



# CRM ON DEMAND

BY MARK LACAGNINA

Air taxi aircraft operators in the United States might be required to implement crew resource management (CRM) training for their pilots, according to rule-making action announced recently by the Federal Aviation Administration (FAA). The announcement responds to years of prodding by the U.S. National Transportation Safety Board (NTSB), which has highlighted

the lack of such training as a factor in several accidents.

CRM training provides pilots with “techniques for improved crew coordination, workload management and error reduction,” NTSB says. CRM training currently is required for pilots and other personnel involved in air carrier operations conducted under U.S. Federal Aviation Regulations Part 121, fractional ownership operations

under Part 91 subpart K and commuter operations conducted under Part 135 in aircraft requiring two pilots or with more than 10 passenger seats. The safety board has repeatedly questioned why CRM training has not been extended to pilots who conduct air taxi, or on-demand, operations under Part 135.

“The cockpit environments and the duties of multi-person flight crews of Part 135 on-demand operations are

similar to those of Part 135 commuter operations,” NTSB said. “Further, many Part 135 on-demand operators use sophisticated turbojet and turboprop equipment and can be affected by operational demands similar to those experienced by Part 135 commuter operators, such as schedule pressure and customer needs, which may influence the aeronautical decision-making process.”

### ‘Most Wanted’ List

Part 135 CRM has been on NTSB’s list of “most wanted transportation safety improvements” for several years. The safety board in June 2002 recommended revision of Part 135 to specify that air taxi operators with aircraft requiring two or more pilots must establish FAA-approved CRM training programs similar to those mandated by Part 121.

“Most air carriers have several days of dedicated CRM training at which accidents are reviewed and, in some cases, pilots examine their own communication styles to determine specific strengths and weaknesses that may affect crew coordination in the cockpit,” NTSB said. “These courses also allow participants to interact with each other, obtain feedback, role play, learn strategies to improve workload and error management, recognize leadership qualities, and reinforce effective attitudes and behavior.”

The recommendation was based on the investigation of the March 29, 2001, crash of a Gulfstream III in Aspen, Colorado. The report said that the pilots either did not have or only briefly had the airport in sight when they descended below the minimum descent altitude (MDA) while conducting the VOR (VHF omnidirectional radio) approach to Runway 15 (*Accident Prevention*, 11/02).<sup>1</sup> The Gulfstream was observed descending from a snow shower at low altitude and making a steep turn toward the runway before it struck sloping terrain about 2,400 ft (732 m) from the runway. The pilots, flight attendant and all 15 passengers were killed.

Among CRM deficiencies identified by NTSB in this accident were the pilot’s

inadequate approach briefing, the absence of required callouts during the approach, the pilot’s exclusion of the copilot in decision making and the copilot’s failure to “question or challenge the [pilot] or intervene when he placed the airplane in a potentially unsafe flying condition.” The latter refers to the pilot’s reduction of power below the minimum recommended setting and deployment of speed brakes, likely in an effort to “get below the snow showers and visually acquire the runway.”

NTSB reiterated the recommendation in November 2003, following its investigation of the Oct. 25, 2002, crash of a Raytheon Beechcraft King Air A100 in Eveleth, Minnesota. The report said that the pilots’ course deviation indicators (CDIs) likely were fully deflected when the airplane neared the MDA during a VOR approach and airspeed had dropped to 76 kt — 54 kt below the recommended approach speed — when the King Air stalled and crashed about 2 nm (4 km) from the runway, killing the pilots and all six passengers (*Accident Prevention*, 10/04).<sup>2</sup>

The report said that, contrary to CRM principles, “the evidence clearly indicates that neither flight crewmember was monitoring the airspeed indicator or CDI during the approach.”

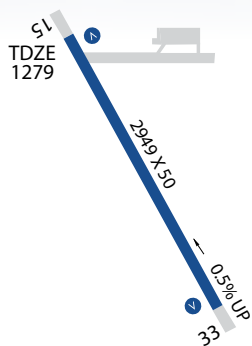
Responding to the recommendation in April 2004, the FAA told NTSB that an Aviation Rulemaking Committee was examining CRM training in the context of a thorough revision of Part 135 and that proposed rule making was expected in 2005.

In May 2006, NTSB again reiterated the recommendation following its investigation of the Nov. 28, 2004, crash of a Canadair Challenger on takeoff from Montrose, Colorado. Light snow was falling, but the crew used dry-runway performance data to plan the takeoff and did not ensure that the wings were clean (*ASW*, 8/06, p. 58).<sup>3</sup> The pilot, flight attendant and a passenger were killed, and the copilot and two passengers were seriously injured when the Challenger stalled and crashed about 636 ft (194 m) from the runway.

**Air taxi pilots targeted for crew resource management training.**

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### A Runway Too Short

The most recent reiteration of the recommendation occurred on May 1, 2008, following the investigation of an accident that occurred in Cresco, Iowa, when the flight crew of a Cessna Citation 560 (Encore) attempted to escape severe weather by conducting a precautionary landing at an airport they had spotted.<sup>4</sup> The pilots did not use on-board resources, such as their charts and the flight management system (FMS) database, to obtain information on the airport and, thus, were not aware — until the last moment — that the runway was only 2,949 ft (899 m) long. The pilots were killed and the two passengers were seriously injured when the airplane overran the wet runway.

The accident occurred on July 19, 2006, during the fifth leg of a planned nine-leg trip. The Citation was managed by a Part 135 operator based in Jackson, Mississippi, but was being used by the owner that day for personal flights under the general operating and flight rules of Part 91. The operator employed six pilots and had three jets and one twin-turboprop airplane on its air carrier certificate. Noting that the operator did not have, and was not required to have, an approved CRM training program, the report said that such training would have benefitted flights conducted under Part 91 as well as Part 135.

The cockpit burst on impact with a tree after the Citation overran the short runway at Cresco, Iowa. The accident report blamed ‘poor CRM.’

U.S. National Transportation Safety Board



Both pilots were rated as captains in the Citation. The pilot flying the accident leg of the trip had 13,312 flight hours, including 833 hours in Citation 560s. He was the operator’s chief pilot. The copilot had 11,607 flight hours, including 557 hours in type.

The pilots began the trip with a departure from Jackson at 0600 local time. They flew to Gulfport, Mississippi; Destin, Florida; Meridian, Mississippi; and then to Oxford, Mississippi. The Citation departed with two passengers from Oxford at about 0920; the destination was Rochester (Minnesota) International Airport.

### Severe Weather

The pilots did not specify an alternate airport on their instrument flight rules (IFR) flight plan. Although visual meteorological conditions were forecast for Rochester, the area forecast called for strong to possibly severe thunderstorms in the Great Lakes region.

As the pilots began their descent over central Iowa, ground radar depicted intense to extreme echoes in the area. “The echo tops ... were depicted to 56,000 ft, with cells moving southeastward from 19 to 32 kt,” the report said. “The regional radar mosaic ... depicted two areas of organized echoes, one over northeastern Iowa and the second over southeastern Minnesota. Both systems merged in the general vicinity of the accident site and appeared as a bowing line with an intense leading edge.”

At 1045, the copilot told Minneapolis Center that they were deviating east of course. “We’re just going to keep heading this direction ... until we get north of Rochester and then turn around and take a look at it,” he said.

At 1051, the controller told the crew, “It’s a heck of a bow hook we got going on there. ... You’d have to go about a hundred miles or more north to get around the very northern edge of it. If you go around the south side, it’s about eighty miles to get around.”

Cockpit voice recorder (CVR) data indicated that the pilots discussed the weather and decided to “pick [their] way through it,” the report said.

“Given the overwhelming evidence of severe weather conditions around Rochester, the flight crew exhibited poor aeronautical decision making by attempting to continue the preplanned descent to Rochester and by not diverting to a suitable airport.”

### ‘I’m Guessing’

The Citation was descending through 14,700 ft when the copilot established radio communication with Rochester Approach. Noting that the surface winds were from 340 degrees at 6 kt, gusting to 24 kt, and favoring the instrument landing system approach to Runway 31, the controller said, “But right now ... we’re showing weather echoes along that final approach course. Say your intentions.”

The copilot told the controller that they would continue flying their present heading for 20 nm (37 km) and then “take a look at it on the radar.” The crew then learned that visibility at the airport had decreased to 1/2 mi (800 m) and the gusts had increased to 37 kt in thunderstorms and heavy rain.

A few minutes later, the pilot told the copilot that he had an airport in sight. The copilot asked, “How long does the runway look?” The pilot replied, “I’m guessing 5,000 ft at least.”

The copilot asked the approach controller about “the airport below us to the left,” and the controller said that it was “Cresco, Iowa.” (Cresco is about 43 nm [80 km] south-southeast of Rochester.)

The pilot said, “I guess, worst-case scenario, we could set here until it clears. ... What do you think?”

The copilot said, “Cresco? Yeah, I mean I’m OK with that.”

The pilot said, “Let’s do that.”

The copilot told the controller that they were going to land at Cresco and

had the airport in sight. The controller cleared the crew to conduct a visual approach to the airport.

### ‘Get Me Some Numbers’

The pilot asked the copilot to “get me some numbers ... the landing numbers would be OK,” and then said, “I’m going to have to put us down here. Hang on.” A passenger told investigators the descent was so steep that he could see the runway through the windshield.

The copilot looked for information on the airport in a commercial airport guide. However, the Cresco airport — Ellen Church Field — was not listed in the guide because its runway is less than 3,000 ft long. “CVR evidence indicates that the flight crew did not use their on-board resources to get critical information about [the airport], including runway direction and length,” the report said. “Further, the flight crew did not use on-airport resources, such as the wind indicator located on the left side of Runway 33.” The indicator showed southerly surface winds.

The approach controller provided the common traffic advisory frequency (CTAF) to the crew before they canceled their IFR flight plan. The copilot announced on the CTAF that they were “turning final, landing to the, ah, north.”

“The flight crew visually recognized during the final approach that the runway was shorter than the at least 5,000 ft they originally believed it to be [but] continued the descent and landing,” the report said.

According to Cessna Aircraft, the required landing distance on a wet runway with a 10-kt (19-km) tailwind was 5,200 ft. The report noted that Cessna does not recommend landing a Citation

on a wet runway with any tailwind component.

Soon before the airplane overran the runway, the copilot called for a go-around and the pilot called for full power. The Citation crossed a road and came to a stop when it struck a tree in a cornfield about 1,700 ft (518 m) from the end of the runway.

NTSB said that the probable causes of the accident were “the flight crew’s inadequate aeronautical decision making and poor CRM.” The board said that a contributing factor was inadequate CRM training for on-demand Part 135 pilots.

### Action This Year?

The FAA originally intended to address CRM training in an omnibus rule-making proposal including all the recommendations generated by the Aviation Rulemaking Committee’s review of Part 135 (*ASW*, 5/08, p. 30). The committee completed its work in 2005, with 167 recommendations for revisions. The FAA decided to group the recommendations into common topics for separate rule-making action.

The agency recently told NTSB that it has “initiated a rule-making project to require all Part 135 certificate holders, both single-pilot and dual-pilot operations, to implement FAA-approved CRM training for crewmembers and flight followers.” The FAA said that it intends to publish proposed revisions for public comment by the end of 2008. ➔

### Notes

1. NTSB report no. DCA01MA034.
2. NTSB report no. NTSB/AAR-03/03.
3. NTSB report no. NTSB/AAB-06/03.
4. NTSB report no. CHI06FA193.