PAUL E. ILLMAN

CONTROLLING PILOT ERROR

Communications

Communications

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CONTROLLING PILOT ERROR

Communications

Paul E. Illman

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Series Introduction

The Human Condition

The Roman philosopher Cicero may have been the first to record the much-quoted phrase "to err is human." Since that time, for nearly 2000 years, the malady of human error has played out in triumph and tragedy. It has been the subject of countless doctoral dissertations, books, and, more recently, television documentaries such as "History's Greatest Military Blunders." Aviation is not exempt from this scrutiny, as evidenced by the excellent Learning Channel documentary "Blame the Pilot" or the NOVA special "Why Planes Crash," featuring John Nance. Indeed, error is so prevalent throughout history that our flaws have become associated with our very being, hence the phrase *the human condition*.

The Purpose of This Series

Simply stated, the purpose of the Controlling Pilot Error series is to address the so-called human condition, improve performance in aviation, and, in so doing, save a few lives. It is not our intent to rehash the work of

over a millennia of expert and amateur opinions but rather to *apply* some of the more important and insightful theoretical perspectives to the life and death arena of manned flight. To the best of my knowledge, no effort of this magnitude has ever been attempted in aviation, or anywhere else for that matter. What follows is an extraordinary combination of why, what, and how to avoid and control error in aviation.

Because most pilots are practical people at heart—many of whom like to spin a yarn over a cold lager—we will apply this wisdom to the daily flight environment, using a case study approach. The vast majority of the case studies you will read are taken directly from aviators who have made mistakes (or have been victimized by the mistakes of others) and survived to tell about it. Further to their credit, they have reported these events via the anonymous Aviation Safety Reporting System (ASRS), an outstanding program that provides a wealth of extremely useful and *usable* data to those who seek to make the skies a safer place.

A Brief Word about the ASRS

The ASRS was established in 1975 under a Memorandum of Agreement between the Federal Aviation Administration (FAA) and the National Aeronautics and Space Administration (NASA). According to the official ASRS web site, *http://asrs.arc.nasa.gov*

> The ASRS collects, analyzes, and responds to voluntarily submitted aviation safety incident reports in order to lessen the likelihood of aviation accidents. ASRS data are used to:
>
> - Identify deficiencies and discrepancies in the National Aviation System (NAS) so that these can be remedied by appropriate authorities.

- Support policy formulation and planning for, and improvements to, the NAS.
- Strengthen the foundation of aviation human factors safety research. This is particularly important since it is generally conceded *that over two-thirds of all aviation accidents and incidents have their roots in human performance errors* (emphasis added).

Certain types of analyses have already been done to the ASRS data to produce "data sets," or prepackaged groups of reports that have been screened "for the relevance to the topic description" (ASRS web site). These data sets serve as the foundation of our Controlling Pilot Error project. The data come *from* practitioners and are *for* practitioners.

The Great Debate

The title for this series was selected after much discussion and considerable debate. This is because many aviation professionals disagree about what should be done about the problem of pilot error. The debate is basically three sided. On one side are those who say we should seek any and all available means to *eliminate* human error from the cockpit. This effort takes on two forms. The first approach, backed by considerable capitalistic enthusiasm, is to automate human error out of the system. Literally billions of dollars are spent on so-called human-aiding technologies, high-tech systems such as the Ground Proximity Warning System (GPWS) and the Traffic Alert and Collision Avoidance System (TCAS). Although these systems have undoubtedly made the skies safer, some argue that they have made the pilot more complacent and dependent on the automation, creating an entirely new set of pilot errors. Already the

automation enthusiasts are seeking robotic answers for this new challenge. Not surprisingly, many pilot trainers see the problem from a slightly different angle.

Another branch on the "eliminate error" side of the debate argues for higher training and education standards, more accountability, and better screening. This group (of which I count myself a member) argues that some industries (but not yet ours) simply don't make serious errors, or at least the errors are so infrequent that they are statistically nonexistent. This group asks, "How many errors should we allow those who handle nuclear weapons or highly dangerous viruses like Ebola or anthrax?" The group cites research on high-reliability organizations (HROs) and believes that aviation needs to be molded into the HRO mentality. (For more on high-reliability organizations, see *Culture, Environment, and CRM* in this series.) As you might expect, many status quo aviators don't warm quickly to these ideas for more education, training, and accountability—and point to their excellent safety records to say such efforts are not needed. They recommend a different approach, one where no one is really at fault.

On the far opposite side of the debate lie those who argue for "blameless cultures" and "error-tolerant systems." This group agrees with Cicero that "to err is human" and advocates "error-management," a concept that prepares pilots to recognize and "trap" error before it can build upon itself into a mishap chain of events. The group feels that training should be focused on primarily error mitigation rather than (or, in some cases, in addition to) error prevention.

Falling somewhere between these two extremes are two less-radical but still opposing ideas. The first approach is designed to prevent a recurring error. It goes something like this: "Pilot X did this or that and it led to

a mishap, so don't do what Pilot X did." Regulators are particularly fond of this approach, and they attempt to regulate the last mishap out of future existence. These so-called rules written in blood provide the traditionalist with plenty of training materials and even come with ready-made case studies—the mishap that precipitated the rule.

Opponents to this "last mishap" philosophy argue for a more positive approach, one where we educate and train *toward* a complete set of known and valid competencies (positive behaviors) instead of seeking to eliminate negative behaviors. This group argues that the professional airmanship potential of the vast majority of our aviators is seldom approached—let alone realized. This was the subject of an earlier McGraw-Hill release, *Redefining Airmanship*.[1]

Who's Right? Who's Wrong? Who Cares?

It's not about *who's* right, but rather *what's* right. Taking the philosophy that there is value in all sides of a debate, the Controlling Pilot Error series is the first truly comprehensive approach to pilot error. By taking a unique "before-during-after" approach and using modern-era case studies, 10 authors—each an expert in the subject at hand—methodically attack the problem of pilot error from several angles. First, they focus on error prevention by taking a case study and showing how preemptive education and training, applied to planning and execution, could have avoided the error entirely. Second, the authors apply error management principles to the case study to show how a mistake could have been (or was) mitigated after it was made. Finally, the case study participants are treated to a thorough "debrief," where

alternatives are discussed to prevent a reoccurrence of the error. By analyzing the conditions before, during, and after each case study, we hope to combine the best of all areas of the error-prevention debate.

A Word on Authors and Format

Topics and authors for this series were carefully analyzed and hand-picked. As mentioned earlier, the topics were taken from preculled data sets and selected for their relevance by NASA-Ames scientists. The authors were chosen for their interest and expertise in the given topic area. Some are experienced authors and researchers, but, more importantly, *all* are highly experienced in the aviation field about which they are writing. In a word, they are practitioners and have "been there and done that" as it relates to their particular topic.

In many cases, the authors have chosen to expand on the ASRS reports with case studies from a variety of sources, including their own experience. Although Controlling Pilot Error is designed as a comprehensive series, the reader should not expect complete uniformity of format or analytical approach. Each author has brought his own unique style and strengths to bear on the problem at hand. For this reason, each volume in the series can be used as a stand-alone reference or as a part of a complete library of common pilot error materials.

Although there are nearly as many ways to view pilot error as there are to make them, all authors were familiarized with what I personally believe should be the industry standard for the analysis of human error in aviation. The Human Factors Analysis and Classification System (HFACS) builds upon the groundbreaking and seminal work of James Reason to identify and organize human error into distinct and extremely useful subcate-

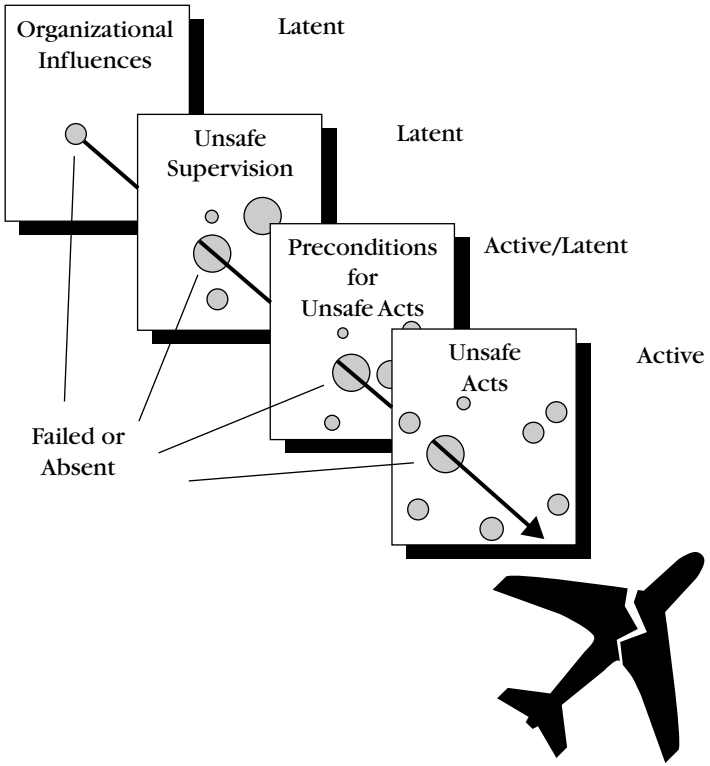
gories. Scott Shappell and Doug Wiegmann completed the picture of error and error resistance by identifying common fail points in organizations and individuals. The following overview of this outstanding guide[2] to understanding pilot error is adapted from a United States Navy mishap investigation presentation.

> Simply writing off aviation mishaps to "aircrew error" is a simplistic, if not naive, approach to mishap causation. After all, it is well established that mishaps cannot be attributed to a single cause, or in most instances, even a single individual. Rather, accidents are the end result of a myriad of latent and active failures, only the last of which are the unsafe acts of the aircrew.
>
> As described by Reason,[3] active failures are the actions or inactions of operators that are believed to cause the accident. Traditionally referred to as "pilot error," they are the last "unsafe acts" committed by aircrew, often with immediate and tragic consequences. For example, forgetting to lower the landing gear before touch down or hotdogging through a box canyon will yield relatively immediate, and potentially grave, consequences.
>
> In contrast, latent failures are errors committed by individuals within the supervisory chain of command that effect the tragic sequence of events characteristic of an accident. For example, it is not difficult to understand how tasking aviators at the expense of quality crew rest can lead to fatigue and ultimately errors (active failures) in the cockpit. Viewed from this perspective then, the unsafe acts of aircrew are the end result of a long chain of causes whose roots

originate in other parts (often the upper echelons) of the organization. The problem is that these latent failures may lie dormant or undetected for hours, days, weeks, or longer until one day they bite the unsuspecting aircrew.…

What makes [Reason's] "Swiss Cheese" model particularly useful in any investigation of pilot error is that it forces investigators to address latent failures within the causal sequence of events as well. For instance, latent failures such as fatigue, complacency, illness, and the loss of situational awareness all effect performance but can be overlooked by investigators with even the best of intentions. These particular latent failures are described within the context of the "Swiss Cheese" model as preconditions for unsafe acts. Likewise, unsafe supervisory practices can promote unsafe conditions within operators and ultimately unsafe acts will occur. Regardless, whenever a mishap does occur, the crew naturally bears a great deal of the responsibility and must be held accountable. However, in many instances, the latent failures at the supervisory level were equally, if not more, responsible for the mishap. In a sense, the crew was set up for failure.…

But the "Swiss Cheese" model doesn't stop at the supervisory levels either; the organization itself can impact performance at all levels. For instance, in times of fiscal austerity funding is often cut, and as a result, training and flight time are curtailed. Supervisors are therefore left with tasking "non-proficient" aviators with sometimes-complex missions. Not surprisingly, causal factors such as task saturation and the loss of



(Shappell and Wiegmann 2000)

situational awareness will begin to appear and consequently performance in the cockpit will suffer. As such, causal factors at all levels must be addressed if any mishap investigation and prevention system is going to work.[4]

The HFACS serves as a reference for error interpretation throughout this series, and we gratefully acknowledge the works of Drs. Reason, Shappell, and Wiegmann in this effort.

No Time to Lose

So let us begin a journey together toward greater knowledge, improved awareness, and safer skies. Pick up any volume in this series and begin the process of self-analysis that is required for significant personal or organizational change. The complexity of the aviation environment demands a foundation of solid airmanship and a healthy, positive approach to combating pilot error. We believe this series will help you on this quest.

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Tony Kern

Foreword

At the dawn of the twentieth century, the great naval theorist Alfred Thayer Mahan dwelled on the difficulties inherent with naval operations in the vast oceans in the Pacific theatre of war. After months of concentrated study, he wrote the following words: "*Communications dominate…Broadly considered, they are the most important single element…*" (*The Problem of Asia,* 1900). Less than 40 years later, Western military strategists would know the precise implications of those words as they confronted the immense power of the Imperial Japanese fleet in World War II.

Now we sit at the dawn of another age—the information and technological age. Like Mahan, we find ourselves looking for the keys to managing this new and exciting time. There is good news and bad news on this front. The good news is that not much has changed since Mahan wrote these words a century ago—communications still dominate. The bad news is that we haven't gotten much better at communicating since then, and in aviation, the consequences of poor communication are far more immediate.

The more things change, the more they remain the same, perhaps even more so. Our "ships" sail faster by orders of magnitude across vast oceans of air, and the

penalty for poor communication has become more severe and less forgiving. As pilots, we need to stop and take stock of our own abilities in this area, beginning with the realization that the greatest enemy of effective communications is the illusion of it. Pilots love to think they have the market cornered on communication. Nothing could be further from the truth.

In modern aviation, the safety system is designed so that a pilot can get away with a variety of shortcomings for a period of time—but not poor communications. Simply put, if an aviator cannot communicate effectively both inside and outside of the cockpit, he/she does not possess the required competencies for safe and effective operation in today's congested airspace. That is the bottom line. Communications are that important. Communications dominate.

The Flight Safety Foundation's Icarus Committee issued a report in 1994 that stated, "Effective communication has been a topic of discussion for many years…[and] the potential for misunderstanding and miscommunication is great. While evidence of accidents and serious incidents caused by language difficulties is elusive, the heavy dependence of the system on the quick and efficient voice transfer of information is at greater risk if this information is miscommunicated, misunderstood, or not transmitted at all." This quote points to the three basic competencies involved in good aviation communication: the ability to *communicate your concerns,* the ability to *understand others,* and the *decision of how and what to communicate.*

The committee report goes on to point out that "…communication difficulties are an important contributor to stress." I believe that this is one of the most important and most-often overlooked issues in human factors training programs today. An old aviation adage says,

"*Aircraft fly because of a principle discovered by Bernoulli, not Marconi. Don't let go of the aircraft to fly the microphone*." Common sense, but too often forgotten. Another of my all-time favorites is the simple three-step plan for emergencies of "*Aviate–Navigate–Communicate*." Don't misunderstand; these are not meant to downplay the significance of effective communication, but rather to help you understand where it fits on the priority list. On the contrary, effective communication is a critical part of both normal and emergency procedures. The true professional communicates *precisely,* using perfectly timed communications and standard phraseology to communicate the most information along the appropriate channel at the proper time. This may be a lost art, but one that the author of this book is intent on resuscitating.

In this volume of the Controlling Pilot Error series, one of the sharpest minds in aviation communications today breaks the complex subject down into bit-sized pieces, easily digestible by the average pilot. Pete Illman is one of the planet's leading experts on aeronautical communication. He is the author of *The Pilot's Handbook of Aeronautical Knowledge, The Pilot's Air Traffic Control Handbook,* and *The Pilot's Radio Communications Handbook.* If you are looking to improve your knowledge in this critical area, you've come to the right source.

Tony Kern

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To Get Us Started...

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The air these days is filled with pilots of all levels of experience, knowledge, and training. For one, there are those who learned to fly at some nontower grass-strip airport and are still reluctant to venture too far from that uncomplicated harbor. Then there are those who earned their pilot certificates at a tower-controlled airport and are reasonably confident of their operating skills in the busier environment. And we have the oldsters who perhaps learned to fly years ago but had to give it up while raising a family and pursuing job challenges. Now in their mid- and upper-middle years, they're back in the air, perhaps a little rusty but again doing what they once enjoyed so much. And, of course, from whatever the beginnings, there are the pros: the airline captains; the executive pilots; the high-time instructors; the military; the commercial pilots who work charters, fly crop dusters, or are involved in some other money-making enterprise.

Regardless of who we are, though, or where we fly, or our levels of competency, the vast majority of us most

likely share more than just a passing interest in matters concerning aviation safety. Of course, if you're masochistic or suicidal, that's another matter, but barring that microscopic percentage of pilots, we're all subject to the basic human need to preserve the physical organism and protect it from undue risk, pain, injury, accident, or loss of life. The implication, then, is that whatever we do in terms of physical actions, we try to do it at the minimum level of risk and the maximum level of safety. Oh, I know we have the daredevils out there, the seemingly foolhardy, such as the early barnstormers, the wing-walkers, the Lindberghs, the likes of the Blue Angels, and so on, but even they, in their acts of high danger, do so only after minimizing every possible risk.

The Purpose of the Book

Which leads to the purpose of this book as part of the *Controlling Pilot Error* series. Within that broad title, and with the help of several ASRS (*Aviation Safety Reporting System*) cases, the principal area of attention here is the role that pilot/controller radio communications plays in aviation safety, whether in the air or on the ground.

While safety is the fundamental issue, an allied intent of the book is to discuss some of the principles and techniques of radio communications. The reason for so doing is that many questions arise about the average pilot's communication competence and confidence to operate in either tower- or nontower airport airspaces. Several cases that we'll be discussing seem to justify those questions. I'll have more to say on this issue in the following chapters.

Communications and Safety

Probably no aviation subject receives more attention than safety—and justifiably so. Courses, classes, books,

magazines, periodicals, films, tapes, etc., proliferate on every conceivable aviation subject, all designed to impart knowledge and enhance skill in the effort to raise safety to its maximum potential.

What I don't think I've ever seen, though, is a study of the direct role communications plays in either contributing to or adversely affecting aviation safety. True, there are many cases in which the misuse or nonuse of the radio is mentioned, but the real cause of the incident or accident is then typically described as "pilot error," "controller error," or some other nonspecific contributing condition.

There is one accident, though, that clearly points to communications as the ultimate cause of a crash. Other influences were involved, but had just one message passed from pilot to controller, the accident might well have been prevented.

Back in 1990, an Avianca Boeing 707 (AVA Flight 052) crashed in a wooded area of Cove Neck, Long Island, New York. The flight, from Bogota, Colombia, to New York's Kennedy Airport (JFK), had been placed in a holding pattern three times for a total of one hour and 17 minutes by ATC (Air Traffic Control) in the New York area because of weather. During the third period of holding, the crew reported that they could hold no longer than five minutes, that they were running out of fuel and could not reach their alternate, which was Boston's Logan International Airport. While trying to return to JFK, all four engines stopped because of fuel exhaustion, and the plane crashed 16 miles from its destination. Seventy three people died; 81 were seriously injured.

Among the probable communication causes, according to the NTSB (National Transportation Safety Board) report, was

1. The crew's failure to declare forcefully and clearly that a bona fide emergency existed.
2. Lack of standardized, understandable terminology for minimum and emergency fuel states.

For whatever reason, the Avianca crew, for whom English was a second language, did not make clear to the controller the seriousness of the situation, nor apparently did they squawk the emergency 7-7-0-0 transponder squawk code, nor is there any indication that they radioed a *distress* or *urgency* message. According to reports, had ATC been aware of the critical shortage of fuel, the flight would have been given landing priority While other factors may have entered the picture, a simple but forceful communication, if even in broken English, would likely have prevented the accident and the death of 73 occupants of Flt. 052.

None of the ASRS cases is as traumatic as this, simply because the individuals involved in those cases are reporting what happened, why it happened, and, usually, what each reporter learned from the incident. I do wonder, though, how many accidents have occurred simply because one pilot or another failed to communicate where he was, what he was doing, or what his or her intentions were. At a nontower airport, I wonder how two aircraft could end up on final approach with one only 50 feet above the other. Or how one aircraft could be taking off on a given runway while another is landing on the same runway but in the opposite direction. Or why one plane is on a right traffic pattern while everyone else is flying left traffic. Somebody in each case is either not listening, not transmitting, not tuned to the right frequency, or hasn't turned his or her radio on.

Whether in controlled or uncontrolled airspaces, the radio and safety are essential partners. I just wonder again how many incidents, accidents, or runway incur-

sions would have been prevented had the assorted communicating facilities been properly used. Unfortunately, we'll never know.

Communications and Competence

Perhaps just a step above safety as a commonality among pilots is the freedom that flying offers: the freedom to go places with reasonable economy and speed, the freedom to get from here to there unencumbered by traffic lights, speed traps, and highway nuts passing you at 85 on a 65-mph interstate. Only the pilot enjoys the true simultaneous freedoms of space, distance, and speed.

A question, though, is the extent to which the typical general-aviation pilot takes full advantage of the benefits that the Cessnas, Pipers, Beeches, and the like, offer. Said another way, how many limit their flying to local nontower airports because they fear the challenges of the big ones? How many understand and are confident about contacting an Approach Control facility, a Flight Service Station, or an Air Route Traffic Control Center? Or how many understand the radio procedures and have mastered the techniques of pilot radio communications that make use of those various facilities possible?

Considering the emphasis placed on pilot training, medical qualifications, operating rules, policies, regulations, and the rest, it would seem that at least a reasonably similar emphasis would be directed to the procedures and skills of radio communications. For whatever reason(s), such is not the case. The literature on the subject is too sparse, the examples of radio dialogue too few, and explanations of what to say and how to say it too incomplete. (Sorry, *AIM* [Aviation Information Manual], but

you just don't cut it.) Innumerable pilots of all levels of experience have repeatedly said that learning how to talk and listen over the radio was one of the most difficult elements of their training.

The problem was that those skills simply weren't taught, or at least not taught in the depth necessary for the development of competency. Too frequently the learning took place mostly by osmosis and "on-the-job" exposure. If you'll spend just a few minutes in flight paying close attention to the radio chatter around you, you'll hear enough examples of radio misuse, overuse, or nonuse to illustrate the assertion that there is, indeed, a void in the training process. Either that, or there's a fair amount of just plain oral incompetence out there.

Regardless of pilot experience level, novice or high-time professional, the second purpose of this book is to help pilots become more knowledgeable, safer pilots through heightened communication awareness and sharpened communicating techniques. That learning process is hopefully achieved by analyzing actual cases and pilot reports of incidents or accidents, culled from the ASRS and NTSB databases, that primarily resulted from radio misuse or nonuse. At the conclusion of each case, I add my own comments about what the reporting flight crew or pilot did well, did poorly, or failed to do at all. Combined with the reporters' own self-analyses, the cases thus provide a platform for the further development of communication skills.

Accordingly, and to fulfill the book's purpose, the chapters that follow these opening comments are:

Chapter 2: Radio communications: problems, causes, solutions

A discussion of communications in general—its real meaning, why it so often fails, and brief examples of proper pilot-controller radio exchanges.

Chapter 3: The airspaces and communication requirements

A capsule review of the airspace system (a necessary summary to be sure the reader understands case study references to the airspace classes and the various radio communication requirements within the system).

Chapter 4: Communications in the tower-controlled airport environment

Case studies of ASRS and NTSB incident reports at the Classes B, C, and D tower-controlled airports and their surrounding airspaces.

Chapter 5: Communications in the nontower airport environment

Similar to Chapter 4, a review of accidents and incidents at uncontrolled nontower Classes E and G airports and the role of communications in these occurrences.

Chapter 6: Communications in the Class A and E airspaces

Communication problems/situations in Class E airspaces out beyond the airport control limits.

Chapter 7: Communications in general-aviation training

Radio communication cases encountered in the flight training process.

Chapter 8: A few words about controllers

Controllers, "chipping," and courtesy in the communicating process.

With these few words as an introduction to what the book discusses and hopes to accomplish, let's move to the next chapter and talk a little about communications in general.

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Radio Communications: Problems, Causes, Solutions

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Analyses by the National Transportation Safety Board (NTSB) of hundreds of aircraft incidents and accidents indicate that 70 to 80 percent of the occurrences can be directly traced to human factors. Mechanical and maintenance failures, plus the all-inclusive "other," are responsible for the balance. While no study, to my knowledge, has been made that focuses solely on the role radio communications has played in that 70 to 80 percent human-factor rate, a review of the NTSB accident summaries, along with the ASRS reports, makes it strikingly evident that the role was significant. Sometimes it was major, sometimes incidental, but it was there, nonetheless. Typical NTSB comments are such as these:

- "Air/ground communications not attained."
- "Improper interpretation of instructions."
- "Communication inattention."
- "Improper use of radio equipment."
- "Communication/information delayed."

- "Failure to communicate on the Common Traffic Advisory Frequency (CTAF)."
- "Radio communications not maintained."
- "Communications not understood."
- "Pilot tuned to wrong frequency."
- "Communications inadequate."
- "Pilot forgot to turn radio on."

Although other factors may have contributed to a given incident/accident, the frequency with which some form of communicating failure is mentioned makes it clear that pilots need to sharpen their radio transmitting, receiving, and listening skills. And this doesn't mean just the low-time student pilot; it means all levels, from student up to and including the high-time airline captain. (As you'll see in the case studies we discuss in later chapters, an ATP [Air Transport Pilot] rating does not guarantee an equal level of communicating competence.)

Whatever the reasons for the communicating deficiencies, the fact remains that those deficiencies are contributing to, or are perhaps the very cause of, too many incidents or accidents. Whether they are conscious or unconscious within an individual, barriers often exist in the communication process that affect one's ability to get a message across or to grasp fully a message being received. And, unfortunately, many of these same barriers exist in families, social relations, politics, international relations, and, yes, between pilots and ATC ("air traffic control") and between pilots themselves. The ability to communicate in ways that unfailingly produce mutual understanding between sender and receiver seems to be an elusive human element.

That talent or ability, if lacking, quite obviously can't be developed in a few pages of reading material. If we're aware of some of the common barriers, however, partic-

ularly those that relate to pilots and pilot communications, there is no reason why each of us can't become highly professional in the use of the radio, regardless of actual flying experience—and this applies equally to the men and women on the ground who are responsible for controlling the traffic in their areas of responsibility.

They, too, are not immune from the same weaknesses displayed by pilots. Done well or done badly in the aviation environment, communications can make the difference between life and death.

Communications Defined

The word "communicate" comes from the Latin, *communicare,* meaning "to share," "to make known." "Communicating" is thus the process by which something is shared, made known, made common.

In essence, if there is no "sharing" between two people, there has been no meaningful communication. Yes, words may have been exchanged and I may have heard everything you said, but that doesn't mean I've understood or correctly interpreted what you have tried to communicate. Not until I have mentally grasped the full meaning behind your words has there been communication in the truly literal sense. I may not agree with what you've said, but that doesn't alter the fact that I *understand* it, whatever my reaction to it might be.

Another way of looking at "understanding" is Webster's definitions, one of which simply says, "To grasp the meaning of; Comprehend." Roughly defined, "comprehend" means to "take hold of with the mind." "Understanding," then, is mentally grasping what is being said, the information being conveyed, the directions being issued. Until the listener fully comprehends what the sender wants the listener to know or do, there has been no fruitful communication. Yes, there has been noise, in the sense of vocal

sounds from one party to the other, but no understanding or comprehension has occurred. Barriers, one or several, have been blocking the full and meaningful flow of communications.

Some Barriers That Affect Communications

Improving your communicating skills, if improvement is needed, means beginning to understand the barriers that affect the receipt or transfer of information. Some, such as body language, physical appearance, dilution or distortion of messages as they are successively passed from one party to another, or mistrust of the other party are often serious barriers in normal face-to-face relations but aren't really issues in the pilot radio communication process. The barriers that do play a part, however, include the following:

Wandering attention

This is something we've all experienced, be it in the classroom, at a business meeting, in church, with a spouse or children, driving a car, or in the air. For example, as a pilot, have you ever been flying along on some crisp and cloudless day in a sort of dreamland, thinking about things that have no immediate relevancy to what you're doing? The radios are on, tuned to the right frequency, the traffic is light, the visibility unlimited, the scenery outstanding—and there you are, a million miles away as you enjoy flight at its best.

Meanwhile, the radio chatters on, but the chatter falls on deaf ears. Whether through speaker or headset, you hear sounds, but they're only meaningless sounds to a wandering mind. You're *hearing* but you're not *listening*. While you're off in outer space, though, another

pilot is reporting his position and altitude to ATC, and that report puts that aircraft squarely in your flight path. Might it not be nice to be aware of that potential obstacle? One would think so, but with attention drawn elsewhere, the sound from the radio hits your eardrums and goes no further. The message never gets through because you were hearing—not listening.

And that's hard work—that process called "listening." It requires your full attention, your ongoing analysis of the information and how that information would or could affect you. If you learn that your safety is threatened, what defensive actions should you take? What radio reports should you initiate, if any? And so on. Whether it's a weather warning, a traffic report, ATC instruction to another plane in your vicinity, or a call to you from a controller, every radio exchange has the potential of containing information important to you. Maybe it's only nice-to-know information, but just one word or one brief transmission might materially affect your flight plan or what you do next.

The point is presumably obvious: Pay attention, pilots. Keep your radio turned up. Develop a second hearing sense so that even subconsciously you catch your aircraft N-number when ATC calls. Learn to grasp quickly the gist of transmissions to and from other aircraft and the possible importance of those transmissions to you. Start *listening* actively as soon as a voice interrupts a momentary radio silence. Especially, be on guard against wandering attention. You're behind your airplane when your mind's not on what's happening *now*—and that could be dangerous to your well-being.

A companion of wandering attention is inattention. In fact the two are almost blood relations. In either case, you're not with it; the mind is elsewhere and not focusing on the reality of what's happening *now.*

Simple examples:

- The pilot of a landing retractable-gear aircraft forgets to lower the gear and bellies in.
- Two planes on final approach at an uncontrolled airport collide $^1/_4$ of a mile from the runway threshold 200 feet above the ground. One pilot had properly reported her position. If the second pilot made a report, it was never heard because the radios were still tuned to the unicom frequency of the pilot's departure airport.
- The single-engine VFR aircraft enters a Class B airspace without radio contact or ATC approval, causing ATC to redirect landing IFR aircraft to ensure required aircraft separation. The offending VFR pilot was reported, and his only excuse was that he hadn't been paying attention to his location relative to the controlled Class B airspace.
- An instructor and his student had their heads in the cockpit in a serious flight-related discussion. The instructor, purely by chance, saw another aircraft out of the corner of his eye, took immediate evasive action, and avoided a midair collision by no more than 20 feet.

The examples of inattention, wandering attention, being asleep at the switch—whatever you want to call it—are almost endless, and we'll have more in later chapters. In the meantime, it would be wise to consider this matter of wandering attention as a *bona fide* barrier in the communication process.

Assumptions

Assuming, taking things for granted, can get us into a lot of trouble, as many have learned. Just a few of the situ-

ations that can cause a listener to fall prey to the assumption tendency are:

- Unfamiliar words, as company jargon, technical terms, acronyms, big words (often used simply to impress).
- Words or expressions that arouse anger, disagreement, arguments.
- A tone of voice that implies that the listener is ignorant, incapable, stupid. ("Can't you do *anything* right?" "I'll explain it one more time…slowly." "Forget about it. I'll do it myself!"

In these not-uncommon scenarios, I'm going to stop listening when I don't understand a word, a term, a direction while I try to figure out what you meant or want—and thus miss the rest of what you're saying that might have later explained things. Or if you anger me, I'll stop listening and start figuring out what I'm going to say in rebuttal. Or if you imply that I haven't got what it takes upstairs to understand what you're saying, I'm either going to react with anger or possibly go into a shell of inaction out of fear of being further degraded. Whatever the reaction, you've lost me and the communication chain is broken.

Thinking versus speaking speeds

This is another of those human factors that leads to both wandering attention and assuming. You may see slightly different figures quoted, but people generally *think* at the rate of about 400 words a minute and *speak* in the 125- to 150-words-a-minute range. That difference often causes the listener to jump ahead of the speaker and decide what the speaker is going to say well before the speaker ever gets to that point. In effect, the listener is

saying, "Okay, okay, I know what's coming. Get on with it." Unfortunately, though, during this period of anticipating, the listener stops listening and the speaker, perhaps to the listener's regret, may say something entirely different than what the listener assumed would be forthcoming.

In your own experiences, have you ever attended a meeting, say on a new procedure or a different way of doing something, only to find yourself jumping ahead of the speaker, certain in your mind that you knew what he or she was going to say? And then, perhaps only a few minutes later, you discover that you didn't have the picture at all?

For the pilot, keep this thinking/speaking-speed ratio in mind as both the sender and the receiver. Before keying the mike to make a call, plan what you're going to say. Next, be sure the air is clear and no one else is talking. Then say what you have to say, but say it tersely, distinctly, and with only enough words to get your message across. Remember that the person you're talking to—be it a ground controller, a tower specialist, a unicom operator, a flight service station specialist—once you've started, will have a fairly good idea of what you're going to say or ask. So don't drag out the obvious. Don't dawdle. Don't stumble. Don't ramble.

Along those lines, the FAA's *Instrument Flying Handbook* says this:

> …Many students have no serious difficulty learning basic aircraft control and radio navigation, but stumble through even the simplest radio communications.…Communications is a two-way effort, and the controller expects you to work toward the same level of competence that he strives to achieve. Tape recordings comparing transmissions by professional pilots and inexperienced or inadequately trained general avia-

> tion pilots illustrate the need for effective radiotelephone technique. In a typical instance, an airline pilot reported his position in five seconds whereas a private pilot reporting over the same fix took four minutes to transmit essentially the same information.…The novice forgot to tune his radio properly before transmitting, interrupted other transmissions, repeated unnecessary data, forgot other essential information, requested instructions repeatedly, and created the general impression of cockpit disorganization.

Along the same lines, an airline captain told me this story of what came over the air one time. As he was approaching an airport, he heard a charter carrier talking to the tower. With names and locations changed to protect the guilty, the call went something like this:

> Pilot: Mayflower Tower, this is Rocky Charter Three Niner Niner Uniform.
>
> *Twr: Rocky Charter Three Niner Niner Uniform, go ahead.*
>
> Pilot: Tower, Three Niner Niner Uniform, we're…[to the first officer, with an open mike] where are we, Harry? [pause] We're over North Centerville for landing Mayflower.
>
> *Twr: Roger, Niner Niner Uniform. Say your altitude.*
>
> Pilot: Altitude is…What's our altitude, Harry? [pause] Altitude is seven thousand five hundred.
>
> *Twr: Roger, Niner Niner Uniform. What's your airspeed?*
>
> Pilot: Let's see, airspeed…how fast we going, Harry? [pause] 375 knots, Tower.
>
> *Twr: What are you squawking, Niner Niner Uniform?*

Pilot: We're squawking…What's our squawk, Harry?

At this point, the tower broke in:

Twr: Three Niner Niner Uniform, would it be all right if we talked to Harry?

I didn't hear this exchange, so I can't swear to its authenticity. The airline captain, however, left no doubt that it was almost a verbatim copy of what transpired.

As another illustration of dawdling and excessive verbiage, take this example of a pilot contacting an airport tower for takeoff approval:

Pilot: Cedar Tower, this is Cherokee Three Four Five Six Tango. Over.

Twr: Cherokee Three Four Five Six Tango, Cedar Tower.

Pilot: Cedar Control Tower, this is Cherokee Three Four Five Six Tango. We're ready to take off on runway three six. We would like to leave the pattern and depart to the east. Over.

Twr: Cherokee Five Six Tango cleared for takeoff, east departure approved.

Pilot: Roger, tower. Cherokee Five Six Tango cleared to take off and east departure is approved.

Compare that with this:

Pilot: Cedar tower, Cherokee Three Four Five Six Tango ready to go three six, east departure.

Twr: Cherokee Five Six Tango cleared for takeoff. East departure approved.

Pilot: Roger, cleared to go, east. Five Six Tango.

In the first transmission, the pilot used 59 words to get takeoff permission. In the second, 23 words, but what

did he say in the first that wasn't said in the second? Nothing. Remember the Navy's oft-quoted admonition to speakers and writers—KISS: Keep It Simple, Stupid.

Semantics

Here's another universal barrier that can make communications confusing for new pilots, pilots with limited experience, or those not familiar with the local procedures or landmarks in the area in which they're flying. Combine semantics—the meaning of words—with the jargon, the slang, and the acronyms associated with aviation and you have the ingredients for all sorts of communication problems.

One of the factors that makes English such a difficult language to learn is the variety of meanings given to a single word. For instance, how many ways could you use or define such everyday words as "machine," "quarter," "face," "sink," "course," "counter," "drag," "pocket?" The list of other multimeaning examples is almost endless. Just check any dictionary.

Then to complicate matters further for pilots, throw in the abbreviations, the acronyms, the slang, the verbal shorthand so common in the language of aviation. It's almost a new language, with some new words and many new meanings to familiar words. Take, for example, "squawk," "squawk standby," "fly the final," "lift," "flap," "chord line," "dihedral," "position and hold," "EFAS" (Enroute Flight Advisory Service), "ATIS" (Automatic Terminal Information Service), "ASOS" (Automated Surface Observing System), and "AWOS" (Automated Weather Observing System)—and this list could go on as well.

There's no way to eliminate the semantic barriers or the in-house jargon you hear in every company, industry, trade, profession, or walk of life. Each has its own

written and spoken language that every newcomer must master if he or she is to exist in that environment. (Is there any better example than computer talk?) Until mastery of that "language" emerges, the opportunities for misunderstanding are myriad.

Filters

Most messages have two parts: The *content* part, meaning a statement of the idea, whatever that "idea" might be, and the *emotion* part—the feelings (fear, anger, sarcasm, urgency, etc.) with which the sender delivers the message. At the same time, and equally important, is how the receiver reacts emotionally to the message. A simple example: A controller calls Bonanza 1234 Kilo with this instruction:

Bonanza 1234 Kilo turn right now.

As an ordinary request or instruction, with no sense of emergency about it, those few words are not likely to arouse any emotional reactions on the part of the pilot, so he makes a normal, standard-rate turn to the right. Would the same be true if the controller sent the same content message this way?

Bonanza 1234 Kilo, *turn right NOW.*

Probably not. Voice volume and word emphasis would imply the existence of an emergency demanding immediate action. Same words, same idea, same instruction, but the emotion behind the words conveys a condition not necessarily evident in the basic message itself.

Here is another example where word emphasis produces six entirely different meanings to a brief six-word sentence.

I never said he stole chickens.

I *never* said he stole chickens.

I never *said* he stole chickens.

I never said *he* stole chickens.

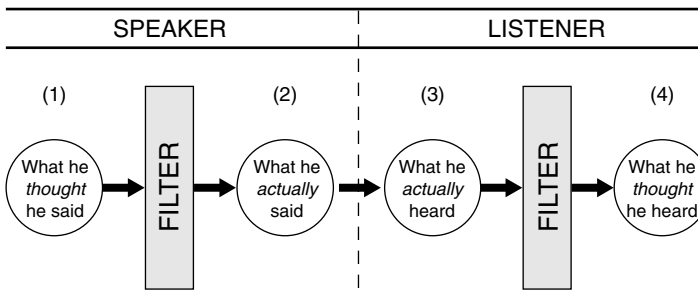
I never said he *stole* chickens.

I never said he stole *chickens.*

Just a simple illustration, but it rather effectively demonstrates how oral or written emphasis on a word, a phrase, or even a whole sentence can materially change the meaning of the message.

Perhaps FIG. 2-1 will make these issues of content and emotions a little clearer. Number 1 represents the speaker and the message content, the idea, the speaker intended to transmit. During the transmission, however, the message may be "filtered" by distraction, noise, excitement, anger, irritation, humor, fear, or any other distorting influence. Consequently, what the speaker thought he or she said passes through the so-called filter. Emerging are the words that were uttered (#2) but maybe not the message the sender intended.

Number 3 is what the listener actually hears, complete with whatever distortions accompanied it. But now the listener's filter enters the picture. What he or she literally heard can be further distorted, positively or negatively, by his or her own emotional reactions to and interpretations



2-1 *The filters that distort messages make it a long way from #1 to #4.*

of the message. Here is where the listener's feelings of anger, frustrations, acceptance, confidence, liking or disliking of the sender, fatigue, interest, disinterest, or the like, can further affect the message. Whatever role the listener's filter plays in the message-reception process, in #4 out comes what the listener *thought* he or she heard. It's on that basis that the listener then responds.

Suffice it to say that it can be a long way from #1 to #4. It's a journey potentially fraught with misunderstandings, misconceptions, and mistakes. Must it be a rough journey, though? No, as I hope will become evident as we move along.

Fear

This has the potential of being a serious communication barrier for any pilot but probably more so for the low-time flier. It's not just the language of aviation that may be foreign; there's also the very real concern about getting on the air and saying the wrong thing or sounding incompetent. This is an entirely understandable fear, because, among other things, what you say over an open mike is heard by every other pilot tuned to the same frequency and within range. That alone can be intimidating enough, especially for the inexperienced pilot.

Reduced to its simplest, two broad fears, or certainly concerns, are in play. One, as the sender, is this fear of talking and communicating over the mike, while the second, as the receiver, is the fear of not being able to understand and hence comply with whatever instructions are issued. Fortunately, though, these fears can be quickly overcome through knowledge of what to say, why you should say it, where you should say it, and when to say it.

Knowledge alone, however, isn't enough. Even with the basics firmly in mind, the next step in mastering

whatever fear may still exist is developing the necessary sending/transmitting skills. Knowledge is fundamentally factual. It's what, where, why, and when you do or don't do something. *How* you do the "something" is another matter: The *how* represents the skills with which the knowledge is applied. The first four come primarily from study and mental absorption; the last is the product of instruction, practice, and hands-on experience.

Regardless of your experience level, if you have qualms or uncertainties about your radio communicating skills, you might buy an inexpensive aircraft-band radio that picks up the various aviation frequencies. Listen to the exchanges involving departing, transiting, and arriving flights. Become familiar with the typical patterns of these calls and how they're structured. Pay close attention to what the tower controllers are saying and the terminology they use. Note the sequence of information in pilot calls for departing and landing clearances. If you're geographically close to a Class B or C airport, listen to the calls to and from Approach or Departure Control to get a feel of how aircraft are cleared into or out of B or C airspaces.

Once you have been taught, or learn, *how* calls to ATC are structured, think of all the transmissions you would make in a normal flight. If it would help the learning process, write down what you would say to ground control for taxi permission at a tower-controlled airport; if you usually fly off a nontower airport, do the same to alert other aircraft of your taxiing intentions. Then continue with the other transmissions from takeoff back through the landing process. Whether you write down these various transmissions or not, get the sequence of information in your mind and then practice aloud what you'd say in each circumstance.

Our discussions of the cases beginning in Chapter 4 will give some clues as to the *how*-to-say-it phase of radio communications. Coupled with books you might read on the subject or instructions you receive, the fear aspect of radio transmitting should begin to subside.

There's still more to it, though: There's the common pilot fear related to understanding what a controller is telling them. Instructors hear it all the time from students: "But I just can't understand what he wants me to do." Or "I can't understand what he said." A student complains that he never heard the tower call his N-number, while another turns to the instructor and asks, "What did he (the controller) say?"

Overcoming the "understanding" problem directly relates to what I said about becoming proficient in the transmitting process: With the hand-held radio, listen carefully to the typical controller responses to pilot calls as well as to calls controllers originate to pilots. Get a good idea of what sort of advice, information, or directives a controller typically communicates in different situations, such as taxi instructions, takeoff clearances, landing instructions, "flight-following" requests of an Air Route Traffic Control Center (ARTCC) on a cross-country flight, weather advisories from a Flight Service Station. The more you listen to the various dialogue exchanges, the more quickly you'll understand the typical responses and the sequence of information you could expect.

It would be nice if a neat two-way communication formula existed that would guarantee immediate transmitting and receiving success. Yes, there is a basic learnable structure for the various types of calls, but the art of skillful communications ultimately comes only with practice and experience. The odds are good, though, that after only a few hours in the air you'll find that your receiving ability has sharpened to the extent that it's no longer a source of worry or concern.

But—What If You Don't Understand?

No matter how many hours you have in your log book, there will be times when you simply can't understand what ATC is telling you. Some controllers do speak rapidly; some occasionally slur their words; someruntheir-wordstogether so that comprehension is nigh impossible; some may use a term with which you're not familiar; perhaps your radio reception is fuzzy; maybe somebody cuts in at the very instant that ATC is telling you what to do, and all you hear are squeaks and squawks. Whatever the situation, you don't get the message that was directed to you.

Here is where uncertainty can have serious consequences. Above all, if you haven't understood an instruction, *don't* just "roger" it and then pray that whatever you do will be the right thing. Remember that "communication" means "sharing," "making common." If you and the controller haven't shared a common message, there has been no communication.

The trouble is that people in general are often reluctant to admit they didn't understand a directive or an instruction—especially if they think that they should have understood it. It's a matter of preserving one's ego or self-esteem, of not losing face. One of the most meaningless questions an instructor, a boss, a parent can ask is, "Do you understand?" Unless there is trust between the two parties, not many people are going to respond with, "No. I didn't understand one thing you said!" That runs the risk of admitting ignorance or, even worse, stupidity.

Pilot and controller talk to each other on a one-on-one basis, but there's still that unseen audience out there capturing every word each party utters. Acutely aware of this, newer pilots uncertain, among other things, about

their radio communication skills face the added concern of exposing their uncertainty to their airborne compatriots. So they dutifully "roger" the instructions, hoping, with fingers crossed, that everything will turn out all right. Maybe it will; maybe it won't. Personally, though, I don't think playing Russian roulette a few thousand feet in the air is a very smart practice.

Count on it: The day will come, if it hasn't already, when you're not going to understand something a controller or a Flight Service Station (FSS) specialist has told you. When that time comes, immediately ask for clarification:

> "Tower, Cherokee Three Three Four Alpha, say again."
>
> "Tower, Three Four Alpha, say again more slowly, please."
>
> "Your transmission was garbled. Say again, please."
>
> "Am unfamiliar with the term. Please explain."
>
> "You were cut out. Please repeat instructions."
>
> "Am unfamiliar with the area. Please identify reporting point." (The tower has told you to report "over the twin stacks," but where are the "twin stacks"?)
>
> "Tower, did you say *right* downwind?" (The normal pattern is left downwind. Did you understand the tower correctly?)

Believe me. Every controller would much rather have you clarify an instruction than go off on some tangent that could endanger you or other aircraft operating in the same airspace. Covering up uncertainty just to save face is hardly worth the potential consequences.

The controller is similar to a coach, with the pilots the players. While we know that the pilot is ultimately in

command of his aircraft, the coach is still calling the plays. He or she is in charge and the players are expected to do as directed. If a "play" won't work in a given situation, tell the "coach." If there's uncertainty or confusion, it had better be cleared up *now,* because the "game" in the air is far more consequential than any earthbound contest.

Another Learning Step

An element in the pilot learning process that has existed for years is to meet with controllers face to face. Whether you do most of your flying at a controlled airport or not, it will do your confidence a world of good to meet those folks in the glass-enclosed cab atop the tower structure. Call a tower supervisor and arrange for a visit, either as part of a small group (four or five) or as an individual. Once the date and time are confirmed, sit down and develop a list of questions you want to ask or areas about traffic controlling that you may not thoroughly understand. Also, one question I found particularly productive when doing research for a communications book I wrote (*The Pilot's Radio Communications Handbook,* McGraw-Hill, 5th edition, 1998) was, "What are some of the things pilots say or do that particularly bug you or make it harder for you to do your job?" I guarantee that you'll tuck away the responses to that question and do your best never to be guilty of such offenses.

If possible, try to meet first with one of the controllers somewhere other than in the tower cab itself so that you can talk without interruptions. Then, after your questions have been answered, go to the tower cab and observe the various activities of ground control, clearance delivery, and airport traffic control. If you want to take pictures, go ahead, but get permission first.

I've never yet met a controller who didn't welcome visitors and the opportunity to answer questions. In many respects, such visits not only help the pilot better understand the rules, the procedures, and the radio communication language, but, in so doing, they also make the controller's job easier. They are valuable learning experiences, these visits. Try one; you'll like it.

In the same vein are visits to Air Route Traffic Control Centers ("Center" for short). These are units that control all of the IFR traffic across the United States, outside of the immediate airport area, and offer traffic advisory services (flight-following) to VFR aircraft—when the center's workload permits. Twenty centers that cover the contiguous 48 states are located in or near these cities:

Albuquerque	Houston	Minneapolis
Atlanta	Indianapolis	New York
Boston	Jacksonville	Oakland
Chicago	Kansas City	Salt Lake City
Cleveland	Los Angeles	Seattle
Denver	Memphis	Washington, D.C.
Fort Worth	Miami	

Additionally, there is one center each in Alaska, Hawaii, Puerto Rico, and Guam. These centers, controlling about 100,000 square miles of airspace each, cover a lot of geography, as FIG. 2-2 illustrates.

This is neither the time nor the place to discuss the workings of a center or the scope of its responsibilities. As a much more meaningful substitute, and regardless of your level of experience, I'd suggest a visit to one of these installations. Just be sure to call ahead to schedule a tour. Even better than that, though, is attending one of the FAA's "Operation: Raincheck" seminars, which are conducted about twice a year at the various

2-2 *The locations of the 24 centers and their areas of responsibility.*

center locations. These are not just walk-throughs of the facility; instead, they are meaningful opportunities to learn about the duties and responsibilities of a center and how it controls the IFR traffic in its geographic area. Additionally, seminar participants are able to sit with controllers at their radar positions, hear the communication exchanges between controller and pilot, and observe the radarscope (or "PVD," *planned visual*

display, as it often called) as the controllers monitor the traffic in their sectors of airspace.

Don't let the fact that centers exist to control IFR traffic discourage VFR-only pilots from signing up for an Operation: Raincheck session or otherwise becoming familiar with how a center functions. As a VFR pilot, you have every right to contact the center responsible for the area in which you're flying, tell him or her where you are and where you're going, and ask for "flight-following, workload permitting." If the workload does permit, the controller will then advise you of other traffic in your line of flight, or, if necessary, help you should you become lost or encounter an emergency of some nature.

Let's just say that being in radio contact with someone on the ground has many benefits, whatever one's level of experience.

Conclusion

Among other things in this chapter, I hope that I've made the point that a "team" relationship exists between the pilot and ATC. What complicates the usual team scenario, though, is that there is no opportunity to establish an in-person relationship. There's no opportunity to see the other person, to observe the facial expressions, gestures, or physical behaviors that constitute the "silent" language, the body language that so often communicates messages far more effectively than the mere transfer of words themselves. In the pilot-controller scenario, it's strictly a speaking-listening relationship that is totally dependent on the clarity of communications between the two parties. What this should mean to both parties is that each must truly listen to what is being said, question what is not understood, and, in turn, speak clearly and to the point. When comprehension prevails, there is usually harmony; when there is harmony, each party is a winner.

It's important, though, to note at this point one other situation, largely unmentioned so far. Up to now, I've talked primarily about communications in the controlled airspace environment. The fact is, however, that most of general-aviation flying takes place in and around nontower airports where there is no one on the ground controlling traffic, whether taking off, landing, or in the pattern. Radio communications in these environments, while heavily emphasized, are still not absolutely mandated by the FAA. In no way, though, does that minimize the importance of using the radio to keep track of who is operating in the airport area, where they are, and what their intentions are. I mention this aspect of the communication discussion now because it will be the focus of Chapter 5, along with a discussion of incidents and accidents that have occurred in these nontowered airport areas. That said, let's move now to Chapter 3 for an overview of the nation's airspace system.

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3

The Airspaces and Communication Requirements

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Any discussion of communications and the cases cited in the next chapters would be confusing, to say the least, unless one had a basic understanding of today's airspace system. As I think you'll see when we come to those later chapters, most of the incidents from ASRS were simply the products of pilot radio nonuse or misuse in the various airspace environments, largely because of ignorance of the operating regulations within a given airspace class.

Accordingly, what follows is a brief summary of the airspace system and its various communicating requirements. At the same time, the summary may help those who are not that familiar with the airspaces better visualize and understand what the reporting pilots did or didn't do, as well as my comments about the pilots' explanations of their actions.

"Controlled" and "Uncontrolled" Airspaces Defined

First, two terms that need defining: "controlled" and "uncontrolled" airspaces. According to the FAA, controlled

airspace is simply that in which air traffic control service, including aircraft separation, is provided to IFR flights. For those not familiar with what an IFR flight is, it's simply one for which the pilot:

1. Has filed an instrument flight plan, regardless of current or forecasted weather.
2. Is required to abide by all instrument flight rules.
3. Is subject to air traffic control instructions.

At the same time and to the extent its workload permits, ATC will offer certain services, when requested, to VFR aircraft. These services, which may include advisories of other traffic on cross-country flights, even though the VFR pilot had filed only a VFR flight plan or no flight plan at all and was just out on a Sunday afternoon sight-seeing trip.

"Uncontrolled" airspace is the rest of the airspace and includes the majority of airports in the United States and most of the airspace below 1200 feet agl (above ground level). With only a few exceptions, ATC service isn't available to aircraft, whether IFR or VFR, when you get below 1200 feet because of the lack of radar, radio, or transmission reception.

If you're a student or perhaps just a weekend VFR pilot, don't let the word "controlled" frighten you. The fact is, by definition, most of the airspace is controlled, but in no way does that limit you just to low-altitude flights into nontowered airports. Quite the contrary. In fact, you can fly VFR in controlled airspace from one end of the country to the other and never talk to an air traffic controller. All you have to do is be aware of the various classes of airspace and the requisites to operate within them. Then, if you or your aircraft doesn't meet the requisites, just avoid those areas (mostly the larger, tower-controlled airports and certain special-use airspaces) that require contact with

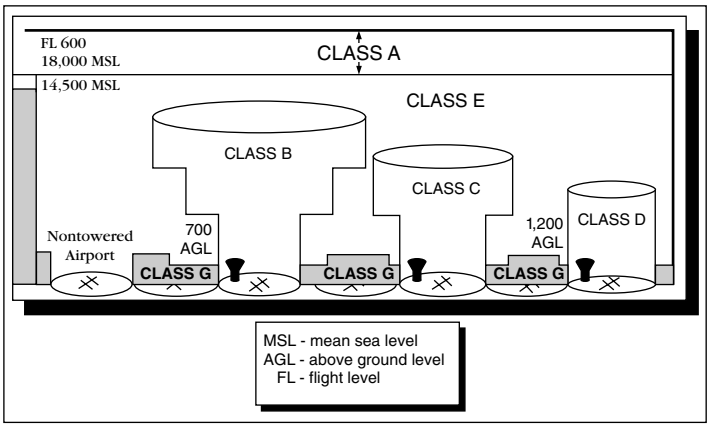
air traffic controllers. Perhaps these last observations leave you scratching your head, but hang on: I think I'll be able to clarify things in a few moments. For now, though, let's identify the airspaces and very briefly summarize the operating requirements for each.

The Airspaces Described

One quick explanatory note first: The United States adopted the airspace designations we have today back in 1993, in order to conform to the international nomenclature as adopted by the International Civil Aviation Organization (ICAO). Prior to 1993, we called today's Class B airspace a "Terminal Control Area" (TCA); an "Airport Radar Service Area" (ARSA) is now a Class C airspace; the Positive Control Area (PCA) is today's Class A airspace, and so on. What we had then versus what we have now is of no consequence, but if you hear pilots talking about TCAs, ARSAs, PCAs or the like, just recognize that those are the designs of the airspace structures themselves. As for today, and assisted by FIG. 3-1, let's look briefly at what these current airspaces are, starting with the most restrictive, the Class A.

Class A airspace

This is the airspace from 18,000 feet msl (mean sea level) up to 60,000 feet msl—or, as ATC would put it, "FL (Flight Level) 600." In this airspace, the pilot in command must be instrument qualified, all flights must operate in accordance with instrument flight rules (IFR) flight plans, and all aircraft must have operating transponders with altitude-reporting capabilities. Other regulations do apply to flight in Class A airspace, but these are the basics. This is the atmosphere in which the jets, the turboprops, and perhaps a very few piston aircraft operate and are at home.



3-1 *The designs and classifications from the most highly controlled airspace (Class A) to the least (Class G).*

Class B airspace

Class Bs identify the airspace surrounding the nation's 34 largest and busiest airports—the size being determined by the number of IFR operations or passenger enplanements. At the time of writing, those airports are as follows (asterisks [*] identify the 12 busiest Bravo airports, which also have special pilot requirements):

Atlanta*	Dulles*	Minneapolis
Baltimore*	Honolulu	New Orleans
Boston*	Houston	Newark*
Charlotte	Kennedy*	Orlando
Chicago*	Kansas City	Philadelphia
Cincinnati	LaGuardia*	Phoenix
Cleveland	Las Vegas	Pittsburgh
Dallas/Ft.Worth	Los Angeles	St. Louis
Denver	Memphis	Salt Lake City
Detroit	Miami*	San Diego

San Francisco*	Tampa	Washington
Seattle		Reagan & Andrews AFB

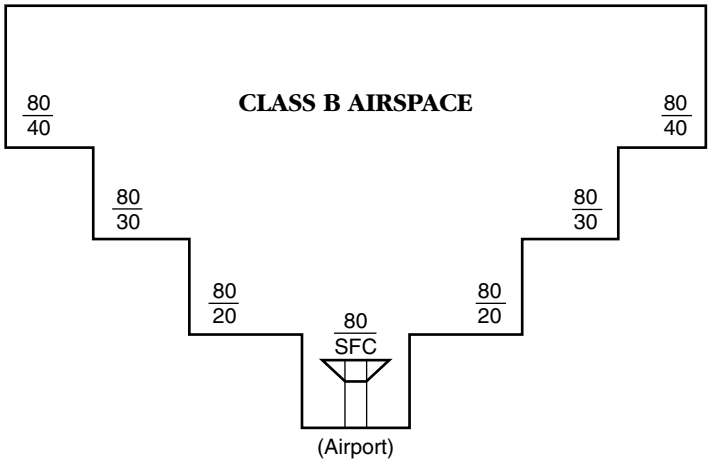
Student pilot requirements also exist for takeoffs and landings at the nonasterisked airports and, in all cases, the aircraft must have a two-way radio, an operable VOR or TACAN receiver, plus a transponder with altitude-reporting capabilities (a Mode C transponder).

Structurewise, if you'll picture an upside-down wedding cake, along with quick references to FIG. 3-2, the following may make a little more sense. Dimensionally, the airspace has a core center with a radius of approximately five miles surrounding the primary Class B airport. All traffic within that roughly 5-mile radius—landing, departing, transiting, or just shooting touch-and-goes—is controlled by ATC personnel (usually referred to as "local controllers") in the tower structure.

Starting at the surface, the airspace rises vertically to approximately 8000 feet msl. Depending on the airport, beginning at about 2000 feet, a series of two or more horizontal levels or layers extend out from the core, with the uppermost level ranging about 30 nautical miles from the center and up to the airspace's common 8000-foot ceiling.

This area, from the floor of the lowest level to the common ceiling, is designed to contain all published instrument procedures once an aircraft enters it. To penetrate any portion of the structure, however, requires specific approval by the responsible controlling agency. At both Class B and Class C terminals, that agency is Approach or Departure Control—Approach when entering the airspace for landing or when transiting the airspace, as on a

*To land or take off, the pilot in command must hold at least a private pilot certificate.



3-2 *The Class B airspace is typically described as an upside-down wedding cake.*

cross-country flight; Departure, after the tower's approval to take off, when the intention is to leave the immediate area of the airport itself.

Class Bs are easily identified on sectional charts, first by a large, blue square band that encompasses the primary airport and its surrounding geography, and then by the basically circular design of the airspace structure itself. The blue square, incidentally, reflects the territory covered by the Terminal Area Chart—a chart that enlarges the territory within the square and makes it easier for pilots not familiar with the area to spot landmarks and reporting points.

Minimum Class B radio contacts

Briefly summarized, the minimum radio contacts required to depart and enter a Class B airspace are:

Departure:

1. **ATIS** (Automatic Terminal Information Service)—Listen for local weather, runways.

2. **Clearance Delivery**—for heading, altitude, and clearance into B airspace.
3. **Ground Control**—for taxi permission and instructions.
4. **Flight Service Station**—open flight plan, if one has been filed.
5. **Tower** (the local controller)—for takeoff clearance.
6. **Departure Control**—for vectors, altitudes, etc., through the Class B airspace.

Arrival [Assumption: You are approaching the airport flying VFR and have not been receiving enroute advisories (flight following services) from a center.]:

1. **ATIS**—Listen for weather, runways, local airport conditions, etc.
2. **Approach Control**—Request **clearance into*** B airspace.
3. **Tower**—for landing clearance.
4. **Ground Control**—for taxi instructions to desired location.
5. **Flight Service Station**—To close flight plan, if one has been filed.

If you're flying VFR, after establishing contact and advising approach of your intentions—whether it is to land at the primary airport, another airport that is under, but not in the B airspace, or merely transit the area—*always* wait until you hear, "(your call number) **cleared into** (blank) Class B" before you penetrate any portion of that airspace. This means that you should be 25 miles or so (depending on the type of aircraft you are flying) out

*Emphasized because entering a Class B airspace without permission is forbidden.

from the level of the B airspace you intend to enter when you make that initial call—which is why the Terminal Area Chart, with its enlarged detail of the area, is so valuable. It helps you orient yourself in relation to the B airspace and, by so doing, keeps you out of trouble.

Another thing: What information should you include in that initial contact with approach at a B or C airspace and with a tower controller at a Class D airport? If you follow this little acronym, you'll say what should be said, and no more: IPAI/DS. Translated:

I = Identification

P = Position

A = Altitude

I/D = Intentions OR Destination

S = Squawking

Example: *Pilot: International Approach, Beech-4321 Bravo, over Topeka VOR at five thousand five hundred landing International. Squawking twelve.*

App: Beech 4321 Bravo, squawk two two one five and ident.

Pilot: Two two one five.

App: One Five Bravo, ident received. Cleared into the Class B airspace. Turn heading eight zero and descend to four thousand.

Pilot: Eight zero and four. One Five Bravo.

And so on.

This is the preferred structure of the initial call to Approach or to a Class D tower when you have not been utilizing the services of a center and the call is the first the controller has heard from you or known about you. The main point is that if you keep that acronym in mind, your call will be brief, complete, and to the point.

No stumbling, no unnecessary verbiage—and that's what controllers really appreciate, no matter where they work.

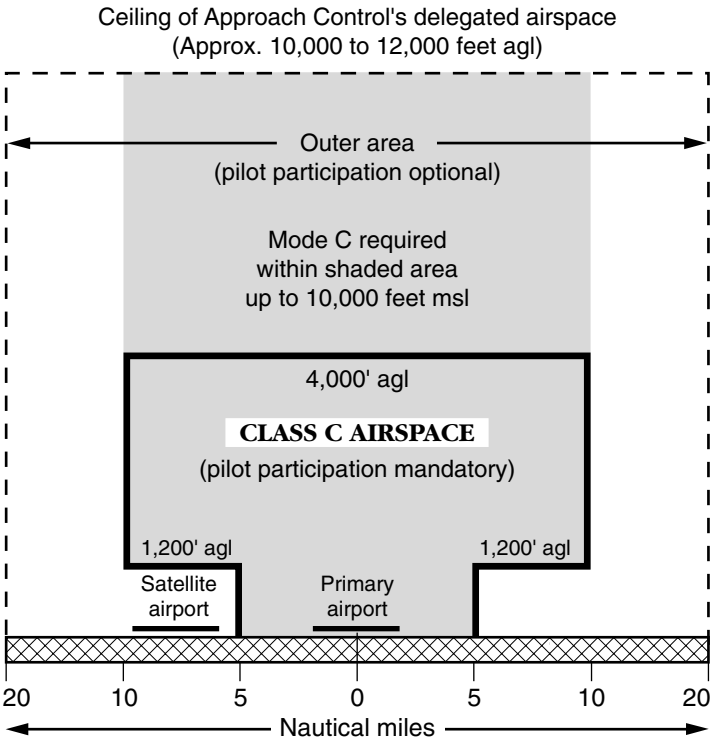
Class C airspace

Similar to the Class B, but more modest in structure, the Class C airspace also pertains to the airport environment and affects some 120 airports across the country. These are the middle-sized airports that have a high volume of instrument flight handlings and passenger enplanements but not at the level of the Class Bs.

The C airspace (FIG. 3-3) starts at the surface with a 5-nautical-mile radius core, called the *inner circle,* that surrounds the primary airport and goes from the surface to about 4000 feet msl—the most common but not universal ceiling of the airspace. Beginning at about 1200 feet and rising to that common ceiling is a shelf or layer that extends 10 nautical miles out from the primary airport. This area is called the *outer circle.* Radio contact with the tower, approach control, or both, is mandatory before entering either of these two circles, and that contact must be maintained while in them.

Beyond the outer circle is the *outer area* that exists from the surface up to the ceiling of the local approach control's limits of authority—approximately 10,000 to 12,000 feet msl. Radio contact with ATC is *not* required in this outer area, but if a pilot wants traffic advisories or alerts while in it and contacts approach control accordingly, approach is required to provide the service. If you're in the outer area, however, and want to enter the outer circle or the inner circle, you must first establish radio contact with the approach controller.

Regulationwise, any pilot, from student on up, may operate within the airspace; the aircraft must have a



3-3 *This Class C profile illustrates the inner and outer circles and the outer area of the airspace.*

two-way radio and an operable transponder with altitude-reporting equipment (Mode C), and the pilot must maintain radio contact with ATC while operating in the inner or outer circles. Contact, as I said, is optional in the outer area. You can easily spot a Class C airspace on the sectional by the blue-colored airport symbol and a usually circular heavy magenta design that surrounds the airport itself.

Minimum Class C radio contacts

Similar to Class B, the minimum radio contacts to leave or enter a Class C airport are:

Departure:

1. **ATIS**—for local weather, runways in use, and the like.
2. **Clearance Delivery**—for heading, altitude, and clearance into C airspace.
3. **Ground Control**—for taxi permission and instructions.
4. **Flight Service Station**—to open flight plan, if one has been filed.
5. **Tower**—for takeoff clearance.
6. **Departure Control**—for vectors, altitude changes, other traffic in the Class C airspace.

Arrival:

1. **ATIS**—Listen 15–20 miles out for local weather, runways, airport conditions, etc.
2. **Approach Control**—Request clearance into* Class C airspace (IPAI/DS).
3. **Tower**—for landing clearance.
4. **Ground Control**—for taxi clearance or instructions to desired parking location.
5. **Flight Service Station**—(by radio or phone) to close out flight plan, if one filed.

*Step 2 and the matter of "clearance" differs considerably from that at a Class B airport. If arriving at a Class C, say Nashville, Tennessee, and after monitoring the latest ATIS transmission, you dial in the appropriate Approach Control frequency (available from the current *Airport/Facility Directory* [A/FD]). The initial call, then, is simply

> *Nashville Approach, Cessna 1246 Alpha.* (Say no more. Wait for Approach to respond.)

Now assume that Approach is busy and can't properly respond to you at that moment but the controller

comes back and says: *Cessna 1246 Alpha, stand by.* If that's all you hear, you have established contact with Approach and may continue into the Class C area. The regulation states that communication with the controller must be *established.* This was done when the controller responded with your call number and the direction to "stand by."

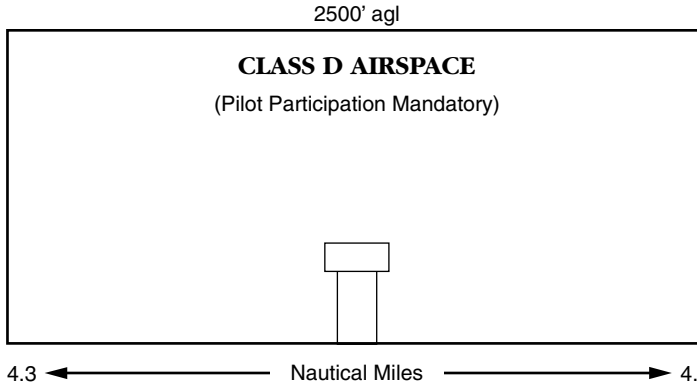
On the other hand, if the controller does *not* include your aircraft number in his response, as: *Aircraft calling Nashville approach, stand by,* contact has not been established, you have not been authorized to enter the airspace, and you must circle or do whatever is necessary to stay out of the controlled area until you can call approach again for the necessary approval.

Class D airspace

The Class D airspace is designed for the still smaller airports in terms of activity but that have sufficient volume to justify the existence of a control tower. In fact, some of these Class Ds can have more operations per month or per year than a Class B airport, but the operations are generally more of the light plane nature — not IFR activities or high-passenger enplanements.

Structurally, the airspace rises from the surface to about 2500 feet agl and extends horizontally 4.3 nms from the airport center (FIG. 3-4). Regulationwise, any pilot, student on up, can operate within the airspace; two-way radio contact with the tower must be established before operating within the airspace; and the aircraft is required to have an operating two-way radio capable of communicating on the tower frequency.

To identify a Class D on the sectional, look for a blue-colored airport that is surrounded by a blue segmented circle. That circle, located 4.3 nms from the center of the airport, defines the limits of the airport control area.



3-4 *The Class D airspace—the smallest but perhaps busiest of the tower-controlled airports.*

Similar in concept to the B and C Classes, you must secure the control tower's authorization to enter any portion of that area. The major difference between a Class D and the other two airport environments is the absence of an approach/departure facility. At the Ds, the tower is responsible for all flight activity within that 4.3-nm area—which is also true at the Bs and Cs. Out beyond that area, however, and unlike either a C or B airport, the airspace is a Class E and IFR traffic is controlled by a nearby Class C, a Class B, or a Center, but VFR operations are uncontrolled.

Minimum Class D radio contacts

The minimum radio contacts required for a VFR pilot in a Class D airspace are:

Departure:

1. **ATIS**—Listen for local weather, runways, airport construction, and the like
2. **Ground Control**—for taxi clearance and instructions

3. **Flight Service Station**—to open flight plan, if one was filed
4. **Tower**—for takeoff permission

Arrival:

1. **ATIS**—monitor 15 miles or so out for local weather, runways in use, etc.
2. **Tower**—call at least 10 miles out for landing instructions (IPAI/DS)
3. **Tower**—(to advise when clear of runway after landing
4. **Ground Control**—request taxi approval or instructions
5. **Flight Service Station**—radio or phone to close flight plan, if one filed

Other calls of various varieties may be necessary or requested, but these are the minimum that must be initiated by the pilot at any tower-controlled airport, regardless of Class.

Class E airports and airspace

Typically, Class E includes certain nontower airports that are equipped with weather reporting sources, such as ASOS (Automated Surface Observation System) or AWOS (Automated Weather Observation System) and have been approved for Part 135 commuter and on-demand flight operations. Control of IFR aircraft in this E environment is provided by a nearby Approach/Departure facility or an Air Route Traffic Control Center with the aid of one of its remoted communication outlets.

But these airports may also have a chameleonlike characteristic, in that they change status depending on the existence or nonexistence of certain features. To illustrate:

Airport A has no tower, but a weather-reporting resource, such as ASOS, AWOS, or a qualified weather observer, is on the property. As long as one of those resources is available, the airport is a Class E. Should the observer go home for the night, however, and either there is no automated source or it is out of service, no weather information is available, so the airport reverts to the uncontrolled status of a Class G.

Airport B has a tower and a weather-reporting source on duty. This, then, is a Class D. Let's say, though, that the tower closes from 11:00 PM to 7:00 AM local time. If the weather source is still available, the airport becomes Class E during those eight hours of downtime. Should both the tower and the weather source go off duty simultaneously, though, the airport drops to the status of an uncontrolled Class G.

Additionally, Class E consists of all of the controlled airspace from 700 or 1200 feet agl up to 18,000 feet msl, except when an airport lies beneath, but not in, a Class B or C. In those instances, Class E rises up to the base of the overlying B or C airspace.

Class E airports (FIG. 3-5) are magenta on the sectional and are further identified by a pale blue and magenta circle or cookie-cutter design that surrounds the airport. If you'll look at a typical example, as FIG. 3-5, on any sectional chart, you'll see that the sharp outer edge of the circular figure is bluish, while the inner magenta portion becomes fuzzy as it fades inward towards the airport symbol. This coloration means that the ceiling of the Class E airspace is 700 feet agl inside the circle and 1200 feet everywhere else outside the circle until the airspace encounters another Class E, D, C, or B airspace.

The design, along with whatever cookie-cutter features it might have (there are none in FIG. 3-5), usually defines the "transition" area that is designed to expedite

3-5 *A Class E airport and its transition area.*

and protect arriving or departing aircraft during IMC weather. Within this "design," VFR operations are prohibited or limited when IMC prevails.

In all the rest of the Class E airspace outside of airport environments, flight operations can be VFR or IFR, but only IFR traffic is controlled by one of the Air Route Traffic Control Centers. This means that a pilot intending to fly IFR must:

1. File an IFR flight plan.
2. Maintain continuous contact with one of the centers.
3. Make periodic position reports.
4. Conform to directions, vectors, altitude changes, and the like, as issued by the various ATC agencies the pilot would encounter from flight departure to arrival.

On the other hand, VFR pilots don't have to file a VFR flight plan (it's dumb not to, though) to fly anywhere in the United States. Furthermore, once out of a B, C, or D airspace, they never have to call a center or talk to anybody on the ground unless they prepare to land at some tower-controlled airport.

Maintaining such radio silence on a cross-country trip, however, isn't very smart, because center, its workload permitting, will provide what is called "flight following," will alert you to other traffic that might affect your flight, and can assist you materially if you're lost or encounter an emergency of some nature. Meanwhile, even if you've been receiving flight following, you're still flying uncontrolled in a controlled airspace. That means that you can go where you want to go and do what you want to do *as long as* you abide by the standard VFR altitude and cloud separation regulations and keep ATC informed of what you want to do.

Radio communications are a different story, though, when it comes to landing or departing a Class E airport in VFR weather conditions. No, there's no tower, hence no traffic controller, hence the greater the need to announce over the air where you are, what you're doing, and your intentions. Out of approximately 5130 airports available for unrestricted public use in the United States, 4450 fall into this uncontrolled category—and it is in and around these smaller but often busy fields where the risk of accidents is the greatest. In many ways, it's probably safer for a VFR pilot to land at Chicago's O'Hare than at many of the one-strip uncontrolled airports on some sunny summer weekend.

Communications in the Class E airspace

There are no FAA-required radio calls when operating in a Class E environment, but this is one area, along

with Class G airports, where communications to or between other pilots is critically important. With no one on the ground controlling the flow of traffic into and out of the airport area, the opportunity is ripe for confrontations of the worst kind. I'll have more to say about this in later chapters, so for now, let's merely establish how to find Class E airport frequencies, where radio calls should be made, and the basic content of each call.

First, locating the frequencies: For a given non-tower airport, check the sectional chart or the *A/FD* for what is called "unicom." This is the aeronautical advisory station that the local radio operator and pilots use to communicate weather and traffic information. Almost certainly, you'll find that the unicom frequency will be *122.7, 122.8,* or *123* in italics. Let's say it's *122.7.* This, then, is the *Common Traffic Advisory Frequency,* or CTAF, for that airport and the one frequency to use for all traffic position reports and contacts with the airport's FBO (Fixed Base Operator).

An FBO, if you're not familiar with it, is the facility, typically run by the owner or operator, where you get oil, gas, sectional charts, coffee, perhaps a mechanic, and the like. It's here, too, either in person or by radio, where you can get information about what runway(s) are in use, the volume of traffic, the type of aircraft in the area, and, if there is no automated weather reporting equipment on the field (AWOS or ASOS), the FBO operator will advise you of the wind speed direction, perhaps the altimeter setting, visible weather condition, and the favored runway.

So, as a matter of preflight preparation, determine the CTAF for the airport you intend to visit and use it, basically in accordance with this sequence:

Arrival:

1. Ten to 15 miles out, tune to the CTAF, such as *122.7,* and monitor the frequency to see what you can learn from aircraft in the pattern or what information the FBO might be relaying to others who have already called in. If you can pick up the wind information, the favored runway, and the like just by eavesdropping, all the better. You're sparing the airwaves that one transmission.
2. If you don't hear anything, address your initial call to the FBO on *122.7* and ask for a "field advisory," which is a request for the current winds, the runway in use, and traffic activity.

   Smithtown Unicom, Cherokee 3434 Tango 10 east at three thousand five hundred for landing Smithtown. Request field advisory. Cherokee 34 Tango.

3. Listen for the FBO's reply, and then acknowledge, as: *Roger, Smithtown. Will enter left downwind for landing runway one five Smithtown. 34 Tango.*
4. As you enter the downwind at a 45° angle, announce your position and intentions:

   Smithtown traffic, Cherokee 3434 Tango entering left downwind for landing one five Smithtown.

   Note that all position reports are now addressed to "(blank)…traffic," not "unicom." Note, too, that the airport name is repeated at the end of the message. At some of these nontower airports, there are frequently several other fields in the same general area that may have the same unicom frequency,

and a lot of confusion can result as to which airport a pilot is talking to or about unless the calls both start and conclude with the airport name.

5. Repeat the position report as you are turning onto the base leg:

   Smithtown traffic, Cherokee 34 Tango turning base for landing one five Smithtown.

   It's much easier for other aircraft to see you when you're in the process of making a turn than when you're flying straight and level, so make the calls to both base and final while you're in the banking configuration.

6. Make a similar call when turning base:

   Smithtown traffic, Cherokee 34 Tango turning final for landing one five Smithtown.

7. You've landed and are clear of the runway:

   Smithtown traffic, Cherokee 34 Tango clear of one five. Taxi to the ramp. Smithtown.

That's a total of seven calls to get your airplane on the ground and parked at a nontower airport. Perhaps it seems like a lot, but you can't be too cautious at these uncontrolled fields. It's better to make one more call than seems necessary than to wish later that you had done otherwise.

Departing a Class E airport

Summarized briefly, these are the routine departure calls:

1. On the ramp after engine start:

   Smithtown traffic, Cherokee 3434 Tango at the FBO, taxiing to one five for departure Smithtown.

2. After predeparture engine run-up and final check:

   Smithtown traffic, Cherokee 34 Tango taking one five for west departure Smithtown.

3. When airborne and about five miles out from the airport:

   Smithtown traffic, Cherokee 34 Tango clear of the area to the west. Smithtown.

This is just a courtesy call to let other local traffic know that you are out of the pattern area and that there is one less aircraft occupying airport airspace. A small gesture but one no less appreciated.

Obviously, there are many other possible radio calls in an uncontrolled Class E or G airspace, but those summarized here are the basic transmissions for VFR or IFR landing and departing operations in VMC (Visual Meteorological Conditions) weather. Just keep these key points in mind:

- Be sure your radio is on and that you're tuned to the correct airport frequency.
- Address all position reports and intentions to "(Blank) *traffic*."
- Always conclude your calls by repeating the name of the airport.
- Don't expect the unicom operator to control *any* traffic. Unicom is a nongovernment service provided by the city or a private party and has no authority of any sort over aircraft ground or flight operations. Unicom may advise, perhaps alert, but not order.

Always abide by the airport's established traffic pattern. If it's left-hand traffic, it's left-hand traffic. Period. That also means no straight-in approaches. These can

really upset the flow of traffic, delay departing traffic from taking the runway, cause other aircraft to widen their patterns, do 360° turns to avoid a conflict, or the like. Go by the book; fly the pattern by the book. You'll never be wrong!

Class G airspace

No, I didn't leave anything out: There is a Class F airspace, but that's for foreign use only. We in the United States have nothing to correspond with it, so forget about it, unless you intend to go flying overseas.

Class G is what little airspace Classes A, B, C. D, and E leave untouched—meaning the space that rises from the surface to either 700 agl around some airports or 1200 feet agl, where it meets the Class E floor. Pilot minimums in the Class G are student on up, and the aircraft need have no radios.

This is obviously the simplest environment in which to fly, from a traffic control point of view. Keep in mind, though, that you have only a maximum altitude of 1200 feet to play with, so except for pattern work around an uncontrolled airport, the operating space to go places and do things is somewhat limited. To operate VFR in the G space, you must have at least one-mile visibility and can remain clear of clouds. Once you get above 1200 feet, the VFR Class E airspace regulations normally come into play, requiring three miles visibility, plus the ability to remain 500 feet below the clouds, 1000 feet above, and 2000 feet horizontally.

The standard CTAF for the Class G airports and airspace is *122.95*. As there is no unicom service on the airport, the initial call (as in the Class E Smithtown example) for a field advisory would be useless. That doesn't mean, however, that an arriving pilot shouldn't tune to *122.95* 10 to 15 miles out to listen in on any pos-

sible traffic talk that might reveal the volume and type of current traffic as well as what the weather conditions are. If all is silent, however, a blind call like this is in order:

> *Any aircraft at Seedy airport, this is Cherokee 3434 Tango 15 north for landing Seedy. Can you give me a field advisory? 34 Tango.*

Depending on what you hear or don't hear, the other calls are much like those in the Class E example, as: **Arriving:** Initial position and intentions; entering downwind, on downwind, turning base, turning final, after landing when clear of the runway. **Departing:** On the ramp; when taking the active runway; after clearing the Class G area.

I can't emphasize enough the importance of these various radio transmissions in any Class E or G nontower, uncontrolled airport. These often seemingly quiet little airports can present hazards unknown in the busy B, C, or D environments. Perhaps some of the ASRS cases in the upcoming chapters will bear out that point and convince any doubters that silence is not necessarily always golden.

Terminal Radar Service Areas (TRSAs)

An oddball in the airspace family that needs to be acknowledged is the Terminal Radar Service Area, or more commonly referred to as "TRSAs" (pronounced "Tersas"). The reason TRSAs exist as unlettered airspaces is because

1. Nothing like them exists elsewhere in the ICAO world.
2. The airports affected lie somewhere between Class Cs and Class Ds in terms of IFR activity and enplanements—sort of neither this nor that.

There aren't too many of these TRSAs around the country, and sooner or later, it's expected that, trafficwise, each will move up to a Class C or down to a Class D. Meanwhile, they're sort of an anomaly and probably won't remain very long in that "neither/nor" state. They are part of the country's airspace system, though, and thus can't be disregarded in an airport classification discussion.

Identified on sectional charts by black lines (they appear as almost a dark gray), the TRSA structure is basically circular as it surrounds the primary airport and extends outward about 15 nautical miles in a pattern somewhat similar to Class B or C airspaces. The airport itself is a Class D, but the rest of the airspace underlying the TRSA is normally Class E.

While the tower is responsible for all traffic within the approximate five-mile radius around the airport, what makes the TRSA unique is that Approach and Departure Control provide radar sequencing and separation services to all IFR aircraft, and elements of that service are *available* to arriving and departing VFR traffic between that five-mile radius and the outer limits of the TRSA.

Note the word *available.* This simply means that the arriving VFR pilot should contact Approach Control about 25 miles from the airport with the usual IPAI/DS, as:

> *Augusta Approach, Cessna 6789 Kilo, 25 north at three thousand five hundred, landing Macon with Echo,* squawking twelve.** Request traffic information. 89 Kilo.*

Unless you advise approach otherwise, the controller will assume that you also want sequencing service along with traffic advisories. To the extent its workload

*Identifies the current ATIS recording.
**Reports the current VFR transponder code—1-2-0-0—being transmitted.

permits, approach will now provide traffic information and perhaps sequencing up to the time the controller advises the pilot to contact the tower for traffic pattern and landing instructions.

If you don't want the radar service, all you have to do is conclude your initial contact with, *Negative radar service. Cessna 6789 Kilo.*

When departing a TRSA, VFR pilots are, as *AIM* puts it, "…encouraged to request radar traffic information by notifying ground control on initial contact with their request and proposed direction of flight." Example:

> *Augusta Ground Control, Cessna Six Seven Eight Niner Kilo at Garrett Aviation, ready to taxi with Delta. VFR northbound. Request radar traffic information.*

(Note: "Garrett Aviation" is where 6789 Kilo is parked. "Delta" is the current ATIS information.) If you don't want the traffic service, simply replace the request with: *Negative TRSA service.*

As far as radio communications are concerned, they follow the same basic pattern of those in a B or C airspace, if you want TRSA service, or as in a D airspace when you don't want that service and choose to contact only the tower for landing instructions.

Again, how long the TRSAs will be around is a matter of conjecture. If you should have the occasion to go to one, though, you'd be wise to review the communicating and operating procedures and check the current *AIM* for any new rules or regulations.

Special-Use Airspaces

One other type of airspace that requires attention is broadly categorized as "Special-Use Airspace" (SUA). In all cases, SUAs are established for purposes of:

1. National security, welfare, and environmental protection.
2. Military training.
3. Research, development, testing and evaluation (RDT&E).

While the airspaces reserved for security, welfare, and the environment could require some flight detours or altitude changes, their size and sparseness make them relatively minor obstacles to VFR or IFR operations. Not so, though, with the areas designed for military training and RDT&E, which provide space for all sorts of flight maneuvers, bombing runs, aerial gunnery, or artillery practice. In light of the dangers an active SUA presents, the few comments that follow may help those pilots not familiar with them and what makes them an integral part of the airspace system.

Types of special-use airspaces

The main types of special-use airspace that should concern the typical nonparticipating VFR pilots are, in abbreviated form, as follows. (I stress VFR pilots here because ATC controls IFR aircraft and routes or reroutes those operations according to military activity within a given SUA. "Nonparticipating" identifies aircraft, VFR or IFR, that are not a part of or involved in the scheduled or ongoing military activities in a SUA.)

Prohibited

Certain geographic areas have been set aside to protect wildlife, recreational and historic lands, or national security. Examples of such areas include the White House and government buildings in Washington, D.C.; Camp David; the Naval Support Facility, Thurmont, MD; and the Department of Energy's nuclear facility at Amarillo, Texas, to mention a few.

Since flight below the published altitude for each area is prohibited, be sure to check the appropriate sectional chart for locations of prohibited areas over which you might be flying and the related altitude restrictions.

Restricted

Restricted areas are designed for artillery, missiles, lasers, ground-to-ground, ground-to-air gunnery, and similar RDT&E exercises. Obviously, then, penetration of these areas is extremely hazardous if a given area is active, or "hot," to use the vernacular. Consequently, be sure to check the appropriate sectional chart for any Restricted areas in your proposed line of flight and the periods of *planned* activity. Also contact the appropriate Flight Service Station or Center on the day of flight for the *actual* activity before entering a hot restricted area. If one is indeed hot, STAY OUT.

Military operation areas (MOAs)

These are large blocks of airspace identified on the sectional by vertically striped magenta bands and, sizewise, are the most frequent obstacles to normal VFR cross-country flight. Entering a MOA is not prohibited, but a nonparticipating aircraft should exercise extreme caution if the area is hot because the typical military activity includes flight training exercises, combat maneuvers, aerobatics, and air intercept training.

For flight planning purposes, refer to the current sectional chart for days and hours of scheduled activity. Additionally, contact the appropriate Flight Service Station or center on the day of flight for actual scheduled hours. The MOA's using agency, let's say an Air Force unit, has a scheduling office that daily advises the center and Flight Service Station in whose area the MOA is located of the intended activity. That office also keeps the center and Flight Service Station updated on

scheduling changes as well as current MOA activity. As a rule, though, center is advised first of any changes, and is thus the logical initial source to contact for an update, once your flight is under way and you near the MOA in question. If the MOA is reported as hot, the strong recommendation is to stay out and detour around the area or fly above or below the altitudes of activity. Keep in mind that those military pilots aren't looking for nonparticipating traffic in their midst, and the aircraft they're flying, as you so well know, could be on you long before you had a prayer of taking evasive action.

"But," you might be saying, "Center has been giving me traffic advisories and flight following all along. Won't they do the same in the MOA?" It's most unlikely. The reason is that in so many instances, center's radar, even with the benefit of its remote communication outlets (RCOs), could lose contact with the military aircraft during their maneuvering and constant altitude changes as well as at low altitudes. Also, to protect its own aircraft, the military may have invoked what is called "MARSA," the acronym for "Military Assumes Responsibility for Separation of Aircraft." This system of air traffic control is typically accomplished by military radar units (MRUs), airborne radar units (ARUs), or just plain visual separation by the pilot who assumes the responsibility to see, avoid, and stay within the confines of the assigned airspace.

These MOAs can occupy a lot of that airspace, but the dangers of venturing into them as a nonparticipator on an innocent cross-country are simply not worth the few miles or gallons of fuel you might save. Moral: If hot, stay out!

Military training routes (MTRs)

Watch out for these! They're just thin gray lines on the sectional that look harmless enough, but tracing their

paths at low or high altitudes are rapidly moving military aircraft on assigned training missions. A Department of Defense and FAA joint venture, MTRs come in two forms: IFR, which is charted as IR, and VFR charted as VR.

All routes flown exclusively below 1500 feet agl are assigned a four-digit number, as IR 1138. Routes with one or more segments above 1500 feet have three numbers, as IR 154. (Don't confuse these routes on the sectional with the slightly larger blue Victor airways and their airway numbers, as V66 or V385.) Another thing: a given-numbered MTR always has one-way traffic flown in the direction of a small arrow placed just ahead of the route number. Unlike Victor airways, though, the same MTR will have a different route number in the opposite direction. For example, MTR1141 in Texas runs east to west and its reciprocal, 1142, goes west to east. Same route over the same geography in the opposite direction but different route numbers.

Something else about MTRs: That thin line on the sectional doesn't look very imposing, but be not fooled. Its thinness hardly reflects its width. If there is an average route width it's probably 5/5, meaning 5 miles either side of the centerline. Don't take that as a rule, though. One route originating in Nebraska varies from 4/4 to 16/25; one in Florida is 10/10 throughout; another in New Mexico fluctuates from 5/5 to 7.5/7.5.

If your flight route parallels or crosses an MTR, check with the appropriate Flight Service Station to get a reading on the potential activity at the time you will be in the MTR vicinity. The FSS will have the planned activity, but once on your way, you'd be wiser to call the controlling center and ask for an update. Military plans and intentions being subject to change, the center will always have the latest schedule of activity.

Other SUAs

Three other types of Special Use Airspace, though not as frequently encountered or as hazardous, should also be noted:

1. **Alert**—which is identified on the sectional charts and is designed to alert all pilots to an area of high-volume pilot training, civilian or military, or other types of aerial activity. There is no air/ground radio communication system ("*No A/G*" notation on the sectional) that is dedicated solely to controlling traffic in the area. Said simply, anyone can enter an Alert area, but use great caution when doing so. The traffic may be very heavy.
2. **Warning**—These chunks of airspace lie offshore and are very similar to the restricted areas, in terms of activities and hazards. One type of area is *nonregulatory,* which lies over international waters beyond 12 nautical miles from the U.S. coastline and thus cannot be regulated by the FAA. Regardless of that, the same warnings cited earlier about entering a restricted area over land apply equally here. In other words, stay out!

   The second type is *regulatory.* These areas extend from 3 to 12 miles from the coast, now considered U.S. territorial waters. Here, the activity is similar to that in land-based restricted areas, the airspaces are thus regulated, and entry by nonparticipating pilots is prohibited.
3. **Air Defense Identification Zones (ADIZs)**—These are airspaces over land or water in which the ready identification, location, and control of civil aircraft is required in the interest of national defense. To operate in an ADIZ:

- The aircraft must have a two-way radio and Mode C altitude-reporting transponder;
- The pilot must file an IFR or DVFR (Defense VFR) flight plan;
- IFR and DVFR position reports are required;
- Flight plan deviations by IFR aircraft in uncontrolled airspace and DVFR aircraft are prohibited unless the appropriate aeronautical facility has been notified prior to the deviation;
- Radio failures must be reported to the appropriate facility as soon a possible.

Conclusion

If you have a few hours in your logbook, this airspace discussion may not have been necessary or anything new. For those, however, just starting out as pilots (and perhaps for even some of the more experienced among us), I felt that knowledge of our airspace system was essential in order to visualize the situations in the ASRS cases and understand the role that radio communications, or lack thereof, played in creating the various reported incidents, accidents, or NMACs (near midair collisions).

One other reason for this brief review: No discussion of pilot safety would be complete without stressing the importance of thoroughly understanding the airspace system. I think you'll see that borne out in several of the ASRS cases, which thus makes it obvious that much more could be said about the system—except that this is not the occasion to delve into all of its details and regulations.

Fortunately, though, the whole airspace structure, and indeed the system itself, is relatively uncomplicated—even for those new to aviation. I would suggest, however that no pilot venture into controlled airspaces such

as Class B, C, or D airports or the Special-Use Airspaces without a thorough understanding of the regulations and what is required communicationswise to enter and while in the airspace itself. If you don't have the feeling of confidence that you'd like, don't let ego get the better of you. You might be surprised as you go through the upcoming cases by the number of highly experienced airline or commercial pilots who, in their ASRS reports, openly admitted their mistakes and their "I-should-have(s)."

So, if you have questions or uncertainties, seek out sources you trust, such as instructors, experienced pilots, FAA authorities, *AIM,* books, videotapes, and so on. A lot of people and a lot of literature are available to help you. Take advantage of what's there, and then sally forth, secure in what you know and what you know is expected of you.

4

Communications Cases in the Tower-Controlled Airport Environment

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As I implied in Chapter 2, this and the next four chapters focus on the various operating phases in which pilot radio communications are particularly critical. In terms of the "critical," it's probably safe to say that nowhere are clear radio communications more important than in the Class B, C, or D airspaces. Here, with the high volume of incoming, outgoing, and transiting traffic, all compressed into a small geographic area, there is little room for uncertainty or misunderstandings as to who is doing what. Even more, there's no room for failing to communicate at all. Be it on the ground or in the air in these controlled airspaces, others, pilots and controllers alike, must know where you are as well as what you intend to do. All of that is probably self-evident, but the regulation violations and accidents within the general airport environment continue to be problems of concern.

Before getting to specific cases that illustrate some of those problems, you might also recall what I said in Chapter 3 about communication requirements in these

Class B, C, and D airspaces—namely, that radio communications *must* be established with ground control, the tower, and approach or departure control before taxiing, taking off, landing, or entering a Class B or Class C airspace. The same also applies to the Class D airports, except for the Approach or Departure control facility. Being less busy facilities, the Class Ds don't have the need for that type of service.

The few remaining Terminal Radar Service Area airports (TRSAs) do have approach control, but using the service is voluntary for pilots operating VFR. As with a Class D, however, both the VFR and IFR pilots must contact the tower for approval to enter the immediate airport area and to land or take off.

In all of these contacts, keep in mind that communications must be brief and to the point. As obvious as that is, even experienced pilots can, and do, get carried away with needless on-the-air chatter and confusing messages. Maybe it's oversimplifying things, but in that context, it does seem that if the communication barriers highlighted in Chapter 2 are replaced by clear, concise information exchanges, a major attack on both airport ground and in-flight incidents will have been launched. Above all, pilots, please think before talking and remember the KISS admonition to Keep It Simple, Stupid.

Some ASRS Cases and Analyses—Introduction

Turning now to the ASRS case studies, let's start in this chapter by reviewing reported cases of taxi and runway incidents at tower-controlled B, C, and D airports—cases that illustrate some of the all-too-common communication breakdowns or failures. Next, we'll look at

takeoff, landing, and traffic pattern incidents that occurred at these same classes of airports, and then conclude the chapter with Class B, C, or D violations in the controlled airspaces outside the standard five-nautical-mile radius of the immediate airport area itself. These are not high-drama, "never again" stories, but rather objective pilot reports of situations resulting from one sort of communication breakdown or another. In that context, we can perhaps learn from others, or, equally important, be reinforced that our communicating practices have been right on target all along.

Each case, you'll note, begins with a summary of some basic ASRS data as to who reported the incident, flight conditions, aircraft type, and so on. Next are the facts of the reported incident. Finally, following the case summaries are my comments about what happened, why it might have happened, what should have been done differently, and the corrective actions the reporter of the incident intends to take in the future. (You may be surprised at the frankness most of these reporters display in analyzing their mistakes of omission or commission.)

In reproducing the cases, I've made only minor edits, such as decoding acronyms or abbreviations with which a reader might not be familiar, and occasionally rewriting a sentence to make it more comprehensible. Otherwise, all incidents are as they appear in the ASRS database. To assist in one aspect of the decoding process, however, the type of aircraft involved in a given incident is described or identified according to weight by the following:

SMA—small aircraft (less than 5,000 lbs.)

SMT—small transport (5001–14,500 lbs.)

LTT—light transport (14,501–30,000 lbs.)

MDT—medium transport (30,001–60,000 lbs.)

MLG—medium large transport (60,001–150,000 lbs.)

LRG—large transport (150,001–300,000 lbs.)

HVT—large transport (over 300,001 lbs.)

WDB—wide-body (over 300,001 lbs.)

ULT—ultralight (including hang gliders)

SPN—sailplane/glider

SPC—special purpose

FGT—fighter

BMB—bomber

MLT—military transport

MTR—military trainer

So, with the preliminaries out of the way, let's turn to the cases themselves and see what we learn from them.

Taxi and Runway Violations at Controlled Airports

At the time of writing (mid-2000), the FAA and the aviation industry are launching concerted efforts to reduce the volume and severity of airport ground incidents or accidents. While the volume of fatal runway accidents since 1990—6, with 63 fatalities—is not large, general aviation has been involved in 5 of the 6, and the number of incursions since 1993 has grown 70 percent. In 1999, according to the aviation newspaper, *Flyer* (June 23, 2000), general-aviation aircraft were involved in 75 percent of the reported incursions, which is a 10 percent increase over 1998. The way the trend is going, there are indeed problems on our nation's runways and taxiways. If the causes of those problems were listed without regard for priority or importance, they would include:

- Traffic saturation at the major terminals.
- Lack of state-of-the-art airport radar surveillance equipment.
- Inadequate or confusing airport ground signs and lighting.
- Radio frequency overload.
- Local operating practices and procedures.
- Communication misunderstandings between pilots and controllers.
- Pilot failure to communicate effectively or to communicate at all.
- Pilot lack of pretaxi and preflight preparation.
- Pilot lack of knowledge of local taxiing and pretakeoff rules and procedures.
- Pilot inattention while taxiing (organizing cockpit, checking charts, etc.).
- And the list could go on.

While the technical or procedural causes are, of course, important, trying to attack them is beyond the scope of this book. Instead, our obvious concern is what we can do to minimize or eradicate those related to radio communications. So, with that in mind, let's begin with the first case. The sketched runways preceding each case are simply to help you visualize the situation the reporter is describing.

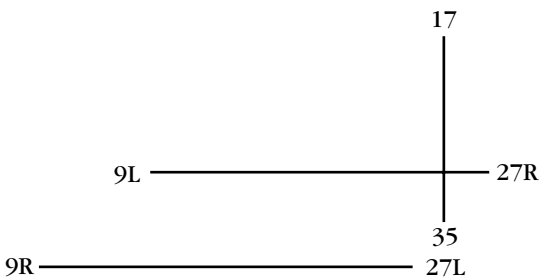
A PHILADELPHIA MISUNDERSTANDING

Accession Number:	417310
Reported By:	Captain
Flight Conditions:	VMC (Visual Meteorological Conditions)
Reference Facility ID:	PHL (Philadelphia)

Facility State:	PA
Aircraft Type:	MDT
Anomaly Description:	Runway Transgression
Anomaly Consequences	None

Narrative: With passengers loaded, our instructions were to taxi to Runway 27 Right (27R), and were cleared to cross Runway 35 (FIG. 4-1). This was a very, very unusual taxi instruction because Runway 27R is full length and hardly used for takeoffs. In 8 years of flying in and out of PHL, I have done so (taken off on 27R) only once. The normal instructions we receive are cleared to cross 27R and taxi to Runway 27L. This is what I believed that I heard. Accordingly, before crossing 27R, I checked the final for 27R and saw a plane on approach a few miles out, so I picked up the taxi speed slightly. As we neared the hold line, the first officer called my name rather loudly. When he did, I jumped on the brakes. We had already crossed the hold line for 27, however, but had not yet entered the runway. I then noticed a plane in takeoff position on the runway. At this point, Ground Control asked if we could do a 180 degree turn. I responded, "yes," and did so immediately. The plane in position was then quickly cleared for takeoff, after which I taxied to 27R without further incident.

I apologized to Ground Control and he said it was no problem. The factors: I heard what I expected to hear instead of what was actually said. More care must be taken to listen to taxi instructions. Never assume. I had always taken pride in



4-1 *Philadelphia International.*

being very safety conscious, but this incident has served to heighten my situational awareness.

Comments

This pilot has pinpointed the heart of the miscommunications here: *He heard what he expected to hear*—which, as I said back in Chapter 2, is an all-too-common cause of all too many communication breakdowns. Similarly, it's also common with experience and the passage of time. "Yeah, yeah, yeah. I know what you're going to say. I've heard it all before," at which point active listening ceases as the intellectual reception button is turned off.

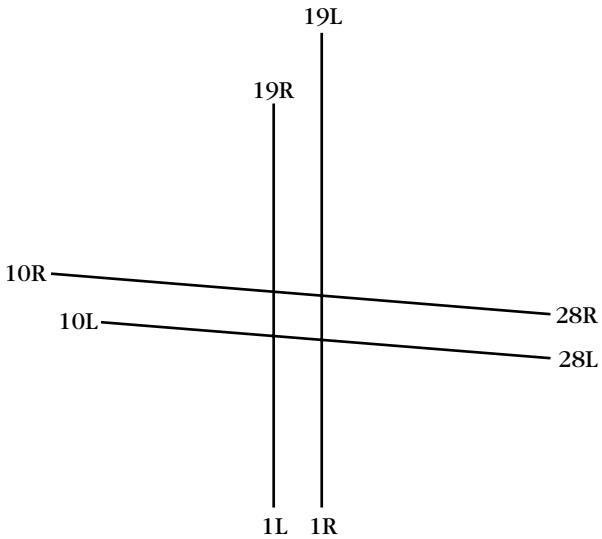
Watch out for wishful hearing or hearing what you expect to hear. While both are somewhat the same, each in its own way has contributed to serious rifts among family members, business associates, or friends and neighbors. In terms of what we're discussing here, though, the results of wishful hearing can be deadly—whether on the ground, in the immediate airport vicinity, or at altitude in cruise flight. In those environments, acting on assumptions or what you *think* ATC wants you to do or what you *think* ATC told you are danger-fraught luxuries no pilot should risk. The reporting pilot here said it all when he concluded with, "Never assume!"

READBACKS AREN'T ALWAYS HEARBACKS

Accession Number:	419912
Reported By:	Flight Crew
Flight Conditions:	VMC
Reference Facility (ID):	SFO (San Francisco)
Facility State:	CA
Aircraft Type:	MDT
Anomaly Description:	Runway Transgression; Other
Anomaly Consequences:	Flight Crew/ATC Review

Narrative: When we started our long taxi from the gate, we were instructed to taxi to Runway1 (1R) Right (FIG. 4-2) for our departure to FAT (Fresno) on the SFO8 departure. A few minutes later, we were next for takeoff. The tower said, "Aircraft XXX hold short of Runway 1 Right for wake turbulence avoidance. I, the first officer, read back the instructions. Fifteen to twenty seconds later, I heard, "Aircraft XXX taxi into position and hold Runway 1 Right," which I read back as "Taxi into position and hold Runway 1 Right." We started our taxi, clearing right and left, into position on Runway 1. The tower then called, saying, "Aircraft XXX, you were not instructed to taxi into position. You were instructed to hold short of Runway 1 Right." My captain then said to the Tower, "We read back the instruction to taxi into position, and sorry about that." The Tower came back and said, "Aircraft XXX, continue holding in position on Runway 1 Right,"—which we did until we were cleared for takeoff.

The captain and I talked about what had happened during our cruise to Fresno. I believe the start of the problem was



4-2 *San Francisco International.*

that another of our company's planes, "Aircraft XX," was behind us, and the Tower told that aircraft to "Taxi into position and hold on Runway 1 Left." I mistook the instructions and heard, "Aircraft XXX taxi into position and hold Runway 1 Right." I was wrong in what I heard.

Contributing factors were: a long taxi; a busy airport; busy radio traffic; similar company call signs and similarity of Aircraft XX and Aircraft XXX. The crew needs to pay closer attention to the frequency.

How it was discovered: The SFO Tower saw us taxi into position on Runway 1 Right. Corrective action: We apologized to Controller AB. I called and asked for the tower supervisor, but spoke to a Controller AB instead. He said that they (the controllers) listened to the tapes and heard me read back, "Aircraft XXX, taxi into position and hold Runway 1 Right." So the controller at the time did not hear our transmission. AB told me that there was not any problem and asked us to listen more carefully when the radio gets real busy. I thanked him and told him I was sorry for the mistake. The captain and I both agreed that in our future communications we will talk more slowly. Sometimes controllers are very busy and begin to talk fast, and, as pilots, we begin to do the same. This is when important information can get lost in the radio communications. As a pilot, I will slow down and ask for clarification when I'm not absolutely sure.

Comments

The reporter of this incident beautifully summed up the causes of the miscommunication as well as the radio technique changes he (and his captain) intend to make. In citing the probable causes, he illustrated some of the filters I talked about in Chapter 1—those conditions that can distort the message the sender *thought* he was sending and the message the listener *thought* he had heard.

It's hard enough to communicate effectively in a normal one-on-one environment, but the difficulties are

compounded—how many times?—in a busy cockpit, whether on the ground or in flight. This pilot, though, is on the right track when he vows to talk more slowly and to clarify instructions when he is not 100 percent certain what ATC is asking/telling him to do.

One other principle that will help avoid aircraft identity confusion: Let's say your aircraft is Cessna 6789 Golf. You're told to taxi into position and hold or are given some other instruction. Instead of just "rogering" the instruction, acknowledge it and include at least part of your N-number in that acknowledgment. Example:

> Tower: Cessna Six Seven Eight Niner Golf, taxi into position and hold.
>
> Pilot: Roger. Position and hold, Six Seven Eight Niner Golf.

Repeating that tail number after a terse acknowledgment of the instruction tells the tower or ATC that you have received the message and will comply. But don't just "Roger" a message and then say nothing more. "Roger" may say, " I have received your message," but it doesn't say "I have received your message and I clearly know what I am to do." That's why the controller's instructions are briefly capsulized so that the tower knows that you know exactly what is expected of you.

I didn't illustrate it here, but you will often hear pilots and controllers alike referring to an aircraft by just the last two digits and the alphabetical designation, as:

> Tower: Cherokee Eight Niner Golf, taxi into position and hold.
>
> Pilot: *Roger, position and hold. Eight Niner Golf.*

This so-called shorthand is acceptable if there is no possibility of confusing the tail numbers with those of another

aircraft in the area and/or when the tower starts using the abbreviation.

TOO MUCH TO DO…TOO LITTLE TIME

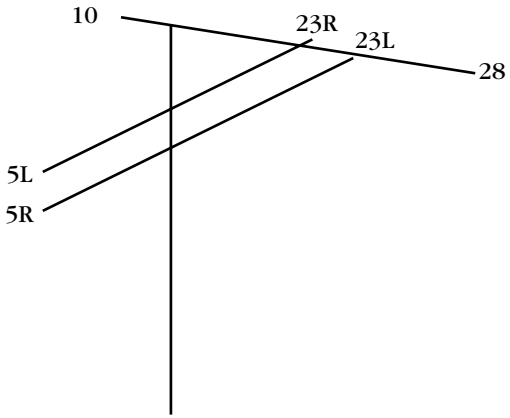
Accession Number:	420115
Reported By:	Flight Crew
Flight Conditions:	VMC
Reference Facility ID:	CLE (Cleveland)
Facility State:	OH
Facility Type:	Tower
Aircraft Type:	MDT
Anomaly Description:	Runway transgression/other; nonadherence
Anomaly Consequences:	None

Narrative: We were assigned to taxi by taxiway uniform and Runway 10/28 and to hold short of Runway 23 Right (23R) (FIG. 4-3). We inadvertently crossed the hold short line for 23R, which was located on Runway 10/28, but we were still short of 23R. We did not realize what we had done, however, until the Tower pointed it out to us.

The problem arose because we were trying to do too much in too little time and were not paying close enough attention to the taxiway and the hold-short line. I had been into the airport several times, but this taxi-and-hold-short arrangement was different from any I had experienced before. Taxi from our gate to the runway is very short and leaves little time to do all the necessary checklists while taxiing at the same time. The tower was busy and moving traffic very fast. In the future, we will do the taxi checklist before leaving the gate so all attention can be given to taxi instructions and hold-short lines.

Comment

This ATP-rated flight crew seems to have learned a lesson before any harm was done—albeit a lesson it should have learned a long time ago. Also, but not mentioned



4-3 *Cleveland-Hopkins International.*

in the report, is the responsibility of someone in the cockpit for taxiing the aircraft, keeping his or her head out of the cockpit, being alert to other traffic, and knowing where the aircraft is at all times. Although no damage was done, this seems to be more an example of the lack of crew coordination, communication, and resource management than anything else. Considering the gate location and the taxi/takeoff instructions, what on-the-spot planning took place in the cockpit before the aircraft left the gate? There doesn't appear to have been much—or any.

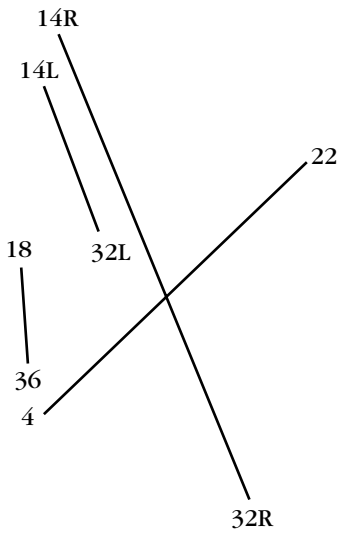
SOMETHING'S WRONG HERE…

Accession Number:	425709
Reported By:	Pilot
Flight Conditions:	VMC
Reference Facility ID:	MWH (Moses Lake)
Facility State:	WA
Aircraft Type:	SMA
Anomaly Description:	Conflict/Ground Critical
Anomaly Consequences:	None

Narrative: I was holding at the hold line when I asked for clearance to taxi for takeoff. The tower then told me to taxi to Runway 4 (FIG. 4-4). I repeated the instructions and proceeded to the runup area. After doing my runup and checks, I taxied to Runway 4 and held short. I then notified the Tower that I was holding short of Runway 4. He then said, "Taxi into position and hold (*Ed: on Runway 36*). Cross runway" (*Ed: Runway 4*). I repeated the instructions and crossed Runway 4 and taxied into position on Runway 36, where I noticed another plane on final, heading directly at me, so I pulled to the side of the runway and waited. The tower then told me to take off on Runway 36.

Comments

Based solely on the pilot's report, a couple of things seem wrong in this scenario. For one, there is no mention of any communication between the tower and the landing aircraft. Nor was there any mention of the tower alerting the reporting pilot to the existence of the landing plane. Also, how could the tower authorize one aircraft to



4-4 *Moses Lake, Washington.*

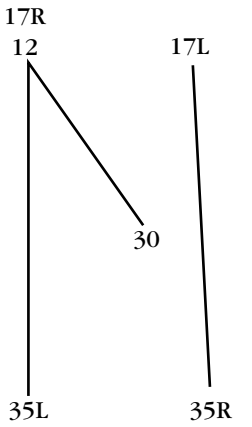
take off on 36 and permit another to land on Runway 18 at the same time? Another thing, 18/36 is a short runway—only 3307 feet long and 75 feet wide. Depending on its make and model, if the aircraft on final was landing long, it's easy to picture the need for full-on brakes to avoid a conflict with the plane waiting to take off. Finally, with one plane on the active runway (36), even though off to one side, what was the tower doing allowing the approaching plane to land? Why was there no order to abort? Or absent such an instruction, why didn't the pilot of that plane initiate a go-around on his own? He's still in command.

Basing these comments solely on the report by the departing pilot, a lot of questions come to mind, particularly about what the tower did or didn't do, said or didn't say, or, whether the written report is the whole story. Perhaps there was a better communications exchange. One would hope so, because the ingredients for a nasty incident/accident were all there.

WHAT *WAS* THE ASSIGNED RUNWAY?

Accession Number:	423170
Reported By:	Pilot
Flight Conditions:	VMC
Facility ID:	COS (Colorado Springs)
Facility State:	CO
Facility Type:	Airport Tower
Aircraft Type:	SMA (Bonanza 35)
Anomaly Description:	Runway Transgression
Anomaly Consequences:	None

Narrative: (1) A night VFR departure was planned from COS direct to GKY (Arlington, TX). (2) I contacted COS ground control for departure clearance and taxi instructions. (3) I received VFR departure ("fly runway heading after takeoff and taxi to Runway 17 right") (FIG. 4-5). ATIS (*Automatic*



4-5 *Colorado Springs.*

Terminal Radar Service) also indicated Runways 17R and 17L were in use. (4) I taxied to Runway 17R, made the runup, and advised COS tower that I was ready for takeoff on 17R I believe there was a change of controllers after that contact. (5) The tower advised me to "hold short at Runway 17R," which I did. Landing traffic touched down long and did a touch-and-go. (6) The tower then cleared me for takeoff, which I did on 17R. (7) Immediately after takeoff, the Tower advised me that I had been cleared to take off on Runway 12 instead of 17R. The tower then advised that no incident had been caused and gave me a radar vector to depart for heading for GKY. (8) Runways 17R and 12 share the same general areas for departure. The area is very confusing at night. (9) Suggest the Tower give more explicit instructions for taxi to 12 for takeoff after "hold short" instructions are given.

Comments

It would appear from the narrative that, for whatever reasons, the tower gave conflicting takeoff instructions; first it was 17R and then 12. Whether the cause was tower confusion, a change of controllers, or failure of tower personnel to listen to the pilot's readback of

instructions isn't clear. On the other hand, from the pilot's point of view, all instructions and readbacks had referred only to 17R, without any predeparture mention of runway 12. Thus, looking at the narrative report objectively, it appears that the cause of the transgression was in the control tower—not with the pilot. Except for this: When the tower cleared him for takeoff, what did the controller literally say? "Bonanza 0035, cleared for takeoff?" Or "Bonanza 0035, cleared for takeoff one seven right?" Or maybe, "Bonanza 0035, cleared for takeoff one-two?" It's not clear, but suppose the tower did merely say, "Bonanza 35, cleared for takeoff." Since the ends of two runways abut each other, the pilot should confirm the runway he is using with a simple acknowledgment: "Roger, Bonanza 35 departing one seven right." The communications chain between parties should now be complete.

In the second instance above, where the tower says, "…cleared for takeoff 17R," the confirming response should be almost the same: "Roger, cleared to go, one seven right. 0035." Now the tower *knows* the pilot *knows* what he's supposed to do.

But what if the controller says, "Bonanza 0035, cleared for takeoff one two"? Now is the time to ask a question: "Tower, Bonanza 35, did you say runway *one two*?" This is a new and contradictory instruction—one that should not be blindly followed without confirmation. The controller might have misspoken or might have had 0035 confused with some other aircraft. Whatever the case, as a pilot, clarify the issue right now. Above all, here we go again: *Don't assume!*

MICROPHONE RUDENESS IN THE TOWER

Accession Number:	425699
Reported By:	Pilot
Flight Conditions:	VMC

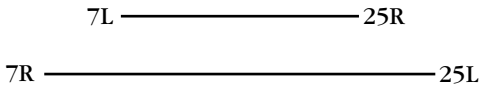
Reference Facility ID:	DVT (Deer Valley)
Facility State:	AZ
Facility Type:	Airport Tower
Facility Identifier:	DVT
Aircraft Type:	SMA
Anomaly Description:	Conflict/airborne; runway transgression; nonadherence legal requirement/clearance
Anomaly Consequences:	None

Narrative: Air traffic at Deer Valley Airport sometimes (FIG. 4-6) becomes very congested, but mostly everyone copes. An atmosphere of cooperation exists and it works out. I expect you see it often.

In my opinion, today's traffic was congested but safe. The controller that was working today is not the easiest person to work for. He is sometimes difficult to understand. He does not provide direct and clear statements, is unusually short with pilots, and doesn't hesitate to issue scoldings for an oversight or an error, however minor. He does not share the cordial but firm and clear demeanor of other controllers. The result is that several pilots, including myself, attempt to quickly comply with instructions to avoid rebuke. That is what happened today and it resulted in a runway incursion.

To recap: At the holding line, I asked for takeoff clearance. Radio traffic was nonstop with many planes in the pattern. I thought the controller replied to me and gave me clearance but misread my N-number. I glanced at my passenger. She nodded yes and pointed toward the runway. I rolled on to the runway and proceeded with a quick takeoff. The controller's chastisement came on climbout. On downwind, my passenger said she had also understood that we had been cleared for "immediate takeoff or hold," and was surprised at the controller's comments afterward.

I have had other unpleasant communications with this same controller. Two weeks ago, I was making full-stop, taxiback landings and had been landing on left-hand for Runway 7 Left (FIG. 4-6). On the third landing, as I turned off the



4-6 *Deer Valley Municipal.*

runway to Taxiway A, he asked what sounded like. "Are your intentions the same?" I answered, "Affirmative." He responded curtly, "What are your intentions?" After the flight, I parked the plane and another pilot remarked to me, "Boy, he was on everybody's XXX tonight, wasn't he?" I have heard him correct other pilots' incorrect readbacks in a very demeaning way. Rebukes for other oversights are frequent and not very helpful, from what I have heard. Today, I let a controller's past and present demeanor push me, and I didn't make a proper decision as PIC (Pilot in Command). I was the one who applied power to enter the runway—not the controller. The error was mine. From this time forward, I will never move unless mutual communications identing my N-number are completely correct, I will not rush clearances for immediate takeoffs, and I will never enter a runway on a "probability and belief" that I was cleared. If there is the slightest doubt, I will not move, and I will always double-check with this controller if there is the slightest question about his transmissions, directions, or clearances.

Comments

If this pilot follows his own advice, he shouldn't have any further difficulties with the rude and domineering controller—or, in all probability, with any other ATC representative. Conversely, though, to what extent could the pilot's fear of making a mistake adversely affect a controller's ability to expedite traffic at a busy airport? It's indeed possible for supercaution to be ultimately detrimental to the traffic-controlling operation as a whole.

Regardless of that potential by-product, it is still critical at a busy B, C, or D airport to know what the controller wants you to do and for the controller to know that you know what he or she wants. If there is any doubt, take action now to clear the air: "Tower, say again." "Please say more slowly." "Did not understand your direction. Please repeat." You're not sure that the controller called your N-Number: "Tower, did you clear Cherokee 3456 Romeo?" (There might be another Cherokee or another aircraft with a sound-alike N-number, as 3465 Romeo, or 4456 Romeo, or Cessna 3456 India. These things do happen.) You're told to report in when you're "Over the twin stacks." Fine, but you're new to the area and don't know where the stacks are. Tell the Tower: "Tower, Cherokee five six Romeo. Am unfamiliar with the area. Advise location of stacks." Or words to that effect.

No matter where you are—on the ground, in the pattern, in cruise flight, in a B, C, or D airspace—don't hesitate to clarify any instruction, and at the same time, give ATC a brief acknowledgment that you have understood the directive. For example, you have been cleared for takeoff on runway 36. Your response: "56 Romeo cleared to go, 36." The tower contacts you in the pattern: "Cherokee 56 Romeo, number two to land. Follow the Citation on base." Your response: "56 Romeo, number two. Have the Citation (or No Contact the Citation)." Confirming your understanding of what you are expected to do should be super brief but yet convey the message that you and the controller are on the same wavelength. When that level of communication exists, the likelihood of aggravating even a perhaps genetically hot-tempered controller is greatly diminished. No, not eliminated, but diminished.

Something that this pilot apparently failed to do: It seems that he didn't keep the controller informed of his intentions relative to the "land and taxi-back" operations. I just wonder if he called the tower on the downwind leg prior to each landing that this would be a full stop and taxi-back. If he had, the controller wouldn't have had to ask twice, "What are your intentions?" A basic communication principle: Keep the controller informed in advance of your intentions. Controllers don't like surprises. As a rule, they don't react kindly when what they expected to happen, didn't, or when what they didn't expect to happen, did. As I said elsewhere, there is a team made up of pilots and controllers at work out there, and when both entities are functioning as a team, traffic flows smoothly and above all, safely.

These seven cases are but a few of the many—too many—airport ground examples that illustrate the misuse or nonuse of radio communications. Those cited, though, hopefully offer a few suggestions that can help attack the runway and taxiway incidents

Takeoff and Landing Problems at Tower-Controlled Airports

In this section, let's expand our geographic horizons a bit and consider some communication cases involving operations within the Class B, C, and D airspaces. I'm referring, of course, to the airspace that starts about five nautical miles from the center of the B or C airports and extends outward 10 miles at a C and about 30 miles at the typical B airport. This is the area in which TRACON (Terminal Radar Approach and Departure Control) services are provided to separate and sequence VFR and IFR aircraft into or out of the tower-controlled B or C airports. (In common usage, the area is typically referred to as "Approach Control" or simply, "Approach.")

Here is just one more environment in which clarity of communications is essential. And I don't mean just the clarity of the words themselves: I mean clarity of understanding and comprehension. It's an environment in which the pilot is expected to listen, respond when called, follow instructions, and ask questions when there is any doubt about what he or she is expected to do. It is not an area in which a pilot is free to roam silently or at will.

Now don't forget that these controlled airspaces are not just for the airlines or the sleek business jets. With only a couple of exceptions, they're for all pilots Also, don't let me imply that they are complex segments of the airspace that test the skills of the average private pilot. They are neither, but they do require a thorough knowledge of the structure of a given airspace, the operating regulations and procedures applicable to it, and skills in the two-way radio communication process.

To get to the communications aspect, perhaps reviewing some of the cases reported in the ASRS database will contribute to a better understanding of what to say and what to expect to hear when you fly in or through a Class B or C airspace. Note that I didn't mention a Class D here. Remember that being relatively less active airports, Class Ds have only a control tower—no TRACON. Nonetheless, the controller in a D tower performs essentially the same function as a TRACON specialist: He or she is responsible for separating and sequencing all landing and departing traffic within the airport's five-mile radius. This first case is an example of a D controller at work.

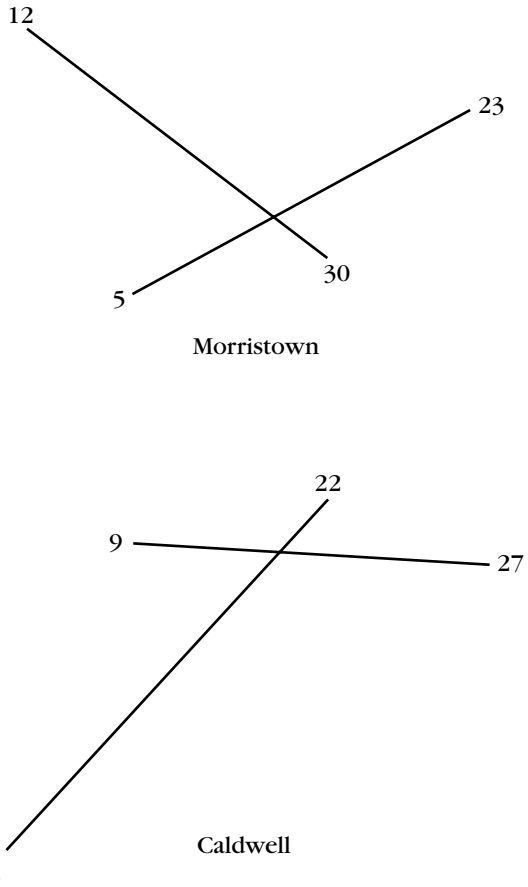
CONFUSION IN THE DARK

Accession Number:	426243
Reported By:	Pilot
Flight Conditions:	VMC
Reference Facility:	MMU (Morristown Class D); CDW (Caldwell Class D)

Facility State:	NJ
Aircraft Type:	SMT
Anomaly Description:	Runway transgression/unauthorized landing; other
Anomaly Consequences:	None

Narrative: (*Ed: All that follows is the pilot's narrative of what occurred to him, even though it reads as though a third party wrote it.*) The reporter was on a training flight from 1N7 (Blairstown, NJ) to CDW (a Class D airport) (FIG. 4-7) at night. The reporter reported 10 miles out from CDW and was advised by CDW Tower to follow a Cessna on downwind. When the reporter reported downwind, as instructed by the CDW Tower, he could not locate the Cessna and was then advised by Tower that the Tower "would call my base." Tower put reporter on an extended downwind and reporter lost sight of the airport. When he turned final, he realized he was over 10 miles out on final. When he was about 1½ miles out, CDW Tower stated that they had the reporter in sight and was cleared to land. However, at that time, the reporter had overflown CDW and was landing at MMU (FIG. 4-7) instead of CDW because CDW has Runway 22 as the main runway and MMU has Runway 23 as the main runway. (Reporter saw Runway 23 at the threshold [*Ed: Just before landing at MMU*].) I doubt whether MMU realized that I landed there.

Corrective action: CDW Tower should not have directed the reporter on an extended downwind behind the Cessna 152. The Cessna flew the pattern at about 80 kts and reporter's twin flew pattern at 120 kts. CDW Tower should have monitored reporter's aircraft more closely and should never have cleared it to land when clearly they were monitoring another aircraft. Reporter should not have lost sight of airport, but CDW Tower put reporter's aircraft on an extended downwind more than 10 miles out. Reporter should have monitored his moving map (Argos 7000) to confirm his position. CDW and MMU are in a direct line and at night they appear similar on an approach to a night landing. When CDW Tower advised they would call my base, I



4-7 *Morristown Municipal and Caldwell Essex County.*

wrongfully assumed that they would keep me in sight and they failed to do so.

Comments

I rather imagine that a good portion of your critique of what happened here would coincide with mine. Frankly, I think the pilot is blaming the tower for much

of the situation, but he does eventually come around to some objective self-analysis.

First off, though, from a regulatory and procedural point of view, what did the pilot do correctly? Before entering the CDW Class D airport area, he contacted the tower about 10 miles out, as required by FAA regulations, and was given landing instructions. On the surface, however, that's about the only correct action he took. (I know that's harsh, but I have to go by what the ASRS report reveals.)

As to things that raise questions, why did the pilot keep flying on a more than 10-mile downwind leg without questioning the tower? As the airport fell further and further behind, good judgment would have suggested a radio call, such as:

> Caldwell tower, Apache zero zero one two Tango, still on extended downwind. Am I cleared to turn base for landing Caldwell? One two Tango.

It's probably true that the tower lost sight of 0012T or perhaps forgot all about him. On the other hand, the tower may well have tried to contact 12 Tango, but 12 Tango's pilot wasn't listening. Maybe he was so distracted by that disappearing runway that he was mentally in another world. Whatever the real facts, by now that pilot should have initiated some radio communication to address a deteriorating situation. Controllers are not infallible; they do forget, they do make mistakes, but 99 out of 100 are aware of their fallibility and want pilots to work with them to ensure the safe, smooth flow of traffic.

How the reporter got on the final for what he thought was CDW 22 is not clear. Keep in mind that on the 10-mile downwind, he has left the CDW's Class D airspace. Now he presumably turns to base on his own, or somehow

takes up the runway heading, and a mile and a half out, the tower gives him permission to land. Since, as we find out, he was not even lined up for CDW's runway 22 but rather MMU's 23, what aircraft was landing at CDW? Why were the differences in N-numbers between that aircraft and the reporter's not caught by somebody? MMU is a tower-controlled airport; When did 0012T get approval to enter MMU's airspace in the first place? When did he get permission to land at MMU; and was MMU even aware that 12 Tango had landed there? Those questions are not addressed in the incident narrative, but they do paint a picture of one twin-engine aircraft wandering around at night in a usually busy traffic area near Newark Airport. Meanwhile, there are two control towers presumably knowing little or nothing about the plane, where it is, or what it's doing. This is the type of scenario of which obituaries are written.

Despite putting perhaps more blame than justified on the tower, the reporter does rightfully admit that he should have kept the CDW airport in sight and that he should have monitored his Argos 7000 more carefully. And perhaps the tower should have spaced a slower single and a faster twin better in the pattern. So be it, but to generalize from what the case tells us, pilots, in addition to keeping airports in sight, should take command of their own situations and question the tower or ATC when they don't understand or when something doesn't seem right; they should pay close attention to tower transmissions with other aircraft and the tail-numbers of the aircraft the tower is contacting; they should listen carefully for all calls directed to them and acknowledge those calls immediately; and at all costs they must avoid penetrating controlled airport airspaces without specific approval of the appropriate ground or air traffic control facility.

This is a basically simple case, but it does offer considerable food for thought in terms of communications lapses that could well have had serious conclusions. While the flight was conducted in an aviation-busy area, what this pilot did or didn't do has application for pilots at all towered airports. In that context, we each can learn from his well-reported experience.

A CLASS C AIRSPACE BUSTER

Accession Number:	422250
Reported By:	Pilot
Flight Conditions:	VMC
Reference Facility:	BTR (Baton Rouge)
Facility State:	LA
Facility Type:	Airport Tower; Approach Control
Aircraft Type:	SMT
Anomaly Description:	Altitude Violation on Descent
Anomaly Consequences:	None

Narrative: This situation occurred due to my failure to properly listen for the altitude clearance given. (I was cleared to 3000 feet msl and I descended to 2000 feet msl.) To facilitate (?) my error, a "readback/hearback" error occurred where I read back my clearance with the incorrect altitude of 2000 feet msl and the (approach controller) controller didn't catch my mistake. I believe the causes of my problem include a combination of preoccupation with descent planning and my lack of attention to the details of my clearance (as) received. I feel that to prevent this situation from occurring again, I must have better discipline while communicating.

Comments

If "discipline," as the reporter uses it, is equated with "attention," then perhaps that's what he needs. And the same goes for the approach controller, who was

apparently not paying much attention to the pilot's readback.

Fortunately, no damage was done here, but BTR is a Class C airport and thus a busy airport. That means, per FAA airport classification standards, that BTR annually boards at least 250,000 passengers, or has at least 75,000 instrument operations, or controls a minimum of 100,000 instrument operations at the primary and secondary airports within the Class C airspace. So, with the potential of such activity, entering an airspace that meets any one or more of those criteria without ATC approval or following its instructions is living dangerously.

Something else I wonder about: The reporter puts part of the blame for the mistake on his preoccupation with descent planning. That's understandable, but he makes no mention of descent preparation, such as having monitored the airport's ATIS while he was still 15 or 20 miles out from the airport. Had he done so, he would have known the runway in use, the winds, altimeter setting, and other pertinent information necessary in the prelanding planning process.

I also wonder about the extent to which he had monitored the Approach Control and tower frequencies before making his first radio contact. If he had done any monitoring, he would have known what lay ahead of him and would not have had to concentrate on the descent to the extent that he misunderstood or forgot the altitude to which he had been assigned.

Now this is a relatively simple case of no more than a wrong readback not being caught or corrected by an approach controller. Reading between the lines, however, it does offer the opportunity for a couple of suggestions, such as:

- Becoming familiar in advance with the controlled airspace, its dimensions, the airport runway/

taxiway layout, approach/departure control, ATIS, tower, ground control, and other related communications frequencies;

- Monitoring the airport's ATIS at least 20 miles out for pertinent approach and landing planning;
- Monitoring approach control and tower frequencies at least 20 miles out for the real-time traffic pattern and landing activities;
- Planning and rehearsing the initial call to approach or to the tower;
- Determining that the air is clear before making the first or any call to a ground facility.
- Writing down the clearance information given by Approach, as altitudes, compass headings, transponder squawk, if applicable, etc.
- Reading back the clearance/instructions as tersely but as clearly as possible.

These few suggestions, which are basically prearrival procedures, won't eliminate all communication misunderstandings. They will, however, help reduce the "preoccupation with descent planning," that affected this pilot and allow him to pay the proper attention to the clearance information he is receiving.

WHEN IN DOUBT…

Accession Number:	384150
Reported By:	Pilot
Flight Conditions:	Mixed
Reference Facility:	TPA (Tampa)
Facility State:	FL
Facility Type:	ARTCC (Air Route Traffic Control Center)
Facility Identifier:	ZJX (Jacksonville ARTCC)

Aircraft Type:	LTT (Learjet 31)
Anomaly Description:	No Specific Anomaly Occurred
Anomaly Consequences:	None

Narrative: We were descending, as well as diverting around weather going into Tampa at night. We encountered what we thought was an altitude deviation from what we thought our clearance was from Jacksonville Center (*ARTCC*) while descending for the ILS approach to Runway 18 left at Tampa International. When we arrived on the ground at Tampa, without being prompted, I decided to call ZJX for a clarification of what they had wanted us to do. They assured us that no violation had taken place, but when in doubt make sure what your clearance was. They also said that when not sure to always "verify your clearance." The lesson learned is to be cautious as well as alert when given altitude changes while descending.

Comments

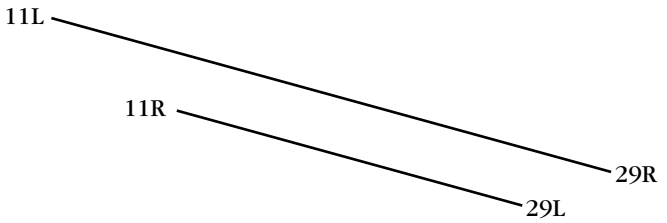
This flight had an obviously uneventful conclusion, but I rather imagine that the cockpit crew was a bit uneasy as it dodged bad weather while descending for the approach to the Class B Tampa airport. If the pilot *was* concerned, as it appears he was, why didn't he contact ZJX when uncertainty first crept in? Was he perhaps more afraid to publicly admit uncertainty over the air than of the dangers of being at the wrong altitude? It's possible but not unusual.

ATC personnel say without exception that if you're not sure about a clearance, an instruction, an approval to go or not go, or whatever, "Come back to us and give us the chance to clear the air." Although it's completely understandable, student or low-time pilots are especially reluctant to admit their uncertainties over the air. Fear of ridicule or of appearing incompetent becomes more important than being sure you're doing the right thing. So often, ego rules over logic—in the air and on the ground.

IGNORANCE IS NOT ALWAYS BLISS

Accession Number:	426741
Reported By:	Pilot
Flight Conditions:	VMC
Reference Facility:	TOA (Torrance)
Facility State:	CA
Facility Type:	Airport Tower
Aircraft Type:	SMA
Anomaly Description:	NMAC (Near Midair Collision); Heading Deviation
Anomaly Consequences:	None

Narrative: I requested a frequency to contact socal (ARTCC) for flight following from TOA to SEE (*San Diego Gillespie Field Airport*) on Victor 25-27 over the ocean. I requested a downwind departure from Runway 29 (FIG. 4-8). The Tower cleared me to take the runway for a standard departure. I responded that I was not sure that I knew what a standard departure consisted of. The Tower cleared me to take off after telling me to hold in position on the runway. The take off clearance included the phrase "standard departure." I made a maximum angle climb takeoff, maintaining runway heading until past the end of the runway, then started a climbing right turn downwind, which I thought was a standard downwind departure. The tower called me to ask me if I had made a standard departure and informed me that I was nearly involved in a midair collision. A third party stated that the miss distance had been about 100 feet. The third party was probably the aircraft in the landing pattern involved in the near miss. The tower cleared me to change frequency. I never saw the other aircraft. I had flown into TOA on several occasions but not within the past six months. I recall, on a previous departure, the tower had told me to turn right 45 degrees after takeoff, then had later cleared me to continue my turn to the right when I was clear of traffic. I now conclude, after the fact of today's events, that the tower had talked me through a "standard departure."



4-8 *Torrance Zamperini Field.*

I could have prevented this event by calling the tower on the phone in the pilot's lounge and discussing with them my departure plan. The tower could have prevented the event by responding to my call "I'm not sure what a standard departure is." I think that persons particularly familiar with the unique traffic rules of a particular airport sometimes become smug in their knowledge to the point that they do not help pilots not as familiar as they are in the traffic pattern. In this case, the tower could have called me to level my wings when I turned beyond the 45° heading. My aircraft is not often at TOA and my activity there was limited to arrivals and departures.

Comments

It's a little hard to get the full picture from this narrative, but it appears that a downwind takeoff on 29R with a right departure could directly conflict with traffic that is in a left pattern for a routine into-the-wind landing on 11 left. That's probably why, on a previous occasion, the pilot had been told to turn 45 degrees to the right after takeoff.

Whatever the situation, here was a pilot in a busy Class D airport who requested takeoff approval without knowing what he was supposed to do after he left the ground. His judgment is questionable. Even before that, though, why did he request a downwind departure? Of course, it might have been that the wind was light or nonexistent, the traffic was light, perhaps the taxi to 29R

was just a few yards, while 11L was far at the other end of the field. Or, maybe there was some other logical reason not apparent on the surface. The reason for the choice, however, does raise some questions.

Regardless of the reason, why did the tower approve a downwind 29R departure when there was left-hand landing traffic in the pattern for 11L? That's hard to understand, based on the pilot's report. And, when the pilot said he wasn't sure what a "standard" departure was, the tower apparently gave no explanation or response. When no response was forthcoming, why didn't the pilot immediately go back and query the tower again? Finally, shouldn't his previous experience when he had been vectored 45 degrees after takeoff (presumably from the same runway) given him some clue about the 29R departure procedures? It should have at least raised questions.

Also, let's don't forget the "third party" in this scenario—the one that said the miss distance was about 100 feet. If that party had been listening to the tower transmissions, he or she would have known that another plane was likely to be heading towards him in the pattern. Why, then, didn't he/she get on the radio and report his position again to the tower? That would also have alerted the departing pilot that another plane was in the pattern area on a normal left downwind. A simple call like this would be enough:

> *Torrance tower, Cessna 99 Charlie about to turn left base for landing one-one left.*
> *No contact departing aircraft.*

In summary, what we have here is a situation born of ignorance or uncertainty and magnified by nonexistent or faulty communications—a most unhealthy mixture that almost produced a tragedy. I do believe, though,

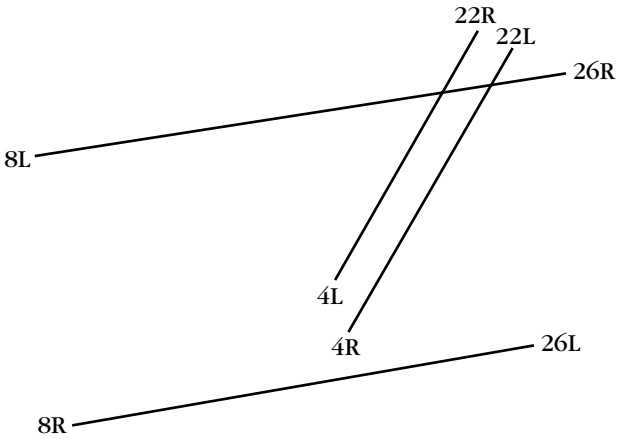
that our pilot may have learned some lessons from this experience, including not to allow seeming smugness on the part of others prevent him from getting the right answers to the right questions.

A CLASS B NEAR-MIDAIR

Accession Number:	413264
Reported By:	Pilot
Flight Conditions:	VMC
Reference Facility:	HNL (Honolulu)
Reference State:	HI
Facility Type:	Tower
Aircraft Type:	SMA (Cessna 172); SMA (Grumman Tiger Traveler)
Anomaly Description:	Conflict/NMAC; Other
Anomaly Consequences:	None

Narrative: I was cleared to land on Runway 4L, which I verified. The Grumman was then also cleared to land on 4L (FIG. 4-9). I looked for traffic and found nothing. The Grumman should have been sequenced much farther back, and I was entering downwind leg, so I concentrated on the landing phase. After flying base and one-half way down the final, the controller of the HNL Tower asked me, "Aircraft number 1, what runway are you lined up with?" I responded, "Runway four Left." Then the controller asked, "Aircraft number 2, what runway are you lined up on?" Aircraft #2 responded, "Runway four Left." At that instant, I knew that two aircraft had to be very close, so I looked all around and when I looked straight up, I saw the Grumman directly above me, descending for the runway. He was only about 100 feet above me. When I saw this, I cleared to the right and broke right. At the same time, the tower controller said, "Aircraft #1, sidestep right, cleared to land on Runway four Right." I landed uneventually.

I think that contributing to the situation were three things: (1) the high wing aircraft under a low wing aircraft; (2) the



4-9 *Honolulu International.*

controller's not having the #2 aircraft identify the traffic ahead; (3) the controller's overexpectation that pilots can always see and avoid even with aircraft visibility restrictions.

Comments

I won't disagree with the pilot's conclusions, but I think more factors than those played parts in this NMAC. For instance, and as the pilot said earlier in the report, the spacing between the two aircraft should have been greater, but the controller should have made it clear to the Grumman that he was number two to land behind the Cessna. Maybe the controller did give the Grumman those instructions, but the report doesn't so indicate. Something else about the controller: He apparently lost visual contact with the two aircraft when both were on final approach to the same runway. Without plenty of spacing, that's a dangerous practice. My question, though, is how the controller could have lost contact with the planes to the extent that he had to ask both

what runway they were lined up on. It's his job to keep track of the traffic in the pattern and keep it properly spaced. Something's wrong in this picture.

As to the Cessna pilot, he knew from the controller's questions that he had company somewhere in his immediate vicinity. Since sky-scanning produced no results, he should have asked the tower where the Grumman was. A quick call, such as, "Tower, where's the Grumman? No contact." That might have alerted both the controller and the Grumman pilot that things weren't quite routine on the final approach.

Bringing that Grumman pilot into the mix, it seems to me that he was as much to blame for the NMAC as the tower. Knowing that the Cessna was ahead of him, he should have been particularly alert to his position relative to the Cessna. Also, especially in conjunction with his last response to the tower, if he did have the Cessna in sight, he should have added, "Have Cessna," or "Have traffic." Conversely, if he hadn't spotted the Cessna, he should have made that known as well: "Tower, (Grumman, or Cheetah, or Tiger) no contact the Cessna." Or "No contact with Cessna on final." His apparent failure (1) to keep his eyes open for traffic and/or (2) to communicate his position contributed greatly to the NMAC. Of course, as you, I can only go by the Cessna pilot's report, but I feel that he did a good job of taking immediate evasive action and then clearing himself before landing on 4R. I wonder, though, what dialogue, if any, took place later between the three parties in this controlled airport near miss.

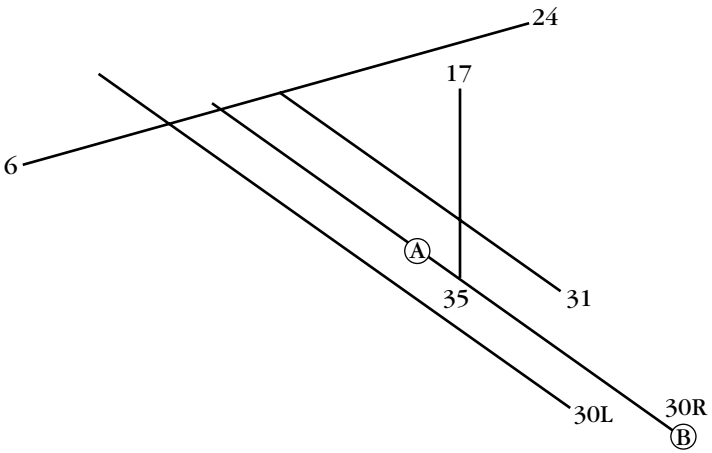
FOR LACK OF A COUPLE OF WORDS… Departing from the ASRS series of cases, the following is a National Transportation Safety Board (NTSB) report of a runway collision at St. Louis, MO between a TWA DC-9 and a Cessna 441 Conquest. The two

occupants of the Cessna were killed, but the 140 passengers on the DC-9 were uninjured in the collision. The runway portion of the airport where the accident occurred is illustrated in FIG. 4-10.

The Basic Facts

The facts reported by the NTSB, in summary, are:

During the takeoff roll on runway 30R, the DC-9 collided with the Cessna, which was positioned on the runway awaiting takeoff clearance. The Cessna had arrived in St. Louis only a few minutes earlier, and, with a quick turnaround, the pilot apparently assumed that having landed on Runway 30R, he would depart on the same runway. After a brief ground time, the pilot was cleared to "back-taxi into position and hold Runway three-one." Apparently thinking that three-one was a taxiway, he back-taxied on it to taxiway Romeo and then came to a stop at the intersection with runway 30R. This was about 2500 feet from 30R's threshold, where the TWA DC-9 was awaiting departure clearance. The ATIS at the time cited runways 30R and 30L as the active runways for arrivals and



Ⓐ Approximate Position of Cessna

Ⓑ Position of DC-9

4-10 *St. Louis Lambert International.*

departures, and there was no mention of the occasional use of runway 31.

Contributing to any confusion was the inability of tower personnel to maintain visual contact with the Cessna after it taxied from the well-lighted ramp area into the runway/taxiway environment of the northeast portion of the airport. ASDE-3 ground radar (Airport Surface Detection Equipment), with AMASS (Airport Movement Area Safety System), was installed on the airport but not operational at the time of the accident. Had both been in service, the combination would have supplemented the visual scan of the northeast portion of the airport. At any event, with the Cessna holding on 30R, some 2500 feet down the runway, the TWA DC-9 was cleared for takeoff.

The DC-9 had reached about 80 knots when the crew suddenly spotted the Cessna. The captain tried to avoid the collision, but the DC-9's right wing tore off the top of the Cessna's fuselage, killing the pilot and his observer. The DC-9 was, of course, damaged but no injuries were reported.

Other Contributing Causes

A mixture of factors, in addition to those just mentioned, contributed to the accident, including garbled as well as incomplete radio communications. The ground controller's frequencies were overloaded, the Cessna's radio may have been having technical problems, and the pilot's responses to taxi instructions did not convey understanding.

For example, AOPA's August 2000 issue of *AOPA Pilot* stated that the Cessna pilot's last contact with the local controller, "Kilo Mike ready to go on the right side," was not specific enough to alert the controller that the Cessna was holding halfway down the runway from the DC-9 about to start its takeoff run. As AOPA put it, "The proper phraseology should have been, 'Conquest Kilo Mike holding in position Runway three-zero right at Romeo, ready for departure'." "This," continues AOPA, "would have alerted the controller—and possibly the TWA crew—that a collision was imminent."

Several factors combined on that November evening to cause the accident, but the easiest one of all to correct or

overcome was communications and the simple phrasing of just one call to one controller. If the pilot had merely said, "Kilo Mike at Romeo ready to go on three-zero right," that might well have saved two lives. The addition of "Romeo" and "three-zero right," versus "…on the right side." Could have made the difference. Once again, "For want of a nail, a shoe was lost…."

Conclusion

Quite apparently, there's nothing riveting about most of these cases, and, happily, each, except the last, turned out favorably for the various reporters. That's the good news. The less good news is that they are only symptomatic of radio breakdowns that are occurring every day in the high-density airport traffic areas. If you question that, listen critically when you next fly in or near a Class B, C, or D airspace. The odds are fairly good that you'll hear far too many examples of radio misuse, overuse, or nonuse.

Unfortunately, radio competency is not one of the skills that receive the attention it should in most flight schools. Perhaps, though, this and the chapters that follow will be of some help to those who avoid tower-controlled airports simply because of lack of communications knowledge or confidence. At the same time, these various cases may remind experienced pilots of the radio requirements in the congested areas. As should be apparent, general-aviation pilots who fly the Cherokees, the Cessnas, the Beeches, and all are not the only offenders of communication principles.

5

Communications in the Nontower Airport Environment

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Moving from the tower-equipped airport environment, let's look at the communication responsibilities at the many nontower airports around the country—essentially those identified as Class E or G airspaces. As you review the cases that follow, just remember that none of the VFR traffic is being controlled by any ground agency, so caution, regular radio position/intention reports, and above all, sharp eyes and a swivel neck are essential.

To refresh your memory relative to radio reports, this brief summary might assist:

Arrival (10–15 miles out tune to correct CTAF and *listen* for traffic information):

1. To *unicom* with PAI/DS for field advisory OR blind PAI/DS call on CTAF
2. To *traffic* on entry to 45° approach to downwind leg
3. To *traffic* on downwind leg
4. To *traffic* when turning to base leg

5. To *traffic* when turning to final
6. To *traffic* when down and clear of active runway

Departure:

1. To *traffic* when on ramp and ready to taxi
2. To *traffic* before taking active runway
3. To *traffic* after takeoff and clear of area

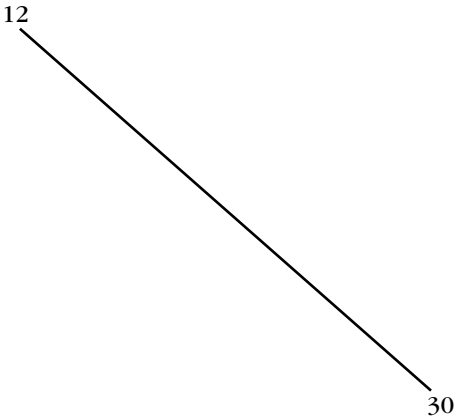
Nontower Airport Radio Communication Cases

With that, let's take a look at a few of the nontower ASRS airport cases.

WAS IT JUST A HEADSET PROBLEM?

Accession Number:	409207
Reported By:	Pilot
Flight Conditions:	VMC
Facility Identifier:	8B8 (Wolfeboro, NH)
Facility State:	NH
Aircraft Type:	Cessna 172; Cherokee PA-28 Dakota
Anomaly Descriptions:	Conflict/Airborne; pattern deviation
Anomaly Consequences:	Other

Narrative: As I entered the pattern from a 45 degree to downwind (FIG. 5-1), I observed approaching traffic coming at me from about 3 miles, same altitude. I deviated right to avoid until I was sure there was no conflict. Other aircraft appeared to turn to his right and flew over town. I continued my approach to the airport Runway 30, advising on CTAF on downwind, base, and final. While on final, we saw the other aircraft approaching us from our right. We watched the aircraft constantly, expecting it to turn upwind for an approach to Runway 30. About the time I decided he wasn't going to



5-1 *Wolfeboro Lake Region.*

turn, he saw us "finally" and deviated course as were on final and below him. He claims I cut him off on final. As we saw it, he was nowhere near the airport or the extended runway centerline and was approaching the airport using a right base approach to Runway 30. The local traffic pattern is left hand. The unfortunate part is that I contributed to the problem because my radios were not transmitting, although they were receiving. I did not know this at the time, and I am sure he had no idea I was in the pattern as the daylight was fading and he could not hear my calls. There was also local float plane activity to add to the radio confusion. After landing and checking the radios, I discovered I had incorrectly connected my headsets to them and they did work properly. However, I believe the whole conflict could have been avoided had the other pilot flown the local traffic pattern the correct way. After a very heated argument with a very arrogant Dakota pilot, I went and found my CFI who observed the conflict, to find out if I had been wrong. After a detailed description of the event, we concluded that even though the radios weren't working, I still flew the proper approach, was lower, and had the right of way. However, a close call makes no one happy, right or wrong, and I'm happy it only resulted in elevated blood pressure and a long talk with my CFI.

Comments

Yes, it does appear that the 172 pilot flew the pattern correctly, but inattention to his radio contributed materially to an NMAC. Also, he says he could receive but not transmit, but he never mentions hearing anything from the PA-28. If he could receive, why the silence? Was the reporting pilot tuned to the correct CTAF for Wolfeboro? Did he have the volume up? Was he really plugged in at all? Or had the Piper pilot, along with bad pattern flying, also failed to communicate his presence in the area, his intentions, or his positions? Was *he* tuned to the Wolfeboro CTAF? Did he even have his radio on?

At first blush, you might attribute the NMAC just to an unplugged speaker line, but without having more facts, it would seem that there's more to the radio situation than that. Perhaps I haven't been exposed to enough headset types, jacks, etc., but I've never seen one that you could plug in incorrectly. The jacks are either in correctly or not at all. Has the pilot told the whole story or perhaps skidded around the facts a little? I have no basis to accuse; I just wonder.

At the same time, the Piper pilot shouldn't get off without criticism of his pattern flying. True, if the Cessna were not transmitting, the Piper might assume he was alone in the pattern as daylight was falling and thus could fly any sort of pattern he wanted, just to get back on the ground. If that was his assumption, it was a dumb one. Maybe at a given moment, he was alone, but a fresh face could suddenly enter the scene, and hearing no one else in the area, figure that he, too, is alone and can fly whatever pattern he chooses. So there, with two silent birds looking for a single runway in the growing dusk, we have the ingredients for a major problem.

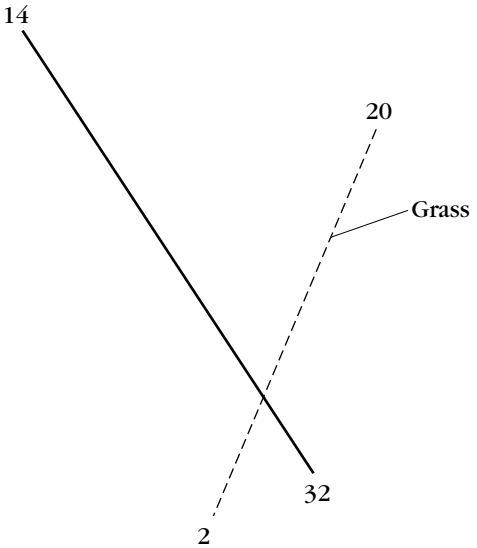
No matter what the situation in a Class E or G environment, other than a *bona fide* emergency, you should always fly the airport's established traffic pattern OR the pattern currently in use, should it differ from the standard. And use that radio! It's a vital tool at nontower airports.

We can guess or assume all we want, but if the facts are as reported, it may be that nothing more than a misplaced headset jack was the NMAC culprit—something like, "For want of a nail, a shoe was lost; for want of a shoe, a horse was lost…etc."

"SORRY. WRONG NUMBER…"

Accession Number:	408364
Reported By:	Pilot
Flight Conditions:	VMC
Facility Identifier:	OLU (Columbus, NE)
Facility State:	Nebraska
Facility Type:	Airport
Aircraft Type:	SMA (Beech 36)
Anomaly Resolution:	Evasive Action
Anomaly Consequences:	None

Narrative: We taxied out for departure from the small uncontrolled airport (FIG. 5-2). The wind was calm. Before entering the runway, a radio call was made to announce entry to the runway. No radio calls were heard from others. At rotation, another airplane coming in for landing was noted at the distant approach end to the runway. The airplane was rolling and in rotation so that a stop at that time would have yielded undesired effects and would probably have caused a crash. Our airplane rolled right and out of the runway environment. At this time, it was noted that the wrong UNICOM frequency was dialed in on the radio. The correct frequency was not used and missed the call of the other traffic in the pattern. Approximate distances were 3000 feet or more laterally. The error herein was having the incorrect frequency dialed in on the COM side of the radio stack.



5-2 *Columbus Municipal.*

Comments

There's not much more to add; the reporter pilot said it all: "…incorrect frequency dialed in." What's surprising, at least to me, is the number of incidents, NMACs, or accidents that have occurred primarily because of this simple oversight or act of forgetfulness. If it's not on every pilot's preflight checklist, it ought to be—not just "Radios On" but "Radios On to correct freq." Or something like that.

Another factor to keep in mind: Many of the nontower airports sharing one of the 122.7, 122.8, or 123.00 frequencies are often only a few miles from each other, and a ground transmission from Airport Alpha will be heard in the air or even on the ground at Airport Baker or maybe even Airport Charlie. If you're at Alpha, where the CTAF is 122.7, but unintentionally transmit on 122.8, which, let's say, is Baker's CTAF, traffic at Baker could well be searching the skies or the ground for you while you're still

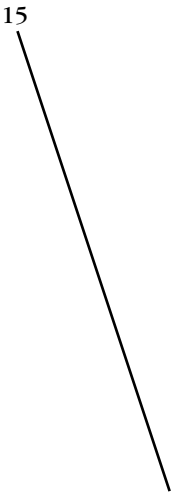
sitting back on the taxi strip back at Alpha. And, of course, in the interim, no one at Alpha knows anything about you until you unexpectedly show up on the runway, in the traffic pattern, or somewhere else in the airport environment. (This airport identification is the prime reason why all calls in the area of nontower airports begin and end with the airport name, as: *Alpha traffic, Mooney 1234 Uniform taking runway three zero, west departure, Alpha.* Or, *Delta Traffic, Mooney 1234 on final, landing Delta.*)

Making certain that you're transmitting on the right channel is such a little thing, but that may be the very reason why it is so frequently cited as causes of incursions or incidents in the airport environment. Another example of "For want of a nail…etc."

PATTERN MIND-WANDERING

Accession Number:	409892
Reported By:	Pilot
Flight Conditions:	VMC
Facility Identifier:	UMP (Indianapolis Metropolitan)
Facility State:	IN
Facility Type:	Airport
Aircraft Type:	SMT
Anomaly Consequences:	None

Narrative: VFR flight returning to home base, UMP (FIG. 5-3), called 5.8 NM Southwest of field after being handed off from IND approach flight following. When called position and requested airport advisory from UNICOM (123.0), a pilot in the pattern called for Runway 15. I announced I would enter downwind for Runway 15. I had just departed Runway 33 about 45 minutes prior to return to airport after dropping off passenger at FRH (Frenchlick, IN). I proceeded to enter downwind and base for 33. As I entered final for 33, a pilot departing Runway 15 called to me to tell me I was on final for 33, not



5-3 *Indianapolis Metropolitan.*

Runway 15. He was above me and banking to right. I banked to right to downwind Runway 15 pattern. I had been very busy messing with autopilot just prior to handoff from approach, and had a mindset for landing Runway 33. Winds were crosswind out of the E-NE. Even though I said "Runway 15," I flew a perfect pattern for 33. There were three planes on the run-up area as well as the departing traffic. No one noticed my position until turn to final. I should have looked closer at the runway traffic, not just what was in front of me. There was not much traffic in the air at the time.

Comments

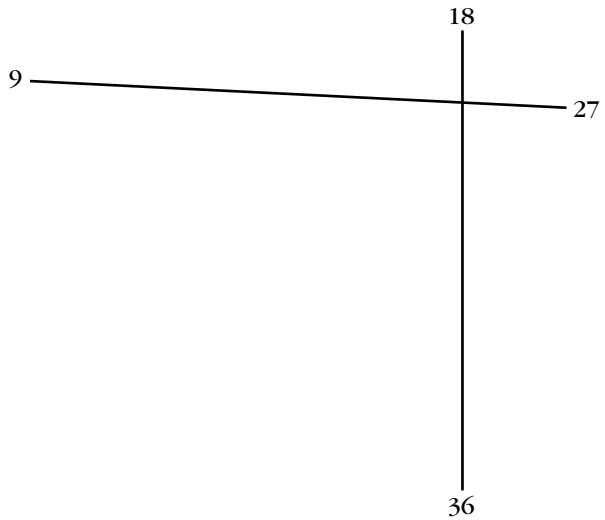
This, of course, is less a communications case and more one of mental alertness and attention. The pilot may have been "messing with the autopilot," but that's not a very good excuse for messing up the pattern the way he did—or almost did. He says he "should have looked closer at the runway traffic, not just what was in front of me." He adds, though, that there "was not much traffic

in the air at the time." Wouldn't it have been much better for him to have confirmed via unicom the runway in use more than 5.8 nm out from the airport? By so doing, he would have had time to think about the pattern, plan his approach, accordingly, and then notify others on the CTAF of his presence in the area and his intentions. At the beginning of his report, he implies that he did some of those things, but the way he worded the incident leaves doubts, or at least questions. Whatever the facts, this looks more like an attention-deficit problem than a communications failure—although there are elements of that in the scenario also.

THOSE PATTERN VIOLATORS—AGAIN

Accession Number:	409986
Reported By:	Flight Instructor
Flight Conditions:	VMC
Facility Identification:	1G5 (Medina, OH)
Facility State:	OH
Facility Type:	Airport
Aircraft Type:	SMA (Cessna 172; Cessna 182)
Anomaly Consequences:	None

Narrative: My student, in C172, and I had been conducting takeoffs and landings in preparation for his 2nd solo flight. He completed three landings and takeoffs to my satisfaction and I left the plane to watch him solo. I stood alongside Runway 27 (the Active) (FIG. 5-4) with my handheld radio to monitor him. Pilot took off and completed one landing, so I sent him for his second and third landings (solo). On his third landing, he was on base leg, just getting ready to turn final, when another aircraft (182) came into the pattern on a right base (nonstandard). The 182 took evasive action by completing a left-hand 360° turn on final, and to my view, narrowly missing my student (172). Both aircraft landed and



5-4 *Medina Municipal.*

I took a photo of the 182 as it landed. My student told me he never saw the other aircraft. I never heard the other aircraft make any radio announcements as to position, as I was monitoring on the handheld radio.

Prevention: All must be alert in the traffic pattern for other aircraft. Nonstandard entries and operations in the pattern should be prohibited, or at least discouraged; and radio calls, as position announcements, be made mandatory.

Comments

It's hard to find much else to add to those last few words. The instructor-reporter has summed things up quite well, although I do have this question: The instructor has said nothing about radio position reports by his student. Had the student been making the standard downwind, base, and turn-to-final calls on the 123.0 CTAF? If so, why didn't the 182 pilot hear them and react accordingly? Did *he* have his radio on and tuned to the Medina CTAF? If not, why not?

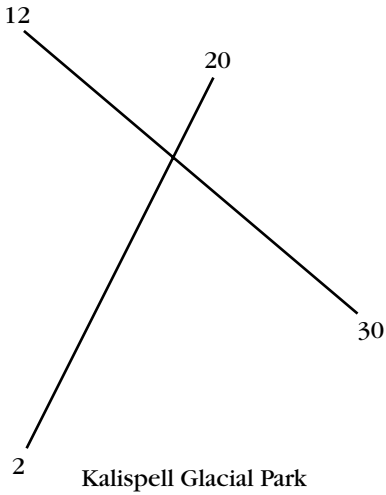
We'll never know the answers, but there may be factors other than just a nonstandard pattern by a 182. I'm inclined to think so. Meanwhile, the student survived the NMAC, thanks to luck and an invading pilot's final approach 360° turn—which, incidentally, is not the most desirable location for evasive action maneuvers.

WRONG AIRPORT, WRONG FREQUENCY

Accession Number:	410546
Reported By:	Pilot
Flight Conditions:	VMC
Facility Identifier:	FCA (Kelispell, MT)
Facility:	MT
Aircraft Type:	MLG (FK28); SMA (Cessna 172)
Anomaly Consequences:	Other

Narrative: I was required to conduct a rejected takeoff at a relatively high speed due to conflict with a C172. The sequence of events is as follows: We taxied for departure at Glacier Park International, Runway 20 (FIG. 5-5), for an IFR flt to SEATAC International (*Seattle/Tacoma, WA*). Due to inbound IFR traffic, we are required to hold on the ground. This IFR aircraft cancels on final to Runway 2 and lands on Runway 2. Next, a Mooney reports on CTAF, base to final for Runway 20. This aircraft lands on Runway 20. As the Mooney rolls out, we taxi into position and hold on Runway 20. We also reported this on CTAF (123.O). After the Mooney clears the runway, we reported taking off on Runway 20, applied power, and began the takeoff roll. At 115 KIAS, I saw a C172 on the opposite end of the runway, coming towards us. Our speed was 9 knots below V1, and I executed a rejected takeoff procedure. Neither aircraft was in danger of colliding. The Cessna exited the runway and taxied to the ramp. We returned to the gate and post-flight inspection showed our #2 main tire fuse plug has melted, resulting in a flat tire.

I feel the real cause of this situation is this: (1) Multiple operations of all types of aircraft at an uncontrolled airport. This



5-5 *Kalispell Glacial Park and Kalispell City Park.*

airport has some very busy times with many aircraft in the area. (2) The pilot of the C172 was not communicating on CTAF 123.0 and not looking for other aircraft in the area. I suspect he saw the first aircraft land on Runway 2 and simply assumed to use this runway. Also the Cessna pilot told the FBO he thought he was at Kalispell City Airport (S27) (FIG. 5-5). Note: CTAF at S27 is 122.8. The Cessna landed at FCA Runway 2 after the Mooney had landed, while we were "taxiing into position and hold."

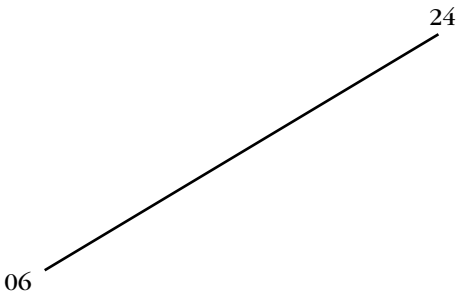
Comments

Undoubtedly, the mixture of aircraft types at an uncontrolled airport contributed to this situation, but even more was the apparent nonuse of radio communications. One plane lands on Runway 2 as another taxis out for Runway 20; a Mooney reports for the first time on base-to-final for Runway 20, and then a C172 lands on 2 just as the F28 begins its takeoff run on 20. On top of all that, the C172 thought he was landing at Kalispell City airport (S27), which is a mile south of the city, while Glacial Park International (FCA) is six miles northeast of the city. It's hard to see how the two fields could be confused, because S27 has only one runway (13/21), while FCA has two (12/30 and 2/20). A case of disorientation and lack of preflight preparation? It would seem so. And, then, to top it off, the same 172 was tuned to the S27 CTAF of 122.8 vs. FCA's 123.0, so obviously, FCA's traffic would not have heard any 172 transmissions, if, indeed, any were made.

It gets sort of boring to keep reading of cases where pilots don't tune their radios to the appropriate frequencies, don't make the right calls at the right times, and end up causing sometimes-serious traffic pattern problems. This, however, is just one more example of such inattention to some basic pilot responsibilities—and there are more to come.

SILENCE IS *NOT* GOLDEN

Accession Number:	414299
Reported By:	Instructor
Flight Conditions:	VMC
Facility Identifier:	GUP (*Gallup*)
Facility State:	NM
Facility Type:	Airport
Aircraft Type:	SMA
Anomaly Consequences:	None



5-6 *Gallup Municipal.*

Narrative: I was with one of my students on an instrument cross-country. We were departing Gallup, NM (FIG. 5-6). The runway alignment is 6/24, wind was less than 5 knots. Runway 24 is closer to the terminal, but there were two airplanes arriving Runway 6, so we decided to use 6 as well. The second airplane landed, and as he was taxiing to the ramp, he was carrying on a conversation on the CTAF with another pilot. Once they got off the radio, my student called departing Runway 6. We taxied into position and started our takeoff roll. My student had just called out "60 knots" when I saw movement at the far end of the runway. I immediately took the controls, reduced throttle, and stopped the airplane, heading to the left side of the runway. The other pilot continued his takeoff roll and rotated less than 500 feet in front of us. The other

pilot didn't seem too concerned about the incident. We never heard the other pilot make a call over the radio.

One of two things happened: Either we unknowingly stepped on each other, which seems unlikely because one of us would have had a longer transmission and as a result would have been heard by the other. The other situation is that the other pilot did not make a radio call.

Comments

One thing hit me early in the report—the observation that the pilot, after landing and while taxiing to the ramp, "…was carrying on a conversation on the CTAF with another pilot." That reads to me that the pilots were engaged in a discussion unrelated to the task of taxiing their aircraft to wherever they were going. In other words, a personal conversation of some nature. Should that have been the case, it's a no-no. The CTAF can be used for personal matters when communicating with an FBO if you want one of the services the FBO can provide, as asking the FBO to call a taxi for you, or to advise your husband/wife of your arrival, or to request a mechanic for a maintenance problem, and the like. Those are legitimate subjects, but avoid even them, if you can, at the often-busy nontower airports where the CTAF is the only vehicle that pilots have to make their presence and intentions known to fellow occupants of the same airspace.

As to the real cause of this situation, I'm guessing that the pilot taking off on Runway 24 against the prevailing traffic never had his radio on—or it was tuned to some other frequency. Otherwise, he almost certainly would have heard at least one of the other aircraft in the area making position or intention reports and would have known that the runway currently in use was #6. Another possibility, of course, is that this pilot jumped in his plane at the terminal, cranked it up, hurried to the nearest

runway, and poured on the coals—all with never a word to anyone. It's happened. I've seen it happen. And I bet many of you have, too.

A *CITATION* THAT WARRANTS A CITATION

Accession Number:	416238
Reported By:	Pilot
Flight Conditions:	VMC
Facility Identifier:	6F6 (Guthrie, TX)
Facility State:	Texas
Aircraft Type:	SMA and LTT (Citation)
Anomaly Consequence:	None

1 **5-7** *Guthrie, Texas.*

Narrative: This occurrence happened at the 6666 Ranch, a private strip near Guthrie, Texas. It is a paved 5100-foot runway 1/19 (FIG. 5-7). Weather was CAVU (*Ceiling and Visibility Unlimited*). Wind was 290-270 at 10 knots or less. On arrival at 6666, I circled the field, making appropriate radio calls on the CTAF provided by the Ranch owners when given permission to use the private strip. The variable wind did not favor either runway, so I chose to land on Runway 19 and entered

the pattern, as recommended in the *AIM*. I also made position calls on the radio as recommended. Prior to entering downwind, the only aircraft observed was a Cessna Citation parked in the parking area next to the Ranch hangar located at the approach end of Runway 1. On short final approaching the runway for landing, I observed the citation on its takeoff run in the opposite direction, using Runway 1. Only an immediate emergency GAR (*Go-Around*) procedure averted a certain collision/accident. The Citation completed its takeoff without an attempt at either an abort or after-rotation maneuver to avoid my aircraft. Witnesses on the ground (Ranch Airport Security) said that they advised the Citation pilots that there was another aircraft inbound and that they should delay their departure until that aircraft (mine) had landed. The witnesses observed my aircraft cross over the field and enter downwind for Runway 19. At the same time, the Citation started engines, began to taxi, and take the runway for takeoff. No radio calls were received. The Citation pilots rushed their departure and did not follow proper procedures in their departure from the uncontrolled airfield.

This near miss could have been avoided had these pilot done any of the following: (1) looked for conflicting traffic in the pattern; (2) monitored the CTAF for other traffic; (3) heeded the warnings of Ranch personnel and exercised due caution; (4) followed proper procedures for operations at uncontrolled airports; (5) looked out their window prior to committing for takeoff.

Comments

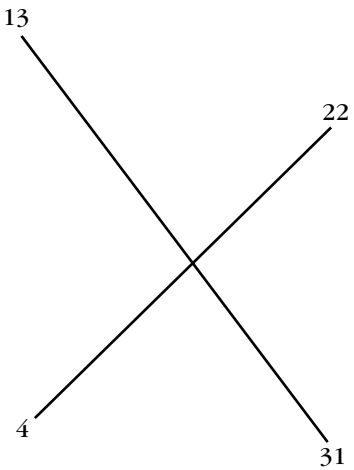
The reporter's five summarizing points leave little to add. Those Citation pilots (whether one or more aboard) are examples of what makes caution and going by the book at uncontrolled airports so important. Why the pilots ignored the airport security warnings we'll never know, but I'd guess it was triggered by one or a combination of egotism, self-importance, ignorance, or disregard, of uncontrolled-airport operating procedures; ignorance, or disregard, of radio procedures, failure to tune the radio

to the right frequency, failure to look out of the cockpit for traffic, or—dare I say it?—just plain stupidity. Only the pilot in the left seat knows why he created a potentially deadly situation at a remote private airstrip. But such pilots are out there, and the only way to protect yourself against them is by constant scanning of the skies around you and going by the book yourself.

TWO STRAIGHT-INS EQUALS ONE NMAC

Accession Number:	418289
Reported By:	Pilot
Flight Conditions:	VMC
Facility Identifier:	FD39 (Okeechobee Baggett Airpark Airport)
Facility State:	FL
Aircraft Type:	SMA; SMA (Cessna 152; PA-34 Seneca)
Anomaly Consequences:	None

Narrative: I was on a solo cross-country flight from Naples to Okeechobee. At approximately XX24 hours, I called 10 miles



5-8 *Okeechobee County.*

southwest of Okeechobee for a full-stop Runway 4 (FIG. 5-8), straight-in. At approximately XX27, I called 6 miles out, inbound, straight-in approach Runway 4, Okeechobee. At approximately XX27 I recall hearing another aircraft calling 12 miles southwest, 2500 feet, inbound for straight-in approach Runway 4, Okeechobee. Just after this, I recall hearing Seneca NXXXX calling 8 miles south for a straight-in approach to Runway 4. At approximately XX30, I called 2 mile straight-in final approach for Runway 4, Okeechobee. I was at 700 feet at 80-85 KIAS, 10 degrees flaps. I looked up and out of nowhere I was overtaken by the Seneca NXXXX. He was above me and to the right approximately 50 feet. The Seneca then continued on final for a touch-and-go. He remained in the pattern and joined left traffic. I can't understand how the Seneca had overtaken me at approximately 50 feet vertical separation when I had been reporting my positions at 10 miles, 6 miles, and 2 miles. I then called short final Runway 4, Okeechobee as the Seneca was doing touch-and-goes on the same runway. The Seneca never acknowledged my position and I consider this to be a flight safety risk—which is why I am filing this report. At approximately XX31, I made a full-stop landing on Runway 4 and advised UNICOM that I was clear of the active runway. I then taxied to the ramp and shut down my engine at XX35. The Seneca remained in the pattern for three circuits.

Comments

About the only thing done correctly in this scenario was the reporter's three position reports on final approach. Otherwise, both he and the Seneca pilot failed to observe the basic traffic pattern procedures at uncontrolled airports. I'm sure you've caught the failures, but let's review them, anyway.

1. The fundamental error of both the Cessna and the Seneca was to disregard the traffic pattern regulations at nontowered airports. They opted for straight-in approaches rather than entering the pattern at a 45° angle to the standard

downwind leg, base leg, and final approach pattern. Had the correct procedures been followed, the sort of NMAC as described would have been highly unlikely.

2. Neither contacted Okeechobee unicom for a field advisory. How, then, did they know for a certainty that Runway 4 was the runway in use? How did they know the wind speed and direction? Were they aware of possible parachuting or ultralight activities on or in the air? (The *Airport/Facility Directory* warns of these.) Did they know whether any other traffic was in the pattern or even in the area? As far as one can tell from the report, the answer to the questions is either "no" or "they didn't." True, the reporter made his initial call 10 miles out, but that was only to announce his current position and his intention to make a straight-in approach for landing on Runway 4 at Okeechobee. In other words, "Here I am and this is what I'm going to do." That's fine *if* what you're going to do fits in with what else might be going on in the airport area. Otherwise, it's an arrogant and potentially hazardous act—an act of which both the Cessna and the Seneca were guilty.
3. Since we know that both pilots were transmitting, it's logical to assume that they both were receiving as well. If so, when the Cessna heard the Seneca report 12 miles out and then at 8, why didn't the Cessna get on the air and address the call to the Seneca to alert its pilot that he (the Cessna) was also on final for Runway 4? If no response was forthcoming, and knowing that the Seneca was overtaking him, shouldn't the Cessna

> have initiated evasive action by starting a wide 360° turn out of the approach path or by aborting the landing and entering the pattern at the published pattern altitude for a new approach? Whichever the case, the Cessna should simultaneously advise the Seneca of the action he was taking. Of course, the Seneca might have been having radio reception problems, because he certainly didn't appear to have heard any of the Cessna calls, or if he had heard them, he totally disregarded them. Regardless of that, though, with someone on his tail and closing fast, it seems only logical that the Cessna should have initiated some sort of action to get out of the Seneca's way.

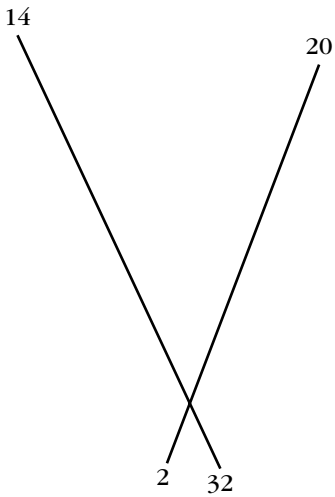
One other thing, unrelated to the NMAC: The reporter said that after landing, he called unicom to advise that he was clear of the runway and then called two more times for taxi instructions. The first call was fine, except that it should go to "Okeechobee *traffic,*" not *unicom*. Unicom has absolutely zero control over ground or in-flight operations at these nontower airports. It can inform, it can suggest, it can advise—but nothing more, as far as what the traffic does.

By the same token, the two calls relative to taxi instructions were irrelevant. No authorization to taxi at uncontrolled airports is necessary or even available. If there were confusion as to how best to get to the ramp from a runway, asking unicom for directions is entirely proper—but not authorization. At best, all unicom could say is, "Taxi at your discretion." That, of course, puts the burden on the pilot to clear him/herself before entering or crossing any runway and to communicate to (blank) *traffic* what actions he or she is taking.

Not much was done correctly in this report, which makes it a good example of the carelessness, arrogance, or lack of knowledge too frequently evident at these uncontrolled Class E or G airspaces around the country.

MORE RADIO ARROGANCE

Accession Number:	426044
Reported By:	Pilot
Flight Conditions:	VMC
Facility Identifier:	DBN (Dublin)
Facility State:	GA
Aircraft Type:	SMA (PA-28-161; Cessna 210)
Anomaly Consequences:	None



5-9 *Dublin "Bud Marron."*

Narrative: The problem arose when the conflicting aircraft entered on a right base while I was on final (Runway 2) from an ILS practice approach during VMC (FIG. 5-9). There was another aircraft behind me on the ILS. The C210 on base called in sight and thought it was me, so he never had me in sight. (*Ed: I believe the reporter meant that the C210 saw only the air-*

craft that was trailing him on the ILS and may not even had been aware of the reporter's plane [the PA-28] that was also on final.) I could not make any calls when three and four miles out because the C210 was talking to UNICOM about something other than flying at hand, so I couldn't talk with him. I noticed him right on top of me about 200 feet and immediately turned right and dove away. I noticed right when he stopped talking to UNICOM and announced short final Runway 2. Two aircraft on final were contributing factors while the C210 was blocking the frequency talking of other matters than the ones at hand.

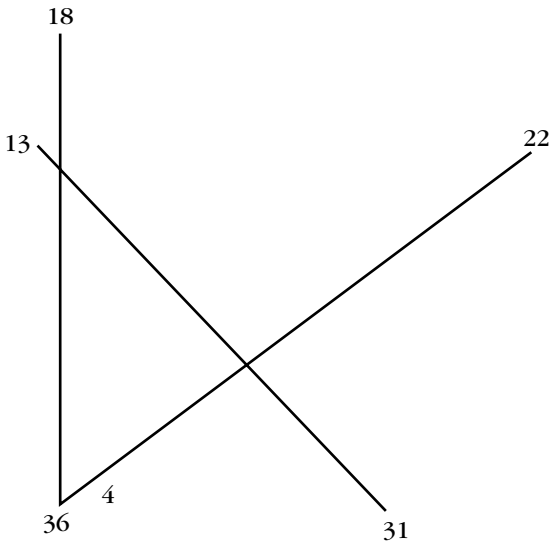
Comments

Pretty much the same tune as the last case, except for the C210 pilot's monopoly of the unicom frequency. Of course, that's not terribly surprising from one who flaunts the standard traffic pattern procedures and breaks into the final approach from a right base.

Disregarding that, and assuming that the reporter's version of the NMAC is accurate, it appears that the C210 pilot's interests or concerns are on matters other than flying his airplane. Or perhaps he just doesn't know that when he's talking over a given frequency, nobody else can either communicate or receive. If that was or is the reason for his thoughtfulness, he should be grounded until he learns the fundamentals of radio communications. He should also learn that the buddy-buddy give and take of the highway CBers is forbidden in the world of flight.

People like the C210 pilot are dangerous folks to have around and deserve to be cited for violations of both traffic pattern and communication procedures. But he'll probably sail along until some FAA inspector just happens to hear or observe such behavior. For the good of all, let's hope that occurs soon, and that immediate corrective action is taken.

A TRAGEDY IN QUINCY Switching to a different information source, here is another case from the National Transportation Safety Board's (NTSB) accident/ incident database. In summary, this is what happened:



5-10 *Quincy Regional-Baldwin Field.*

The accident occurred November 19, 1996, at the Quincy, Illinois, Regional-Baldwin Field. To visualize the situation, picture a United Express Beech 1900C, with 10 passengers and two crewmembers, on final approach to Runway 13 (FIG. 5-10) in VMC weather. At the same time, a Beech King Air and its two qualified pilots are preparing to take off from Runway 4. Behind the King Air in the number-two takeoff position is a Piper Cherokee, also on Runway 4.

In the sequence of events, the B1900C had made its proper position reports for a landing at Regional and queried the King Air as to its intentions. While the B1900C was still on its final, the Cherokee pilot radioed that he was holding for

departure on Runway 4 but did not indicate that he was number two in line behind the King Air. It is not clear whether the pilot identified himself as "*Cherokee* XXXX Alpha" or simply "XXXX Alpha." Whichever the case, the B1900C apparently assumed that the call was from the King Air, the first plane in line for takeoff on #4, and that he was going to hold until Runway 13 was clear.

As the B1900 landed and was rolling out, the King Air began its takeoff run on #4. The two collided at the runway intersection, killing all occupants of both planes. Strangely, the Cherokee proceeded to take off and left the airport area, despite the accident.

The probable causes of the accident are apparent—the failure of the King Air crew:

1. To scan the approach end of Runway 4 for a landing or departing aircraft.
2. Apparent failure of the King Air to monitor the airport's CTAF or perhaps even have its radio turned on or tuned to the correct CTAF frequency.
3. Failure of the King Air to communicate its intentions.
4. The Cherokee's failure to make clear that it was number two to take off behind the King Air.

With these omissions or commissions, the B1900C was lulled into a sense of security, shattered only when the imminence of an unavoidable collision became apparent.

The NTSB notes that contributing to the severity of the accident and the loss of life were the lack of adequate rescue and firefighting services at the airport and the inability to open the air stair door on the B1900C.

What makes this a difficult accident to understand is that the pilot in the King Air's right seat was an experienced flight instructor who was checking out another experienced pilot in the King Air.

Conclusion

These are only 10 of innumerable possible illustrations of traffic pattern incidents at nontowered airports—incidents caused primarily by:

1. Radio communication misuse or nonuse.
2. Disregard of the standard uncontrolled airport traffic pattern regulations.

Either cause is serious enough on its own, but when combined, they create incidents that are almost begging to become accidents. It sounds simplistic, but if all pilots would go by the rules and make the radio intention and position calls I outlined at the start of this chapter, the air would be a lot safer at these hundreds of nontowered fields.

6

Communications in the Class A and E Airspaces

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Let's leave the airport environment for now and see what communication situations some pilots have experienced in the Class A and E airspaces. Class A, as you'll remember, rises from 18,000 feet to 60,000 msl, while Class E generally begins at about 1200 feet and goes up to but not including 18,000 feet msl.

A Moment of Review

If your memory needs jogging, Class A is a totally controlled airspace wherein an IFR flight plan is required and the pilot must be instrument rated. Furthermore, continuous radio contact with the appropriate Air Route Traffic Control Center is required, pilots must adhere to center's instructions, and must report in to the center controller at various points along the way. This is the airline, high-altitude military, jet, turboprop environment and, at the lower altitudes of the airspace, a few piston aircraft.

Still, despite the presumed pilot qualifications and experience for Class A operations, radio misunderstandings and goof-ups do occur. An IFR rating doesn't seem to immunize a pilot from listening or transmitting mistakes, as some of the ASRS cases attest.

The typical general-aviation piston pilot, however, rarely ventures into the 18,000-foot-plus atmosphere. Whether IFR rated or not, beyond the immediate airport vicinity, he or she operates primarily in the Class E airspace. In this space, IFR flights are controlled by ATC, just as in the Class A airspace, but VFR traffic is uncontrolled—meaning that pilots are free to go where they want to go and do what they want to do, as long as they abide by the VFR altitude, cloud separation, visibility, and ceiling FAA regulations.

While this seems to offer an unlimited playground for VFR flight, the sheer relative volume of traffic demands vigilance and horizon-scanning eyes. At the same time, depending on where you are geographically, you ought to be tuned to nearby towers, Class B or C Approach Control frequencies, or a center to get an idea of what traffic is in the area, its direction of flight, its altitude, and general type of aircraft. All this can often be picked up just by eavesdropping, or better yet, if on a cross-country flight, by requesting an Air Route Traffic Control Center to provide flight following.

Some Radio Communications Cases

Of course, whether IFR in a Class A or VFR in a Class E receiving flight following, the radio plays a most important role in traffic control and pilot understanding of what instructions or advisories ATC may be issuing. The following cases illustrate just a few of the situations

some pilots found themselves in because of one communications barrier or another.

ATTENTION, PLEASE!

Accession Number:	381990
Reported By:	Flight Crew
Flight Conditions:	VMC
Facility Type:	ARTCC (Memphis)
Facility Identifier:	ZME
Aircraft Type:	Large (A320 Airbus)
Anomaly Consequences:	None

Narrative: We were operating as Aircraft X. Had climbed and leveled at FL240. We thought Center had given us a climb clearance to FL290, followed by a change in center frequency. We checked on with new center frequency. Center replied, "Aircraft YX, Roger, climbing to FL290." We then said, "No, this is Aircraft XY climbing to FL290." Center replied, "I don't know anything about any XY. I am working an Aircraft YX. Return to your last frequency." At this point, I realized that the previous climb clearance to FL290 and center frequency change were for YX, not us as XY. Prior to this we did not realize an Aircraft YX was out there. At this point we were climbing through FL 251. We checked in once again with the previous frequency and said that we were climbing to FL290, which they acknowledged. They did not seem concerned or in any way apprehensive over the situation. Bottom line: We were not paying close enough attention to flight numbers and mistook our call, XY, for YX, another flight on frequency. Center never gave us a heads up either to the similar call sign on frequency.

Comments

Here we have two aircraft, one XY, the other YX, both climbing to FL 290, both in the same center controller's sector of responsibility, but the controller is aware of and handling only aircraft YX. Something is wrong, and

the fault lies with either the pilot responsible for manning the radio or the center and its internal process of "handing off" a flight from one sector controller to another.

Considering the pilot first, perhaps he did make the simple mistake of "not paying close enough attention," but there's also another factor to consider: how he worded receipt and understanding of the calls directed to him. It's difficult to tell from the narrative, but it's possible that the acknowledgment(s) omitted the important details of aircraft type and call number. Otherwise, if he had included that information, there probably would have been none of the confusion on the parts of both pilot and controller that apparently developed. I've said it several times before, but it's so simple to make that one, brief acknowledgment of an instruction, as:

> ATC: United twenty seven-five, climb to flight level two niner zero.
>
> *UAL: Roger, United twenty seven-five leaving flight level two four zero for two niner zero.*
>
> Versus
>
> *UAL: Roger. Out of two four zero for two niner zero.*

Or, as some of the road-running CBers might put it: "Roger. Out of two forty for two ninety."

The exact structure of a response and the specific words chosen are relatively unimportant, as long as the aircraft is identified and the pilot has repeated back the action he has been told to take—in this case, to climb to flight level two nine zero. What is important is to make the response terse, clear, and to the point.

The second possible cause of the incident that warrants investigation is why controller #2 had no information about Aircraft XY. In every Air Route Traffic Control

Center, when an IFR flight approaches the geographic limits of a given sector, the controller responsible for that sector "hands" the aircraft off to the controller of the next sector in line of flight. The transfer takes place, however, *only* after that controller has accepted the handoff. So how the aircraft in question could have entered the second controller's sector without his or her knowledge is very odd and presented a potentially very dangerous scenario. But all's well…etc., and the reporter has lived to share his experience with us.

CONFUSION … CONFUSION

Accession Number:	394700
Reported By:	First Officer
Flight Conditions:	VMC
Facility ID:	PIE (St. Petersburg/Clearwater)
Facility State:	FL
Aircraft Type:	MLG (DC-9)
Anomaly Consequence:	None

Narrative: Navigating GPS direct to Tepee Intersection, Jacksonville Center issued a turn "right 30 degrees." I read back the clearance. However, the Captain mistakenly turned left. I tried to confirm direction of turn with ATC but due to unusually high radio congestion, my transmission was blocked. By this time we were already 30 degrees left of original heading. I kept trying to talk to ATC but was unable to communicate. ATC then told us there was a traffic conflict and said two to three times "immediately turn right to a heading of 270 degrees, descend and maintain FL 270," And added she had given us a right turn. Contributing factors: Overcongestion on the frequency, too many airplanes, more talking than usual due to bad weather causing deviations. Unnecessary communications tying up frequency for longer than necessary with both ATC and aircraft. Example: The controller issued our evasive clearance 2–3 times. One would have been

enough, more is a waste of valuable air time. Specifying a specific heading, example, "Turn right to a heading of 270 degrees" instead of issued "Turn right 30 degrees" would eliminate left-right turning errors.

Comments

Three things hit me in this narrative. The first: The reporter says that he read back the initial clearance directing a 30° turn to the right. In so doing, did he include his aircraft type and call sign in the readback to confirm that the right aircraft had received the instruction and would comply? Maybe he did but apparently without much conviction because, as he said, he tried and tried to reestablish contact for confirmation. It's possible that ATC addressed the wrong plane. If so, a full readback could have alerted the controller to that fact so that he or she could immediately take corrective action. This is admittedly supposition, but it might have been one of the elements in the initial misunderstanding.

The second point is fact—not supposition. The airwaves were clogged, making contact with ATC difficult. Perhaps little could have been done to unclog the frequency, because weather and IFR conditions do generate more dialogues than usual, but that doesn't seem to have been the only causal factor. What stands out in the report as correctable is the volume of unnecessary calls "…tying up frequency [sic] for longer than necessary with both ATC and aircraft." The reporter then uses the fact that ATC issued the evasive clearance "2–3 times," when once would have been enough. Perhaps so, but maybe the repetition was deserved. The DC-9 had disobeyed one instruction and the controller may have been just making certain that the evasion message was getting through. No doubt, though: Those repeats contributed to clogged airwaves. But the reporter is correct

in condemning excessive verbiage—something I've been railing about many times in previous chapters.

The third element that strikes me in this scenario is not a radio communications issue but one of cockpit interpersonal communications or cockpit interpersonal trust. I'm not sure which it is in this case, but we do know that the captain turned 30 degrees to the left when he should have gone to the right. Did he really misunderstand the first officer, and if so, why didn't the first officer correct the captain on the spot? Or was the first officer too uncertain about what ATC had told him to correct the captain without recontacting ATC? Then a third possibility: Did the first officer know he was right but was just too intimidated by the captain to dispute him openly without further confirmation by ATC?

From the report, there is no indication of any pilot-copilot discussion of the issue. If there was none, the question of cockpit resource management arises and whether there is a team up there in the front end or just a congress of individuals—be there two, three, a non-flying pilot, or whatever the staffing complement. A later book in this series focuses on that very point, and rightly so. True teamwork, whether in the cockpit, the office, or on the production line floor, depends on how effectively team members *communicate* with each other, *participate* in the planning and problem-solving process, *collaborate* with each other, and *control* themselves, their emotions, their feelings about people, ideas, things. Or the situation of the moment.

I obviously have no idea of what the working climate was in the cockpit of that DC-9, and maybe even a suggestion of fear or intimidation is totally out of line. On the other hand, if a captain turns an airplane one way when his first officer says it should be to the opposite direction and the first officer then doesn't feel confident

enough to question the captain—even perhaps strongly—something doesn't seem quite right.

THE RISKS OF ASSUMING—AGAIN

Accession Number:	408590
Reported By:	Captain
Flight Conditions:	VMC
Facility ID:	ATL (Atlanta); ZTL (Atlanta Center)
Facility State:	GA
Aircraft Type:	LRG (B727)
Anomaly Consequences:	None

Narrative: Upon climbout from ATL evening of (day, month, year), ZTL was (as usual) very busy. ATL asked us what our airspeed was and we responded, "Approaching 320 KIAS." Center then said, "Hold 310 KTS or less for your climb" and we acknowledged this call. Center then said, "Now fly 250" only, and since we were talking about airspeed before, I slowed to 250 KTS. Prior to handoff, Center then said they wanted me to "Fly 250 degrees," now switch to Center on XXX.XX frequency.

Comments

Another case of, yes, assuming. Also, at the very least, a case of lack of curiosity. One would think that the captain, when told to "Now fly 250," would have questioned the controller. Going from 310 kts to 250 kts is a fairly significant airspeed drop, and one that would seem to warrant confirmation. All the captain had to say was, "Is that two-hundred-fifty *knots*?" ATC would probably have appreciated the question. Controllers want to know that pilots know what they are supposed to do. Controllers do not like surprises.

But let's don't let that one controller off so easily. He or she was also guilty of assuming—assuming that the

pilot would obviously know, under the circumstances, that "250" meant heading, not airspeed. Consequently, and probably not even thinking about it, he or she dropped the key word: "…degrees." Omitting that one word, however, resulted in the needless expenditure of many additional words, consumption of radio air time, and possible traffic disruption. The little things so often mean a lot.

MORE CONFUSION…

Accession Number:	390620
Reported By:	Flight crew
Flight Conditions:	VMC
Facility ID:	ZDV (Denver Center)
Facility State:	CO
Facility Type:	ARTCC
Aircraft Type:	WDB (Wide Body)
Anomaly Consequences:	None

Narrative: While in cruise at FL330, we received a call from ZDV which we understood as follows: "For traffic, climb to and maintain FL370." We looked at each other, commented that we didn't want to but were able to, and responded to ZDV, "Leaving FL330 for FL370." Shortly thereafter Denver called saying that we had not been cleared to leave FL330, and to return to FL330. This we started to do, when ZDV gave us a 40 degree heading change to avoid conflict. Maximum altitude reached was 340 before descent was initiated. Center called us with position of the traffic and we confirmed visual contact. No TCASII (Traffic Alert and Collision Avoidance System II) warnings were received. I believe the confusion arose because our reply to Denver was not heard, and because the controller was not expecting a reply, as he did not believe he had issued a clearance. He did not repeat his transmission.

Comments

The end of this report is a little confusing as to who did or heard what. Despite that, the fact remains that a wide-body aircraft with a bunch of people aboard was out there fluctuating between altitudes and headings because of communication breakdowns between center and airplane. What appears to be missing in the dialogue which, if included, would probably have prevented the mix-up? You've got it: No indication that the crew's response to center included their call sign. Merely rogering the instruction, as "Roger, Center. Leaving FL 330 for 370" doesn't confirm that the instruction reached its intended receiver—which it apparently didn't, according to the narrative.

There may have been more to the situation than this one possible or probable omission, but just that single little addition might have prevented the need for the precautionary altitude and direction changes. It seems that the center controller was as confused as the flight crew, and that's not good in our undoubtedly crowded skies.

ONE FROM A CONTROLLER

Accession Number:	386644
Reported By:	Huntington, WV, TRSA TRACON Controller
Flight Conditions:	MVF (Marginal VFR)
Facility ID:	K22 (Prestonsburg, KY)
Aircraft Type:	SMA (Bonanza 36)
Anomaly:	None

Narrative: SMA was issued an IFR clearance through Louisville Flight Service Station, along with a void time. The aircraft had filed direct GZG (Glade Springs VORTAC) and on to the SE, and requested 9000 feet. (*Ed: The Glade Springs*

VORTAC is southeast of the pilot's departure airport, Prestonsburg, KY, K22.) I issued a route of direct ECB (Newcomb VORTAC) and climbing to 5000 feet since, as filed, would have put the aircraft into ZID (Indianapolis Center Airspace without prior coordination (*Ed: The ECB VORTAC is northwest of K22.)* Direct ECB was to the NW while direct GZG is SE. There is very rapidly rising terrain and obstructions as you proceed South and SE from K22, while to the NW the terrain is hilly but lower. The aircraft took off and was tracking SE when I first talked with him. He stated that he was going to ECB, and I had not yet radar-identified the aircraft. As he proceeded SE, I lost communication with the aircraft, and observed him level at 5000 feet. Another aircraft called SMA and I was able to re-establish communications. By this time, the aircraft was 10 miles SE of K22, and he still said he was proceeding direct to ECB. After getting the aircraft idented, I was able to issue a clearance on course and climb to 9000 feet. What happened? (1) The pilot figured, why go NW when the controller will probably put me on course right away. The controller only wants to delay me… or (2) a complete loss of situational awareness by the pilot, and he was blindly flying along into rapidly rising terrain trying to figure out why the controller was repeatedly asking him if he is going NW. I (we) issue clearances with very good plans in mind. While there are those times that it seems you are going out of your way, it is to keep you out of someone's way or to avoid an unplanned close encounter with earth. If ATC does something that creates a delay or other nonsafety issues, please call from on the ground and discuss it there. Please do not just assume the controller is wrong (or just doesn't have the picture) and do what you want. By the way—this incident happened in deer season. Not a good day to fly low over a bunch of people with guns (Grin!).

Comments

Two issues stand out here. The Bonanza pilot was not very smart to disregard ATC's instructions to depart on a

northwest heading and, on his own, head out southeast towards the Glade Springs vortac. How was he to know what traffic was out there, what flight plans of other aircraft he might affect, or what effect the rapidly rising terrain might have on his own intentions? Furthermore, one might ask: If you're going to disregard an ATC clearance, why even bother to file a flight plan or request vectors? Of course, once the FAA learned of your regulation violations, you might find yourself grounded for a short or long period of time, so not doing your best to do what ATC asks is not only foolish but potentially fatal.

This should be said, though: if for whatever reason you cannot obey ATC's instructions, get on the air, briefly explain why, and request alternate headings or altitudes. After all, as a certificated pilot, you have the ultimate decision-making responsibility, but that doesn't mean you have the right to do what you want to do without any coordination with ATC.

The second issue of consideration is the failure of the controller to briefly explain why the northwest versus a southeast heading. Just a couple of words, such as account traffic or rising terrain or whatever would probably have told the pilot why a seemingly oddball clearance was issued.

Thirdly, why didn't the pilot question the NW versus SE clearance? He had every right to, but it appears that he just accepted the clearance and then immediately disregarded it. Again, you're in command of your airplane and you are completely justified in questioning a clearance that seems at odds with the flight plan you filed. Yes, as the controller said, if you have a problem with something ATC does, "Please call us from on the ground and discuss it there." And that you should do, but that might be too late. Sometimes the air has to be cleared now, so if you feel it necessary, do so, but do it

in the fewest words possible and do it nonconfrontationally. In the vast number of cases, both parties emerge winners.

"…A CLASSIC EXAMPLE OF PILOT/CONTROLLER MISCOM."

Accession Number:	435953
Reported By:	SIC (Second in Command)
Flight Conditions:	VMC
Facility Reference:	ZOB (Cleveland ARTCC)
Aircraft Type:	Learjet 31A
Anomaly Consequence:	FAA reviewed incident with flight crew

Narrative: Acting as SIC on a Learjet 31A enroute from Cleveland, OH, to Norfolk, VA, our aircraft was given a descent from ZOB to FL 190. Only after 3 freq. changes to ZDC (Washington ARTCC) and at least 150 miles later were we first made aware that we were at the wrong altitude. ZDC gave us the phone number of ZOB and a phone call was subsequently made upon arrival in Norfolk. Apparently we took a descent clearance from another aircraft with a similar call sign and then even took that aircraft's freq. change soon thereafter. There was some misunderstanding between controllers and we continued our descent, unaware of the problem. I believe this is a classic example of pilot/controller miscommunication. Factors affecting the problem were maximum cockpit wind noise at FL270 in the Learjet, and frequency congestion. Also the beginning of the call sign was perhaps clipped off as the controller keyed his mike. I also believe we should have been made aware of similar call signs on the same frequency. This would have alerted both flight crews of a potential COM (communication) conflict. In the future, I will be more aware of problems stemming from similar call signs.

Comments

Perhaps the flight crews should have been alerted to the call sign similarity, but shouldn't they be attentive to

such possibilities? One ear should always be cocked for similar-sounding call numbers, aircraft types, or combinations of the two. Examples: You're in Cessna 1234 Delta; another aircraft is Cessna 1324 Delta. Unless you're listening closely, it would be easy to misread a call to 24 Delta as 34 Delta and then mistakenly follow whatever instructions ATC might be issuing.

Whether ATC should be responsible for advising pilots of similar call signs on the same frequency is a matter for debate. Personally, I think it would be helpful to the aircraft so involved, but to make it a "responsibility" is really shifting the burden for aircraft identification from the pilot to the controller. The reporter in this case has the most practical answer when he says at the end, "In the future, I will be more aware of problems stemming from similar call signs."

ATC TO THE RESCUE This is neither an ASRS nor an NTSB database case but comes from an issue of the *Flyer*, a biweekly newspaper published in Tacoma, Washington. I'm citing it simply because it illustrates how a group of concerned ATC personnel can work together to rescue a pilot in jeopardy. In the interests of space and brevity, I've capsulized many of the details that made up the *Flyer* report.

What Happened

The incident began at 9:20 in the morning when a non-instrument-rated pilot of a Bonanza A-35 requested flight following from a center while over the Sierra Mountains. All seemed routine until the pilot entered the Class A airspace and climbed without approval to 20,000 feet to get over the clouds that were building ahead of him. As the *Flyer* article stated, the controller contacted the Bonanza and learned that the pilot (1) was not instrument rated, and (2) had no oxygen on board.

Knowing the potential of a serious problem on the horizon, a different controller, who was also an instrument-rated pilot,

took over the controlling responsibilities. As he did, other center personnel tried to find breaks in the overcast through which the Bonanza might descend. With no autopilot on board, those involved in the efforts to help feared that the VFR-only pilot would lose control of the plane if he had to descend through a thick overcast. There were no breaks, though, and after about an hour in the rarefied 20,000-foot altitude, the pilot's speech was becoming increasingly slurred because of hypoxia (lack of oxygen). And, of course, with hypoxia, judgment, problem-solving abilities, and normal motor skills begin to fail. At that point, unless followed by counteraction of some nature, unconsciousness and ultimately death are inevitable. With early hypoxia symptoms showing, it was clear to the controllers that the Bonanza would have to start down—now.

After turning toward the airport, the instrument-rated controller began a continuous communication with the pilot, directing him to reduce power, keep his wings level, and begin a descent to 12,000 feet. Talking him through the overcast, the pilot descended until he broke into the clear at 14,500 feet. The drama, intense for several minutes, was over.

Shortly afterward, the Bonanza landed safely, with the pilot left with nothing but a headache for his time in the relatively rarefied atmosphere. Following engine shutdown, he phoned the center to express his appreciation to the controllers for the help they had given him.

The *Flyer* closes with this paragraph:

"How long those good feelings for the FAA will last is unknown. An FAA spokesman said the pilot is now under investigation and possibly facing sanctions for departing an assigned altitude without ATC clearance and for operating at altitude without supplemental oxygen." (I don't know the final results of the FAA investigation.)

Comments

The case speaks for itself. Besides facing sanctions for the violations cited, other questions might be asked: Did the pilot contact a Flight Service Station for a preflight

briefing? Was he aware of the cloud cover, its floor, its ceiling, and the conditions within the overcast, such as icing, turbulence, rain, lightning? Did he file a flight plan? Why did he allow himself to get caught on top of a cloud cover? Why didn't he do a 180° and get back to where the weather was clear? Was he aware that he had entered the Class A airspace when he went above 18,000 feet, that he had no approval to do so, and that he was illegal because he did not have an instrument rating and presumably had not filed a flight plan? Questions that should be answered.

At the same time, the center controllers deserve hearty kudos for what they did to escort the pilot through a 6000-foot overcast into clear air and an eventual incident-free landing. This is merely one example of what ATC can do for you when you get into trouble and an example of why VFR pilots should learn to use, and then use, the FAA services that are at their disposal. It does seem fair, though, to observe that this pilot, with no instrument rating, had to have done a good job to descend safely through almost 6000 feet of overcast. Not many untrained instrument pilots would have been so fortunate, so skilled, or perhaps so lucky.

Conclusion

The fact that all the cases in this chapter, except two, involve commuter or airline operations is not by design. Almost exclusively, ASRS pilot/controller cases in the Class A or E cruise environment related to misunderstandings between a pilot and a controller, principally about clearances, while the aircraft was in flight. It seems that even mid- to high-time airline or air transport pilots can be just as subject to clogged communication lines as their less-experienced compatriots. So ye of lit-

tle time, if you've had trouble understanding a controller or misinterpreting an instruction, realize that those flying the Learjets to the 747s are even now subject to the same ailment.

That realization, however, should never allow complacency to become the dominant attitude. The fact that "they" also screw up does not mean that it's OK for the less experienced or the less qualified to do the same. Instead, every miscommunication example, of whatever nature, should be a source of learning and an impetus to avoid the cause of the problem.

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7

Communications in General-Aviation Training

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This last group of cases illustrates communication situations involving student pilots and, in most instances, their instructors. In addition to the situations themselves, what I found interesting in these case were:

1. What the instructor himself learned from the experience.
2. The extent, in certain instances, to which the students were lacking in basic preflight airport research.
3. The apparent student deficiencies in radio communications and appropriate airport operating practices.

Communication Cases and Flight Training

The cases that follow are reports by both students and instructors that offer food for thought and situations for consideration. As with the many preceding cases, each

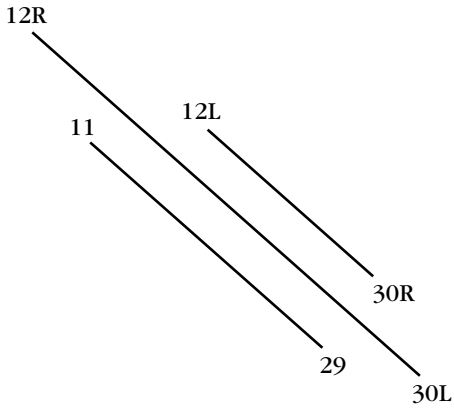
provides the opportunity for learning, for refresher training, or perhaps reinforcement that what you've been doing all along has been right. That in itself is a meaningful learning experience. So, with those thoughts in mind, let's take a look at the cases and see whether you agree with any of my observations or conclusions.

DOUBLE FORGETFULNESS

Accession Number:	389840
Reported By:	Instructor
Facility ID:	San Jose
Facility State:	CA
Aircraft Type:	SMA
Anomaly Consequences:	None

Narrative: Late in what would be a one-hour training flight in the pattern at San Jose Airport, my student and I did a touch and go on RWY 11 (FIG. 7-1) without clearance for the option. Winds during the flight at the surface were variable from 130-210 degrees at 9 KTS variable, 16 KTS gusting to 21 KTS. Winds aloft at pattern altitude of 1000 feet MSL were much stronger and a direct crosswind. Needless to say, the patterns and landings were difficult for my student and there was light turbulence on the downwind. I continued the flight, however, because my student was capable of handling the aircraft in these conditions and it was excellent experience for him.

After approximately 4 touch-and-goes on RWY 11, my student told me on the upwind that he thought we had not been cleared to land. He was right. We had not been cleared to land or for the option for that touch-and-go. I had completely forgotten and Tower said nothing, so I told my student to say nothing over the radio and continue as before. Tower cleared us for the option approaching base on the next landing, and the flight continued without further incident. While not too dangerous by itself, our uncleared landing was dangerous considering how busy the airport was. The Tower departed



7-1 *San Jose International.*

one aircraft off RWY 11 while we were on final, another was landing behind us, there was the usual stream of airline departures and arrivals on RWY 12R, and several aircraft were stacked up on RWY 12L for departure. Tower simply forgot about that Cessna (the reporter's) in the pattern, and we forgot to get cleared to land, as we were busy with the difficult patterns and watching for traffic. Not exactly my finest moment as the all-powerful, student-mistake-catching CFI.

Comments

The reporter is at least honest about his performance as an instructor because, indeed, it was not a very fine moment or hour. For one, it appears from the report that the instructor had chosen a busy time of day for a student to practice touch-and-goes at a traditionally busy airport. Coupled with the traffic volume and the wind conditions, the instructor's judgment might be questioned.

Beyond that, though, there is no evidence that he (and his student) had even been authorized to land—much less shoot a touch-and-go. If he had contacted the

tower, one of three clearances would have been issued: "…cleared to land," "…cleared for touch-and-go," or "…cleared for the option." Since none of the three was forthcoming, the only conclusion one could come to is that there had been no contact—or that it was disobeyed, since the reporter admits no touch-and-go had been authorized. In fact, he admits at the end that "we forgot to get cleared to land." Which landing he was referring to isn't clear, but it was probably the first one in the report.

Another thing: Shouldn't a student, advanced enough to handle tough crosswinds at a busy tower-controlled airport, be capable of handling the radio communications? You'd think he would know where the calls are to be made and how they should be phrased. You'd also think he'd know that clearance to land at tower-controlled airports is required, and that if the tower has not issued that clearance, the pilot, on the downwind leg, is expected to query the tower, as:

> Tower, Cessna Seven Eight Tango, right downwind. Are we cleared to land (or touch-and-go, or for the option) one-one?

The fact that "The tower simply forgot about that Cessna in the pattern and we forgot to get cleared to land…" paints a dangerous picture, especially at a busy airport, with its steady flow of departing and arriving traffic. Based on the reporter's comments, however, I would imagine that both he and his student learned a few lessons from the experience.

INNOCENCE ABROAD

Accession Number:	425638
Reported By:	Pilot
Flight Conditions:	VMC

Facility ID:	BDL (Bradley International Airport)
Facility State:	CT
Aircraft Type:	SMA
Anomaly Consequences:	Pilot/ATC Review

Narrative: On Jan XX 99 I was a student pilot on a solo cross-country, flying from SCH (Schenectady, NY) to PVD (Providence, RI) and became disoriented and drifted South into Windsor Locks Class C airspace. I reoriented myself and continued on to PVD without contacting BDL approach. This was a mistake. I was at 3500 feet MSL and below the 4200 foot ceiling of this Class C airspace. Upon landing at PVD, I was instructed to call BDL approach, which I did. The supervisor at BDL explained what I had done and asked me how it happened. I explained. He then explained how I should have contacted approach when I was disoriented and that they were there to help. I apologized and thanked him for making me contact him.

This was a major mistake on my part, and thankfully no incident occurred. I know the seriousness of this situation and have learned from this experience and will be more aware of airspace violations in the future. I have also spoken with my CFI and received instructions on what to do when lost and how to prevent future violations.

Comments

I would imagine that this student has learned his lesson well, thanks in part to an understanding ATC supervisor.

Quick: What radio call is required *before* entering (1) a Class C *outer area*? (2) a Class C *outer circle*? (3) a Class C *inner circle*? Answers: (1) Optional. No call required, unless you want Approach Control separation and sequencing. (2) Mandatory contact with Approach Control for separation, sequencing, and vectors. (3) Mandatory contact with the airport control tower for landing instructions.

As to inadvertently penetrating a controlled airspace, the only complete answer is to carefully plot the flight (headings, winds, radio aids, and key checkpoints) so as to stay 10 to 15 miles away from the outermost levels of a Class B or C airspace, and then fly the flight as plotted. If the center responsible for your route of flight can handle a request for VFR flight following, take advantage of the service. Among other things, the controller will alert you if you're drifting too far off course, or toward one of the Special-Use Airspaces, or a Class B or C area.

What with all of the radio navigation tools at our disposal and the ground ATC or Flight Service Station assistance available, it's pretty hard to get lost these days. With a well-plotted flight, about all a VFR flight requires now is to pay attention to what we're doing and know how to tap the various ground resources when expected checkpoints don't show up and the landscape below doesn't look quite right.

IGNORANCE MAY NOT BE BLISS

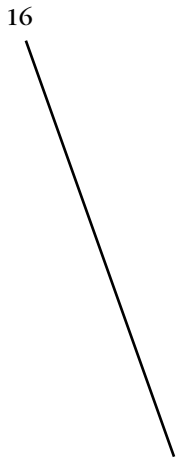
Accession Number:	425382
Reported By:	Pilot
Flight Conditions:	VMC
Facility ID:	1K1 (Benton)
Facility State:	KS
Aircraft Type:	SMA (Tailwheel)
Anomaly Consequences:	None

Narrative: Reporter receiving PIC (Pilot In Command) check in tailwheel aircraft from CFI. Crew departed AA0 Airport (Col. James Jabara, Wichita) for 1K1 (FIG. 7-2) for several takeoffs and landings. CFI stated that he was familiar with operations at 1K1 Airport (small gen. aviation airpark) and had recently conducted takeoffs and landings there. Unaware that airport did indeed have a UNICOM service, CFI did not tune appropriate traffic advisory frequency. Reporter tuned 122.9

KHS for traffic advisories. CFI instructed reporter to operate in left-hand traffic for Runway 16—no observable airport markings disagreed with this statement. Following the flight, 1K1 Airport manager telephoned FBO owner to complain that this aircraft was to have utilized UNICOM frequency 123.0 and right traffic for 16. CFI called airport manager to apologize. Lesson learned: Irrespective of a CFI's current experience or statements regarding same, it is critical that a pilot (student, copilot, or otherwise) unfamiliar with a particular operation check all details for himself (AFD [*Airport/Facility Directory*] in this situation) prior to commencing such an operation. Although other traffic was observed in the airport vicinity also performing nonstandard operations, and no collision hazard existed in this instance, compliance with approved traffic pattern procedures certainly minimizes the risk of a midair collision. Reporter will be more cautious before operating in an unfamiliar airport.

Comments

If this instructor had indeed recently conducted touch-and-goes at 1K1, he probably was just as guilty then of



7-2 *Benton.*

radio and traffic violations. Unicom facilities don't usually crop up overnight any more than do the ground features that dictate a right traffic pattern versus the standard left. Perhaps the instructor learned a lesson from this, but isn't it too bad that a student pilot has to learn from the mistakes or oversights of a supposedly qualified CFI?

The student here is absolutely right about checking all details for himself—specifically the *A/FD.* One glance at 1K1's data page would have revealed the unicom frequency and the right-hand pattern for runway 16. Yes, students should be able to trust instructors, and 95 percent of the time the trust is totally justified, but there's always the chance of a slip-up or assuming that something that has been the case for years in the past is still true today. Change *does* happen. Maybe it's just a frequency change or a new housing development that requires a pattern change for noise abatement purposes. Whatever the case, it's the pilot's job, from student on up, to do his homework before going into a strange airport. Otherwise, it could prove embarrassing at the very least.

WHO'S AT FAULT HERE?

Accession Number:	425558
Reported By:	Pilot
Flight Conditions:	IMC
Facility ID:	STS (Santa Rosa)
Facility State:	CA
Aircraft Type:	SMA (Cessna 210)
Anomaly Consequences:	PILOT/ATC REVIEW

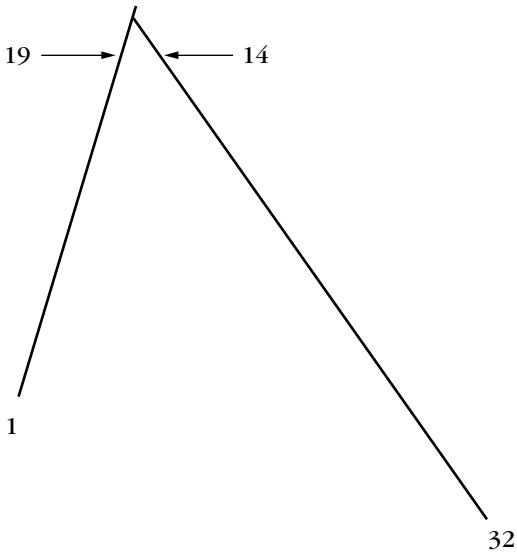
Narrative: After run-up prior to an instrument training flight, I thought the Controller asked me to "Taxi into position and hold" (FIG. 7-3). I probably answered "Position and hold" and

he thought I said "Hold short." I taxied onto the runway and he said I had not been cleared onto the runway but I should hold my position. Within 15 seconds he cleared me for takeoff. There was no conflict with another aircraft. Good example of poor communications between pilot and controller.

Comments

Something's a little odd here because "Position and hold" doesn't sound a bit like "Hold short." Of course, the pilot doesn't tell us whether he was using runway 14/32 or 1/19 or the direction of takeoff. The possibility, though, is that he assumed a call to another aircraft also waiting to take off, perhaps on the other runway, was directed to him, and thus responded as he did.

If that were the case, you could conclude that the reporter wasn't paying close enough attention to the tower and didn't hear the call sign of the aircraft being



7-3 *Santa Rosa Airport.*

cleared. Since he was apparently ready to go, he assumed the authorization was for him.

How could the situation have been avoided? Simply by including the aircraft type, abbreviated tail number, and runway number in the acknowledgment call, as: *Roger, position and hold one-four* (*or one-nine*). *Cessna 56 Kilo.* Or, *Roger Cessna 56 Kilo, position and hold one-four.* Either wording would have told the tower that the right aircraft on the right runway had received the intended clearance. To make it even briefer, it's OK to drop the aircraft type (in this case, "Cessna") if there's no chance of confusion with another aircraft with a similar-sounding tail number. Brevity but clarity are the two essentials of pilot-controller communications.

I suppose there's the possibility of one other scenario here: The controller did authorize the reporter to taxi into position and hold, but in a moment or two realized he should not have done so and thus tried to blame the pilot for the error. This is very unlikely but has to be offered as a possible explanation of an uneventful incident. The probable cause is just what the reporter said: "good example of poor communications between pilot and controller."

WRONG NUMBER…

Accession Number:	426655
Reported By:	Pilot
Flight Conditions:	VMC
Facility ID:	O6C (Schaumburg); PWK (Palwaukee)
Facility State:	IL
Aircraft Type:	SMA
Anomaly Consequences:	Pilot/ATC Review

Narrative: Departed PWK with student. Proceeded to O6C for traffic patterns. Changed the #1 radio to UNICOM, did not

realize I was transmitting on #2, PWK Tower. TWR called 06C and I realized my mistake. In the future, I will brief all students on the possibility of this and verify the radio I am transmitting on so this embarrassing situation does not happen again. I did call Tower and apologized.

Comments

This kind of slip happens, and it can be embarrassing. More serious, though, is the possibility of not receiving necessary traffic information, in this case from the O6C unicom—plus tying up the other frequency (PWK) with transmissions intended for 06C.

So there are implications other than just the embarrassment of not tuning your radios correctly. The instructor here is wise to impress on his students its importance and the risks involved when this small detail is overlooked.

THE OLD ORDER CHANGETH…

Accession Number:	426707
Reported By:	Pilot
Flight Conditions:	VMC
Facility ID:	IWA (Williams Gateway)
Facility State:	AZ
Aircraft Type:	SMA (Beech 76)
Anomaly Consequences:	None

Narrative: In January '99, my student and I inadvertently entered Class B airspace without clearance. We made a flight to Williams Gateway on an IFR flight plan uneventfully and opted to depart visually for the return flight. Prior to departing IWA, I questioned my student about the Class B airspace boundaries and he stated that the floor did not begin until 6000 feet in our area. We decided that leveling off at 5000 would be a good plan in order to request our clearance. Having flown into the area on numerous occasions, I knew, or assumed I knew, that 6000 feet was indeed the floor of the

Class B airspace. However, I had taken 5 months off from flight instructing, and what I did not realize was that the airspace had been redefined. What used to be the floor at 6000 feet had been lowered to 5000 feet. This change occurred approximately 2 months before my return. Thankfully there were no adverse results from our transgression, other than being chastised by ATC. I believe that contributing factors to this incident were complacency on my part for assuming the airspace boundaries had not been changed during my hiatus, and my failure to supervise my student more closely. As my student was checking his VFR sectional, I should have been checking it with him!

Comments

Another case where comments are almost needless. The instructor has said it all. It does point up, though, the fact that airspace ceilings, floors, boundaries, and/or structures do change from time to time and are made known by one medium or another, including sectional charts. That's the primary reason why you should never plan or fly with an out-of-date sectional. In fact, you can be cited if you do and happen to be ramp-checked by the FAA. It's OK to fly with *no* chart, but not with one that's out-of-date.

Something else to watch about change and the sectionals: Change can come at any time, but the sectionals are revised twice a year, so if an updated sectional comes out on, say, June 1, a change effective September 1 won't appear on the sectional until the December 1 issue. The September change may be publicized by bulletins, NOTAMs (Notices to Airmen), or other written media, but unless you keep on top of the various notices or question Flight Service Station for recent NOTAMs, you could be making the same sort of mistakes this instructor made.

Which does raise these questions:

1. If the student was using a current sectional that reflected the lowered floor of the airspace, how come he wasn't aware of the change?
2. If he was flying with a current chart but that had not yet reflected the changes, was he aware of other information sources that publicize upcoming or implemented changes, revisions, etc.? If not, why not?
3. If he was flying with an old and outdated chart, why? Had he been taught the risks of so doing? If not, why not?
4. How much should an instructor who has not flown for a period of months rely on a student for current operating procedures or regulations? To that question, rather minimally, I would think.

One thing the instructor did well was to level off at 5000 feet, 1000 feet below what he thought was the 6000-foot airspace floor. When operating VFR, a 500- to 1000-foot separation from a Class B floor is a wise decision, especially if the airspace is busy, there is turbulence of any magnitude, or the pilot is paying insufficient attention to his altitude control. Any separation less than 500 feet could be playing it pretty close, which makes 500 to 1000 a good choice.

A relatively minor airspace violation such as this would not seem to be a big issue, but it definitely is when you consider the potential calamity should one light plane make contact with any other man-made obstacle. The "no trespassing" rules are very firm about violating any controlled airport airspace without clearance, and the price for so doing can be quite severe—as it ought to be.

WHEN IN DOUBT, ASK

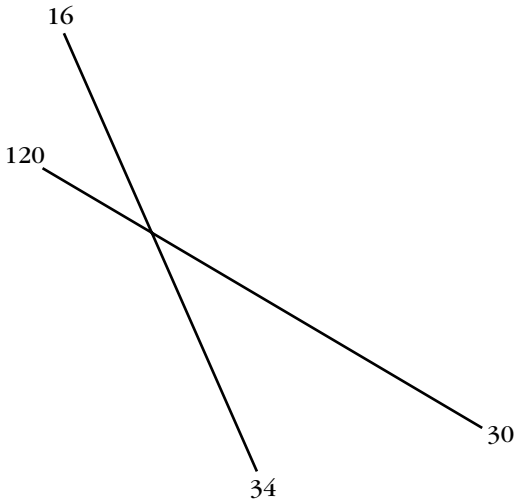
Accession Number: 427268

Reported By: Pilot

Flight Conditions:	VMC
Facility ID:	RDD (Redding)
Facility State:	CA
Aircraft Type:	SMA
Anomaly Consequences:	None

Narrative: I am a student pilot with approximately 58 hours time. I approached RDD Muni (FIG. 7-4), a Class D airport, while on an instructor-endorsed 3-leg cross-country flight. Approximately 10-12 miles from the airport, I contacted RDD Tower and was instructed to enter a right downwind pattern to land Runway 34. Upon entering pattern, I notified Tower of my position and was instructed to "Land following the Cessna." I had no visual contact with the other plane, although I could hear the Tower talking to the Cessna over the radio. I made the (mistaken) assumption that the Cessna was well ahead of me, and probably on final for landing to Runway 34. I announced to the Tower as I turned right base and final. I was also careful to visually scan before I made my turns, and I still could not see any other traffic. While on final, I heard radio communications between Cessna and Tower, and I noticed the Cessna at about the 11 o'clock position, approximately 100 feet above my position. The Cessna was in left traffic for Runway 34, had already seen me, and was making a go-around (GAR). Tower acknowledged GAR with Cessna, then contacted me and scolded me for not following Cessna as instructed. I confessed my inexperience and apologized profusely, both to the Tower as well as the Cessna. I assured both that my actions were unintentional. I landed uneventfully, followed further instructions to taxi off the runway. I requested to taxi and park at FBO ramp, which I did. After taking a break for 20 minutes or so, I departed airport uneventfully, following instructions from Ground Control and Tower. After returning to my airport of origin (Alturas), I discussed this incident with my instructor.

I made an error in assuming that the Cessna was well ahead of me. I was unclear as to the Cessna's position and otherwise



7-4 *Redding Municipal.*

unable to make visual contact. For whatever reason, I was probably (and mistakenly) reassured by the lack of response from the Tower as I announced my turns to base and then to final. I didn't realize that the Cessna was in a left-hand pattern for the same runway, although a more experienced pilot would probably have gleaned this info from the radio exchanges between the Cessna and the Tower. I was focusing too much on setting for my own landing. In hindsight, I should have been more diligent in trying to communicate with the Tower as to the Cessna's exact position in relation to my own. Most of my training has been at a nontower airport (Alturas), and I need more experience flying in tower-controlled airspace.

Comments

It seems to me that this student tried to do things correctly from a communications point of view—except for not being more diligent in pursuing with the tower the position of the Cessna. Being inexperienced, he might

have been reluctant to query the tower, but that is what he should have done. For example, after not being able to locate the Cessna when he was first told to follow it, he should have gone back to the controller with something like this:

> Tower, (Acft Type) 1234 Kilo, no contact the Cessna. Can you advise position?

Just before turning base, and still unable to find the Cessna, another call to the tower would be in order:

> *Tower, (Acft Type) 34 Kilo about to turn right base. Still no contact the Cessna. Advise location.*

By this time, the tower should have been alerted to a potential problem and taken immediate action, either by telling 34 Kilo where the Cessna was or by directing one of the planes to abort its landing or to take some diversionary action.

If this report is 100 percent accurate and complete, I think that tower controller is a lot more responsible for the incident than the student. For one, he cleared the Cessna for a left traffic pattern and the student a right pattern, with both landing on the same runway, one behind the other. Not very smart, unless there is plenty of separation in time and space between the two aircraft. Another apparent failing was the controller maintaining radio contact with the Cessna but not with the student, up to approving the Cessna's go-around. Then he proceeded to scold the student for not following the Cessna as instructed. If anything, the student as well as the Cessna pilot should be scolding the controller for authorizing conflicting traffic patterns and then not responding to the student's calls for position reports on the Cessna.

All in all, I'd put the brunt of the blame for the incident on the tower controller and less on the pilot. The latter's major failing, as I see it, was not continually trying to communicate to the tower that he did not have the Cessna in sight, and then, if necessary, initiating a landing abort by climbing and banking away from the traffic pattern.

The one thing I wonder about is whether the tower actually did approve right and left traffic patterns for two airplanes at about the same time and for the same runway. That's not very smart traffic control, but it's apparently what happened—unless the student misunderstood the initial instruction at the very outset of the incident. Over all, I would think that the student learned a lesson from this experience and should feel more confident the next time he goes into a tower-controlled airport.

LISTENING FOR SILENCE

Accession Number:	436058
Reported By:	Instructor
Flight Conditions:	VMC
Facility ID:	ROC (Rochester)
Facility State:	NY
Aircraft Type:	SMA (Beech 36)
Anomaly Consequences:	FAA Review with Flight Crew

Narrative: Instrument flight for proficiency check on a Vector for ILS Runway 28, circle to land Runway 25. Handed off to ROC approach. Established communications and responded to some traffic advisories. After a few minutes, I got concerned because of lack of radio traffic. The airplane had pretty fancy radios, including one that stored up to 4 frequencies. Apparently, while setting up radios for the ILS approach, the Controller frequency got knocked off setting.

Upon restoring it, the student promptly announced to the Controller that we had been off the frequency for a while. This resulted in a lecture from the Controller about trying to call us for the past 15 minutes to warn us about traffic and don't ever leave frequency without permission. Unfortunately, my transmission capability would not work, so the student, who was pretty slow talking, had to do all the talking. The Controller was getting more and more unhappy and by the time we were handed off to the Tower, she was speaking very slowly, loudly, and enunciating her instructions very carefully. We were wrong in not catching the fact that the frequency was set wrong. My error was not having some means to transmit directly and not have to prompt student on her first IFR practice flight.

Comments

The instructor/reporter has effectively summed the causes of what went wrong, but the causes still warrant a couple of additional comments.

First, as to the frequency setting and the resultant radio silence: Be attentive to any unusual radio silence. If a short period of time goes by and the typical pattern of chatter is no longer heard, start looking for a reason. First, double-check the volume control and the frequency setting. If both are where they should be, try adjusting the squelch or increasing the volume. Then check the mike and headset connections (which should have been done on the ground anyway). If these produce no results, try pushing the set in a little. Vibration over time might have caused the set screws to loosen just enough to let the set slip out of its rack and break electrical contact. I mention this because I had that happen once when riding as safety observer on an instructor's practice IFR flight. Concerned about a longer-than-usual radio silence, I gave the case a slight push that brought the set back to life and reestablished

communications with the Approach Controller. As in the situation reported here, he had been trying to reach us for the previous 10 or 15 minutes and proceeded to chastise us for our negligence. We did not appreciate the oral spanking (self-esteem, you know) but had to admit it was deserved.

Speaking of being scolded, I'll have a bit more to say on that subject and pilot reactions to it in the concluding chapter. In my opinion, it's a subject that needs to be addressed, if only briefly.

Since the subject of maintaining radio contact with ATC has come up, a few more words on it are in order. With only a couple of exceptions, when on frequency with one of the ATC facilities, don't change to another frequency until you have notified the first controller of your intent or the controller has otherwise approved a change. If you're operating VFR, you do have the freedom to switch from one agency to another—as from center to a Flight Service Station for weather information—except when flying in a Class B, C, or D airspace. You are, however, expected to advise the first controller of what you intend to do.

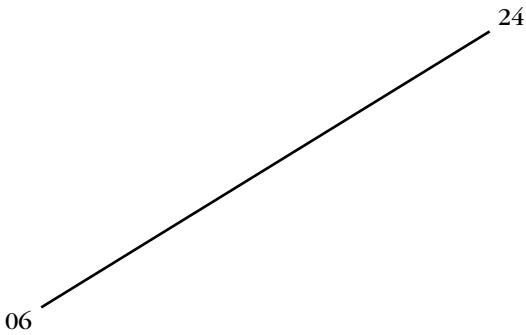
An exception to this would be when you are departing a Class D airport. After a few minutes, you're out of the 4.3-nm Class D airspace and into the Class E. You may want to continue to listen to the tower for traffic information but then decide to call a Flight Service Station, call Center, listen to some music, or even turn the set off (not very smart, though). This you can do without any further contact with the tower you just left. You're no longer under that tower's control, you're in the E airspace which, for VFR operations, is uncontrolled, so you are free to do as you wish, radio-wise. For most other situations, though, stick by the rule of keeping your present ATC contact advised of your intentions.

CONTROLLER INCOMPETENCE—WHAT PILOTS DON'T NEED

Accession Number:	445811
Reported By:	Instructor
Flight Conditions:	VMC
Facility ID:	FUL (Fullerton
Facility State:	CA
Aircraft Type:	SMA (Cessna 172)
Anomaly Consequences:	None

Narration: I was helping a student with landings, doing touch-and-goes at Fullerton Municipal (FIG. 7-5). We were in right closed traffic. On our second touch-and-go, the Tower said (as we understood it), "Cessna 123, left traffic, Runway 24." We read back the instruction and, as we were rolling out on left crosswind, Tower asked us if we were departing. We told him no. He told us then to continue left downwind at 1100 feet. So, we said "Roger." As we turned to base leg, Tower said, "Cessna 123, why are you on base? Make immediate right turn. Traffic 12 o'clock position, Cessna 182 on final." We then saw traffic coming from our right to left in front of us. We turned a steep right turn to avoid the traffic. Tower then asked why we were on base. He told us to extend our downwind. We then told him we understood that he wanted us to fly downwind at 1100 feet, to which we complied. We continued to fly downwind until the Tower called our base.

The factor that led to the near-miss is the miscommunication between the Tower and us. Also, we did not see the aircraft on final until the Control Tower told us. Proper corrective actions were taken. It is possible that there was a block (dual transmission) on the radio. When the Tower gave our instructions, but both my student and I heard the Tower say, "Fly the downwind at 1100 feet," but did not hear, "Extend downwind."



7-5 *Fullerton Municipal.*

Comments

On the surface, this looks more like a controller problem than a pilot's. The ASRS synopsis of the case sums it up this way: "An apparently confused contract tower controller asked more sarcastic questions of the reporter than disseminating urgently needed information. An NMAC occurred as a result of the controller's overuse of the frequency." [If you're not familiar with it, a "contract tower controller" is one employed by a private organization contracted to provide control tower personnel and operation. Neither the organization nor the controllers are affiliated with the FAA. Such towers are identified on sectional charts by an "NFTC" (Non-Federal Control Tower) notation as part of the airport data block.] Possibly to complicate the scenario was the instructor who, with only 350 total hours of flight time, may not have been sure how to handle an overbearing controller and confusing instructions.

True, the controller, whether FAA or private, has to be obeyed. There would be ground and aerial chaos otherwise, but the controller also has to be understood. At the same time, the pilot is in command of his or her

airplane and has the responsibility to make sure that instructions from the tower are understood. If you only *think* you know what the controllers want, you're playing on dangerous ice. "Assuming" won't do it in this game. If in doubt about something, immediately go back to the controller with something along these lines:

Say again, tower.

Last message garbled, tower. Say again.

Did not understand last instructions. Please clarify.

Please repeat (instructions, squawk code, frequency, call point, or whatever).

Am unfamiliar with the area. Please clarify call-in location.

Did you say right *downwind?*

And the like.

There's no question but what pilot inexperience plays a considerable role (how much a role, I don't know) in communication misunderstandings. No one but the pilot, however, knows when uncertainty or confusion exists—and no one but the pilot can take the first step to clear the air. So don't hesitate to ask when you're not sure. It's far better to know what you're supposed to do than to assume—and then pray that whatever you do is right.

UNAUTHORIZED LANDINGS…AGAIN

Accession Number:	445230
Reported By:	Instructor
Flight Conditions:	VMC
Facility ID:	MHT (Manchester)
Facility State:	NH
Aircraft Type:	SMA (Cessna 150)
Anomaly Consequences:	None

Narrative: While practicing multiple touch-and-goes, a full-stop landing was made without permission to land or for a touch-and-go. After making a touch-and-go, Tower made no effort to give us permission to land. The usual procedure is for aircraft to report downwind abeam the Tower, and then receive permission to land. I was distracted while giving instruction and forgot to ask for permission to land. After clearing the runway, ground was contacted and no discussion was made about the incident. In the future, I can be more diligent when giving instruction.

Comments

This matter of landing without tower clearance or approval is a serious matter. As the reporter said, you should call from about midpoint on the downwind leg and advise the tower of your intentions—that is, whether you want to make a full-stop landing, a touch-and-go, a stop-and-go, or have the option to do any one of the three. If you just want to land and taxi to the ramp, the controller will typically acknowledge your call with instructions such as one of these:

Cherokee 1234 Alpha, clear to land one-eight. This clearance will come when there is either no traffic ahead of you or any traffic ahead of you will be well clear of the runway by the time you would touch down.

Cherokee 1234 Alpha, touch-and-go approved one-eight. Follow the twin Commander on one-mile final. Here, the tower has only approved your request but not literally cleared you for the touch-and-go because of the traffic ahead of you. That clearance would come when you're on the base leg or on final, and would simply be: *Cherokee 34 Alpha, cleared to land.* If you're on final and the clearance has not yet been issued, don't land without it. Go back to the tower with *Tower, 34 Alpha on final. Am I cleared for touch-and-go one-eight?* Response: *34 Alpha cleared for touch-and-go.* Now

you're set and legal for the touch-and-go or whatever type of landing you had requested.

The primary reason for these contacts and tower approval is that the controller has to sequence and separate both landing and takeoff aircraft to ensure a smooth flow of traffic within the tower's controlled airspace. That's why he or she must know who you are, your type of aircraft, your present position, and your landing intentions. That's also why the controller might have to deny permission for touch-and-goes at peak activity hours or when there is a traffic pattern mix of aircraft types and speeds.

There are other forms of instructions the tower might issue, such as: *Cherokee 34 Alpha, extend downwind or slow down; speed up; fly the final; do a left 360 for spacing, etc.*

Those who have landed without clearance and have escaped unscarred are lucky. Just don't try it again. The cards next time may not be so favorable.

Conclusion

As I said at the start of this chapter, one of the things that interested me in these cases was what the instructors might have learned from their various experiences. As a general summary, a few of the areas that warrant attention would include:

- Their overall use of judgment relative to training times and locations, use of radio, when to give instructions in flight versus attention to aircraft;
- Their own and their students' lack of preflight preparation, keeping current on airport facilities, airspace changes;
- The need for increased student instruction in tower-controlled airport operations and obtaining landing clearances;

- The reluctance or failure of students to make necessary calls independent of instructor or how to clarify instructions when in doubt.

These are not the only situations from which lessons can be learned. They do, however, represent some of the areas to which instructors should pay closer attention, as far as both they and their students are concerned. There were too many instances where the instructor himself was at fault or didn't monitor closely enough what the student was or was not doing. Fortunately, with the ASRS system in effect, each instructor was able to evaluate his or her performance without fear of recrimination and objectively examine what should be done differently. With that self-learning opportunity, the odds should favor the likelihood that changes where necessary will be made.

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8

A Few Words About Controllers

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Flight Service Stations, Towers, Approach and Departure Control, and the Air Route Traffic Control Centers are the pilot's valuable but unseen friends. They exist to serve the pilot and make flying safer for all, but the services these organizations provide are not really free. You've paid for them through your taxes. Since they are there to be used or not used, why not get something back from your annual donations to Uncle Sam and the taxes tacked on to your fuel bills?

At the same time, remember that all the other pilots have also paid for these ATC services, so they are not solely yours to use or misuse. Also, some of the services available to VFR pilots, particularly those provided by center, can be denied you if you give the impression of incompetence. On occasion, the people on the ground may simply not have time to make sense out of nonsense or clarity out of obscurity. To try to do so might put someone else's life in jeopardy. Even then, though, I have not yet met a controller or ATC specialist who wouldn't do his or her best to help any pilot, whatever

the pilot's level of communication skills. It might test their emotional control, but even though we've seen samples of it in a few of the preceding cases, voiced anger over the air is a rare happening.

Controllers Are Human, Too

That said, however, we've got to recognize the humanity of controllers. Strangely, they, as we, have their good days and their bad days, their ups and downs. Even on the good days, though, they can turn into vocal ogres when they encounter ignorance or stupidity over the air. Contrarywise, on bad days, they can come across as halo-endowed saints when a skillful communicator solicits their assistance or advice. More than in almost any other profession, they have been tested and retested and evaluated and reevaluated for their ability to work effectively under highly stressful conditions. So, as I said, emotional outbreaks are rare occurrences.

Courtesy in the Communicating Process

Which raises the subject of basic courtesy in the radio communications process. Despite my last comments, let's admit that there are times when a pilot or a controller runs into situations that generate anger, sarcasm, or oral abuse. When either party reacts with sarcasm or abusive language, he or she is merely reflecting an immaturity that has no place in an environment where emotional stability is so critical. Controllers call it "chipping," a polite term for "telling the other guy off."

Controllers are well aware of the humanity of man. It's been part of their training, and 99 percent never utter a word of recrimination when mistakes are made

or ignorance shines brightly. They'll correct if necessary, but they won't or don't scold. There are those few, however, who can chip with the best, as did one I overheard when he couldn't get a response from a pilot with whom he had just been in contact: "You gonna talk to me boy? If you are, talk *now*."

To give them their due, controllers have to be models of tolerance and self-control to put up with some of the things that go on in and over the air. Yes, some talk too rapidly and some runtheirwordstogether so that comprehension is nigh impossible. But the performance of the vast majority, even under pressure, sets a standard of excellence in their profession that pilots should strive to attain in theirs.

If you have a problem with a controller, don't let anger override good judgment. The radio is not the place for chipping. Wait until you're on the ground. Then call the facility and talk to a supervisor. Explain calmly what happened. Let the supervisor take it from there. Childish spleen-venting is out of place in the adult world, whether airborne or ground-bound.

This should be said, however: The fact that the controller is indeed a "controller" doesn't mean that he or she has to be obeyed at all costs. You're still the pilot in command. If the controller tells you to do something that you believe would endanger you, say so. Don't follow blindly into the path of possible destruction or illegality, but be sure to tell him or her what alternate action you're taking. Don't keep a controller in the dark about your concern or what other course of action you are taking or intend to take.

In a very literal sense, a team is at work: you and those on the ground. They are there to ensure your safety and that of your fellow pilots, but they can fulfill their responsibilities only if you keep them informed

and conduct yourself with the skill expected of a licensed pilot—private or ATP.

By the same token, if you can help a controller when he or she asks you to speed up, slow down, make a high-speed landing runout, lengthen your downwind, land long, land short, or whatever, you'll be functioning as an effective team member. Keep in mind that the controller can do without you, but in most of your flying you cannot do without the controller. Whether you're new or experienced, it's entirely to your personal benefit to make it easy for the controller to do his or her job and thus help you do yours. Achieving that end is largely a function of communications—knowing *what* to say, *where* to say it, *when* to say it, *why* it should be said, and then *how* to say it. In other words, **knowledge** (*what, where, when, why*) plus **skill** (*how*) equals **professionalism.**

All evidence I have found indicates that a strong case can be made for greater pilot communication skills. The reason behind communicating inadequacies, be it the absence of literature on the subject or instructor reluctance to emphasize it, is secondary. The result is often a pilot's unnecessary fear of the microphone, which, in turn, tends to restrict his or her flying activities and the airborne adventures to which all certificated pilots are entitled.

Everyone has qualms when they make those first tentative calls. Everyone has screwed up a transmission one time or another, but the more they practice and the more they get on the air, the faster will the qualms disappear.

Conclusion

In its own way, this book is designed to help quell qualms by using and discussing real-life situations created by a breakdown somewhere in the communication process. By surfacing these various situations, and then critiquing what the pilots or controllers did or didn't do, the hope is that the reader will learn something from the frank reports submitted by other pilots, ranging from low-time students to those with Air Transport Pilot ratings.

The sky belongs to all of us. For those, experienced or otherwise, who would like to venture forth but may not have the confidence in radio procedures to do so safely, perhaps some of what's been covered here will help overcome inhibiting uncertainties. Should that be the case, these few chapters will have fulfilled their purpose.

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Pages shown in **boldface** have illustrations on them.

About the Author

Paul E. (Pete) Illman is the author of *The Pilot's Air Traffic Control Handbook*, now in its Third Edition; *The Pilot's Handbook of Aeronautical Knowledge*, now in its Fourth Edition; and *The Pilot's Radio Communications Handbook*, now in its Fifth Edition, all published by McGraw-Hill. An active private pilot for over 50 years, he holds a certificate with single-engine, commercial, and multi-engine ratings. Mr. Illman was employed by TWA for more than 30 years in various management capacities, and he is a member of the Aircraft Owners and Pilots Association, the United States Pilots Association, and the Kansas Pilots Association.