

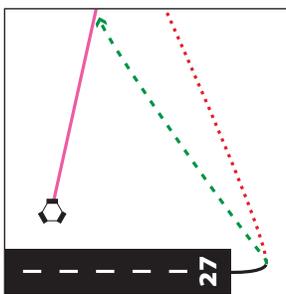


➤ THE MAGAZINE FOR THE ACCOMPLISHED PILOT



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IMC and engine out. One pilot shares what went right, and what could have gone better



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CHOICES UNDER PRESSURE

We may dream of testing our mettle with a real IMC emergency. But do we have the guts to put our choices under the hard scrutiny of afterthought? This pilot does.

We laud the pilots and instructors who practice the art of IFR in actual conditions. Nothing ratchets up the stakes for doing it right more than filling the sky with clouds to obscure the rocks, towers and trees.

Nothing, that is, except a full-blown emergency while in that same IMC.

Yet that's exactly what happened to Robert Schapiro, an *IFR* reader who was generous enough to share his story and the data he obtained through a Freedom of Information Act request, as an educational tool. In my talks with Schapiro, examination of the data, and review of the ATC tapes, one thing that jumps out is how influential communication with ATC was in shaping the outcome of this event—in both positive and negative ways.

The day ended with a dead engine but a live pilot and an otherwise undamaged airplane, so it's hard to say that the sequence of choices was a bad one. It's also

outright impossible to state things would have gone better if different choices were made. But it's worth putting those forks in the road of choice under the lens. New technology, a practiced technique, or just a better understanding that not all suggestions are good ones, might change how each of us chooses our fate someday when we're in the hot seat.

A Busy Day

Schapiro is an experienced helicopter instructor but is working through his fixed-wing ratings. Earlier that day he had been practicing 180-degree power-off landings toward his Commercial certificate in airplanes. The weather was low IMC back at his home, so he planned to tack some approaches onto the second flight of the day. But it was Friday afternoon, and the emails and texts to friends turned up no takers. He launched solo.

"About the time I took off, the weather was improving," he told me. "I

was worried the flight was going to be a wash." Without a safety pilot, he needed real IMC, so he angled west to where the ceilings were still 900-1100 feet overcast and visibilities were 3-4 miles in mist.

His fourth approach of the day had been at Gaithersburg, Md., and he was cruising northbound for one last approach at Frederick, Md. (Five approaches in actual after a Commercial flight lesson earlier that day? This guy is no flight sissy.)

Right after the first vector to set up for the RNAV Runway 5, the aircraft started shaking horribly. It would turn out that two pushrods had bent and snapped. Not only did this make the engine run smoothly as a washing machine loaded with cinderblocks, it also meant the oil was being rapidly transferred from the sump to the atmosphere, although he wouldn't find that out for another 10 minutes. Full power was yielding less than 90 knots and a 100-FPM descent.

What Now?

Schapiro declared an emergency and asked for vectors to final. This was a logical move considering Frederick was only about four miles northwest and he was setting up for that already. The problem was that the straight-in from his position would be to Runway 30. But there's no

THE PLAY-BY-PLAY AS SEEN FROM FROM ATC'S SEAT

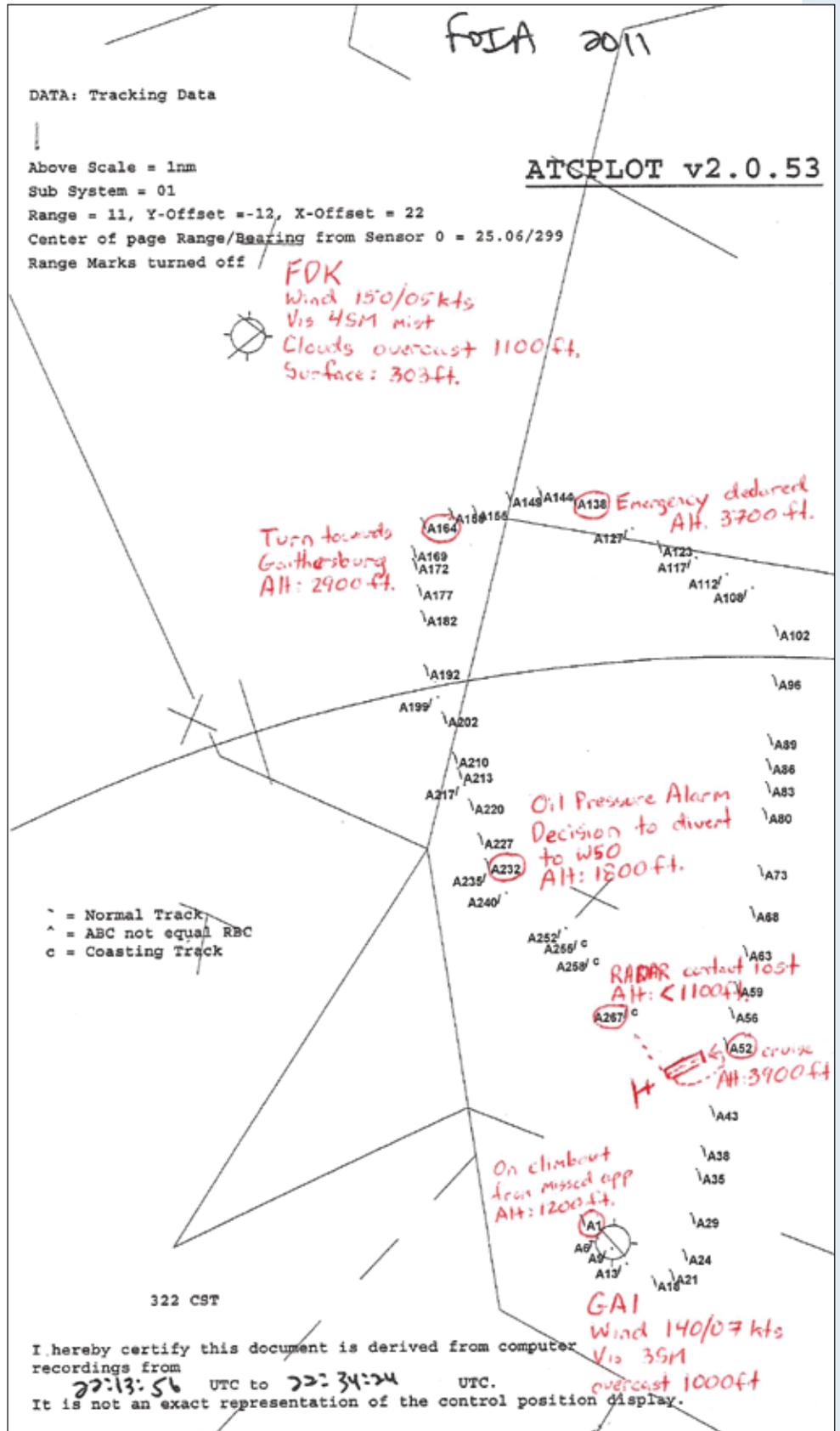
Here's what it looked like from the controller's point of view (annotations in red by the pilot). It starts at the lower right climbing out from Gaithersburg, Md., (GAI) and a climb generally northbound with the intention of flying an approach to Runway 5 at Frederick, Md., (FDK).

The Cessna leveled at 3900 feet—almost over Davis airport (W50, drawn in by hand) where it would land at about 15 minutes later—and proceeded northbound, until vectored northwest. After the emergency was declared, the controller vectored the Cessna west to make a tight approach to Runway 5 at Frederick. The aircraft would be straight in for Runway 30, but there's no approach for that runway.

Looking at the relative distances between the aircraft at position A164 and Frederick (three miles) and the aircraft and Gaithersburg (10 miles), it's not immediately clear why the controller would offer Gaithersburg at all.

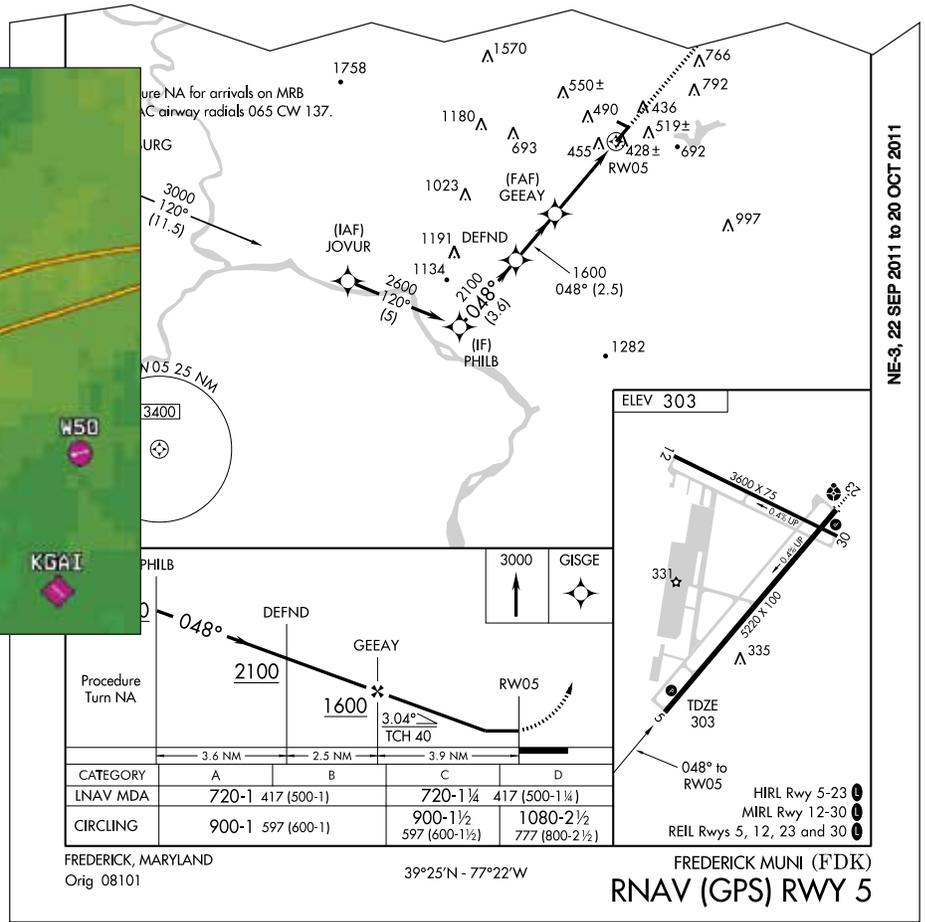
There were likely two factors in play here. One was that the aircraft would have to travel significantly west of Frederick to get established on the Runway 5 approach course. The approach to Runway 14 at Gaithersburg would be almost a straight-in. The total flight distance for the aircraft might have been almost the same—if the aircraft had to fly the Runway 5 approach from outside the final approach fix.

The other factor was that the controller must have thought Frederick was IFR. But as the METARs shown on the chart make clear, the weather at Frederick at the time of the emergency had actually improved and was better than Gaithersburg. It's possible the controller didn't have the update, as it was recorded only 20 minutes prior to the incident.





You can ask ATC to vector you right to the FAF, or even just inside it in an emergency. But you may be able to do even better yourself with a good moving map.



NE-9, 22 SEP 2011 to 20 OCT 2011

approach for Runway 30. If the engine were dead, this wouldn't be a question: Glide for Runway 30 and hope you break out with enough ceiling and visibility to align and land.

With an engine likely to die, but still running, it's not so clear. Should you head straight over the field and spiral down with the hopes of breaking out and landing from something like pattern altitude? The ceilings at Frederick were about 1000 feet. Schapiro told me in an interview that only weeks later he saw the *IFR* article on practicing exactly this spiral maneuver. He said that, in retrospect, that's what he now thinks he should have done. He was flying a G1000

Cessna 172, so he would have a huge moving map to help make this work.

He said that throughout the event, "ATC was giving me vectors, but I couldn't hold a heading to save my life," because of the shaking. "In retrospect, I probably would have been better just aiming for the pink dot on the MFD."

That same moving map could have aided a cut-off approach to Runway 5. Normally, ATC will vector an aircraft at least two miles outside the final approach fix on the final approach course. This meant the Cessna would have to fly miles west of the airport to turn back and fly northeast for the runway. You can always ask a controller for an intercept right at

the FAF (emergency or not). But with the high-accuracy moving map, it might have been possible to self-vector even closer to the field, inside the FAF, watching the slowly dwindling altitude and deciding how close to cut the corner accordingly.

The Power of Suggestion

Watching the aircraft struggle along toward the final approach course at Frederick, the controller handling the emergency put another option on the table: Gaithersburg was VFR and 10 miles southeast. Looking at it after the fact, Gaithersburg was only barely VFR with 1000-foot ceilings and it's possible Frederick had actually improved to VFR, as well, but the controller didn't know.

Schapiro took the suggestion and turned southeast. Looking at the radar track history, this seems a questionable choice. But picture yourself alone and in the clouds with a sick engine (your only engine), the calm voice of ATC and the thought of VFR would be tough to turn down. When I asked him what it was about the suggestion that made it

(continued on page 22)

PODCAST | Ride along to Davis Field

To hear the pilot describe how events played out in his own words, and hear excerpts from the ATC tapes, log onto our sister publication www.avweb.com and click the PODCAST button in the upper-right of the page, or go directly to <http://tinyurl.com/4y4keuz>.



QUIZ ANSWERS *(questions on page 14)*

- 1. c.** This is halfway between the surface pressure of about 1000 mb and the pressureless void of space, and it's often likened to the beltline of the atmosphere. Where the winds flow at 18,000 feet, the major storm systems usually follow.
- 2. b.** This is the best option, but SLD is technically anything over 50 microns. That said, by 100 microns you're more likely to have precipitate as freezing drizzle. By 500 microns it's freezing rain. Stratus droplets are often in the 10-30 micron range.
- 3. True.** Freezing rain events tend to be concentrated close to the surface, so if you're not going to that specific airport—and your destination isn't reporting the freezing rain—you're more likely to pass over it. Freezing drizzle can cover thousands of feet, so it's a factor in a bigger swath of airspace you might fly through.
- 4. e.** Any of those factors might keep the fog at bay. Or in the bay, anyway.

Choices Under Pressure

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seem like the best choice, he said it was “Gaithersburg is reporting VFR” that swayed him.

It was a suggestion with the best intentions, but it did muddy the waters of choice. In my interview with Schapiro, he reflected that it was both disturbing and freeing that he was solo that day. “Had there been a more-experienced instructor on board, I think we would have spent time deciding what was best.” Would this have helped or just gummed up the works? “Ah, I think it would have actually gummed up the works.”

Partway to Gaithersburg, the engine got worse and the descent rate increased from about 100 FPM to over 300 FPM. He told ATC and the controller put another card on the table: Davis airfield was only three miles southeast. Our pilot knew the area and knew that there couldn't have been an instrument approach to Davis. He coolly asked a key question: How long is that runway? The answer was, “2000 feet of asphalt.” He kept on for Gaithersburg figuring the big target was a better bet coming out of the clouds.

Then the oil pressure warning light and alarm sounded. ATC again suggested Davis. Schapiro accepted.

Misunderstandings

Schapiro knew ceilings were about 1000

feet. He wanted some idea when he'd break out, so he asked ATC what the ground level was at his position. The controller answered “903”—or was that “900 and three,” as in a weather report of 900 overcast and three miles? Given that he was already approaching 1500 feet, being 600 AGL made no sense. He asked again.

Schapiro told me that the controller again gave him ceilings, so he gave up. The ATC tapes, however, clearly have the controller saying “943 feet” the second time. So the controller was reporting some terrain or obstacle elevation close to the Cessna's location. I plotted his approximate point on topo maps and saw many patches of earth in the 800-foot range nearby. Even a small tower could reach 943 feet MSL.

Schapiro told me that he never thought to put the terrain information up on his MFD as he approached Davis, and thinks this would have been a good move. Of course, it would have lit up in yellows and reds if he were really that close to the hills.

He got ground contact and then found the airport as it passed below the aircraft. Keeping his speed up for fear of a “moose stall” on the tight turn to final, he touched down fast and ran off the end. The Cessna stopped in the weeds, undamaged but for some scratches and oil accents on the paint. Oh, and a dead engine.

There was one final, ironic, misunderstanding. He called Potomac TRA-

CON via cell phone to say he made it on the ground safely. (The ATC tapes were from the FAA and actually have this conversation, including the controller answering the phone saying, “IFR cancellation received.” Yeah, that's cancelled.) But because he said he was down at an airport, the FAA cancelled the ground response to the scene. The tiny FBO was closed. Davis isn't exactly in the middle of town.

“I'm a volunteer firefighter,” he told me. “So I know how long it takes to answer a call and get in the truck, but I'm thinking, ‘Boy, this is taking forever.’” A call to 911 finally clarified that although he was OK, he'd need some help with the airplane stuck in the woods.

For Next Time

What's the value in a critique when everything turned out so well in the end? Call it the mark of the perfectionist, but even Schapiro volunteers that some choices could have been better struck.

The ability to self-vector to an airport directly, or to a final approach course, could have been better used. “I think I relied too heavily on ATC,” he said. The terrain awareness could have been a great tool for those hills that were potentially poking into the clouds.

Help is a two-headed beast. While it's tempting to take any suggestion from ATC in a bind, a quick query about just *how* VFR Gaithersburg was might have made it much less attractive. It might have prompted the controller to double-check the weather at Frederick and notice it had come up as well. It's also clear that there's room for improvement on asking for exactly what you want, such as the height of the surface below or a tow truck fit for a Cessna.

Acting on any of these improvements will take more than wishful thinking. Some are old habits to beat into new habits—always a tough road. Some require practice, like spiraling down over an airfield using the map or self vectoring inside the FAF.

What about practicing single-engine IFR in actual IMC? “The plane is back in the air and I just flew it for the first time IFR yesterday,” Schapiro told me.

You don't get better if you don't keep working at it. | IFR

Jeff Van West is the editor of IFR.

You Cleared Me to What?

continued from page 11

Many of us would begin a turn to the left while punching in direct to FIRSTFIX in the navigator, and most of the time Center probably wouldn't care. But that's wrong. You were not cleared direct to FIRSTFIX, you were cleared "on course." Your filed and cleared course is ONFIELD to FIRSTFIX, so that's what you should fly.

Some folks may argue the extreme that you should simply make a left-180 and go back to the VOR, but you were given "on course" not "direct ONFIELD, on course." The proper procedure is to turn left and set up a proper 30- to 45-degree intercept of the cleared course between the two fixes.

However, if the controller gives you, "Turn left. Cleared direct FIRSTFIX," then you should, indeed, just punch in and follow the course from your present position direct to FIRSTFIX.

Oldies But Goodies

You almost never hear a cruise clearance any more, but, "Cruise 8000" means you can fly freely at any altitude above the minimum IFR altitude up to 8000. It further authorizes you to descend to your destination and make an approach of your choosing. However, if you report leaving an altitude, you may not return to it without further permission. Think of it as a combination of a block altitude assignment and an unspecified "Cleared approach."

A contact approach requires visual contact with the ground and not less than one mile of in-flight visibility, with an expectation that these conditions will be maintained to the landing. This authorizes you to leave your previously

cleared routing and proceed to the airport and land visually. It's an approach given in IFR but conducted visually. ATC will never offer you a contact approach; it must be requested by you.

Another IFR clearance that requires visual conditions is VFR-On-Top. Again, this is something that the pilot must request. This altitude clearance requires the pilot on an IFR flight to maintain VFR visibility and cloud clearances, follow the cleared routing, and authorizes the pilot to fly on his IFR flight plan at any valid VFR altitude (hemispheric rule) at or above the minimum IFR altitude. ATC may apply other restrictions, such as minimum or maximum altitudes.

Oddly, a VFR-On-Top clearance can be requested while you're still on the ground. Why would you ever do this? VFR-On-Top allows for see-and-avoid spacing with other traffic and can sometimes get you an IFR release when you'd otherwise have to wait. This is probably a good topic for another article.

When In Doubt

I said it up top and it needs to be repeated: Mistakes born of uncertainty have led to countless "uh-oh" moments, more than a few ASRS reports and plenty of violations. There's absolutely no need to add to that number.

If ever you don't understand exactly what the controller is expecting of you, key up your mic and chat it over—in plain language for clarity—and proceed with confidence that you're doing what's expected.

I'm often in that situation and on one occasion I said something to the controller like, "Uh, this may be a dumb question, but do you want me to...?" He promptly gave me a lengthy clarification and ended with, "... and that's OK. Dumb questions are ever so much easier to handle—and safer—than dumb mistakes." Point taken. | IFR

Frank Bowlin usually has his first officers ask the really dumb questions for him. In fact, that's where he gets the best answers.



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