ELECTRIC AIRPLANES POISED TO TRANSFORM AVIATION

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By Alex Vanover

When I started taking flying lessons in 1998, one thing that surprised me was the relatively primitive engines that modern airplanes use. These are engines that have more in common with tractor engines than the reliable high-tech automotive engines we all drive behind. Would you be surprised if I told you that in the year 2015 most brand new airplanes have engines that use carburetors with primers and chokes? Not only that, but these engines also require you to manually adjust the fuel mixture as you ascend and descend. And to top it all off, these engines require fuels with lead additives to operate. How can this be when we live in an age of fuel injection and electronic ignition? How can this be when we just turn the ignitions in our cars and drive, never giving so much as a thought to how our engines operate?

Federal regulations -that's why.

Surprised? You shouldn't be. The Federal Aviation Administration (FAA) long ago put in place strict regulations on aircraft engines that were supposed to ensure that only engines that have gone through a long and arduous testing process would be approved for use in certified aircraft. It was for our safety, we were told. The implementation of these regulations, however, backfired in one big way: The regulations were so strict that it became prohibitively expensive for engine manufacturers to test new engine designs. This caused aircraft engine technology to lag decades

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behind automotive engine technology. It simply became too expensive to develop and test new engine designs due to the strict new rules. There is one category of aviation, however, where people are free to experiment and test new designs with limited government oversight. That category of airplanes is called…wait for it…the experimental aviation category.

Experimental airplanes are what we most commonly refer to as home built airplanes or kit planes. These are airplanes that amateurs build in their garages from either plans or kits they purchase. Airplanes built in the experimental category can use a wide range of engines, including automotive engines adapted for airplane use. And with the rapid advancement of battery technology, it was only a matter of time before someone attempted to build an all-electric airplane in the experimental category. One particular electric airplane design has already hit the market, the ElectraFlyer , an ultralight design with an enclosed cockpit. Even some big-name aviation companies are researching electric-powered airplanes like Airbus, EADS, Boeing, and others.

Airplanes equipped with electric motors have several advantages over those powered by internal combustion engines. Just a few of these advantages include:

- Instant starting (no fumbling around with primers or chokes);
- Near-silent operation (no upsetting the neighbors);
- No engine vibration for smooth operations;
- Solid-state motors (no need for oil changes, expensive overhauls, or carburetor cleanings);
- No need to handle dirty, smelly fuels;
- Affordable operations (electricity costs just a tiny fraction of the cost of expensive aviation fuel);
- Motors can be easily stopped and restarted in-flight (for glider operations).

As the technology continues to mature, it is inevitable that the FAA will eventually have to allow electric motors to be used in certified airplanes. Once this happens, we will see a massive technology leap in aviation propulsion systems. Aviation companies will essentially get to skip over newer technologies proven in the automotive sector (like fuel injection and electronic ignition) and go straight to motors powered by electrons. The end result will be airplanes that are more reliable than ever before with simplified operations and reduced operating costs.

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