

Single-Engine IFR At Last!



The Bell 407GX received its STC for IFR operations in August. (Bell photo)

Until this summer, no single-engine helicopter had been approved for IFR operations in more than 20 years. Efforts by VFS and other associations begun in 2014 helped pave the way for this major breakthrough with the potential far-reaching impacts.

By Paul M. Schaaf

On Aug. 15, the US Federal Aviation Administration (FAA) granted a Supplementary Type Certificate (STC) for instrument flight rules (IFR) for the single-engine Bell 407GX helicopter. This STC — along with the IFR certification of the single-engine Leonardo TH-119 granted on July 17 — represent more than two successful projects; they are possibly the beginnings of a paradigm shift in the way we think of helicopter operations and even urban air mobility.

Both projects leverage commercially available and cost-effective off-the-shelf avionics systems (the Garmin G1000 and Genesys 680 series EFIS, respectively) offering high reliability, light weight installation and ease-of-use supportive of single-pilot IFR (SPIFR) operations. These avionics suites pack a plethora of integrated safety features, such as terrain, obstacle, and traffic avoidance, synthetic vision, flight path indications, ADS-B and other datalink functionality — to name a few. Combined with reliable autopilots and the benefits of modern flight planning interfaces, IFR will now become a “non-issue” for an instrument-trained helicopter pilot.

From 2001 to 2013, there were 194 accidents worldwide — with 326 fatalities — for Part 27 single-engine helicopters involving controlled flight into terrain (CFIT), loss of control after continued flight into instrument meteorological conditions (IMC), or attempts to “scud run” — flying close to the ground to navigate in bad weather (see “IFR Saves Lives,” *Vertiflite*, Sep/Oct 2017).

As the Leonardo TH-119 and Bell 407GX IFR aircraft — and hopefully many others — make their way into the marketplace, the number of high-risk scud-running operations may dwindle to a regrettable trickle. Operators will gravitate toward IFR operations as a safer option for safety’s sake, and be motivated by

the ability to operate and generate revenue un beholden to many of Mother Nature’s vagaries.

These two new IFR certifications are due to the grit and determination of these respective manufactures and the genuine willingness of the FAA to follow through on the performance-based objectives outlined in the industry white paper. The “14 CFR 27 Single-Engine IFR Certification Proposal” was developed by the Airborne Electronics Association (AEA), General Aviation Manufacturers Association (GAMA), Helicopter Association International (HAI) and VFS, and submitted to the FAA in November 2015 (see www.vtol.org/se-ifr).

While Leonardo’s IFR certification project benefited in spirit by the white paper, it achieved certification mostly without the alternate methodology proposed in the white paper, owing to the fact that the single-engine AW119 was derived from company’s twin-engine, IFR-certified AW109.

Bell’s 407GX, on the other hand, achieved IFR certification by leveraging four of the six areas proposed by the white paper. The first area had already been adopted by FAA policy PS-ASW-27-15 which defined classes of Part 27 helicopters and created a Safety Continuum of requirements more appropriate than the “airliner values” previously used by default. The other three areas — protection against high-intensity radiated fields (HIRF, e.g. microwaves) and lightning strikes testing; single hydraulics and the criticality of a navigation and communications failure — were addressed through the Bell 407GX certification plan and the issue paper process.

Bell’s goal was to make IFR certification of the 407GX affordable for the civilian market place. However, no free passes were given



In July, the Leonardo TH-119 was awarded the first single-engine IFR certificate since the 1990s. (Leonardo photo)

in the process of getting there. Bell's rigor in demonstrating continued safe IFR flight following a loss of hydraulic boost went far beyond the suggestions of the white paper. Some 16 pilots with varying degrees of experience were involved in performing a series of flight evaluations. Although the white paper suggested demonstrating 30-minutes of continued flight, most of these pilots flew the Bell 407GX_i for well over an hour with hydraulics off. During these flights, pilots were asked to fly to the same Practical Test Standards (PTS) that are normally applied when the helicopter is fully functional. The flights included IFR navigation exercises, changes in flight plan, and multiple instrument approach procedures with go-arounds.

With thousands of helicopters in operation today restricted to visual flight rules (VFR), an affordable retrofit IFR STC for legacy models following the cue of the IFR AW119 and IFR Bell 407GX_i projects is the logical next step. The two remaining recommendations of the white paper are key to the necessary affordability: a reasonably sized, large-capacity battery in place of installing a second generator, and the ability to certify for IFR with a single-pilot static system with an alternate static port (as allowed in Part 23 airplanes). Since most existing models do not allow for the easy installation of a second generator or a second pitot static system, a willing and able applicant will need to submit the necessary issue papers. Given the anticipated demand for a retrofittable, single-engine IFR capability, hope is in sight that this too will come.

As lower-cost (i.e. single-engine) helicopters enter into the IFR system — flying more reliably and safely — the benefits will be realized industry-wide. Ultimately, we are likely to see CFIT accidents become an extreme rarity, rather than regularly occurring phenomena of today, and not just for single-engine helicopters. The fatal crash on June 10 of a Leonardo A109E Power

on top of a 54-story skyscraper in New York City — which prompted Mayor de Blasio to call for a ban on non-emergency helicopters flying over Manhattan — is a case in point. The aircraft, of course, is a fully IFR-equipped aircraft, but the pilot, who was said to be highly trained but did not have an IFR-rating, took off into a 400 ft (120 m) ceiling overcast flying VFR. If IFR flights were more often the rule rather than the exception, the pilot would likely have been IFR-certified and could have performed the flight without the need for scud running. Similar examples abound.

The breakthrough of single-engine IFR also has implications for much wider benefits to society. IFR certification and operation of single-engine (i.e. lower-cost) helicopters will provide manufacturers, operators and regulators of the future urban air mobility (UAM) ecosystems the ability to begin tackling these challenges now. It will also motivate present-day development of infrastructure, airspace, procedures and regulations critical for the implementation of successful future UAM solutions. 🦋

About the Author

Paul Schaaf is an airline transport pilot (ATP)-rated helicopter pilot with 33 years and more than 10,000 hours of experience as a military, law enforcement, corporate and emergency medical services (EMS) helicopter pilot, instructor and manager. He has been an advocate for IFR helicopter operations his entire career. Paul previously served as HAI's Vice President of Operations and was instrumental in the advancement of the "14 CFR 27 Single-Engine IFR Certification Proposal." He currently flies EMS in an Airbus EC145 as a single-pilot IFR captain, and serves as a technical advisor to the Vertical Flight Society.