# *METHODOLOGY FOR THE ASSESSMENT OF AN AIR TRAFFIC SYSTEM*

## *EPIS-CA document user guide*

# Contents

**Reference documents:**

1. ESARR 4, Version 1.0 of 5.4.01
2. Glossary of terms commonly used in a safety case, Memo CENA/NT02-919
3. Draft Order relating to risk assessment and mitigation in ATM, Version 10 – June 2004
4. Instruction XXX/DIRCAM No. 22200/DNA relating to the performance of safety studies

# 1 Introduction

## 1.1 Regulatory context

In April 2001, EUROCONTROL approved a Safety Regulatory Requirement relating to Risk Assessment and Mitigation in ATM (ESARR 4).

Appendix A to ESARR 4, "Risk Classification Scheme", stipulates that in order to identify hazards and assess the severity of their effects on operations, the following aspects in particular should be taken into account:

- Effect of hazard on air crew (workload, ability to perform functions, etc.);
- Effect of hazard on the air traffic controllers (workload, ability to perform functions, etc.);
- Effect of hazard on the aircraft functional capabilities;
- Effect of hazard on the functional capabilities of the ground part of the ATM system;
- Effect of hazard on the ability to provide safe Air Traffic Management Services (magnitude of loss or corruption of Air Traffic Management Services/functions).

In France, this text is incorporated in a draft Interministerial Order relating to risk assessment and mitigation in ATM which stipulates that "all changes to a sub-component of an ATM system shall give rise to […] a procedure for hazard identification and risk assessment and mitigation in the form of a safety study".

Such a safety study also covers changes to air traffic systems[1]. It breaks down into two phases:

1. a preliminary safety impact assessment (EPIS) making it possible to decide, by means of a simple evaluation, whether a safety case needs to be constructed;
2. where applicable, a safety case which will be updated throughout the system's lifespan.

## 1.2 Purpose of the guide

This guide sets out the procedure, developed by the EPIS-CA WG, to be followed in the event of a change (as defined by ESARR 4) to an air traffic system (see Glossary of terms commonly used in a safety case, Memo CENA/NT02-919) and is therefore a tool of practical use for performing an EPIS-CA.

It explains the terms used in the EPIS-CA document and the risk assessment criteria. Its plan follows that of the EPIS-CA document.

[1] Note: this procedure does not apply to a "real-time reaction" to a safety problem.

## 1.3 General layout of the EPIS-CA procedure

The procedure is intended to help the person in charge of implementing a change in the air traffic system to quickly assess, as objectively as possible, the operational and functional risks involved and the associated constraints with a view to deciding whether or not to construct a safety case. The study must be performed as soon as possible in order to have the time needed to construct a safety case, if required.

The first stage is to define the scope of the EPIS by identifying as accurately as possible the change in the air traffic system which is the subject of the study and all the associated phases: setting-up, implementation, transitional phases, possible parallel operation of the old and new systems, possible decommissioning of the old system, etc.

Insofar as the EPIS procedure is well upstream, it may not be possible to accurately define the change, and not all the information required for the EPIS might be available when the document is first drafted. It is therefore important to view the EPIS-CA as an **iterative procedure**: as progress is made in defining the change, the document will need to be updated to take account of developments.

However, care must be taken to ensure that the EPIS procedure is not too drawn out, as there must be sufficient time to construct a safety case, if required, since the latter may itself necessitate preparatory phases in complex cases: public contracts where subcontracting is involved, public enquiries, various studies (measurements, traffic sampling, simulations, etc.).

The assessment breaks down into three phases (see Annex 1):

- An analysis of the scale of the change (see Chapter 3). Where the nature of the change is found to be major, a safety case must be constructed. The EPIS is then terminated in line with the process defined by the Operator (see Chapter 6).
- Otherwise, the same analysis principle is applied to the risk characterisation (see Chapter 4). Where the nature of the risk is found to be major, a safety case must be constructed and the EPIS is terminated as defined in the previous paragraph.
- If the first two phases do not allow a decision on whether or not a safety case is required, the analysis must be expanded and a search made for hazards with a severity class above the threshold defined in the Order transposing ESARR 4.

The three phases must be implemented by people competent in the field in question. This may require the input of several people or units, possibly from outside, and the EPIS-CA coordinator's role (see Chapter 2.3) is crucial.

The EPIS document contains justification/explanation boxes which need to be completed with care to ensure that the document can stand alone and that those involved can play their roles to the full (approval, validation, verification by the Regulator, etc.), and to facilitate feedback.

Once the EPIS-CA document has been completed and the ‘proposal for a decision’ block (see Chapter 2.5) has been filled in, the EPIS-CA follows the validation and approval circuit defined in the service provider’s SMS (see Chapter 6).

This document will be referenced locally and made available to the competent authority.

# 2 General layout of the EPIS-CA document

The page headers and footers are the responsibility of the centres on the basis of their documentary classification. The minimum information they should contain is:

- In the header: the body carrying out the EPIS, the general subject, the title, version and the date when the document was produced;
- In the footer: the location of the file, the author and the page numbers

## 2.1 A: Title of the EPIS

The purpose of this box is to give the EPIS a name to facilitate referencing and keywords to help searches: name of the centre where the air traffic system is being changed, type of system (procedure, route, airspace), duration (permanent, temporary).

Example: TFFF generic temporary parachute drops.

## 2.2 B: Identification

The first information to be entered will be the unit responsible for the EPIS, an absolute reference number for the document which will be quoted in all subsequent associated documents, and the EPIS activation date.

A distinction is made between an initial EPIS and the update of a completed EPIS already referenced. Where an uncompleted EPIS has to be updated, all that needs to be done is to go back to it by completing the chapter "Follow-up of document" (iterative process).

The nature of the EPIS is specified – isolated, global or element of global EPIS No.:

- An isolated EPIS relates to a one-off change to an air traffic system.
- A global EPIS means that when the change to the air traffic system is part of a more global project resulting in several EPIS (e.g. where several air traffic centres are concerned), the current EPIS is the "mother EPIS".
- In the case of an element of a global EPIS, where a global EPIS exists, the current EPIS is the "daughter EPIS" and the global EPIS reference is given.

Finally, a distinction is made between a specific EPIS, a generic EPIS or the application of a generic EPIS.

- A specific EPIS relates to a one-off change to an air traffic system.
- Generic relates to a regularly and/or frequently repeated change to an air traffic system (e.g. temporary parachute drops, etc.) the components of which are sufficiently stable to make the EPIS re-usable. The generic EPIS shows the list of measures needed to mitigate risks.
- The application of a generic EPIS is where the change is manifestly similar to a change which was covered by a generic EPIS. In such cases, the generic EPIS reference is reiterated and the remainder of the document must provide clear justifications for the application of the generic EPIS and highlight any differences. As regards the application of the generic EPIS, the **actual implementation of the risk-mitigation measures** must be verified.

## 2.3 C: Followed by:

Performing an EPIS necessitates the involvement of a large number of people, depending on the area of expertise, time, context, etc. The operator has to appoint a competent coordinator who is responsible for:

- acquiring data;
- ensuring the coordination and smooth progress of EPIS-related activities;
- activating the validation and approval process (see Chapter 2.6).

This means that the coordinator must have the necessary expertise and a bird's eye view sufficient to understand the implications of the change in question.

## 2.4 D: Description

The permanent or temporary (dates of validity) nature of the planned system is specified.

The following is then specified:

➔ creation of an air traffic system, or

➔ modification of an existing system, or

➔ temporary and/or repetitive (punctual) modification.

The geographical location and nature of the change are described (by specifying, where appropriate, the change to the existing system and/or the event necessitating the change).

The system description also includes a list of additional elements which will be taken into account subsequently in the EPIS. These may include:

- relief proximity;
- military zone nearby;
- coordination with foreign centres;
- political importance;
- other.

Lastly, the implementation arrangements are specified (installation, putting into operation, transitional phases, possible parallel operation of the old and new systems, possible decommissioning of the old system, etc.):

- presence of transitional phases?
- presence of risk reduction measures? If so, the information given in box O is repeated (list of tested safety barriers for the various hazards). Any precautionary measures planned are also noted here. These are temporary measures intended to accompany the introduction of the new system (traffic reduction/regulation, etc.).
- Is a "back to previous state" possible?

## 2.5 E: Decision proposal

This is where the outcome of the EPIS is described: proposal on whether or not to construct a safety case for the planned change. If the construction of a safety case is not planned, the maximum impact on safety of the planned change is described (level 4 (increase in workload) or 5 (no immediate impact on safety)).

## 2.6 F: Approval and decision workflow

The operator is responsible for defining an organisation for EPIS management (designation of coordinator, drafting, procedures and definition of the approval and decision workflow, archiving, statistics, etc.). This organisation will need to be documented.

The final decision is shown: decision whether or not to construct a safety case. If it is decided not to do this, the impact of the planned change on safety (severity class 4 or 5) is explained by commenting on the decision.

## 2.7 G: Attached documents

This box makes it possible to identify the documents which need to accompany the EPIS: maps, memos, letters, NOTAMs, etc. These are the documents facilitating comprehension of the EPIS and/or making it possible to **justify the actual implementation of the risk mitigation elements identified in box D**.

## 2.8 H: Document history

This box ensures the traceability of the changes made to the document (version number, date of change, nature of change, chapter(s) and page(s) concerned, author).

## 2.9 I: Distribution

The coordinator has to ensure that the internal DGAC and/or external units affected by the change are sent the EPIS, specifying in each case whether the distribution is "for action" or "for information".

## 2.10 J: Justifications/general explanations

The EPIS author lists here all the information substantiating the final decision and, where a safety case is not constructed, specifies the maximum severity class hazard envisaged in the EPIS.

# 3 Analysis based on the scale of the change

## 3.1 K: Characterisation of the scale of the change

This analysis constitutes the first phase of the EPIS. Each criterion is allocated a mark of 0, 2 or 4.

Recent experience in a similar case is also indicated, in negative terms.

If the total mark is 12 or more, the nature of the change is deemed to be major and a safety case then has to be constructed. Otherwise, the EPIS has to be continued (see Chapter 4). This means that if three criteria are allocated a mark of 4 without a tested safety barrier, a safety case has to be constructed.

The SC (Safety Case) column means that the line is sufficient to activate the construction of a Safety Case regardless of the total mark.

- six relatively macroscopic criteria need to be assessed:
- the number of internal air traffic services involved: these are the area and/or approach control centres impacted[2] by the proposed change;
- the number of external air traffic services involved: foreign and/or military control centres impacted[2] by the proposed change;
- volume of airspace element impacted;
- influence on controllers' methods;
- influence on pilots' methods;
- environmental constraints.

*Note:* For the record, it should be pointed out that the decree applying the "Proximity Democracy" Act makes provision for a public enquiry to be held prior to any change in arrival or departure procedures at one of the ten largest French aerodromes meeting the following three criteria:

- the change in procedure is applicable below FL65 (1981 m), AND
- the change relates to at least 30 jet aircraft flights per day, AND
- the area of the zones thus overflown constitutes at least 10% of the zones previously overflown.

A public enquiry involves a highly formalised consultation process lasting an average of one year and based on a finalised and **non-modifiable** dossier, failing which the process will be declared null and void.

## 3.2 L: Justifications/Explanations Characterisation of the scale of the change

This is where the EPIS author will enter all the information explaining and justifying the information contained in the previous box in order to facilitate subsequent comprehension of the choices made (traceability). The number of the box relating to each explanation/justification must be quoted (*e.g. J1 = 2 centres CRNA/E and Basle)*.

[2] centre impacted = centre for which the proposed change involves modification of the operating manual or operating instructions

# 4 Analysis based on characterisation of the risk

## 4.1 M: Characterisation of the risk

The risk is characterised using six domains. For each of these, various criteria have to be assessed and awarded marks of 0, 2 or 4: the higher the mark in the line, the greater the necessity to construct a safety case. The importance of the safety barriers tested is also assessed (using negative marks).

If the total is

- 32 or more, the nature of the change is deemed to be major and a safety case then has to be constructed;
- between 26 and 32, the case must be presented at the safety review of the ANSP(s) concerned in order to decide whether to construct a safety case or continue the EPIS;
- 26 or less: the EPIS must be continued (see Chapter 5).

The SC (Safety Case) column means that the line is sufficient to activate the construction of a safety case regardless of the total mark.

### 4.1.1 Conception

#### *a. Derogation from regulations applicable in France (see Annex)*

This domain is used to assess compliance with the regulations applicable in France as regards departure, holding, approach and en route procedures and strategic separations[3]

The instruments applicable are as follows:

- Amended DNA Instruction No. 20754 of 12 October 1982 relating to the establishment of instrument departure, holding and approach procedures;
- DNA Instruction No. 20380 of 29 April 1998 relating to the establishment of aerodrome operational minima;
- DNA Instruction No. 20925 of 18 October 1995 relating to the establishment of IFR minimum en route flight altitudes;
- DNA Instruction No. 20131 of 31 January 1993 relating to the establishment of IFR departure or approach procedures in the absence of an ATC centre;
- The amended Order of 24 September 1986 relating to the establishment of IFR departure, holding and approach procedures and the associated operational minima;
- Amended DNA Instruction No. 20760 of 18 September 1986 relating to the practical arrangements for the establishment of instrument departure, holding and approach procedures and the associated operational minima;

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[3] National documentation addresses strategic separation in Instruction No. 20754 (approach procedures only). The regulation relating to en route procedures still has to be drafted.

- DNA Decision No. 22400 of 12 December 2003 relating to the arrangements for the establishment of RNAV instrument procedures based on GNSS.

0 = no derogation

2 = formal derogation

4 = several formal derogations referring to different flight phases

SC = Safety Case mandatory

### *b. Complexity level (limits/stops, pilotability)*

The following criteria may be used to assess the complexity of the planned air traffic system:

- ➔ speeds systematically in droop stop;
- ➔ sequence of short segments;
- ➔ sequence of maximum slopes;
- ➔ number of fixes during descent;
- ➔ number of navigation aids to be used;
- ➔ number of frequency changes to be made;
- ➔ existence of multiple constraints (FL, speeds, etc.);
- ➔ change in navigation mode (in particular RNAV to conventional);
- ➔ number of sectors impacted;
- ➔ number of procedures to be changed;
- ➔ impact on foreign and/or military centres;
- ➔ interface with adjacent airspace (different airspace classes)
- ➔ other.

The overall complexity level of the planned air traffic system is assessed:

0 = low

2 = average

4 = high

### *c. Type of procedures*

This box is used to assess the quality of the pilot's three-axis positioning in relation to the nominal procedure. The check airman, users or flight control centre may if necessary be consulted.

0 = good (e.g. precision approach or RNAV route)

2 = average (e.g. conventional direct approach without vertical fixes or route based on conventional aids)

4 = poor (e.g. conventional indirect approach or estimated route)

***d. Difficulties connected with aerodrome certification***

This criterion relates solely to instrument approach and departure procedures. Certification procedures are defined in the Order of 28 August 2003 relating to aerodrome certification conditions and operational procedures.

0 = aerodrome certified for the operation

2 or 4 = aerodrome certified with restriction(s) or derogation*

SC = aerodrome not certified for the operation

* The mark awarded is based on the nature, scale and number of restrictions.

***e. Obstacle density and validity of associated information:***

Assessment of the density and validity of the information on obstacles taken into account.

0 = obstacle environment known and low-density, no impact on procedure

2 = obstacle environment known and high-density, impact on procedure

4 = obstacle environment insufficiently known or strong aerological phenomena

### 4.1.2 Integration of the change in actual system

***a. Level of heterogeneity of traffic***

Assessment of traffic heterogeneity level:

- aircraft: size, speed, flight type (IFR, VFR, COM)
- flows: number of intersections and direction in relation to existing systems

0 = low

2 = average

4 = high

***b. Level of difficulty of separation management***

Assessment of the level of difficulty of separation management:

- Strategic or tactical separation,
- type of separation used (conventional or radar),

0 = poor (strategic)

2 = average (tactical and radar)

4 = high (tactical and conventional)

***c. Level of inconsistency approach/en route***

What is of interest here is the interface between approach and en route, with the level of inconsistency/discontinuity between lower and upper airspace being characterised.

0 = poor (consistency)

2 = average

4 = high (e.g. departures from an airport in the opposite direction to an en route gyratory)

***d. Airspace class and nature***

The more uncontrolled the airspace, the higher the risk.

The more flights controlled in the same airspace, the lower the risk.

The mark awarded is based on the airspace class(es) concerned:

0 = A, B, C or D

2 = E

4 = F or G, or several airspace classes including E, F or G.

SC = derogating sector

### 4.1.3 Controllers' working methods

***a. Level of impact on controllers' working methods***

Assessment of the impact

- on working methods of a new tool associated with the change to the air traffic system
- of the changes in working methods brought about by the new air traffic system.

0 = low

2 = average

4 = high

***b. Complexity of coordination between controllers (local, external)***

Do the changes in working methods remain local, or do they involve other centres? To what extent (different transitional altitudes, number of sectors impacted, etc.)?

0 = low

2 = average

4 = high

### 4.1.4 Equipment

***a. Level of impact of the change on the controllers' tools***

Assessment of the need to simultaneously improve existing equipment or develop new tools to meet the needs of the new air traffic system.

0 = low

2 = average

4 = high

NB: the introduction of a new tool results in a technical EPIS, or a safety case. Coordination with the technical department must be ensured.

### 4.1.5 Human aspects

***a. Level of risk of project management***

Project management/in-house coordination: all those involved must have the same level of information as regards objectives, deadlines, etc. The greater the number of players, the greater the risk of the project losing cohesion.

Assessment of the level of difficulty of coordination:

0 = low

2 = average

4 = high

***b. Level of risk linked to training***

Assessment of the scope of training to be provided and of the risk of not having the correct tool/slot or of not having trained all the controllers.

0 = low

2 = average

4 = high

### 4.1.6 Aeronautical publication and communication

***a. Impact of the change on AIPs***

The more voluminous the AIPs, the greater the risk that they will contain incorrect or incomplete information or that other documentation will not be amended.

Assessment of the risk associated with the volume of AIPs required to introduce the planned system.

0 = low

2 = average

4 = high

***b. Level of external communication needed***

This covers all communications to the "aeronautical world" designed to attract attention to specific points deemed sensitive and to explain official documentation.

It is therefore necessary to assess the need for external communication if it is felt that the official documentation is insufficient to achieve the communication objective for the case.

0 = low

2 = average

4 = high

## 4.2 N: Justifications/Explanations "Characterisation of the risk"

This is where the EPIS author will enter all the information explaining and justifying the information contained in the previous box in order to facilitate subsequent comprehension of the choices made (traceability). The number of the box relating to each explanation/justification must be quoted (*e.g. M1b = sequence of short segments*).

# 5 Detailed analysis

Where the previous two phases were not able to establish the major nature of the change, the purpose of this final phase is to ascertain whether the impact of the planned change on safety has a severity class exceeding the thresholds defined in the Order relating to the performance of safety studies by ANSPs, necessitating the termination of the EPIS and construction of a safety case.

This analysis is carried out by identifying the hazards created by the planned change and assessing their severity. Once one of the hazards exceeds the thresholds defined in the Order (three or four, depending on the individual case), the EPIS is terminated (see Chapter 6) and a safety case must be constructed.

It is essential to call on the services of those people with the requisite (operational and/or technical) expertise and to follow the appropriate methodology, for example of the preliminary risk analysis (PRA) type, in order to ensure that this important phase is properly carried out.

If no hazard exceeds the aforementioned thresholds and the procedure has been as exhaustive as possible, the EPIS is terminated without constructing a safety case (see Chapter 6).

Severity is assessed twice: prior and subsequent to application of the tested safety barriers. The difference between the two makes it possible to assess the effectiveness of such risk mitigation action.

## 5.1 O: Detailed analysis, hazards

The "hazards" page must be replicated for each hazard. Each hazard must have an identification and a label.

By way of **example (this classification is valid in the French-DGCA environement and shold therefore not be used by other ANSP without prior validation in their own operational environement)**, and on the basis of the change considered, the following hazards might apply:

| Hazard | *A priori* severity (no safety barrier) | Example of "tested" safety barriers |
|---|---|---|
| Undetected penetration of a prohibited airspace class close to an IFR trajectory (e.g. VFR in class A). | 2 | Airspace structure, display of VFRs |
| Uncoordinated and undetected penetration of a sector/airspace where the flight was not expected. | 2 or 3 | Colour customisation with ODS base, telephone coordination, airspace construction. |

| | | |
|---|---|---|
| Failure to comply with transfer conditions as a result of e.g. mutual ignorance of new constraints and working methods. | 3 or 4 | Briefings, training, TFL display. |
| Inconsistency of ground/air information (failure to understand a clearance, publication or encoding error)<br>- procedure reference<br>- reporting point<br>- heading<br>- speed<br>- FL<br>- Other. | 3 or 4 | Test on airborne simulator or trajectories, caution in defining procedures, coordination with airlines and encoding bodies. |
| Loss of information (particularly in RNAV) by the guidance tool on final approach (spoofing, jamming, masking, etc.). | 2 | VMC flight test<br>ILS certification |
| Failure to respect flight profiles on approach (as a result of e.g. a procedure design error:<br>- trajectory not appropriate or impossible to follow for the planned aircraft (slopes too steep or gentle, etc.)<br>- definition error in the vertical plane, descent slope<br>- positioning error of a vital point<br>- intersection difficult to manage) | 2 to 4 | VMC flight test or test on appropriate simulator, user consultation |
| Closure resulting e.g. from non-segregated trajectories | 3 or 4 | Scheduling of departures |
| Decrease in ground separation margin as a result e.g. of:<br>- errors in topographic surveys (or non-exhaustive)<br>- errors in positions of obstacles, altitude values, descent fix values<br>- coordinate conversion errors<br>- errors in application of the regulation | 2 or 3 | Cartography, appropriate obstacle surveys<br>Validation by detailed site reconnaissance<br>Approved software and data cross- |

| | | |
|---|---|---|
| at the time of establishment of protection areas<br>- lack of regulations | | checking<br>Competence of the study body<br>Increase in margins |
| Poor management of intersections caused inter alia by:<br>- intersections which are dispersed, close to or above the sector limits<br>- horizontal and/or vertical convergence<br>- poor integration of departure flows with overflight and/or arrival flows | 3 or 4 | Appropriate procedures (preferential levels, flow rates, etc.)<br>Increase in vertical or horizontal separation |
| Taxiing error likely to result in runway incursion or confusion<br>- lack of taxiway plan<br>- plan inappropriate or obsolete<br>- reduced visibility<br>- terrain configuration (slope, etc.)<br>- taxiway configuration | 1 to 3 | Signposting, taxiway plan, A-SMGCS<br>Restriction on numbers of aircraft taxiing simultaneously |
| Increase in wake turbulence<br>- displacement of the threshold of one of a pair of runways | 2 to 3 | Throughput on take-off |

## 5.2 Assessment of risk severity and acceptability

Severity must be assessed using the classification scale proposed in ESARR 4 and incorporated in the Order relating to risk assessment and mitigation in ATM (see Annex 2) and taking into account the tested safety barriers. These safety barriers may help reduce the severity and/or frequency of occurrence of the hazard.

If the EPIS does not recommend the construction of a safety case, it must, pursuant to the draft ESARR 4, justify the acceptability of the risk.

For this purpose, recourse could be had to the safety objectives of the centre and the frequency of occurrence of the hazard in question could be assessed, possibly qualitatively, using the following grading:

- Extremely rare
- Rare
- Occasional - once or twice a year

- Likely - several times a year
- Numerous - several times a month

It is recognised that an argument based on a combination of quantitative (statistical) and qualitative (good working method, professional judgment, improvement in safety in relation to the system previously in operation) elements can be used to demonstrate, with a sufficient level of confidence, that certain safety objectives and requirements have been met.

**This demonstration includes confirmation of the actual implementation and sustained effectiveness of the risk mitigation measures presented, particularly in the case of permanent changes.** The justification box will indicate the follow-up and monitoring methods applied to ensure that the effectiveness of the safety barriers does not deteriorate over time. In the same spirit, the risk mitigation action managers will need to be identified with maximum precision: name, unit, internal/external player, etc.

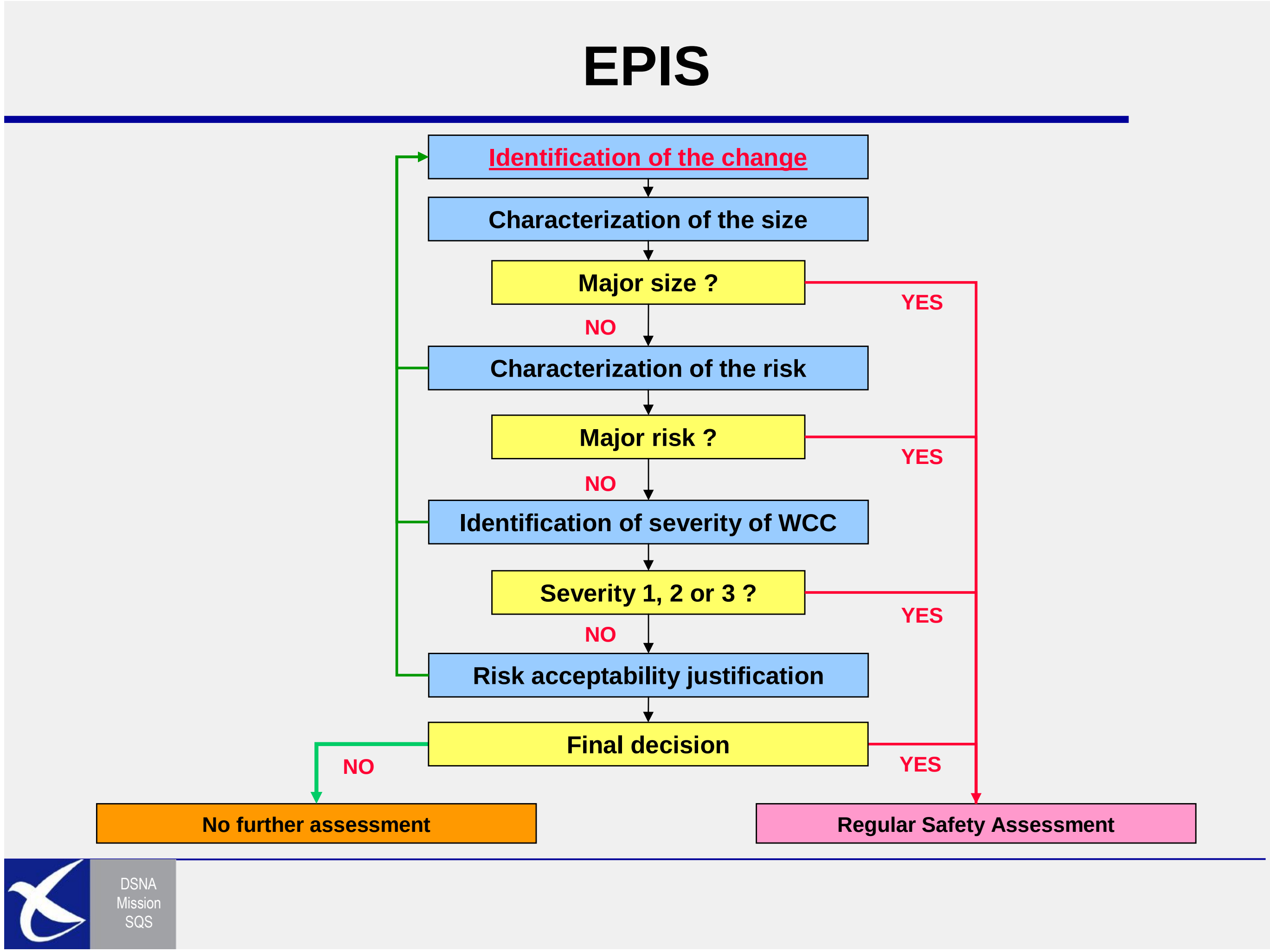
Furthermore, the contribution of a safety barrier to the adjustment of the severity class and/or the frequency of occurrence will be highlighted as far as is possible.

# 6 Completion of the EPIS

Once the EPIS-CA has been completed, the "decision proposal" block (see Chapter 2.5) is filled in by the coordinator, who then activates the approval and decision circuit defined in the service provider's SMS.

The EPIS document and all appendices are then archived. However, they must remain accessible in order to ensure effective follow-up of EPIS analyses, and facilitate feedback and being made available to the Regulator.

# Annex 1: EPIS-CA procedure



# Annexe 2 : Severity grid determining the impact of hazards on safety[4]

| Severity class | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Effect on operations | Accident | Serious incidents | Major incidents | Significant incidents | No immediate effect on safety |

CNS: Communication Navigation Surveillance

ATC: Air Traffic Control

The examples given in this grid may be supplemented, provided the following criteria are met:

Severity class 1: Accident;

Severity class 2: Safety margins are seriously compromised with no possibility of immediate closure;

Severity class 3: Safety margins are compromised, but the ANSP or crew has closure tools available, or the margins are slightly compromised without any possibility of immediate closure;

Severity class 4: Incident resulting in an increased workload which may compromise to some extent the anticipation capability of the controller or pilot;

Severity class 5: No immediate effect on safety.

[4] Extract from the draft DNA Order relating to risk assessment and mitigation in ATM, V10 of 11 June 2004