



The Hardest Part of Being A Crew Member

One of the toughest systems a pilot has to master is that aspect of communications that deals with receiving and recognizing the flow of information from other crew members and from ATC, says the author.

by

Donald R. Wilson

NASA's Aviation Safety Reporting System once reported an incident in which a student pilot, apparently while practicing maneuvers with his instructor, received a traffic report from ATC. The controller reported that the potentially conflicting aircraft was at 10 o'clock. The instructor quickly spotted the traffic and informed his student, "I've got it." The busy student, interpreting this to mean that his instructor was taking control of the aircraft, released the controls, which resulted in a stall warning and the necessity for a surprised instructor to recover the aircraft.

How this incident affected these two anonymous aviators is known only to them. All an observer knows for sure is that it impressed one of them enough to motivate him to record the experience for the benefit of other airmen. The incident is very useful in that it is a vivid example of what can happen when pilots fail to communicate. What if this little communications breakdown had occurred close to the ground, for instance in a ground-reference maneuver? And what if the instructor was prevented from responding for just a moment too long by dropping a chart and reaching down to pick it up at just the wrong time? Insert one or two of these contributing factors and we would not have had the benefit of these pilots' experience. There would be a statistic of little meaning.

The way pilots are trained is interesting. There is no

doubt that a huge majority of accidents are the end result of a tragic accumulation of contributing factors. The mix is always different, but some combination of aircraft systems failure, distraction, outside pressure, complacency, fatigue, communication failure, physical problems, confusion, poor judgment or lack of proficiency is almost always present. Sometimes the list is extremely long. It is usually apparent, when looking back on these catastrophes, that had the pilot or crew been able to interrupt the chain of events by recognizing and correcting just one of the failures in their particular nightmare, they might have been able to awaken from it safely. Pilot training, outside the major air carriers, has yet to recognize the importance of each of these potential failures and teach pilots to recognize them and treat them accordingly. Knowledge and aircraft-maneuvering skill continue on such a high level of priority that there is little time left to teach these other important segments of knowledge.

Communication is the Connection

The pilots in this example got a scare from something that was unrelated to their ability to understand and handle their airplane. Hopefully, they were permanently impressed with the potential dangers of communication errors. They were not alone. About 80 percent of the reports given to NASA via the ASRS involve some kind

of communication failure. Communication is a powerful thing. It is the electrical system of the human side of aircraft operations. That is, it provides the connection between the human minds that work together to move the vehicle safely. Like electricity, communication must be harnessed and controlled in order to make it do the job intended. If it is not, it will obey the laws of nature and rather than serving the needs of man, it will be forever a lurking enemy.

Communication is a process of **effectively** exchanging information by a **common** system of language, signs or behavior. One of the frequent misunderstandings about communication is that "commonness" is easy to come by. In fact, the use of communication methods not commonly understood by both the giver and the receiver is one of the major obstacles to effective communication.

There are three fundamental requirements for a communication to be effective. First, it must be received. Both the giver and the receiver of information must understand that there are potential barriers to this simple requirement. Second, a communication must be understood. This is where the failure occurred in the previous example.

Finally, a communication is not effective unless it inspires in the receiver a need or desire to react, or to do something appropriate with the information. This may be anything from using the information to verify one's own conclusions, to coming to a sudden understanding that an immediate change of plans is required. The receiver may only need to file the data for future reference, but at least he has used it in some way in the conduct of his flight. A communication that results in anything less is not effective with regard to the flight.

Barriers to Communications

The many factors which work to block communication can be organized into three general categories. They are:

- physical,
- psycho-social and
- technique-related barriers.

The physical barriers primarily work to prevent a communication from being received. Problems which fall into this category are fairly straight-forward and easily identified and understood. Their effect is sensed on people every day. The physical barriers are things like noise, audible confusion, inappropriate volume, hearing loss, fatigue, and others.

Noise, audible confusion and volume problems are external influences which spring from the environment rather than from human limitations. A number of fac-

tors can contribute to this. For instance, cockpit noise varies with indicated airspeed. When a pilot starts a descent, he reaches for the volume controls to adjust them for the circumstances and begins to realize that he almost has to shout to communicate with the other crew member. Separate audio control panels lead to further confusion when they are adjusted differently or when one crew member tunes ATIS while the other monitors ATC. Transmitters can feed back blood-curdling squeals under just the right circumstances, and controllers can wear their mikes at varying distances from their mouths. These simple, everyday frustrations must be understood, expected and guarded against. Some of these hazards can be prevented almost completely by the use of individual headsets.

Ways to Correct Physical Barriers

Hearing loss and fatigue are more complicated in that they originate from within a person, yet they can be controlled relatively easily by the careful professional. If hearing loss creates difficulty in receiving communications, special care must be taken to employ the safeguards that are available. A headset is a must in order to isolate ATC communications from those in the cockpit. A headset also allows better control of individual volume, and it can be placed in the best ear. The most important thing that a pilot whose hearing is slipping can do, of course, is to acknowledge it so that he can move on to getting it under control.

Fatigue is even easier to handle. A pilot who is interested enough in excellence to read articles on communication should be able to understand that a pilot who comes to his job without enough rest is not acting like a professional. Being truly excellent at flying airplanes involves a willingness and ability to control one's personal schedule to allow for rest. But at those times when circumstances place one at the controls without proper rest, it is important to understand the possible effect and to act accordingly. Certainly the other crew member should know about it.

The physical barriers to communication are something most pilots guard against instinctively because the slips and blockages usually make themselves so plain.

The Hidden Nature of Human Attitudes

The psycho-social barriers, however, often work to block communication without even making their presence known. Because they arise out of the complicated patchwork of human attitudes and feelings, their presence can be insidious and completely unrecognized. Moreover, if the feelings are strong enough, the relative importance of

issues can be distorted to the point where a crew member knows that communication is blocked and simply does not care. This possibility makes this type of barrier uniquely dangerous. Some of the road blocks that fall into this category are resentment, preoccupation, status differentials, cultural differences, strongly-held differences of opinion and so forth.

Resentment can rise from a number of different causes and it may be justified, completely unreasonable, or anywhere in between. Where it came from and its degree of justification, however, matter little in the cockpit of an aircraft. What resentment between crew members (or between pilots and controllers, pilots and mechanics, etc.) does is to establish a preconceived or pre-decided perspective in the mind of the resentful crew member. Unfortunately, it creates the same frame of mind in the non-resentful pilot if he is aware that he is resented. This means that a situation can develop where both parties are making a judgment based on their feelings about the intent of any communication that may be offered; in other words, they assume the worst.

For example: If you are told that your ATTITUDE SELECT flight-director mode is not selected during a climb, you may react a number of ways based on your perception of what was really meant by that communication. If you feel threatened in some way by the communication, whether justified or not, you may feel the need to protect yourself by insisting that you were fully aware of it and that your flight director was programmed that way by choice. Accordingly, you leave ALTITUDE SELECT deprogrammed — a condition you're not used to — and you run an unnecessary risk of busting an altitude.

In this example, a communication has broken down. It was received and fully understood, but that third element of effective communication, the requirement that the receiver do something appropriate with the information, has been blocked and effective communication has not occurred.

Status Differentials Play a Role

The psycho-social barriers can block communication at any level. Accident investigations have revealed several examples of crew members failing to even begin communicating due to status differentials. Junior crew members have gone to their deaths because their fear of reprimand or loss-of-relationship with supervisors prevented them from asserting themselves enough to save their own lives. Conversely, some senior captains have unnecessarily endangered their passengers because of their fear of losing their subordinates' respect.

The possible human-interaction problems could easily fill a book. (As a matter of fact they have; I highly

recommend John Nance's book, *Blind Trust*, for a thorough discussion of human interaction in the cockpit.) A captain does not receive a perfectly-clear communication from his first officer because he is preoccupied with thoughts of his angry exchange with dispatch just before the flight. The stereotyped perspective of the "Archie Bunker" in the right seat twists and distorts every communication with the black pilot in the left seat. The avid hunter in the left seat discovers he is flying with an animal-rights activist. The belligerent non-smoker in one seat grates at the puffing of the thoughtless smoker in the other. It can happen to almost any crew pair in a hundred unexpected ways. As long as the cockpit is crewed with people, effective communication will always be threatened by this lurking menace.

What can be done about it? There are no pat answers, but there are tools for the task. To restate the problem; attitude interferes with effective communication when a giver attempts to "load" his communications with implications that extend beyond the immediate context, or when the receiver perceives this to be the case. The answer to preventing this is to practice employing basic professionalism. It is very important that the two communicators in the cockpit come to the process with a business-like frame of mind. Both individuals are responsible to put aside prejudgment-of-intent and approach the process with the good of the operation in mind. The critical responsibility of flying the aircraft must completely eclipse any tension between crew members. If it does not, the question arises of whether such individuals have the emotional maturity to be safe pilots.

How to Process Communication

When a pilot receives a communication in the cockpit he must first realize that he cannot control the tone or intent with which it was offered. That is the problem of the giver. Like most cockpit problems, this one too can be handled with appropriate procedure. Once good communication procedure becomes habit, the potential for error is controlled, which is the primary business of a cockpit resource manager.

A professional processes incoming data and information in the same way every time. The following questions should be answered about each operational communication that is received before a response is made or action is taken:

- What is its literal meaning?
- What is its contextual meaning?

If these questions cannot be answered to the satisfaction of the receiver, he should seek clarification. Once this is done, he should then move on to the question:

- What action is appropriate in response to this communication?

This kind of controlled reaction, when it is habitual, establishes a very professional atmosphere and, no matter what the feelings between crew members or between a crew member and outsiders, the heavy lid of professionalism maintains control over the cauldron of human sensibility beneath it.

Professional communication in the cockpit does not involve implication of any sort. If exchanges are clear, precise, well-timed and procedural, a pilot never needs to ask, "What did he mean by that?" The question should simply never come up.

Choosing Words Properly

Such issues as clarity, precision and timing, of course, lead to the third type of barrier to communication. In addition to physical and psycho-social, there is the most common category of communication barriers, the technique-related ones. These are the kinds of errors that result from the undisciplined use of the language.

The most common problem with communication technique is the use of inappropriate semantics. This involves choice of words and construction of phrases. Before a pilot can improve his performance in this area, he must realize that there is a notable difference between conversation and cockpit communication. The difference is in the consequences of imprecision. The demands of conversation are low unless one chooses to elevate them. The demands of cockpit communication are much higher, in proportion to the potential consequences of error.

First of all, grammar is important. Proper grammar is the foundation of precise communication. There are some "good old boys" who were great pilots, but one aspect of their excellence was their understanding of when they were engaging in conversation versus when they were offering operational communications. In this context, poor English and colorful idioms can open the door to misunderstandings. They can, without warning, become barriers to communication.

People who are interested in communicating, if they expect to be successful, must understand that the key element that they provide, or control, is opportunity. This applies to both the giver and the receiver. It is the giver's responsibility to control language and timing. The receiver must maintain a physical readiness to receive information. This maximizes the opportunity for successful communication. Obviously, all crew members are at the same time potential givers and receivers of

information. The roles change back and forth continually.

The Art of Language

It should not be surprising that Murphy has provided us with a law of language: Words and phrases will mean what they can mean. General, abstract or ambiguous words can mean a lot of things, so you can bet that sooner or later, they will. Precise, well-chosen words have specific meanings and, in accordance with Murphy's law, they will mean only that. It is fine to let your mouth stay a step or two ahead of your brain when you are shooting the breeze about your real estate investments, but when it comes time to offer an operational communication to your colleague, a noticeable shift in emphasis is required. Communications must be planned so that they will come out clear and precise, specific, not mumbled, and in accordance with expected procedure.

Standard aviation terminology exists because it has been thought out and planned over decades to ensure clarity and precision and to minimize the prospect of misunderstanding. When communicating with ATC, proper radio terminology should always be used. There is no reason to do otherwise. Not doing so sounds less professional and opens the door to missed communication. The importance of this is hammered into the habits of controllers constantly by their superiors. Pilots should take it no less seriously.

One final note regarding language. Most of the time, the bigger the word, the more complex its meaning. Here is an example. A pilot picks up his microphone before takeoff, punches the public address button, and says, "Ladies and gentlemen. We'll be taking off momentarily. Please check your seat belts." The word "momentarily" means "lasting only a moment." It is doubtful that is what the pilot means. Words should not be chosen because they seem to sound professional. What does sound professional is saying what one means. If the passengers should know the aircraft will be taking off in a moment, the pilot should clearly say so.

Timing is Essential

Offering clear and precise communications to someone who is not ready or able to receive them is a waste of a good effort. Insuring effective communication sometimes involves withholding it until a time when the receiver is not distracted by other concerns. Again, this is maintaining control of opportunity. Offering a piece of information to a crew member who is himself trying to communicate with ATC, for instance, is like extending flaps 40 miles out because the pilot does not want to worry about it later. It is an idea, but it could do more harm than good. A good crew member offers communi-

cation at times when it is appropriate, not just whenever it comes to mind.

It should be remembered though, that there are times when appropriate timing requires **breaking through** the other concerns of the receiver, forcing him to change the subject that is currently on his mind. When a communication is time-critical, it must be offered forcefully and the receiver should be monitored for some verification that he has received and will act upon it. This technique should be used with discretion, however, recognizing that it is needed rarely and, when used routinely, can create psycho-social barriers between crew members.

A Communicative Frame of Mind

Since pilots are in a crew environment, they are always potential receivers of important information. One of the most important elements of controlling opportunity is simply to recognize this cockpit fact of life. No matter which seat he occupies, a pilot requires a constant flow of information from the crew and from ATC in order to perform his function. From the moment he shows up for work, the pilot will be seeking and receiving critical

information from others. An excellent pilot, among other things, maintains a readiness, even an eagerness, to receive this input. To do that, he must struggle to understand and control resentment and prejudice. He must guard against noise, fatigue and confusion, and he must work at being clear and precise. It may be the most difficult task that faces him on a continuing basis.

The Desire to Communicate

There is a lot to learn in becoming an excellent pilot. That is why the value of experience is discussed so often. It does take time to reach a high level of mastery of the disciplines of the aviator's profession. But experience and time alone will not do it. It takes more than just doing it over and over. It takes a high level of interest and desire, it takes thoughtfulness, commitment and constant vigilance.

Communication is one of the most subtle and dangerous complexities a pilot may face. Indeed, this could be the toughest system he has to master. But how much training do pilots get in interpersonal communication? Unfortunately, not enough. ♦

Just a Slip of Caution

Two pilots learn the hard way not to tailgate in the pattern.

by

Lt. Matthew J. Bablitz

During the last night familiarization hop of the evening, I decided to take my student to a nearby Air Force base, rather than our usual Navy auxiliary field. Upon initial contact with the Air Force tower, I asked if they had room in their landing pattern for a turboprop T-34C. The controller said he was working a couple of C-130s on TACAN approaches, then cleared us for touch-and-goes.

As we approached the five-mile initial, I had mixed feelings about sharing the pattern with four-engine C-130s. I wondered if their wake turbulence would be a problem. Could my awesome "Turbo-Tormentor" handle a blast of it?

Not to worry, I thought. I've landed behind DC-9s and 727s at the regional airport without the slightest bump. Why should C-130s be any different?

We entered the pattern, and my student and I both did a few touch-and-goes. Everything was working out just right, except my student's no-flap landings. He was having trouble with his flare and touchdown, so I took the controls to show him how.

As I hit the abeam position, I reported downwind and the controller advised, "Departing C-130; cleared for touch-and-go." I rogered, delayed my approach turn a bit and began the descent.

Approaching the 90 degree position, I saw the departing C-130 starting his turn toward the downwind. We'll have close to three minutes of separation between us. And just in case we don't, I'll come in a little high. That'll keep me above any turbulence that may have lingered.

From the 180 to the 90, my strategy seemed to be working. The air was smooth as glass. On short final, at about 150 feet AGL, I reduced power to land. Then, just as I retarded the power control lever, wham! We were thrown into an uncontrollable 90 degree angle-of-bank turn to the right, then a 90 degree angle-of-bank turn to the left. It was like some sort of monster had grabbed my plane in midair and twisted it from side to side. Control inputs had no effect. All I could do was firewall the power and raise the gear.

It worked. The plane leveled off and flew out of the turbulence. Shortly thereafter, I regained my composure and departed the pattern.

Flying home, I knew we could have just as easily ended up as a mishap report with two bodies in a smoking hole because I was using poor headwork.

For a long time it bothered me that I had let myself get into that

position. I wasn't being pressured. It wasn't even an operational necessity. Why had I used such poor headwork? How could I keep it from happening again?

The first thing I learned was obvious: big airplanes and small airplanes don't mix. The second thing I learned was to wait at least a full three minutes before landing behind large aircraft, especially if the winds are calm.

The third thing I learned was never quit listening to your "safety voice." You know the one I mean. It's the little voice that starts talking to you just before you're about to do something you shouldn't. It usually says things like, "Be careful, follow the rules," and, "This isn't safe." The night I flew into the wake turbulence, my safety voice was talking to me, but I chose to ignore it and almost became a statistic. ♦

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