NATS

Performance through Innovation

The Practicalities of Advanced Controller Assistance Tools

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Automation Themes

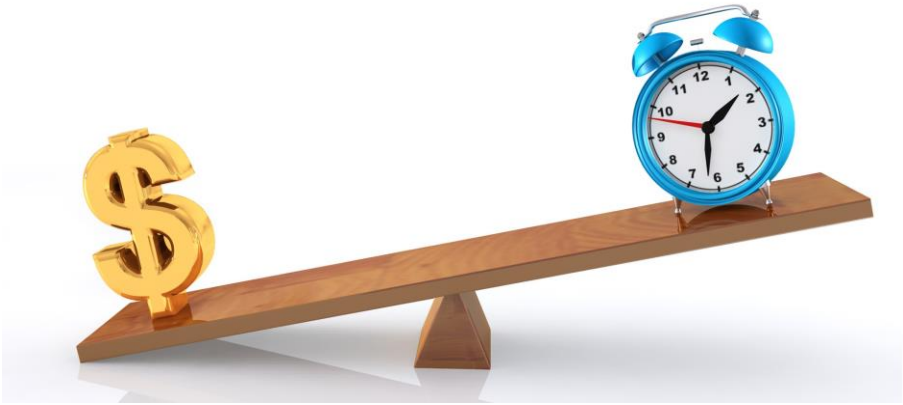
1. Scope
2. Human
3. Obligation
4. Integration
5. Training
6. Resilience
7. Transition
8. Emergence

1. Scope

Understand the current operation and identify the real need for automation.

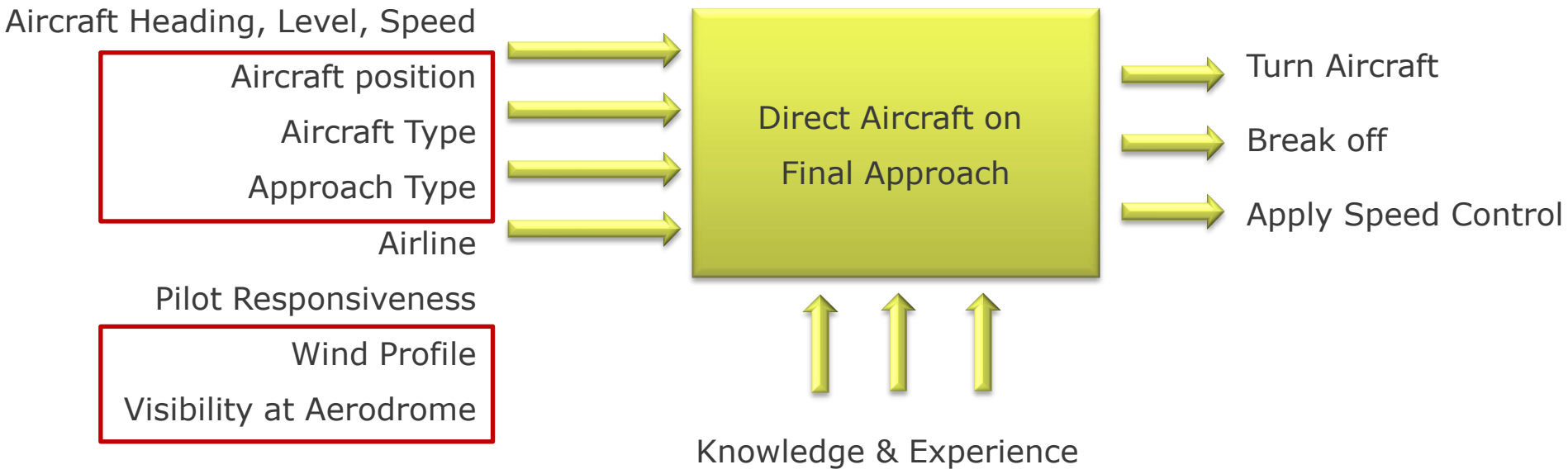
Scope

Clearly identify and articulate the need, aims, and aspired benefits of the automation on the system as a whole.



Scope

Identify the complexities of the operating environment, and the strengths and weaknesses of the current ATM system (people, processes, technology).



Scope

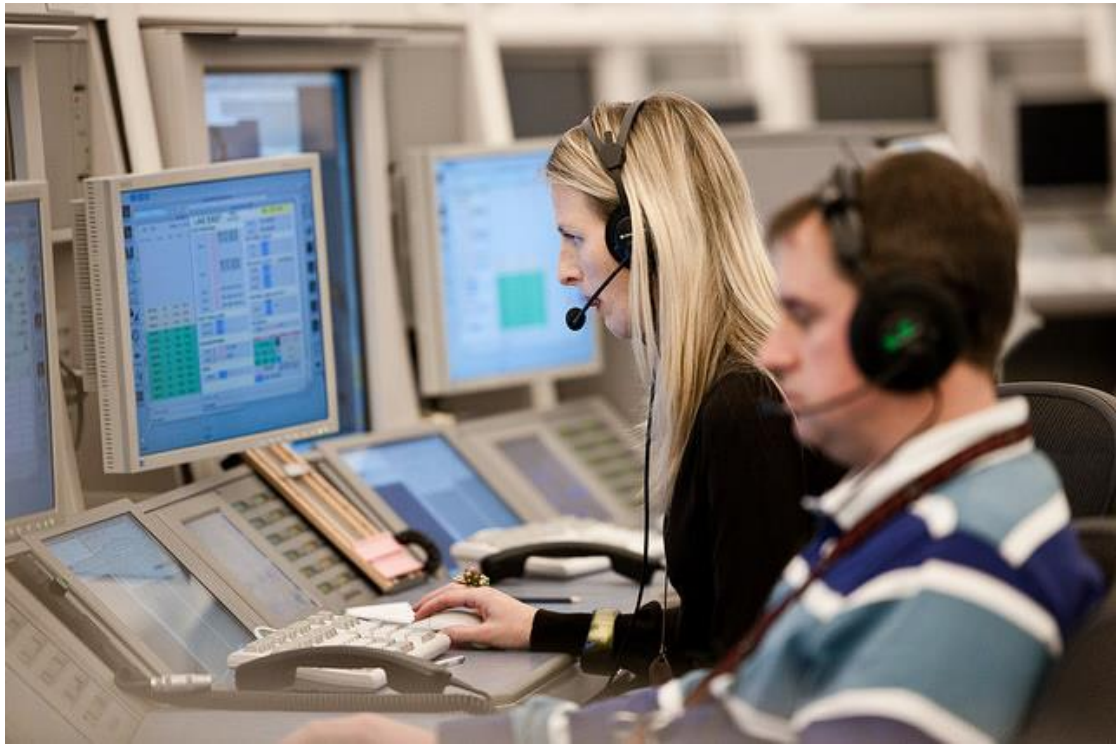
Document the decision regarding the degree and level of automation needed to take into account and balance business needs with reliability, and residual human capabilities

2. Human

Design, develop and deploy automation with human performance in mind.

Human

Involve users in all stages of design and development, facilitated by systems engineering, human factors, and safety expertise.



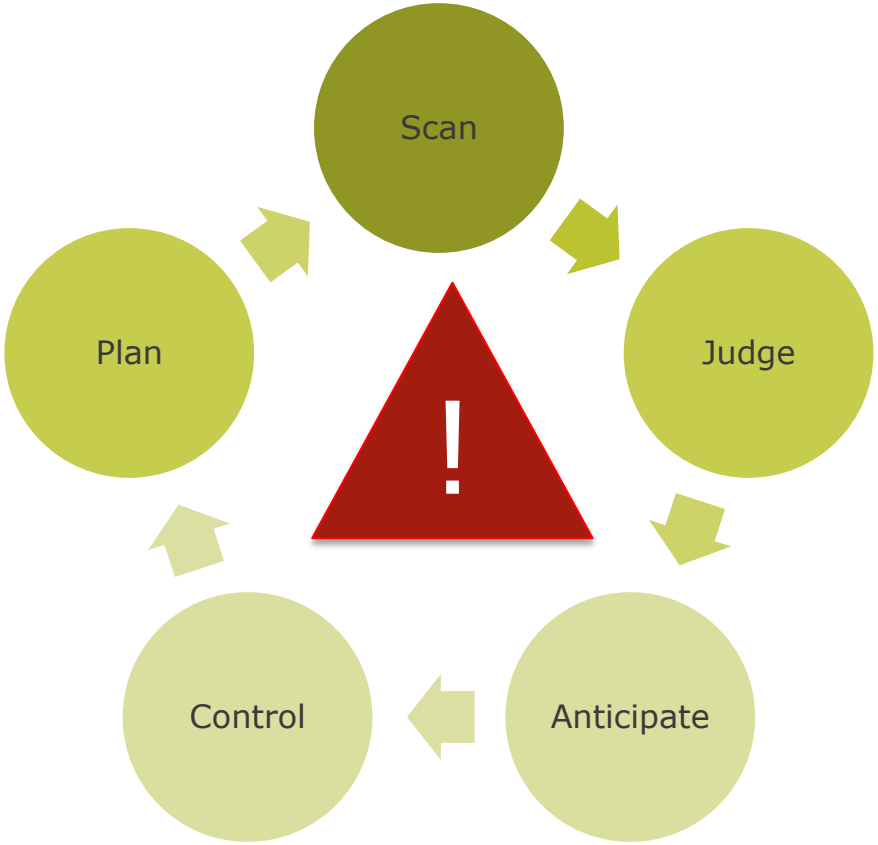
Human

Take account of the natural human tendency to over rely on highly reliable automation and be biased by large data sets.

Ensure that the technical performance and integrity meets the trust needs of the operator/user

Human

Design information presentation to optimise situational awareness and workload.



3. Obligation

Roles, responsibilities, and accountabilities in automated operations need to be bounded and reasonable.

Obligation

Minimise reliance on people as monitors and ensure they remain engaged in the situation.

Obligations

People can only be held responsible for decisions based on the information presented to them.

Obligations

Ensure new or transferred accountabilities are appropriate and unambiguous to the individuals concerned.

~~Endeavour~~

~~Aspire~~

4. Integration

Automation interfaces and dependences must be robust.

5. Training

Train people to understand, not just to operate automation

6. Resilience

Plan for technical failures and fallbacks

Resilience

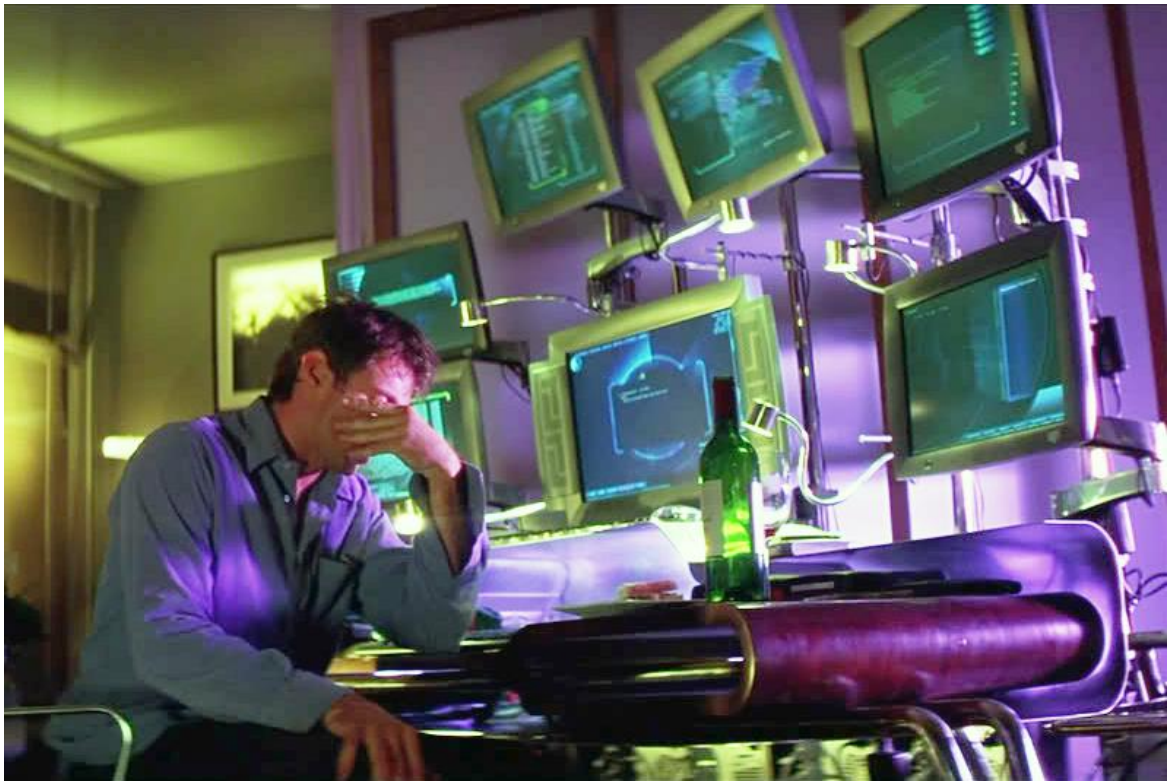
Design automation such that failures are obvious and graceful.

Resilience

Identify residual skills, or alternative systems, required to cater for fallback situations and implement processes to ensure their maintenance.

Resilience

Ensure that fallback procedures place reasonable demands on the residual capability and capacity of the team.



7. Transition

Manage the adaptation to, and normalisation of the automation

Transition

A transition plan for each deployment should address:

- Social Change.
- Transitionary Human Performance.
- Interim Capacity Management.
- Roll Back Plan

Transition

For deployment of multiple tools a longer-term roadmap and incremental deployment should be developed.

8. Emergence

Monitor and act on emergent properties and behaviours in service.

Emergence

In service SMS monitoring processes should be designed to identify and address emergent behaviour of humans using the system in operation.

Emergence

Technical design performance assumptions and predictions should be routinely reviewed, assessed, validated, and updated in service.

Automation Themes

1. Scope – Understand the current operation and identify the real need for automation.

2. Human - Design, develop and deploy automation with human performance in mind.

3. Obligations - Roles, responsibilities, and accountabilities in automated operations need to be bounded and reasonable.

4. Integration - Automation interfaces and dependences must be robust.

5. Training - Train people to understand, not just to operate automation

6. Resilience – Plan for technical failures and fallbacks.

7. Transition – Manage the adaptation to, and normalisation of the automation

8. Emergence - Monitor and act on emergent properties and behaviours in service.

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