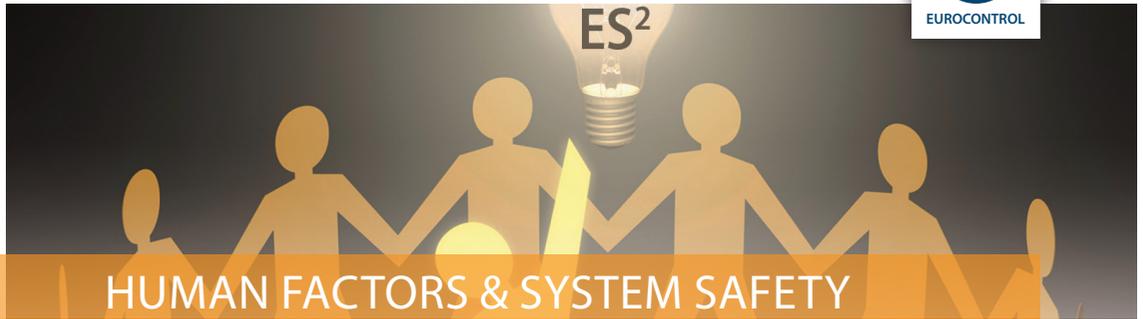




Network Manager
nominated by
the European Commission



Experience Sharing to Enhance Safety - WS02-2015

Barcelona, Spain, 5-7 October 2015

"Understanding Normal Work"

FOREWORD

Human factors and ergonomics is a design discipline concerned with interactions among humans and other elements of a system, with the purpose of optimising human well-being and overall system performance. It works in the intersections of the system, and must be highly participative to be effective. But human factors and ergonomics has suffered from a lack of commitment from the very top of organisations. This is evident in the limited specialist resource available in most ANSPs, and in industry generally. There are many possible reasons for this, but it may be about to change.

At a EUROCONTROL Conference on 11 June 2015, Chief Executive Officers, Safety Directors and Safety Managers representing 30 European ANSPs met in Split, Croatia, on for the biennial ANSP CEOs' Safety Conference. The conference had the theme of 'Managing the Boundaries of Operations' in the context of meeting the European Union's Performance Scheme. In his opening address, EUROCONTROL's Director General Frank Brenner outlined 'Five Needs' that must be attended to in order to maintain ATM's safety record. Two of these reflect the themes of this seminar.

The first is **the need to understand everyday work**. Often, work-as-done differs from work-as-prescribed in official procedures, and also from how we think things work – what we might call work-as-imagined. Mr Brenner noted that *"This gap between work-as-done and work-as-imagined is a major risk for us CEOs. We see it emerge from major accident investigations and inquiries. It is a blind spot, and a risk to us all; things are often not as we think they are. But finding out how things actually work is also an opportunity, because work-as-done is normally incredibly*





safe, and we need to understand how and why. Indeed, we all know that work-to-rule is a strategy to slow down work and make it inefficient! So we as CEOs we must understand local practice, and then decide with the field experts how best to close the gap to improve safety and operational effectiveness." For management, Mr Brenner noted that this means shaping a culture where we openly and routinely discuss differences between work-as-done and work-as-imagined, being mindful of the possibility to drift into failure, but also seeking out innovation and local assets or sources of strength.

The second is **the need for better human system integration**. This relates to an emerging theme in all areas of Europe, all sizes of ANSP. Mr Brenner noted that "Systems are changing fast – often faster than we can comprehend. We have multiple commercial-off-the-shelf systems, as well as legacy systems and newly-designed in-house systems. Humans are still critically important, to design, implement, operate, and maintain these systems. But their needs and requirements must be better understood if we are to have safe and effective systems." Mr Brenner noted that this includes the need for expertise in human factors and ergonomics, which offer advantages for both system performance and wellbeing. Mr Brenner added that "By investing in human factors, we can better understand system and user requirements, we can help prevent delays in implementation, and we can improve both user satisfaction and system safety. It is not enough to focus on technical safety when we are so critically dependent on human beings."

The increasingly fast-pace of technological development, means we need to pay more attention to engineering – not just the equipment, but the engineers and technicians who implement and maintain it. "Our systems are changing faster than at any time in history," said Brenner "Technicians are telling us that innovation cycles are so short, that getting the balance between training for new systems and actually working on them is a real challenge. For them, safety and security issues are more complex than ever. We need the best engineers and technicians, and we need to support them as their role becomes ever more important".

These two needs are critical, and help to focus our minds for our third EUROCONTROL Human Factors and System Safety seminar in Barcelona, where safety managers, safety and human factors practitioners, ANSPs' managers, Airlines and Aerodrome operators join leading researchers and thinkers. NSAs representatives are welcomed at Industry invitation.





AGENDA

5 October – HOTEL REY DON JAIME Casteldefells

11:45 Registration

13:00 Welcome & Opening Workshop

Angel Luis Arias Serrano - Director General ENAIRE,

Tony Licu - Head of EURO-CONTROL NOM/SAF and **Jörg Leonhardt** - SHP-SG co-chairs, Head of Human Factor in Safety Management, DFS,

Jesús Gómez Lera - President of APROCTA

13:20 “New Step in Safety Management within DFS” - SMS 2.0

Osman SAAFAN - Director Safety - DFS

13:50 “Do brokers and ATCs/Pilots have something in common when making decisions? - Thoughts and experiences of Loss Aversion in ATM”

Alejandro Mena - Head of Regional Safety Department- Barcelona ACC - ENAIRE

“ATCO Resilience: Best Practices from Barcelona ACC”

Guadalupe Cortés Obrero - Aprocta Human Factors Specialist

14:30 Coffee Break

15:00 “Perceiving what cannot be seen - the practical side of Safety-II”

Prof. Erik Hollnagel & Maria Lundahl - Acting Head of Safety - LfV

Work management - and in particular safety management - requires that we have a good understanding of how work is actually done, of normal work. This understanding cannot be derived from the analysis of infrequent but noticeable events. It must instead look at the seemingly trivial, everyday activities that normally go unnoticed. Although this is not technically difficult to do, it does require a revision of the dominating mindset. The presentation will show how this can be done in practice.

16:00 Moderation Panel - The difference between theory and practice is larger in practice than in theory

Moderators:

Steven Shorrock and Tony Licu - Q&A and Discussion

17:00 End of day 1/ Welcome Drink sponsored by ENAIRE & APROCTA





AGENDA

6 October - HOTEL REY DON JAIME Casteldefells

08:55 **Summarize day 1 & Introduction to day 2**
EUROCONTROL

09:00 **“How Complexity Overwhelms Rules: Building Graceful Extensibility to Manage Surprises”**
Prof. David Woods

Graceful extensibility is a form of resilience that asks - how do systems stretch to handle surprises? - Systems with finite resources in changing environments are always experiencing and stretching to accommodate events that challenge boundaries. Systems with high graceful extensibility have capabilities to anticipate bottlenecks ahead, to learn about the changing shape of challenge events, and possess the readiness-to-respond to handle challenges at the appropriate tempo - they are able to anticipate and prepare for crunches ahead. Systems with low graceful extensibility rely just on following plans and rules when surprises occur. As a result, decisions and interventions often are too slow and stale as disturbances grow and cascade following surprises in complex systems.

How do air navigation services currently generate graceful extensibility? What forms of graceful extensibility will be needed in the future given the technological and organizational changes that are underway? How can deploying increasingly autonomous services improve productivity yet undermine graceful extensibility when new kinds of surprises occur? An example of how an aviation organization prepares to handle the crunches created by extreme weather events will be used.

10:00 **“Commercial Operations in Airspace E – Threats, Challenges and Limitations”**
Cpt Andrew J. Elbert - Regional Base Captain - Ryanair

10:30 **“System Safety from an Airline Perspective”**
Sian Evans, Cpt Jim Pegram and Cpt Rob Legg - Easy Jet

How ANSPs and Airlines can learn from each other from operational experience, including safety culture, then, how SMSs can interact.

11:00 **Coffee Break**

11:30 **Moderation Panel - Complex Adaptive Systems**
Moderator:

Christoph Peters - Air Traffic Controller Senior Expert Safety Management - DFS
Q&A and Discussion





12:30 Lunch

**14:00 "You gotta know when to hold 'em, know when to fold 'em.
A Country- Western view of ATC operational decision making."**

Prof. Richard Cook

ATC automation is expected to extend margins for safe operation in the 21st century, shifting the role of humans from active ("in-the-loop") to supervisory ("out-of-loop") control. Not all such technology shifts have been smooth. The role of humans as supervisors can be more demanding than expected, especially if the human is expected to recognize and intervene in specific situations. Supervision can require new skills, for example predicting how the automation will behave in order to forestall foreseeable bottlenecks. Rather than eliminating the need for decision making, next gen systems are likely require operators to become even better at "readin' people's [i.e. the system's] faces".

15:00 Coffee Break

15:30 Moderation Panel - Going Solid

Moderator:

Joerg Leonhardt - SHP-SG co-chairs, Head of HF in Safety Management - DFS

Q&A and Discussion

16:30 End of day 2

19:00 Dinner on own expenses





AGENDA

7 October - HOTEL REY DON JAIME Casteldefells

08:55 **Summarize day 2 & Introduction to day 23**

EUROCONTROL

09:00 **“Lessons from WebOps - Automation As Water (not a drop to drink)”**

John Allspaw - ETSY

Software operations in modern Internet-connected services make for an interesting environment in that the users of software are very frequently also the designers of the software. This affords some advantages: fast feedback in new designs, a fine-grained control on when/how changes are made to the software, and the ability to introspect deeply what the code is doing while you're using it. At the same time, these “pros” can easily morph into “cons” when it comes to human factors concepts such as data overload/under-load and decision-making. One of the ways we explore how these pros/cons manifest in normal work is through a process and perspective we call blameless post-mortems. This talk will provide some insight into the Internet software domain and in the process, we will see what connections we can make to ATM.

10:00 **“Automation in ATM Systems - ANSPs experience”**

Andre Perott - Automation Design - DFS

Automation is considered as a critical success factor for enhanced safety and capacity. On the contrary, current literature describes several phenomenon that may even increase the workload if automation is not designed well. However the same literature remain short on details how to exactly design automated systems. To face the new challenges that arise from automation DFS developed a mid-term automation strategy for system design. This presentation will introduce the basic approach and discusses next steps for a practical and future oriented automation design.

10:30 **“The Practicalities of Advanced Controller Assistance Tools”**

Lisa Aldridge - UK NATS

Air traffic management is complex and unpredictable. Humans have a limited capacity, are easily misled by big data, and are bad at monitoring highly reliable systems. It is not practical to test every line of code, against every possible scenario, so we have to assume that technology will fail at some point. So how are we going to increase safety, capacity and resilience whilst keeping humans accountable? This presentation sets out NATS' current thinking on the practical implementation of advanced controller assistance tools illustrated through principles, successes and ongoing challenges.





11:00 Coffee Break

11:30 "Spanish ATC Safety Local Practices"

Fernando Marian - Head of the Technical and Safety Department of Aprocta

"Work as imagine" and "Work as done", local implementation of the concept of Prof. Erik Hollnagel.

11:45 "Automation in the Cockpit"

Prof. Don Harris - *Zooming out and zooming in: Synthesising and analysing human-machine interaction in the cockpit*

In the last few years 'design induced error' has been a major concern for the airworthiness authorities. From the analysis of accidents occurring to modern, highly-automated airliners it has been observed that pilots can sometimes fall into a hole left for them as a result of poor human-interface design at the micro-level of the interface. As a result, new airworthiness rules have been developed for the certification of flight deck interfaces to help mitigate against such 'design induced error'. However, this requires a deterministic approach to human activity, a perspective currently less fashionable in the Safety-Human Factors community. This presentation therefore provides a view from an equipment design viewpoint. Through formal analysis designers try to predict and analyse human activity and hence design equipment and procedures accordingly. This presentation looks at the lessons that can be learned from the flight deck design community with regard to 'design induced error' and argues reductionist, deterministic approaches to the prediction and analysis of human activity, and more holistic systems methods, are both required. This micro-macro perspective shift is vital for safety, and resilience.

12:30 Moderation Panel

Moderator: Steven Shorrock - Q&A and Discussion

13:30 Summary and Outlook

Facilitators: Tony Licu & Jörg Leonhardt

13:45 Lunch





ADDITIONAL INFORMATION

CONTACT

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

Mr. Tony Licu

Head of NMD/NOM Safety Unit,

Tel: +32 2 729 34 80

antonio.licu@eurocontrol.int

Dr Frederic Lieutaud

NMD/NOM Safety Unit, ES² Leader,

Tel: +32 2 729 31 55

frederic.lieutaud@eurocontrol.int

Mrs Chantal Mouzelard

Secretary of the NMD/NOM SAF unit,

Tel: +32 2 729 37 25

chantal.mouzelard@eurocontrol.int



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