dynon, GRT, and others had introduced systems at price points that significantly undercut my original investment.

For a 2000 system, however, the Sierra system held up very well functionally. While it lacked the high resolution and, shaded 3D visual model of the newer systems, it performed well and the situational awareness it offered was remarkable for someone who flew a six-pack on trainers. The data logging capability was invaluable in

identifying aircraft and engine performance issues.

There were, some pain points as well.

The ring laser AHRS was large and very limited on placement options. I struggled to find a suitable location and the final mounting location in the wingroot did suffer from occasional "Dutch roll" indication while the aircraft was flying straight and level.

The system used MMC memory card that was increasingly difficult to obtain and unreliable in operation.

reaching up with the left hand crossing my center to the right overhead.

- Positioning of the prop control, pitch trim, and speed brake switch was such that during take-off, traffic pattern, and in a go-around, my right hand was going all over the place, away from the throttle. During cruise phase, I would have to lean forward to change trim setting and prop pitch.

- Mounting switches and circuit breakers directly on the panel blank meant that servicing them involved removal of the panel. On the dual yoke

> An instrument panel is both a functional manifestation of the builder's flying missions and an artistic expression of the aesthetic vision.

The manufacturer has long stopped supporting experimental installations and while they still did offer some limited upgrades and repairs, the older first-generation hardware I had was largely orphaned. It used such exotic technology as solid state floppy disk emulator.

Other Lessons from the V1 panel

Aside from the Sierra systems, there are few other lessons to be had as well.

- Starting the aircraft was akin to playing "Twister." The overhead position of the primer and starter meant that while I had my right hand on the throttle in the middle, I was

airplane, that also meant disassembling the control systems.

- Having spent some time in a DA-40, the transition from yoke to stick really was not as difficult as I imagined and in retrospect, a stick control airplane would have been simple a simple transition.

Panel V2 Planning: The Inception

When I re-activated the airplane in 2013, we made some minor additions. An IFR-certified CNX80 was added to the radio stack and a Grand Rapid Mini-X was added as a full-featured backup EFIS to the primary displays. With this addition, I finally had the standby attitude indicator I always wanted. Aside from the smaller size, the 13-years-old Chelton was, feature-for-feature, competitive with the GRT and more. With these additions, the airplane was more than adequately equipped for the VFR missions we typically flew and aside from lacking autopilot, confidently handled longer cross-country flights. Then, came the FAA's 2020 ADS-B mandate.

For the record, there was really no requirement that I needed to toss out the old panel just to meet the 2020 mandate. A new transponder and approved GPS position source would have taken care of it. Now, while that would meet the FAA requirement, it meant that while others are getting the benefit of my position broadcast, I won't be seeing any benefit as I fly along since my display units will not accept ADS-B dataset.

By 2016, it was clear that the whole family liked to fly and we will be spending many hours on the plane, and on cross-country flights. To that end, a true IFR setup, onboard weather, autopilot, and improved ergonomics became desirable improvements. Thus, began the planning for the panel improvements project.

I contacted Infinity Aerospace, now the owner for the old Chelton line of EFIS, and discovered that updating the software on the old system would require a $5,000 per display hardware update, and the new GADHRS for another $5000 before other 2020 related updates and addition of autopilot. Several options existed for a full solution for less that it would cost to update the old equipment.

Why not a mobile solution?

Astute readers may point out that ADSB-in can be achieved inexpensively through the combination of commonly available tablet device and receiver running on software-defined radio module. Indeed, I did build one such receiver on an experimental basis and did run some software code that will receive and decode ADSB-IN signals from nearby aircrafts. Indeed, plenty of people fly with this solution and have been very happy with it.

My personal preference has always been that all the avionics I consider "primary" to be panel mounted and ship powered. My reasoning for this is based on the following considerations.

- Clutter – My cockpit is already fairly cramped with two adults up front. I would like not to have loose electronics up front.

- Reliability – I would like my avionics not to be subjected to instability introduced by consumer grade software updates, misbehaving non-aviation software, and threat of malwares.

- Dedicated – Panel mount avionics are exactly that. Panel mounted. They are not going anywhere and are not going to roll under the seats, gets smashed in the backpack or battery being dead just when I need it.

In the end, it comes down to personal preference. I preferred panel mounted solution. And even with three independent GPS position sources, and moving map displays on my panel, I fly with paper charts. Old training dies hard.

Selecting the System

The process I used was first to select the main system, then worked outward. In other words, the first selection was the IDU, or the primary displays. Then, backup systems, the radios, supplemental gauges, and then switches and CBs. In the initial phase, little attempt was made to layout and positioning.

Comparison shopping

To get started, I identified features I considered requirements for the core system.

- Minimum of two display units that are interchangeable
- Integrated engine management
- Synthetic Vision
- Georeferenced Chart
- ADSB-in / Traffic + WX
- Data logging
- Integrated Auto Pilot
- IFR Capable

Once these were articulated, it became clear there were really three viable contenders for the main EFIS system. Garmin, Grand Rapid Technologies, and Dynon / Advanced. Among them, when configured with autopilot, transponder, and sensors there was no meaningful pricing advantage between the systems. GRT, for example, listed lower price for the display unit but needed external additions to make it full featured. It was down to the old-fashioned pro / con comparisons.

Garmin

Pros:

- Large, well-funded company with established distribution, support, and service network
- Integration with in-house radios and MFDs
- System architecture based on proven G1000 series certificated avionics

Cons:

- New entrant into experimental market. Long-term commitments to experimental market unproven
- High recurring cost of database updates and subscriptions
- Proprietary closed data exchange architecture

Grand Rapids Technologies (GRT)

Pros:

- Largest screen format available (12")
- Free database download
- Extensive experimental support / open data format

Cons:

- Smallest of three contenders
- Tier-2 build quality / fit and finish

Dynon

Pros:

- Local company (walk-in technical support)
- Experimental-first
- Flexible inter-connect bus system

Cons:

- Semi-open data communications
- Somewhat idiosyncratic sub-menu presentations
- No site-loading option for chart views (subscription required for chart display)

Advanced Flight Systems (AFS)

I should mention them as well since they technically were a viable option

on the market. I did not factor into my personal selection process due to my previous experiences with Sierra / Chelton / Cobham / Infinity, and Apollo / UPSAT / Garmin. I was keenly aware of what happens to the IP for systems that are absorbed through acquisition. Advanced was acquired by Dynon, and while the company publicly stated they will continue both lines, my hunch was that over time, Dynon's in-house line would absorb the Advanced IP from through the acquisition and development will phase out on the original Advanced line.

Final Selection

Initially I was leaning toward the Dynon system, I did not make up my mind until I had a chance to play with each of the systems. It's one thing to look through spec sheets, stare at screen shots on the Internet sites, and read the installation and operations manuals each supplier publishes. It's quite another to spend some time twisting knobs, pushing buttons, and simulating scenarios. As luck would have it, such opportunity presented itself in the Northwest Aviation Conference and Trade Show that is held locally every year. All three companies were represented there in 2016 with respective live demo units.

- **Garmin** – It felt like a Garmin. The operating conventions were similar to that for G1000 I have flown with and not necessarily in a good way. You definitely have to think "The Garmin Way". On the positive side, the UI and the overall presentation showed refinement and the "maturity" that comes from its certificated heritage.

- **GRT** – HXr acted very much like "bigger Mini-X" I have been using. The UI is simple text based just like the Mini-X. I did like the "floating gauge" display where certain engine data can be overlaid on the primary screen without the black box allowing more expansive attitude awareness.

- **Dynon** – The "pictorial icon menu" continued to bug me with their over-sized sub-menu that blocked the underlying information whenever it was invoked. At the same time, Dynon was one system that presented multiple paths to get to many of the commonly accessed screens and data. It also had touch screen.

Now, about that touch screen, despite my day job designing, manufacturing, and validating touch screen consumer electronics, I have not been a big believer in touch screens on the avionics. It seemed to me that tapping, dragging, and gesturing on the screen would be difficult on a moving platform that is subject to vibration and turbulence. While I was aware that Dynon was shipping systems with touch screens, I was quick to dismiss it as gimmick aimed at the "smart phone generations."

After spending some time with the demo unit, I became more convinced that it did offer some valid use cases and was a significant differentiator that would "seal the deal". Most notably, with the 10" display moving map, tapping on just about any object on the screen showed a quick info on the item. Tap on the airport showed the longest runway and primary frequency. Along with it, the soft keys on the bottom changed to "drill down" such as "INFO," "FPL," etc. The interface was intuitive and the transitions between touch and button / knob felt natural.

Based on the experience, I came to a decision that the dual 10 in. Dynon HDX would be our main unit.

Radios and Backup

With the primary system selected, it was time for some down-stream integration decisions. Namely, NAV/COM, GPS, Transponder, and Audio Panel. While the Dynon system does come with a 2020 compliant GPS position source, to legally fly GPS approaches, it requires a separate GPS NAV-source. Since I already had CNX-80 installed on the aircraft, it was a natural choice to keep it as the IFR NAV source.

Dynon offers a remotely mounted COM radio. Since CNX-80 already has COM built in, and I also had an Apollo SL40 COM, I would continue to use them for my COM 1 and 2.

With 2020 transition, the existing SL70 Mode C transponder will not meet the ADS-B requirement. It would be replaced by the Dynon's remotely mounted transponder, and thus free up a slot on the radio stack.

In addition to Dynon EFIS, I decided to keep the GRT Mini-X as backup. It has its own GADAHRS, remote magnetometer, and is fully self-contained full feature EFIS running a completely different software codebase minimizing the possibility that some software bug taking out the primary instrumentation altogether.

CNX-80 would feed Dynon the nav information through ARINC-429 connection and an RS-232 connection to Dynon will enable remote tuning of COM and NAV radios. CDI and ILS will be shown on the Dynon and thus no need for a separate head-end.

Laying it out

The first stage for the layout planning involved taping a bunch of 8½"x11" paper together into a full-size mockup. Yes, this can easily be done on Visio, Illustrator, or any other computer software out there. The software, however, does not give the sense of scale, and allows me to sit in front of full size sheet and go through my hand motions and test the ergonomics.

It is also during this phase I realized this upgrade has additional ripple into the airplane.

The ripple effects

With the 10" dual screens, there was not enough clearance for the yoke mount. Either the panel had to be extended 1" higher, moving the glare shield up, or the control system needed to be re-thought. As both myself and my wife are not very tall people, raising the glare shield was not a palatable option. Since the aircraft had the cut down "SUV keel," the conventional center console mounted stick was not an option. The dual side stick was the logical conversion.

The dual side-stick, however, requires a substantial amount of dead space on the lower extremities of the panel. On the V1 panel, that was the space occupied by the ignition switch, annunciator panel, and some CBs on the passenger side. These would need to be relocated.

I mentioned earlier in the article that I have been doing contortions during engine start. This panel re-layout presented an opportunity to rectify that as well.

Dynon offers a heated pitot tube that also incorporates an AOA sensor. Unfortunately, they do not make them in the side-mounted configuration that is common to Velocity installations. This necessitates the re-location of pitot tube to another suitable location that allows for vertical installation.

Since my current pitot tube assembly also includes static port, replacement static ports will need to be created.

ADSB-IN requires a separate antenna from the Mode-S transponder. This will now require a separate antenna with its own ground plane.

As I started deeper into configurations and planning of the new panel, the list of changes and modification continued to grow. In the part 2, I will go into the full scope of the changes, process of detailed designs, and the implementation and installation of this panel.

[Editor's Note: Look for Part 2 in an upcoming issue of Velocity News.]

Hiroo Umeno built an SUV that became airworthy in 2006. He is working on a series of upgrades, including a passenger door, side sticks, and this panel update.

Phase II

Fly Your Velocity into AirVenture 2018

by Mark Riley

We will be flying our Velocity into the show for the 10th year in 2018. I am always surprised and disappointed by how few Velocities there are on the field. Of the hundreds of registered planes, there are typically only 8 to 12 on the field. I wanted to try to put out a call this year for more of us to fly into the show, give a few reasons why it's worth it, and to address concerns some have about doing so.

First, there are several reasons why you absolutely need to experience flying your Velocity into Oshkosh for AirVenture. This place is aviation Mecca. If you haven't been there and experienced it in person, you must. No article or video can convey the feeling of this place. You need to see, hear and, most of all, feel it.

The energy of the place is incredible—tens of thousands of happy pilots doing their thing immersed in their element and their people. The feeling of camaraderie is palpable. Some people, including me, consider AirVenture to be the highlight of their year.

Yes, it is loads of fun to just drive in or fly commercial to the show. Flying your own Velocity in is a completely different, and much better experience. First, as a builder, you've slaved away for years building your plane. This is its coming out party. Oshkosh is where

Top: the largest airshow, from the air
Middle: Landing on iconic 36L
Bottom: Happy pilots and passengers

Top: "Welcome to Oshkosh. Taxi to homebuilt parking."
Middle: Fellow Velocity enthusiasts assisting with arrival.
Middle: Early arrivals get a coveted position on "Velocity Row."
Bottom: Plane-side seats to the big show.

you go to finally show off your creation to those who will most understand and appreciate it.

Flying the Velocity you built into the show is a defining life moment and an accomplishment that you will never forget. It is hard to match many of the moments you will experience flying your plane into the show. There is the excitement and adventure of flying the arrival procedure from Fisk, taxiing past the crowds to parking with your doors up, taking it all in.

It is great to park on Velocity Row as part of the group. It is loads of fun having your plane right there in the middle of the show. You have your very own real estate right in the middle of Oshkosh. We love hanging

out by the plane during the day. Hundreds of people stop by to admire the plane and ask questions. Friends old and new hang out with you in the shade of your Velocity. It's just great watching the air show from your own plane with your friends.

It is extremely handy to have your own base and storage locker right on the field near the flight line. We keep our chairs, purchases, jackets, and backpacks in the plane. No more lugging them into and out of the show.

If you are into photos, you will have photo ops galore. Backdrops will include bombers, fighters, explosions, fireworks, crowds, OSH tower, as well as group shots of Velocities which can't be

Top: "Nancy Riley making sure her plane passes inspection.
Middle: Garrett Hooper, Kathryn Roberts, Brett & Elizabeth Ferrell, and Mark & Nancy Riley chillin' by the plane.
Bottom: Andy Millin hosts Reiff & Melissa Lorenz and Jerry & Linda Brainard under his award-winning wing.

Top: Tom and Loretta Irion earned EAA's Golden Lindy award for their fixed-gear XL. A crowd of fans takes refuge in its shade.

Bottom: Brett Ferrell sits by his plane, "Victor Fox" answering questions from one of the many admirers at the show.

taken anywhere else. As anyone who knows me will tell you, you will end up with lots of pictures of your Velocity even if you don't take a single picture.

It's not just being at Oshkosh that's great, it's the journey there in your own plane. It's a great adventure and an accomplishment you can be proud of. The experience of flying your Velocity into the show is just different. We went by airliner for years. We drove to the airport in Philadelphia, then parking, lines, security, the flight, the rental car, etc. Then we finished the plane and started flying to the show. It was a completely different experience. The trip itself became part of the fun. We would drive to the airport near our house, take off and 4 hours later we were in the middle of the show at Oshkosh. It kind of made our heads spin at first.

One of the things we've enjoyed is the feeling of being welcomed into a fraternity of fellow Velocity Oshkosh Aviators. Each year people meet us as we taxi in and park with hugs and handshakes. Friends have photographed and videotaped our arrivals and departures. We all know each other and our respective planes from the Ferrells' "Victor Fox" to Bill Batten's "36 Lost Vacations" to Irion's grand champion beauty, Millin's purple and green award winner, to Tim-Dave's top loader, and more. It's just fun being a part of such a great group of pilots and terrific aircraft.

So why don't more Velocities fly into the show? I think it is because of several misperceptions. First, folks worry that it will be too hard, dangerous, scary, or crowded to fly into the show. It really isn't. As I said, we have flown the arrival procedure 9 times with no problem. The first time I had about 100 hours total time.

If you are worried about the crowds on arrival, just come on Saturday before they arrive. We have a new tradition where we all arrive then and head out to the flight line on Runway 27 to judge landings. It is loads of fun

watching the incoming traffic while we catch up with each other. The group grows each year and we'd love to have more Velocities join us.

If you study the NOTAM it is totally straightforward flying in. I have posted several first-person videos of the approach and landing on YouTube that can be used to prepare. Once you land, your work is done. The rest of the way you will be directed by numerous flight line volunteers right to your parking spot where they will even help you park.

Some people worry that the crowds will touch or damage their planes. Again, we've been there for 9 weeks in total with no damage. The crowds at Oshkosh are some of the most considerate you will find anywhere, and pilots watch out for each other's planes.

Some folks worry that their planes are not quite there yet in terms of finish or detail work. I flew my plane to the show in

Top: The author adds hand-winglets to his air-chair.

Middle: Departing Oshkosh at the end of a week.

Bottom: A beautiful flight home.

green and grey primer. As I was riding the bus back to the dorms, an Australian pilot noticed my Velocity shirt with my N number and asked if the green Velocity was mine. I said that it was, and he told me, in that great accent "I heard some rather unkind comments about your paint scheme." I said it wasn't a scheme, just primer. He told me, "Relax lad. Those who get it will understand and appreciate it. Those who don't get it—who cares about them?" Even if your plane is still in primer, bring it in so we can admire it. (Right, Cabiroys?)

The area where Velocities are parked is just off taxiway Papa One over by the warbirds. We have a great spot, with a Subway, bathrooms, and easy access to the flight line. It is designated "Heavies" by AirVenture parking and is not restricted to Velocities. We have referred to our area variously as Velocity Row or Velocity Lane. I have always wanted to get enough Velocities to fill our area and make it "Velocity Parking."

Let's try to make AirVenture 2018 the best attended show ever. Make the effort, fly in to join us and you will have a terrific time.

I hope to see you and your Velocity parked with us this year!

Mark and Nancy Riley have built two Velocities: an SE-RG completed in 1999 and an XL-5-RG in 2010. Follow their frequent aviation adventures at: http://marksvelocity.blogspot.com/

Top: The author gives AirVenture Oshkosh two thumbs up.

Bottom: Mark and Nancy Riley with their son Sean and the second Velocity they built.

The Best of Our Builders

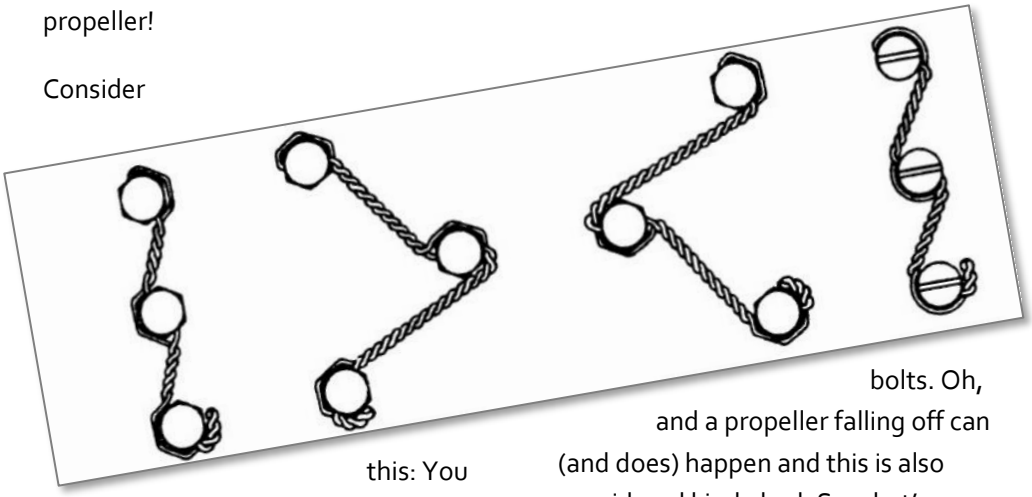
Keeping Nuts on Bolts

by William Hunter

Don't you just hate it when your nuts and bolts vibrate off? Worse yet is when your Rockwell Harness Scale C33 AN hardware falls through your composite propeller!

Consider this: You tighten that fastener to the prescribed torque value or rotation, run the equipment for the prescribed number of hours/heat cycles, check and recheck; but how do you know during preflight or at the next annual condition inspection that the part in question is still in the position you left it at and that it has not started to vibrate loose? Tightening components with metal to metal interaction is problematic enough, however when the component you are fastening is made of fiberglass or some other squishable composite or silicone gasket material, the underlying material can compress over time and then the hardware will vibrate loose.

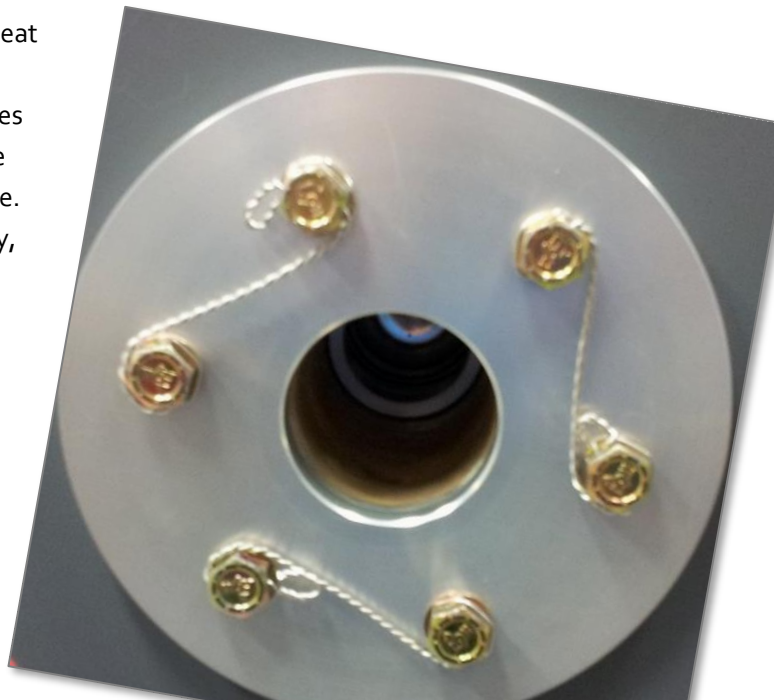
There are all kinds of parts that can fall off of a Velocity. My guess, however, is that the biggest offender of falling-off-parts on a Lyco-Saurus-powered Velocity are the valve cover bolts and the upper cooling plenum-to-head bolts. Oh, and a propeller falling off can (and does) happen and this is also considered kinda bad. So what's a builder to do?!?



Naturally, for these repeat offenders, there are fasteners that have holes drilled in the head to be secured with safety wire. When installed properly, these are the most vibration resistant fasteners available. Propeller hubs and other critical components require a real professional safety wire job according to best practices. The EAA offers some really good instructional videos on how to properly use safety wire: http://www.eaavideo.org/detail/videos/feature/video/1777037517001/safety-wiring--single-wire-method

For other less critical components like valve cover bolts, a simple string of

Top: Valve cover Fillister head screws with a simple loop of safety wire
Left: Examples of best practice safety wire jobs.
Bottom: Nice safety wire installation on a propeller



safety wire looped through each drilled head Fillister screw can be a big jump from the OEM design and can save your prop from a couple of dings. Upper cooling plenum attachment bolts are a big prop-assaulter, so safety wire protection can save some future time and expense.

Other Vibration-Resistant Options

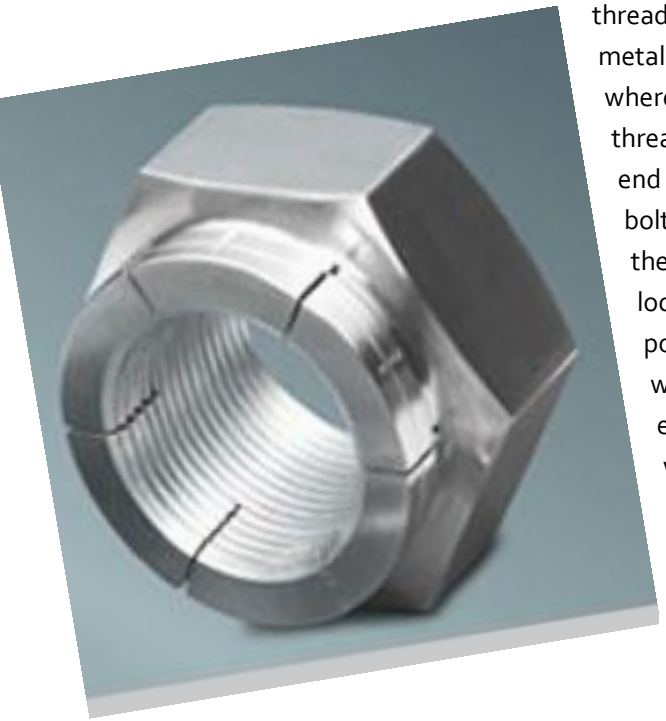
What other types of vibration resistant hardware options are out there other than safety wired fasteners?

Aircraft hardware often takes advantage of the "Flexloc"-style of self-locking nuts. This nut design has a section of the thread that is concaved inward adding friction to the bolt threads. The thin slots allow for expansion of the slightly constricted nut body so that the threads impart an inward pressure that is sufficient to prevent the nut from self-loosening. (For more information on Flexloc nuts: http://www.ultrafastener.com/about-flexloc.html)

Then there are the "Nyloc" brand or other similar design nuts that have a nylon collar insert that resists turning. These lock nuts should only be used once because the nylon collar will wear significantly with each application. There is a certain undefined torque value added by the nylon collar's friction so these are not suitable for applications that require an accurate torque value. These are best used for low heat applications because heat will melt the nylon insert—do not do any welding nearby or install on exhaust systems.

For bolts that are inserted into a "blind" hole (a threaded metal bore where the threaded end of the bolt is not exposed) there is a very interesting design of locking washer that is gaining popularity – the "Nord-Lock" washer. My first (and only) experience with this design was on the MATCO brake caliper. This design has two washers with a ratchet like surface. These locking washers come in pairs so it is important to match the ratchet face of the washer with its counterpart on the other washer. These things look fancy and I hope they work because brakes are somewhat important. Here is an interesting video on the NordLoc washer https://www.youtube.com/watch?v=cDlmbMVgICU

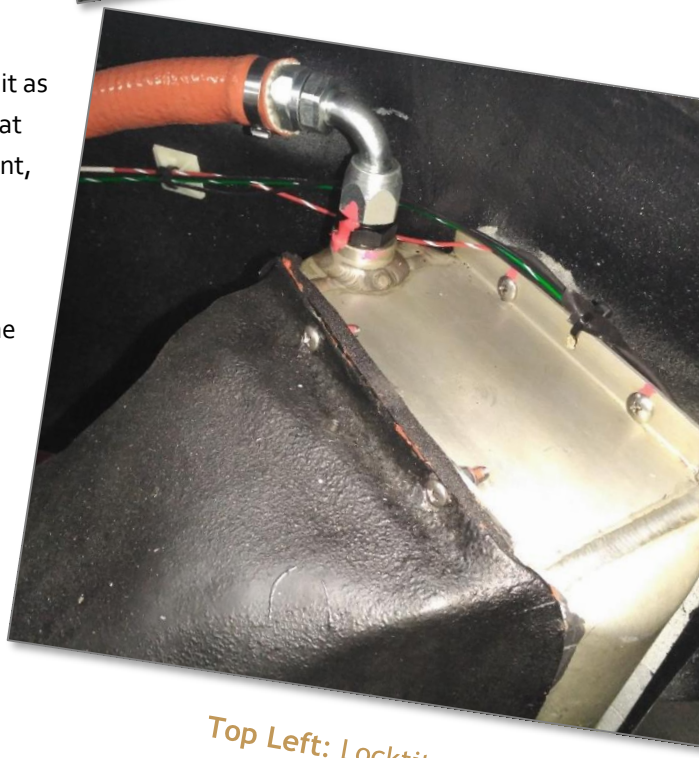
Note the dissimilar faces of the washer surfaces on the NordLoc washer (Source: **http://www.nord-lock.com/nord-lock/wedge-locking/washers/introduction/**)



Top Left: Nut with a nylon insert.
Bottom Left: Flexloc nut.
Top Right: NordLoc interlocking washers prevent rotation, even in extreme vibration.
Bottom Right: NordLoc washers have "teeth" that grip the bolt and the underlying surface.

Loctite is a brand of thread sealant. It is a glue-like substance that is applied to the bolt threads before the bolt is inserted into the threaded hole. After the glue dries the bolt threads are protected from rust and corrosion and the adhesive prevents loosening from shock and vibration. The adhesive strength of Locktite is indicated by the color, with blue labeled as "Medium" strength and red being the "never will come apart again" strength. Blue makes a really difficult-to-unfasten application so it can be used on airplane bolts, however, I really do not recommend it because the adhesive will need to be removed from the bore before the next installation. Red has been known to break off bolt heads during "disassembly."

fastener has been torqued, checked, and rechecked. This material provides visual evidence if the nut or bolt is rotating and also adds approximately 100 inch pounds of torque resistance that will prevent the fastener from vibrating farther apart. I used it as a quality control product in that after I torqued each component, I placed a dab of red Cross Check on the threads and/or bolt head and in the future when pre-flighting the airplane I can see if the fastener is moving.



Top Left: Locktite "Blue" (medium strength) comes in a red (?!?) tube.
Bottom Left: Cross Check the "tamper proof torque mark"
Top Right: Gear booties attached with The "belt and suspenders" solution: Grade 8 nuts with Nyloc inserts plus a dab of Cross Check.
Bottom Right: When you have a tube of Cross Check in your hand it is hard to resist using it!

So what to do on other applications where the above mentioned solutions are not the "the solution"? Consider "Cross Check" the "tamper proof mark." This is a quick dry plastic like material that is dabbed onto the exposed threads or bolt head after the

Bill Hunter purchased N101BH, an XL-RG-5 in 2016. He is in the process of renovating and upgrading it.

Velocity Views

Twenty Years Ago

by Jeffrey Richmond

Here is what the Velocity community was talking about two decades ago.

Volume 13, 1st Quarter 1998

➢ **Factory Fly-in & Workshops**

About 45 Velocitites attended a weekend fly-in to kick off a program that featured an open house and workshops at the Factory.

Topics for the workshops included: electrical, avionics, annual/100-hour inspections, maintenance, composite construction, composite molding techniques, interiors, and engine installation

The fly-in included a Saturday night dinner get-together at the Vero Beach Club. Retired Colonel Philip Corso, Sr., who authored the intriguing book "The Day After Roswell," was the guest speaker. Col. Corso fielded lots of questions and delighted Velocitites with his sincere nature and good humor. His military career was very impressive. Among his many assignments, he served on the White House staff for President Eisenhower and, during the 60's, was in charge of foreign technology at the Pentagon. While at the Pentagon, various articles that were recovered from the Roswell, NM 1947 spacecraft crash were given to Col. Corso. His mission allegedly was to place certain items recovered into the R&D divisions of American firms such as Bell Labs for "reverse engineering!"

Col. Corso's son Phil Jr. is a Velocity builder.

VELOCITY VIEWS

Volume 13

Factory Fly-in & Workshops Big Hit!

Martin Hadley conducts his workshop covering "Electrical Basics"

November 1st saw a Velocity weekend fly-in to kick off a program that features an open house at the Sebastian, Florida, factory each month. About 45 Velocitites attended the event – in spite of foul weather, which prevented most pilots from flying to Sebastian from the north. Three Velocitys did manage to fly in from south Florida, with the rest of us driving in.

Until notified otherwise, mark your calender for future open houses on the first Saturday of each month. Starting at 10:00 am, and continuing to about 3:00 pm, workshops of interest to Velocity builders will be held. If you plan on attending an open house, please call the factory to register. You can also check at that time to find out what workshops will be running.

"We plan on rotating a series of composite and maintenance type workshops at each open house," explained Scott Swing. Topics for workshops include: electrical, avionics, annual / 100 hour inspections, maintenance, composite construction, composite molding techniques, interiors, engine installation, and just about any other topic a builder might suggest.

Each monthly Saturday open house will start off with coffee and donuts served in the hangar at 9:00 am. A cookout (burgers & dogs) is served at noontime, allowing time for one more workshop after lunch.

Workshop highlights continue on next page

In this issue

Factory Fly-in 1
The November 1st factory weekend fly-in gets good marks from attendees
Factory News 3
Sun N Fun '98 dinner sign up, XL update, open house workshops, FAA manual & engine book
Views from the West.....4
News and builder tips from Velocity's West Coast service center
Short Circuit.....5
Electrical, instrument, and avionics related tips from Martin Hadley
Factory KPCs 6
Kit plans changes to keep your manual up-to-date
Safety Corner 8
Accident & Incident Reports and Maintenance Service Difficulties.
FAA Paperwork 10
What you need to do to "license" your new aircraft
Wes Rose First Flight 11
Wes builds his Velocity Elite in just 14 months, including his wings.
Builder Forum 12
Tips, information & letters
Buy Sell or Trade 19

1st Quarter 1998

1

➢ **Factory News: The New XL**

The Factory continued to put hours on the new XL design, N97XL, AKA "Bubba". Duane reported, "This airplane is a delight to fly and has become our demo of choice."

The Stormscope was reportedly inoperative when the Electroair electronic ignition was on. With the EI running, it showed two storms in the 150-mile range, one at about 40 degrees and another at 220 degrees.

There was also a problem with the elevator getting stiff. This was traced to rust building up where the offset torque tube goes through the fuselage and at the center bearing block. After being cleaned up, painted and greased, the problems disappeared.

Engine Book

Kas Thomas published a book that explains the ins and outs of air-cooled Lycoming and other aircraft engines, in a way that any pilot can understand.

Although this book was published 20 years ago, it looks like a good one to have in your library—if you can find one.

On his first flight, the oil temp. started climbing and it took almost full right rudder to correct the yaw.

Angle of Attack Indicator

The Factory was evaluating an angle of attack (AOA) indicator in the XL. Its purpose is to provide the pilot the proper approach angle regardless of the weight and CG of the airplane. Duane's thinking was that if it provided proper pilot awareness, it might become standard equipment on future kits.

➢ **Views from the West - Mark and Nancy Machado**

Mark was often asked "What's the difference between an Experimental class airplane and a Certified one?" His gut reaction was to say "Absolutely nothing!" Why? Because some people take good care of their certified planes and some don't. Some people take care of their experimental planes and some don't.

He identifies the difference between the "doers" and the "don'ters"...RESPECT! When you respect what you have built, you give it the same attention to detail you hope those mechanics did on a jumbo jet headed to Hawaii.

He further points out that we must be willing to ground our airplanes whenever you would expect the same thing to be done on a certified airplane you're renting or an airliner you're taking a family vacation in. The future of our being allowed to build and fly experimental airplanes, with the freedom we have today, may just depend on it!

➢ **Wes Rose's First Flight**

Wes Rose set build-speed records and his 173 Elite FG made its first flight just 14 months and 3 days after the kit was delivered. On top of that, he built his own wings and held a day job!

On his first flight, the oil temperature started climbing and it took almost full right rudder to correct the yaw. Wayne, the test pilot, missed his first approach and went around again. By that time the oil temp was up to 250 degrees, so that ended the flying for the day. Adjustments to the oil cooler outlet and rudder rigging fixed the issues.By the end of the third flight things were working well.

➢ **Builder's Comments**

Builder Jim Willsie wrote about how to make the top strakes easier. He recommends:

1. Add a 1" wide foam lip along the fuselage area for a complete strake platform instead of just a butt joint at the root.

2. It's important to avoid shifting the strake top when it's finally laid on. Also important is not to press down too hard and then ease off, because this will also squeeze the goop out. To guard against over squeezing, make about a six HIGH-POINTS with micro daubs filed down to the desired

Wes Rose's 173 Elite, completed in just 14 months!

height. This then allows all the pressure you want without the risk of over squeeze.

3. Instead of just wide T tops on the bulkhead and baffle flanges, make them V shaped with flexible sides. Do this with a narrow one-bid layup on each upper side of the baffles that extends about 3/8" above the top. Then later, when it's not sticky but still pliable, roll the edges outward forming a V. The cured edges are flexible since they're only one ply and flex to contact to top perfectly.

4. The hardest area to seal (inverted) is the area between the rear fuel bulkhead and the spar (using the 'stick trick'). This headache can be eliminated before the top strake is put on by adding horizontal foam pieces from the back of the rear fuel bulkhead to the main spar (under its top lip). By making this 2 or 3 pieces and steps depending on the length of your forearm, each piece can be completely finished and sealed underneath while it can be easily reached.

See the Spring 1998 issue for more details.

➢ **A Canadian First Flight**

Richard Dargis of St. Vincent, Alberta, reported that his 173 RG E (C-FZST) had its first flight with pilot Tom Jeters at the stick. This happened after just 12.5 months of building. The first flight was brief, with one circuit done and grounded for a few hours due to high oil temps. A few hours later, another flight was undertaken with little difference in oil temperature.

Richard Dargis's 173 RG-Elite. 12 1/2 months to build!

On a subsequent take-off roll, shortly before rotation, Tom heard a loud bang. Without hesitation, he aborted take-off and returned on the ramp. Richard soon realized he had forgotten a pair of pliers on top of the engine, which decided to exit when Tom applied full power. The propeller was severely damaged.

Richard resumed flight testing with new Ivo Prop a few weeks later. A number of flights went smoothly, and all functions were normal.

A few days later, a gear up landing ruined the new prop, and started a fire in the engine compartment. Richard's quick response with the fire extinguisher in the plane put out the fire before it did much damage.

a gear up landing ruined the new prop, and started a fire in the engine compartment.

After the dust settled, he dragged the aircraft back inside the hangar and went home to bed. The following morning, the military Search and Rescue arm was looking for him. His ELT had been triggered by the hard landing and a satellite was picking up a signal. A military aircraft landed in St. Paul with four military personnel, who went through the airport's hangars until they found and shut down the ELT.

Want a more in-depth look at the Velocity newsletter of old? The complete archive of back issues is available online on the VOBA website's documents section: http://www.velocityowners.com/docs

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From the Editor

Looking for Memorable Flights, Builders' Tips and Experiences

We want to hear about any first flights, memorable flight adventures, building milestones, tips, tricks, and ideas.

Send photos and information about your Velocity to Jeff Richmond (Editor@VelocityOwners.com)

FAA Data

Aircraft Updates

by Otto Mattic

Airworthiness Certificate Issued

N155FA 10/26/2017 (Turbine XL) Owned by FALCON AERO INC of FREDERICKSBURG, TX. Built by ADAM W SHEFFIELD.

N113EC 11/29/2017 (XL) Owned by CARRASCO ENRIQUE of JUPITER, FL. Built by ENRIQUE CARRASCO.

Accident

↑ N787SB 1/16/2018 (XL) Owned by CLOUD CATCHER PROPERTIES INC of KLAMATH FALLS, OR. (Previously TRUTINA DESIGNS INC of RAMROD KEY, FL.) Built by BRYK STEVEN L.

Incident

↑ N2980W 2/7/2018 (Standard) Owned by Holub, Douglas of Crowder, OK. (Previously HOLUB DOUGLAS R of CROWDER, OK.) Built by HOLUB DOUGLAS R. (Aircraft may previously have been registered as N6KA built by BOXER AARON I)

Kit listed for sale

↑ N141AK 1/15/2018 $100,000 (XL) Owned by Khasky, Albert of Minneapolis, MN. Built by Khasky Albert.

Kit listed for sale

↑ TBD-Coria 3/2/2018 $35,000 (173) Owned by Coria, Ricardo of São Paulo, . Built by Cória, Ricardo.

Kit Listed for sale

TBD-Falls 3/2/2018 $22,000 (SE) Owned by Falls, Tom of Trenton, SC. Built by Falls, Tom .

Listed for Sale

↑ N289AE 2/21/2018 $27,500 (Jet XL) Owned by LAWRENCE CARL E of LOUISVILLE, CO. (Previously ESPINAL ANTONIO D of YONKERS, NY.) Built by ESPINAL ANTONIO D.

↑ N992PC 3/2/2018 $129,000 (XL) Owned by AMBKJ LLC of WILMINGTON, DE. (Previously CALHOUN PAUL of GLENDALE, AZ.) Built by CALHOUN PAUL.

↑ N99KT 3/2/2018 $154,000 (XL) Owned by Burfield, Blain of Willis, TX. (Previously BURFIELD BLAIN D of WILLIS, TX.) Built by TONYMON KENNETH.

Listed for Sale

N551ZL 12/22/2017 $205,000 (XL) Owned by CLEARED HOT LLC of WILMINGTON, DE. Built by HARRIS PIERCE. (Aircraft may previously have been registered as N7ZE built by HARRIS PIERCE)

↑ N800CB 3/2/2018 $144,950 (XL) Owned by BILLIONAIREBOB INC of WILMINGTON, DE. Built by BROCK CHRISTOPHER H.

N223DV 3/2/2018 $82,000 (Standard) Owned by VAUGHAN EDGAR DANIEL III of SPANISH FORT, AL. Built by EDGAR, DANIEL VAUGHAN III.

↑ N33SV 12/18/2017 $7,500 (173) Owned by SHERIDAN CRAIG T of BROKEN BOW, NE. (Previously MAGER CHRISTOPHER D of BALLSTON LAKE, NY.) Built by OWENS R WAYNE.

Listed for Sale

↑ N24TR 3/2/2018 $44,000 (Standard) Owned by TROYER TIMOTHY R of EAST PEORIA, IL. Built by TROYER TIMOTHY R. (Aircraft may previously have been registered as N25PR built by BLAHA ROY C)

Registration Cancelled - [Reason unknown]

↑ N360TV 9/8/2017 (Standard) Owned by ARAGON KIRK C of APEX, NC. Built by HUTCHINSON KENNETH A.

↑ N205MB 10/27/2017 (XL) Owned by ROCKET RACING INC of ORLANDO, FL. Built by MCKEE BEN E.

Registration Cancelled - [Reason unknown]

↑ N6ZL 1/8/2018 (XL) Owned by FRANKS ERIK of ESCONDIDO, CA. Built by FRANKS ERIK. (Aircraft may previously have been registered as N98EF built by Franks Erik)

↑ N77VX 1/9/2018 (173 Elite) Owned by MOYA ADELINO of ALBUQUERQUE, NM. (Previously Moya, Lino of ALBUQUERQUE, NM.) Built by MOYA ADELINO.

Registration Cancelled - Registration Expired - Pending Cancellation

↑ N389DM 1/18/2018 (SE LW) Owned by FRITTS WILLIAM M of OSCEOLA, MO. Built by FRITTS WILLIAM M.

Registration Cancelled - Registration Expired - Pending Cancellation

↑ N133XP 1/10/2018 () Owned by ROCKET RACING INC of ORLANDO, FL. Built by VELOCITY INC.

↑ N20PX 1/16/2018 (173) Owned by Calovini, Chris of Marion, OH. (Previously PROXY AVIATION SYSTEMS of GERMANTOWN, MD.) Built by OSHMYAN MICHAEL.

↑ N242JP 1/16/2018 (173) Owned by OLIVIERI DAMIAN L of TEMPLE, TX. Built by PRUDHOMME JEAN JOSEPH.

Where does this report come from?

Every month the FAA releases an updated database on aircraft registrations, airworthiness certificates, and incidents. An automated process is run that uses the FAA info plus some public listings on aircraft classified ad sites in order to:

- Find any new Velocities in the FAA registry.
- Flag any changes in airworthiness, registration, ownership, or location.
- Match the registration number against 5,000+ photos in the Velocity Wiki and VOBA archives and select a high-res image of the plane.
- Compile the changes and photos into this report.

The information represented here has not been checked for accuracy. The images may not faithfully depict the aircraft mentioned. This was all compiled by a robot. You may be the first human that has read it. If you find an error please email it to us at: Admin@VelocityOwners.com

Registration Cancelled - Registration Expired - Pending Cancellation

↑ N289AE 1/17/2018 (Jet XL) Owned by LAWRENCE CARL E of LOUISVILLE, CO. (Previously ESPINAL ANTONIO D of YONKERS, NY.) Built by ESPINAL ANTONIO D.

↑ N444YP 1/23/2018 (XL) Owned by CRANE GREGORY B of MESA, AZ. Built by ADVERTISING MGMT & CONSULTING.

N66XL 1/26/2018 (XL) Owned by EYMANN BERNARD E of KEY WEST, FL. Built by EYMANN BERNARD.

Registration Cancelled - Registration Expired - Pending Cancellation

↑ N951DR 1/24/2018 (Standard) Owned by AVIATION RESEARCH & DEVELOPMENT LTD of WILMINGTON, DE. Built by RIDER DAVID R.

Registration Cancelled - Valid Registration

↑ N116GT 10/18/2017 (Standard) Owned by RUDIN MELVIN of PORT ANGELES, WA. Built by MEISE GRAHAM Q. (Aircraft may previously have been registered as N211JP built by BROOKS J / DOERS D)

VOBA FAQ

What's in it for me?

The Velocity Owners and Builders Association provides a number of resources for members at no additional charge. Contact us at Admin@VelocityOwners.com if you want your own:

- Builder blog
- Photo album
- Specialty forum

Where do my dues go?

VOBA uses the funds it collects to help cover these expenses:

- Hosting the VOBA site
- Hosting the Wiki site
- Newsletter writing/editing
- Participation in EAA's Type Club Coalition
- Liability insurance for VOBA fly-ins and cookouts
- Mailings to non-members
- The Oshkosh cookout

How can I help?

Write something! Send us photos. Tell us what you're working on. We'll use it in the newsletter, on the web site, or add it to the technical library. Email your submission to: Editor@VelocityOwners.com

Publication Notes

This issue

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About Velocity News

VOBA's Velocity News is a publication of the Velocity Owners and Builders Association (VOBA). All content © 2018 VOBA. It is published quarterly and distributed to VOBA members.

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On the cover

Jan Rombouts's Standard Velocity, a student project at The Belgium Campus in South Africa.

A special thank you to Brett Ferrell for providing a database of aircraft and a wiki full of well-labeled, indexable images.

Please direct copyright questions and other concerns to: Admin@VelocityOwners.com

Colophon

VOBA's Velocity News is written and edited in Microsoft Word on Windows PCs. Photos edited in Paint.net. Personnel management by Upwork. File management by Dropbox. Typesetting and layout in Microsoft Word. Body text is Corbel 10.5 point. Final distribution in Adobe Acrobat Portable Document Format is through a ClubExpress-hosted forum and web site.

More info

A note to new builders and those becoming interested in Velocity Aircraft.

There are many resources available to help you research, get started, and stay motivated throughout the construction process.

There is a **wiki** of Velocity-related information (run by builder Brett Ferrell) at: http://wiki.velocityoba.com
It has the most information of any single site. A free account is required for some sections.

Some of the best Velocity knowledge can be found in our members' blogs . Find a list of them here: http://wiki.velocityoba.com/index.php?title=Builder%27s_Websites

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We also have a **Facebook group** started and administrated by builder Larry Epstein. https://www.facebook.com/groups/4013549683/

Plus these social media outlets:
Twitter: @VelocityOwners
Instagram: VelocityOwners


Travis Belloitte's SE-RG, N720LS

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