Expanding Build and Fly

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EAA'S BUILD AND FLY program is a marvelous companion to Young Eagles. Build and Fly is an opportunity to engage youths in other than occasional flights; to introduce them to broader aspects of aviation.

EAA Chapter 105 started its version of Build and Fly in 2023. The chapter is tucked just southwest of Portland, Oregon, on Stark's Twin Oaks Airpark in Hillsboro. It's just a stone's throw from Van's Aircraft headquarters at Aurora, and not only are many chapter members building RVs, but some are employees of the company as well.

Like most chapters, Chapter 105's Build and Fly started with the RC aircraft packages available through EAA. Everything went swimmingly — until it came time to fly. As one would expect with kids flying brand-new RC airplanes, the losses came spectacularly and early. Which meant it was back to the building phase.

Chapter members felt they needed additional opportunity for the youths involved. Several had attended a chapter leadership program at Oshkosh that included races involving setting Clecos. That was instituted. A member





with computer skills developed a small micro-Arduino program to light multicolor LEDs on a map according to the METAR listing for flight conditions. Gliders were added, as were air-powered rockets.

Still, more was needed. Mike Whelan, the chapter's Build and Fly coordinator, had an ace in the hole: chapter member James Breazeal had built a flight simulator into a Cessna 150 carcass. He'd documented the build on his YouTube channel. Mike asked James to build something similar for Build and Fly.

Fortunately, another chapter member "happened" to have a decommissioned Bearhawk LSA. Conversion to a flight simulator was largely accomplished by the youth participants. Mike and James chopped down the fuselage and put it on wheels (to make it easier to store in a crowded chapter hangar), but the youths themselves did much of the work. They mounted the displays, ran the wires, and altered the structure under the direction of the chapter members. The METAR map program required fine soldering, and the youths graduated from that to connecting the simulator wires to the appropriate connectors.

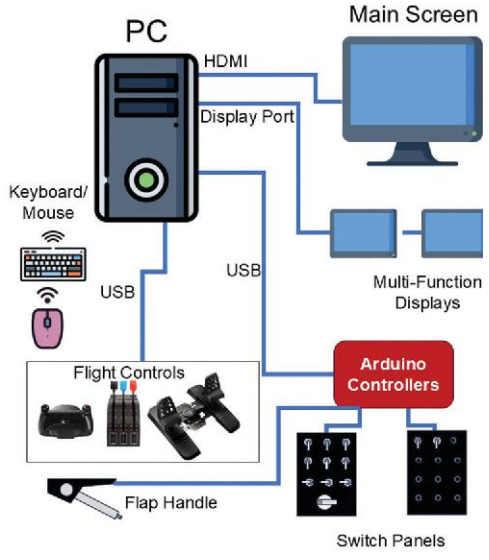
Richard Ecker supplied the heart of the simulator, a tower-type PC. It may not be state of the art, but it has enough "oomph" to run X-Plane 12. The youths installed a large monitor in front of the windshield and two smaller 10.5-inch displays in the panel — Chapter 105's simulator has a modern glass panel. The three displays are driven by HDMI and DisplayPort, a common gaming standard.

A stock joystick and rudder pedal assembly was attached to the floor by the youths, and they made a mount to put the throttle quadrant on the left. These both plugged into the PC via USB cables.

All the work so far could easily be duplicated by any chapter, but from this point, stuff started getting a bit wild. Arduino interfaces were built to allow the addition of a scratch-built flap handle (built by the youths, with chapter members 3D-printing covers), a trim crank on the roof, and switch panels for aircraft control. A transducer was donated by ButtKicker Haptics; this provides a physical jolt when the airplane touches down or is handled too roughly.

The simulator is still evolving. Recently, a moving-map display was implemented on one of the small screens, and Chris Edwards swapped the joystick for a yoke. Stark's Twin Oaks Airpark has graciously allowed the chapter activities (including gatherings and Build and Fly) to move to a large conference room in one of its buildings, including space to park the simulator itself (not small!) as well as storage areas for the RC airplanes, METAR maps, Cleco races, and all the equipment needed to support Build and Fly.

What's next? Who knows! There's muttering about a second simulator; there's also talk about adding some motion to the current one. Chapter 105's members are pushing even more excitement into Build and Fly.



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