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SIMULATION
in Aviation Training

ATSYSTEMS:
Simulation Training Should Be
REALISTIC,
RELEVANT & REPEATABLE

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Pilots Jerry Griffin (left) of the Birmingham (AL) Police Department and Jonathan Johnson of the Jefferson County (AL) Sheriff's Office conduct a helicopter training flight using new virtual reality technology. This technology provides a cost effective alternative to full-motion simulators, equipment that is often in great demand and expensive to use. The ATS virtual reality system can be programmed for all sorts of weather scenarios and even replicate previous accidents.

Technology continues to change and improve aviation operations and safety. While it could be argued that aviation technology has not kept pace with Moore's Law, which says computer costs halve every two years, the industry has certainly seen its share of innovations.

Significant developments and improvements have been made in electronic flight bags, as well as their sister technologies. The use of satellite-based weather, ADS-B data and similar technologies provide a wealth of information in the cockpit.

Technology training is a must for effective and safe use of these and other specialized tools in the cockpit. Aviation operators would not install a new thermal imaging system without providing training to its crews prior to flight, and other technologies should be no different.

Simulation is another area that has seen significant technological improvement, both in capabilities and cost, over the last decade. The cost of realistic simulators continues to decrease while technology levels increase. The push into virtual reality has expanded

Pilot Jonathan Johnson (left) said AT Systems' technology is "like no other [training] flight I've flown." Pilot Jerry Griffin (right) said, "It doesn't get any realer than that."

availability for emergency procedures and mission equipment training and reduced its cost. Augmented reality has made in-aircraft training even more realistic and effective.

Augmented reality training systems, such as the one AT Systems provides, coupled with the ATS Device (a patented IIMC and degraded visual environment training device) was the solution the National Transportation Safety Board suggested following the Calabasas helicopter crash earlier this year. The ATS Device simulates aircraft motion, which is critical to effective spatial disorientation training.

AT Systems' in-aircraft simulators are capable of creating realistic scenario-based training, putting pilots in their aircraft, airspace and inflight mindset. The simulators provide physical motion, air traffic control inputs, and the typical stress of flight for the most realistic training possible.

IN-AIRCRAFT TRAINING

In-aircraft training should incorporate automated systems for aircraft GPS location, attitude, altitude and speed. This allows consistent, scenario-based training for pilots while keeping the trainer focused on safety.

Performing certain training in aircraft introduces safety issues. Degraded visual environment-induced spatial disorientation has proven to be one of the greatest threats to helicopter aviation, while also continuing to be a threat to fixed-wing aviation. In-aircraft training systems can supply an added layer of safety. The ATS Device is able to simulate degraded visual conditions while incorporating the use of NVGs, HUD or synthetic vision in day and night conditions. Pilots can use the device to safely limit their vision and train to rely on the information the technologies provide.

Conducting training with in-aircraft degraded visual environment simulators is no different than emergency procedures training conducted in the aircraft; a robust training plan and multiple redundancies are needed for safe and effective utilization. If the training pilot exceeds safe conditions, the layered safeties should stop the training and bring all crewmembers back to visual flight conditions. This allows for both the training pilot and trainer to be focused on safe aircraft operation.

Pilots who are tasked with setting standards and training have the responsibility to ensure the training provided is safe and

effective. Training must be current, realistic, relevant and repeatable across aircrews. Effective and consistent training should include the use of technology during day-to-day flights. Frequent general training should also ensure pilots can effectively operate their aircraft fleet using all the tools available to them, as well as refine their basic aviation skills for times when technology doesn't perform properly.

TECHNOLOGY IMPROVES SAFETY

When developing training plans for aircrews, consider this question: when does our technology go too far? When does technology-driven training put new pilots who grew up with the tools or experienced aircrews who have let proficiency slip at a disadvantage? For example, pilots might never have mastered the art of navigating because a moving map was always available, or an instrument pilot might let land base navigation skills diminish due to confidence in GPS availability. What happens to the pilots when the GPS system is not working properly, whether due to system malfunction, a training exercise or a deliberate act of sabotage?

For example, some organizations become so dependent on autopilot

ATS Device

The ATS Device is capable of demonstrating the skill required and simulating the stress induced by flying in low visibility/low ceiling and other degraded visual environment conditions. The ATS Device trains pilots specifically for degraded vision, IIMC and brown/white outs. The device is a standalone training system requiring no alteration to aircraft for power or telemetry data; it attaches to currently used helmets and is controlled wirelessly through a tablet application.

The ATS Device's regularly updated accident scenarios replicate real-world historical accident conditions. With the device, visibility can be set between 0 and 6 miles in quarter-mile increments and ceilings can be set to any altitude in 100-foot increments. The patented technology provides safety features to cease training scenarios when users' preset conditions are exceeded. The parameters include pitch, roll, altitude, descent rate and the proximity of other aircraft.

systems that they find their pilots lack the basic skills needed for safe aircraft operation during emergencies. The example might seem extreme, but it should serve as a reminder that basics training is critical to safely implementing aviation technology. Blending new technologies with old school skills should not only be a

consideration, but an integral part of the training plan.

Technology continues to improve aviation operations and safety on every front. Find the technology that best fits your organization and culture and train for its use, but be strategic in training for the one day when the technology is not available.

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