

2.2 Communication

Introduction

As humans, we communicate all the time, so we may believe we are already expert communicators, but effective communication is not as simple as it appears and most of us could benefit from improving our communication skills.



Communication: Communicates through appropriate means in the operational environment, in both normal and non-normal situations .


During any given working day, pilots communicate with a team of people, all of whom influence the level of operational safety. To achieve a successful flight, a pilot may need to communicate with dispatchers, refuellers, engineers, load controllers, cabin crew, ATC etc. *Effective communication* is essential in all high-performance teams; the consequences of poor communication can be catastrophic.



It has been documented that miscommunication has contributed to the deaths of more than 2,000 people in aircraft accidents since the mid-1970s.¹ This chapter will take a big-picture view of communication, including the different forms of communication that people use, the barriers to effective communication, and what is required for effective communication.

Observable Behaviors

The following observable behaviors appear in the ICAO communication competency (COM):

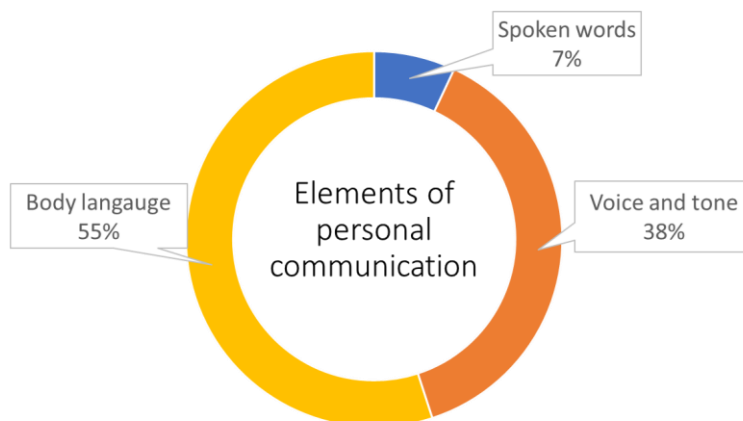
<p>COM</p>  <p>Observable Behaviorsⁱⁱ</p>	<p>COM 1 Determines that the recipient is ready and able to receive information</p> <p>COM 2 Selects appropriately what, when how and with whom to communicate</p> <p>COM 3 Conveys messages clearly, accurately, and concisely</p> <p>COM 4 Confirms that the recipient demonstrates understanding of important information</p> <p>COM 5 Listens actively and demonstrates understanding when receiving information</p> <p>COM 6 Asks relevant and effective questions</p> <p>COM 7 Uses appropriate escalation in communication to resolve identified deviations</p> <p>COM 8 Uses and interprets non-verbal communication in a manner appropriate to the organizational and social culture</p> <p>COM 9 Adheres to standard radiotelephone phraseology and procedures</p> <p>COM 10 Accurately reads, interprets, constructs, and responds to datalink messages in English</p>
---	---

- COM 1-5 cover the communication process.
- COM 6, 7 include skills required for questioning and resolving queries.
- COM 8 – 10 are based on the types of communication and a common ‘professional language’ that can help to overcome common barriers.

Mehrabian’s Myth

Some commonly accepted “truths” about the way we communicate can be misleading. For example, a common misconception states that only 7 percent of communication is spoken words.

Researcher, Ray Birdwhistellⁱⁱⁱ believed that between 60% and 70% of human communication is non-verbal, and many people also translate psychologist Albert Mehrabian’s^{iv} work as per the pie chart here.



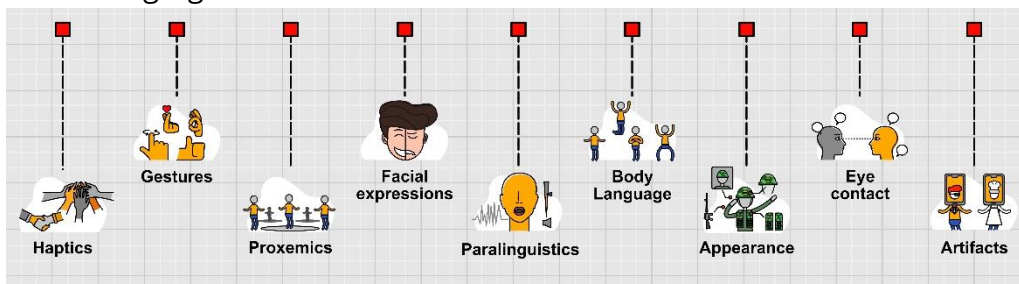
However, if only 7% of communications is words, then:

- We would understand 93% of a conversation in any language across the globe.
- Radio or telephone calls would be a very poor way of communicating.
- Written words would be nearly impossible to understand without tone or body language.

This shows us what is known as the Mehrabian Myth. Albert Mehrabian's statistics were only relevant to his research about *conflicting or ambiguous* situations. For example, if a child asks for an unattainable present for their birthday, a parent might respond with the word "maybe." In this case only 7% of the message is found in the word itself; to fully understand the likelihood of the child receiving the gift, the tone and body language would be required as well. For effective communication, it is important that we avoid ambiguous words or situations, and if in doubt, double check.

Let us define the basic types of communication:

- **Speech** - Speaking is the most common form of communication. However, as we know from experience, misunderstandings and miscommunication are common.
- **Non-Verbal Communication** -These include facial expressions, eye contact, body language, and gestures. The clear benefits of gesture use are seen aircraft marshaling signals.

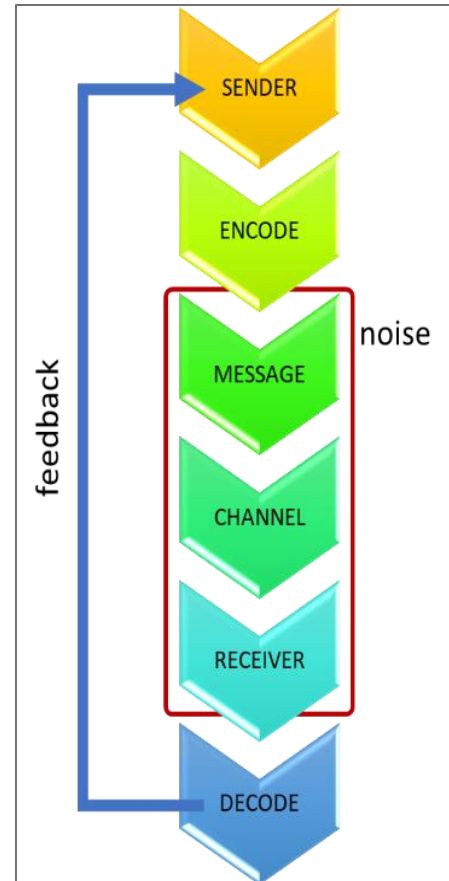


- **Visual Communication** -Symbols can also serve as a form of communication. For example, a pilot's uniform shows passengers who is responsible for their safety; the number of gold bars on the pilots' sleeves indicate a rank structure. However, these are only effective if the observer is familiar with the meaning of the stripes. The Nautical Alphabet and semaphore also give visual communication.
- **Written Communication** - Documents, manuals, weather reports, and NOTAMS are all forms of written communication. One common misconception about written communication is that all readers receive the same message, but written messages are not immune from misinterpretation.

The Communication Process

Communication involves sending a message between people with the intention of creating a *shared understanding*. There are many published “communication processes;” let us take a brief look at one of them.ʻ

- SENDER** – the communicator
- ENCODE** – the sender prepares the information to transmit
- MESSAGE** – the message content
- CHANNEL** – the communication method selected by the sender
- RECEIVER** – the person for whom the message is intended
- DECODE** – the interpretation of the message by the receiver
- FEEDBACK** – the information provided back to the sender indicating message efficacy
- NOISE** – the barriers to communication



The success of communication is defined by the impact on listener behavior, or what the listener understands by the message, and this will vary depending on the listener.

Accuracy Brevity Clarity

Often the information we are trying to send is valid, but our ability to communicate the information is weak. Our message can sometimes get lost in our explanations. It can be useful to consider three principles of effective communication:

1. **Accuracy** – make sure the information is correct
2. **Brevity** – keep the message as short as possible to aid understanding and retention
3. **Clarity** – Use plain simple language to make the point as clear as possible

To further assist with clarity, the communication can be formed as a ‘bottom line up front’ communiqué, like the communication triangle. Give the listener the most important piece of information first, and then back it up with evidence. This reduces the risk of the listener becoming distracted as it limits the information to “need to know;” you can cover more in further discussion if necessary.

Overcoming Barriers to Communication

There are several obstacles to effective communication, including:

- Poor Listening
- Environmental barriers (e.g., noise, distractions, or stress)
- Language barriers
- Assumption and Bias
- Unclear or mixed communication

Ultimately, they all lead to an assumption that a message has been understood as intended. Threat and Error Management techniques (Chapter 3.1) may be used to develop mitigations for each of these barriers.

“The single biggest problem in communication is the illusion that it has taken place”^{vi}

- George Bernard Shaw

Listening Skills

It is a common saying that humans have two ears and one mouth and that we should listen and talk in the same proportion, although in a two-way conversation, this is not always possible. However, the idea still holds that we should pay particular attention to the listening portion of a conversation to give full attention to what the other person has to say if we are to fully understand the message.

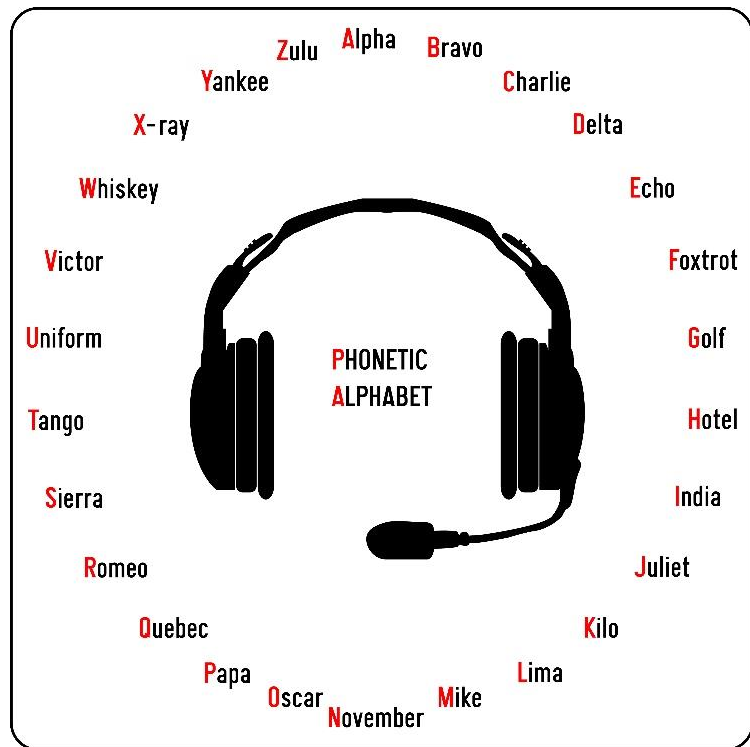
Focus on Environmental Barriers

Many high-performance teams operate in difficult and distracting environments. It is therefore important to maintain focus on communication. Attempting to listen while multi-tasking means that vital details could be missed so it is important to focus fully on receiving the message. This could mean either stopping the task you are doing to receive the message, or if priorities dictate, asking the sender of the message to wait and resend at a more convenient time. Equally, it may be that the transmission medium is unworkable (e.g., radio interference or equipment failures) and other communication methods must be used.

We should always listen with the intent to understand, instead of listening with the intent to reply^{vii}. Effective listening requires patience.

Clear Language

Whilst English is the “common language” in aviation, it is not the first language for all colleagues. So, it is helpful to keep communication concise and to use standard phraseology and terms to give listeners the best opportunity to understand your message.^{viii} For example, the phonetic alphabet uses clear and distinct words to prevent mishearing commonly mistaken letters, such as M/N. Standard phraseology will avoid confusion and is vital to aid understanding of all nationalities and languages.^{ix}



The use of standard phraseology is just as important on the radio as on the interphone and CPDLC.

Flying Tigers 1989^x

- In February 1989, a Boeing 747 freighter operated by Flying Tigers was approaching Kuala Lumpur airport in Malaysia.
- ATC instructed: “Tiger 66, descend **two** four zero zero (2,400)”.
- The crew read back: “Ok, descend **to** four zero zero (400)”
- A few minutes later the aircraft impacted terrain at an altitude of 400 ft and the four people on board lost their lives.

What could have saved them:

COM 4, 5, 7 Whilst a read back was received, flight monitoring could have identified when the aircraft busted 2,400 ft and therefore corrected the then-evident miscommunication.

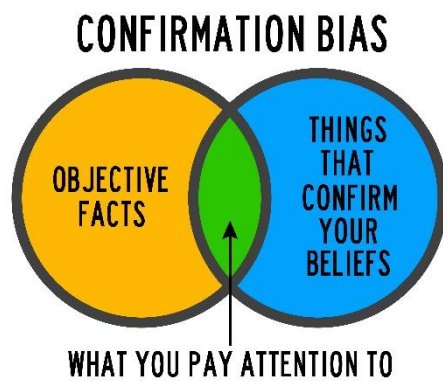
COM 9 The crew should have used standard phraseology, avoiding use of the word ‘to’.

Avoid Assumption and Bias

Understanding the audience for a message will help to “encode” the message appropriately given the level of experience, knowledge, culture, etc. of the listener. This increases the chance of getting the message through without misinterpretation or assumption.



Confirmation Bias: Tendency to search for, interpret and recall information in a way that supports what we already believe.



Confirmation bias can be a significant obstacle to communication, particularly when a message is received that challenges or contradicts what is already understood. A common reaction to this is resistance to the idea that threatens the currently held belief system and can often include subconscious filtering of information.

“The first law of communication is not a matter of what meaning the message puts into their (the receivers) minds; it is a question of what is already in their minds – in the form of stored experience and potential responses – which they can draw on to make sense of the messages which are relevant to them. Messages cannot evoke what is not there.”^{xii}

Studies show that the more the listener trusts the person sending the message, the more likely they are to “accept” the message.^{xii} This in itself can be useful and is indeed necessary for problem solving. But it could also be a pitfall if pertinent information is subconsciously discounted.

Overcoming assumptions and bias is incredibly difficult, but a helpful general rule can be to discuss with others; ask for opinions and ideas without first suggesting your own thoughts to avoid swaying the debate.

Briefings and SOPs

Briefings and SOPs are extremely important parts of a safe flight, yet as with any type of communication, there is always the potential for mixed messages. Written SOPs should be regularly reviewed for effectiveness and clarity. Often, incidents, accidents and near misses can help to highlight where SOPs need updating; therefore, an open and honest reporting culture forms a vital part of any review cycle.

Verbal communication, such as briefings, may be more challenging to moderate and evaluate from a supervisory perspective, as they are less formalized, generally unrecorded, and dependent on the individuals involved. There are many hints and tips published regarding effective oral communication. A popular approach is from Dr Philip Borne of the University of California. His ten steps (on the left) can be further simplified into 5 areas (on the right):

Ten Simple Rules for Oral Presentations^{xiii}	General Tips for briefings
1. Talk to the audience	Make eye contact, engage
2. Less is More	Accuracy Brevity Clarity
3. Only talk when you have something to say	
4. Make the take home message pertinent	
5. Be logical	
6. Treat the floor as a stage	Professional manner, leadership and command
7. Practice and time your presentation	
8. Use visual effects sparingly	
9. Review audio/ video of your presentations	Continually improve
10. Provide appropriate acknowledgements	Praise is a powerful tool

Briefings are vitally important before the event, so that communications can be succinct during the flight. A shared understanding can support continued communication and avoid any potential breakdown. Particularly on large aircraft, communication between the flight deck and crew can be problematic due to separation across the cabins. Whilst the sterile cockpit rule forbids nonessential conversations between the pilots and the cabin crew during critical phases of flight^{xiv}, past incidents have shown confusion over when to apply it. In the past there have been cases of over emphasis on this rule has prevented cabin crew from contacting the flight deck about vital technical issues, for fear of breaking the law.^{xv}

Air Ontario Flight 1363

- A Fokker F-28-1000 operated by Air Ontario crashed upon take-off from Dryden, Canada on 10 March 1989.
- Before takeoff, cabin crew noticed snow on the wings, but failed to convey this vitally operational information to the flight deck. The cabin crew admitted to not informing the flight deck due to a previous negative experience from a previous flight.
- The aircraft struck trees shortly after takeoff and then disintegrated on impact.
- The accident caused the deaths of 21 of the 65 passengers and three of the four crew members on board, including both pilots.

What could have saved them:

COM 1, 2, 3 The cabin crew should have passed this information on

COM 6,7,8 Cabin crew could have used the Ask, Suggest Insist escalation framework to highlight the situation to the flight deck

CPDLC

As discussed previously, written communications can remove ambiguity, ease radio chatter, and allow for easy cross check of information. It is for these reasons that the Controller Pilot Data Link Communications (CPDLC) is used in many modern aircraft. Despite these benefits, the CPDLC has its own challenges.

Radio chatter: Use of the CPDLC removes radio chatter but hearing that radio chatter may be giving other crews a higher level of SAW. By removing this radio chatter, we may also be reducing a pilots SAW. This can be mitigated by considering the use of voice communication as a preferred method in busy situations.

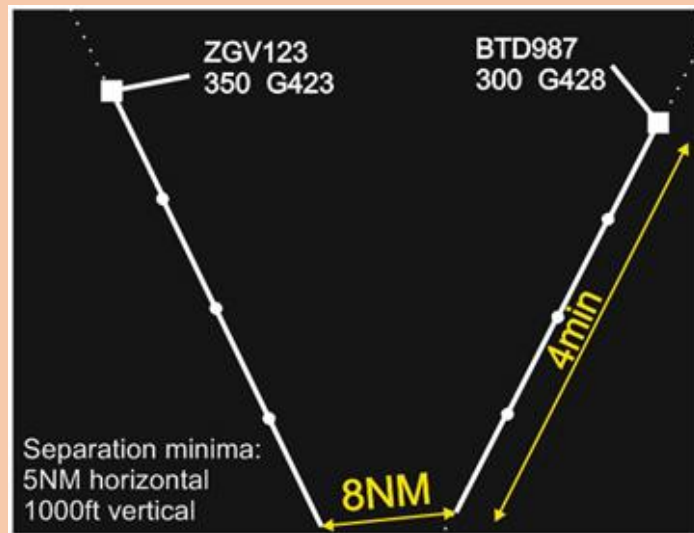
Spotting contradictions: Without everyone hearing the messages over the radios, it is possible that two controllers contradict each other. If this happened on a radio call, it might be more easily noticed, but then go unnoticed and uncorrected on CDPLC. ATS procedures are designed to mitigate this issue, but information should always be checked for potential errors.

Information overload: Messages on CPDLC can sometimes be long. If a request can only partially be complied with, then a single 'unable' response would have to be returned. This would then need an entirely new message and elongate the process. Consider keeping messages short so each item can be agreed at a time.

Time criticality: Non time critical messages are sent by CPDLC. However, as earlier discussed in the PRO/KNO chapter, there is no definition of 'time critical.' This could result in a messaged deemed time critical by one individual being missed by the receiver.

Skybrary offers this time critical CPDLC example:^{xvi}

- ZGV123 is maintaining FL350 but is supposed to descend to FL250. As there is a crossing conflict with BTD987 the controller issues a descend instruction via CPDLC *"ZGV123 DESCEND FL250, DESCEND AT 2000 ft/min MINIMUM"*. This instruction would be generally safe if voice communication were used, but with CPDLC there is much uncertainty about the maneuver commencing.



- If ZGV123 starts the descent right after receiving the uplink message, the conflict will be resolved safely. If, however the maneuver starts two minutes later the assigned vertical rate may not be sufficient to ensure separation with BTD987 and this is the moment when the situation becomes time critical.

Summary

- Effective communication is the fundamental basis for the application of all non-technical competencies. The effectiveness of leadership, teamwork, decision making, situation awareness, and workload management is dependent on effective communication.
- Communication is a complex process that requires both sender and receiver to be diligent in encoding, decoding, and giving feedback on message efficacy.
- There are many types of communication which may be appropriate for different purposes. However, words form a major part of communication to ensure accuracy, brevity, and clarity. Relying only on body language and tone can easily cause miscommunication.
- Barriers to communication must be openly discussed to develop relevant mitigation in terms of threat and error management.

References

- i Farris, Candace, et al. Aviation English: A Lingua Franca for Pilots and Air Traffic Controllers. United Kingdom, Taylor & Francis, 2016.
- ii IATA GM: Competency Assessment and Evaluation for Pilots Instructors and Evaluators
- iii Birdwhistell, Ray L.. Kinesics and Context: Essays on Body Motion Communication. United States, University of Pennsylvania Press, Incorporated, 2010.
- iv Mehrabian, Albert, Silent Messages, Belmont, California, Wadworth Publishing, 1971
- v What is Communication Process? definition and meaning - Business Jargons
- vi Jones Carter.com
- vii Covey, Stephen R.. The 7 Habits of Highly Effective People: Powerful Lessons in Personal Change Interactive Edition. United States, Mango Media, 2015.
- viii Estival, D., Farris, C. and Molesworth, B. (2016). Aviation English. A lingua franca for pilots and air traffic controllers, pp. 3–4. Routledge, London, England.
- ix English Language Proficiency and Aviation Safety Robert Fowler Jr. Embry-Riddle Aeronautical University, Robert.Fowler@mtsu.edu
- x Safety Recommendation A-89-022. NTSB. FAA. Retrieved 5 January 2016.
- xi Mackay, Hugh , Why Don't People Listen, Australia, Pan Macmillan, 1994
- xii White, Devin. Listen with Intention: How to Connect, Create Rapport, Develop Trust, and Build Deep Relationships. N.p., More Books LLC, 2021.
- xiii Bourne PE. Ten simple rules for making good oral presentations. PLoS Comput Biol 3(4): e77. doi:10.1371/journal.pcbi.0030077. 2007
- xiv FAR 121.542 / FAR 135.100--Flight Crew Member Duties
- xv Chute, R. D., & Wiener, E. L. (1996). Cockpit/cabin communication II: Shall we tell the pilots? *The International Journal of Aviation Psychology*, 6(3). 211-231.
- xvi <https://skybrary.aero/articles/cpdlc-general-safety-considerations>