

ETSO Modelling Methodology for the Automation of Data Interchange of Business Processes (EMM)

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Revision History

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| | | | Annex A | Creation of an annex for the XML details. Addition of a rule (rule 6) concerning relations. |
| 1 | 2 | | 5.3 and 5.4.1 | Addition of clarifying text |
| 1 | 3 | | 4.4 | Addition of the necessity for dependency matrixes for conditional class attributes |
| | | | Annex A3 | Clarify rule 8 |
| 1 | 4 | | Axxex A | Suppression of annex A to create a new document |

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1 Introduction

ETSO Task Force 14 "Electronic Data Interchange between Market Participants" has been set up by ETSO to "to define and document EDI standards based on a general functional description of the electricity market in the EU and on existing examples in the deregulated market".

One of the initial factors to be addressed in the development of EDI standards was to determine the syntax that would be used for the information exchanges. The EDIFACT standard has been introduced in the Ediel developments and several counties, such as Holland, Norway, Finland, Denmark and Sweden, use it extensively. However, the emerging standard, XML, has created a considerable amount of support mainly because of its ease of use and the number of Internet products that currently support its use. The UN/CEFACT body that manages the maintenance of the UN/EDIFACT standard has itself addressed the issue of moving to the XML standard. It set up during the course of 2000 a special working group in co-operation with OASIS to define the procedures that would be necessary for the standardisation of XML as an information exchange standard for business messages. This working group, called ebXML, finished its work in May 2001. The continued development of their output has been agreed, UN/CEFACT basically taking responsibility for the development of business semantics and OASIS assuming the responsibility for the supporting infrastructure. At the same time an ISO standardisation effort has concluded that provides a technical paper explaining how to migrate an EDIFACT message to XML as an interim measure.

In light of such a massive move to the XML standard, Task Force 14 decided to develop its information exchange standards respecting the philosophy that has emerged from the current standardisation efforts of ebXML using the XML syntax. At the same time it was felt necessary to provide a basic guide of how an equivalent EDIFACT message could still be used to exchange the same information.

In light of having to lean on an emerging standardisation philosophy based on ebXML and the need to maintain a connection with the existing standardisation efforts within the energy industry based on UN/EDIFACT, Task Force 14 has developed its own development methodology. This methodology respects the spirit of the emerging standardisation effort and the Task Force 14 deliverables are in complete alignment with the intent of the new standardisation deliverables.

The task therefore of moving from a Task force 14 deliverable to the new standard when it appears should to all intents and purposes be minimal.

The use of the underlying communication infrastructure is not within the scope of Task force 14. Consequently Task force 14 does not include the ebXML messaging services (i.e. the reliable and secure transmission of messages between partners) as part of the process. However, all application level acknowledgement processes are completely dealt with within the methodology

From Task force 14s perspective the underlying messaging services infrastructure is the responsibility of each TSO and the agreements that each TSO has come to with its information interchange partners.

2 The ebXML basic methodological steps.

The ebXML philosophy introduced the following seven concepts and underlying architecture:

- 1. A standard mechanism for describing a *Business Process* and its associated information model.
- 2. A mechanism for registering and storing *Business Process and Information Meta Models* so that they can be shared and reused. (Out of Scope for Task force 14)
- 3. Discovery of information about each participant including:
 - The *Business Processes* they support.
 - The Business Service Interfaces they offer in support of the Business Process.
 - The Business Messages that are exchanged between their respective Business Service Interfaces.
 - The technical configuration of the supported transport, security and encoding protocols. (Out of Scope for Task force 14)
- 4. A mechanism for registering the aforementioned information so that it may be discovered and retrieved. (Out of Scope for Task force 14)
- 5. A mechanism for describing the execution of a mutually agreed upon business arrangement which can be derived from information provided by each participant from item 3 above. (*Collaboration Protocol Agreement CPA*) (**Out of Scope for Task force 14**)
- 6. A standardized business *Messaging Service* framework that enables interoperable, secure and reliable exchange of Messages between *Trading Partners*. (Out for Scope of Task force 14)
- 7. A mechanism for configuration of the respective *Messaging Services* to engage in the agreed upon *Business Process* in accordance with the constraints defined in the business arrangement. (Out of Scope for Task force 14)

As can be seen a number of these concepts are out of Task Force 14s scope. The concepts that have not been taken into consideration are

- The registration of business processes and the participants. The business processes that are developed by Task Force 14 are to a certain extent registered insofar as they are publically available on the ETSO website. Participant registration with their capabilities is not currently in place. However, with the introduction of the ETSO Identification Coding Scheme (EIC) a minimum amount of information will become available about the participants.
- The discovery of potential partners is not necessary within the context of the electricity market where all the potential traders is already known.
- Each TSO is currently responsible for the protocol agreements that it puts into place.
- The introduction of the "electronic highway" in many respects satisfies the requirements for messaging services.

This document therefore focuses of the first requirement of the ebXML philospohy, the analysis of business processes and the development of the corresponding information models.

It also addresses:

- 1. A discovery process that enables a better specification of the business processes. Whilst this does not really comply with point 3 above, it was felt to be in the same spirit since the guides for the business processes developed are industry wide.
- 2. The use of XML as the basic syntax for the transmission of information.
- 3. The use of core components within the messages.
- 4. A mechanism for registering the resulting guides. This does not relate specifically to point 4 since in reality it doesn't allow a discovery process. However, guide version and releases as well as a core component repository are managed within the TF14 methodology.

The recommended methodology within ebXML for describing business processes is the use of the UN/CEFACT Modelling Methodology (UMM) (TMWG N90R10). This document outlines the UN/CEFACT methodology to model business processes and supports the development of EDI for electronic business.

The business process and modelling technique is based on the Unified Modelling Language (UML) of the Object Management Group (OMG). The UMM methodology is based on Rational's Unified Process methodology. The UMM focuses on the description of the business processes and their resulting messages. It does not cater for the information technology aspects that are associated with business transactions.

The UMM focuses on the technology independent aspects of project development which are project initialisation, development and documentation. Certain aspects of implementation, such as message development, are outside its scope.

Within the TF14 methodology it has been necessary to include these functions in order to provide a methodology orientated towards providing complete implementation guides for business processes (the notions of inception, elaboration and a part of construction within the UMM).

3 The ETSO Methodology outline

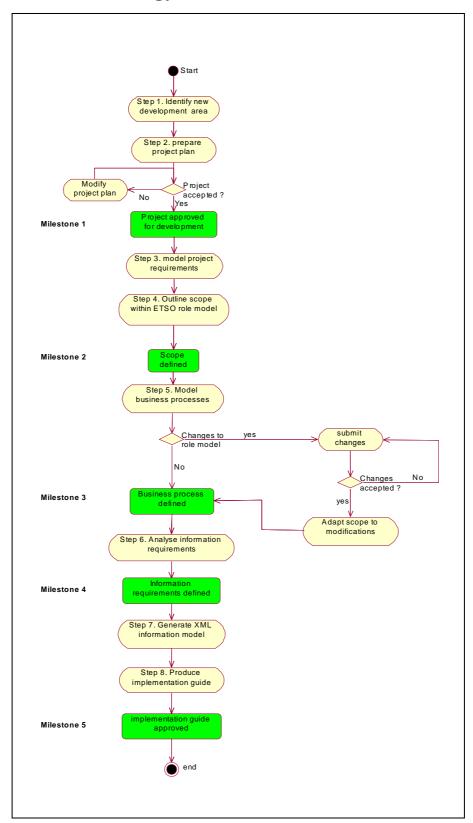


Figure 3-1 The ETSO methodology outline

The ETSO modelling methodology is aimed at the production of an implementation guide for a defined business process within the energy market. It is an 8-step process with 5 key

milestones that concludes with an implementation guide approved and posted to the ETSO EDI web site for implementation by interested TSOs or by software providers.

The outline respects the essential of the UN/CEFACT methodology. However since the key deliverable is not the same the methodology cannot also be the same. In the UN/CEFACT methodology the key deliverables are a library of business objects and business processes, whereas the key ETSO deliverable is an implementation guide that can be put into operation by TSOs or by software providers to satisfy a given business need.

The five key milestones have been provided in order to facilitate project management. Each of the milestones identifies a significant and measurable point in the project.

Each of the 8 steps can be resumed as follows:

- 1. Prior to any project development a business area or process for development has to be identified and approved. Any TF14 participating member may submit a development area for consideration. The submission method or content has not been formalised. It is the knowledge within the evaluation team of business practises covering several countries that will determine the validity or not of setting up a project.
- 2. Once the development area is approved a project team is set up to prepare a detailed project plan. This plan once approved will form the basis of all future development work. It provides a perspective of the area that is to be covered and the expected deliverables. Once the project plan has been approved the *first milestone of development* has been reached.
- 3. Project development then begins and use case diagrams are produced which detail the project requirements.
- 4. The requirements having been described, the scope of the project is outlined within the ETSO role model. In the case where the role model does not cover all the roles or domains necessary to satisfy the project requirements a modification request is initialised in order to adjust the role model once the business process development has confirmed their use. Once the project requirements has been scoped within the role model the *second milestone of development* has been reached.
- 5. The business processes are then developed using sequence diagrams and activity diagrams. Through these diagrams the workflow of the business processes in question is developed. This process refines the project's scope and if the maintenance request for new roles or domains identified in the preceding step is confirmed or additional roles or domains are identified the maintenance request is submitted to the role model maintenance group. The role model adjustment may be an iterative process and will continue until the project's scope has been successfully integrated into it. This process may additionally require modifications to the project requirements. The approval of the business processes signifies that the *third milestone of development* has been reached.
- 6. From the business processes and workflow diagrams the required set of information requirements can be identified. Each information flow identified between two actors that is determined as being a candidate for automation is modelled through the use of class diagrams. The ETSO core components is interrogated to make use of existing objects or core components. New core components are added to the repository if necessary (this process has not yet been completely mapped out). The approval of the information model signifies that the *fourth milestone of the development* has been reached.

- 7. From the class diagrams XML DTDs or XML schemas are generated respecting the generation rules that have been defined for this transformation process. Software tools could in the future allow this step to be totally automatic. An EDIFACT branching diagram may also be prepared where EDIFACT messages exist. The branching diagram will indicate where each attribute of the class diagram should be situated.
- 8. The implementation guide is written up in compliance with the layout key for ETSO implementation guides. The approval of the implementation guide signifies that the *fifth* and *final milestone of development* has been reached. The approved guide is then inserted in the ETSO web site for implementation.

The requirements necessary to satisfy each of the milestones will be covered in more detail in the rest of this document. In relation to the UMM one can easily see that the inception phase which addresses the workflows of business modelling and requirements are covered by the first three milestones, and the elaboration phase which addresses the workflows of analysis and design are covered with the fourth milestone. The fifth milestone is not addressed within the UMM.

4 Milestone requirements

4.1 Milestone 1. Project approved for development

The initial phase of starting up a Task force 14 process is to prepare a project plan. A project plan can only be developed against an approved development area.

The project plan will contain the following:

- 1. Presentation of the project,
- 2. Outline of the goals and benefits
- 3. Explanation of how its going to be organised,
- 4. Description of the deliverables,
- 5. Establishment of the initial timetable,
- 6. Declaration of needed resources.
- 7. Presentation of the development costs.

The presentation of the project will describe a single and complete business process. It will provide the framework for the future development.

The goals must be clearly stated and measurable.

The organisation of the project will identify a project leader and the team that is going to work on the project. The members of the team must have a commitment from their organisation that they, or their replacement, will follow the project through to completion.

The deliverables, which are generally one or more implementation guides, will define what is to be expected when the project has been terminated.

The initial timetable will be built identifying the key development milestones. For example, the four milestones of development could be used as the principal milestones for the development of an implementation guide. The milestones are not necessarily limited to those outlined in this methodology. However, the basic milestones must be outlined as a minimum.

If external consulting resources are to be used these should be identified here along with any travel costs that may be required. ETSO members finance the project through their time, where their expected contribution is over and above the normal time necessary for meeting preparation and meeting time then this should be identified.

The key deliverable of this milestone is the project plan which has to receive official ETSO approval before the project itself can be launched. It is recommended that the approval process in question be identified in the project plan

4.2 Milestone 2: Scope defined

The initial task of the project is to situate it within its general context and in more detail. Once the context has been defined through the development of a use case, all the roles necessary to complete the task will have been identified.

TF14 has together with Ediel and other organisations developed a role model that it uses to identify areas of interest and all the roles and domains necessary to satisfy them.

This role model is a living model that outlines all the actors and domains with their principal interactions within the industry. It is consequently not necessary in the preparatory stages to spend a significant amount of time working on the overall business domain. This task is already catered for within the role model.

However, during the development of the project requirements it may happen that roles that have not previously been identified may appear. The project should prepare a maintenance request to change the role model. This request will be confirmed during the next development phase.

The key deliverables at this milestone is as follows:

- ➤ an eventual revised version of the role model along with the maintenance requests outlining the revisions;
- ➤ an outline of the project scope identifying all the roles and domains in the role model that will come into play in the project;
- the initial version use cases describing the requirements and their explanatory text.

4.3 Milestone 3: Business process defined

The business process analysis stage builds on the use cases that have been developed during the project requirements stage. It introduces activity and sequence diagrams that show the interactions between the various roles. These are placed in the context of the use cases previously defined.

The use cases may be refined at this milestone, as more information becomes available. This provides clarification to more detailed points that are not necessary during a requirements development process. For example more detailed use cases may de developed to show up particular contexts that are necessary in order to describe completely the business process in question.

However, if a use case described during the requirements step is completely put into question then it may be necessary to reiterate the requirements phase completely.

This stage of the methodology will also identify the workflow requirements for the business process. It will identify all the information flows between the different roles that are necessary

to satisfy the requirements. The relationships between the information flows will also be developed.

The need for any new roles or domains is confirmed and appropriate maintenance requests are submitted to the role model maintenance group. The role model maintenance process may immediately approve the new role or they may require clarification or suggest the use of another role. This is an iterative process that shall continue until the project has a satisfactory solution to the roles that it wishes to present in its project requirement and business process models.

The key deliverables at this milestone are as follows:

- ➤ the finalised version of the business process use cases and the associated explanatory test;
- ➤ the activity, sequence diagrams and associated text describing the interactions between the roles;
- > the workflow requirements for the business process;
- > the information flows between roles necessary to satisfy the business requirements;
- if any, the finalised role model maintenance requests.

4.4 Milestone 4: Harmonisation requirements defined

All the information flows that have been identified will be further analysed to identify their content. Class diagrams will be used for this purpose. If an attribute within a given class is conditional then a dependency matrix identifying the conditional where the attribute must figure must be provided.

During this analysis the ETSO core components will be examined in order to determine whether of not existing objects or components will satisfy the requirements. If so, they will be introduced into the model.

If a core component could satisfy the requirement with the adjustment of the definition then a maintenance request should be placed against the ETSO core components repository. The use of sub-typing (or generalisations) is encouraged at this stage.

If there are no equivalent core components a new core component shall be defined.

For certain core components there are associated code lists. If a new code is required for one of the lists in question a maintenance request shall be issued.

If the contents of an object are identical and there is only a difference of object name then a stereotype of the initial object should be used.

The key deliverable at this milestone are a set of class diagrams, their associated definitions along with, if necessary the dependency matrixes that qualify the mandatory use of conditional class attributes and the codes that are intended to be used.

4.5 Milestone 5: Implementation guide Approved

4.5.1 Generate XML information model

The XML information model has to be generated from the UML class diagram for each information flow that is a part of the implementation guide. The generation process must

respect the rules as defined in paragraph **Error! Reference source not found.**, basic rules for XML generation.

These rules enable the production of an XML DTD.

From the DTD in question an XML Schema is produced making use of the ETSO core components. The ETSO core component library will be updated with any new core components or context specific core components as needed.

The DTD and the Schema form the basis of the XML information model.

4.5.2 Produce implementation guide

Once the DTD has been generated from the class diagram the project implementation guide may be produced.

All ETSO implementation guides should be constructed respecting the same basic structure and layout. An ETSO implementation guide is a standalone document and does not require any other documentation.

The implementation guide will be broken down into three basic parts

- 1. The first part describing the project requirements.
- 2. The second part describing the business processes
- 3. The third part describing each information flow that represents a message.

A final part of the guide will resume the library of core components used in the guide and any code lists that are required. There may be other chapters containing information that is necessary to ensure the complete comprehension of the guide.

4.5.2.1 The first part of the implementation guide

This part of the implementation guide will contain all the information prepared during the first and second stages of the development process. This shall include, but shall not be restricted to, the objective of the project and the overview of the process. The use cases developed during the course of the project and their explanatory documentation shall be included in this part of the guide.

4.5.2.2 The second part of the implementation guide

This part of the implementation guide will contain all the information prepared during the third step of the development process. This shall include, but not be restricted to, the sequence diagrams depicting the information flows between the different roles that participate within the scope of the project. The various information flows and their diagrams that were established during this step will also be included. Finally any general ground rules that need to de defined in order to ensure that the business processes can be correctly interpreted.

4.5.2.3 The third part of the implementation guide

This final part of the implementation guide will contain all the information prepared during the Forth stage of the development process. It will also include the XML information model and the explanations that are necessary in order to ensure that the resulting message can be correctly interpreted. This third part will be decomposed as follows:

➤ The information model

- ➤ The message DTD
- ➤ Rules governing the overall message implementation
- ➤ Rules governing each aggregate element (class)
- ➤ Rules governing each element within the aggregate (basic element or attribute)

There will be as many repetitions of this third part as there are distinct information flow messages necessary to ensure the execution of the business process that the project is implementing.

The rules governing the overall message implementation and the aggregate elements should contain a dependency matrix wherever there are conditional elements. The dependency matrix shall define the conditions where a conditional element is used and where it is not.

The rules governing the basic elements shall be made up of the following table:

| ACTION | DESCRIPTION | | |
|------------------------------|--|--|--|
| Definition of element | Define here the basic element | | |
| Description | Describe here the signification of the element and any specific requirements. | | |
| Size | Describe here the size and nature of the elements contents | | |
| Applicability | Describe here the applicability rules such as mandatory or conditional | | |
| Dependence requirements | Describe here the dependency requirements to which the element is subjected. Upwards and downwards dependency may be described | | |

4.5.2.4 Communications information

The implementation guide shall not contain communications information. Such information may be found in a complementary guide maintained by Task Force 14 that specifically addresses this subject. This functionality is essentially out of the scope of TF14s terms of reference. It is also essentially because there is no one unique possibility of implementing the transmission of the defined messages.

5 THE IMPLEMENTATION GUIDE MAINTENANCE PROCEDURE

5.1 Introduction

All ETSO implementation guides are maintained on a regular basis. This is to ensure that they reflect the electricity market information interchanges as they currently stand and that they take into account any intended evolutions.

In such a fast moving market this is essential to the success of the seamless operation of electronic data interchange systems.

At the same time between market players there is a recognised need for a certain form of stability. The users of the implementation guide (market players and software providers) need to know when a new version is scheduled to appear with added functionality. They need to be able to determine how long a given development may remain operational before necessary changes are required.

In an environment where there is little or no change this is not such a problem, but in fast moving environments it is essential to know the frequency of change.

The objective of the ETSO maintenance procedures is to ensure that the user community as a whole is perfectly aware of the periodicity of change and the potential modifications that can take place.

5.2 Version/release

For this purpose every implementation guide is managed by a version/release procedure. Change is not systematic nor does a change always have the same significance. For this reason ETSO has introduced a version/release process to manage implementation guide change. The distinction between these two notions ETSO has defined as follows:

- A version changes only whenever there is a modification to the implementation guide that entails a functional change in any supporting software. For example a change to the data model, DTD, process flow, functional processes, etc all impact in one way or another the operational system.
- A release changes only whenever there is a modification to the implementation guide that does not require a change to supporting software. For example a correction of documentation errors, improvements to provide better clarification, additional reason codes, coding schemes, etc do not impact the operational system.

With this process users can then immediately determine that if there are only release changes their software implementations will not require modification.

The version/release indicators are represented by numeric values. A version value of "0" represents a document in development. In this case the release number is used to identify different editions of the development document. The first official version of a document is assigned the number of "1". With each version change the release indication is reinitialised to 0.

5.3 Modification frequency

ETSO will only update implementation guides on an "as needed" basis. However in order to ensure a certain level of stability the following constraints have been introduced:

- A version change to an implementation guide can take place only after a two year period of operation of the active version
- > ETSO will only support two versions of an implementation guide (the active version and its predecessor).
- A release change may occur in general at yearly intervals or, as necessary, to ensure non-ambiguous documentation, or to add new code requirements.

This means that a given implementation guide will be valid at a minimum over a 4-year period assuming that there are at least 2 version changes within the approved timeframe.

If there is no requirement for a version change the implementation guide can be considered stable and will remain active until such a time as two version changes occur.

This naturally enough implies that only the latest 2 versions of the DTDs or schemas will have the ETSO stamp of approval. All other versions will be withdrawn and will no longer be considered as ETSO standards.

In the case of the need to introduce new functionality, such as for new market requirements, it may be necessary to publish an intermediate draft document on the website to inform the user community of these evolutions prior to the publication of the official release.

5.4 Maintenance procedure

5.4.1 Review committee

ETSO is responsible for the review of the Implementation Guides.

TF 14 on behalf of ETSO will perform the functions of the review committee as long as the group remains in existence. When the TF14 terminates its mission a common neutral body will be set up to continue this function.

The review committee may delegate the review functions, for one or more Implementation Guides to designated ad-hoc working groups of experts.

The Ad-hoc working groups will have a specific charter and TOR.

The review committee will call for experts after each set of request for changes are approved.

Other interested parties (market participants making use of the implementation guide i.e. non ETSO members, trader associations, software providers, ...) may establish a liaison with the review committee in order to follow the progression of maintenance requests that they initiate or to follow the evolution of the guides. The liaison members shall have no voting rights within the review committee. Their role is essentially informative and they may provide clarification to requests for which they are concerned.

The review committee will carry out the following tasks:

- Ensures that the maintenance procedures are respected.
- Posts all maintenance requests to the web site and ensures that they are duly processed within the announced timeframe.
- ➤ Provides justification for any maintenance request that has been rejected.
- ➤ Maintains all ETSO approved code lists.
- > Submits the approved requests to the ETSO Task Force for implementation guide modification

5.4.2 Maintenance request

All maintenance requests shall be sent to "ETSO Task Force 14 Electronic Data Interchange" via e-mail at the following address: edi@etso-net.org.

The implementation guide maintenance procedure is transparent to both market players and software providers. All maintenance requests will be posted on the ETSO EDI web site for a 30-day comment period.

After the comment period is closed the review committee shall examine the request bearing in mind the business practises that are currently operational throughout Europe.

The review committee's acceptance or rejection of the maintenance requests will be posted to the ETSO EDI web site. The procedures established by the review committee determine the criteria for the acceptance or rejection of a maintenance request. The basic philosophy is through consensus. However where necessary an internal voting procedure will be identified in the procedures.

Once the review committee has accepted the maintenance request, an ad-hoc group will be formed to integrate the maintenance requests in a new version of the implementation guide concerned by the modification.

Maintenance requests involving code requests will immediately be implemented on their approval providing the implementation guide is not impacted by their addition.

5.4.3 Maintenance request form

A maintenance request to the ETSO implementation guides can cover one of the following categories of modification or addition:

- ➤ The addition of new functionality.
- > The modification of existing functionality
- > Correction of text of an editorial nature
- Clarification of existing text
- > The addition of new codes to lists within the document

A request may cover only one type of addition or modification. This is to enable an easy follow up of the maintenance requests and also to avoid the problem of the partial rejection of a multiple modification request.

A maintenance request is essentially a cover page containing all the essential information and in many cases this will be sufficient. However in the cases where additional functionality is requested or modifications of a complex nature additional documentation will be required. This additional documentation shall be attached to the maintenance request cover page. The additional documentation may, for example, be a complete electronic document such as a Microsoft Word document. In this case the first page of the document shall consist of the maintenance request form.

In the case of a code addition, the request has to provide the following:

- > The UID or name of the element concerned,
- > A detailled description of its purpose,
- The proposed name of the new code

In the case of a code modification, the request has to provide the following:

- ➤ The UID or name of the element concerned?
- > The motivations for the change
- > The modified information

Modifications to text, either corrections or additional explanatory text, shall identify the incriminated text as it exists in the guide and the proposed corrections or additions.

The addition of new functionality or the modification of existing functionality shall provide use case and information flow diagrams positioning the new or modified functionality. Detailed explanatory text must also be provided.

The standard maintenance request form in a Microsoft Word format may de downloaded from the ETSO website (www.edi.etso-net.org).

All maintenance requests have to be submitted by e-mail to edi@etso-net.org.

ETSO IMPLEMENTATION GUIDE MAINTENANCE REQUEST

| Submittor identification | | ETSO identification | |
|--------------------------|--|-------------------------|--|
| Submittor name | | | |
| Submittor organisation | | | |
| E-mail address | | | |
| | | | |
| Implementation guide | | | |
| | | | |
| Nature of change | | Code request | |
| | | Functional addition | |
| | | Functional modification | |
| | | Correction of text | |
| | | Clarification of text | |
| | | | |