What you hear is

by Maciej Szczukowski

What is safety not? Safety is not a binary, zero-one, state. It is a consequence of a sequence of events, which may or may not end with an incident...

Maciej Szczukowski

has been an Air Traffic Controller, for over 10 years, at Warsaw Okecie Airport, Warsaw, Poland. He also holds a PPL.

Safety is not available in shops, even before Christmas and it cannot be created only with equipment, however advanced. Safety is not a permanent state either. The variables on one side and the barriers against failure on the other do change. Sometimes for better, sometimes for worse. A change from A-SMGCS Level 1 with identified surveillance only to A-SMGCS Level 2 with RIMCAS may sound like a big jump towards better safety on runways, just as STCA tries to provide in the air. But all our technology is only a step on the way to even better safety technology. Also, increasing the hourly capacity of a sector, closing a taxiway or reducing the range of airport radar may diminish the power of such systems instantly. To deal with what's left we have a human being – the last barrier. A pilot and a controller, who are responsible for the effects of their actions, are an integral yet inherently vulnerable part of the safety system.

With the rapid growth of information and computer technology capability, we have been able to broaden the scope of available safety-related information to an amazing extent. Often, a controller is able to 'see' massive volumes of airspace, to obtain almost any information about almost any visible traffic and to leave certain decisions to be made by computers for better efficiency of traffic flow. What a controller cannot see is what is happening in the flight deck beyond the radio transmissions made, which are just a small part of the task of the pilot. This makes a wider context, in which pilots make radio transmissions to ATC, largely unknown. As controllers we must first of all give correct instructions and then listen to what is read back. Of course, not only must we listen carefully to the read back, but also perhaps we can sometimes get a bit more from those pilot transmissions than words only. By this we may be able to advance the chances of a safe (or safer) outcome.

My own experience has taught me that attentive listening to the voices of the pilots I am talking to (and sometimes to those of my nearby colleagues too!) can provide me with useful information which can constitute an additional 'free' safety barrier. We all have probably detected, at some time, an evidence of apparent uncertainty, concern or overload in the flight deck, not (just) from the words used but from the way they were spoken. Such signs may identify stress. Experts in these matters tell us that when exposed to stress, the human voice often changes. We may tense our speech-production muscles and so increase our vocal pitch. We may talk more quickly or repeat words and phrases. Some people also have a tendency to mirror speech patterns - a person speaks fast so we respond by speeding up ourselves. Although in stressful circumstances, there may be no time to instantly reduce the stressor, the potential for stress-signs to be detectable over the air waves is at least worth remembering.

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what you get

Whilst for a controller, listening to pilots is as important as telling them what to do, we should remember that pilots listen to us too. The tone of our voice may sometimes 'give away' the existence of stress and provide an indicator of the level of confident control that we have in our sector. Still we should not expect pilots to do more than 'note' such signs in the context of their primary task of controlling their own particular aircraft.

How should one react hearing the "hidden" message of the voice in his/hers headphones ? Being an 'anti-mirror' maybe one of the ways. The faster people speak to you, the more you may try slowing down your speech rate. If a person expresses impatience or irritation, be certain to make your voice relatively more quiet, slow and less emotional. If you suspect that the pilot is reacting to overload, think what you can do to make their life easier and, whilst working this out, share some (relative) calm. I say "relative" because not all pilots remember (or want to remember!), when they're under pressure, that life as a controller can enter overload too. Also while it may be tempting to discuss an incident or mistake on the frequency immediately after it happened, don't even consider this option. Who ever made the mistake, the immediate aftermath is definitely not the time to discuss it. Both parties need, for the time being, to move on and deal with the evolving situation. Remember that you both need to keep concentration and memory, critical task facilitators intact. Looking back whilst necessarily moving on can

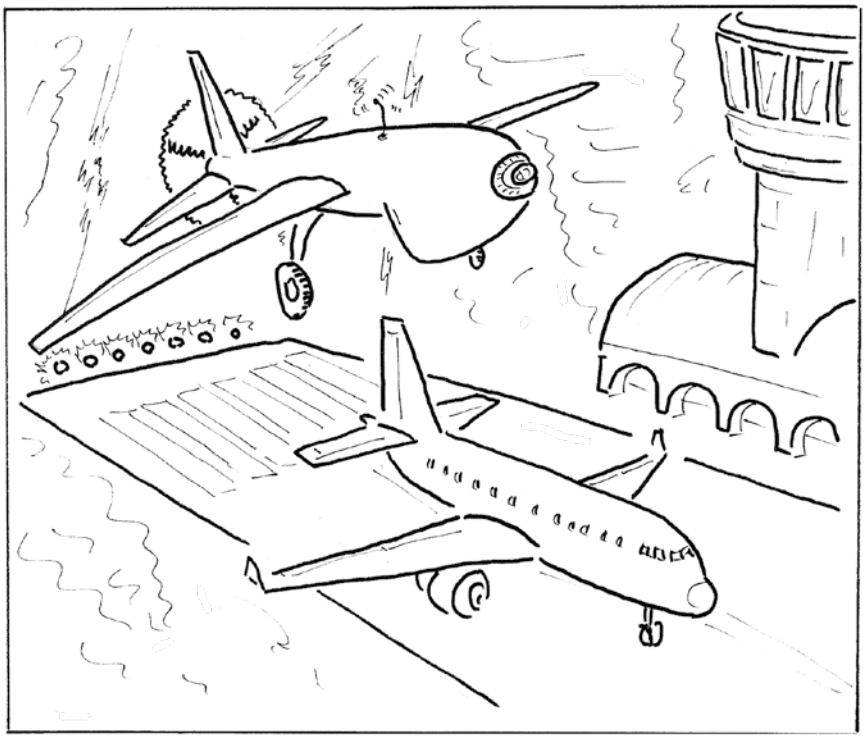
unnecessarily compromise your mental resources.

Just one more thing about the signs that come with speech, only in this case in respect of those you can see as well as hear – your controller colleagues. As we must require a read-back to be complete, clear and unambiguous, we should not forget that crucial exchange during hand-over. The "sound" of my colleague, either steady and convinced or distracted and pensive, becomes a clear "indicator" of whether a safety barrier, being created by us, is strong or not. If it seems like it may be weak, remaining for few minutes following a hand-over is always a good practice[1]. For those of us working in aerodrome control, the ability to be co-located with our colleagues and interchange roles promotes understanding, even when we're not handing over. It allows the sound of the voice, unlike that of a pilot, to be additionally associated with visual 'evidence'. An investigation of a runway incursion event at Zurich[2] questioned the absence of such co-location:

"The two services, "Zurich Apron" and "Zurich Ground", are accommodated in spatially separated operating centres and are provided by apron controllers and air traffic controllers, who are not mutually exchangeable. The question arises as to whether it is expedient to have this spatial separation between two services who have similar duties that complement one another and who must co-ordinate intensively."

There is a belief that safety comes from 'hard' actions. That to increase safety it is necessary to "do something visible' like buying new equipment or implementing a new activity or procedure. Or maybe as little as pressing one more button, making a phone call, using an extra flight strip holder. But all this costs money, energy or precious time. In fact safety is ultimately based on building and guarding barriers. The above remarks about R/T communications are one of the methods of creating them. "Active" listening (and hearing) is surely the cheapest, yet most effective, defensive barrier anyone can create.

I have been discussing a non statutory – and free – component of safety. Of course an idea that one should be aware of all the evidence around is not new. Despite the luck of all aviation, except Icarus' unsuccessful attempt in full sunlight, most of the ideas about human organisation and behaviour upon which aviation relies to achieve safety are firmly rooted in classical times. Quintus Horatius Flaccus, the Roman poet more often identified as Horace, wrote[3]: "nam tua res agitur, paries cum proximus ardet" which, written as advice that an unwelcome development next door may soon be happening to you if you do not take notice, has been translated as "it is your concern when your neighbour's wall is on fire." It is one of my mottos to build the "big picture" by trying to hear (hence understand) more than we are formally expected to, even if it requires extra effort. After all, we've got one mouth but twice as many ears. Let's use them. At least until the age of 100% CPDLC is upon us!



Pilot: No problem Control... Going around and holding... Will wait for another approach...
ATC: Listen to this guy! He is truly amazing... I don't know how he manages to keep cool **up there** under those circumstances...

1- See http://www.skybrary.aero/index.php/Hand-over/take-over_of_operational_positions
2- See http://www.sust.admin.ch/pdfs/AV-airprox/1788_e.pdf
3- in Epistle 1.18 published in 19 B.C.