FROM EXPERIENCE REPORTS **TO EXPERIENCE SHARING**

Pilots and controllers talk a lot over RT, but rarely in person. So when tensions and misunderstandings arise, these tend to remain unaddressed. In this article, **Erick Hoarau, Florence-Marie Jégoux and Sébastien Follet** argue that this needs to be addressed. Can a focus on everyday experience help to resolve everyday friction, before things heat up?

It was a normal, calm and cloudy day. There was no more and no less traffic than usual on the approach. Everything was normal, yet the interface between pilots and controllers did not match.

This story begins while Airjet 123, a regional jet, is flying FL 240, before further descent, still in contact with the ACC. The crew is briefing for an ILS approach as given in the ATIS. They are instructed to maintain 310kt or more. Shortly after, they are transferred to the approach centre. On his first message, the approach controller instructs the plane to reduce 250kt and descend FL100. Further speed reductions and other changes occur in this Approach sequence figure.

KEY POINTS

1. **Pilots and controllers have different objectives, constraints, and expectations. They interpret facts differently, with their own filters.**
2. **Very few opportunities exist for them to meet and collaborate 'off mike'.**
3. **Exploring Safety-II, we could start by debriefing the 'friction situations'.**

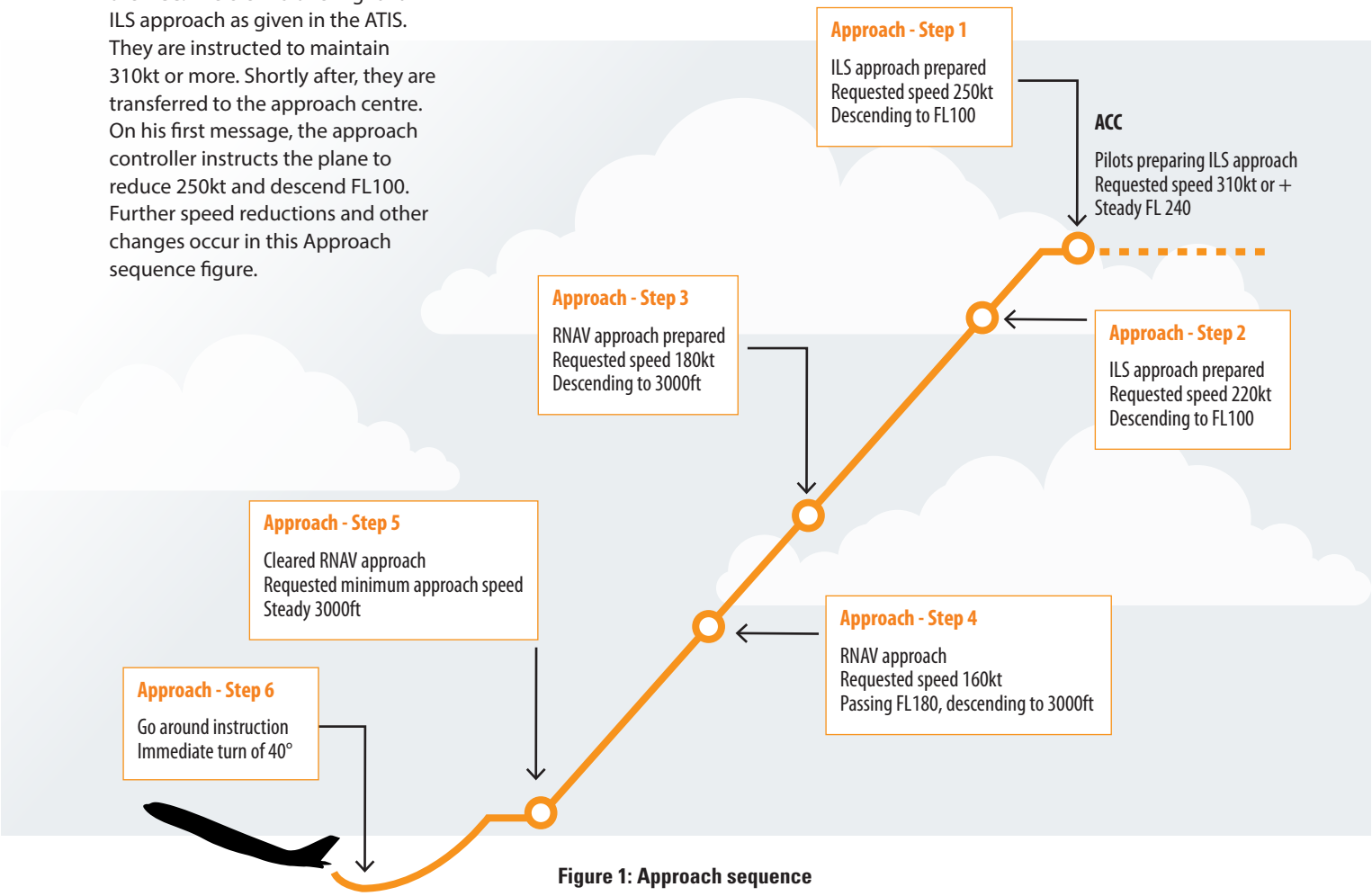

Figure 1: Approach sequence

Now let us examine the situation through the eyes of both the controller and the flight crew.

	Approach controller point of view	Flight crew point of view
Step 1	[The controller does not know about the previous ACC clearance.] "I need to reduce the Airjet. I have to make it number 2." ***"Airjet 123 Approach Hello. Descend FL100 via Standard arrival. Reduce 250kt."***	[The crew feels comfortable with high speed to be on time on arrival. his drastic speed reduction upsets them.] "Keep speed… Reduce… This is nonsense! Do they sometimes talk to each other?"
Step 2	"Aircraft of this company usually reduce early and descend fast… I need to cross them with transiting traffic. What are these guys doing with this slow decent rate? Why are they not reducing?" ***"Airjet 123 reduce further to 220kt. Maintain FL100 upon reaching. Traffic 1000ft below your cleared level."***	"How do they want us to descend and reduce at the same time?" [In clean configuration the aircraft loses about 1kt per second in level flight and 1kt every 3 seconds in descent. Meanwhile the estimated track miles to touchdown and the distance to the preceding aircraft decrease rapidly.]
Step 3	"Okay… no more conflict ahead. The ILS is now inoperative. I will guide them now for the RNAV approach." ***"Airjet123, due to ILS calibration, expect RNAV Z approach runway 34.*** ***Descend 3000ft QNH1023.*** ***Reduce 180kt for spacing."***	"Now we have to insert the new approach in the FMS, check for RAIM, get the RNAV charts, crosscheck all approach points… pffff!!!" [Below FL100 the only task of the PF (Pilot Flying) is to fly the plane on the correct track. All other tasks are devoted to the PM (Pilot Monitoring) who already manages radio communications, monitors the PF's actions, aircraft behaviour and the environment, and calls out any deviation. Instructions to modify the approach type below FL100 dramatically increase crew workload and may put the PM out of the loop.]
Step 4	"They are still flying above 200kt… These guys are impossible!!!" ***"Airjet 123. Cleared RNAV approach.*** ***Reduce speed now 160kt.*** ***I do confirm 160kt!"***	"Now we have the anti-ice system on! This is not our day… Okay… Ice speed selected!" [Icing conditions just worsen the situation: Anti-ice systems collect hot air from the engines. As a result, engine idle power increases, impairing both aircraft deceleration and descent path.]
Step 5	"At last they have slowed down! Spacing should be sufficient now." ***"Airjet 123, reduce minimum approach speed. You are number 2, 6Nm behind a Beech 200."*** [The controller is used to seeing very low approach speeds on regional jets. Therefore he considers the situation as okay.]	"I don't know the speed of that guy ahead but we're closing in with our minimum approach speed of 143kt." [Minimum approach speed is not the same everyday for a given aircraft. It depends on its landing configuration, its present weight and the current weather conditions. Together, these factors can lead to an approach speed variation of up to 30 kt.]
Step 6	[While the regional jet starts its final descent, the controller notices with dismay that the distance between the two planes actually decreases and gets closer to the minimum radar separation.] "Damn it! It won't make it!" ***"Airjet 123 cancel approach. Immediately, turn right heading 020, climb and maintain 3000ft, immediately."***	PF: "Go-Around… TOGA… Flaps 2!" PM: "Positive Rate…" - "Gear Up… Heading Mode! Set Heading 020!" - "Set !" - "Check !" - "Reset ASEL to 3000ft!" - "Set!" - "Check!" … [ATC non-standard missed approach instructions generate a huge workload increase in the cockpit. Go-around procedures are normal procedures. That said, an unexpected go-around and its associated startle effect may lead pilots to SOP violations (SAMSYS, Deutsche Lufthansa, 2015) and non-compliance with tracking, altitude and ATC requirements (Etude PARG, BEA, 2013).]
	The controller is very upset and frustrated. His best strategy to regulate the regional jet behind the calibration plane was defeated by those non-cooperative pilots, who did not comply with ATC instructions, leading to this inefficient and stressful mess.	The crew is very upset and frustrated. A normal approach turned to a fiasco because of this lousy controller who put them behind the slower one! …And they eventually landed way behind schedule!

Minimum radar separation is respected. This situation is not considered as a safety event by either the airline or ANSP.

Analysis

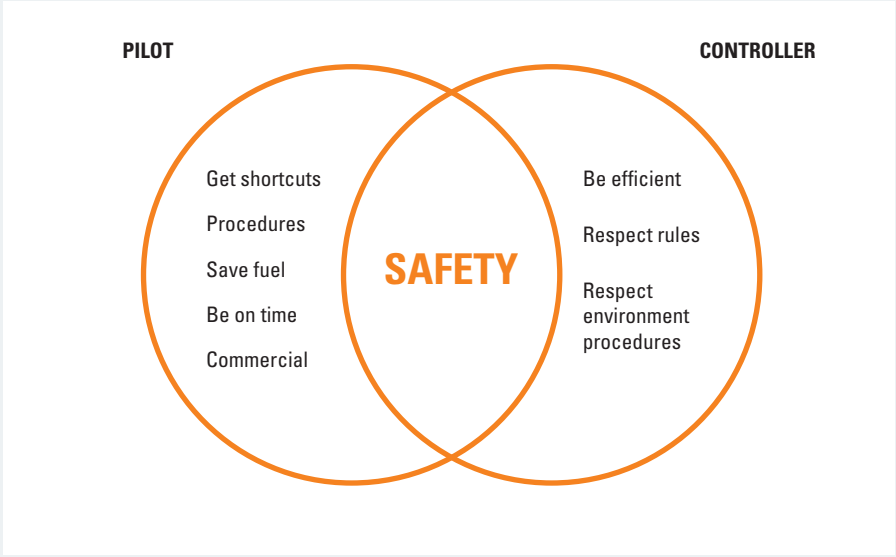

Figure 2: Example of goals for pilots and controllers.

One event, two points of view, and people on both sides of the interface who do not understand each other and yet strive to ensure safety. For instance, when we think of 'performance', for a pilot, it might mean saving time and fuel all along his flight. For a controller, it implies a global efficiency, which saves time on the whole sequence regardless of some aircraft saving or losing more than others. These discrepancies in how we perceive goals and situations are not fully understandable for a pilot in the cockpit or for a controller in front of the radar screen, especially under time pressure.

To fulfil their seemingly individual objectives, pilots and controllers have their own needs, expectations and constraints.

In order to prepare and perform a safe and stabilised approach, a pilot needs time and anticipation. To save fuel, he needs an optimised descent path. To be on time, he needs direct routing and appropriate speed. This is what he might expect from controllers. His constraints are, among others, the weather (wind, icing conditions, build-ups, etc.), the current aircraft status (weight, performance, equipment, etc.) and the operational and commercial aspects of the flight (schedule, flight time limitations, connecting passengers, etc.). He would expect the controller 'sitting in the tower' to fulfil all his needs and understand all his constraints. In some situations, a control instruction that would disturb his plan might be perceived as a reluctance to help.

On the other side, to ensure safety and efficiency of the whole sequence, the controller needs the airplane to

comply with his instructions. She needs aircraft to turn or reduce when asked. Like pilots, she has lots of expectations regarding her own experience. For her, a regional jet of a specific manufacturer flying for a specific company should reduce at approximately this specific speed when told to fly at minimum approach speed. She also expects her requests to be immediately effective. She has other constraints: regulation associated with specific spaces, regulation for wake turbulence, for aircraft spacing, etc.

These differences of expectations, needs and constraints are not well known to the other party, in the control room or in the cockpit. This leads to misunderstandings, misinterpretations and assumptions on the other side's intentions and a dissatisfactory experience for both. When there is no safety issue at the end, no one will ask for explanation and both parties continue to work in silos without ever meeting nor getting answers. As a consequence, frictions occur regularly. It is no big deal, it is just friction with some local heating.

"VIC 77, please remember it's not a race...."

Consequences

But friction also means erosion. Sooner or later there will be areas where the heating process will increase so considerably that it will put safety at stake.

In our example, on the go-around, the controller asked for an avoiding action from an airplane configured for a final approach. The crew's answer was immediate and the turn was applied without delay. By a non-standard go-around instruction, the controller implemented a manoeuvre that could have been dangerous, although not ordering this go-around could have been even more dangerous. Ignorance of the other point of view could easily bring about risky situations.

Friction areas may also be seen as forerunner signs that safety might be downgraded. This type of friction has already led to overheating. The French national committee, which manages safety events (ITES), raised a specific topic that keeps on coming back: spacing gets infringed by aircraft catching up others. Different situations, but the same issue: the complexity of speed management, ensured by pilots as well as controllers, may lead to spacing infringement.

Solutions

What solutions can be found? Let's look at it from a Safety-II perspective.

Most aeronautical services only pay attention to Safety-I. Both airlines and control providers have their own reporting systems to get feedback and learn lessons from events. Operators (pilots or controllers) who have experienced an unsatisfactory event sometimes file a report to get answers. The reporting forms are collected and analysed by specific services of both providers. If safety is not at stake, the case is closed and none of the operators is contacted.

It may be time for organisations to get interested in Safety-II and in everyday work.

As a result, one operator never gets answers, and the other does not even know that someone else had a disturbing experience during a past interaction. So, the Safety-I perspective does not reveal the differences in experiences and perspectives. It may be time for organisations to get interested in Safety-II and in everyday work. One way to explore this huge number of situations would be to explore those 'friction' situations first.

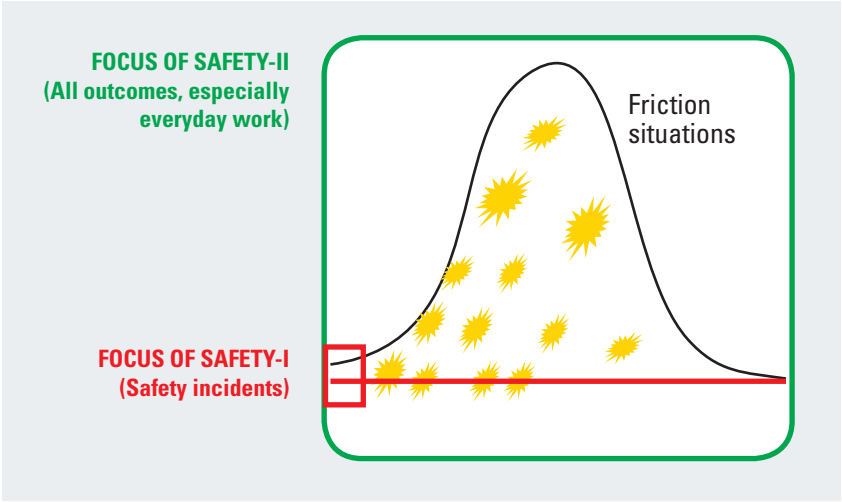

Figure 3: Friction situations in everyday work

It might be time also to build a system in which people can share their experience and have explanations instead of assumptions. People would make contact to discuss 'friction' situations. A few years ago, a French Internet forum was created in order to share experience and points of view: pilots and controllers used to discuss, share their knowledge, apprehensions, needs and expectations. Unfortunately, for different reasons (security, inappropriate messages…) the website was closed. But the idea remains. And it could be a good way to implement experience sharing: a neutral, fully moderated, Internet platform where pilots and controllers could discuss. Such a forum could be hosted by EUROCONTROL, in order to give the opportunity to operators from all over Europe to share their experience, instead of misunderstandings and sometimes grumpiness on the frequency.

Another option could be to organise regular meetings between pilots and controllers, or more generally between operators. Some initiatives are implemented locally:

- VFR meetings: VFR pilots and controllers share constraints, goals, and what they mostly have in common: their passion.
- 'ANS-ANC' meetings: conferences that gather pilots and controllers, to talk about problems of non-stabilised and non-compliant approaches.

On the French 'ITES', safety events are analysed by both ATC experts and pilots. It makes it very easy to recognise our assumptions, and ignorance of the other's constraints.

An HF reflection group is led by the French oversight authority, which gathers some CRM pilots, flight instructors, and HF experts, from many airlines, and some controllers: hearing and understanding the problems and questions from the other group can really help to be more empathic instead of judgemental.

Our HF team started years ago to meet CRM pilots, and worked on different projects: we made a pedagogical film with instructional situations for both pilots and controllers. We did some HF and facilitation cross-training: CRM pilots came to our HF sessions, and we went to their CRM training. Along the years, we have solved many misunderstandings, some of them very significant, for instance why controllers would put sometimes 3NM spacing between two aircraft, and sometimes 8NM. The 8NM controller is not worse than the 3NM one. He or she just has a different radar, different technology, which means different regulations and norms.

Pilot-controller cross-training would be great, but administrative or financial reasons seem to prevent this from happening, to our regret.

Controllers and pilots collaborate not only via RT, but also in formal meetings, and informally, at the flying club pub, and on the internet. When pilots and controllers can share experience, magic will happen. We will improve safety.

Erick Hoarau occupies a position of First Officer with a French airline. He has been a CRM Trainer for 10 years and was nominated CRM Trainer Examiner in 2016. In 2015 he obtained a Diploma in 'Human Factors for the Conception of Human-Machine Systems' at the Paris V René Descartes University. He is a member of a focus group gathering pilots and controllers to address flight safety through human factors.

Florence-Marie Jégoux became a private pilot in 2000, a certified air traffic controller in 2004, and HF facilitator in 2009. She is also a coach and is trained in systems theory. She now works for an ANSP in their training department as a Human Factors coordinator and specialist. She passed an HF University Degree in 2017 in the National Polytechnic Institute of Bordeaux.

Sébastien Follet has been working as an Air Traffic Controller for the last 16 years. He has been an HF facilitator for controllers for the last 10 years and is currently instructor for controllers in his ATC center. Formerly, he has also worked on various safety studies to implement new equipment. He has a degree in Ergonomics & HF Basics from Paris Descartes University. This aviation enthusiast has been a private pilot for 16 years.