

Vertical Power

EAAer's aircraft project leads to aviation business

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Building an airplane is an impressive enterprise. When you consider the work that has to be performed accurately—and to high standards—the people who build their own aircraft are in a class by themselves.

One such person is Marc Ausman, EAA 768933, who has participated in building several different aircraft over the years. Marc's first kit, which took more than 24 months to complete, was a Van's RV-7. He initially planned to purchase a used RV-7; however, there were few to be found, which led to the project.

The system would offer prompts, help with checklists, and automate many of the tasks associated with flying.

Marc comes from an aviation background. His father was an airline pilot and his mother a flight attendant, so you could probably say he was flying before he was born. "I used to go to the Reno Air Races when I was a kid, and that's when I got bit by the bug," Marc explained. "My dad advised me not to become an airline pilot, because it wasn't the job it used to be, so as a result, I enlisted and ended up flying for the United States Navy."

He flew as a naval flight officer in the P-3 Orion, logging some 2,000 hours. After leaving the military, he worked on several software startups. He worked in the sales end as a product manager who turned customer problems into products the customers could use to solve those problems.

"The product development process involved generating the requirements and then working with engineers and the product development team to bring the product to market," Marc said. This tracked back to work Marc had



The Vertical Power Team used imagination and innovation to bring this ground-breaking product to market.



The VP-100 is more than a basic electrical system, and amounts to an intelligent electrical control system for your aircraft.



The VP-200 ups the ante in the cockpit, providing a visual interface for various parameters, as well as an automated electrical system.

done while in college, in his first aviation job. “My senior project in college was a program to track maintenance on the local flying club aircraft,” he said. “While I didn’t make any money on that program, it allowed me to endear myself to the other members of the flying club, which allowed me to shuttle planes around and build flight time.”

Oddly enough, the desire to build high-quality airplanes took Marc in a completely different direction, one that has been of great benefit to other builders. His directional change started while he was in the process of building his RV-7, and in some respects, while he was helping a friend build an RV-7A.

Marc was working on home automation systems in his spare time. These systems use a single intelligent switch that performs multiple functions, such as turning lights on or off, changing thermostat settings, or powering up equipment. While in the process of developing these products for the home market, he noted that similar products were being made for the automotive and marine markets, but none directed toward aviation. He saw this as a natural extension of the product line, since it would enhance and im-

prove the plane and would dovetail well with the current trend in glass panels.

“When I was doing the planning for the RV-7 electrical system, there were beautiful glass panels and electronics,” Marc noted. “However, when I looked at the electrical system that supported these components, it was basically the same as it has been.”

He noted there were cases where avionics costs exceeded the total cost of the rest of the project. “There has been a significant improvement in electronic systems, and the old electrical system that was available for my RV-7 project was inadequate for what I wanted to do,” explained Marc, who pointed out that the cockpit of planes being built today contain GPS/nav/comms, autopilots, airborne heading-attitude reference system (AHARS), electronic trim, air data computers, and engine monitors. “There were tons of advances in avionics in the cockpit, but no change in the electrical system.”

Building a Better Electrical System

This prompted Marc to develop an intelligent electrical switching system for his airplane. The system would offer prompts, help with checklists, and automate many of the tasks associated with flying. He called the product the Vertical Power Flight Operations Monitor.

The development process for the flight operations monitor was a lot like building the RV-7, in that there were trial and error processes in the development as Marc’s team looked for the right combination of components to make the product work the best and require the least amount of maintenance. For example, in one of the earlier prototype models of the unit, the development team tried to use solid-state relays; however, those were abandoned in favor of integrated circuits, which provide more reliable solid-state switching.

Pressing another button on the key fob will turn on the interior lights in the aircraft, with each other button cycling through nav lights, strobes, and landing lights, so you can verify proper operation without having to jump in and out of the airplane.

Then they needed to automate some of the switching processes. For example, Marc noted that starting an airplane is a complex process that most pilots learn by repetition. You have to make sure the avionics and electrical equipment are off, and then you turn on the master switch, prime the engine, and hit the starter. While in flight, as it gets dark, you have to turn on the various recognition

lights and strobes for anti-collision purposes, and dial up the cabin lights. Marc wanted to come up with something that would allow the pilot to control flight with the touch of a few buttons, so he incorporated these features into the design of the product. While he was designing, it was simple to incorporate engine instruments such as manifold pressure, oil pressure, temperature, fuel information, electrical system data, including an engine monitor, and switching for everything from lights to the landing gear.

As a result, the company developed several products for pilots, many of which were introduced at EAA AirVenture Oshkosh 2007. The first is the VP-100, an intelligent switching system. It provides the pilot with information needed to fly the plane and stay aware of its condition. The unit comes with a key fob, which the pilot presses when approaching the airplane. As the unit turns on, the nav lights flash and the Vertical Power system turns on. Pressing another button on the key fob will turn on the interior lights in the aircraft, with each other button cycling through nav lights, strobes, and landing lights, so you can verify proper operation without having to jump in and out of the airplane.

A more advanced unit that automates much of the process of flying is the VP-200, which includes a 6.5-inch diagonal LCD color display. The VP-200 features the same solid-state controls and remote key fob as the VP-100 but also offers “mode selectable” flight characteristics. For example, as you transition from climb to cruise mode, the aircraft trim will automatically step back in sensitivity to better match your cruise needs. If an electrical system failure occurs, the VP-200 verbally announces the failure in your headsets and then automatically sheds non-essential electrical loads to better assure a safe return to the ground.

“Adding a VP-200 is like switching from using a VOR needle to installing a GPS moving map,” Marc told AirVenture visitors.

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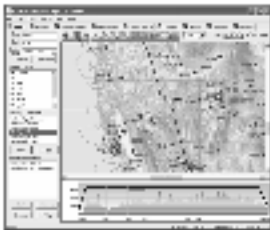
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Looking at one of the displays of the VP-200, you can see the power that the unit can bring to your cockpit.



Ausman served as a Flight Officer on a P-3 Orion while serving in the US Navy.

There are also a variety of emergency checklists, which allow the pilot to quickly mitigate the effects of most in-flight events. The unit's features are so varied that the best way to check them is on the company website at www.VerticalPower.com, where you can look at the products and even opt to take a virtual flight with the unit. Both units can be retrofit into existing experimental aircraft. The company has no plans to produce a unit for production aircraft at this time.

The best part of both products is simplified wiring. The unit's cen-

tral core provides all needed interface points. This includes power to the various electrical loads with automatic switching, as well as to the flaps and landing gear. All wiring is routed through this central core or, in the case of planes with two electrical systems, through two of these units. The bottom line is a far simpler way to wire an airplane than would be the case otherwise. 

George Wilhelmsen is an Illinois-based pilot. He holds a commercial certificate, airplane single engine land with an instrument rating, and he has more than 1,000 hours of flight experience. He has a bachelor's degree in engineering technology, with a background in DC, analog, and digital controls. He flies a Beech Debonair.

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