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Mitigating Negative Impacts of Monitoring high levels of Automation: the MINIMA project

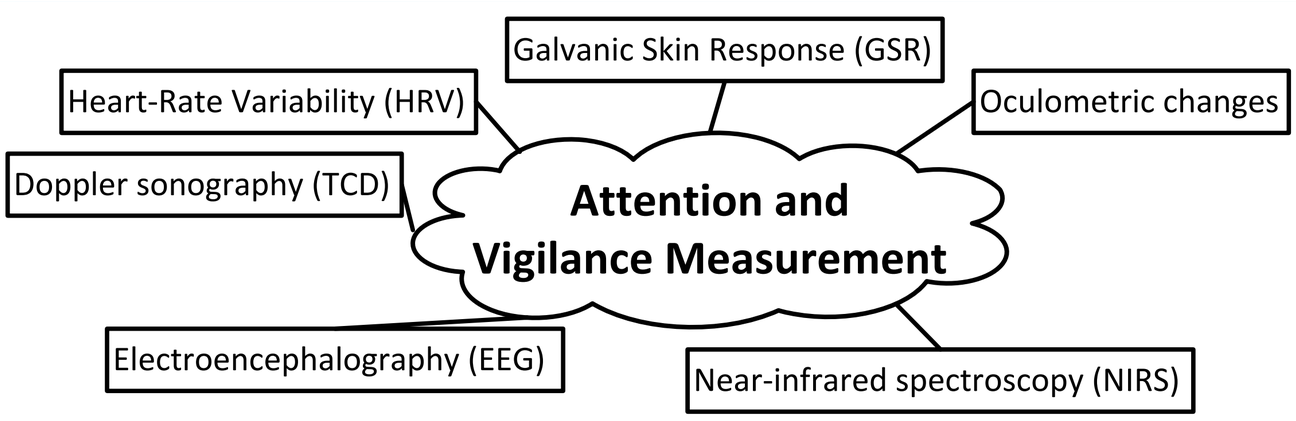
Oliver Ohneiser[1], Andreas Hasselberg[1], Bruno Berberian[2], Francesca De Crescenzio[3], Fabio Babiloni[4], Tobias Schmeier[5]

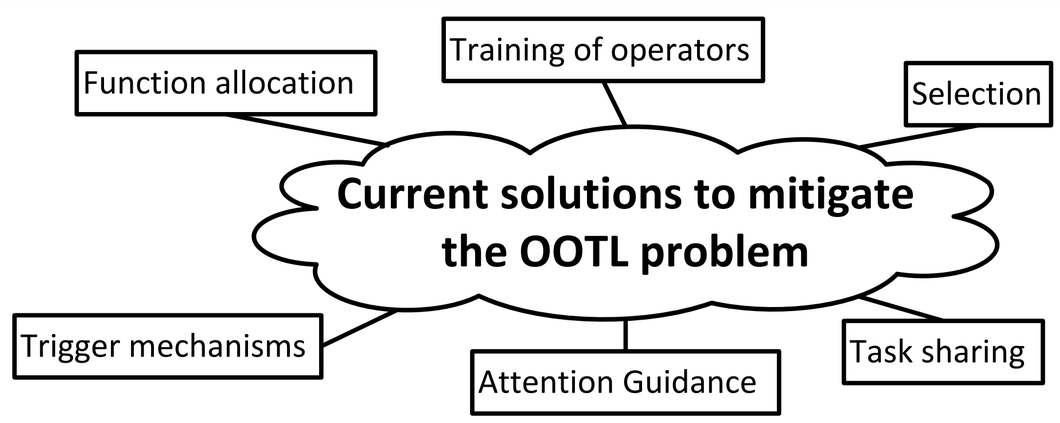
[1]German Aerospace Center (DLR), Institute of Flight Guidance, Braunschweig, Germany, contact: Oliver.Ohneiser@DLR.de
[2]Office national d'études et de recherches aérospatiales (ONERA), Salon-de-Provence, France
[3]University of Bologna, DIN, Department of Industrial Engineering, Forlì, Italy
[4]BrainSigns srl, Roma, Italy
[5]Technical University of Applied Sciences Wildau, Wildau, Germany

Introduction and Objectives of MINIMA

- Trend: Higher levels of automation in air traffic control
- Problem: Out-Of-The-Loop (OOTL) phenomenon
- Solution: Dynamic Vigilance and Attention Controller
- Example: Task Environment with Terminal Manoeuvring Area
- Method: Adaptive/Additional Task and Support Activation
- Objective: Minimize OOTL problems

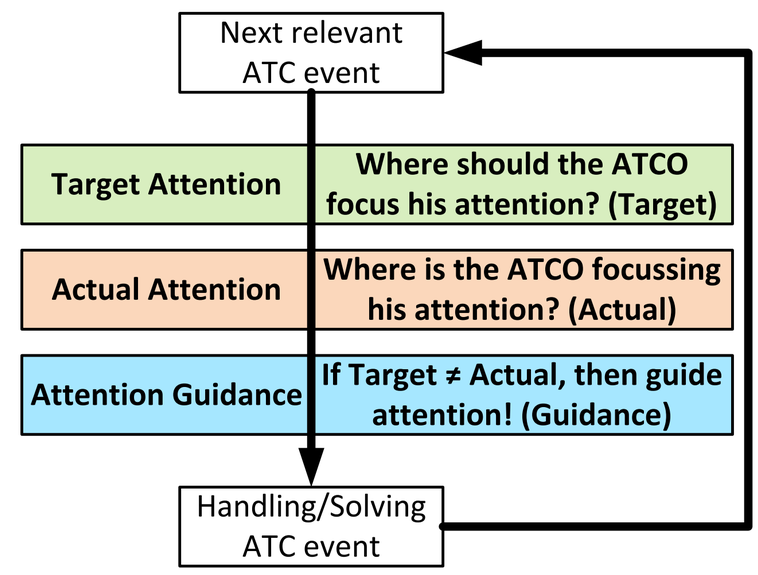
Related Concepts

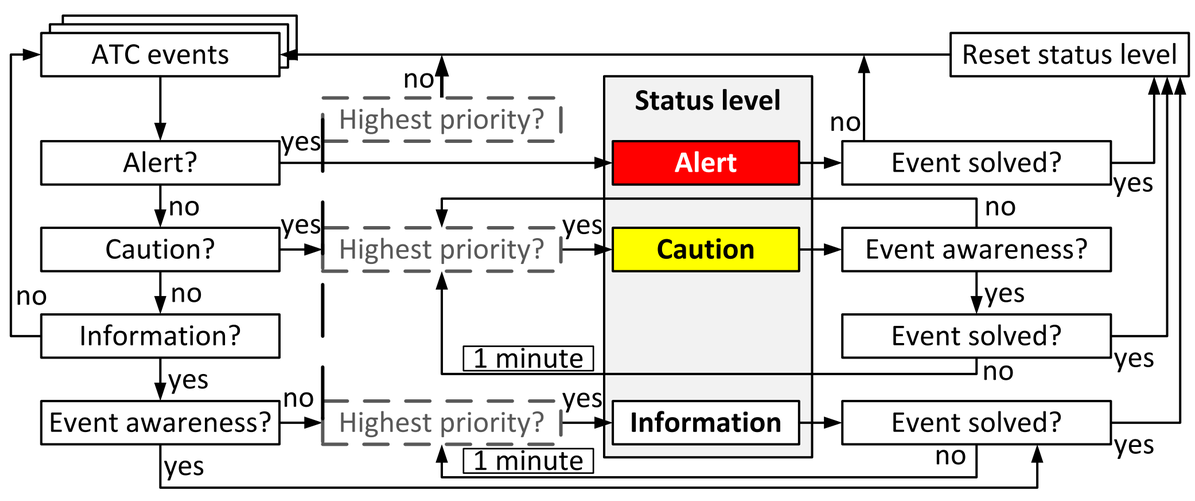


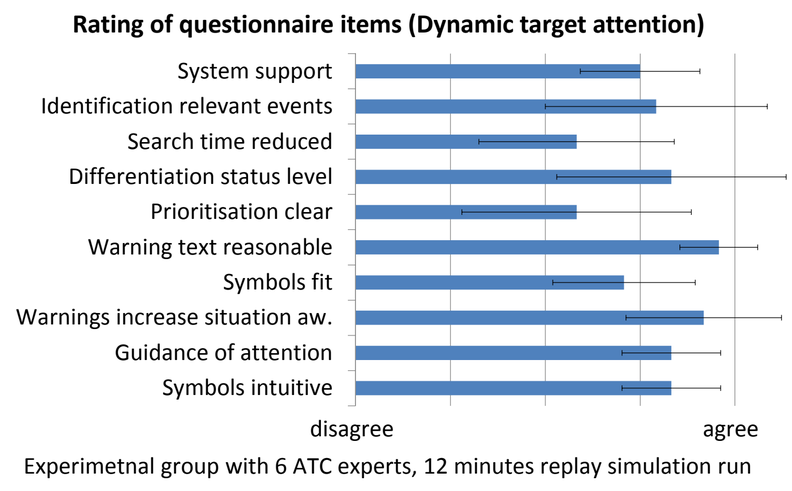


Preliminary Study regarding Controller Attention

Air Traffic Control Event (Excerpt)	Status Level	Import.	Urgency	Score
Minimum Separation Violation (Appr. angle 90°/180°)	Alert	10,0	10,0	10,0
Vertical deviation from glide slope (ILS)	Alert	10,0	9,5	9,8
Danger of restricted area entry (<2 minutes)	Alert	9,5	9,5	9,5
Minimum Separation Violation (Appr. angle 0°)	Alert	10,0	9,0	9,5
Emergency (transponder code 7700)	Alert	9,0	9,0	9,0
Flight route (cleared flight level) left (vertical)	Caution	9,0	8,0	8,5
Flight route (cleared route) left (lateral)	Caution	9,0	7,5	8,3
Lateral deviation from glide slope (ILS)	Caution	9,0	7,0	8,0
Upcoming conflict (3 minutes)	Caution	8,0	7,0	7,5
Initiate descent/climb	Information	6,5	5,0	5,8
Reaching top of descent	Information	5,0	5,5	5,3
Handover to next sector	Information	5,0	3,5	4,3
Initiate turn to base	Information	3,0	2,0	2,5







Summary and Outlook

- Done: Dynamic target attention of controllers, attention guidance, state-of-the-art literature research
- Next: Concept with Task Environment for Approach, **Building physiometrics based Vigilance and Attention Controller**, Adaptive Task Manager, Human-in-the-Loop Evaluation, Human Factors guidelines for monitoring high levels of automation

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