LEARNING FROM PERFORMANCE VARIABILITY AT SKYGUIDE

The reality of everyday work is that – confronted with varying conditions and limited resources – people must adapt and adjust to make the system work. The details of these adjustments often remain a mystery to those who don't do the work. **Melanie Hulliger** and **Matthias Reimann** report on a study at **skyguide** to learn from them.

KEY POINTS

- **In air traffic control, performance variability such as deviations from procedures and rules is an inevitable reality of everyday work, also at skyguide.**
- **An internal, independent study on performance variability sheds light on areas, situations, reasons and perceived impact of deviations.**
- **This article includes a detailed description of the applied approach, shares main results, puts them into context and discusses them.**
- **The study helped to understand a very complex topic and allows to continuously improve to the benefit of safe and efficient operation.**

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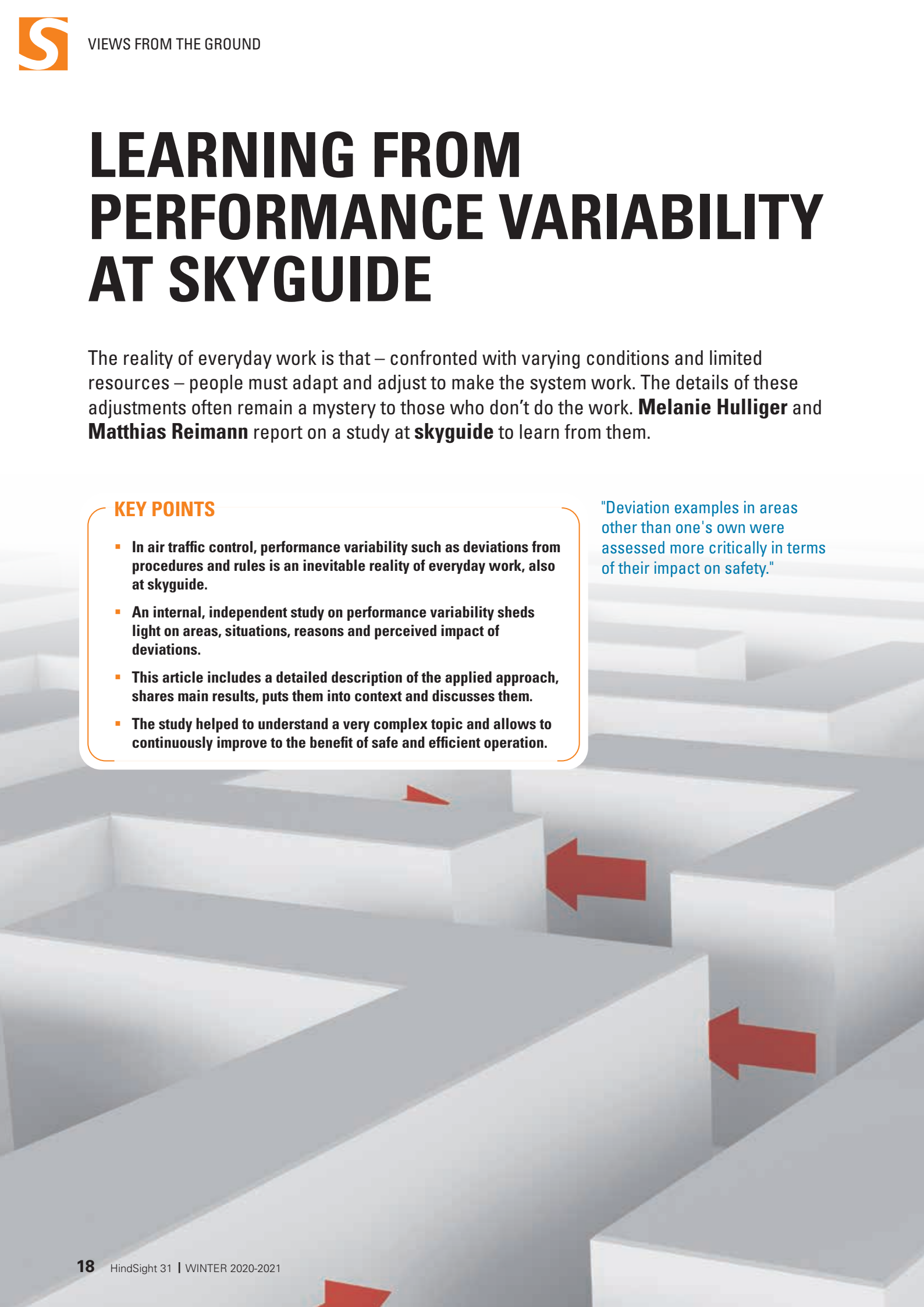

Introduction

Performance variability was a key topic both at the EUROCONTROL Safety Forum in 2018 and in issue 25 of *HindSight* magazine. This growing interest, as well as a EUROCONTROL safety culture survey for skyguide in 2016, led to an independent study of performance variability in skyguide in 2019.

What do we, skyguide, understand as 'performance variability'? Front-line operators such as air traffic controllers or technicians permanently find themselves confronted with varying conditions. They must constantly adapt to tackle the realities of daily work. Organisations cannot function if people simply stick to every existing rule and procedure to the letter. Sometimes, these adjustments therefore involve deviations from procedures. But systematic deviations are not desirable from a corporate, legal and safety perspective. This presents a challenge.

The goal of this study was to analyse performance variability in skyguide's air traffic control services provided to controlled flights. The study aimed to understand the gap between work-as-prescribed and work-as-done by identifying areas, situations, reasons as well as specific procedures and rules in order to improve them.

As we write this *HindSight* article, we find ourselves in the global COVID-19 crisis. At this time, performance variability is even more relevant, as we experience daily adaptations, innovations and improvisations. While creative problem-solving and flexibility are part of the daily job of ATM professionals, the results of our study will hopefully help us to continue operating safely during and after this human and economic crisis.

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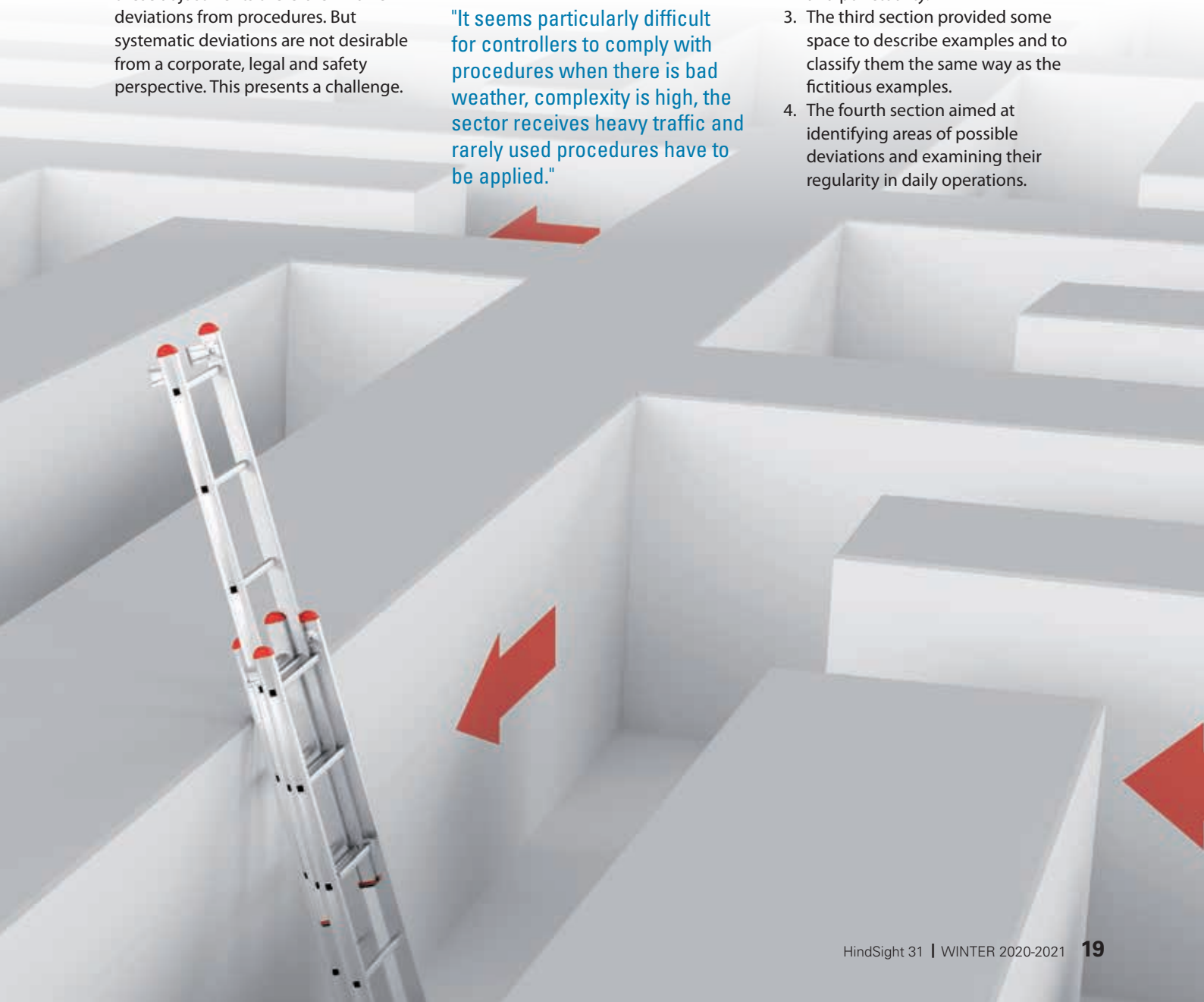
Approach

Questionnaire

Following a literature research, an internal document analysis and several expert interviews, we developed an online questionnaire. This questionnaire consisted of seven different sections, to approach the deviations from procedures.

1. The first section included a repetition of some procedure-related questions from the EUROCONTROL safety culture survey in 2016.
2. The second section presented some fictitious deviation example situations. These were to be rated regarding the degree of deviation ('violation', 'grey zone' or 'normal ops'), and impact on safety, capacity and punctuality.
3. The third section provided some space to describe examples and to classify them the same way as the fictitious examples.
4. The fourth section aimed at identifying areas of possible deviations and examining their regularity in daily operations.



5. The fifth section assessed to what extent certain situations hinder or enable controllers to comply with procedures.
6. The sixth section aimed at understanding the most relevant reasons for deviations.
7. The last section captured the perceived impact of deviations on the SESAR key performance indicators.

The surveyed target group included all skyguide air traffic controllers except those at regional aerodromes and military units. The return rate was around 22% of the staff targeted.

Main Findings and Conclusions

The need to deviate from procedures

The results of the EUROCONTROL safety culture survey questions showed us that, very similar to 2016, a significant number of controllers felt a need to deviate from procedures.

The role of professional culture

The results of the fictitious deviation examples as well as the examples provided by the respondents helped to understand the topic of deviations in everyday work, but are difficult to describe, as they are diverse and situation-dependent. However, we discovered one interesting tendency: deviation examples in areas other than one's own were assessed more critically in terms of their impact on safety.

This could be explained by a rather strong belief that one has control over the outcome of events (so-called 'internal locus of control') due to one's knowledge and experience in the respective unit. It could also be explained by drift due to habituation to certain situations. Another interesting discovery was the fact that there were no significant differences in perception between geographical regions. This suggests that deviations are rather a topic of professional or company culture than national subculture.

Main areas of deviations

Overall, four main areas stand out, in which deviations from regulations and procedures are comparatively frequent, meaning that participants indicated they occur at least occasionally. These four areas are: 1) voice communication, 2) areas of responsibility, 3) noise abatement and 4) traffic priorities.

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Deviations concerning air traffic control areas of responsibility and voice communication are of particular interest concerning safety. Are deviations in these areas inevitable to reduce workload in a highly complex environment? Are they inevitable to provide the required capacity? Or have they become an established working habit? These are interesting questions that we would like to further examine.

Compliance-hindering factors and a word about workload

It seems particularly difficult for controllers to comply with procedures when there is bad weather, complexity is high, the sector receives heavy traffic and rarely used procedures have to be applied. Particularly strong VFR traffic, special restrictions such as parachute dropping, photo flights and rare operational concepts also play a role.

High workload seems to be related to deviations. Workload is, of course, likely to be affected by all the situations above, especially when several of these situations co-exist. For example, high complexity coupled with rarely used procedures makes work difficult and that leads to a higher workload. Reducing workload with current procedures is likely to be difficult, especially under performance pressure within a complex environment.

Under certain circumstances, the calculated capacity limit may be exceeded. In such situations, the deviation from a procedure might be seen as the only way out to ensure safe management of traffic and can therefore be tolerated, provided it is just for a very limited period of time. However, systematic deviations for capacity reasons need to be tackled carefully.

Procedures or awareness?

In addition to the reduction of workload and complexity, procedural issues were also evident in controller responses. The reasons included perceived senselessness and impracticability of procedures, procedures not being applicable, conflict with other procedures, or too much room for interpretation. On one hand, these results could indicate issues on the procedure side, even though knowledgeable experts are developing procedures. On the other hand, they raise the question of whether it can be claimed that controllers know all the reasons behind the design of procedures and how they fit together in the broader operational context. The deviation examples provided by controllers help to decide whether procedures need to be clarified, adapted, modified or even withdrawn. Alternatively, the rationale for certain procedures may need to be communicated more clearly. To understand this, operational staff support is needed to help understand the procedures, the work and the context of work.

Perceived impact on safety

Another interesting reason for deviations from procedures is the intention to improve safety. However, questions sometimes remained about whether the deviation is really safer? This uncertainty is also reflected in the results regarding the estimated impact of deviations. Here, people are unsure about whether deviations help or hinder safety. It might be that a locally taken decision to deviate for safety reasons has a positive effect at small scale, but an adverse effect at a bigger scale. This may be hard to know at the time.

Some questions about capacity

Except for safety, controllers indicated an enabling impact of deviations on all of the SESAR 2020 key performance

indicators, namely 1) airspace and aerodrome capacity, 2) customer satisfaction, 3) fuel efficiency, 4) cost efficiency, and 5) predictability and punctuality. Most of the time this may really be the case, and obviously helps us in handling high capacity demands. However, can we really claim to know how favourable these deviations are for the capacity, efficiency and punctuality of the whole (Swiss or international) aviation system? This is an interesting question, especially in the current light of COVID-19, where the capacity demand has changed significantly compared to when this study was conducted.

Closing Words

Performance variability is an integral part of human work. In our highly regulated environment, this creates some inevitable challenges. While procedures are developed with the intention to be complied with, we see that this is becoming increasingly difficult as they become more prescriptive and detailed. The deviations we studied here are usually the result of a conscious choice, with distinct underlying goals, i.e., reducing current workload, reducing complexity, or local optimisation in a situation. Individual and local optimisation, however, also carries the risk of creating unintentional, and potentially negative impacts on the overall system.

This study is a starting point for us to reassess and hopefully simplify our procedures. Ideally, a future procedure framework will account for performance variability and provide prescriptions within appropriate room for manoeuvre.

Melanie Hulliger is a safety specialist in Zurich, Switzerland, who joined skyguide in 2013. With her degree in work and organisational psychology, her main focus lies on the development of a favourable safety culture. Next to her job at skyguide she also works as a Cabin Crew Member for Swiss Int. Air Lines and has a lectureship in Applied Psychology at the Zurich University of Applied Sciences.

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Air Traffic Management (ATM) is most probably one of the most regulated businesses, requiring unambiguous procedures, well-defined processes, stringent rules and highly skilled people doing the job. This is the recipe for a high level of safety and efficiency in a domain that is subject to impressive growth over the last decades. However, in a human centric system, 100% standardisation can never be achieved, as individuals always have a different approach to a given problem. This is also true for ATM and thus for skyguide.

Does this leave the skyguide COO with a bad feeling? Yes, and no. Of course I would like to have an operation which is perfectly standardised, running according to the defined processes and thus guaranteeing the safety level we aim at delivering. However, since I know that individuals will always tackle a given situation in a slightly different way, I am more than happy to know that the job is being done by highly skilled and reliable professionals. This gives me the assurance that things are going well, even though not all procedures are strictly followed by everybody in the same way. One thing is for sure: if our controllers deviate from procedures, I want to know why, in order to be able to act accordingly. Is it for safety reasons or capacity reasons? Is it for personal comfort, or due to lack of knowledge? Or is it simply because the procedure does not make sense and is badly designed?

This Performance Variability Study allowed us, for the first time, to better understand to what extent controllers deviate from procedures and why. Thanks to the numerous examples we were able to gather, we can now define appropriate remedial actions.

I would like to warmly thank all controllers who were ready to participate in this study and openly share their experience with us. This is a major component of information allowing us to permanently improve our processes, rules and procedures, to the benefit of a safe and efficient operation.

Urs Lauener
Chief Operating Officer skyguide