

Radar Service Terminated

Knowing the subtle limitations of ATC IFR radar services is no easy task.

By Wally Roberts

ACCIDENTS SUCH AS THE American Airlines crash in the mountains north of Cali, Colombia, the Air Force crash during a non-radar departure at Jackson Hole, WY, and even the crash of the Air Force T-43 during an NDB approach in Dubrovnik, Croatia, keep reminding us it's not a radar world for IFR operations.

Pilots trained to use the FAA's domestic ATC system are conditioned by the "radar imperative" where most IFR training and day-to-day IFR operations occur. The system, as we know it, could not function at high traffic levels without the controller having radar eyes. ATC radar is a great tool for controllers, and the users of the system generally are the beneficiaries of the vast increase in airspace capacity afforded by ATC radar services.

It's the controller's tool

Let's restructure the preceding sentence somewhat: ATC radar is the controller's tool, of which the pilot is normally the beneficiary. ATC radar is *not* a pilot tool. When things are going smoothly, and you are granted that request for a short-cut vector, it might seem the radar is a pilot tool, but it isn't. In that case you asked the controller to use his/her radar work tool, and your request was granted. Keep that context in mind, and the lessons of this article will be easier to digest.

Fundamental misunderstanding

There was a message posted on a popular electronic aviation forum by a pilot working on his instrument rating. This pilot informed the group that his young CFII had told him IFR flight could not be conducted without ATC radar!

At first glance, this struck me as humorous; this hapless CFII had gotten through the certification mill while

missing a fundamental aspect of the required course. Then, upon reflection, it occurred to me in many busy parts of this country, that wouldn't be an unreasonable inference to draw in the absence of some really good training in the less apparent fundamentals of the system.

I suspect CFIIIs who receive all of their training in Montana don't have this problem. Keep in mind, however, that the production of CFIIIs occurs a lot more in, say, Atlanta than in Missoula.

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"Radar Contact"

The words "radar contact" are referred to by some pilots as the magic phrase. What does it really mean? It means the controller has identified you on his/her radar display, nothing more and nothing less. Further, you normally won't hear the phrase these days unless you had previously been operating either outside radar coverage or the controller was unable to previously identify you on the ATC radar display.

The AIM states controllers will use the phrase "radar contact" upon initial radar identification of an IFR flight. It doesn't always happen that way, however, at busy facilities where radar is the way of life. It's often simply assumed in such cases. Like most assumptions, don't bet any money on it. Keep in mind, instead, the principle that it's the controller's tool, and it doesn't directly concern you during the departure phase of flight unless you are to be radar vectored. If you are to fly a "pilot nav" SID or the airport's IFR departure procedure, your concern is with the proper execution of that *non-radar* procedure.

There's a significant note in the AIM

that should be one of your cardinal principles of IFR flying: "The term Radar Contact, when used by the controller during departure, should not be interpreted as relieving pilots of their responsibility to maintain appropriate terrain and obstruction clearance." When the departure controller *doesn't* state "radar contact" on departure, the preceding note assumes an even more urgent character.

There is language in the AIM in the section about radar vectors: "Pilot [duties with respect to radar vectors]: (1) Promptly complies with headings and altitudes assigned to you by the controller. (2) Questions any assigned heading or altitude believed to be incorrect." Number 2 cannot be emphasized enough.

Question the ambiguous heading

One of the hallmarks of an experienced, competent instrument pilot is the ability to negotiate and modify clearances and instructions from ATC without seeming to be hostile or amateurish, or worse, engaging in one-upmanship. This is part diplomacy and resolve, and part *timing*.

Timing is crucial; both for your's and the controller's sake. It's far better, for instance, to question an ambiguous or unclear departure clearance on the ground instead of getting into a debate with a departure controller just after hand-off from the local controller (tower). A pilot challenge to a heading assignment at an inappropriate time can sometimes result in ATC filing an incident report against the pilot for non-compliance with an ATC instruction.

You can usually sense a vague or ambiguous departure clearance. For instance, a clearance that reads, "Flashback 1234 Charlie is cleared to the Metrofire Airport as filed. Maintain 5,000. Fly runway heading for departure vectors to Wobbly VOR." The departure portion of that clearance is un-

ambiguous. So far, so good. When you get airborne and are handed off to departure control, what if the controller doesn't say "radar contact" or doesn't issue any instructions that clearly connote radar vector services? On initial call to departure you report both your assigned and present altitude as required by the AIM. That *should* invoke a response by the controller if his/her Mode C information doesn't jive with your "passing through" report—admittedly, negative assurance but of some value in context.

After a reasonable interval of time on a departure where you're flying an assigned heading, and it's unclear you're being provided vectors, make an inquiry: "Departure, do you have Flashback 1234 on radar?" If the answer is no, it's time to become aggressively safe. If the answer is "yes," but the situation still seems strange, then it's time to ask, "Is Flashback 1234 being radar vectored?"

In extreme circumstances, where you have high terrain nearby, bring out the big guns by asking, "Are you providing Flashback 1234 with terrain clearance at this time?" Although this series of escalating questions is particularly appropriate and time-critical during a departure, the principles apply to en route and arrival operations as well, whenever you are taken off of non-radar routing by ATC.

Non-radar departure heading

The controller is permitted to assign a departure heading without it being for purposes of a vector, or even for a vector where radar contact won't be established for greater than the typical distance from the departure runway (typical is within one mile of the departure runway). I'm aware of a hot, ongoing debate on this subject between controllers and pilots on a popular aviation electronic forum. It's clear its application isn't clearly understood by anyone, neither controllers nor pilots.

Pilots shouldn't have to be subjected to procedures where even controllers can't agree amongst themselves. Alas, that is the state of the FAA these days.

In addition to what I've stated up to this point, consider the departure environment at the airport. If it has an IFR departure procedure, but no SIDs, that should be a red flag (absent positive assurance to the contrary) the IFR departure procedure is the only safe way out of the airport under night or instrument meteorological conditions (IMC).

Unless you're absolutely certain radar contact is routinely assured within one mile after takeoff, get into a question-asking mode before takeoff. If the airport has one or more SIDs, those are acceptable alternatives to any published IFR departure procedure, because they have been fully evaluated for terrain clearance. Watch out, however, for greater climb gradient requirements on some SIDs vis-à-vis the airport's IFR departure procedure.

Where an airport has standard takeoff minimums and no published IFR departure procedure whatsoever (absence of "T" symbol on NOS approach charts), then diverse departures are okay, from a terrain-clearance standpoint, except perhaps for some mountain, "big valley" airports. (See "Graphic IFR Departure Procedures," February *IFRR*.) At such a diverse-departure airport, a non-radar heading assignment by ATC is okay.

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Subtle on-course clearance trap

Sometimes the initial ATC clearance will clear you "direct" to the first fix on your route clearance without a heading assignment. Keep in mind this means "direct" via the full IFR departure procedure, where the airport has an IFR departure procedure and you can't maintain visual avoidance of terrain or tall towers. Similar departure clearances might state, to the effect, "cleared as

filed, report over Scallop VOR" (the first airway fix). To the unwary, even this type of clearance suggests direct bypassing of the published IFR departure procedure. Don't allow yourself to fall into this trap that bypasses the safety of an IFR departure procedure.

The official word

To this point, I've emphasized the departure phase of flight, because that is where misunderstandings about radar coverage, and the interfacing of pilot and controller obligations is most likely to cause an accident. The same principles apply to all phases of the IFR flight.

The official AIM words about termination of radar service are:

"Radar Service Terminated - Used by ATC to inform a pilot that he will no longer be provided any of the services that could be received while in radar contact. Radar service is automatically terminated, and the pilot is not advised in the following cases:

"a. An aircraft cancels its IFR flight plan, except within Class B airspace, Class C airspace, a TRSA, or where Basic Radar service is provided.

"b. An aircraft conducting an instrument, visual, or contact approach has landed or has been instructed to change to advisory frequency.

"c. An arriving VFR aircraft, receiving radar service to a tower controlled airport within Class B airspace, Class C airspace, a TRSA, or where sequencing service is provided, has landed; or to all other airports, is instructed to change to tower or advisory frequency.

"d. An aircraft completes a radar approach."

Although I agree with everything in the above, it doesn't cover the ambiguities of the real world. Unless you are receiving what is obviously a proactive radar vector, with a definite aura that the controller both sees you and is providing active radar steers, assume that radar services can be virtually nil, even in the absence of "radar service terminated" or "radar contact lost."

Radar services, other than a proper
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Radar Service...

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vector, can vary from considerable controller diligence in watching you track your flight plan, to his complete inattention to your data block on his scope. You have no way of knowing the controller's state of attention or mind. You could be, for example, the only aircraft for miles around in one part of a controller's sector, and he could have a swarm of airplanes in a distant part of the sector occupying his full attention and capabilities. In such case you are, for the time being, effectively "non-radar."

The "radar monitor"

ATC is required, by policy, to provide some level of radar services in Class A, B, and C airspace. The lowest level of this radar service is to provide radar monitoring services. What this really means is open to endless conjecture. The preceding example of the lone airplane in an isolated part of a sector not being watched by the controller is still within the definition of radar-monitored services. In addition to Class A, B and C airspace radar monitoring requirements, aircraft flying RNAV random routing within the United States

are required to be radar monitored. In airspace other than Class A, B, or C, the FAA's policy is to provide radar monitoring where facilities and circumstances permit.

You could be, for example, the only aircraft for miles around in one part of a controller's sector, and he could have a swarm of airplanes in a distant part of the sector occupying his full attention and capabilities.

You can rest assured radar monitoring is quite active in Class B and C terminal airspace, but that's it. You don't have the same assurance in any other airspace, not even Class A. Of course, Class A doesn't mean much to most of us unless we're fortunate to have turbo power of some kind. Plus, there are no hard rocks anywhere in the contiguous 48 States' Class A airspace.

Another misconception

I recently heard yet another pilot misconception about radar services.

This pilot believed ATC couldn't terminate radar service without the pilot's concurrence! Apparently this pilot has never experienced being in a sector where ATC suddenly experienced a radar failure. Further, he has likely never flown the lower altitudes of Victor airways in the Western mountains where the Center sometimes hands you off to the local FSS frequency for en route or terminal arrival services. Do you know how to handle ATC communication en route and on arrival with the local FSS?

You must remember this

If you remember nothing else from this article, at least remember this: there are three types of radar service terminations: (1) the obvious one, where the controller states it; (2) the AIM-specified automatic conditions of radar service termination; and (3) the practical radar service termination that comes and goes without your direct knowledge, depending upon controller workload and related circumstances.

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