



Notes From The Washington Counsel

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'See And Avoid' Requirement

■ ■ Through Sept. 20 of this year, there have been 23 midair collisions in U.S. civil aviation. In 1970, there were 37. In 1969, there were 27. In 1968, there were 38.

In terms of the number of hours flown in U.S. civil aviation, or in terms of the number of aircraft, or airmen, these figures may not be particularly startling. But what is disturbing about these collisions is that most of them should have been avoided. A study made by the National Transportation Safety Board of 1968 midair collisions shows that most of them occurred in VFR weather, outside of high-density areas, and between aircraft where the closure rates were well below the cruise speeds of the aircraft involved. An analysis of the midair collisions which have occurred since 1968 shows that this pattern has generally held true.

Why these collisions? The experts are hard-pressed for definitive answers. But some possibilities suggest themselves. For one thing, we who fly experience hours and hours of flight when we don't see another aircraft or, when we do, the aircraft is so far away that it is not a factor to us. The passage of time, with this contact-free experience, wears down our appreciation of the midair collision hazard. And, after all, it only takes a few moments inattention in a critical situation for a collision to occur. If there is any validity to this theory, then a reminder like the one above—that midair collisions are occurring under these circumstances—should serve us well.

Another possibility which suggests itself is that we who fly IFR in a radar environment have a tendency to rely too heavily on the ATC system for collision avoidance. If this theory is true, then it is well to remind ourselves of two things. First, ATC's primary obligation is to separate your IFR aircraft

from other aircraft being controlled by ATC. Radar traffic information warning of the presence of VFR traffic in your vicinity is provided on a workload-permitting basis only. Where weather conditions permit, it is the primary responsibility of the pilot operating IFR to see and avoid traffic not being controlled by ATC. Second, radar has its limitations. While controllers do their best to provide radar target information, radar (for several technical reasons) does not always see traffic which may be a factor to you.

So much for possible reasons. In this column we have been periodically reviewing the flight rules of the Federal Aviation Regulations. The analysis of the midair collisions which have occurred in the past several years suggests to me we should restate the "see and avoid" requirement and make some suggestions as to how to comply with it.

The requirement is specified in FAR 91.67(a), and is as follows:

When weather conditions permit, regardless of whether an operation is conducted under Instrument Flight Rules or Visual Flight Rules, vigilance shall be maintained by each person operating an aircraft so as to see and avoid other aircraft in compliance with this section.

It's a rather simple rule. Except for the right of way rules, it leaves to the discretion of the pilot how best to comply with it. Each pilot must determine for himself what technique to use in scanning for traffic, and how best to divide his time between in-cockpit duties and scanning for traffic.

There is not much technical information available to us about effective scan techniques and effective time sharing. The best source of information which I could find is an article by Tiley Vickers called "Visual Collision Avoidance" which appeared in the September

1967 issue of *The AOPA PILOT*. It is very technical and not easily condensed. I commend it to you. Reprints are available from AOPA. My research also disclosed that scanning techniques were developed and taught to military pilots during World War II. But I couldn't find out what they were. Also I learned that Dr. Richard F. Gabriel, a psychologist employed by McDonnell Douglas, conducted a study in 1955 on scanning techniques. By using a simulator to train Navy pilots who were flying A-4 aircraft, Dr. Gabriel was able to establish that scanning techniques could be taught which would improve a pilot's ability to see and avoid other aircraft without derogating the piloting skills required to fly the aircraft. He is currently working on training programs for the airlines and general aviation. But again, nothing was available on technique which could be passed on in this column.

FAA has an advance notice of proposed rulemaking on time-sharing scan training [NPRM 70-37, Docket No. 10594, 34 F.R. 14934] but this notice merely solicits the views of the aviation public regarding ground training using simulators. It does not make any suggestions to pilots about scan techniques and time sharing. But it does suggest that work is being done in this area, and that we can probably look forward in the near future to some technical assistance in both scan technique and time sharing.

In the meantime, the time-honored admonition to "keep your head on a swivel" is still good advice. And with what we know about the speeds of aircraft using our airspace, which compute to some fairly high closure rates, the time devoted to in-cockpit chores should never be more than a few seconds at a time.

In meeting our "lookout" requirement it is also helpful for us to know when and where we are most likely to encounter other aircraft. If we know this, we can increase our vigilance during those times and at those places. The National Transportation Safety Board study concerning midair collisions, referred to above, furnishes us a good bit of useful information. The study shows that of the midair collisions which occurred in 1968, most occurred below 5,000 feet, at or near an uncontrolled airport, in VFR weather, during the summer months and on the weekend. What is even more helpful is that the study was able to pinpoint that, of the midair collisions which occurred in the vicinity of an airport, most occurred while approaching to land and that the hazard increased as the aircraft proceeded from downwind to the base leg to the final approach. It was noted that the number of midair collisions increased on final approach, getting worse at the position of flare-out. There is an easy lesson to be drawn from this study. We must increase our vigilance at the times and places where and when the report shows midair collisions are occurring. □