

THALES


TopSky
ATC

Application of New Technologies in ATC HMI Design

24th ICAO CNS Subgroup Meeting

www.thalesgroup.com





GEOFF
BATES

Radio/radar technician

TMA (Tower/Approach
Controller)

Operational Authority

NEW TECHNOLOGIES

supporting our HMI 2025 research

Voice
Recognition

Eye Tracking

Touch
Screens

Data Mining

VOICE RECOGNITION

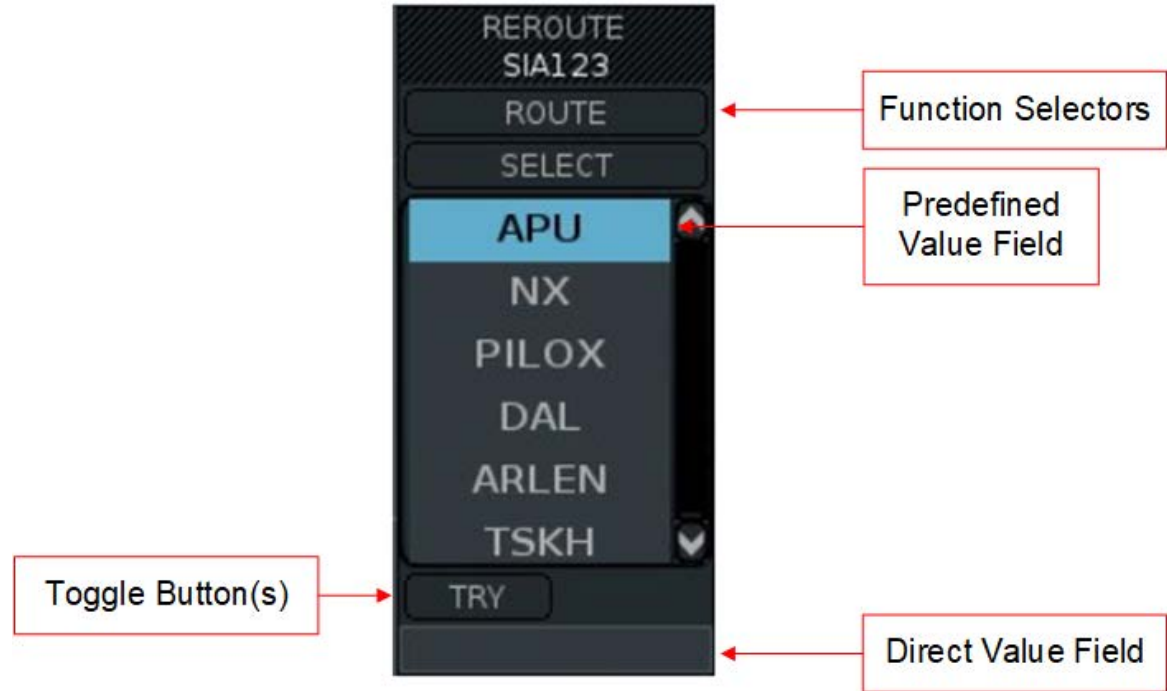
Supporting workflow and repetitive tasks

How can a controller's tasks be automated?



Voice Recognition : Automation

- Capturing clearances and instructions
- Managing repetitive tasks
- Assisting workflow



VOICE RECOGNITION

Supporting workflow and repetitive tasks

How can a controller's tasks be automated?

How can a complex HMI be simplified?

Voice Recognition : Simplification

- Learning from voice assistants such as Siri and Alexa
- Capitalising on concepts such as routines
- Helping filter data



VOICE RECOGNITION

Supporting workflow and repetitive tasks

How can a controller's tasks be automated?

How can a complex HMI be simplified?



Where can eye tracking provide a benefit to system users?

EYE TRACKING

Predicting Controller Needs

Eye Tracking : Benefits

- Using the gaze position
- Data output
- Data input
- Number of physical interactions





Where can eye tracking provide a benefit to system users?

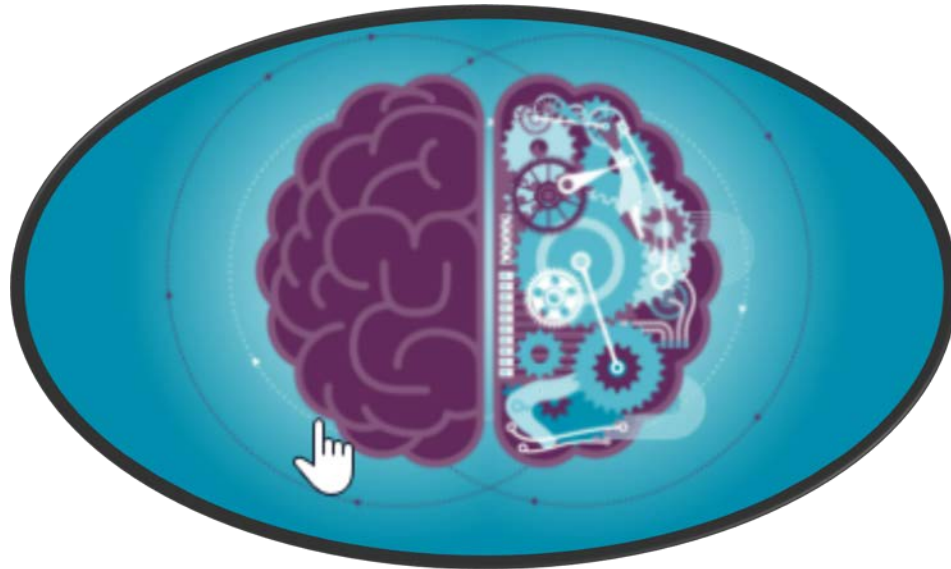
What interactions can be supported?

EYE TRACKING

Predicting Controller Needs

Eye Tracking : Interactions

Eye data can supplement AI and Machine Learning





Where can eye tracking provide a benefit to system users?

What interactions can be supported?

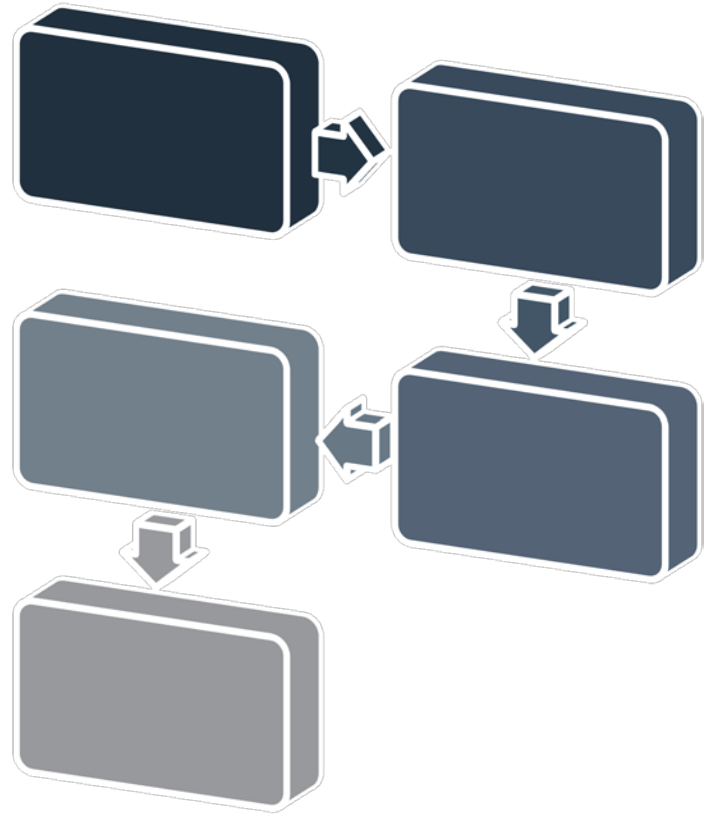
How can we automate the controller's workflow?

EYE TRACKING

Predicting Controller Needs

Eye Tracking : Workflow

■ Pre-empting possible/likely actions





Where can eye tracking provide a benefit to system users?

What interactions can be supported?

How can we automate the controller's workflow?

How can we improve system safety?

EYE TRACKING

Predicting Controller Needs

Eye Tracking : Safety

- Identification of dead-spots
- Dwell periods
- Scan analysis
- Alert recognition





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EYE TRACKING

Predicting Controller Needs



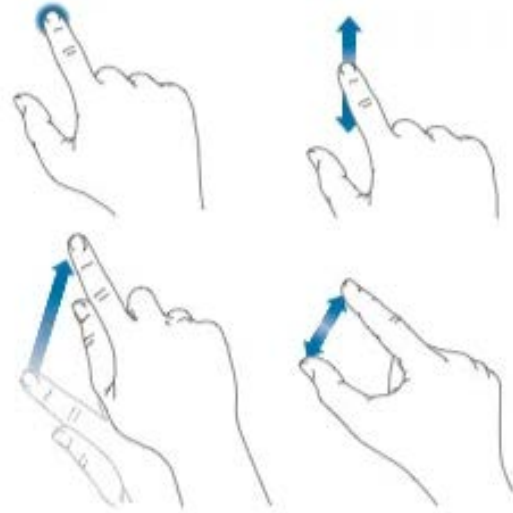
TOUCH SCREENS

Not just a Keyboard/Mouse replacement

Can the concepts of personal touch-devices be applied in an ATC context?

Touch Screens : Device “Muscle Memory”

- Overfamiliarity issues
- Complexity of ATC requirements





TOUCH SCREENS

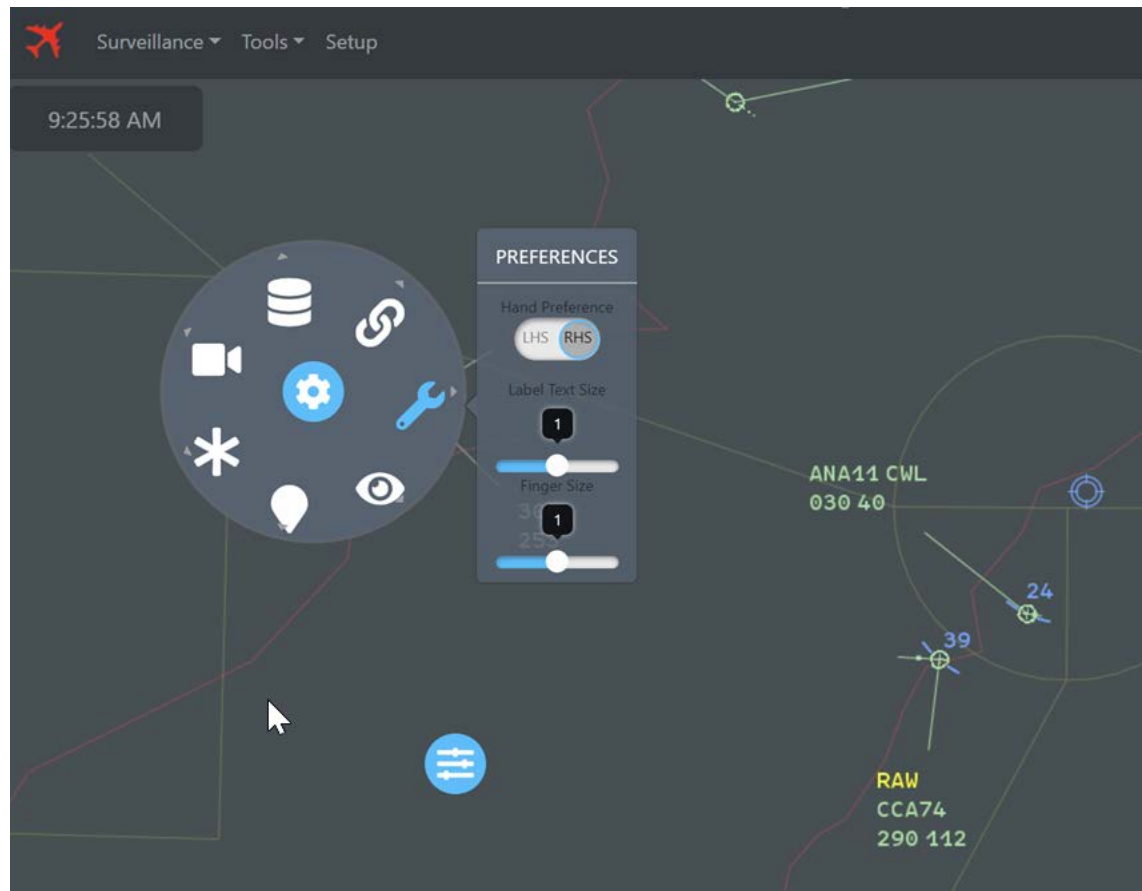
Not just a Keyboard/Mouse replacement

Can the concepts of personal touch-devices be applied in an ATC context?

How do we prepare for the “next generation” of controllers?

Touch Screens : Overcoming Ubiquitousness

How to provide consistent meaning





TOUCH SCREENS

Not just a Keyboard/Mouse replacement

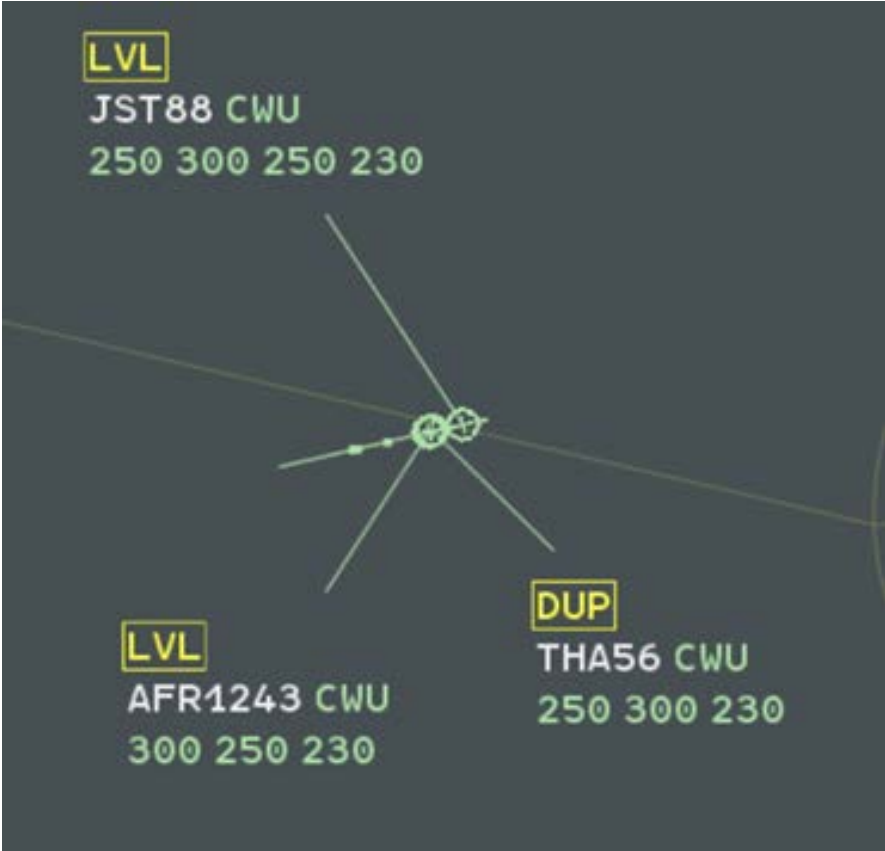
Can the concepts of personal touch-devices be applied in an ATC context?

How do we prepare for the "next generation" of controllers?

What are the problems of touch interfaces?

Touch Screens : Limitations

Obscuring data





TOUCH SCREENS

Not just a Keyboard/Mouse replacement

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How do we prepare for the "next generation" of controllers?

What are the problems of touch interfaces?

How can we focus a controller's attention?

Touch Screens : Hands-Off

- No longer a “physical connection”
- Issues with focus in a multiscreen environment



TOUCH SCREENS

Not just a Keyboard/Mouse replacement

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DATA MINING

How important is data gathering becoming?

Understanding controller interactions



Data Mining : Unlocking Hidden Habits

Very slow change in how ATC is managed

Due to low visibility of the controller's actions



DATA MINING

Understanding controller interactions

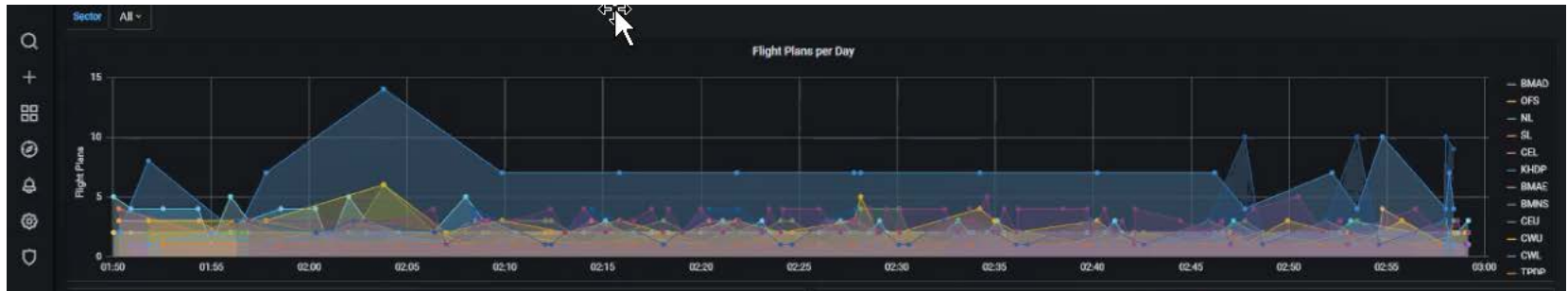
How important is data gathering becoming?

How can data analysis add value to an ANSP?



Data Mining : Meeting KPIs

Correlation between actions and flows



THALES

Thank you for your attention

Keep in touch

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