Human Performance Considerations for Digital Towers

Neil May
Head Human Performance

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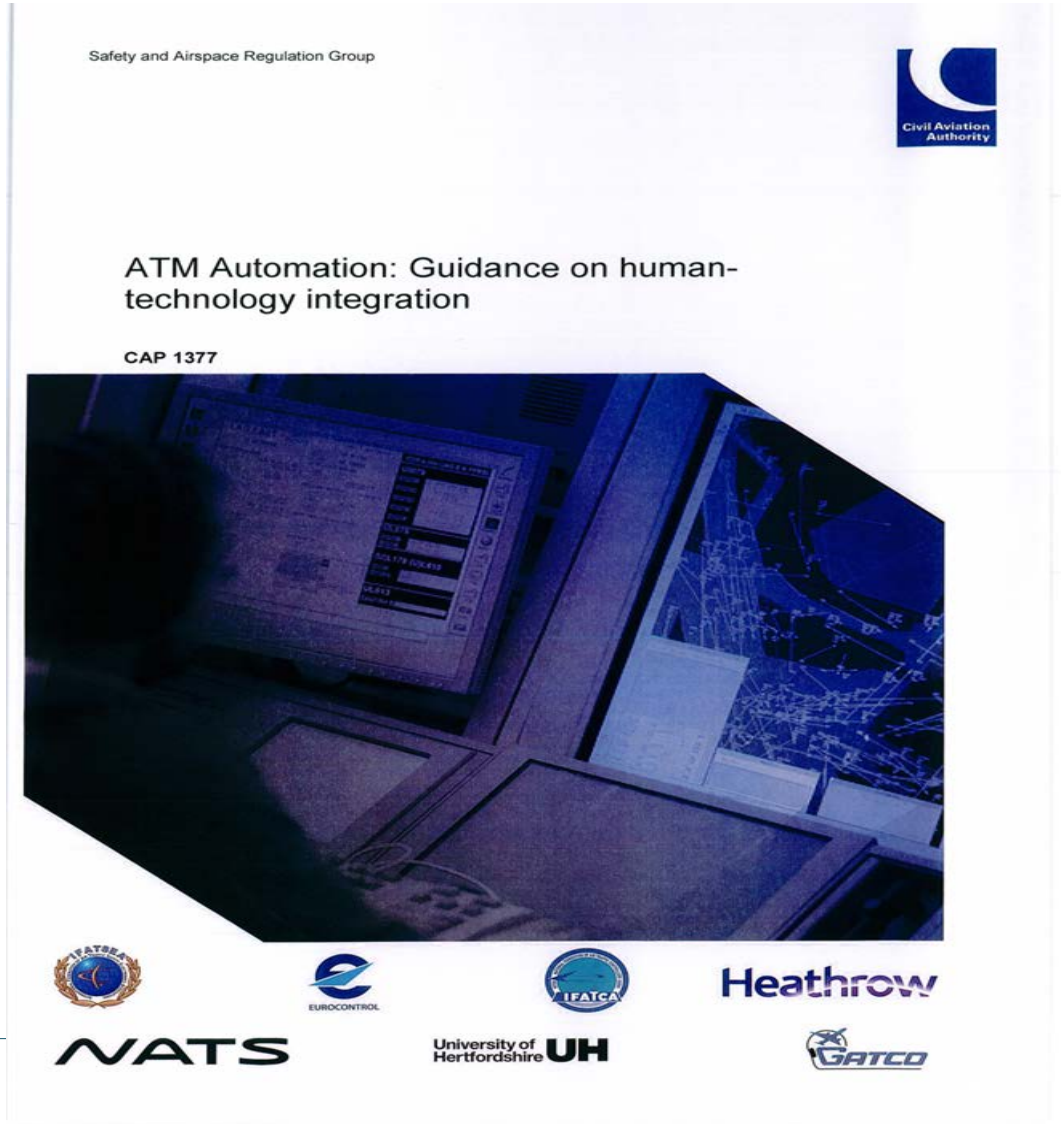
But first … some observations about automation in ATM

UK CAA Document CAP 1377

A great introduction to the issues associated with the implementation of automation in Air Traffic Management



Automation Themes

Business Case

Human Centred Design

Safety Obligations

Systems Integration

Training

Continuity of Service

Transition

Emergent Behaviours

General Observations about Automation in ATM

- The controller is in control, it is they who hold the Air Traffic Control licence.
- Automation in Air Traffic Control is not new. There is already lots of automation being used e.g. radar, electronic flight progress strips, short term conflict alert, code callsign conversion, datalink etc.
- Automation does not make decisions. It provides information that assists the controller in doing their job safely, effectively and efficiently.
- Automation can be thought of as being “assistive technology” or an “electronic team member” that supports the controller.

General Observations about Automation in ATM

- People create safety. They must be in conscious control of the safety critical decisions.
- People use their experience, knowledge, training and intuition to detect cues and subtle changes, to diagnose problems, to adapt, and to create innovative ways to solve problems.
- Automation can quickly and consistently process large quantities of data but can cause the system to become “brittle” when faced with novel situations.
- Automation must service the needs of the controller, not the other way around.

Benefits of Automation in ATM

- The benefits of Automation in ATM are many and include:
  - Increased safety.
  - Increased consistency and reliability of service.
  - Increased interconnectivity between sectors, units, service providers, controllers / pilots.
  - Increased resilience of operation.
  - Reduced environmental impact.
  - Reduced cost – maybe!

Watch-outs for Automation

- There are a number of potential pitfalls associated with automation that need careful consideration to ensure that it is implemented and used safely:
  - System Considerations.
  - The Role of the Controller.
  - Design.
  - Training.
  - Trust / Complacency.
  - Safety Accountability / Safety Assurance.
  - Degradation / Fallbacks / Contingency.

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London City Airport to S

https://www.google.com/maps/dir/London+City+Airport+(LCY),+Hartmann+Rd,+Royal+Docks,+London+E16+2PX/Swanwick,+Southampton/@51.2005233,-1

London City Airport

Swanwick, Southampton SO31 1BJ

Add destination

Leave now

OPTIONS

Send directions to your phone

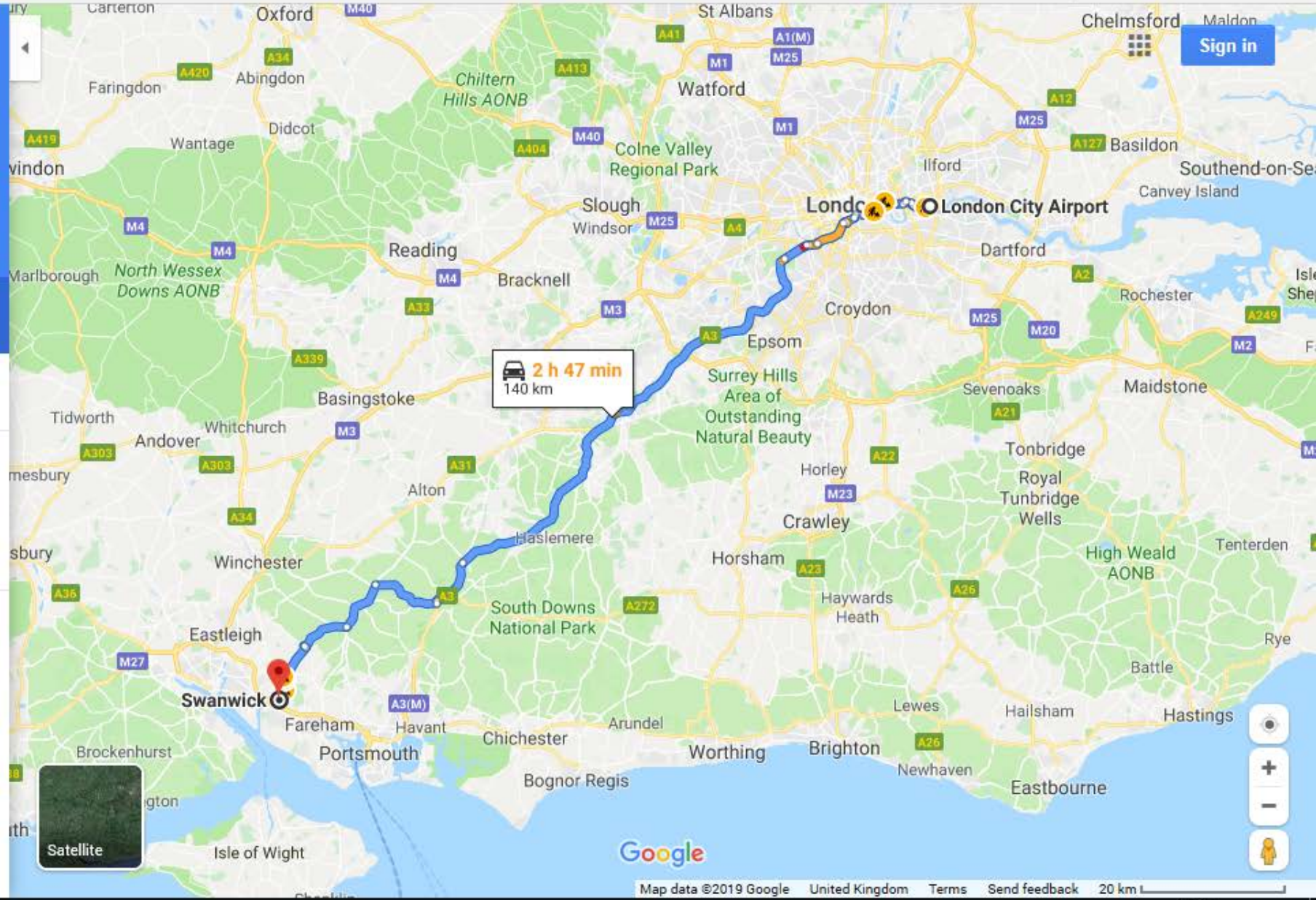
via A3 — 2 h 47 min

Some traffic, as usual — 140 km

DETAILS

Explore Swanwick

Restaurants Hotels Gas stations Parking Lots More



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There are 3 elements to how we help people to do their jobs

- How well the person is supported by the things they use to do their job (technology, equipment, airspace, procedures etc.)

Provide the right TOOLS

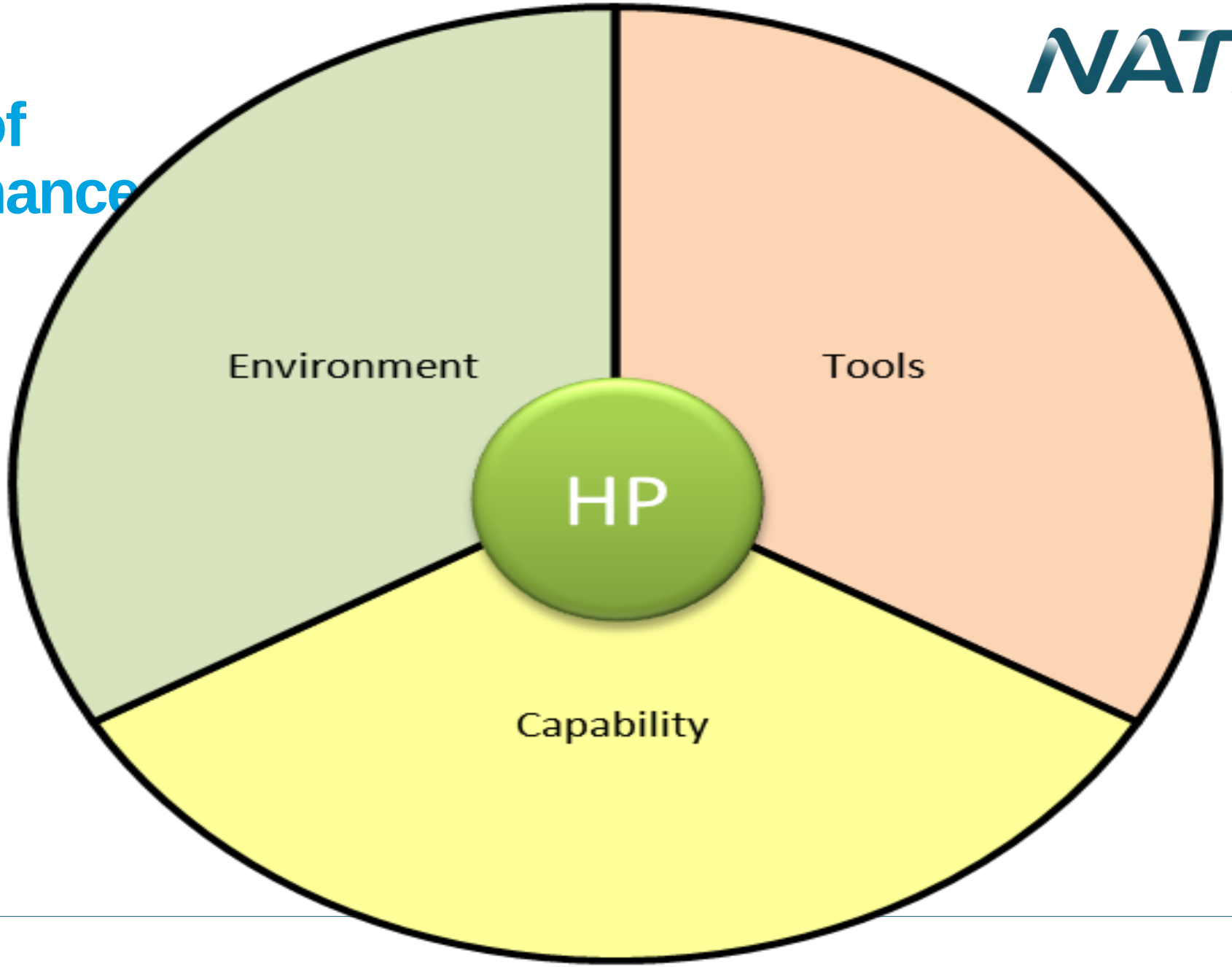
- How well the person is prepared for the task (selection, training, confidence, competence etc.)

Provide the right CAPABILITY

- How well the person is supported by the organisation (culture, well-being, fatigue risk management etc.)

Provide the right ENVIRONMENT

All 3 elements of Human Performance have to work together



CANSO Human Performance Management Standard of Excellence

ATM Equipment and Tools

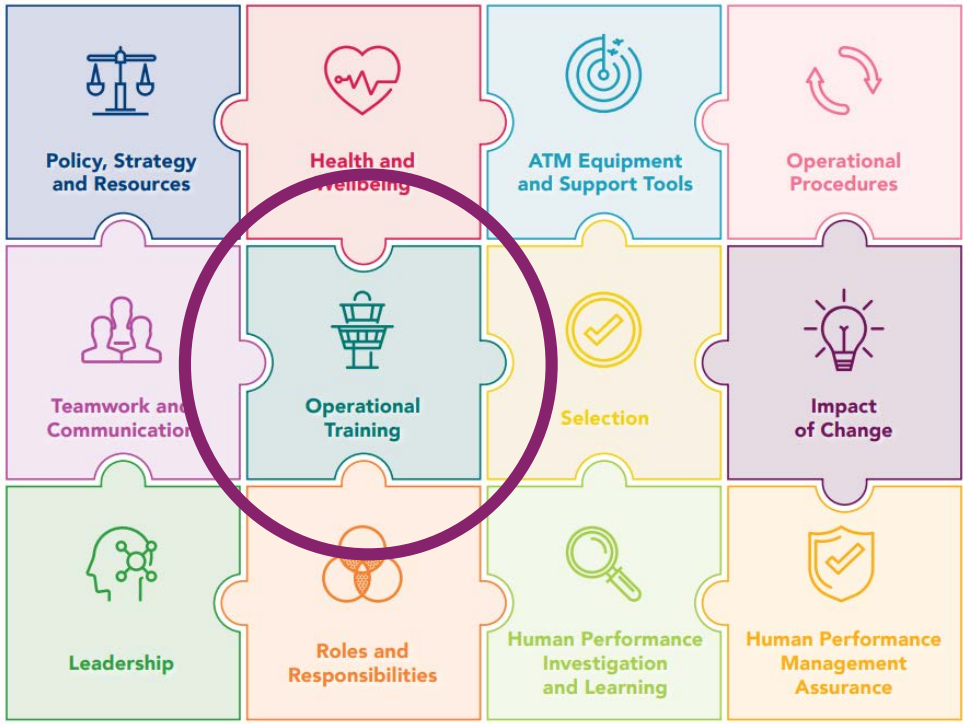
- Control room, display
- Zoom facility and additional information e.g. labelling, hatching etc
- Trust
- Degradations / failure

Operational Procedures

- Procedures associated with the new technology and method of operation

Operational Training

- How to use the new technology
- How to control using the new technology
- Visual, audio and other cues
- Understanding how perception changes e.g. view / height, 2D vs 3D, 360 degrees vs 270 degrees

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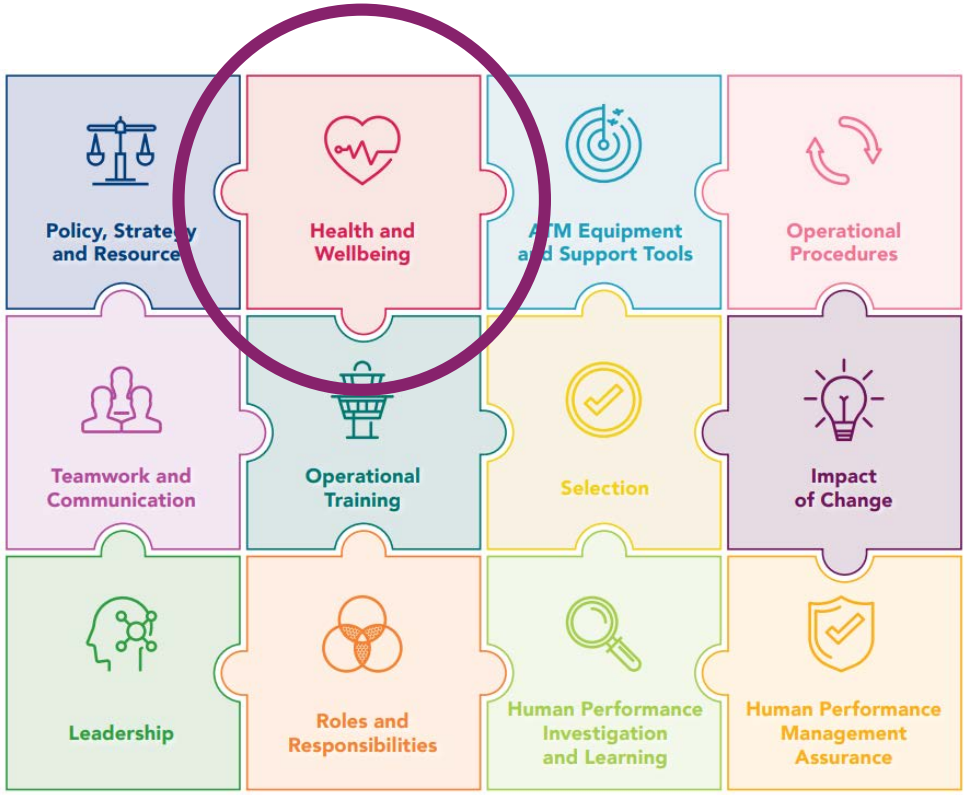
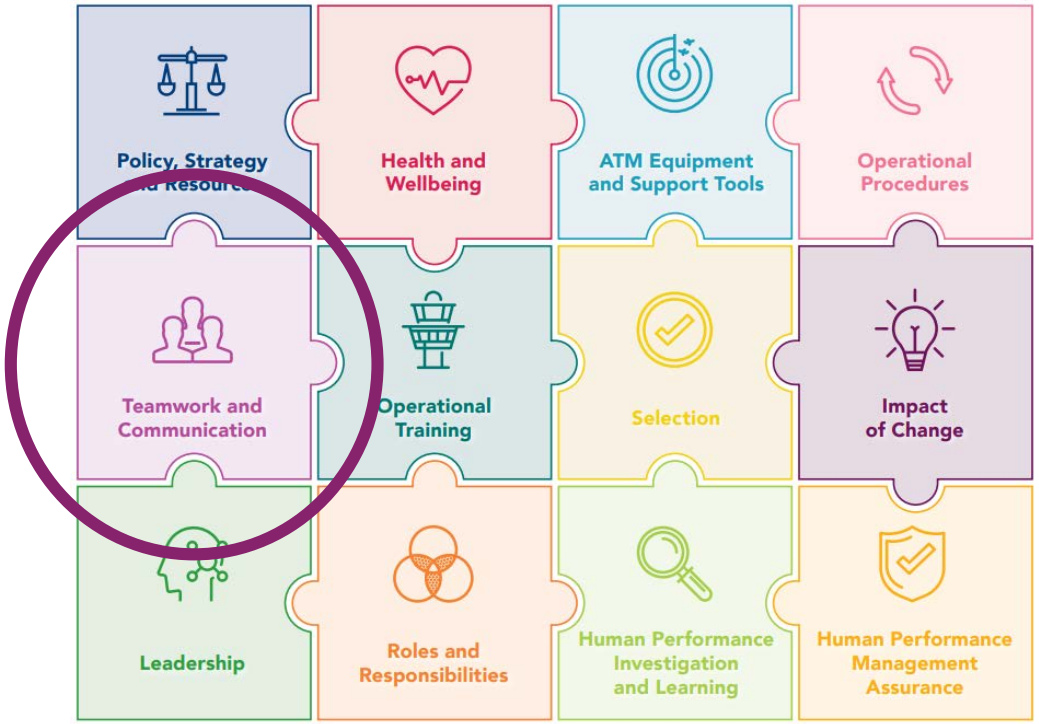
Health and Wellbeing

- Stress associated with move of location, family etc
- Effects of blue light technology
- Digital eye strain and fatigue

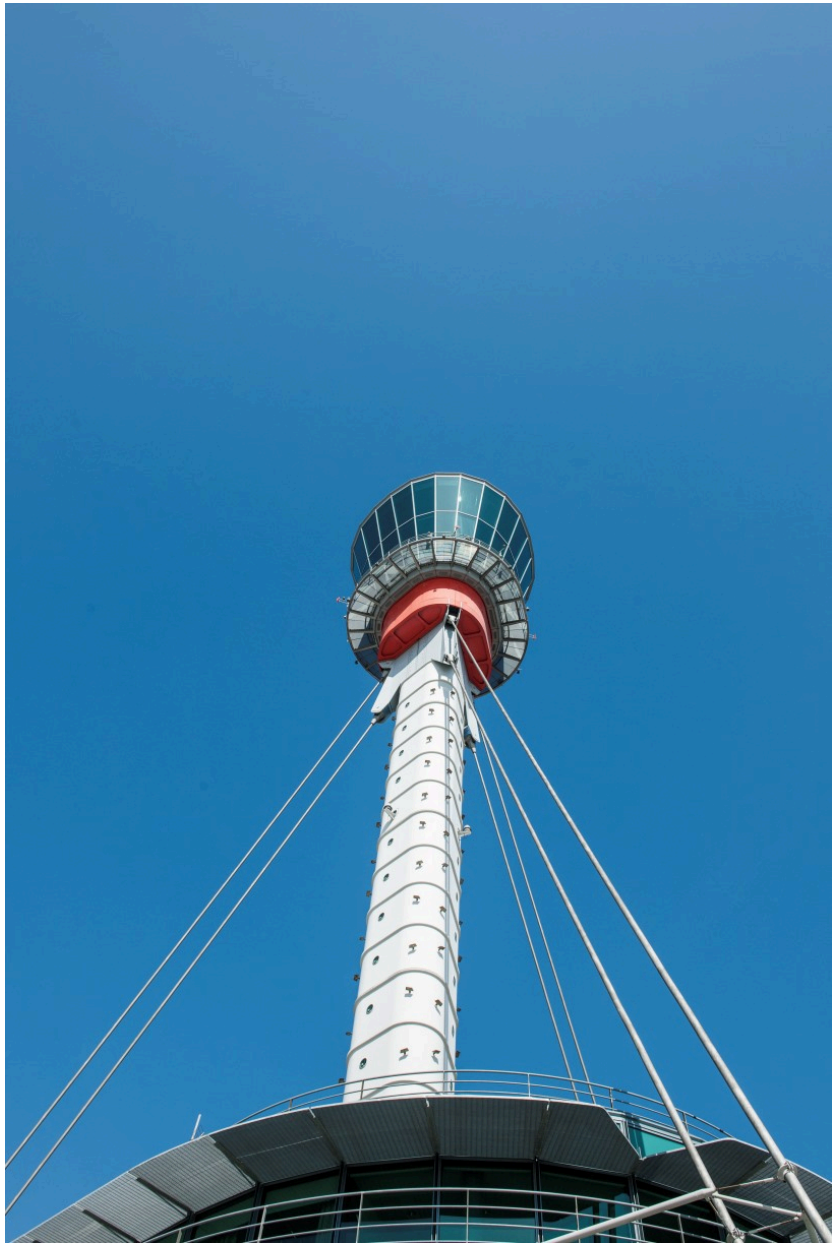


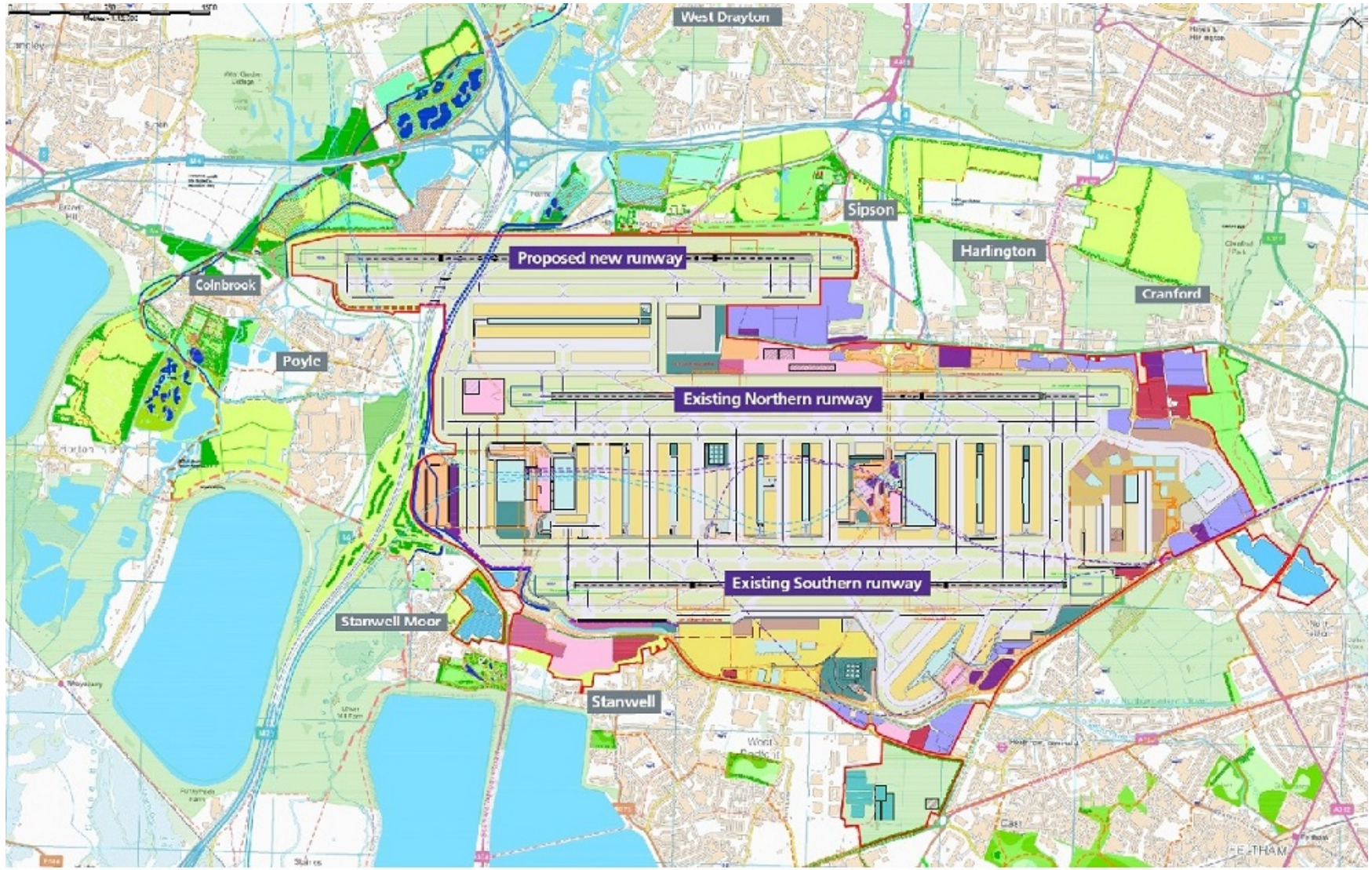
Teamwork and Communication

- Thinking of technology as an “electronic team member”



All Elements have to be Considered




West Drayton
Sipson
Harlington
Cranford
Proposed new runway
Colnbrook
Poyle
Existing Northern runway
Existing Southern runway
Stanwell Moor
Stanwell

What’s next for Digital Towers?

https://vimeo.com/310794956

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