Tutorial on ATM & Automation

“HALA! : Achievements"
Summary

HALA! Activity in ATM Automation

Involvement of ATM Community

HALA! Addressing SESAR Vision 2020 and beyond

Research Progress

- Trajectory prediction
- Human Factors
- System resilience
- Separation assurance

What next?
HALA! Activity in ATM Automation

HALA!
- Exploring new ideas, concepts, technologies
- Promoting long-term research

Activities
- Research projects (WP-E)
- Funding PhD studies in ATM & Automation (PhD Calls)

15 Research Projects WP-E
13 PhDs Studies funded. A third call (1 PhD)
HALA! Activity in ATM Automation

- On average 25% of WP-E long term research is focused on Automation & ATM
Participation in HALA!

• HALA! is composed of 20 members
• HALA! has brought together the principal European...

– Research Institutes
– Academia/Universities
– Industry
– Individuals

Interested in long term research in Automation in ATM
Participation in HALA!

**Universities**
- UPM
- Imperial College
- KTH
- TU Braunschweig
- TU Dresden
- IRIT
- Delf University of Technology

**Universities (II)**
- TU Darmstadt
- University of Rome 3
- UPC
- U Kassel
- Istanbul TU

**Aeronautical Companies**
- Boeing BR&TE
- EADS
- GMV SKY
- Pildo Labs

**Research Centres**
- CRIDA
- Deep Blue
- NLR
Participation in HALA!

• ..... and has created a Network on Automation R&D among the ATM Community
HALA! Addresses SESAR Vision 2020 and beyond

HALA! tries to provide solution to different SESAR Vision 2020 subjects, principally to issues related to HF and improvement of ATM Performances
How HALA!'s Projects demonstrate the paradigm shift in ATM automation

- Shift from Airspace-Based Operation towards trajectory-based operation: 28%
- Shift from a controller-based system towards a more distributed system: 22%
- Shift from tactical management towards a more proactive system: 33%
- Others: 17%

HALA! Addresses SESAR Vision 2020 and beyond
4D Trajectory

- Development of predictive TP uncertainty models
- Identification of uncertainties associated to TP ahead of time
- Development of CR/CD models

- TESA
- UTOPIA
- ProGA
- PHD Application of the theory of formal languages to the modelling of trajectory uncertainty
- PHD: a framework to assess the ability of automation to deliver capacity targets in European airspace
Human in the loop in ATM system. Human continues to be participant but as manager

Maintenance of situational awareness

Motivation and trust are an important factors

- MUFASA
- ADHAR
- C-SHARE
- SPAD

- PhD: supporting function allocation in H/A

- PHD: a multi model based approach for the analysis and modelling of usable and resilient partly autonomous interactive systems

- PhD: User interface design for highly automated systems
Achievement on exploring the resilience of the system

- Designing resilience and reliable systems
- Definition of recovery paths
- Avoidance of propagation of disturbances and degradation

- SPAD
- PHD: a multi model based approach for the analysis and modelling of usable and resilient partly autonomous interactive systems
Progress on separation assurance

- Development of obstacle tracking models
- Improvements on information acquisition and analysis process
- Development of CR/CD models

- TESA
- PhD: Exploring innovation sensor data fusion strategies for sense and avoid units to be installed onboard Unmanned Aerial Systems
- PhD: AUTOFLY-Aid
Experiments, tools and models

- **Trajectory Prediction tools**
- **Gaming to validate human role in ATM Simulations/demonstrators**
- **Decision Support Tools**
  - CD/CR Tools

- MUFASA
- ADHAR
- TESA
- C-SHARE
- UTOPIA
- ZeFMap

- PhD: Exploring innovation sensor data fusion strategies for sense and avoid units to be installed onboard Unmanned Aerial Systems
What next?

Further areas or research

- The adequateness and correctness of the human role in the control system
- Responsive and adaptative automation
- Resilience and control system degradation
- Change management
- RPAS integration in ATM


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See you at

4th SESAR Innovation Days

27th - 29th November 2014
hosted by Universidad Politécnica de Madrid, Spain

HALA! SESAR
Research Network
Summer School

INTEGRATION OF REMOTELY PILOTED AERIAL SYSTEMS IN ATM OPERATIONS

14th-17th July 2014
La Granja (near Madrid)

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