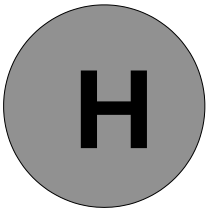

ANNEX:

“WHAT IS A CHANGE”

1 INTRODUCTION

This annex proposes means to assess whether a change in the Air Navigation System deserves a safety assessment or not.

2 PURPOSE

The purpose of this Guidance Material is two fold:

- Firstly propose a set of examples where SAM should or need not be applied. It is not intended that this list will be exhaustive, however it is hoped that it will be sufficiently extensive to provide useful guidance. It is anticipated that there will be a significant 'grey area' into which changes may fall but it is not clear whether application of SAM is fully necessary.

- Second propose guidelines for determining how to deal with those changes that fall into the 'grey area' mentioned above.

It is also important to recognise that the application of this guidance will be strongly linked to and reliant upon the ANSP safety management systems, particularly for the following:

- Existing risk assessments and procedures – for reference and to generate new risk assessments;

- Safety Management and Quality Assurance system – procedures, document and records control;

- Competence management system – to ensure the competence of the ATM operations and maintenance staff;

- Change management system – to ensure all change proposals are formally assessed and approved/rejected and that suitable records are maintained;

- Project management procedures – to control the change;

- Safety occurrence reporting system – to ensure that urgent unplanned changes are followed up with the necessary risk assessments, etc. when time permits;

- Contingency planning and procedures – to ensure that all credible contingency requirements are addressed;

- The review process – to identify any necessary changes to the safety management system which are required;

- The argument developed to demonstrate that existing operations (so-called "legacy") are acceptably safe.

3 APPROACH

The provision of an air navigation service is inherently risky operation providing the primary means of avoiding aircraft collisions. The existing systems in use across the ECAC states have been developed over an extended period of time, much of which pre-dates formal safety management practices. In many cases the only evidence that legacy systems are 'tolerably safe' is that they have proved themselves to be so over years of operation.

Modern safety management practice rightly demands that before making a change to a safety related system we take appropriate steps to ensure that the change does not introduce an unacceptable risk into the system.

The aim of this study is to identify when SAM should, or should not be applied. In fact this equates to identifying what 'changes' can be implemented to the ATM system without the need for a formal risk assessment procedure. It is recognised that there are many 'changes' made to the system on a day-to-day basis for which a formalised and recorded risk assessment is not undertaken, indeed were it necessary the whole operation would be unable to continue (possibly presenting a greater risk than implementing the change without assessment). In many cases such changes are already covered by an existing risk assessment – they are merely configuration changes within a safe 'design envelope'. The tactical implementation of such changes often involves an undocumented risk assessment undertaken by the person responsible for implementing the change.

There are very few circumstances under which the implementation of a change can be justified without a prior risk assessment. However, it is clear that if a hazard Identification process is undertaken and no significant risks are identified, then there is no safety benefit to be gained from further safety management activity. It is proposed therefore that a simple hazard identification (or hazard elimination) procedure might be appropriate to determine whether it is necessary to apply SAM.

Certain special circumstances may also provide justification for implementation of a change without a full implementation of SAM:

- If a system or a piece of equipment is known to be unreliable and/or unrepairable and the impact of failure is known and can be mitigated (such as might be the case with an obsolete piece of equipment) then it is probable that replacement with a more reliable alternative will provide a safety benefit. Even if the replacement were to fail it would be no worse that the previous situation. Under such circumstances it may be justifiable to implement the change before a full SAM assessment is possible. However it would be necessary to undertake such an

assessment before such a change could be accepted as permanent.

Note that in this situation, where the replacement system offers improved functionality it will often be the case that operational practices will be altered to take advantage of the improved functionality, thus failure of the replacement system may become more significant than failure of the system being replaced. Under these circumstances an assessment should be made of the change in working practices, either when assessing the introduction of the replacement system, or when implementing the new procedures.

- Under certain unpredictable circumstances (e.g. in an emergency) it can be necessary to operate a system in a non-normal manner in order to mitigate immediate risks. Under these circumstances it is normal to assess the situation rapidly as a tactical change and determine the optimum course of action. This process will involve a preliminary form of risk assessment, but not the detailed process described in SAM. However, due to the nature of the situation it may be necessary to implement the change anyway.

3.1 Change straight forward subject to further assessment

Proposed list to be validated, approved and included in the ANSP safety Management Manual:

- New system (people, procedure, equipment)
- New service
- Strategic change (see §3.3.1)
- AIRAC Change (except non-ATM operations-related, correction of previous erroneous data, already published in NOTAM)
- Inclusion of a new waypoint
- Suppression of an existing waypoint
- Return to service of a previously suppressed waypoint
- Decommissioning of operational equipment that is no longer in use
- Changes to ink or paper in flight strip operational printers would be subject to an assessment (this involves testing but not Risk Assessment)
- Passive components (e.g. leads) would be tested

3.2 Change straight forward not subject to further assessment

The term “minor” change is not used in this Guidance Material as too much mis-leading. Thus this document refers to changes that are “not subject to further assessment” and it refers to the first stage in the decision-making process and it is defined as “a change which has been assessed as having no significant safety impact upon ATM operations and maintenance, including upon those using the ANSP service”.

There are several, broadly similar approaches that have been taken by some national ANSPs, ranging from the subjective identification and consideration of the risks associated with all relevant factors, to highly numerical weighted-factors approaches.

The essential factors to be considered in determining whether a change is "subject to further assessment or not" should include the following as a minimum:

1. The number of sites to be affected by the change (nationally or by organisation).
2. The number of adjacent centres to be affected by the change (including across national boundaries).
3. The impact upon the ATCO's duties, including training, procedures, co-ordination role, equipment, Human-Machine-Interface, etc.
4. Similarly, the impact upon the pilot's duties.
5. The environmental impact, including the density of obstacles, mix of traffic, level of separation, airspace class, continuity of operations, etc.
6. The overall complexity of the change in its entirety (ensure that a change subject to assessment is not being achieved by means of a series of such changes not subject to assessment – "salami tactics").
7. The impact on technical publications including the need for derogation.
8. The project management aspects of the change, including leadership, timescales, resources, critical path, changing contingency, control of contractors, testing and commissioning, acceptance, etc. (This also has strong links with item 6.)

Note: Factors 6 & 8 have to be understood such that even if the change has no impact on the other factors (more operations related), the change could deserve an assessment due to factor 6 or 8 characteristics.

In addition to these criteria, a list of such changes is proposed here after:

Changes, not normally subject to an assessment (proposed list to be validated, approved and included in the ANSP safety Management Manual):

- Instantiation of a Corrective maintenance (at the time of the action itself when maintenance staff perform corrective maintenance intervention, assuming that the "generic" procedure has to be assessed/accepted before being applied)
- Emergency operations (unknown till now, example: "9/11", "cas de force majeure")
- Material for administration offices (not on operational/simulation network)
- Connectors (as long as they are tested & tried)

- Some test equipment (for those which do not impact operational equipment)
- Training session (operational training: ESARR5-related + competency in ESARR3-related) (at the time of delivering a session of the training, but it assumes that the training plan and material have been assessed & accepted)
- Instantiation of Sector frequency change (assuming that the “generic” risk assessment was done prior)
- Split/combine sectors (no new sectors)
- "Legacy" runway change & SID-STARS
- Actions on administrative rooms (cleaning, ...) (excluding noisy, dusty or vibration-maker works)
- Specific military operation (under time constraints, military exercises are not part of that category)
- Specific weather conditions (not part of Ops manual, under time constraint)
- Decommissioning of administrative (non-operational) equipment
- Visitors (a simple but formal assessment should be done)

3.3 Strategic Change and Tactical Change

It is clear that changes applied to the ATM System can be classified as either strategic or tactical:

Strategic changes are those that are anticipated and planned and as such, a thorough risk assessment (in accordance with SAM) can be undertaken in advance of implementation. Typically this will include engineered changes to the system, such as new equipment or procedures or airspace, routes, SIDs and STARs or resectorisation (additional sector or change of the existing sectorisation) or LoA (Letter of Agreement) or ….

Tactical changes are those that are necessary as a result of circumstances and situations that arise during operation of the system. These can include routine changes, such as opening and closing sectors or changing runway direction, or exceptional changes, such as use of a standby frequency or diversion of traffic due to bad weather. By their nature some unanticipated tactical changes may be implemented without the opportunity for an ad-hoc, formal and documented risk assessment in accordance with SAM (see §3.3.3).

3.3.1 Strategic Change

Strategic change is what might be considered the normal process of change in ATM. A strategic change will involve changes to one or more parts of the ATM system (people, procedures & equipment) which are applied with prior consideration and planning. Strategic changes would include, amongst

others, changes to hardware or software in the ATM system, airspace redesign or changes to operational procedures or staffing arrangements.

When implementing strategic change SAM dictates that a formal risk assessment should be undertaken. Only if this assessment identifies that there are no risks associated with the change can the risk management activities be curtailed.

3.3.2 Anticipated Tactical Change

An anticipated tactical change may be defined as “an urgent change to the operational system that has previously been planned for and associated risks have been assessed.”

Some examples of anticipated tactical change are implemented after performing a safety assessment in accordance with SAM.

Many examples of anticipated tactical change will be considered to be part of normal operations, such as routinely combining sectors during quiet periods or change of active runway. Others may include exceptional, but predictable change, such as like-for-like replacement of parts under corrective maintenance, or emergency procedures (e.g. use of standby frequency) which should have been considered in any existing safety justification and associated risk assessment for the system under consideration.

Such anticipated tactical changes may be part of the “legacy design envelope”: part of the system/service definition, but no safety demonstration was made, therefore they are considered as tolerably or acceptably safe using legacy argument. Such kind of demonstration (legacy) should lead to some safety management system decision on how to further proceed i.e. stop using legacy argument and gradually perform safety assessment of such changes in accordance with SAM.

Therefore, ANSPs should survey such practices, identify the anticipated tactical changes which are operationally performed without any demonstration of their acceptable contribution to safety and gradually complete the missing safety assessment (e.g. perform “generic” safety assessment for like-to-like replacement, ..).

Some of those exceptional tactical changes can be gradually anticipated by some ANSPs by learning from other ANSP occurrences (e.g. a 9/11 kind of scenario can now be defined and assessed by any ANSP).

When implementing anticipated tactical change (part of the “legacy design envelope” using legacy argument) it may be necessary to undertake a “tactical risk assessment”, e.g. to determine the optimum time/conditions for

implementing a runway change. There should be a recognised procedure (preferably a formal one) for implementing such anticipated tactical change and a person responsible for making such decision. However it is recognised that it is unlikely that this "tactical risk assessment" be documented, or be performed in accordance with SAM.

3.3.3 Unanticipated Tactical Change

An unanticipated tactical change may be defined as "an urgent change to the established normal, degraded, or emergency Air Traffic Management operational regime which is not part of the emergency in normal circumstances ???? would have been addressed by means of a formal risk assessment, but the time (or other) constraints will only permit some subjective consideration of the risks and the best way to mitigate them." In this situation heavy reliance is placed upon the ATM staff's competence and experience, and almost by filling a subsequent incident report a review of the risk assessments would be required.

Its use therefore lies between where there is time to carry out an ESARR4 compliant change and where immediate action is required. Typically, this could range from a few minutes to a few hours, and it is important to make the best use of this time to minimise risk.

In order to help defining "Urgent": its value should be expressed in number of minutes or hours.

4 UNANTICIPATED TACTICAL CHANGE MANAGEMENT

4.1 Introduction

The following checklist is intended to act as an "aide memoire" to help identify the key considerations, which should be addressed when considering an unanticipated tactical change.

4.2 The checklist

1. Sources of assistance, information, advice and guidance		**Y/N** (Ref)
National Supervisory Authority guidance.		

Relevant procedure(s).	Identifying relevant information (e.g. limits) when procedures do not wholly apply.	
On-call/standby staff	If further staff are needed, or for advice.	
Senior management.	Should be consulted as a priority.	
Safety case/risk assessment.	The situation may have been identified but not fully addressed in terms of follow-up actions (e.g. procedures).	
Industry guidance.	Eurocontrol, ICAO, etc.	
Other ATM staff.	Locally and at other ATM centres.	
The regulator.		
2. Developing the change strategy		
Use all sources of information, advice and guidance.	Contingency plan	
Identify objectives that the change must satisfy.		
Consider any operational limitations that may have to be imposed.	To provide adequate mitigation of the risks. Full co-ordination with operations staff is required.	
Consider any changes to contingency planning.		
Use competent ATM staff to peer review & validate the change.	Local or remote as necessary.	
Gain approval from the highest authority immediately available.		
3. Communicating the change		
Identify all of those who need to be aware of the change.	e.g. other ATM centres, aircraft in and approaching controlled sectors.	
Inform the other stakeholders about the consequences of the change to their operational regime (not only notify but also gain some assurance of the correct understanding).		
Report the change as a technical incident.	Using the occurrence reporting system. This will ensure that the change is followed up with the necessary risk assessment and properly validated, etc.	
4. Records		
Take notes of key points in the decision-making process, information sources used, conversations with individuals contacted as log entries, etc.	As justification for the decisions made and their technical bases.	

5. Monitor		
Continue to monitor the change to ensure that it meets its defined objectives and that safety is not compromised.		
6. Ensure Continuity of Operations		
Prepare a brief for staff on the next shift to ensure they fully understand the implications of the change and the operating regime to be applied.		
7. Consider reverting to normal operations		
When a normal operating regime can be adopted consider how to safely revert to normal operations.	If necessary, repeat this checklist process as a change back to the normal regime.	

5 HOW TO USE OF THIS GUIDANCE MATERIAL

This Guidance Material has to be included in the Safety Management Manual.

Consequently, a customisation of the process has to be done to match the organisational aspects of the Air Navigation Service Provider (ANSP).

In particular two aspects need the endorsement of the ANSP Senior Management and the National Supervision Authority (NSA):

- List of changes (straight forward) not subject to further safety assessment;
- Criteria for “urgent” unanticipated change.

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