Experience Sharing to Enhance Safety

WS03-2017

Human Factors & Systems Safety Thinking

"People in Control"

27-29 September 2017

Brussels,

Belgocontrol Headquarters

Tervuursesteenweg 303, 1820 Steenokkerzeel, Belgium

Belgocontrol

Foreword

In many ways, air traffic management remains a human-centred industry. Despite the introduction of more complex technology and procedures, people at the sharp end remain in control, making safety and business-critical decisions, as controllers and engineers, and others in supporting roles. But as complexity increases, our ideas about this 'control' are challenged. Who is, or should be, in control, and how is control distributed between actors? What are they in control of? How can and do they exercise control? In an increasingly complex technological, regulatory and organisational environment, and with increasingly complex airspace and traffic, can we expect people to be in control in the same way as we used to?

This seminar will explore the issues of people in control of complex safety-critical technology from a number of perspectives. It will integrate talks and group discussion, and for the first time in the industry – immersive theatre, to help make sense of the new world.

Day one looks at people in control where safety, security and other goals conflict, and where work-as-done is not as imagined. We are taken outside of our own industry, away from the usual people of interest, and even outside of our habitual way of learning about safety, via the interactive theatre production 'Nuclear Family' (Fever Dream Productions). You will have to put yourself in the shoes of Joe and Ellen, nuclear plant workers and siblings who are faced with an imminent disaster. The production unearths and safety and human factors concepts in an innovative, interactive and entertaining way. You and others are not passive, but actively involved in decision making as the scenario unfolds. Human Factors and safety concepts emerge as the play infolds, along with implications for safety management. These will be discussed in a follow-on facilitated session by Steven Shorrock and Tony Licu.

Day two looks at people in control first in the context of automation. Professor David Woods explores some of the interdependencies between and within organisations can be hard to see and occur over the short and long term. The inter-dependencies produce multiple effects that go beyond those intended. The day goes on to examine some of the human factors implications for keeping people in control. Professor Erik Hollnagel takes us back to basics, via a practical set of principles for the 'nitty gritty of human factors'. Sebastian Daeunert ends the day with a practical demonstration of improving work-as-done in the context of runway operations. What if we keep people in control of their own work, and decisions about the way that they work?

Day three looks at people in control from an engineering point of view. What can happen when control is lost? Professor Chris Johnson talks to us about Black Swans in ATM, while Alain du Bois will discuss Lessons Learnt from Belgocontrol Power Failure. Professor Johnson returns to look to the future with a talk on digitisation in ATM.

The event will be relevant to ATM managers, safety specialists, support staff and front-line operators.

AGENDA

27th September (Day 1) – Belgocontrol HQ

12.00 Registration

13.30 Welcome & Opening Workshop

Belgocontrol Management, SHP–SG co-chairs Tony Licu - Head of EUROCONTROL NOM/SAF & Jörg Leonhardt - Head of Human Factor in Safety Management, DFS

13.45 "Nuclear Family"

Fever Dream Theatre

Nuclear Family is a gripping piece of interactive theatre which follows Joe and Ellen, nuclear plant workers and siblings, faced with an imminent disaster. Audience members will be privy to what could possibly be their last hours as they struggle with the biggest decisions of their lives. In this participative production, the audience will experience the pressure of making what might be life and death decisions.

15.30 *Coffee Break*

16.00 "Take-away and lessons learned from Nuclear Family" – Implications from systems thinking, safety, and just culture

Steve Shorrock and Tony Licu

This facilitated session will explore audience reactions following the experience of Nuclear Family. What were your thoughts about the actions of Joe and Ellen, and the situation in which they found themselves? What are the implications for you and your organisations?

17.00 End of day 1

28th September (Day 2) – Belgocontrol HQ

09.15 "Autonomy, Complexity and Resilience in ATM: 1. Case study of how people and automation coordinate when problems arise"

Prof. David Woods – Ohio State University

The attendees will explore a current case of deploying autonomous capability into the air traffic system. Work is underway to develop Detect and Avoid on-board software/hardware that will coordinate with a ground pilot to keep an aircraft "well clear" of other traffic. This detects and avoid plus ground pilot system is intended for drones flying in mixed airspace. The question is what happens when air-ground communications are degraded. The attendees will work on how the air traffic system can adapt to manage traffic when communications with drones are degraded. The case will provide the basis for discussing how people and automation can coordinate when problems arise, and to help uncover the sources of resilience in air traffic systems.

10.45 *Coffee Break*

11.15 "Autonomy, Complexity and Resilience in ATM: 2. Proactive assessment of resilience following deployment of new autonomous technologies"

Prof. David Woods – Ohio State University

Based on the case study, this session will demonstrate how to do a proactive assessment of the resilience of ATM system following the introduction of new autonomous technology. Past work shows that introducing new autonomous capabilities can increase complexity in ways that undermine coordination and responsiveness when abnormal events occur. This session will walk participants through the background and fundamentals for analysing the resilience of an envisioned human-automation system.

12.30 *Lunch*

14.00 Work-as-Imagined and Work-as-Done: The Nitty Gritty of Human Factors

Prof. Erik Hollnagel – University of Southern Denmark

The first question for human factors is how to provide a work environment and working conditions that allow as much work as possible to go well, which means that it is both safe and efficient. Work and work environment are designed by someone to be used by someone else. The design must consider many issues e.g. tools, interactions, interfaces, roles and functions etc. both as single issues and as parts of a whole. A good design requires more than an understanding of work-as-imagined, of how work should be done; it requires and understanding of work-as-done, of what people do when the actual conditions differ from what the design assumed. While there are many guidelines and design principles that represent a theoretical approach to human factors and specific models of human function, there are only few that can account for recurrent patterns of performance that are characteristic of everyday activities. Finding ways to capture work-as-done and to reconcile that with work-as-imagined should therefore be a priority for human factors in a rapidly changing world.

15.30 *Coffee Break*

16.00 "Work-as-Imagined and Work-as-Done – Improving Runway Operations from the Car Park"

Sebastian Daeunert – Incident Investigator – FRA Tower DFS

The way that we adapt to our environment in everyday life can teach us about how we do this at work. In his presentation, Sebastian Daeunert describes how Frankfurt tower contemplated changes to runway operations, ultimately giving controllers responsibility for their way of working.

17.00 End of Day 2

29th September (Day 3) – Belgocontrol HQ

09.00 **"Lessons from complex systems and interactions leading to "Black Swans" in ATM OPS"**

Prof. Chris Johnson - Glasgow University

*Taleb's influential ideas about black swan events focus on situations that deviate from the norm and hence are extremely difficult to predict. Although he has influenced human factors in ATM operations – in is hard to identify the practical long term benefits. In particular, recent contingency events show that many ANSPs struggle to respond and recover from significant adverse events even though they provide high quality crisis management tools. We argue that there is a need for systematics means of identifying Black Swans, which from the perspective of a single ANSP are rare, but at a European or global level are surprisingly common *when you know what to look for*…….*

10.00 *Coffee Break*

10.30 **"Lessons Learnt from Belgocontrol Power Failure"**

Alain Du Bois – Safety Manager - Belgocontrol

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11.30 **Digitalisation of ATM World and the implications of that**

Session led by Prof. Chris Johnson

The last decade has seen a growing pace of interconnection across the aviation industry. We have seen a huge shift in the ways that people search for and book flights. At the same time, airlines depend upon increasing volumes of engineering and operational data exchanged over wired and wireless networks. Airport Operations Centres (APOCs) coordinate dispatchers, baggage handlers, customs and border staff, parking and even retail activities through digital infrastructures. Air traffic management (ATM) has served increasing traffic levels and delivered unparalleled levels of safety through corporate and enterprise Information Technology (IT) and the Operational Technology (OT) of CNS services. Both SESAR and NextGen reinforce these trends and offer new concepts of operation for ATM that can only be realised through tightly integrated digital networks.

In the past, many aviation networks were isolated, preventing data or code from migrating between them and wider public networks. This provided a degree of protection that has gradually been eroded. Even when OT components, such as primary surveillance, are isolated there are ways to reach them (for example, through memory devices that carry data between the Internet and private ATM networks during software up-dates). How can we deal is this shifting paradigm and continue to operate safe and secure systems?

12.30 **Way Forward**

Session led by Tony Licu and Jörg Leonhardt

After 4 major conferences in Systems Safety Thinking and Human Factors and several workshops on practical application – what have you tested from the theory? What next? Have we made progress? What should we retain within the priorities?

13.00 **Closure of event**

ADDITIONAL INFORMATION

CONTACT

Should you like to discuss this event further, please do not hesitate to contact:

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