The "Look-See" Crash

Flying an approach to take a look requires the utmost in mental awareness and discipline.

By Wally Roberts

TWO PILOTS IN A PIPER PA32-300 (Cherokee Six, N888JK) crashed during a "look-see" instrument approach while commuting to work in the Los Angeles Basin from their outlying mountain area home. Also killed was a woman who was asleep in the bedroom of her second floor apartment into which N8JK crashed.

The pilots were attempting a nonprecision localizer approach to Fullerton Municipal Airport (FUL), CA in the early morning before the part-time control tower was open. There was no weather report available for the airport, but weather from nearby airports strongly suggested that Fullerton was well below minimums.

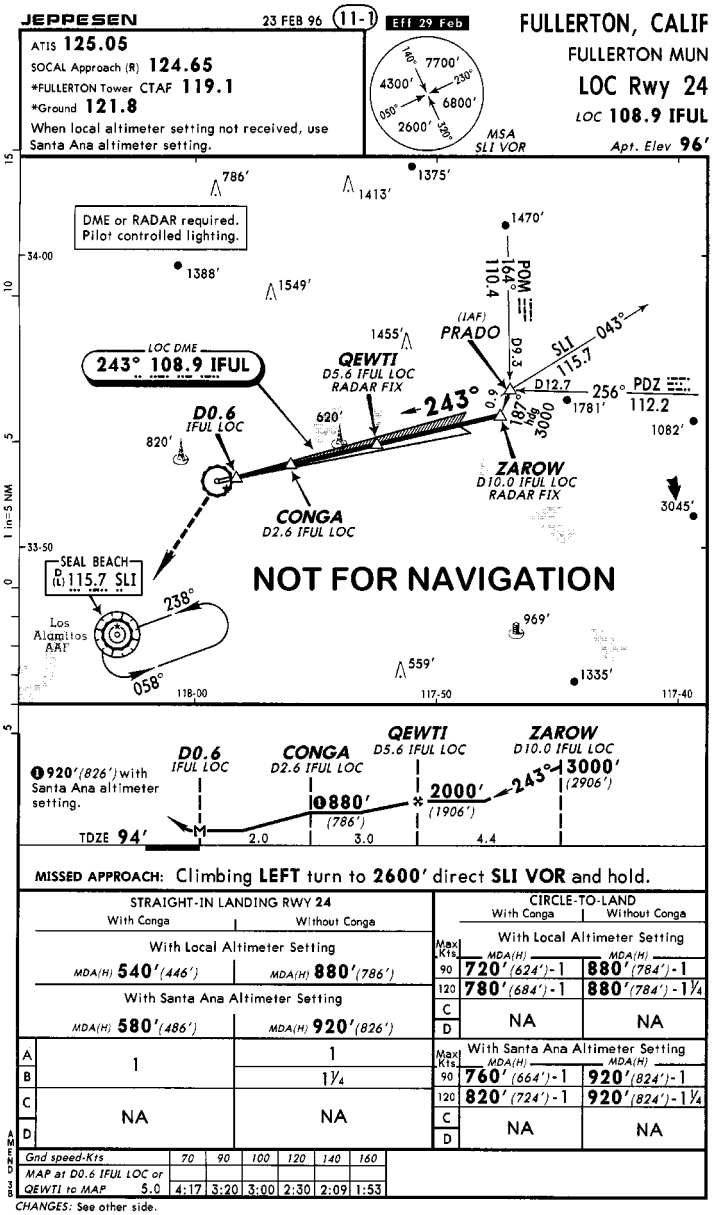
These not-for-hire pilots were within their legal rights to start an approach with either no weather report, or weather reported below minimums, but they were legally and morally bound to carefully exercise the privilege and limitations of the general aviation look-see option.

Pop-up commuters

The left-seat pilot was a private pilot who was a co-owner of the aircraft. He had been working on his instrument rating with the right-seat pilot, who was a CFII. Both pilots lived in the mountain area town of Big Bear, CA, about 60 miles northeast of FUL and both of them commuted to work in the Fullerton area. On the morning of the flight, the pilot-owner told his wife he would drive to work that morning because of the weather. The pilot and CFII had occasionally flown to work together in the past.

The CFII was a paraplegic who held an FAA Statement of Demonstrated Ability. He was required to have special controls adapted to the rudder pedals to maintain full control of the airplane. N8JK was not so equipped. Thus, neither pilot was certified to conduct IFR operations under the circumstances of equipment and pilot conditions that existed for the ill-fated flight. According to the CFII's work supervisor, he was due at work at 0700.

N8JK first appeared as a VFR flight-following pop-up as soon as it cleared the mountains and entered the Los Angeles Basin, 40 miles northeast of Fullerton. En route, N8JK requested an instrument approach into FUL. The aircraft descended VFR to 3,000 feet and was cleared for the Localizer Runway



REPRODUCED WITH PERMISSION © JEPPESEN SANDERSON, INC., 1996. ALL RIGHTS RESERVED

N8JK wasn't DME-equipped. Therefore, the pilots were bound to the higher minimums. Using the Santa Ana altimeter, their MDA should have been 920 feet. The tops of the fog (700-800 feet) were actually below the MDA.

24 approach when it was 12 miles northeast of FUL (see chart page 10).

No reported weather

There was no reported weather at the time because FUL was a manual weather reporting station, which relied upon the observation of ATC control tower personnel. The crash occurred at 0634 PST. The tower was scheduled to open at 0700. ATC tower personnel made a weather observation at 0655, 21 minutes after the crash: Indefinite ceiling 100 feet, 1/4-mile surface visibility in fog, temperature and dewpoint 54° F, wind calm, altimeter 30.07.

Based on an analysis of the existing weather conditions and pilot reports from both John Wayne and Los Angeles airports, the likely tops of the low stratus clouds/fog in the Fullerton area were between 700 and 800 feet msl. This means N8JK most likely entered the tops of the clouds *below* the non-DME MDA.[1]

Prior to issuing the approach clearance, the SoCal Approach controller working N8JK advised the flight there was no Fullerton weather available and "at John Wayne (Santa Ana) and Long Beach it's pretty bad. Long Beach is worse than Orange County." SoCal provided N8JK with the Santa Ana altimeter (30.08), which N8JK read back. Just prior to receiving the approach clearance, the pilot advised that if they missed the approach they would go to John Wayne. Prior to reaching Qewti (the FAF), N8JK requested that SoCal Approach "call Qewti for us," which is a requirement for this IAP without DME equipment. SoCal made the requested radar call.

Before crashing into the second story bedroom, N8JK first impacted utility poles and wires at about 140 feet msl, at about 1 nm prior to the landing runway threshold and about 300-400 feet right of the localizer centerline. The first point of impact was approximately 400 feet below the lowest straight-in MDA of 540 feet msl (446 feet HAT). In any case, N8JK's authorized MDA was 920 feet msl (826 feet HAT).

Complex and steep approach

The FUL Localizer Runway 24 approach is a demanding non-precision IAP. The descent gradient from the FAF to touchdown is 381 ft/nm, which is close to the TERPs maximum of 400 ft/nm. There is the added complexity of the application of remote altimeter setting criteria, which apply when the tower is closed. The descent gradient after the Conga step-down fix exceeds TERPs criteria when the remote altimeter setting additive is applied. [(920-94)/2.0 = 413 ft/nm]. (See "Steep Descent Gradient" following this article.)

Note that the altitude before crossing Conga is also the MDA for aircraft without DME. This non-DME MDA is 786 feet HAT when using the local altimeter setting. When the actual flight visibility is at the minimum of 1 sm for Approach Category A, a pilot would be required to maintain the MDA until 1 sm on final approach, because there are no approach lights to reach out and trigger FAR 91.175(c)(3) prior to having one of the runway visual cues in sight.[2] This translates to a visual segment descent angle of almost 8.5 degrees, a significant point often overlooked by pilots and which only comes into play when the weather is at its worst. With the remote altimeter setting, the non-DME descent angle with 1 sm flight visibility is almost 9.0 degrees.

This brings up an inherent limitation of the geometry of Approach Categories A and B HAT vs. visibility minimums permitted by TERPs criteria. TERPs Table 6 permits the HAT of the MDA to be as high as 880 feet for Category A (740 feet for Category B) with the standard visibility minimum of 1 sm. When the flight visibility is indeed only 1 sm, and there are no approach lights, it may be impossible to land straight-in. On the one hand, the pilot must not depart MDA until seeing one or more of the FAR-required runway-specific visual cues. On the other hand, the "normal rate of descent" requirements can preclude landing straight-in, especially on a 3,000-foot runway, such as at Fullerton. These are significant issues that should have been in the

(continued on next page)

Prior to issuing the approach clearance, the SoCal Approach controller working N8JK advised the flight there was no Fullerton weather available and "at John Wayne (Santa Ana) and Long Beach it's pretty bad. Long Beach is worse than Orange County."

[1]According to the aircraft equipment list, the DME had been removed three years prior to the accident, and a VFR-only Magellan SkyNav 5000 GPS had been installed in its place. The lack of DME required an MDA of not less than 920 feet (826 feet HAT) for this IAP.

[2]FAR 91.175(c)(3) sets forth nine different runway-specific visual cues, one or more of which the pilot must see prior to descending below MDA, except when installed and operating approach lights are sighted. The approach light exception permits descent to 100 feet above runway elevation, based on sighting of only the approach lights. Prior to descending below MDA the pilot must find the flight visibility to meet, or exceed, the prescribed visibility minimum set forth on the approach chart. This flight visibility requirement applies continuously from start of descent below MDA to touchdown. In addition to the required visual references and flight visibility requirements, the aircraft must not continue descent below MDA unless "the aircraft is continuously in a position from which a landing on the intended runway can be made at a normal rate of descent using normal maneuvers..." (Stand-alone RAILs, such as those for Runway 24 at FUL, aren't considered to be an approach light system. Nor are they one of the other nine FAR 91.175(c)(3) authorized visual cues for purposes of descending below the MDA.)

The "Look-See". . .

(continued from page 11)

minds of the pilots of N8JK.

No approach chart onboard?

In spite of a rather intense post-crash fire, the NTSB recovered a hand-written note from the wreckage that briefly, and incorrectly, described the approach. Handwritten on notepad paper was the first transponder code assigned to the flight when it became a VFR pop-up, "0232," another line had written: "Qewti - 880," and the last handwritten line: "2.3 CONGA - 580." We can only assume whichever pilot wrote this meant the applicable altitude applied after the related fix.

Presumably, the "2.3" with reference to Conga was an error in writing the DME distance of 2.6. Because there was no DME onboard, it becomes somewhat problematic. The altitudes shown were valid only with the local altimeter setting, and the altitude after Conga was valid only with DME.

Was this piece of notepaper the only approach "chart" onboard N8JK? Because of the post-crash fire, that wasn't possible to determine.

ATC radar plot

SoCal Approach Control reviewed recorded radar data of N8JK's approach. At 14 DME northeast of FUL, the data showed the aircraft at 2,900 feet when the pilot reported level at 3,000 feet. Zarow was crossed at 2,700 feet, Qewti at 1,700 feet, and Conga at 500 feet. Radar contact was lost shortly after N8JK crossed Conga.

Lack of altitude discipline

The altimeter was recovered from the wreckage. The indicated altitude was 51,340 feet, and the barometric pressure window indicated 30.06. Tests conducted on the altimeter at an instrument shop revealed the altimeter sustained both fire and impact damage. The instrument technician stated the impact damage most likely caused the extreme high altitude indication. The required transponder and altimeter inspections and tests were performed on N8JK in March, 1995.

It's reasonable to hypothesize that the altimeter was set correctly and that the indicated altitude and true altitude were about the same, given the recency of the required inspections and tests, and that the atmosphere that day was fairly close to an "international standard atmosphere."

This leads to the inference that altitude awareness was sloppy crossing the IAF and FAF, and became virtually non-existent inside the FAF. Not only was there apparently no sense of the non-DME, remote altimeter MDA of 920, there was no awareness of the lowest MDA under any circumstances of 540 feet msl (446 feet HAT). It appears a cavalier or thoughtless election was made to descend to the airport elevation, without regard to the MDA, once past the FAF.

At 14 DME northeast of FUL, the data showed the aircraft at 2,900 feet when the pilot reported level at 3,000 feet. Zarow was crossed at 2,700 feet, Qewti at 1,700 feet, and Conga at 500 feet.

Were these pilots hell-bent on suicide, or were they simply doing what is all-too-common in the undisciplined cockpit? Based on my years of observing the instrument flying game, my money comes down squarely on the latter. There is nothing to indicate psychological stress or atmospheric conditions that would have made the aircraft difficult to control. There was the stress, however, of getting to work on time.

I'll offer some additional personal insight: the pilot-owner was a neophyte at instrument flying. He had made some disorganized attempts at something that passed on paper as instrument training. His CFII likely had a very fragile foundation in the "tough stuff" required for low-visibility, non-precision instrument approach operations.

Like too many pilots who take a casual approach to instrument flying, the CFII likely had few actual instrument approaches under his belt, and most—if not all of them—had broken into the clear well above MDA, well before the altitude where strict altitude awareness and discipline were required. It's like floating down on the proverbial "wing and a prayer" and having had a fairly high ceiling make "the save" more than once previously.

The local weather conditions at Fullerton Airport, when clouds are present, are most often California coastal stratus, which is typically 500 feet or more above the ground. Ground fog conditions, like those at the time of the accident occur far less frequently than "good ceiling" stratus conditions.

"On-top at the FAF" approach

How many instrument training syllabuses include training and practice in instrument approach procedures, particularly non-precision IAPs, where the aircraft is still in "severe" VFR passing the FAF, with the cloud tops over 1,000 feet below the FAF crossing altitude? Far too few, I suspect. For the neophyte, whether an instrument student or an inexperienced CFII, the topsy-turvy environment presented by such weather conditions is a real setup for disaster.

Let's forget the lack of DME equipment in this case. Suppose they had DME or were prepared to cheat with a decent GPS fix for Conga. Let's even forget the remote altimeter penalty and concentrate on the lowest possible minimums: 540 feet. N8JK's first impact was with utility wires and poles almost 400 feet below that MDA. Further, based on the location of the crash site, the localizer needle was between 1/2- and 3/4-scale deflected to the left just prior to impact, which is further evidence of a real sloppy operation, especially in the no-wind conditions that existed.

The investigation revealed the flight controls and engine were performing normally, although the handicapped CFII didn't have legal and necessary access to the rudder pedals. Nonethe-

less, the CFII was fully capable of controlling altitude and attitude. In the case of "attitude," the CFII was responsible for that aspect of the airplane's control, as well as his and the other pilot's mindsets.

This discipline demands that the pilot place his expectations of what the actual weather conditions might be "on hold," and instead plan and expect that a missed approach will be the likely outcome upon reaching the MDA.

The thin barometric line

Most non-precision IAPs have only 250 feet of vertical obstacle clearance over the controlling obstacle in the final approach segment. This could be a tower near the edge of the protected trapezoid, or it could be a solid ridgeline that extends across the final approach centerline. In any case, it's a thin barometric floor that is a *minimum* value. When you can't see, there's no room for error. The regulations that restrict us to MDA until seeing the legal visual cues aren't some arbitrary FAA nonsense. They've been written and revised over the years, mostly in blood.

Look-see privilege

Not only were the two hapless pilots of N8JK faced with the highly demanding, potentially disorienting "on-top at the FAF" non-precision IAP, they were taking it on without a weather report. This threw another unknown at them, which further reinforced the need for MDA discipline. This discipline demands that the pilot place his expectations of what the actual weather conditions might be "on hold," and instead plan and expect a missed approach upon reaching the MDA.

General aviation interests have worked hard at retaining "look-see" IAP privileges for non-commercial operations. The pilots of N8JK violated that trust and in the process snuffed out the life of an innocent victim asleep in her bed.

Wally Roberts is a retired airline captain, former chairman of the ALPA TERPs Committee, and an active CFII in San Clemente, CA. His e-mail: terps@terps.com Wally's web site: http://www.terps.com/terps/

Steep Descent Gradient

IFR Refresher reported its concerns to the FAA about the excessively steep descent gradient at Conga when using the Santa Ana remote altimeter setting. On July 19, 1996, the FAA issued the following FDC NOTAM in response to our findings: !FDC 6/5040 FUL FI/T FULLERTON MUNI, FULLERTON, CA. LOC RWY 24, AMDT 3B. ADD NOTES: WHEN SANTA ANA ALSTG USED, INCREASE ALT AT CONGA/I-FUL 2.6 DME 40 FT. WHEN SANTA ANA ALSTG USED, S-24 AND LOC/DME MINIMA S-24 NA.