

INCREASING THE EFFICIENCY OF COMMUNICATION

Original idea from David Carlisle

Examining communication between flight crew members & their interface with ATC provides a framework from which the underlying causes of listening and dialogue errors can be described and improvement strategies mapped out.

A DC-8 that crashed in December 1977 had abandoned an approach at Salt Lake City to work through a landing-gear problem. ATC issued the flightcrew confusing and incomplete holding instructions. The pilots believed they were cleared to hold north of the SLC VOR, when in fact they were to hold northwest of the VOR. The flightcrew failed to fully question the incomplete clearance and the stage was set for disaster. To complicate matters, the flightcrew did not inform ATC that they had lost their number one communication radio and had left the frequency for 10 minutes while they conversed with the company mechanics via ARINC.



By the time they returned to the approach frequency, the aircraft was too close to the mountains to avoid the collision. The DC-8 impacted the Wasatch Mountain range, killing the three pilots. The NTSB determined the probable accident cause to be the approach controller's issuance and the flightcrew's acceptance of an incomplete and ambiguous ATC clearance in conjunction with the flightcrew's failure to adhere to defined impairment- of-communication procedures as outlined in the *AIM*.

The "Statistical Summary of Commercial Jet Airplane Accidents," published by Boeing in June 1998, states that from 1988 through 1997, 89 percent all accidents (Jet aircraft heavier than 60,000 pounds gross weight) happen during taxi, takeoff, initial climb, climb with the flaps up, initial approach and final approach to landing. While the flightcrew is listed as a primary factor in 70 percent of those accidents, the statistics illustrate that adhering to unambiguous phraseology, concentrating on listening, and practicing the sterile cockpit concept in the regime below 10,000 feet msl is a must.

LISTENING AND DIALOGUE

Dialogue is defined as visible sound, according to Madelyn Burley-Allen, an expert in the field of dynamics and human behavior. In her books and seminars she states, "The purpose of dialogue is to promote understanding." She says that effective dialogue is not possible without the active process of listening, which is defined as "attempting to see things from the other person's point of view." Her studies show that we devote 40 percent of our day to listening, yet most people listen at only a 25-percent efficiency level.

"An emphasis on listening will improve flightcrew effectiveness and allows the pilot to take control of communication situations and influence their outcome. A dangerous misconception is to assume listening is instinctive," according to Burley-Allen.

She states that a major barrier to effective listening is that we equate speaking with action and power. "Resistance to listening is our cultural norm. Listening is a highly selective and subjective experience, and as a norm we pay attention only to what we find of value," she says. In her books and seminars, Burley-Allen illustrates that everyone receives verbal data in a unique way, and that information is filtered and interrupted by the receiver.

"All flightcrews and ATC personnel must examine their own listening patterns and look for barriers and filters," Burley-Allen says. "It won't be hard to find the areas that need improvement if we drop our egos and decide that safety is more important," she says.

"Communication is collaborative; your listening patterns influence others. When you are attentive, alert, non-distracted, and make eye contact with the other pilot during flight-deck briefings and decision making you will create a positive atmosphere and enhance the flow of communication and the use of proper phraseology. You must have a spirit of cooperation, be non-judgmental, non-intimidating, and keep your anger and other emotions out of the dialogue.

Don't let the other person "hook you" and allow you to be drawn into an argument as can happen when you get angry, upset or jump to conclusions. Facilitate the other crewmember or ATC in problem solving, and be reachable, i.e., allow the sender to bounce ideas off you. Listening is a potential force for reducing cockpit stress and tension. Listening builds teamwork, and a sense of trust. If a crewmember knows he is talking to a listener instead of someone who sits in judgment, he is more open to suggest ideas and share thoughts. The listener then has an opportunity to respond and offer his views, thus increasing the margins of safety," according to Burley-Allen.

ASRS DATA VALIDATE LISTENING PROBLEM

A review of NASA's Aviation Safety Reporting System (ASRS) data through June 1998 illustrates the extent of the communication problem, and interest in addressing it. The second most frequently requested ASRS data report deals with pilot/controller communication. The number one requested set was cabin attendant reports. Rounding out the top five were CRM issues, CFIT and checklist incidents.

These rankings reflect interest in ASRS data as requested from various sources ranging from research scientists, the FAA, and airline personnel to individuals, and show that listening and dialogue difficulties are found across the broad spectrum of aviation. Solving these communication barriers is an integral component of flight-deck safety as the following ASRS communication research illustrates.

METHODS TO IMPROVE YOUR LISTENING SKILLS

- Search for something you can use - Find areas of common interest. Adopt a positive attitude, what is being said that I can use?
- Take the initiative - Find out what the talker knows. Make the communication two way. Ignore his delivery if that distracts you. Reach for the idea he is conveying.
- Work at listening - Efficient listening takes energy. Practice, think it over, and establish your point of view. Listen energetically.
- Focus your attention on ideas Listen for the speaker's central ideas. Sort the facts.
- Make meaningful notes: Record the main points. Pick out key words, phrases or ideas. Stay flexible.
- Resist external distractions Concentrate on concentrating. This makes it possible to be aware of background clutter without being distracted by it.
- Keep an open mind Ask questions to clarify understanding. Clarify meaning by restating what you thought was said.
- Analyze what is being said - Listen between the lines for hidden meanings.
- Capitalize on thought speed Summarize. The core of effective listening is to develop the utmost concentration on the immediate listening situation. Concentrate on what the talker says. Contrast and compare, identify the speaker's evidence.
- Evaluate and be critical of content - Don't let the speaker's poor voice, mannerisms, personality or appearance get in the way of the message. Most people are not very skilled at getting their message across.

A "Synopsis of Pilot/Controller Communication Reports" compiled by the ASRS in 1994 and available through the Ames Research Center, states that frequency congestion is the worst communication problem confronting the aviation system. "During these busy times, be careful of hearing words and sounds only, half listening, and listening in spurts," says Burley-Allen. An emphasis on listening will prevent you from preempting a clearance that ATC sent. CFIT accidents have occurred when, in conjunction with other factors, ATC issued a clearance to a transition altitude and the pilot read back a lower altitude he had expected to receive. If ATC misses the incorrect read back, the results can be and have been disastrous.

Your dialogue must serve to *inform and inquire*. You must think before keying the transmitter and know what you are going to say before transmitting to ATC. You must be clear, direct and concise to eliminate confusion, inconsistencies and ambiguity. If you believe the assigned heading, altitude or speed adjustment is incorrect, excessive or incongruent due to information you possess, you must *inform* ATC and *inquire* about alternatives. "Effective listeners are able to concentrate and find the most valid information in what they hear or don't hear," says Burley-Allen "It takes time and effort to learn to listen effectively, but in the long run it enhances safety. You don't have to go back and clear up misunderstood communication. The flightcrew's needs will be met and the pilot can concentrate on other important aircraft duties."

COMPLICATIONS IN LISTENING AND DIALOGUE

"Fatigue is a negative factor in the flightcrew's or ATCs ability to listen, since listening takes concentration and effort. When we don't feel up to par we have a more difficult time being attentive," says NASA Ames human factors research psychologist Barbara Kanki, an expert in flight-deck communication problems. "It is easier to daydream and become preoccupied when our energy levels are low. Fatigue can be caused by physical, emotional and mental exhaustion. While these areas overlap, common behavioral traits are apathy, chronic dissatisfaction, anger, physical exhaustion, unnecessary risk and increased distractions. Simple attention skills are the first cognitive functions to be affected by fatigue. Prolonged episodes of fatigue can lead to job burnout," Kanki says.



"Burnout is a response to long, unrelieved and cumulative periods of high levels of work- and personal-related stress. The salient feature of work-related job burnout on the flight deck is the disruption of satisfactory communicative relationships between flight crewmembers. The symptoms of stress lessen the amount of energy an individual has to concentrate and listen. While it is impossible to work without some degree of stress in the work and personal environment, the trick is to manage stress so that a positive balance can be maintained," according to Kanki.

"NASA studies show that the positive effects of crew familiarity were stronger than the negative effects of fatigue. Crews that had flown together regularly, in spite of being fatigued, performed and communicated better than crews that never had flown together and were less fatigued. To a degree, the effects of fatigue can be overcome; however, fatigue always should be considered a potentially dangerous stress," according to Kanki.

Pilots must be able to manage cockpit distractions and have the practiced discipline to remain listening and dialogue focused without being victimized by checklists and aircraft duties. Cockpit distractions and confusion over phraseology are commonly reported causes of landing without a clearance.

If you are off the communication frequency, when you return you must regain entry into the flight-deck loop to verify ATC clearances. Be clear and direct with the other pilot, and ask what clearances have been received while you were preoccupied. If you are working the ATC frequency, jot down the clearances and thoroughly brief the other pilot when he comes back on the frequency.

When in doubt, ask ATC to repeat the information. Many flight crewmembers will automatically ask ATC to verify the clearance to augment the other pilot's word. This redundancy will reduce instances of altitude deviations and missed/misunderstood clearances that can occur, according to ASRS data.

A pilot must never become complacent about what he believes he knows about flightcrew and ATC listening and dialogue devices. Pilots communicating during flight below 10,000 feet msl and under high-stress situations must be able to recognize and deal with extraneous thoughts, fatigue, apathy, inattentiveness or inactivity in themselves, their crewmembers and ATC. Don't tolerate a flight crewmember or ATC controller who has a disregard for radio discipline, or cannot communicate in a clear or direct manner. This can lead to a communication breakdown and remove your most important source of collision avoidance. Poor listening and dialogue skills can render all other safety systems powerless.

SIGNS OF TROUBLE

Just as there are symptoms of illness, Burley-Allen has identified systems that can be used to identify adverse mental and physical states that can lead to communication problems. If you detect the following signs in yourself, a fellow crewmember, or hear them from a controller, a heightened vigilance is in order.

- Physical actions - Loss of situational awareness, drowsiness, poor reaction time, nervous grinning, pencil tapping, knuckle cracking, nail biting, lip nibbling, shrugging of shoulders.
- Poor controller phraseology - Verbal expressions such as (or lack of): "Hub?" "I didn't hear you," "I don't care," "Who says so?" "Whatever you say."
- Behaviors - complacency, over-confidence, laziness, inattentiveness, cynicism, rudeness, arrogance, timidity.
- Poor CRM - Not working as a team, poor aircrew coordination, improper briefing before a flight, inadequate coordination of flight.

A REDUCED STATE OF ATC ATTENTIVENESS

The NTSB has documented a distinct Pattern in the circumstances involved in many ATC errors. *"Flightcrews must be aware that controller oversights can increase during a reduced state of attentiveness. A light to moderate workload situation, such as when a single controller is responsible for combined frequencies, has been a contributing factor in numerous runway incursions and ground collisions between two aircraft or an aircraft and a ground vehicle, and have been responsible for numerous midair collisions. Heavy traffic and reduced visibility are hardly ever a factor,"* according to Kanki.

Never filter out other ATC communication because flightcrews that only key into their call sign often miss incorrect or incongruent read backs by ATC and other aircraft. Confirmation and clarification of clearances - such as taxi to or across, hold short, position and hold (especially extended) cleared for takeoff, and cleared to land - with the controller will help prevent ground incidents and accidents. Remember that two clicks of the microphone does not qualify as confirmation of a clearance. It is the pilot's responsibility to listen and demand critical information if it is not offered by ATC.

Always pause before keying the mike after a frequency change. Never abbreviate call signs on initial contact or at any time when other aircraft have similar numbers or identical letters. Always acknowledge all call ups or clearances and read them back in the order you received them unless the controller states otherwise. If there is a prolonged lack of sound in your receiver, recheck your frequency and volume, and make sure your microphone is not stuck in the transmit position. If the assigned frequency is jammed, use the procedures described for IFR radio outage as found in Part 91-185. Failure to follow these strategies has resulted in flightcrews executing clearances intended for other aircraft, according to the ASRS.

SAFETY ISSUES IN INTERNATIONAL OPERATIONS

Kanki is involved with 2 SAE groups, one studying global phraseology (disparities between ATC and pilots within the worldwide ATC system) and the other studying operational communications (international issues related to effective verbal communication). One of the goals of these community service industrial groups is to put the ICAO phraseology guide beside the FAA phraseology guide to show what is equal to what. These are gigantic topics and there is no right or wrong. Each country has its own glossary and we are trying to find a variability that is acceptable. While these are working documents, Kanki says, *"the normal standard phrases are most clearly, universally structured and standardized by regulations and glossaries. Unusual situations exist where the need to deviate may require communication for which there are no standards. This makes the clarification/verification process all the more critical. There are numerous industry efforts studying the added problem of pilots and ATC controllers whose first language is not English in dealing with non-standard situations,"* she says.

"Anticipate that the foreign controller may pronounce the fix or identifiers differently than you expect to hear it or that you would announce it. Speak very slowly; this technique will often result in the controller's slowing down his rate of speech. Seek clarification by rephrasing the clearance in plain, simple words different from those used by the controller. The controller will often understand the crew's restated question and be able to provide clarification. Be wary of any additional use of another language other than English that will leave you out of the party line, and always query the controller and clarify. Remember that misunderstandings arise from differences in language and cultural meaning," according to the ASRS.

There have been numerous foreign incidents and accidents attributed to language differences, non-standard phraseology, and misunderstood ATC clearances. To review, the March 26 *Federal Register* (Vol. 64, No. 62) states that *"the simple act of giving a read back does not shift full responsibility to ATC. This cannot insulate pilots from their primary responsibility under 14 CFR 91.123 and related regulations to listen attentively, to hear accurately and to construe reasonably in the first instance."* According to Part 91.3 (a) *"The Pilot-in-Command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft."* The flightcrew must monitor ATC communications attentively, acknowledge receipt and understanding of any ATC clearance when time permits, and request clarification or amendments in the event that they are uncertain about the ATC clearance or if the clearance is unacceptable from a safety standpoint.

Safety of flight is the pilot-in-command's responsibility, thus the need for clear communication, both listening and dialogue is an unadulterated reality. These communication events require that you listen and engage your stream of conscious speech to speak competently, clearly, and concisely in your communication with crewmembers and ATC. Don't reduce your state of vigilance because of boredom, complacency or a diffusion of responsibility with the controller. Use standard phraseology in normal as well as abnormal and emergency communications. Crewmembers and ATC must understand you completely and act on your instructions if the need dictates.