Network Manager
nominated by
the European Commission

EUROCONTROL

Explanatory Factors

Safety Learning Cards

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Feedback
If you have any comments on the cards, please contact esp@eurocontrol.int.

Find out more
To find out more about systems thinking for safety, go to: http://bit.ly/ST4SAFETY

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Purpose

These cards are intended to help anyone to ***discuss, understand and improve the way that systems work***, with a particular interest in ***ensuring that things go right*** and ***preventing things from going wrong***.

The cards can be used in all learning activities (e.g. conversations, analysis, synthesis and training) to help understand ATM as a socio-technical system. The cards can focus on both ***ordinary work situations*** and ***safety occurrences***.

The cards focus on ***elements of the ATM system*** and can be used to discuss and examine ***interactions between these elements*** with field experts to help to understand system interactions.

These cards are designed to be used in conjunction with the **Systems Thinking For Safety** cards (available separately), to help encourage a systems perspective. See www.bit.ly/ST4SAFETY for the White Paper and associated cards.

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Organisation of the cards

The cards are in several sections, in accordance with the EUROCONTROL explanatory factors. The factors are split into five sections.

Personnel

Interaction with the Environment

Equipment

Contextual Factors

ATSEP Communications

In each section, there are a number of elements. Each card introduces a different element. On the reverse of each card is a detailed list of the explanatory factors. (Definitions and examples are available separately.) The elements and lists may help discussion, analysis and synthesis, but they should not constrain - there may be other factors of interest.

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How to use these cards

The cards are designed as a flexible resource that may be used in different ways for different purposes. Some possibilities are described in the following cards, but you will probably think of others!

Information gathering
Use the cards in discussions or interviews to gather information on aspects of a situation or system.

Analysis & Synthesis
Consider the system interactions within the organisation and operating context, and map flows of work in both routine and unusual situations.

Training and Communication
Use the cards as learning aids to explore the concepts contained in the cards.

You may use as many or as few cards as needed depending on the purpose of the application. Remember, though, that it is particularly important to consider ***interactions between system elements***, which the cards represent. How do the system elements affect and influence each other in the context of the overall system? Some methods are presented on the backs of the following cards.

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Information Gathering

The cards may be used as a tool to facilitate conversations and other information gathering activity concerning normal operations and safety occurrences.

As you start to explore a situation or system, the cards might prompt questions, or help to identify questions about certain elements (e.g. pilot-controller communication) and the interactions between elements (e.g. between pilot-controller communication, documentation and procedures, and training and experience).

The cards may help to structure an exploration of a situation, in the context of a system. The cards may also help to identify other information that might be needed from other sources. A few methods are shown overleaf. Education/training or specialist support (e.g. from a human factors/ergonomics specialist or systems thinking specialist) is need needed for the selection and use of some methods.

The relevance and contributions of the elements and initial interactions identified can be explored further in **Analysis & Synthesis**.

Information gathering in action

The cards may be used in conjunction with several methods to help gather information. These include the following and can be found online.

- **Check-Plan-Do cycle** (an adaptation of Plan-Do-Check-Act) helps to guide continuous change. This can be a good starting point.
- **Document/data review** looks at data that exist in documents, information systems, and so on. Cards may be used to help understand prescribed work.
- **Discussion and interview** is one of the most fundamental and essential information gathering methods to understand work-as-done.
- **Critical Incident Technique** is designed to facilitate the recall of critical incidents or events.
- **Observation** is necessary to understand work and the work context, which can be important also after a safety occurrence. Cards may be used to help understand interactions and the flow of work.
- **Rich pictures** are a means of communicating, expressing and discussing complex interactions through images.
- **Spray diagrams** provide a non-linear means of taking notes - like a mental map.

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Analysis & synthesis

The real understanding of systems comes during analysis and synthesis. This is where the system structure and dynamics of the system and situation are revealed.

At a basic level, you can organise cards into patterns of interactions to show how elements relate to one another. Some elements may have fairly obvious cause-effect relationships. Others may influence each other in a more subtle way. For instance you may find causal loops and other non-linear relationships, or unintended consequences of system interventions.

There are several methods that originate from systems thinking, systems safety and human factors. The cards may be used to inform or support some of these methods, or may simply trigger you to use them. Some of these are mentioned overleaf. Again, training, coaching or specialist support (e.g. from a human factors/ergonomics specialist or systems thinking specialist) is need needed for the selection and use of some methods.

Analysis & synthesis in action

The cards may be used in conjunction with several methods to help understand system interactions. These include the following and can be found online.

- **Systems maps** clarify the purpose of a system, its basic structure and boundary (but not sequence or influence).
- **Influence diagrams** show connections between elements of system in the form of influence (but not events or causes).
- **Causal loop diagrams** visualise a system's structure and causal behaviour.
- **Multiple cause diagrams** and **Sign graphs** show webs of interconnected causes and effects, including positive and negative feedback loops.
- **Seven Samurai method** helps to understand interactions between seven different systems and is particular useful to understand change.
- **Behaviour over time graphs** show trends and patterns in system behaviour over time for particular variables.
- **STAMP** is an accident model founded on basic systems theory concepts.
- **AcciMaps** are multi-layered causal diagrams that arrange causes in terms of their causal remoteness from the accident.
- **FRAM** models interactions between functions using the idea of resonance arising from the performance variability.

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Training & communication

The cards can be helpful in training and communication situations to explore the concepts within the cards. The cards may be used in the context of education and training in the following, for example:

- **Systems thinking** to understand systems and system interactions, including system conditions, system behaviour and system outcomes.
- **Safety management** including safety investigation, just culture, assessment, promotion, etc.
- **Human factors** to help understand and design interactions between humans and other elements of a system in order to optimise human well-being and system performance.
- **Team resource management (TRM)** to understand strategies for the best use of all available resources – information, equipment and people.

Training & communication in action

The methods outlined on the **Information gathering** and **Analysis & synthesis** cards, as well as other methods, can be used in discussions, workshops and practical exercises for training and communication.

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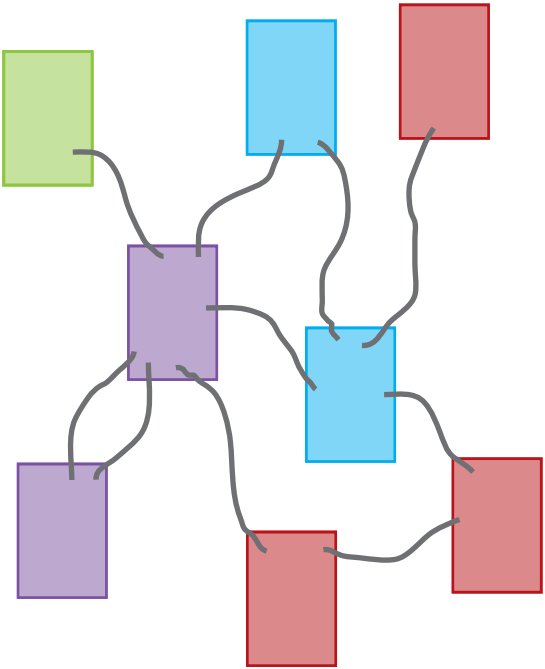
Exploring interactions...



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Perception

The detection, identification and interpretation of visual or auditory information

Perception depends on many aspects of a situation, associated with the information itself, the focus of attention, the operational environment, the equipment and contextual factors. How does the detection, identification and interpretation of information vary and what factors and interactions affect this variability?

Personnel

A-1. Perception

A-1-1. See - identification
A-1-2. See - detection
A-1-3. Hear - identification
A-1-4. Hear - detection
A-1-5. Perceive visual information (accuracy)
A-1-6. Perceive auditory information (accuracy)

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Memory

Recalling information that has been seen or heard, recalling previous actions, and remembering to act, monitor or check something

Our ability to remember information and past or future actions is limited. Recall and recognition is affected by the information itself, the operational environment, the equipment and contextual factors. How does recall and recognition vary and what factors and interactions affect this?

Personnel

A-2. Memory

A-2-1. Remember to monitor or check
A-2-2. Remember to act
A-2-3. Remember previous actions
A-2-4-a. Recall information from working memory (accuracy of recall)
A-2-4-b. Recall information from working memory (presence of recall)
A-2-5. Recall information from long term memory (accuracy of recall)
A-2-6. Recall information from long term memory (presence of recall)

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Decision

Judging or projecting the accuracy of spatial or temporal information and forming a decision or plan to achieve an intended outcome

Judgements and decision-making require continuous performance adjustments depending on system conditions. What adjustments and trade-offs do people need to make when making decisions in order to respond to system conditions? How do decisions make sense to the person at the time?

Personnel

A-3. Decision

A-3-1. Judge / project
A-3-2. Decide / plan (appropriateness/workability)
A-3-3. Decide / plan (sufficiency)
A-3-4. Decide / plan (timing)
A-3-5. Decide / plan (presence of decision/plan)

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Action

Physical actions or speech to implement a decision, particularly with respect to the person's intended actions or speech.

Whether one's physical actions or speech are 'as intended' is influenced by a range of factors, and people have to balance thoroughness and efficiency dynamically. How does the context of performance, including the design of work processes, equipment and ambient environment affect this variability?

Personnel

A-4. Action

A-4-1. Select / position manually (as per intention)
A-4-2. Convey / record information (clarity)
A-4-3. Convey / record information (correctness)
A-4-4. Convey / record information (presence)
A-4-5. Convey / record information (completeness)

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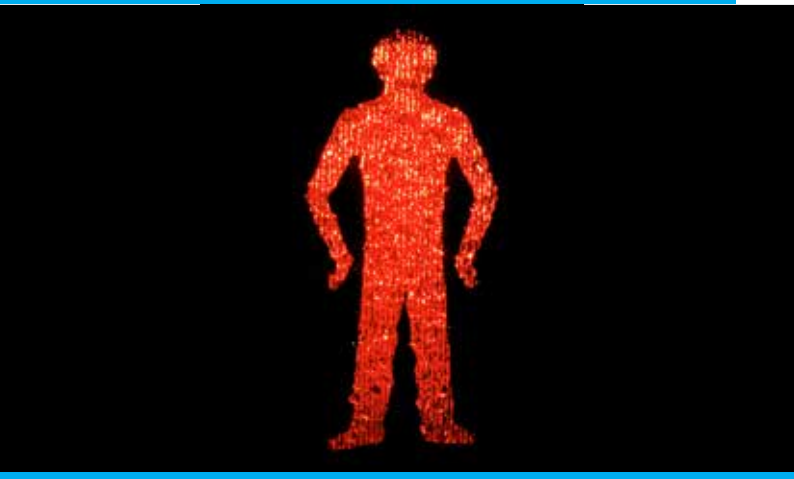
Conformance

Behaviour with respect to conformance with rules or procedures

Usually, individual or team performance is in line with rules and procedures, but occasionally it may not be or cannot be. Most decisions are taken with good intent and make sense to the person at the time. How does conformance vary in light of context, including demands and pressure, goal conflicts, resources and constraints? What does this say about the system as a whole?

Personnel



A-5. Conformance

A-5-1. Deliberate or malicious act
A-5-2. Individual conformance with rules or procedures (isolated individual occurrences)
A-5-3. Individual conformance with rules or procedures (routine individual behaviour)
A-5-4. Team conformance with rules or procedures (routine behaviour)
A-5-5. Individual conformance with rules or procedures (situation-induced behaviour)
A-5-6. Team conformance with rules or procedures (situation-induced behaviour)

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Pilot Actions

Actions and activities in the cockpit

Includes issues such as cockpit activities from pre-flight briefing, through all stages of flight. Includes responses to ATC instructions, and all interactions with the equipment, procedures, airspace, routes, ground signage and infrastructure, crew, etc.

Interaction with Environment

B-1. Pilot Actions

B-1-1. Speed control
B-1-2. Pilot action after readback (correctness/quality of action)
B-1-3. Pilot readback (accuracy of readback)
B-1-4. Pilot readback (completeness of readback)
B-1-5. Pilot readback (correct/incorrect pilot)
B-1-6. CRM
B-1-7. Approach stability
B-1-8. Adherence to cleared Departure Procedure
B-1-9. Compliance with ATC procedure
B-1-10. Response to TCAS or GPWS
B-1-11. Altimeter setting
B-1-12. Altitude / Heading (clarity or confusion)
B-1-13. Entry into controlled airspace (authorisation)
B-1-14. Rate of turn / climb / descent
B-1-15. Position or time report (correctness)
B-1-16. Entry into restricted airspace (authorisation)
B-1-17. Pre-flight briefing
B-1-18. Navigation
B-1-19. Response to TCAS or GPWS (correctness)
B-1-20. Push-off stand clearance
B-1-21. Push off stand
B-1-22. Aircraft taxi route
B-1-23. Response to illuminated stop bar
B-1-24. Pilot action at runway threshold

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Pilot/Controller Communications

Information exchange between pilot and controller.

Includes issues such as the ATC transmission the pilot's communication, the aircraft radio and transponder equipment, and the frequency.

Interaction with Environment

B-2. Pilot/Controller Communications

B-2-1. Pilot experience
B-2-2. Pilot response
B-2-3. Call signs (similarity)
B-2-4. Speech rate / tone
B-2-5. ATC transmission (complexity)
B-2-6. ATC transmission (clarity of interpretation)
B-2-7. Aircraft radio (availability)
B-2-8. Pilot frequency switching (correctness)
B-2-9. Aircraft transponder (availability)
B-2-10. Language / accent
B-2-11. Phraseology (correctness)
B-2-12. Frequency congestion
B-2-13. Conditional clearance
B-2-14. Frequency change (appropriateness)

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Airspace

Factors associated with airspace design and activity

Includes issues such as temporary and military activities, IFR/VFR airspace design and procedures, and wake turbulence.

Interaction with Environment

B-3. Airspace

B-3-1. Temporary activities
B-3-2. Military activities
B-3-3. Military area activation
B-3-4. IFR/VFR mix
B-3-5. Airspace design
B-3-6. Operational procedures (complexity)
B-3-7. Wake turbulence

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Traffic Management

Factors associated with traffic management

Includes issues such as traffic management information, traffic delivery, EDCT, traffic mix, weather avoidance and capacity restriction.

Interaction with Environment

B-4. Traffic Management

B-4-1. TM information (adequacy)
B-4-2. Action on TM information
B-4-3. Delivery of regulated traffic
B-4-4. Delivery of regulated traffic below MAP
B-4-5. Delivery of unregulated traffic below MAP
B-4-6. Delivery of unregulated traffic above MAP
B-4-7. Compliance with EDCT
B-4-8. Update of EDCT
B-4-9. Traffic mix (complexity)
B-4-10. Weather avoidance
B-4-11. Delivery of unregulated traffic
B-4-12. Capacity restriction (planning)

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External Agencies

Factors associated with external agencies

Includes issues associated with operator activities such as flight planning and callsign allocation, contract and military towers, and airport authority and emergency systems.

Interaction with Environment

B-5. External Agencies

B-5-1. Operator flight planning
B-5-2. Operator callsign allocation
B-5-3. Operator other
B-5-4. Contract Tower
B-5-5. Military ATC
B-5-6. Airport authority systems
B-5-7. Airport emergency services

Photo: Gaute Bruvik/Avinor http://www.avinor.no

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Weather

Factors associated with the weather

Includes issues such as visibility, turbulence, winds, thunderstorm activity, snow and ice, light and temperature.

Interaction with Environment

B-6. Weather

B-6-1. Low visibility
B-6-2. Turbulence
B-6-3. Windshear / down draft
B-6-4. Extreme high level winds
B-6-5. Extreme surface winds
B-6-6. Thunderstorm activity
B-6-7. Snow / slush
B-6-8. Icing
B-6-9. Glare
B-6-10. Temperature
B-6-11. Strong or variable wind on approach
B-6-12. Sun

Photo: Gaute Bruvik/Avinor http://www.avinor.no

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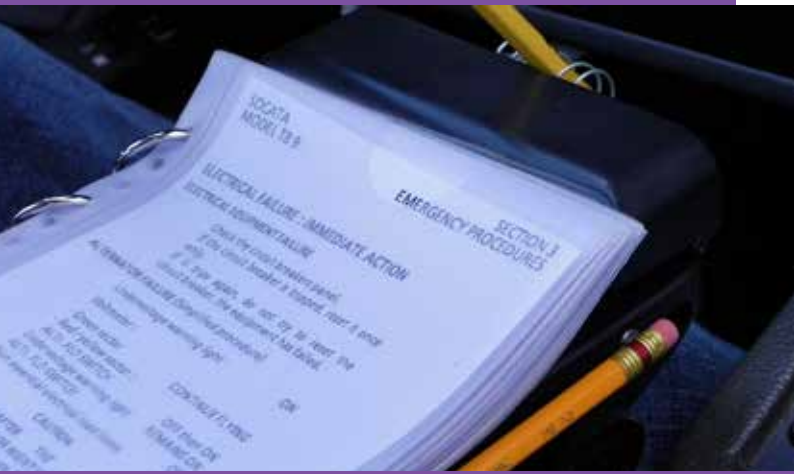
Aircraft Technical and Emergencies

Factors associated with aircraft technical issues and emergencies

Includes issues associated with aircraft technical problem and emergencies, medical emergencies, security emergencies, and fuel shortage emergencies.

Interaction with Environment



B-7. Aircraft Technical and Emergencies

B-7-1. Aircraft technical problem
B-7-2. Aircraft technical emergency
B-7-3. Medical emergency
B-7-4. Security emergency
B-7-5. Fuel shortage emergency

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Airport

Factors associated with airports

Includes issues associated with ground markings, signage, lighting, airfield layout, work in progress and line of sight.

Interaction with Environment

B-8. Airport

B-8-1. Ground markings
B-8-2. Signage
B-8-3. Airfield ground lighting
B-8-4. Airfield layout
B-8-5. Work in progress
B-8-6. Line of sight

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Navigational Equipment

Factors associated with navigational hardware and software

Includes issues associated with the availability and integrity of VOR, NDB and ADS-B.

Equipment

C-1. Navigational Equipment

C-1-1. VOR (availability)
C-1-2. VOR (integrity)
C-1-3. NDB (availability)
C-1-4. NDB (integrity)
C-1-5. ADS-B (availability) - hardware
C-1-6. ADS-B (integrity) - hardware
C-1-7. ADS-B (availability) - software
C-1-8. ADS-B (integrity) - software

Photo: DFS Deutsche Flugsicherung GmbH http://www.dfs.de

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Surveillance

Factors associated with surveillance hardware, software and adaptation

Includes issues associated with the availability and integrity of Mode A and C, primary and secondary radar, RDP, Mode S and conflict alerts.

Equipment

C-2. Surveillance

C-2-1. RDP design
C-2-2. Radar coverage
C-2-3. Mode C (integrity)
C-2-4. Mode A (integrity)
C-2-5. RDP (availability) - hardware
C-2-6. RDP (availability) - software
C-2-7. RDP (availability) - Non ATO
C-2-8. Terminal secondary radar (availability)
C-2-9. Terminal primary radar (availability)
C-2-10. ADS-B (availability)
C-2-11. ADS-B (integrity)
C-2-12. Conflict alert
C-2-13. RDP (integrity) - hardware
C-2-14. Mode S
C-2-15. RDP (integrity) - software
C-2-16. RDP (integrity) - adaptation
C-2-17. En-Route secondary radar (availability)
C-2-18. En-Route primary radar (availability)

Photo: DFS Deutsche Flugsicherung GmbH http://www.dfs.de

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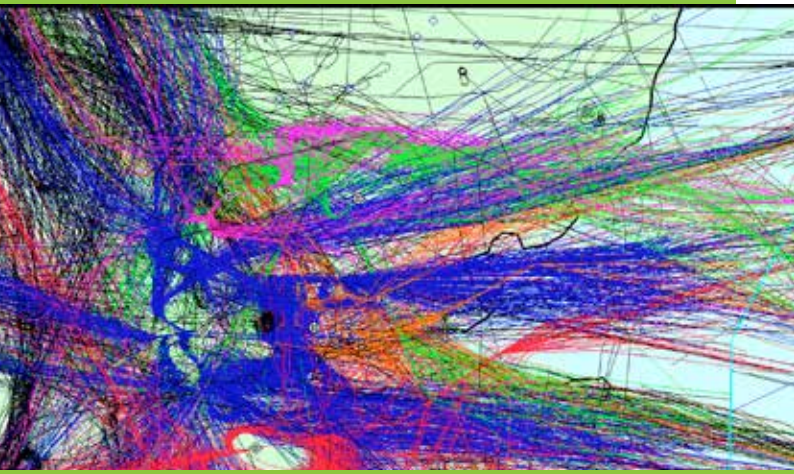
Flight Data Processing

Factors associated with flight data processing hardware, software and adaptation

Includes issues associated with the design, availability and integrity of FDP systems and URET.

Equipment



C-3. Flight Data Processing

C-3-1. FDP design
C-3-2. FDP (integrity) - hardware
C-3-3. FDP (availability) - hardware
C-3-4. FDP (availability) -software
C-3-5. FDP (integrity) -Non ATO
C-3-6. Oceanic FDPS
C-3-7. Airport EFPS
C-3-8. FDP production
C-3-9. FDP (integrity) - software
C-3-10. FDP (integrity) - adaptation
C-3-11. URET

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HMI and Support Systems

Factors associated with HMI and support systems hardware, software and adaptation

Includes issues associated with the design, availability and integrity of support information, data blocks, and paper and electronic strip displays.

Equipment

C-4. HMI and Support Systems

C-4-1. Data block visibility
C-4-2. Data block format
C-4-3. Electronic strip display
C-4-4. Paper strip display
C-4-5. Support information (availability) - hardware
C-4-6. Support information (availability) - software
C-4-7. Support information (availability) -Non ATO
C-4-8. Support information (integrity) - hardware
C-4-9. Support information (integrity) - software
C-4-10. Support information (integrity) - adaptation
C-4-11. Support systems design

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Air/Ground Communications

Factors associated with air/ground communications hardware, software and adaptation.

Includes issues associated with radio availability, integrity, design, reception, transmission, authorisation, frequency load, as well as aircraft transmitter, CPDLC, ATOP and ATIS.

Equipment

C-5. Air/Ground Communications

C-5-1. Radio design
C-5-2. Radio reception (clarity)
C-5-3. Radio (availability) - hardware
C-5-4. Radio (availability) - software
C-5-5. Radio (availability) - Non ATO
C-5-6. Radio transmission (authorization)
C-5-7. Radio transmission (integrity)
C-5-8. Radio frequency load
C-5-9. Backup radio (availability)
C-5-10. Aircraft transmitter (integrity)
C-5-11. CPDLC
C-5-12. ATOP
C-5-13. ATIS

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Ground Communications

Factors associated with ground communications hardware, software and adaptation.

Includes issues associated with telephones and other ground communication equipment.

Equipment

C-6. Ground Communications

C-6-1. Telephone/Interphone (availability)-hardware
C-6-2. Telephone/Interphone (availability)-software
C-6-3. Telephone/Interphone (availability)-Non ATO
C-6-4. Ground comms-other

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Airport systems

Factors associated with airport systems hardware, software and adaptation.

Includes issues associated with the localiser and glidepath, DME, ASDE/AMASS, SMP, ASMGCS and airport lighting systems.

Equipment

C-7. Airport systems

C-7-1. Localizer
C-7-2. Glidepath
C-7-3. DME
C-7-4. ASDE / AMASS (availability)
C-7-5. ASDE / AMASS (integrity)
C-7-6. SMR (availability)
C-7-7. SMR (integrity)
C-7-8. ASMGCS (availability)
C-7-9. ASMGCS (integrity)
C-7-10. ATC lighting panel
C-7-11. Airport lighting

Photo: DFS Deutsche Flugsicherung GmbH http://www.dfs.de

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Power Systems

Factors associated with power systems hardware, software and adaptation

Includes issues associated with commercial power, generators and UPS, switchgear, fuses/circuit breakers, batteries, power systems and alarms.

Equipment

C-8. Power Systems

C-8-1. Commercial power (availability/reliability)
C-8-2. Generator (availability/reliability)
C-8-3. UPS (availability/reliability)
C-8-4. Switchgear (availability/reliability)
C-8-5. Fuse / circuit breaker (availability/reliability)
C-8-6. Battery (availability/reliability)
C-8-7. Power alarm (availability/reliability)
C-8-8. Power system (availability/reliability)

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Networks

Factors associated with network hardware, software and adaptation

Includes issues associated with network design, availability and integrity.

Equipment

C-9. Networks

C-9-1. Networks design
C-9-2. Networks (integrity) - hardware
C-9-3. Networks (availability) - hardware
C-9-4. Networks (availability) - software
C-9-5. Networks (integrity) - software
C-9-6. Networks (integrity) - adaptation

Photo: Naviair http://www.naviair.dk

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Workstation / Console Positions

Factors associated with workstation/console positions hardware, software and adaptation

Includes issues associated with workstation/console design, availability and integrity.

Equipment

C-10. Workstation / Console Positions

C-10-1. Workstation / console design
C-10-2. Workstation / console (availability) - hardware
C-10-3. Workstation / console (integrity) - hardware
C-10-4. Workstation / console (availability) - software
C-10-5. Workstation / console (integrity) - software
C-10-6. Workstation / console (integrity) - adaptation

Photo: DFS Deutsche Flugsicherung GmbH http://www.dfs.de

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Control and Monitoring Positions

Factors associated with control and monitoring positions hardware, software and adaptation

Includes issues associated with control and monitoring positions design, availability and integrity.

Equipment

C-11. Control and Monitoring Positions

C-11-1. Control and monitoring design
C-11-2. Control and monitoring (availability) - hardware
C-11-3. Control and monitoring (integrity) - hardware
C-11-4. Control and monitoring (availability) - software
C-11-5. Control and monitoring (integrity) - software
C-11-6. Control and monitoring (integrity) - adaptation

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Documentation & Procedures

Rules, instructions and working methods to conduct tasks and activities in normal and abnormal situations and the method used to convey the information, including the format or type of documentation or media.

Includes issues associated with documentation (manuals, SOPs, charts, displays, checklists) and all types of procedures.

Contextual Factors

D-1. Documentation & Procedures

D-1-1. Documentation-manuals
D-1-2. Documentation-charts
D-1-3. Documentation-SOP
D-1-4. Documentation-checklists
D-1-5. Procedures-airport
D-1-6. Procedures-approach
D-1-7. Procedures-EnRoute
D-1-8. Procedures-oceanic
D-1-9. Procedures-oceanic contingency
D-1-10. Documentation-displays
D-1-11. Procedures-engineering
D-1-11-a. Procedures – Engineering Delivery
D-1-11-b. Procedures – Asset Management
D-1-11-c. Procedures – Engineering Projects
D-1-11-d. Procedures – Engineering Non-internal
D-1-12. Procedures-SOP

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Interaction with Equipment

Interaction design and usability of the working position and associated equipment such as input devices and output devices. Does not include availability or integrity problems (See "Equipment").

Includes interaction with working position/console, surveillance, communication, navigation, information displays, warnings, Mode S, CPDLC and ADS-B.

Contextual Factors

D-2. Interaction with Equipment

D-2-1. Working position / console
D-2-2. Surveillance equipment
D-2-3. Communication equipment
D-2-4. Navigation equipment
D-2-5. Other information display
D-2-6. Equipment warning device
D-2-7. Interaction with Mode S
D-2-8. Interaction with CPDLC
D-2-9. Interaction with ADS-B
D-2-10. Planned equipment outage

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Training & Experience

The development and applied experience of the knowledge, skills, attitudes and behaviours required to perform a task or job to an acceptable standard. Training includes initial, unit, continuation, and development training.

Includes issues associated with training, experience, proficiency, task familiarity, mentoring, OJTI, emergency handling, TRM and trainee issues.

Contextual Factors

D-3. Training & Experience

D-3-1. Training (completeness)
D-3-2. Experience
D-3-3. Proficiency / time on position
D-3-4. Task familiarity
D-3-5. Mentoring (quality)
D-3-6. OJTI technique
D-3-7. Emergency handling
D-3-8. Team Resource Management
D-3-9. Controller / pilot under training
D-3-10. Controller / pilot under examination check
D-3-11. Expectation of skill level

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Organisational Factors

Organisational design and functioning, including, organisational risk perception and decision making, goal trade-offs, resource management and communication

Includes issues associated with staffing and scheduling, safety and efficiency balance, management and supervisor support, combining or splitting sectors, organisational risk perception, and communication and scheduling of planned outages.

Contextual Factors

D-4. Organisational Factors

D-4-1. Availability of qualified staff
D-4-2. Balance of safety and efficiency (Team)
D-4-3. Balance of safety and efficiency (Management)
D-4-4. Staffing / scheduling
D-4-5. Supervisory decisions and support
D-4-6. Management decisions and support
D-4-7. Combining or splitting of sectors
D-4-8. Organisational risk perception
D-4-9. Communication of planned equipment outage
D-4-10. Scheduling of equipment outages

EUROCONTROL

Operational Environment

The operational ambient environment can affect most aspects of human performance. The factors (lighting, noise, etc) have various acceptable ranges, specified in guidance and standards, but are also situation-specific.

Includes issues associated with including distraction, noise, lighting and glare, temperature and line of sight.

Contextual Factors

D-5. Operational Environment

D-5-1. Distraction-job related
D-5-2. Distraction-non job related
D-5-3. Lighting
D-5-4. Noise from people
D-5-5. Noise from equipment
D-5-6. Glare
D-5-7. Temperature
D-5-8. Visual impairment-line of sight

EUROCONTROL

Team Factors

How people with assigned functions or roles interact and work together to achieve shared goals

Includes issues associated with briefings, assistance and support from colleagues, relations between sectors, watches and facilities, temporary staffing issues, team pressure, roles and responsibilities, working practices, coordination and team risk perception.

Contextual Factors

D-6. Team Factors

D-6-1. Position Relief Briefing (PRB) issues
D-6-2. Assistance from other controllers
D-6-3. Support from engineers
D-6-4. Support from other ATC facilities
D-6-5. Relations within / between sectors
D-6-6. Relations within / between watches
D-6-7. Relations within / between facilities
D-6-8. Temporary staffing
D-6-9. Team pressure
D-6-10. Roles and responsibilities
D-6-11. Working practices (clarity)
D-6-12. Coordination
D-6-13. Team risk perception (adequacy)

EUROCONTROL

Personal Factors

Individual variability in capability, states and responses to demands. Variability may be between different individuals and within the same individual over time. The factors do not imply fault or blame.

Includes issues associated with confidence, fatigue, stress, physical capability, health, task interest and involvement, trust in automation, workload, and personal perception of risk.

Contextual Factors

D-7. Personal Factors

D-7-1. Confidence
D-7-2. Restedness / Fatigue (not work-related)
D-7-3. Level of stress - Work-related
D-7-4. Level of stress - Personal
D-7-5. Physical capability
D-7-6. Health
D-7-7. Task interest and involvement
D-7-8. Level of trust in automation
D-7-9. Workload (excessive)
D-7-10. Workload (post-peak)
D-7-11. Workload (stability)
D-7-12. Workload (underload)
D-7-13. Restedness / Fatigue (work-related)
D-7-14. Personal perception of risk

EUROCONTROL

ATSEP Communication

Communication between ATSEP supervisors and others.

Includes communication between ATSEP supervisors and ATCOs, ATSEPs and service providers.

ATSEP Communication

F. ATSEP Communication

F-1. ATCO/ATSEP supervisor communications
F-2. ATSEP/ATSEP supervisor communications.
F-3. ATSEP supervisor/service providers

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