DK/SE FAB and NUAC HB
Safety Case and Safety Assessment Process

NAVIAIR

Air Navigation Services

ES2 WS2-11
FAB SAFETY CASE &
FAB SAFETY ROADMAPS

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18-05-2011

Danish/Swedish FAB

DK/SE FAB consist of:

Danish airspace including dedicated airspace from Scottish.
Danish airspace, Greenland and Faroe Islands is not included.

And
Swedish airspace including dedicated airspace from Poland, Norway and Finland.
The Swedish airspace dedicated to Norway is not included.

The airspace is from ground and up.

DK/SE FAB Background

- **Regulation (EC) No 549/2004 of the European Parliament and of the Council of 10 March 2004 layed down the framework for the creation of the single European sky.**

- **DK/SE FAB is a step towards the single European sky.**

- **DK/SE FAB is developed to achieve maximum capacity and efficiency of the air traffic management (ATM) and air navigation services (ANS) with reduced cost maintaining or increasing the high level of safety and reduced environmental influence in the Danish and Swedish airspace.**

DK/SE FAB Legal

DK/SE FAB is owned by the governments of Denmark and Sweden.

The NSA´s in Denmark and Sweden are overall responsible.

A new ANSP - NUAC HB has been established to carry out ATM/ANS En Route and Approach Copenhagen, Stockholm and Malmö.

The 3 major ANSP´s in DK/SE FAB are:

LFV

NAVIAIR

NUAC

DK/SE FAB Certification

LFV and NAVIAIR

Are certified and designated. LFV to carry out ATM/ANS in Swedish airspace and Naviair to carry out ATM/ANS in Danish airspace.

NUAC Is preparing for certification.

NUAC HB is acting on behalf of LFV and Naviair.

DK/SE FAB Transition Plan

TRANSITION PLAN for NUAC HB

NUAC commencement:

- 1 January 2011 NUAC HB started work in partial commencement.
  Partial commencement because NUAC was not and is not yet certified.
  SMS was not ready at that date.
  Work was and is still carried out on the certificate of LFV and Naviair.

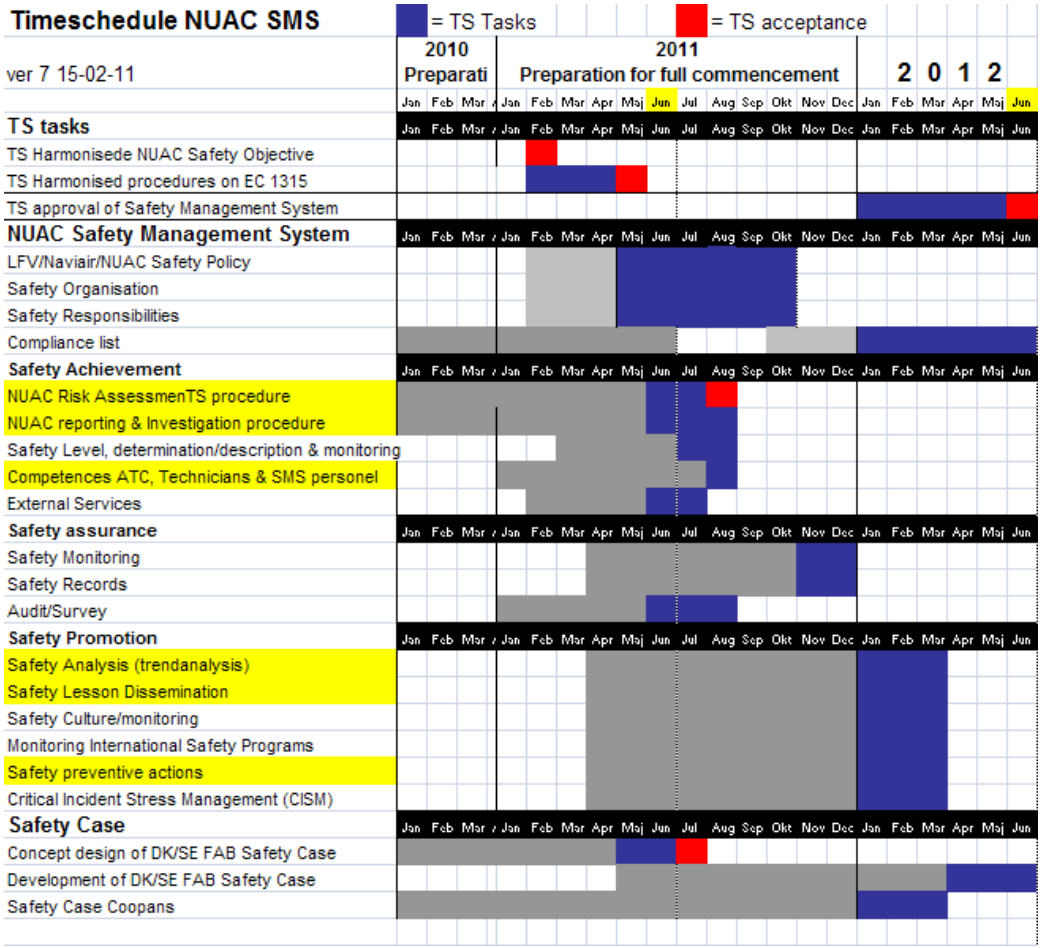
- Full Commencement Date: Mid 2012.
  At that date NUAC HB is certified.
  LFV and Naviair are designated.
  The Safety Case has been accepted.
  SMS is harmonised.

DK/SE FAB Time Schedule SMS

Dk/Se FAB SMS Time Schedule:

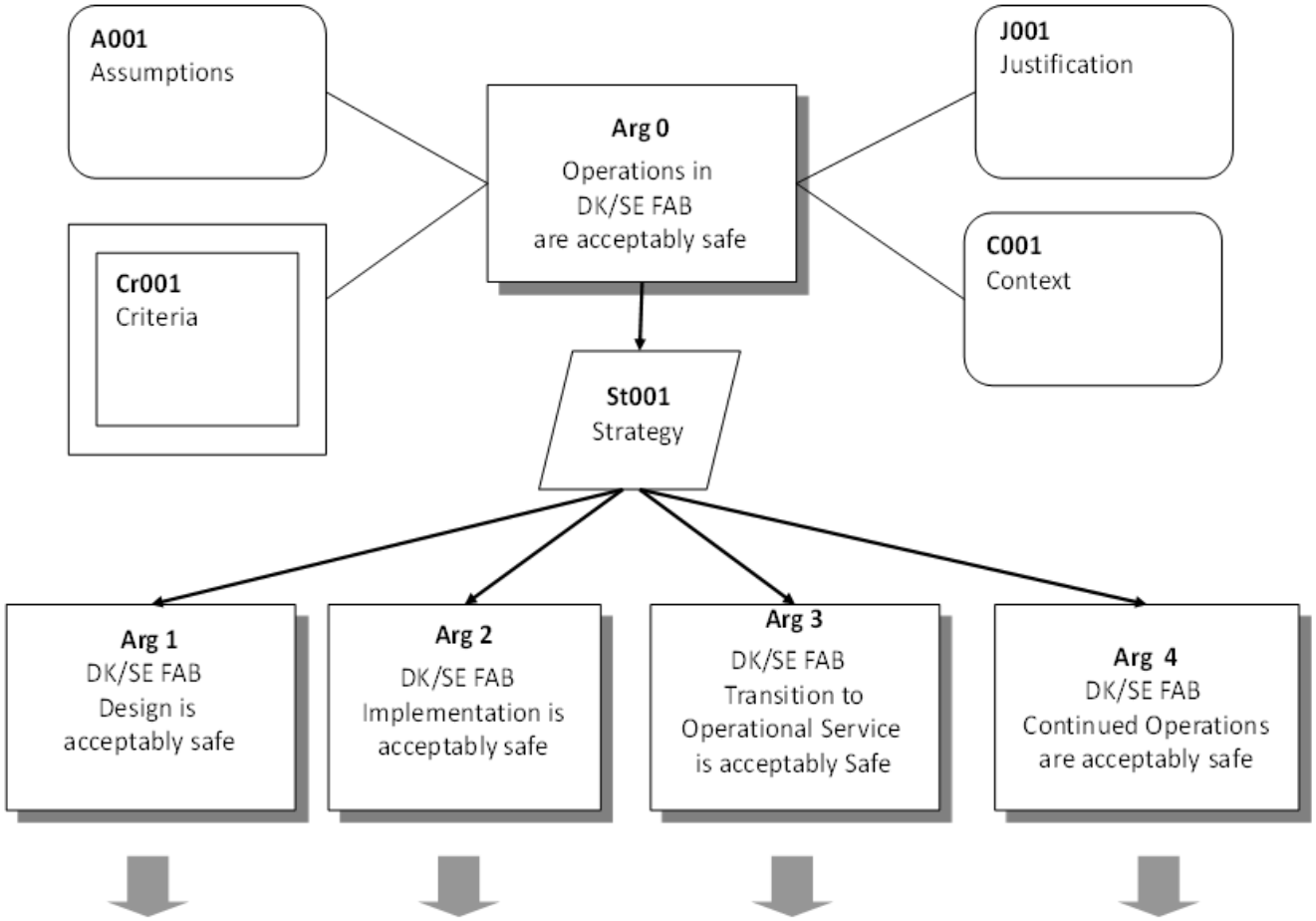
TS Sweden

TS Denmark



Concept design of DK/SE FAB Safety Case Arg 0

GSN:



Concept design of DK/SE FAB Safety Case Arg 1

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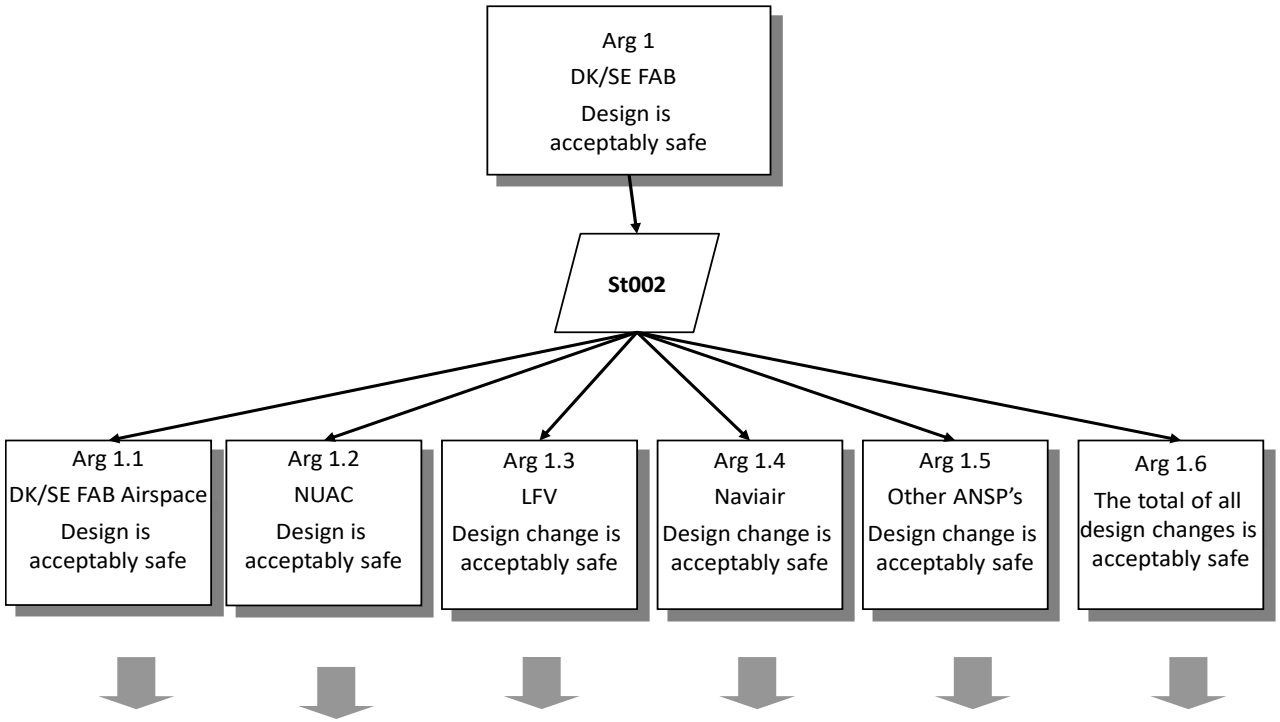

Concept design of DK/SE FAB Safety Case Arg 2

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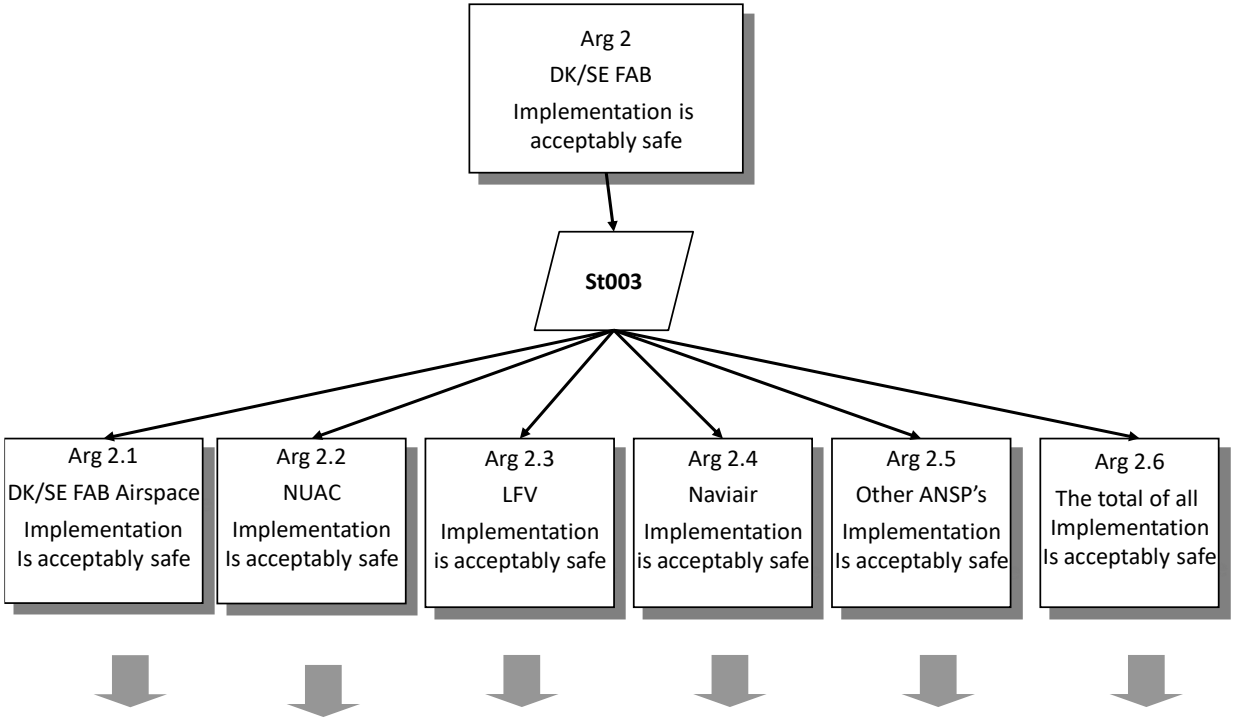

Concept design of DK/SE FAB Safety Case Arg 3

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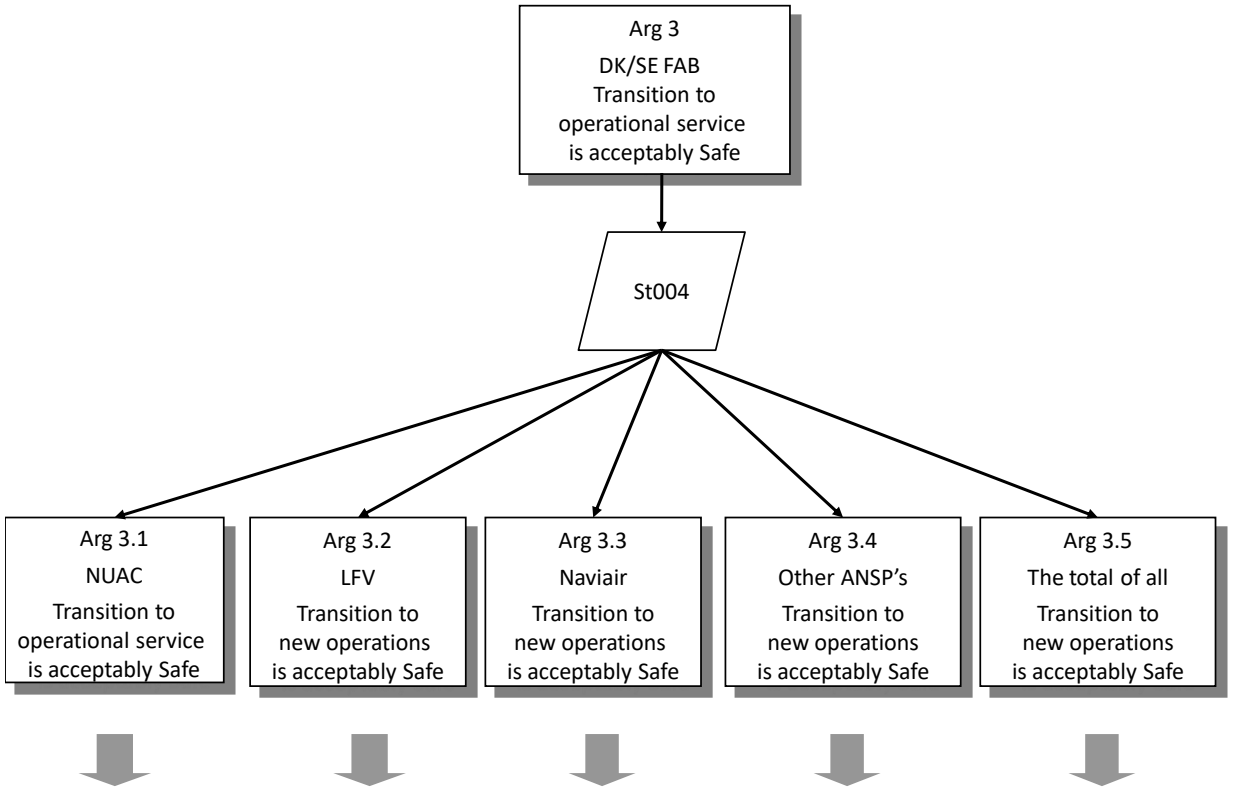

Concept design of DK/SE FAB Safety Case Arg 4

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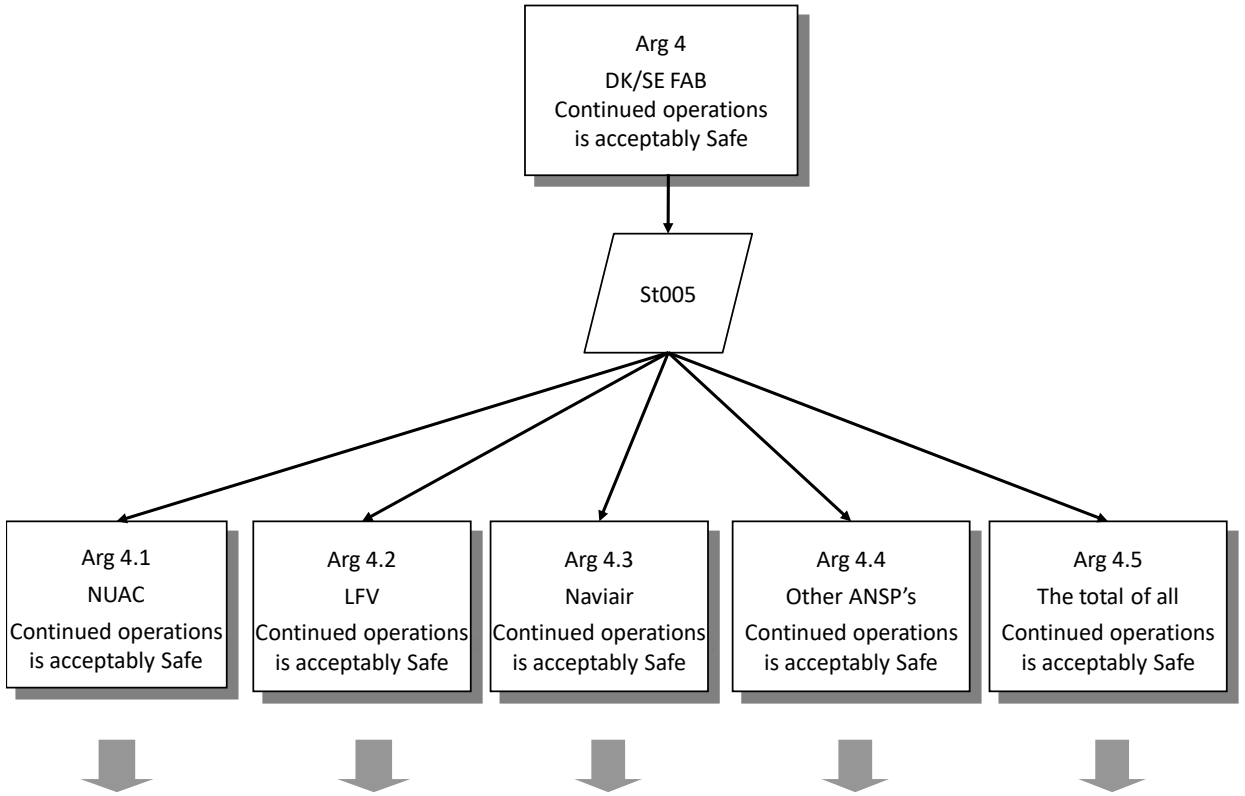
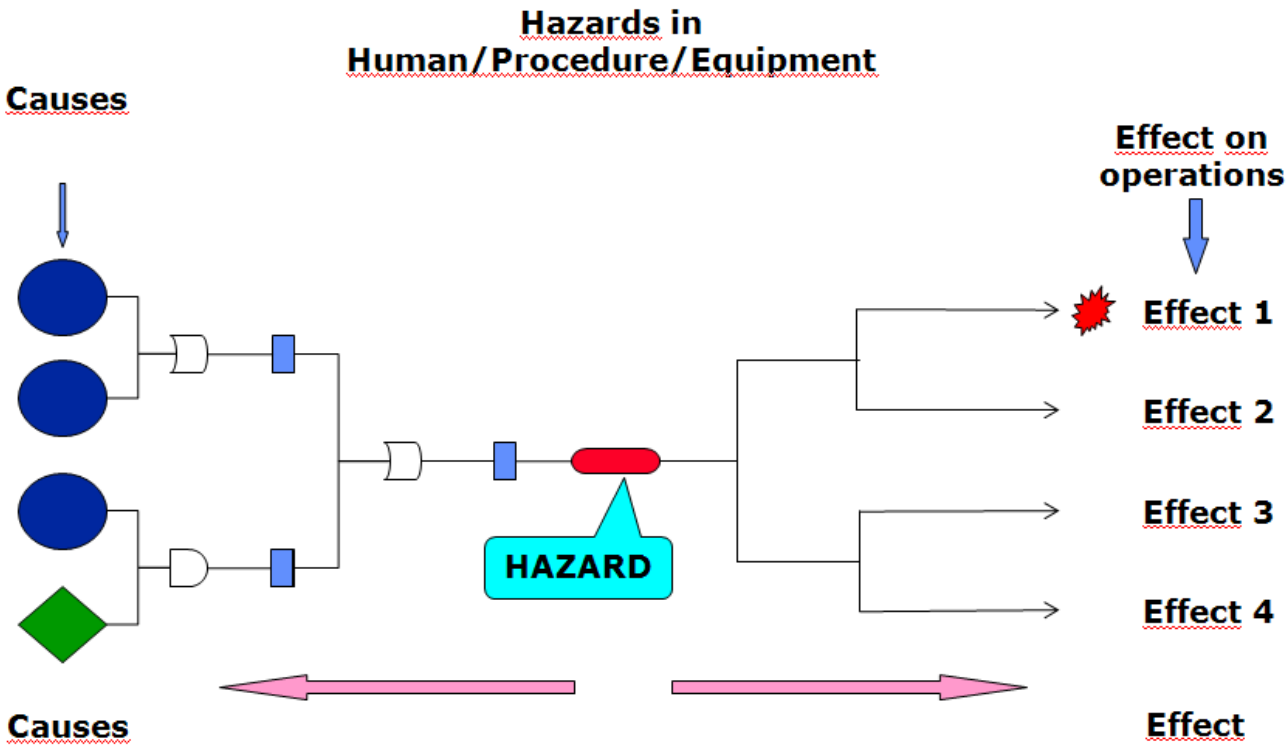


DK/SE FAB Safety Management System

NUAC HB, LFV and NAVIAR have a common safety management system in accordance with Common Requirement EC 2096/2005 of 20 December 2005. The safety management system includes the following:

- Common Safety Policy.
- Plan
  - Planning
  - Organisational Structure
- Achievement
  - Competency
  - Safety Occurrences
  - Safety Targets
  - Risk assessment and mitigation
  - External Services
- Assurance
  - Safety surveys
  - Audits
  - Safety Monitoring
  - Safety records
- Promotion
  - Trend monitoring
  - Lesson dissemination
  - International flight Safety Programmes
  - Safety Improvement

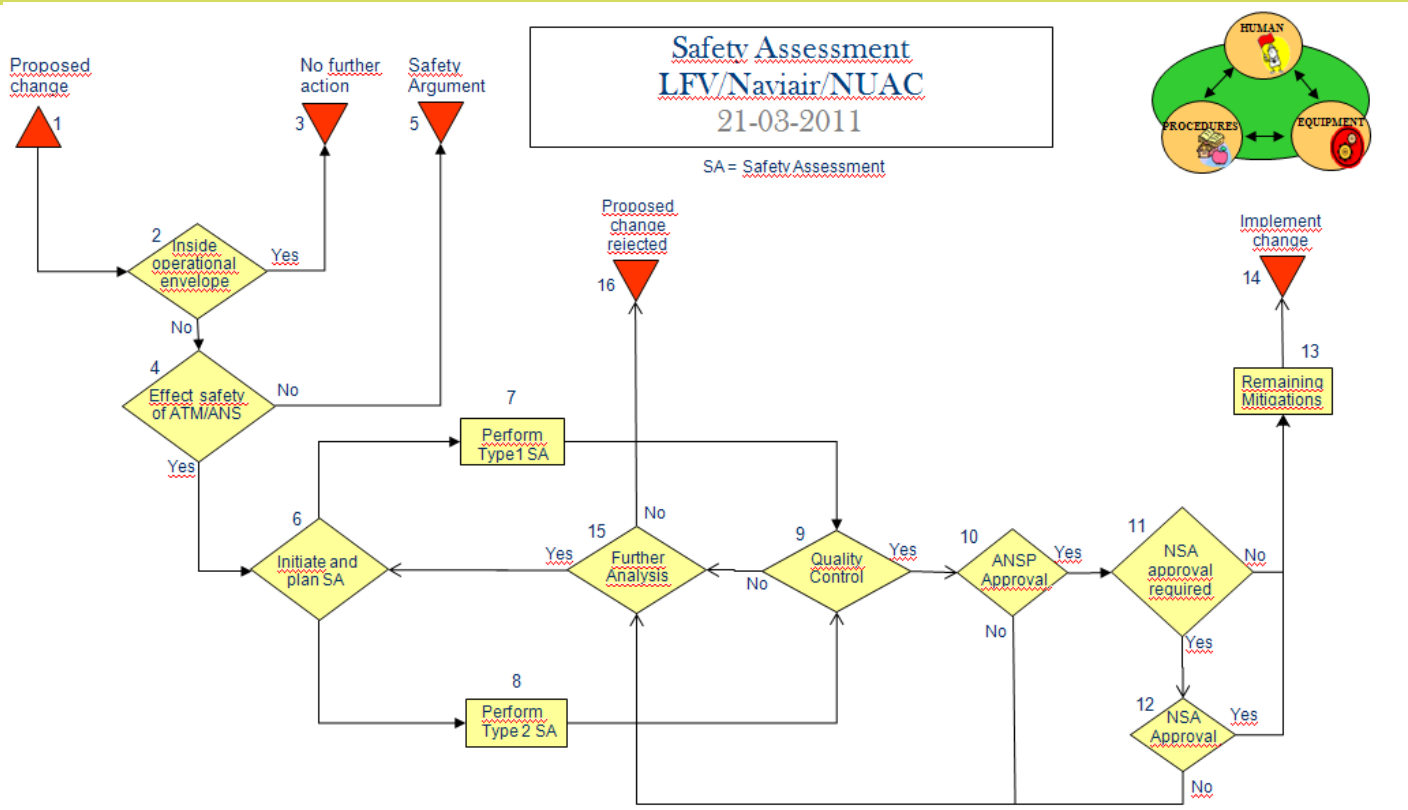
DK/SE FAB Safety Assessment Model



Fault tree

Event tree

DK/SE FAB Safety Assessment Process



DK/SE FAB Safety Assessment Process

Step 1: Proposed change.

Input to this process is a proposed change. It may be any change concerning the ATM/ANS inside or outside the operational envelope.

The typical areas of changes are:

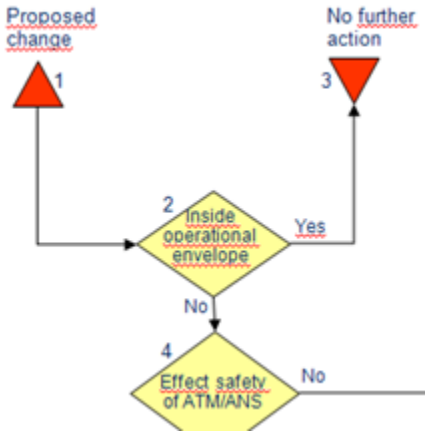
- **Procedures**
- **Equipment**
- **Education**
- **Organisation**
- **Environment that may influence ATM/ANS**
- **Implementation of Regulations**
- **Maintenance**
- **The list is not complete.**

DK/SE FAB Safety Assessment Process

Step 2: Inside operational envelope?

At this step it is decided whether the proposed change is considered to be part of the normal operations as defined in the operational envelope.

DK/SE FAB Safety Assessment Process



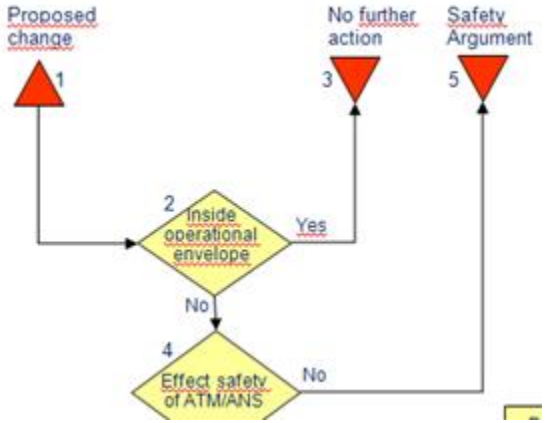
Step 4: Effect safety of ATM/ANS.

Determine if the proposed change can have an effect on the Air Navigation System/Services.

The change owner is responsible for this evaluation. If necessary, persons with safety assessor competence can make the evaluation.

Determine if the change is an immediate unanticipated tactical change. Such event should lead to fill an occurrence report. A safety assessment should be performed on the occurrence report.

DK/SE FAB Safety Assessment Process

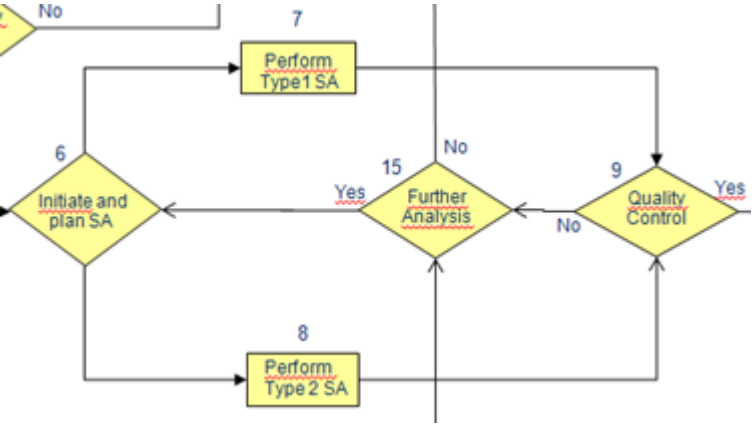


Step 5: Safety Argument.

Produce a safety argument and file it.

This is performed by the change owner or, if necessary, by a person with safety assessor competence.

DK/SE FAB Safety Assessment Process



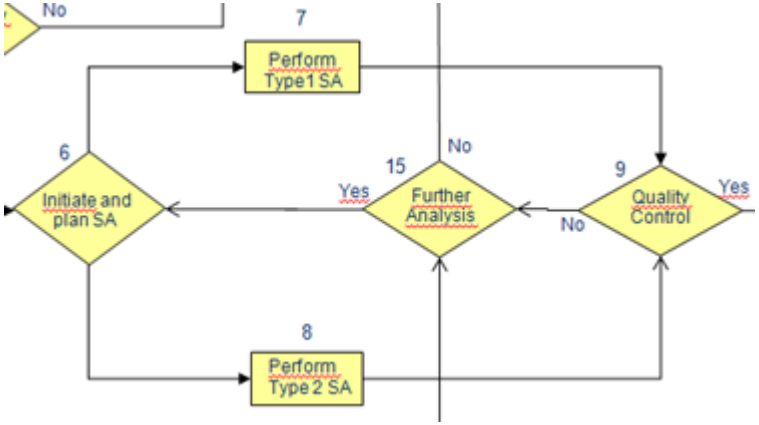
Step 6:

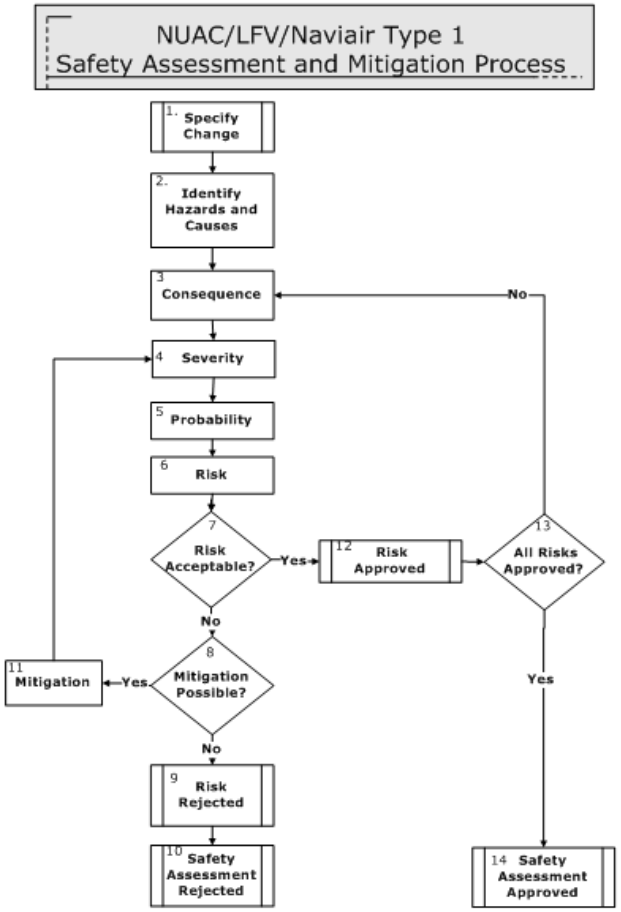
Initiate and plan Safety Assessment.

Initiate and plan the Safety Assessment process. Decide on the type of assessment (type 1 or 2), structure of argumentation and documentation.

DK/SE FAB Safety Assessment Process

Step 7:
Perform type 1
Safety Assessment.





NAVIAIR

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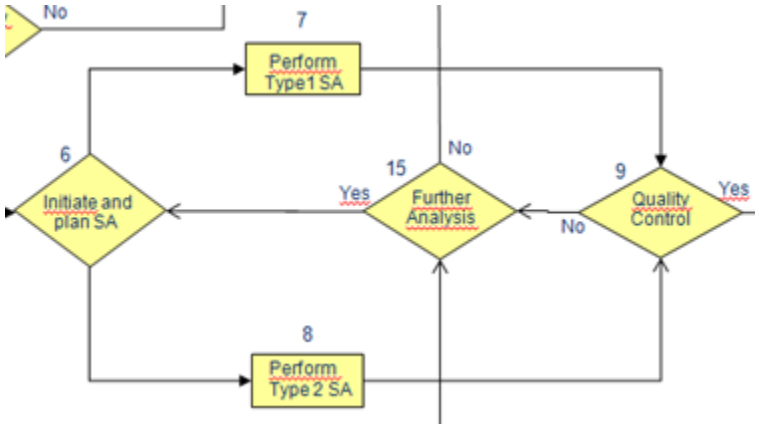
DK/SE FAB Safety Assessment Process



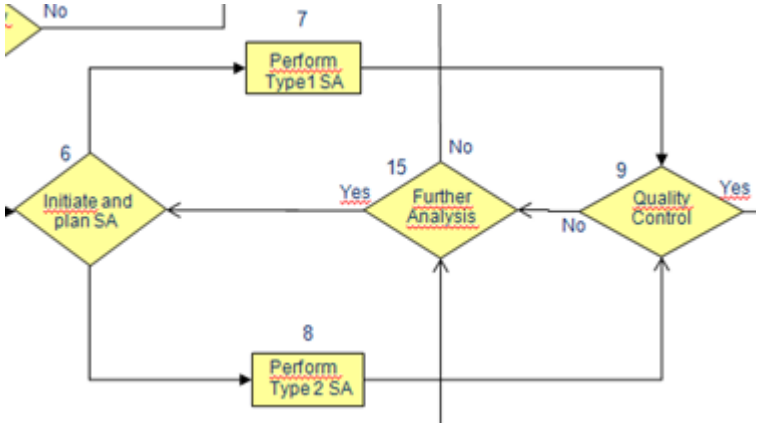
Step 8:

Perform type 2 Safety Assessment.

Type 2 Safety Assessment is the SAM model.

Type 2 Safety Assessment begins with an FHA (Functional Hazard Assessment) followed by a PSSA (Preliminary System Safety Assessment) continuing with a SSA (System Safety Assessment).

DK/SE FAB Safety Assessment Process



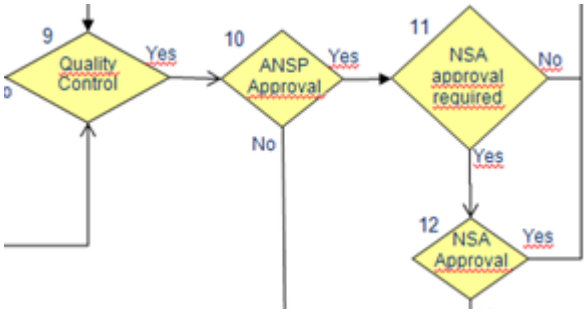
Step 9: Quality Control

Review is performed to make sure that the quality of a safety assessment is of a high value and ready to approval.

Type 2 SA: Review is performed during the project and when it is complete.

Type 1 SA: Review is performed when the Safety Assessment is complete.

DK/SE FAB Safety Assessment Process



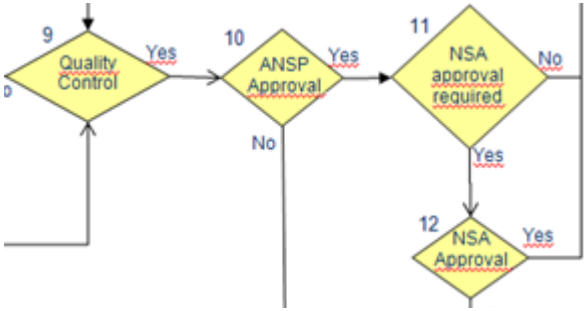
Step 10: ANSP Approval.

Determine if the level of safety is acceptable for operations.

Every approved risk shall be signed. If not all risks are approved, the level of safety is not acceptable and the change cannot be implemented as is.

ANSP approval includes a validation of the risk and the cost to introduce the change as a result of the Safety Assessment.

DK/SE FAB Safety Assessment Process



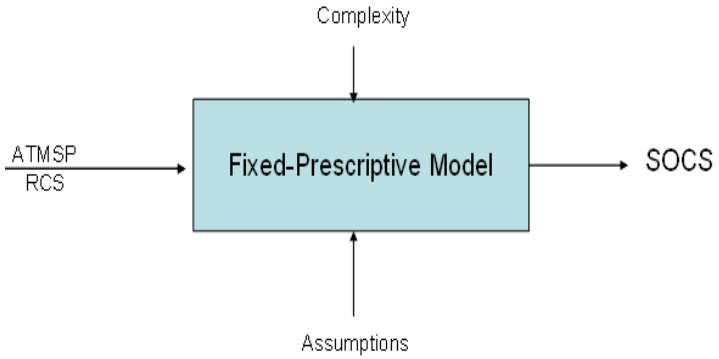
Step 11: NSA approval required.

Decide if the Safety Assessment Report or Safety Case shall be sent to the NSA for approval. The decision is taken according to Commission regulation (EC) No 1315/2007 of 8 November 2007.

If yes, send the Safety Assessment Report or Safety Case to the National Safety Authority (NSA) with request for approval.

DK/SE FAB Safety Assessment Process

Risk Classification Matrix
Derived from ED-125 model 4.



Risk Classification Matrix:

Hazard			Probability - hazard/year				
Probability / Hazard / Risk / Severity			Often	Several times during the lifetime of the system	Probably during the lifetime of the system	Probably not	Unlikely to occur
			3E+00 or more	3E+00 to 2E-01	2E-01 to 1E-02	1E-02 to 3E-05	Less than 3E-05
			I	II	III	IV	V
Severity	Accident	1	A	A	A	A	C
	Serious incident	2	A	A	B	C	D
	Major incident	3	A	B	C	D	D
	Significant incident	4	B	C	D	D	D
	No immediate effect	5	C	D	D	D	D

Thank you

Questions?