Researchers in the same building are meanwhile inventing a low-cost version of a spatial disorientation trainer, a high-end piece of equipment that may be prohibitively expensive for many flight-training programs. Combining motion simulation and virtual reality, the aviation illusion trainer now under development will subject student pilots virtually to a deadly yet common scenario—a sudden transition from visual to instrument meteorological conditions.

We are not leveraging these teaching tools simply because they are fun and today’s students grew up playing video games. Research has shown that virtual, mixed and extended reality training tools work well within the context of a holistic educational program under the guidance of skilled instructors. In a 2018 study by Jennifer Lewis and Joyner Livingston of SAIC, for instance, immersive synthetic training environment simulators helped student pilots complete their first successful solo flight in roughly half the time. At Embry Riddle, we are conducting rigorous assessments before and after XR training to gauge its efficacy.

Evidence-based validation of virtual, augmented and mixed reality training technologies—including computer-based systems and haptic feedback devices—will be an essential step in expanding their use.

We can get there: Simulation training tools are widely accepted in the medical and industrial fields. Health care workers are leveraging visualization training to better understand human anatomy and prepare for complex surgeries.

XR systems support the safe, efficient training of new talent—for both flight and space travel. For aviation maintenance professionals, XR minimizes expensive mistakes and allows students to perform invasive procedures without jeopardizing safety. For aspiring pilots, high-fidelity interactive XR environments make it possible to prepare for dangerous scenarios in the air. The technology also allows students to complete assignments remotely at minimal cost—a major plus during a global pandemic. Research-based validation of XR training tools will be key to their advancement.

P. Barry Butler is president of Embry-Riddle Aeronautical University.

The Power of Extended Reality

By P. Barry Butler

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