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FRASCA

PROVES QUALITY, COST EFFECTIVENESS
AND FOCUS GARNERS SUCCESS



Simulated SUCCESS

EVEN AFTER 50 YEARS IN BUSINESS, FRASCA CONTINUES TO PROVE THAT FOCUSING ON QUALITY, COST-EFFECTIVENESS AND THE CUSTOMERS' NEEDS IS A SOLID PATH TO SUCCESS.

by Jeffrey Decker

The oldest consistent presence in the world of flight simulation is Frasca International, which has, over the last few years, turned its formerly small role in helicopter training into a major one.

"It's become our largest area of growth," said Frasca's manager of advertising & promotions, Peggy Prichard. "We're focusing on it because of that. You find a market and people come to you. Five years ago, Air Logistics and PHI each decided they wanted their own flight training devices. We also had a contract with the U.S. Army around 10 years ago. It's just grown since then. We have helicopter devices in over 20 countries."

NEW MARKETS

In fact, even helicopter training experts FlightSafety International looked to the company from Urbana, Ill., when its new Lafayette Learning Center needed three Level 7 flight training devices (FTDs), the most advanced possible. "Frasca obviously has a very strong reputation in the FTD field," remarked George Ferito, FlightSafety's director of rotorcraft business development. The Iraqi Air Force recently brought on line its two Bell 206 and two Huey FTDs, part of a nine-unit order that includes fixed-wing

simulators from Frasca. These devices use the company's new TruVision system to accurately recreate the details of terrain around the world.

In February 2008, Frasca sold Houston-based Bristow Group a Eurocopter AS 355 FTD and Level B full flight simulators for the EC 225 and Sikorsky S-92. "I like dealing with Frasca because they have the technical expertise and manufacturing capabilities of a big company, combined with the flexibility of a small entrepreneurial organization," said Patrick Corr, Bristow senior vice-president, global safety, training and standards. "They make a great product and give outstanding aftermarket support. . . . Dealing with their engineers is a great pleasure because they're very practical — they don't always try to sell you every new gizmo or gadget. Instead, they listen to your needs and deliver a cost-effective solution."

EXPANDED FOCUS

Expanding beyond flight training devices into full flight simulators has helped satisfy new customers, said VP John Frasca. "Our vision at Frasca is to provide the highest quality simulators for

the aviation industry. We have remained committed to general aviation, which is our original product segment, but have progressively added product range and technology."

John's father, Rudy Frasca, founded the privately owned company in 1958. Rudy's offspring are spread throughout the company, with Tom, Bob, David, Mary, Peggy (Prichard) and Liz handling marketing, management, production and finance at the 70,000 square-foot headquarters in Illinois.

With over 160 employees, it's a big leap from the garage Rudy started the company in. One thing remains the same, though, Frasca's products are built for the long haul. Ninety percent of the 2,200 training devices delivered over those 50 years are still in service.

The company designs and manufactures all components of the simulators, including software, interface systems, instrumentation, visual systems, control loading and cockpits. Recently, technicians have started linking a special recorder to an aircraft, so Frasca can measure its performance during operation and use that data to replicate every nuance.

EXPANDED BENEFITS

Simulation can be better than actual flying, suggested senior project manager Bob Summers. "There are certain procedures you just don't want to practice in the aircraft," since the worst that happens in the simulator is the screen goes red and the pilot tries again. "In ab-initio training, you definitely want to do the majority of the training in the actual aircraft, but where the FTD is beneficial is when it comes to emergencies or where you come into inadvertent meteorological conditions, where you can't see. It gives pilots a better idea what to expect."

Sim training also counts toward flight hours in many cases. This varies for aircraft type and the rating desired, but Summers laid out the benefits for Frasca's TruLiteH system. "It's called a generic simulator device. It's perfect for flight schools because it's convertible from an R22, to an R44, to a Schweizer 300."

He added, "In the generic sim device, you're given 7.5 hours of VFR [visual flight rules] training that can go toward that private license, or for a commercial rating. That's 7.5 hours that, theoretically, you wouldn't have to use the aircraft for. And you get a total for instrument training of 20 hours.

Full flight simulators have the added benefit of perching above mechanics that lift and twist on six axes to move the enclosed cockpit with each maneuver, just as it would in the air.

Said Summers: "Where the FTD comes in strongly is to acclimate the pilot to the aircraft, as far as startup procedures, where buttons are located, proper startup and shutdown procedures and some limited hovering techniques. This gives not only the student, but the instructor, more confidence when they get into the actual aircraft."

FTDs also keep costs down. Said Summers, "Particularly with higher prices of fuel and insurance and operating costs, aircraft manufacturers have a higher liability and they pass that on to customers too. . . ." When one considers that an R22 might cost \$100 per hour to operate it, plus other potential costs, the FTD is an incredible bargain. Besides the wage of the instructor assigned to the machine, the costs are, said Summers, "For one hour, maybe five to seven bucks for the electricity."

ADDED SAFETY

On top of cost savings, the instructor can throw a lot of curve balls at the pilot, testing alertness and nerves in ways that prepare them to avoid fatal mistakes. The visual system can call upon an extensive library of fixed-wing aircraft and helicopters to

suddenly fly an intercept course, or to trigger a "piece of traffic," as they call it, to fly a pre-arranged pattern.

They can call in snow, fog, lightning and a host of other complications. More simulator time is one of the ideas being floated in the wake of rising emergency medical service (EMS) crashes. The most recent official recommendation for increased simulator usage came in the third week of October from the United Kingdom's Air Accidents Investigation Branch in its final report on the 2006 crash of a CHC Scotia Eurocopter SA365N Dauphin 2 off England's northwest coast. Its two pilots and five passengers all died instantly when they hit the ocean at high speed in poor visibility at night.

For now, Bell Helicopter is the only customer making use of night vision goggle (NVG) training. Appropriately enough, Bell was one of Frasca's first helicopter customers, said Prichard. "They have a number of Frasca FTDs, including a 206, 407, 427 and 412."

She said other platforms that could soon offer NVG training, include Eurocopter's EC 135 and AS 350.

NVG, traffic and all the latest tricks are in the EC 135 FTD delivered in August to the Finnish Aviation Academy in Pori, Finland. The device received JAR-STD2H FTD 3 MCC qualification, the highest available for an FTD, which allows for considerable training and checking credits. "It was a very big deal," said Prichard. "It's not easy to get those approvals. . . . They're allowing a device to be used in training a pilot, so there's a lot of safety involved. It takes a lot of paperwork, a lot of engineering testing. That was a huge thing, and that's going to help with future contracts."

MORE HORSEPOWER

Until 1983, training devices were analog. Motion bases were added in 1987. Then, in 1991, Frasca built its first full-motion helicopter simulator for an order from the Indonesian Army.

When manager of graphics engineering Geoff Leu started there 10 years ago, Frasca was using Intel Pentium processors. "Although we were using commercial, off-the-shelf computers, we still used specialized graphics," he recalled. "At that time, it was pretty good, actually. I don't remember the exact specs on it, but it was capable of rendering a photo-realistic texturing out of polygons, and it supported 3-D models in the open flight format.

"Compared to today, obviously things are much more powerful. You've got your dual core and quad core CPUs [central processing units] that are allowing us to perform many more functions within the IG [image generator] channel than we used to. The GPU [graphics processing unit] that processes the giant curved images stretching 200 degrees around the pilot and 70 degrees above and below could be said to be more powerful than the CPU. We're able to take advantage of higher rendering resolution. . . . We are



TOP Over 160 employees work at Frasca's 70,000-square-foot facility.

ABOVE Frasca recently completed two Bell UH-1H FTDs for the Iraqi Air Force.



TOP LEFT Company founder Rudy Frasca with son John, vice-president. Three generations of Frascas are involved with the company.

TOP RIGHT Since the company was founded, Frasca has manufactured over 2,200 training devices that are operated in 80 countries. Ninety percent of these units are reported to still be in use.

ABOVE Rudy Frasca with his first gray simulator box, built in 1958.

CLOSER TO REALITY

Today, a problem that's as old as computer graphics — the staircase-like zigzags on diagonal lines — has been smoothed out in the newest systems. "As you move around, those jagged images can flicker, which is very distracting to the pilots," explained Leu. "Because it's so powerful now, you're able to take advantage of the higher settings, and you can get a better quality anti-aliasing by increasing the levels."

The clarity and operating power allow realism like never before, and not just realistic images, but images of reality. Frasca's brand-new image generating software supports a terrain and culture model for the whole world. Called TruVision Global, this major software rewrite has involved integrating the latest image generation technology called GenesisRT from Diamond Visionics.

This gives a crisp new look to rain, snow, lightning, brown out, white out and rotor-wash effects, over a world that's ever-more detailed. Already, there are more than 10,000 worldwide airfields programmed in. Coastlines, waterways and mountains are ready to fly over. Owners can even add their own visual features to add new details, features or obstructions, or have Leu's team handle it.

"Each customer has a customized database for their local areas that fully replicate a number of airports within the surrounding area," said Leu. "The water bodies and coastline are faithfully replicated off of digital data," including satellite imagery and numerous other databases. "When we develop a customized area for a customer, if there are certain buildings or landmarks that

now able to achieve upwards of 1,920 by 1,080 resolution."

Those perfect cockpit replications make use of simulated electronic flight instrument system and vehicle and engine monitoring displays, as well as multi-channel sound simulation. By 2007, Frasca had reached a major milestone with its first Level 6 helicopter FTD.

they need to be very realistic, we take photos of those structures and we're able to reconstruct those objects in 3-D."

The area ordered by the Finnish Aviation Academy "was basically every road in the country. It was so extremely detailed, as detailed as they wanted it to be. We are able to check the accuracy by making comparisons with very high resolution satellite imagery. We're also using some high-resolution elevation data to make sure the terrain is very realistic, which is particularly important for helicopter training. We are also going to be populating the ocean with oil rigs that are placed at their real-world location."

The next challenge, said Leu, is building full flight simulators for the Sikorsky S-92 and Eurocopter EC 225. "Because the level of certification on that is Level B, that's going to be the highest one that we've done so far for helicopters. We are going to be spending a lot of effort to make sure the visuals are even more developed than anything we've previously done. . . . Frasca is always striving to increase the quality and fidelity of our visual systems to provide the most realistic experience possible given the technology that is available."

Including the simple cockpit procedures trainers it builds, Frasca has built custom products for a vast array of helicopter models including the AgustaWestland AW119; Bell 205, 206, 212, 407, 412, 427 and 429; Eurocopter AS 350, AS 365, Bo.105, EC 120, EC 135, EC 225; Enstrom F28F; Hughes/Schweizer 300; Robinson R22 and R44; and Sikorsky S-76 and S-92. Its long list of clients includes Bell, Bristow, the Colombian National Police, the Defense Helicopter Flying School (British armed forces training), Era Training Center, FlightSafety, the Indonesian Army, the Mexican Navy, the Royal Netherlands Air Force, the Royal Saudi Air Force, Samsung Aerospace, Tokyo Aircraft Instrument and the U.S. Army.

It's safe to say, that in the last 50 years, Frasca has done more than just leave its mark in the world of aircraft simulation. They've set the standard for realism and success.

Jeffrey Decker reports on issues in aviation, energy and politics. He lives with his wife and son in Oshkosh, Wis.

