FLYING LESSONS for June 21, 2012

suggested by this week's aircraft mishap reports

FLYING LESSONS uses the past week's mishap reports to consider what *might* have contributed to accidents, so you can make better decisions if you face similar circumstances. In almost all cases design characteristics of a specific make and model airplane have little direct bearing on the possible causes of aircraft accidents, so apply these *FLYING LESSONS* to any airplane you fly. Verify all technical information before applying it to your aircraft or operation, with manufacturers' data and recommendations taking precedence. You are pilot in command, and are ultimately responsible for the decisions you make.

If you wish to receive the free, expanded *FLYING LESSONS* report each week, email "subscribe" to mastery.flight.training@cox.net.

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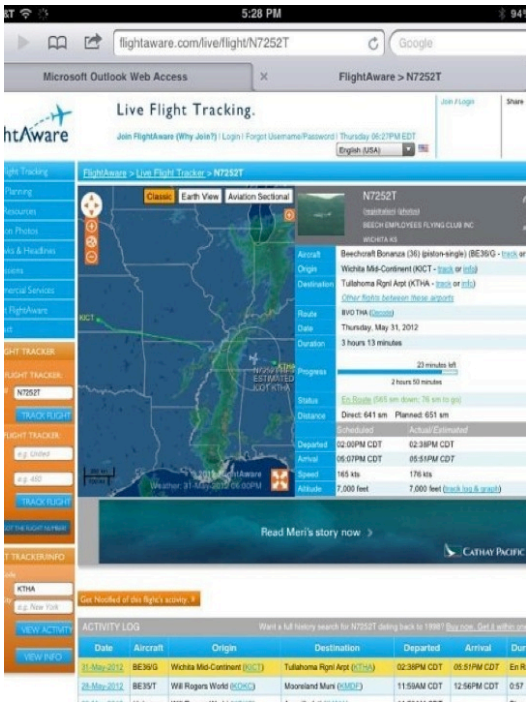
This week's lessons:

The pilot of a turbocharged airplane was cruising westbound at 20,000 feet toward a line of severe thunderstorms. At 1625 local time, the Center controller advised the pilot of extreme precipitation at the airplane's 12 o'clock position and 85 miles away, extending north and south. The pilot acknowledged the information and added that he was looking at it (presumably on a datalink weather display), and evaluating whether there was any way to get through the line.

At 1626, the controller advised the pilot that there was a break in the extreme precipitation, but still moderate to heavy precipitation on a heading of 330 degrees at 115 miles. The pilot stated that he saw that on datalink as well, and thought it would be the best location to fly through the line of precipitation.

The pilot subsequently received permission to deviate to that location. At 1633, the controller asked the pilot if he had weather radar onboard, and the pilot replied that he had "NEXRAD Composite." At 1636, the pilot requested a lower altitude to remain below the freezing level, and he ultimately descended to 12,000 feet. At 1653, the pilot advised the controller that a cell had "filled in," but there was still a gap about 10 miles north, which he planned to fly through. The controller acknowledged the pilot's intentions. No further communication was received from the accident airplane and radar contact was lost at 1656:27…29 minutes after the first ATC warning about the radar returns. The airplane broke up in flight after control was lost.



I was attempting a flight from Wichita, Kansas to Tullahoma, Tennessee (KTHA) that same afternoon. At almost exactly the same time as the fatal mishap I diverted to Walnut Ridge, Arkansas (KARG) because I was approaching a nearly solid line of heavy precipitation and thunderstorms extending from the Great Lakes down the Mississippi River valley to the Gulf of Mexico. The line was extremely slow-moving, and my passenger and I ended up staying the night at Walnut Ridge. We nearly caught up with the storms at Tullahoma the next morning.

(left) Flightaware.com plot of my flight at the time of the other aircraft's in-flight breakup. After we diverted the FlightAware plot went into coast mode. We did not continue through the lines of heavy precipitation and storms—which displayed as much worse on my in-cockpit weather, and afterward on my iPad display.

The accident pilot saw "moderate to heavy precipitation" as his best option to get through the line of storms. But it was better only by comparison to the better weather around it. Would the pilot have attempted to fly through such

weather otherwise, or would he give pause and divert? In other words, did the pilot judge the weather on its own merits, or did he feel like he *had* to charge through the line, and chose the *least-impenetrable* part instead of an area that would provide safe passage?

How current was the imagery in the uplink on which he ultimately bet his life, unsuccessfully? Radar data uplink is updated and transmitted every five minutes by XM providers (by far the most common provider of weather uplinks). The data itself, however, is up to six minutes old if the linked surface NEXRAD is in precipitation mode, and as much as 10 minutes out of date if the linked radar is in "clear air mode." A date stamp on the in-cockpit display identifies when the displayed information was sent, but this is only *after* the delay from linked radar systems. According to the NTSB, the total delay from radar observation to update in the cockpit may be as much as 20 minutes—the entire life cycle of an air mass thunderstorm in some cases, and the time from storm cell formation to reaching the mature stage in most. Since thunderstorms can build, move and dissipate rapidly, what you see on the screen may not precisely describe the very real threat out your window.

See www.faa.gov/documentLibrary/media/Advisory_Circular/AC%2000-6A%20Chap%2010-12.pdf

Just yesterday (June 20th), the U.S. National Transportation Safety Board (NTSB) released a Safety Advisory on in-cockpit NEXRAD weather displays, noting the critical need to consider the "date stamp" when using weather uplinks to make safety decisions in flight. As noted in the Advisory, "the in-cockpit NEXRAD display depicts where the weather **WAS**, not where it **IS**. Read the Safety Advisory before using in-cockpit NEXRAD displays to make safety-of-flight decisions.

See www.ntsb.gov/doclib/safetyalerts/SA_017.pdf

This is why most weather experts call even weather uplink information "strategic" information (i.e., used to avoid areas of adverse weather) instead of "tactical" data (used for picking your way between cells).

Yet pilots seem to be taking more risks with weather uplinks that they do without—reinforced by recent, independent NTSB and AOPA studies indicating an increased en route weather accident rate in glass-cockpit airplanes, which typically have weather datalinks. Dr. William Knecht, senior weather researcher with the Federal Aviation Administration, tells us: "Most of the time the pilot gets through and is rewarded" for taking the risk. "It's just every once and a while that he gets killed." John King of King Schools warns us that pilot psychology routinely prevents us from realizing any safety benefit from the addition of enhancements to our aircraft. Instead, John observes, pilots tend to use additional capabilities to try to increase airplane utility—and in doing so, inadvertently expose themselves (and their passengers) to *increased* risk.

A *LESSON* I learned over many years of studying accident reports and causality is to expect the need to change plans, and give myself time accordingly. I didn't need to be in Tullahoma until noon the next day. Instead of pushing it on Friday morning, I chose to start on Thursday. I even told my passenger before we left Wichita that we'd probably have to land in Walnut Ridge and re-evaluate the weather with increased resources available on the ground. That's what we did—leaving ourselves time to rent a car and drive the rest of the way if needed and still be on site in time.

There's no such thing as an all-weather aircraft. If you routinely fly cross-country you will routinely need to make decisions about diversions and delays. To make better go/no-go decisions, use advanced avionics and airplane capability to help you *avoid* the hazards…not try to fly through them.

See www.kingschools.com

Questions? Comments? Let us know, at mastery.flight.training@cox.net

"Some people do something wrong for years and call it experience."

-- Norm Komich, on Robert M. Jenny's Cockpit Concepts at www.aviation.org.

"We try to teach pilots how to identify risk and how to quantify it, but not what to do about it."

-- Aviation safety consultant Robert Wright, at the NTSB General Aviation Safety Forum: Climbing to the Next Level," June 19, 2012

"The technology is outpacing the [pilot's] understanding" of in-cockpit weather.

-- Bob Dreisewerd, Baron Services (which provides the weather data used by XM datalink and other services), at the NTSB General Aviation Safety Forum: Climbing to the Next Level," June 20, 2012

"If a pilot sees a hole [on in-cockpit radar depictions] he tends to go through. Higher resolution is not always a good thing."

-- Dr. William Knecht, FAA weather human factors researcher, at the NTSB General Aviation Safety Forum: Climbing to the Next Level," June 20, 2012

"[General aviation] pilots are the chief pilot of an airline of one."

-- Deborah A.P. Hersman, Chairman, National Transportation Safety Board, in her opening comments to the NTSB General Aviation Safety Forum: Climbing to the Next Level," June 19, 2012

See www.ntsb.gov/news/events/2012/GA_safety/index.html

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Thomas P. Turner, M.S. Aviation Safety, MCFI
2010 National FAA Safety Team Representative of the Year
2008 FAA Central Region CFI of the Year