MISO:

Method for Intervention on Systems linked to ATM Operations

Users Handbook

1 Content

2 Purpose of the sheet

This sheet (generally 4 pages in the form of a folder) is designed to assist the person responsible for the scheduled intervention on an operational system to evaluate rapidly and as objectively as possible the technical and functional risks associated with the works and the related constraints in order to select the appropriate preparation procedure for the operation.

- **ASSURANCE** preparation: avoiding all omissions, examining in detail the risks, potential scenario options and steering/coordination constraints. The Project Leader appointed for the operation should apply the full generic procedure for this type of intervention, including the additional sheet provided for Assurance preparation, the operating mode sheet, etc.

- **NORMAL** preparation: such cases rely on the know-how of the staff involved in the interventions and in their self-discipline in applying the routine procedures as regards notification and coordination.

In all cases, the sheet will be used as pre-project work sheets and summary description of the procedure, which shall be sent to the all interested parties without waiting for the sheets to be finalised.

3 Presentation of the sheet

3.1 Headers and footers

These are the responsibility of the centres, depending on the documentary classification. Originally they contain:

- In the central header: the name of the centre, the general subject, the version title and the date of preparation of the form

- In the footer: the location of the file, the author and the page numbers

3.2 Sheet type and reference

Initially, an absolute reference will be defined for this sheet, which will be reused in all the documents subsequently annexed:

Then it will be decided whether it is an intervention sheet which is either

- specific – i.e. a unique intervention. (in the sense that the content of one software version for example may be more relevant than another). In such cases a period can be scheduled for the intervention without setting an exact date.
- or generic – i.e. a simple and/or frequently repeated intervention, but which amounts to a functional change of the impacted system (software, hardware, etc.). In such cases its content has to be revisited for each occurrence in the light of the criticality of the modifications made (compared to the former case).
- Repetitive – i.e. a simple, recurrent or frequent intervention that does not induce any functional system modification. It includes preventive maintenance, training session on operational system, operational procedure test. As a MISO will be performed once for all on such interventions (that is not supposed to change except in case of users feedback), therefore the analysis of such interventions will be eased and less resource demanding. Operational Manual may reference such MISO sheets.

4 Notice of work (Page 1)

The first page allows the person responsible for preparing the intervention, in general the drafter in the Technical Service (local), to define the intervention and notify all the relevant contact people that it is being prepared. Thus, in this phase he becomes the preparation coordinator for these various parties.

As stated in §1 and for coordination purposes, this draft notice of work will have to be disseminated as soon as possible to interested parties whether they play a role in the intervention or they are impacted by it.

4.1 Object of the intervention (§1)

Quote the general title of the intervention, the drafters and validators of the two Operational and Technical Services (local) in accordance with the local SMS Manual, and the drafting and approval dates.

Date of validation is reported at the end of page 4 (§12) before dissemination to decision maker and before its approval.

4.2 Description of the intervention (§2)

Start with a detailed description of the intervention. (do not worry about the size of the box – it expands to fit)

Then select the following type:

- F: Preventive maintenance.

In the framework of SAM, MISO will be used only for Preventive maintenance intervention.

- A: Change of component (hardware and/or software)
- B: Modification of operational context[1]
- C: Modification of parameterisation
- D: Intervention relating to the environment of the system[2]
- E: Geographical reorganisation of equipment

Then tick the hardware, software and functions impacted.

The support service(s) will be identified. In case no support service is impacted (very rare), justification should be provided and if confirmed, then §6 is not applicable.

In exceptional cases, an observations field is available for entering such information as hardware installed occasionally or to better define the function impacted.

[1] Example: when a system switches from "test" to "ops" or "redundant" mode.

[2] Example: intervention on the electricity supply network, on the air conditioning network, works which may generate dust, humidity around the technical room, etc.

Comments:

Ensure that for each centre the entire list is kept up to date, if possible by unit so that it is easier to determine the services concerned.

4.3 Interested parties (§3)

These are pre-defined and complementary lists (see comment above) for distribution of this sheet, incomplete at this stage, serving as a draft notice of work for subsequent coordination in preparing the intervention.

As mentioned earlier, this information to interested parties (as identified in §3) shall be performed without waiting for the sheets to be finalised.

It should be noted that certain contact staff external to the French ANSP (Communication Service Provider, military, etc.) may not be advised by this procedure.

5 Technical Risk Analysis (Page 2)

The second page is for the Technical Service (local) to determine the technical complexity of the operation and decide the type of technical procedure applicable: either NORMAL or ASSURANCE. They will also state the mitigation means and risk-reduction measures they envisage and in particular the period during which they would like to perform the intervention. (e.g.: light traffic). This will allow the Operational Service to better assess the conditions and constraints so as to be able to make a functional analysis of the impact on the services provided.

5.1 Technical Risk Analysis (§4)

This table (No. 4) will directly determine the preparation method to be applied for the operation - the other tables only apply at a later stage (along with table no. 4 of course) when determining the scenario and procedure to be adopted. The purpose of the exercise is to reduce the risks with a value of more than 1 in this table. In this case,it is necessary to enter comments in the observations field.

In order to provide help with this process, practical guidelines have been set out below.

These guidelines will of course be updated on the basis of feedback. The lists are not exhaustive and may be progressively added to, section by section.

5.1.1 Technical complexity

This involves evaluating the technical risks. For this first criterion, we seek to establish the risk posed by the intrinsic complexity of the intervention or by its rarity (little previous experience, little prior training, etc.).

Evaluation factors:

0. routine or not complex intervention
1. average degree of complexity - could be carried out by all staff at the unit(s) concerned
2. degree of complexity requiring action by experienced staff and careful preparation, or problem of large number of simple, but repetitive, tasks
3. highly complex, requiring high level of skills and extremely meticulous preparation.

Practical guidelines:

- Take experts for the works wherever possible,
- Break down the tasks
- Classify the tasks by criticality. For the most critical tasks:
  - Indicate a number of characteristics associated with these tasks: initial status, final status, conditions for initiation, any tests or checks, etc.
  - Check whether there is any suitable documentation (operating modes in particular) and revise it where necessary; if appropriate, indicate references and where the documentation is kept.
  - Identify hazards and feedback on these tasks.

5.1.2 Multiple stakeholders

Risk can stem from the number of staff involved in an intervention and a lack of joint preparation and/or coordination.

Evaluation factors:

0. staff from the same section (within the same unit)
1. several staff involved, but from the same unit
2. staff from several units in the same centre, usual external companies
3. staff from several centres, not the usual external companies

Practical guidelines:

- Preferably designate one overall manager.
- If the operation is also technically complex, do not hesitate to assign responsibility for the operation to one person whose sole task is coordination and supervision. This is because if this person has a complicated task to carry out, he/she might get caught up in that task and forget to coordinate.
- Give the various staff involved an overview of the operation: objectives, constraints, risks, critical tasks, operational impact.
- Ensure that the participants have a common reference baseline for the operation: plans, common language and terminology, test scenario, etc. To this end, do not hesitate where necessary to organise prior meetings for all the participants; distribute the necessary documents.
- Emphasise the importance of coordination and treat it as a particularly important task.
- Heighten the risk awareness of external companies.
- Emphasise the need for coordination and exchange of information between Technical Supervision and Maintenance skill centre (local).
- Clearly identify the staff involved.
- Draw up the intervention scenario; clearly indicate the conditions for sequencing the tasks (pre-tests, triggers, etc.) and define the interfaces.

5.1.3 Interaction with other systems

This is an attempt to measure the potential impact of the intervention on **other (critical or major) related systems**, envisaging the possibility of disruption.

Evaluation factors:

0. not interconnected
1. slightly interconnected
2. relatively interconnected
3. highly interconnected

Practical guidelines:

- Keep yourself informed, and keep others informed, of any constraints or other planned interventions which might cause problems (in the centre and in other impacted centres).
- Secure authorisation to involve other (internal and external) services responsible for the connected systems.
- Coordinate (see previous paragraph).
- Consider whether there are constraints on the status or configuration of connected systems.
- Prepare a programme of tests and checks which takes due account of the existence of connected systems: Verify that they operate satisfactorily after the intervention, but ensure that no unacceptable risks are taken for these tests; select the slot accordingly.

5.1.4 Intervention duration

The longer the intervention, the greater the theoretical risk of disruption and the greater the need for coordination and care in defining stable intermediate statuses.

Evaluation factors:

0. short intervention (in relation to the service concerned)
1. intervention lasting less than ½ day
2. intervention lasting more than ½ day and less than 1 day (may depend on the centre)
3. intervention lasting more than 1 day

Practical guidelines:

- Even if the intervention is very short, advise the Technical Supervision and obtain its authorisation.
- Where the operation is lengthy, break it down into stages (stable statuses) and monitor works by noting the progress made, with suitable comments. Make provision for backtracking conditions (reversion to previous state) or extended operation conditions at one of the stable states.
- Do not be too ambitious or optimistic in estimating how long tasks will take.
- Ensure that information is passed on when new people take over (Technical Supervision and Maintenance skill centre (local)).
- When the operation is lengthy, always make a point of reviewing the overall plan when certain specifically identified stages have been completed. Make a new plan where necessary.
- If the deadlines set are overrun, advise the staff concerned.

5.1.5 Risk due to mis-handling

This involves evaluating whether, during the intervention, there is a risk of a technician causing an operational system to malfunction or fail: e.g. a screwdriver falling into a slide-valve and causing a critical system to fail, or an error operating critical relays or switches, etc.

Evaluation factors:

0. No particular risk
1. Slight risk of mis-handling
2. Risk of a mis-handling which might result in degradation of an operational function
3. High risk of a mis-handling which might result in degradation or loss of an operational function

Practical guidelines:

5.1.6 Sequencing constraints:

It has to be established whether the intervention is part of a wider operation. If this is the case, any delay might jeopardise the operation and moreover it has to be ensured that the pre-requisites for the intervention are catered for, since they might be dependent on other sequenced actions or interventions.

Evaluation factors:

0. isolated intervention
3. several operations to be sequenced

Practical guidelines:

- Describe the sequencing of the tasks and the associated conditions: pre-conditions for initiating a task, trigger, etc.
- Introduce checks to be made for each task: testing modalities, duration, backtrack position (reversion to previous state) if necessary, etc.

5.1.7 Backtracking conditions (reversion to previous state)

Account has to be taken of the time and resources needed to restore the best possible conditions of stability in the event of an incident connected with the operation or an incident having an impact on another critical or major system. The result of any possible backtracking must also be considered.

Evaluation factors:

0. simple backtrack
1. backtrack requiring specific precautions
2. complicated or not credible backtrack
3. backtrack impossible

Practical guidelines:

- Analyse possible backtracks for the various stages.
- Describe the modalities for any backtrack (for every stage): resultant configurations, functions available and performance, resources required, associated procedures, duration of backtrack, required information, authorisation and coordination, etc.
- Where backtracking is not possible, identify one (of the) possible solution(s) for remedial action (e.g. pre-flight terminal out of service, but possibility of activating flights via TID (Touch Input Device) , etc.) or degraded solutions.
- Prepare specific action plan in the event of a backtrack.

5.1.8 Number of problems experienced

This involves taking account of experience by considering similar operations in the past:

Evaluation factors:

0. no problems experienced on similar interventions
1. rare incidents
2. two incidents per year or no feedback or immature system or specific intervention
3. frequent problems (systematic problems or immature system subject to frequent problems)

NB

Feedback is not considered a risk but a positive factor, which therefore reduces risks.

Practical guidelines:

- Examine the reports of interventions which went wrong.
- Take account of feedback from outside the centres (in particular reports from other centres issued by the Operational Service (headquarters), Technical Service (headquarters) or on groupware).
- Where equipment or software is immature, do not hesitate to take precautions and make provision for any problems: choose a slot which minimises risks, make provision for support from, or the intervention of, experts; plan backtracks (reversion to previous state) or remedial solutions, etc.

5.1.9 Level of involvement of the Technical Supervisor (local)

This involves taking account of the supervisor's availability and monitoring possibilities during the intervention.

Evaluation factors:

0. No supervisor involvement (seldom case, deals with intervention having no impact on any support service)
1. Monitoring (He is kept informed about, and monitors, the operation)
2. Participation (he performs operations in the course of the intervention)
3. Project manager (he carries out the entire intervention)

Practical guidelines:

5.1.10 Total: technical risk

The table columns are totalled. This total tends to reflect the complexity of the intervention, but does not indicate the operational impact it might have. The preparation mode will be Assurance if the total is **greater than 10**, otherwise it will be Normal.

5.1.11 Expected consequences

We are now in a position to analyse the foreseeable technical consequences. These are therefore described to inform the other partners, and in particular the operator, so that he can make his functional analysis in the conditions laid down.

5.1.12 Hazards (caused by Technical Incidents)

List all hazards that may be caused by technical incidents, and mention their reference if they are part of a (predefined) list of hazards.

Also try to imagine unpredictable hazards which could arise and would cause problems. Describe as many hazards as possible.

5.2 Mitigation of the technical risks (§5)

5.2.1 Technical risks evaluated

Tick the bock depending on the value given in the field of §4 "Total: technical risks" (see chapter 5.1.10)

5.2.2 Choice of preparation mode

The choice of normal or assurance preparation mode depends on the total technical risks previously assessed and is determined in relation to a ceiling (around 1/3 of the maximum score).

If total is equal to or less than 10, "NORMAL" preparation mode only can be acceptable.

If greater than 10, the full "ASSURANCE" preparation will be necessary.

However, it is possible where justified to select a procedure other than that determined by this scoring system.

5.2.3 Justification of different mode

Main reasons which lead to choose another preparation mode.

5.2.4 Conventional mitigation means on the technical side

These are resources (documentation, feedback, etc.) or routine procedures/instructions for the Technical Service (local), stipulated at this level, to inform the Operational Service of the conditions in which the intervention will be performed.

5.2.5 Risk-reduction measures proposed by the Technical Service (local)

These are specific measures proposed to the Operational Service by the Technical Service (local) with a view to reducing risks. They can be entered in box 7, after analysis of the Operational Risks, in conjunction with the operator.

5.2.6 Observations and recommendations for the intervention

These are additional items for information which analyse the human factor, the impact on the Technical Supervisor (local), and proposing specific recommendations on how the intervention should be performed.

5.2.7 Tests at the end of intervention

Describe the tests which shall be performed at the end of the intervention to check if the new functions are actually effective. Those tests can generate risks by themselves.

6 Preliminary assessment of safety impact (Page 3)

Overall, the third page allows the local Operational Service (in close cooperation with the Technical Service (local)) to carry out, under the conditions set out above, a functional analysis of the impact on the Support Services. This makes it possible to incorporate mitigation means (bypass procedures, feedback, etc.) and propose further

risk-reduction measures where there is an anomaly as compared with the threshold associated with the risk 'determinant' of each support service.

A final decision will be taken as to the overall risk of the intervention, still on the basis of the same references, and will make it possible to decide whether to seek further information or request arbitration at a higher level.

NB

Where arbitration results in a decision not to go ahead with the intervention, a risk and opportunity analysis should also be performed, since the decision not to perform such intervention might be more risky than the intervention itself

6.1 Operational Risk Analysis (§6)

6.1.1 The Support Services

Describe the support functions or services affected by the intervention.

- See list of Support Services (the title and meaning of the Support Services are constants)
- This list of support services may be amended on the basis of the specific nature of the centres (e.g. an ACC does not need to analyse the Radio-Navigation Support Service and may delete the line).
- A number of sub-analyses (each corresponding to a support service impacted) may have to be managed for an intervention.

Important notes:

When filling in this section, the services provided to all "customers" should be considered: control room for ACC, approach control, the military, flight testing centres, etc.)

6.1.2 Risk 'determinant'

For each support service, allocate a risk 'determinant' (i.e. a risk rating).

Evaluation factors: (See SAM – FHA Chapter 3 Guidance Material D)

- Accident (meaning credible risk of ATM direct contribution to accident)
- Serious Incident
- Major Incident
- Significant Incident
- No impact.

Principle

This criterion assumes that the ANSP:

1. prepares its list of Support Services (updating and customising the one proposed in risk assessment sheet §2);
2. has identified its list of hazards associated to its Support Services;
3. has identified the Worst Credible effect of those hazards in its Operational Environment (See SAM- FHA Chapter 3 Guidance Material G)
4. can associate the impact of any maintenance intervention malfunction with those identified hazards.

A default score is proposed to fill that field using the Support Service with its hazard classification.

However, the "Conductor" is allowed to perform a more detailed analysis to enter that field (for example in the case of an intervention which involves only a parameter which is not sensitive or which is less sensitive for the support service as a whole).

If an early MISO assessment of the intervention results in a "accident" score, then a complete and detailed safety argument is required prior to performing MISO.

Practical guidelines:

6.1.3 Expected impact (redundancy, fallback, etc.)

Evaluation factors:

0. Service not impacted by the intervention as scheduled (neither redundancy nor final fall-back)
1. Redundancy of a service impacted
2. Final fall-back of a service impacted
3. Redundancy and final fall-back of a service impacted
4. Service totally unavailable (normal service + redundancy + Ultimate Fallback)

NB

For services which have no final fall-back, since they are less critical, the score should not exceed 2.

Practical guidelines:

Reliability diagrams may be used to analyse the expected impact of the intervention. They should be added to by each of the centres.

6.1.4 Proportion of flights affected by the intervention as planned

Depending on the conditions proposed by the Technical Service (local), the impact on traffic will be evaluated as a whole.

Evaluation factors:

0. Very few flights impacted
1. Small proportion of flights impacted
2. Significant proportion of flights impacted
3. Majority of flights impacted

Practical guidelines:

6.1.5 Validation tests

Tests might still be required during the intervention, since completing them before is not achievable in a simulated environment (need to be operational). The verification completeness of the change and the correction capability are evaluated before the intervention

Evaluation factors:

0. Any change may and will be tested beforehand, with the possibility of correcting before
1. Any change may and will be tested beforehand, with no possibility of correcting before
2. The change will be tested before but not fully, since the scale of the change does not allow this where there are non-testable parts (e.g. retention of codes).
3. Only a small part of the change will be tested in advance.

Practical guidelines:

6.1.6 Potential risks

Induced risks are evaluated here from a "Worst Credible" (being reasonably pessimistic) point of view (See SAM- FHA Chapter 3 Guidance Material G).

Evaluation factors:

0. Induced risks highly improbable given the architecture, the type of intervention and the location of the intervention.
1. Possible induced risks, but covered by technical MISO **AND** similar operational experience
2. Possible induced risks, but covered by similar operational experience
3. Possible induced risks covered by technical MISO but with no similar operational experience

Practical guidelines:

6.1.7 Backtracking typology

Depending on the constraints and the location of the impact, backtracks (reversion to previous state) are more delicate to perform and above all require time to coordinate.

Evaluation factors:

0. Purely local but in real time
1. Purely local but NOT in real time, because of constraints
2. National or international, but only bilateral
3. Multilateral international

Practical guidelines:

6.1.8 Conventional mitigation means on the operational side

This is similar to the notion of **tried and tested** mitigation means adopted at the French ANSP discussions for instruction regarding safety argument.

This makes it possible to distinguish between:

- the **conventional** mitigation means**(**tried and tested), whose contribution can be taken into account when assessing the safety impact, and
- the **less routine** mitigation means(which also have to be deployed in addition to conventional mitigation means if risks are deemed insufficient with only conventional mitigation means).

This score has a relieving effect, hence the negative coefficient.

Evaluation factors:

0	Nothing more than those already recorded on the technical side
-3	positive feedback from the operational side on a mitigation means
-5	positive feedback from the operational side on a number of mitigation means
-6 to -9	Adjustable to intermediate values depending on the quality and the number of conventional barriers
-10	major feedback from the operational side on experience of a number of mitigation means and there are moreover procedures which have already been used for operational bypasses in the event of total absence of service.

Practical guidelines:

Conventional barriers

- Presence of operational specialists
- Presence of person responsible for round-the-clock operations
- "Prior briefing" to the Head of the control room
- "Prior briefing" to the controllers
- The centres could implement new mitigation means (or use the observations field)

6.1.9 Residual index and anomalies

The line is totalled in the residual index column N°2. (in + and -). It is then compared with the admissible threshold determined below (for each support service).

List of thresholds and risk 'determinant' associated

Threshold	Risk determinant	
0	Accident	(degree 1)
3.	Serious Incident	(degree 2)
6.	Major Incident	(degree 3)
9.	Significant Incident	(degree 4)
12.	No impact.	(degree 5)

Practical guidelines:

This assessment has to be conducted once the additional mitigation means are set, thus allowing identifying the final severity of the "worst credible" effect (see SAM – FHA Chapter 3 Guidance Material G), what is called "residual risk".

If it reaches or exceeds this threshold, this support service is declared anomalous (box to be ticked).

6.1.10 Operational risk assessment

The overall result of an intervention using MISO should include the assessment of the intervention on all impacted Support Services.

If any support service (or function) exceeds the residual risk set by this here above table (§5.1.9), the anomaly box will be ticked and overall the operational risk analysis will be deemed to be anomalous, automatically giving rise to additional risk-reduction measures. A different assessment may be made, but it will have to be substantiated.

6.2 Additional risk-reduction measures (§7)

Less routine measures or measures not initially planned by the Technical Service (local). In general these mitigation means are also tried and tested mitigation means, but they may also be innovative when implemented for the first time, and are described in greater detail in the Other or Additional risk-reduction measures fields.

6.2.1 Operational mitigation means

- Traffic flow restrictions
- Additional ATCO per sector
- Others: (describe)

6.2.2 Technical mitigation means

- As a result of very little traffic with presence constraints
- Presence of technical experts
- Others: (describe)

6.2.3 Choice of intervention slot

This is negotiated between the two services in the light of the complexity, risks and mitigation means already described.

6.2.4 Observations and recommendations for the intervention

In the observations, account may be taken of human factors, psychological and other factors both in the control room and in relation to supervision and, insofar as is possible, an attempt will be made to propose solutions to alleviate such factors if this has not already been achieved by the mitigation means referred to above.

6.3 Summary of risk analysis after risk-reduction (§8)

Following the technical and operational risk analysis, taking account of the mitigation means and risk-reduction measures, an overall final assessment is made.

The result of this evaluation should never fall within the risk 'determinant' "accident or serious incident". If it did, it would then be necessary to request arbitration at a higher hierarchical level. The same applies where the impacted service is deemed to be the cause of the "accident" level. If it is decided not to proceed with the intervention, it would be useful also to analyse the risks generated by such a decision.

The higher hierarchical level should always be advised where the evaluation is "major incident".

Arbitration by the Head of the Centre (resp a full safety argument) is required if the rating of the overall residual risk is "Major" (resp "serious").

7 Normal procedure (Page 4)

This fourth page is completed in parallel with the preceding phases and will be used for a brief and concise description of the procedure introduced for cases deemed simple and/or effectively controlled by the Technical Service (local). This should be carried out independently of the risk analysis of the Support Service(s). It will describe in particular the coordination meetings and the staff responsible for operations involving the sequencing of procedures implemented. It will conclude with a final assessment of the intervention once carried out and may be used as an entry point for any feedback, prior to archiving, which might be centralised by the Technical Quality Unit (local).

7.1 Coordination meeting (§9)

The restricted table of coordination meetings (dates and participants) allows inputting essential information for such coordination.

Where there is a greater need for coordination and/or greater formality, it is possible to use the equivalent table in the Assurance Procedure sheet and attach it to this file.

7.2 List and reference of useful documentation (§10)

These tables may contain references to documents upstream (definition of requirement, notice of work, overall MISO, project notes, etc.) or downstream (actual notice of work, service notice, framework notes, etc.)

Similarly, the applicable documents (instructions, Operational Manuals, feedback, etc.) are quoted insofar as is possible in the case of high-risk tasks (procedures, operating modes, etc.).

Otherwise the training and experience of staff can be considered sufficient for them to be aware of the existence and content of the operational documentation.

7.3 Staff involved (§11)

This section is for designating the staff responsible and staff involved (surname, first name or section, tel. no. and location at the time of the intervention) whether internal or external to the centre, and external companies involved. These are the actual actors on the day of the intervention, they may be different from the coordinators involved in preparing the procedure.

7.4 Summary implementation table (§12)

The restricted table describing the tasks to be performed is for sorting them and planning them in the course of the intervention. It is also to be used for brief descriptions of such tasks.

Where there is a greater need for precision and/or greater formality, it is possible to use the equivalent table in the Assurance Procedure sheet and attach it to this file.

7.5 Closure of the intervention (§13)

At the debriefing, the Technical Quality unit (local) shall note here whether or not the intervention has been performed smoothly (in accordance with what was expected), any problems encountered and whether there should be formal feedback.

There is no scheduled overall assessment for the two services (Technical and Operational services), but each centre may, depending on requirements, duplicate this table (one per service).

8 ASSURANCE procedure (ADDITIONAL SHEET)

This preparation mode is the result of a choice determined through analysis of technical complexity or a serious and substantiated assessment of the technical risks inherent in the intervention.

It gives rise to more exhaustive preparation and requires the completion of a supplementary sheet entitled "**ASSURANCE procedure**", where most of the items in the Normal procedure are taken over and explained in more detail. It may also give rise to one or more "operating modes" detailing the procedures to be implemented.

These documents are to be attached to the preceding file.

8.1 Preparation (§14)

This field indicates the internal and external responsibilities for the preparation and scheduling of any contacts which prove necessary to minimise risks and guarantee an efficient intervention (meetings, teleconferences, videoconferences). For many incidents, it has been noted that no or insufficient preparation has been a key factor for many staff involved: various parties' constraints not always taken into account, no shared vision of the intervention, different vocabulary, undefined tests and acceptance procedures, undefined responsibilities, staff not clearly identified, etc.

8.2 Implementation table (§15)

This section indicates the necessary level of detail, which is dictated by the intervention and the associated procedure.

8.2.1 List of operations

- Defines, operation by operation, a series of actions to bring a stable situation A to a stable situation B, taking account of physical compatibility (one or more systems) and organisational compatibility (area of responsibility, team concept, etc.)
- The criticality of each operation should be examined and a decision taken accordingly as to whether or not an operating mode should be defined. In the normal procedure, this decision will be taken by the manager, whereas in the "assurance" procedure the criticality analysis should be formalised - an operating mode shall be defined for operations with criticality rated at more than 2.
- The list of operations should indicate the necessary operating modes, quoting references upon completion. Lastly, in order to facilitate intervention monitoring and avoid certain errors, the fact that the operation has been completed should be indicated in this table.

9 Technical operating modes (ADDITIONAL SHEET)

The procedure will incorporate a number of operating modes, associated with operations which are either considered risky or which are not sufficiently well-known or documented in the existing Operational Manuals.

9.1 Proposed operating mode model (§16)

This takes the form of a "header" sheet stating the context and also listing key information for minimising risks and guaranteeing an efficient operation. It might include:

- The pre-requisites for initiating the operation:
  operations are sometimes initiated without those involved first determining the pre-requisites, which become apparent in the course of the operation, with major consequences …
- The hazards and risks involved in this operation:
  to avoid such risks and to be ready to counter them, should the need arise.
- The suspension or completion conditions:
  there are cases where an intervention is not terminated cleanly (non-nominal or unstable status, failure to update doc, unplug testing tools, advise the Technical Supervision of the status of the system, etc.);
- Backtracking conditions (reversion to previous state):
  These must be thought through and prepared in advance. Not all operations allow backtracking, and the time and resources needed for backtracking, etc. must be known in advance.
- Spare parts:
  List and prepare in advance any spare parts which might prove necessary during and after the operation.
- Tools:
  The same applies as for spare parts, i.e. the tools must be prepared in advance to avoid having to go looking for them once the operation has begun.
  This concerns firstly the physical and software interface with related systems, which means that the risks for related systems (during the works and completion tests) are not neglected and that provision is made for the necessary resources (couplers, cables, drivers, etc.) and the necessary customisation;
  and secondly the associated tools and resources needed for coordination, execution, monitoring and completion (tools, apparatus, hardware, specific software interfaces, means of communication, etc.).
- Documentation:
  The documentation required for the operation must be listed, with references and, if necessary, information about where it can be obtained. This list should only include either specific documentation or documentation which must be consulted. There is no need to list routine documentation, which is generally taken care of in the organisation's procedures and is familiar to staff.

9.2 Operating modes in operations

If necessary, operating modes may be defined on a case by case basis according to the same general principles as those used for defining technical operating modes (e.g. transition criteria, hazards, backtracking conditions, closure/end of intervention criteria, documentation, …).
If this operating mode is frequently used, then it could be useful to fill a form dedicated to this operating mode.

10 Content of the "notice of work": (Free format)

The final intervention procedure, defined under the responsibility of the Project Leader, is reviewed and validated by the various actors involved in the previous stages and might ultimately be officially circulated with the notice of work signed by the Head of the Technical Service (local) or be made accessible in a common consultation area.

The standard form for the notice of work is the model used at the centre. (see SMS at the Centre): but must contain at least the following information:

- date of the notice of work or the document
- reference of the notice of work or the document
- reference of the MISO file with, if possible, direct access (link, location of the file)
- contact person: (person responsible for preparation/coordination)
- purpose of the intervention or nature of the works
- dates and times of the beginning and end of the intervention, or slot
- equipment/channel concerned
- identification of the staff involved (with details of how they might be contacted during the intervention (tel. no., location, etc.)
- instructions and procedures for the supervision and/or return of existing operational documents
- an idea of the operational impact for the supervisors.
- date and initials of the signatory, depending on the importance determined by the MISO
- list of addressees

A consistent "Notice of work" form is provided as part of the MISO package.