

REETS-TEN

Activity 1: Contractual Framework and Risk Management

D 1.2 Description of Risks and Mitigation Measures

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Management Summary

1. Introduction

Art II.2.3 of the EC Decision C (2013) 9473 concerning the granting of Union financial aid for projects of common interest "Regional European Electronic Toll Service (REETS TEN)" - 2012-EU-50009-S (the "EC Funding Decision") provides:

"Sub activity 1.2 Risk Management

The project will evaluate how risks can be reduced or eliminated for the benefit of all the stakeholders in the EETS-environment, especially through the cooperation between the stakeholders. The work on risk management focuses on the definition of a list of risks accompanied with mitigating actions for the top priority risks. Furthermore it is highly desirable to achieve a common understanding of the global risk management plan mentioned in Article 3 of EETS Decision 2009/750/EC.

The expected results will be described in the following deliverables:

- ...
- *D 1.2 Description of Risks and Mitigation Measures"*

Chapter 3 of this deliverable contains recommendations about a "global risk management plan", Chapter 4 contains the definition of a list of risks accompanied with mitigating actions for the top priority risks.

2 Definitions

The following terms and definitions serve the purpose of better understanding with deliverable and further on any risk management plan.

Term	Definition
Risk	A risk can be defined as the possibility of a negative occurrence such as damage, injury, liability and loss, which is caused by either an internal or external vulnerability.
Risk Management	Risk Management is the process of analysing and assessing the exposure to risk and determining how to best manage the exposure to limit or even eliminate the risks. Risk management involves the identification, assessment, and prioritisation of the risks and the application of resources to minimise, monitor and control the probability and/or impact of the negative occurrences.
Management	Management is leading or making things happen through people. It is also the use or co-ordination of the resources and people's responsibilities for directing or running an organisation.
Plan	A plan involves knowing where you are currently in your company, where do you want your company to be in the future and how you are going to get there.
Inherent risks	An inherent risk is those risks that exist due to natural activities of the business. (Risks that are unavoidable)
Residual Risk	Risk exposure that remains in existence after mitigation measures are taken
Risk appetite	The level of risk that an organization is prepared to accept, before action is required necessary to reduce that particular risk.
Risk tolerance	The ability of an organization to survive the losses associated with risks
Risk register	A database of the risks that an organisation is exposed to.
Risk impact	Risk impact assessment is the process of assessing the probabilities and consequences of risk events if they are realized. The results of this assessment are then used to prioritize risks to establish a most-to-least-critical importance ranking. Ranking risks in terms of their criticality or importance provides insights to the project's management on where resources may be needed to manage or mitigate the realization of high probability/high consequence risk events. In this document: A – not severe/ B – severe/ C – threatening.
Risk probability	The risk rating is based on the probability of impact and the level of impact (manual mapping approach). In this document: 1 – unlikely/ 2 – slight possibility/ 3 – normal possibility/ 4 – very possible/ 5 – certain.

Risk frequency	The total amount of times that a risk occurs in a particular time frame
Risk control	The method by which firms evaluate potential losses and take action to reduce or eliminate such threats. Risk control is a technique that utilizes findings from risk assessments (identifying potential risk factors in a company's operations, such as technical and non-technical aspects of the business, financial policies, and other policies that may impact the well-being of the company), and implementing changes to reduce risk in these areas.

3 Global Risk Management Plan according to Article 3 Decision 2009/750/EC

3.1 Decision 2009/750/EC and Application Guide

According to Art 3 of the Decision 2009/750/EC of the definition of the European Electronic Toll Service and its technical elements for the purpose of registration EETS Providers shall fulfil the following requirements:

"...

(e) maintain a global risk management plan which is audited at least every two years".

The EC Guide for the Application of the Directive on the Interoperability of Electronic Road Toll Systems (the "EC Application Guide") section 2.2.2.3 provides:

"A global risk management plan should contain evaluation and mitigation measures of the risks relevant to the electronic toll collection sector and especially EETS.

The management plan should identify the main risks facing the EETS business such as:

1. business interruption (failure in the information processing chain ...);
2. cash flow/liquidity risk;
3. economic slowdown;
4. increasing competition
5. damage to reputation;
6. failure to reach or maintain full EETS domains coverage;
7. difficulty to reach required quality-of-service levels;
8. third party liability;
9. Regulatory/legislative changes.

The management plan will detail the mitigation measures envisaged to face these risks. According to the Art 3 in this document the risks are mainly considered only from the perspective of the EETS provider impacts. Nevertheless the Toll Charger impacts should also be considered and / or the impacts on the service as a whole.

3.2 Approach for establishing a global risk management plan

With regard to the amount of investment needed to establish the business of an EETS provider it is the clear expectation and assumption of the REETS project that – under its own corporate responsibility – every company with its seat in the EU and applying for a registration as an EETS provider has

- Set up and approved a business plan covering the project and
- Either risk management plans and systems already in operation (company in operation) or established a risk management plan before investing into EETS.

REETS TEN therefore first analysed and clustered the risks mentioned in the EC Application Guide to these presumably already established management tools:

The following risks listed in the EC Application Guide shall be (and will usually be) part of the business plan analysis (possibly including a sensitivity analysis) for the setting up of the EETS business:

- No 2 (cash flow/liquidity risk)
- No 3 (economic slowdown)
- No 4 (increasing competition)

The following risks listed in the EC Application Guide

- No 5 (damage to reputation)
- No 8 (third party liability)
- No 9 (regulatory/legislative changes)

are risks not specific to REETS/EETS and shall therefore be part of the general risk management plan of the company which of course has to be amended with regard to the setting up of the EETS business.

3.3 REETS/EETS specific risks

Going beyond the EC Application Guide the REETS TEN project has concentrated its analysis on REETS/EETS specific risks which are described in section 4.2 and 4.3 of this deliverable. These sections describe the risks and possible mitigating measures.

The following risks listed in the EC Application Guide

- No 1 business interruption (failure in the information processing chain ...)
- No 6 failure to reach or maintain full EETS domains coverage,
- No 7 difficulty to reach required quality-of-service levels and

are REETS/EETS specific risks and section 4.2 and 4.3 of this deliverable.

REETS TEN recommends that any risk management plan for an EETS provider should therefore consider the REETS/EETS specific risks described in section 4.2 4.3.

3.4 Possible clustering of risks

In the below given cluster of the generic risks a reference to REETS / EETS has been added. As these risks are treated in each global risk management plan of any company the WP 1 members decided not to go any further and defining countermeasures and evaluate the probability and impact of these generic level but to go more in detail and select specific REETS / EETS risks. In the Overview Table (see 4.2) each specific risks has been related to the types of risk listed below.

Types of risks (generic)
Reference to REETS/EETS

Legal Risk	Non-conformance with fit and proper EU and national requirements (-> litigation with all stakeholders of EETS)
Compliance Risk	Non-conformance with stated EETS requirements (EU legislation and toll domain statement in relation to technical requirements). At a TC/SP level conformance is achieved through management processes which identify the applicable requirements.
Financial Risk	Multiple types of risks associated with financing (loss of investments in hard- & software equipment, level of guarantee), it also includes financial transactions that of the SP's payments for SUs which could face the risk of default or non-payments.
Technical Risk	Multiple types of risks associated with technical functioning of hard-/software equipment, which are used in an EETS IT-architecture.
Operational Risk	Non-conformance with operational requirements arising from the TC/SP's EETS business functions.
Human Resources /Staff Risk	Loss of staff with deep EETS knowledge, unqualified personnel causing operational risks due to unexperienced usage of EETS systems, strike
Reputational Risk	Loss of trustworthiness of the TC/SP and also the SU
Business & Demand Risk	Business & Demand risk refers to the potential for SPs income (in value) to decrease due to factors affecting the entire market/industry
Market Risk	Types of risk associated with significant changes in prices of investments (production factors)

Table 1 Types of risks

3.5 Possibilities for Presenting and categorizing of risk in a Global Risk Management Plan

As there are several options for presenting and categorising risk the following examples should demonstrate how identified risk can be categorised by each stakeholder participating in REETS / EETS. Each example follows a different structure and highlights the principle focus.

- Example 1 shows that this type of risk would need to be structured in such a way that a **review date** is part of the categorisation

Example 1 (compliance Risk: single occurrence by one or more SP)

Risk identified	Impact	Probability	Exposure	Control	Review date
Low quality of SP service, when penalties have to be paid by SP to TC	High	Low	Medium	Notified bodies & TC & SP	Every time when there are e.g. larger system changes, toll tariff scheme changes

- Example 2 shows how best to reduce the risk and how important should be **clear responsibility allocation including a 4-eye principle**.

Example 2 (financial Risk: on-going Business for SP and TC)

List of possible risk	Likelihood	Impact	What are we doing about it now	What more can we do about it	Person responsible
Record keeping of bank guarantee	L	H	Original Documents stored in filing cabinets which are locked	Keeping scanned copies of documents & making weekly backups of electronic data	Admin Dep: Mr / Mrs XY Mr / Mrs WZ

- Example 3 shows that the identified risk needs recommended action outside typical company responsibility in a risk management plan in order to be effective.

Example 3 (legal risk: specific effect on all SPs)

Section 1: Legal Risk	Issue / risk	Recommended Actions	Risk Rating (H/M/L)	Responsible Organisation	Monitoring frequency
Change of national legal Act with consequences to toll business, for example: Cancellation of MS bilateral agreement on reverse	This changes the business environment for SP and SU	Ensure that no market deterioration occurs	Medium	EU Commission and Member States	Annually and/or when it occurs

charge principle for tolling					
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In the global RMP of any company a scale should be introduced which can be applied to the categorisation of all risks, which is relevant according to their business. E.g. for frequency (occurrence) a probability of a risk occurring during one year or ten years of service operation could be used. For impact or severity, the ratings could be linked to the duration or extent to which toll revenue collection would be affected.

3.6 Recommendations to the authorities of the Member States

REETS TEN therefore recommends the following checks of the competent authorities of EU member states when dealing with an application of an EETS Provider with regard to Art 4 (e) Decision 2009/750/EC:

- **Recommendation 1**

1. Check whether the business plan of the company duly considers the following risks of the EC Application Guide:

- No 2 (cash flow/liquidity risk)
- No 3 (economic slowdown)
- No 4 (increasing competition)

2. Check whether the risk management plan business plan of the company duly considers following risks of the EC Application Guide:

- No 5 (damage to reputation)
- No 8 (third party liability)
- No 9 (regulatory/legislative changes)

3. Check whether the risk management plan business plan of the company duly considers the REETS/EETS specific risks listed in section 4.2 and 4.3

- **Recommendation 2**

EETS is a complex business due to type of stakeholders (public & private) and the level of a toll is to be considered as an important income of Member States (MS) households. A financial & technical high quality needs to be ensured in each specific area of EETS. The following list shows the areas where risk can occur and for which the specific list of risks (see chapter 4.3) has been developed by WP 1 members:

List of specific areas of the EETS business environment where risk occurs

- Service Provider and OBE certification
- Service Provider registration

- Contractual negotiation and conclusion
- Suitability for Use Tests
- Change management
- System monitoring
- Service Components
 - User registration
 - OBU personalisation and distribution to user
 - Usage date collection, toll declaration
 - Production of toll statement

It is recommended to regular update EETS specific risks in the risk management plan of all stakeholders involved at least once per year. This should be monitored possibly on EU level to ensure coordinated updates of all toll domains.

▪ **Recommendation 3**

The most casual risk which can occur and effect one or more, or even all toll domains are linked to external & internal criminal attacks

- IT system as such
- IT security mechanisms (e.g. payments flows, misled transactions)
- Staff (internal & external corruption)
- Accuracy of measurement of tolls

It is recommended that each EETS risk management plan includes a specific section which details the countermeasures of the company to this type of risk. Particular attention should be given to the financial procedures.

4 Description of risks and mitigation measures in the REETS/EETS context

4.1 Risk treatment strategy

Factors to consider for a risk treatment strategy include:

- Avoid risk
- Mitigate risk
- Transfer risk
- Accept risk

Treatment of risks

Can the probability of the risk occurring be reduced? (e.g. through preventative maintenance, or quality assurance and management, change in business systems and processes), or

Can the consequences of the event be reduced? (e.g. through contingency planning, minimizing exposure to sources of risk or separation/relocation of an activity and resources).

Examples for the mitigation activity:

- Transferring the risk totally or in part - This strategy may be achievable through moving the responsibility to another party or sharing the risk through a contract, insurance, or partnership/joint venture. However, one should be aware that a new risk arises in that the party to whom the risk is transferred may not adequately manage the risk!
- Retaining the risk and managing it - Resource requirements feature heavily in this strategy.

The next step is to determine the target level of risk resulting from the successful implementation of the preferred treatments and current control activities.

The intention of a risk treatment is to reduce the expected level of an unacceptable risk.

4.2 Overview about REETS/EETS specific risks

In the following given overview only additional REETS/EETS specific risks are listed. This list is to be considered a selection of what the WP 1 members have identified as REETS/ EETS relevant, it should be noted that in the course of REETS / EETS implementation additional risks might be identified and need to be added. The specific risks come additional to the generic risks (see 3.4), for example Human Resources/Staff Risk is not a specific risk as such but has nevertheless to be considered in global risk management plan.

The “Overview Table” on the next two pages shortlists the risk as such, detailed description in then outlined in the pages following thereafter.

Risk	Risk name	Risk category	Frequency /Probability	Impact level /Severity	Mitigation / Countermeasure	Type of risk see p. 5	Responsibilities*/In charge of mitigation actions.
1	Risk on Toll Charger (TC) or Member State (MS) decision(1) and/or change of legislation (2) impacting the EETS business (ex 1.: VAT law -> business impact ex 2: judgment of notified body affecting TC in another toll domains)	SP & TC Risk	1,2	B, C	<ul style="list-style-type: none"> Change mechanism in the bilateral contract Coordination of activities by MS and multi-field bodies 	legal	<ul style="list-style-type: none"> European Union (EU) National Government (NG)
2	Risk of system (1a) or components (1b) unavailability or failure and risk of errors in road usage data (2)	SP, TC & SU Risk	3	B, C - depending on the number and frequency of errors	<ul style="list-style-type: none"> system test procedures before start OBE certification & testing continuous system monitoring (TC) continuous process improvement (SP) 	compliant	<ul style="list-style-type: none"> Toll Charger (TC) Service Provider (SP)
3	Risk of delays (1) and uncontrolled errors (2) of any change made in the OBE	SP, TC & SU Risk	Risk (1) - 4, 5 Risk (2) - 1	Risk (1) – B Risk (2) - C	<ul style="list-style-type: none"> fall back solution in degrade mode system test procedures before start OBE certification & testing continuous system monitoring (TC) continuous process improvement (SP) 	compliant	<ul style="list-style-type: none"> Toll Charger (TC) Service Provider (SP)
4	Risk of low quality service level of toll chargers (TC)	SP & TC Risk	1 - 2	B/C depending on the level	<ul style="list-style-type: none"> Check of quality of toll domain statements SLA with KPI to measure quality of TC penalties in contract in case of low TC/SP service quality Provision in the TC-SP contract allowing the contract termination Independent audit of the SP by the TC 	compliant	<ul style="list-style-type: none"> Toll Charger (TC) Service Provider (SP) Notified bodies (NB) Conciliation bodies (CB) European Union (EU) National Government (NG)
5	Risk of low service quality of service provider (SP)	SP & SU Risk	3	B/C depending on the level	<ul style="list-style-type: none"> check of quality of SP & toll domain statements penalties in contract in case of low SP service quality Provision in the TC-SP contract allowing the contract termination terminate contract – SLA with KPI 	compliant	<ul style="list-style-type: none"> Toll Charger (TC) Service Provider (SP) National Government (NG) European Union (EU)
6	Payment risk regarding tolls of Service User (SU)	SP Risk	5	A, B, C - depending on the SU	<ul style="list-style-type: none"> Provisions to be included in the contractual and legal framework "blacklisting" exchange with TC Contractual provision SP / SU 	financial	<ul style="list-style-type: none"> Toll Charger (TC) Service Provider (SP) Service User (SU)
7	Payment risk regarding toll of SP)	TC Risk	2	A, B, C - depending on the SP	<ul style="list-style-type: none"> Bilateral contract between TC & SP Monitoring by EU or another entity 	financial	<ul style="list-style-type: none"> Toll Charger (TC) Service Provider (SP) National Government (NG)
8	Insolvency risk of a service provider (SP)	SP & TC Risk	3, 4	B, C depending on size of SP and status of payment security	<ul style="list-style-type: none"> bank guarantee or credit insurance from SP or other type of financial back up TC need to provide a fall back solution 	financial	<ul style="list-style-type: none"> Toll Charger (TC) Service Provider (SP) National Government (NG) European Union (EU)

* The stakeholders listed are responsible according to the risk category identified. There is no prioritisation in the order of appearance.

Risk	Risk name	Risk category	Frequency Likelihood	Impact level Severity	Mitigation / Countermeasure	Type of risk see p. 5	Responsibilities* / In charge of mitigation actions*
9	Risk of Toll Charger (TC) bankruptcy	SP & TC Risk	2	B/C	<ul style="list-style-type: none"> MS monitoring another TC could replace bankrupt TC Bankrupt TC could be replaced by NG institutions 	financial	<ul style="list-style-type: none"> National Government (NG) European Union (EU)
10	Excessive failure rate of the OBE (software)	SP, TC & SU Risk	1, 2	B, C depending on size of the failure rate	<ul style="list-style-type: none"> Set-up system with double checking of collected data Suitability for use tests have to be carried out Monitoring tools & alerts of each toll system KPIs monitoring 	technical	<ul style="list-style-type: none"> Toll Charger (TC) Service Provider (SP)
11	Risk of investment	SP, TC & SU Risk	1,2	B, C depending on the effects	<ul style="list-style-type: none"> Anti-trust laws Prevent agreement (e.g. price-fixing) Contractual arrangement SP and TC within contract framework with REETS/EETS 	technical	<ul style="list-style-type: none"> Toll Charger (TC) Service Provider (SP) European Union (EU)
12	Risk of fraud (1) by the users and by the Service Provider (SP) (2) or security failure	SP, TC & SU Risk	3 (1), 1,2 (2)	A, B, C depending on the extensiveness of the fraud	<ul style="list-style-type: none"> Constant monitoring by KPIs & set-up of cross border enforcement rules Fraud / security issues for the SP & SU 	operational	<ul style="list-style-type: none"> Toll Charger (TC) Service Provider (SP) National Government (NG) Toll Stakeholders (TS) European Union (EU)
13	Risk of recurrent dysfunction in the TC/SP exchanges of the processes - single event	SP & TC Risk	1,2	A, B, C depending of the number of OBE / RSE	Quality check of process and regular update, use 4 eye principles where appropriate.(Actively monitored by KPIs of TC and SP)	operational	<ul style="list-style-type: none"> Toll Charger (TC) Service Provider (SP)
14	Risk of market deteriorations (1) & discrimination or national market protection (2)	SP Risk	3	B	<ul style="list-style-type: none"> EU & MS legislation and monitoring fair play rules to be foreseen in contact framework (trustworthiness) 	market	<ul style="list-style-type: none"> National Government (NG) European Union (EU) Conciliation bodies (CB)

* The stakeholders listed are responsible according to the risk category identified. There is no prioritisation in the order of appearance.

4.3 Description of REETS/EETS specific risks and mitigating measures

Risk name	Risk on MS/C decision (1) and/or change of legislation (2) impacting the EETS business
Risk category	SP & TC Risk

Risk	1
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Detailed description of the risk
This is a risk of change of national legislation, new compliance standards and incoherence or non-compliance between EU and MS legislation compromising the investment made by the SP (e.g. payment services, banking business, collection services, legal & VAT requirements, money laundering....) Example for this risk - major political changes in tolling policy (e.g. Ecotaxe FR). Significant risk, every business fears the changes in legislation, which is very relevant for the SP, when working as SP in several EU (toll domains) countries is consequently exposed to more changes.

Frequency/Probability	1	unlikely
	2	slight possibility
	3	normal possibility
	4	very possible
	5	certain

Impact level/Severity	A	not severe
	B	severe
	C	threatening

Impact of the risk
This risk impacts the EETS Business and concerned is the EU / MS tolling policy in total.

Frequency/Probability	1, 2
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Impact level/ Severity	B, C
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Main barriers to EETS rollout
<ul style="list-style-type: none"> ▪ Business development - termination of contract ▪ Expenses - cost for system updates or changes ▪ Loss - investments

Mitigation actions: provisions to include in the contractual and legal framework			
Action	Description	In charge	
1	Possibly the notification of new tolling schemes or changes in existing tolling schemes to the COM according to directive 1999/62/EC might be helpful to reduce changes in tolling schemes and therefore also for EPs."	EU	National (NG) Government
2	Change mechanism in the bilateral contract		
3	Coordination of activities by MS and multi-field bodies		

Risk name	Risk of system (1a) or components (1b) unavailability or failure and risk of errors in road usage data (2)
Risk category	SP, TC & SU Risk

Risk	2
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Detailed description of the risk
<p>Risk of system unavailability (1) or failure compromising toll data collection or toll data correctness. It deals with unintentional errors (no fraud involved -> separate risk). (1a/1b) this risk is a significant risk. It also includes the risks on OBE failure at a large scale. ,</p> <p>(2) This risk concerns the road usage data collection process up to the toll (usage) declaration:</p> <ul style="list-style-type: none"> ▪ errors in data collection in general and regarding the user – to avoid confusion with toll data received & possibly paid ▪ failure of data transmission ▪ mistake in user registration, vehicle data collection and OBE personalization.

Frequency/Probability:	1	unlikely
	2	slight possibility
	3	normal possibility
	4	very possible
	5	certain

Impact level/Severity	A	not severe
	B	severe
	C	threatening

Impact of the risk
<p>(1) This risk can lead a global non-working state of a batch or whole generation of OBUs, which are no longer capable of collecting toll in a GNSS toll domain thus inflicting huge losses to the TC”</p> <p>(2) This risk can lead to over or under charging .</p>

Frequency/Probability	3
Impact level/ Severity	B , C depending of the number and the frequency of errors

Main barriers to EETS rollout
<ul style="list-style-type: none"> ▪ Loss of toll revenue for TC ▪ Expenses regarding the cost for system improvement and penalties for SP ▪ Cost for failure handling for TC and SP

Mitigation actions/ Countermeasures: System test procedures before start & OBE certification & testing & continuous system monitoring (TC) & continuous process improvement (SP)			
Action	Description	In charge	
1	System set-up with double checking of collected data, company insurance covering e.g. system failures,	TC	SP
2	OBE certification based on comprehensive specifications, continuous system monitoring - as discussed in WP 3: <ul style="list-style-type: none"> ▪ TC - continuous system monitoring by enforcement checks ▪ SP - continuous process improvement 		

<ul style="list-style-type: none"> ▪ Reputation damage for SP and drop of users satisfaction ▪ TC - users confidence in the tolling system 	3	<p>Implementation of the requirements of the EFC security framework and adhere to an EETS security policy (see D.4.3) to avoid excessive system failures (e.g. backup, disaster recovery, mirrored back end systems). This needs to be described in the risk management plan!</p> <ul style="list-style-type: none"> ▪ On TC side - manageable on contractor / general contractor level and actually a local matter. ▪ On SP side – this should be linked to SLAs in the TC-SP contract (see WP 4 - D4.3) 		
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Risk name	Risk of delays (1) and uncontrolled errors (2) of any update made in the OBE
Risk category	SP, TC & SU Risk

Risk	3
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Detailed description of the risk
<p>Risk of delays required for introducing any change or firmware update by the air in the OBE. This risk is specific to GNSS systems and stems from the possibility to update data and/or software over the air interface.</p> <p>Concerned is the OBE update process:</p> <ul style="list-style-type: none"> ▪ failure of data transmission ▪ failure of software update over the air interface.

Frequency/Probability:	1	unlikely
	2	slight possibility
	3	normal possibility
	4	very possible
	5	certain

Impact level/Severity	A	not severe
	B	severe
	C	threatening

Impact of the risk
<p>This risk can lead a global non-working state of a batch or whole generation of OBUs, which are no longer capable of collecting toll in a GNSS toll domain thus inflicting huge losses to the TC. In interoperable devices GNSS & DSRC it may also affect the DSRC system (during personalization)</p>

Frequency/Probability	4 or 5 (1) and 1 (2)
Impact level/ Severity	B (1), C (2)

Main barriers to EETS rollout
<ul style="list-style-type: none"> ▪ Loss of toll revenue for TC ▪ Expenses regarding the cost for system improvement and penalties for SP ▪ Cost for failure handling for TC and SP ▪ Reputation damage for SP and drop of users satisfaction

Mitigation actions/ Countermeasures: Fall back solution in degrade mode/ system set-up with double checking of collected data & OBE certification & testing /continuous system monitoring & process improvement		
Action	Description	In charge
1	System set-up with double checking of collected data, company insurance covering e.g. system failures	TC SP
2	OBE certification based on comprehensive specifications, continuous system monitoring - as discussed in WP 3: <ul style="list-style-type: none"> ▪ TC - continuous system monitoring by enforcement checks ▪ SP - continuous process improvement 	
3	Implementation of the requirements of the EFC security framework and adhere to an EETS security policy (see D 4.3 and Stockholm Group proposal) to avoid excessive system failures (e.g. backup, disaster recovery, mirrored back end systems). This needs to be described in the risk management plan! <ul style="list-style-type: none"> ▪ On TC side - manageable on contractor / general contractor level and actually a local matter. ▪ On SP side – this should be linked to SLAs in the TC-SP contract (see D4.3)" 	

Risk name	Risk of low quality service level of toll chargers
Risk category	SP & TC Risk

Risk	4
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Detailed description of the risk
<p>This risk concerned the system of the TC and it interfaces to the SP and its operational functionality. Very sensitive is the usage data collection process up to the toll (usage) declaration.</p> <p>In particular for GNSS toll domains (e.g.) absence of LAC beacons installation (LAC = localization augmentation communication), dysfunction of RSE and unavailability of ETC lanes can create a problem</p>

Frequency/Probability:	1	unlikely
	2	slight possibility
	3	normal possibility
	4	very possible
	5	certain

Impact level/Severity	A	not severe
	B	severe
	C	threatening

Impact of the risk
<p>This risk leading to loss of tolls or dispute involving the EETS Provider system liability. Insufficient and/or low quality description in the toll domain statement can lead to mismatch between TC and SP.</p>

Frequency/Probability	1- 2
Impact level/ Severity	B/C (depending on the affects)

Main barriers to EETS rollout
<p>It could be a significant barrier to EETS implementation and could be a blocker for the TC & SP in their contractual arrangements.</p>

Mitigation actions/ Countermeasures: Check of quality of TC				
Action	Description	In charge		
1	<ul style="list-style-type: none"> Pre-check before start of EETS Suitability for use test have to be carried out SLA with KPI to measure quality of TC . 	TC	SP	Conciliation body
2	<ul style="list-style-type: none"> include a provision in the TC-SP contract allowing the contract termination in case of too frequent or too severe quality of service issues include independent audit of TC by the notified body (NB), and guarantee by TC to refund any losses or missing revenue identified by the notified body (TC penalties - Independent audit of the SP by the TC) 	TC	SP	NB
3	In case a TC can not be pushed to achieve the contractual agreed KPI levels the conciliation body (CB) shall assess the case	TC	SP	CB
4	In case no solution by conciliation bodies can be found and continuous no quality service level of TC, SP need to have the possibility for legal counter measures – EU/ NG/ SP	EU	NG	SP

Risk name	Risk of low service quality of SP
Risk category	SP, TC & SU Risk

Risk	5
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Detailed description of the risk
This risk leading to loss of tolls or dispute involving the EETS Provider system liability. Insufficient and/or bad service quality of SP can lead to mismatch between SU, SP and TC. This risk is a significant risk and can lead to user data privacy disclosure (User writes correct information - > SP makes a mistake). In particular, if the SP provides the Toll Charger with wrong customer data for the purposes of enforcement proceedings.

Frequency/Probability:	1	unlikely
	2	slight possibility
	3	normal possibility
	4	very possible
	5	certain

Impact level/Severity	A	not severe
	B	severe
	C	threatening

Impact of the risk
Concerned is the usage data collection process up to the toll (usage) declaration: <ul style="list-style-type: none"> ▪ errors in data collection in general and regarding the user – to avoid confusion with toll data received & possibly paid ▪ failure of data transmission ▪ mistake of SP in user registration, vehicle data collection and OBE personalization.

Frequency/Probability	3
Impact level/ Severity	B/C depending on the level

Main barriers to EETS rollout
Loss of toll revenue for TC <ul style="list-style-type: none"> ▪ Expenses regarding the cost for system improvement and penalties for SP ▪ Cost for failure handling for TC and SP ▪ Reputation damage for SP and drop of users satisfaction

Mitigation actions/ Countermeasures: Check of quality of SP		
Action	Description	In charge
1	<ul style="list-style-type: none"> ▪ Define the required service quality in the SLA ▪ Define KPI's for the service elements to be measured ▪ Define actions to be taken depending on the value of the measured service quality in order to improve the quality 	TC & SP
2	<ul style="list-style-type: none"> ▪ include penalties in the contract in case of low SP service quality ▪ include a provision in the TC-SP contract allowing the contract termination in case of too frequent or too severe quality of service 	SP & TC
3	<ul style="list-style-type: none"> ▪ include independent audit of SP by the TC, and guarantee by SP to refund any missing toll revenue identified by the TC's audit body 	SP & TC
4	<ul style="list-style-type: none"> ▪ Check and justify the Service Level Agreement with the corresponding KPI's. 	SP & TC

Risk name	Payment Risk regarding tolls of SU
Risk category	SP Risk

Risk	6
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Detailed description of the risk
Non-payment of SU includes all outstanding toll payments under national law of each toll domain in which SU has outstanding payments. Due to European-wide collection of toll by SP large scale international SU it could be a significant risk and particular for the transport sector due to the volatile type of business.

Frequency/ Probability:	1	unlikely
	2	slight possibility
	3	normal possibility
	4	very possible
	5	certain

Impact level / Severity	A	not severe
	B	severe
	C	threatening

Impact of the risk
In terms of delays of payment and/or non-payment, costs of legal activity due to non-payment of SU, loss of revenue, damage to the company stability, which can in a worst-case scenario lead to insolvency of the SP. As the transport market is considered a high-risk market SP needs to have very good financial stability and/or risk management skills (see also WP 1 D.1.1 section on remuneration)

Frequency/ Probability	5
Impact level/ Severity	A , B or C depending on the SU

Main barriers to EETS rollout
It could prevent a significant barrier to EETS implementation in case there is no remuneration for this valid service of SP. This will prevent SP from entering in EETS business take-up.

Mitigation actions/ Countermeasures: provisions to include in the contractual and legal framework			
Action	Description	In charge	
1	This risk it currently "solved" via risk monitoring tools of each SP to detect non-payments. For this monitoring also "blacklisting" exchange with TC is the most effective countermeasure.	SP	TC
2	<ul style="list-style-type: none"> ▪ Contractual provisions SP-SU ▪ SP to cover their own risk needs own insurance and to back up toll amounts with equity ▪ SP to ensure risk evaluation schemes for SUs 	SP	SU

Risk name	Payment Risk regarding toll of SP
Risk category	TC Risk

Risk	7
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Detailed description of the risk
<p>Non-payment of SP includes all outstanding toll payments under national law of each toll domain in which SP has outstanding payments. Due to European-wide collection of toll by SP it could be a significant risk for the TC.</p> <p>This risk does not include insolvency of SP (see Risk 8), it is related to a national & cross border non-payments in case of any dispute between TC & SP</p>

Frequency/ Probability:	1	unlikely
	2	slight possibility
	3	normal possibility
	4	very possible
	5	certain

Impact level / Severity	A	not severe
	B	severe
	C	threatening

Impact of the risk
<p>In terms of delays of payment and/or non-payment, costs of legal activity due to non-payment of SP (penalties), loss of revenue, damage to the company stability, which can in a worst-case scenario lead to termination of contract with SP. As the transport market is considered a high-risk market TC needs to have very good financial stability and/or risk management skills for detecting and monitoring non-payments by SP.</p>

Frequency/ Probability	2
Impact level/ Severity	A , B or C depending on the SP

Main barriers to EETS rollout
<p>It could be a blocker for the TC to open up for contractual arrangements between various SP not based in the home country of the TC as the TC is not aware about the payment behavior of the SP in his home country.</p>

Mitigation actions/ Countermeasures: Bilateral contracts between TC& SP			
Action	Description	In charge	
1	<ul style="list-style-type: none"> This risk can be "solved" via bilateral contracts between TC and SP, which can lead to penalties and termination of contract by the TC against SP. 	TC	SP
2	<ul style="list-style-type: none"> The EU & the National Government could help to reduce the risk for the TC when evaluating unknown SP by coordinating information flow from one toll domain to other toll domains 	EU	TC
2	<p>The EU or another entity could take up the role of overall monitoring of EETS SP and assessing the quality of all SP for all total EETS area as each TC is only watching and monitoring their bilateral contracts with "their" SPs.</p>	EU	

Risk name	Insolvency risk of a service provider (SP)
Risk category	SP & TC Risk

Risk	8
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Detailed description of the risk
Risk of insolvency linked to events on one or more toll domains or on other activities than tolls by the SP.

Frequency/Probability	1	unlikely
	2	slight possibility
	3	normal possibility
	4	very possible
	5	certain

Impact level/Severity	A	not severe
	B	severe
	C	threatening

Impact of the risk
This risk impacts the financial stability of SP and impinges on TC, which can in a worst-case scenario lead to insolvency of the TC. As the transport market is considered a high-risk market TC needs to have very good financial stability and/or risk management skills. The SUs of this SP or several SPs do need immediate support for new Onboard devices. As this situation cannot be foreseen a continuous fall back scenario needs to be provided by the TC.

Frequency/Probability	3/4
Impact level/ Severity	B or C depending on the SP and the status of payment security

Main barriers to EETS rollout
<ul style="list-style-type: none"> ▪ Business development - termination of contract ▪ Loss - investments

Mitigation actions/ Countermeasures : bank guarantee or credit insurance from SP				
Action	Description	In charge		
1	request bank guarantee or credit insurance from SPs or other security means for a sufficient amount, insolvency rules differ in each EU country (!), other options are rating of SP (should be not below B) [see D.1.1 chapter 2.1]	EU	Gov-	TC & SP
2	TCs need to provide a fallback solution		NG	TC

Risk name	Risk of Toll Charger bankruptcy
Risk category	SP & TC Risk

Risk	9
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Detailed description of the risk
<p>Typically the SP owes money to the TC thus if a larger SP or several SPs are insolvent this could create a financial problem to the toll charger, which could lead to bankruptcy of the TC. This inconsequence will affect other SPs having done the business in the correct manner.</p> <p>Further a large scale system failure lead to severe financial impact of respective TC this could have similar consequences to SPs.</p> <p>In case of shareholder /bankruptcy of respective TC could also have an influence on the solvency of TC and their contractual SPs</p>

Frequency/Probability	1	unlikely
	2	slight possibility
	3	normal possibility
	4	very possible
	5	certain

Impact level/Severity	A	not severe
	B	severe
	C	threatening

Impact of the risk
<p>This risk impacts the financial stability of SP and impinges on TC. Due to the fact that today's national SPs and to some extend also international SPs have "home market" where most of the SUs are located, the bankruptcy of a TC could have a severe business impact on SP which can lead to SP bankruptcy.</p>

Frequency/Probability	2
Impact level/ Severity	B/C

Main barriers to EETS rollout
<ul style="list-style-type: none"> ▪ Business development of the TC and termination of the contract with SP ▪ Loss of investments by TC ▪ Loss of expenses by SP – for system implementation costs.

Mitigation actions/ Countermeasures : MS monitoring				
Action	Description	In charge		
1	<ul style="list-style-type: none"> ▪ another TC could replace bankrupt TC safety countermeasure through NG : assume the toll can continue to be collected the bankrupt TC could be replaced by NG institutions ▪ safety net national government - in case of bankruptcy of TC - assume that toll can continue to be collected 	<table border="1"> <tr> <td>EU</td> <td>National Government</td> </tr> </table>	EU	National Government
EU	National Government			

Risk name	Excessive failure rate of the OBE (software)
Risk category	SP & TC & SU Risk

Risk	10
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Detailed description of the risk
This risk of excessive failure rate of the OBE Software affects the SP and TC as well as the SU. This could be e.g. wrong calculation of distance and price level (billing data), wrong segment data settings, wrong geo-mapping data for road network. Concerned are the OBE Software functioning

Frequency/Probability:	1	unlikely
	2	slight possibility
	3	normal possibility
	4	very possible
	5	certain

Impact level/Severity	A	not severe
	B	severe
	C	threatening

Impact of the risk
This risk is leading to additional effort for reconciliation, in particular the right level of toll or billing data, worse leading to loss of tolls (wrong calculation).

Frequency/Probability	1, 2
Impact level/ Severity	B, C depending on size of the failure rate

Main barriers to EETS rollout
<ul style="list-style-type: none"> Revenue loss for TC and possibly termination of contract with SP Loss of expenses by SP for system implementation costs - mal reputation of national SP & TC

Mitigation actions/ Countermeasures: Testing & Monitoring of OBE (for further details see WP 3)			
Action	Description	In charge	
1	System set-up with double checking of collected data, company insurance covering e.g. system failures,	TC	SP
2	<ul style="list-style-type: none"> Suitability for use tests have to be carried out. This risk can be reduced via systems monitoring tools and alerts of each toll system to detect malfunctions 	TC	NG
3	use penalized KPIs	TC	SP

Risk name	Risk of investment
Risk category	TC, SP, SU Risk

Risk	11
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Detailed description of the risk
The risk of loss /reduction of revenue across EU could raise risk of investment in implementing EETS and further EETS developments. This has occurred in the past (2008 /2009 economics) and cannot be forecasted for the future.

Frequency/ Probabil- ity:	1	unlikely
	2	slight possibility
	3	normal possibility
	4	very possible
	5	certain

Impact level/ Severity	A	not severe
	B	severe
	C	threatening

Impact of the risk
Because of less business or withdraw by SP the contract between SP & TC could be terminated. This possibly could lead to monopolization of EETS market.by very few SP

Frequency/Probability	1, 2
Impact level/ Severity	B, C depending on the effects

Main barriers to EETS rollout
Some SP may stop their business take up because of no potential,

Mitigation actions/ anti-trust laws, mergers & cartels in/of the EU			
Action	Description	In charge	
1	Prevent agreement to act uncompetitive trough price-fixing and other measures and prevent cooperation from gaining a monopoly or near monopoly from abusing positions within the toll market (§80 within the treaty)	TC	EU
2	Contractual arrangement: SP and TC within contract framework with REETS /EETS should present any discrimination of a SP in respective toll domains		

Risk name	Risk of fraud (1) by the users and (2) by the EETS Provider
Risk category	TC, SP, SU Risk

Risk	12
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Detailed description of the risk
The responsibility of detecting fraud of SU in a toll system can occur at any time and needs specific security measures as described WP 4. The detection of fraud by SP can also occur at any time and needs specific SLAs monitored by TC.

Frequency/Probability:	1	unlikely
	2	slight possibility
	3	normal possibility
	4	very possible
	5	certain

Impact level/Severity	A	not severe
	B	severe
	C	threatening

Impact of the risk
Fraud can lead to financial loss for one or more toll domain. Fraud can lead to increased enforcement effort and expense by TC

Frequency/Probability	3(1) / 1, 2 (2)
Impact level/ Severity	A, B, C depending on the extensiveness of the fraud

Main barriers to EETS rollout
The enforcement and the procedures to prevent fraud need to be harmonized across existing and future toll domain. According to the toll domain statements it varies amongst the EU Member States. How best to overcome is still an ongoing process.

Mitigation actions/ Countermeasures: Constant monitoring by KPIs & set-up of cross border enforcement rules see WP 04				
Action	Description	In charge		
1	Set up of cross border enforcement rules for fraudulent a SUs	EU	NG	Stake-
2	<ul style="list-style-type: none"> For the SP fraud issues: Constant monitoring of SP's operation by TC. To be monitored by KPIs. For the SU fraud issues: Block fraudulent SUs. Cooperate with the TCs in enforcing fraudulent SUs. TC request (in TDS or contract) from the SP for the collection of evidentiary vehicle documents (i.e. proof of emission class) SLA with KPI for user registration and OBE personalisation 	TC	SP	

Risk name	Risk of recurrent dysfunction in the TC/SP exchanges of the processes
Risk category	SP & TC Risk

Risk	13
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Detailed description of the risk
Risk of recurrent dysfunctions of the processes (OBE/RSE dialog or back-office exchange/interfaces) with operational consequences and additional costs. This risk is purely iterative dealing with front end and backend processes, which can occur any time.

Frequency/Probability:	1	unlikely
	2	slight possibility
	3	normal possibility
	4	very possible
	5	certain

Impact level/Severity	A	not severe
	B	severe
	C	threatening

Impact of the risk
This risk can lead to operational problems (OBE/RSE dialog or back-office exchange/interfaces) if not detected and solved in short time.

Frequency/Probability	1, 2
Impact level/ Severity	A, B , C depending of the number of OBE / RSE

Main barriers to EETS rollout
<ul style="list-style-type: none"> ▪ Loss of toll revenue of EETS for TC ▪ Expenses of SP regarding the cost for system improvement and possible penalties for SP ▪ Cost for failure handling for TC and SP ▪ Reputation damage for SP and drop of users satisfaction ▪ SUs loss of confidence in the EETS system

Mitigation actions/ Countermeasures: Quality check of process and regular update (further details see WP 3)			
Action	Description	In charge	
1	<ul style="list-style-type: none"> ▪ Perform extensive suitability for use tests before the start of operation. ▪ Replace a batch/generation of non-performing OBEs. Constantly maintain and service RSE. ▪ Actively monitored by KPIs of TC and SP. 	TC	SP

Risk name	Risk of market deteriorations (1) & discrimination or national market protection (2)”
Risk category	SP Risk

Risk	14
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Detailed description of the risk
Risk of market deteriorations (1) - e.g. unbalanced revenue schemes and national subsidy schemes. There is a risk of intentionally preferred national versus non-EETS products with better conditions that can slow down or even make it impossible for SP to “sell” the EETS or any update on to customer. Risk of discrimination or national market protection (2) - e.g. national scheme better positioned than EETS on a user point of view, obstacles made for SP or SP equipment acceptance, payment rules discrimination among SP, difficulties to access to discount schemes, discrepancies between REETS/EETS registration procedures and updates during EETS live time.

Frequency/ Likelihood:	1	unlikely
	2	slight possibility
	3	normal possibility
	4	very possible
	5	certain

Severity	A	not severe
	B	severe
	C	threatening

Impact of the risk
EETS market is affected in total, possibly SP will leave or stop their business, possibly monopolization of market by very few players.

Frequency/Likelihood	3
Impact level/ Severity	B

Main barriers to EETS rollout
<ul style="list-style-type: none"> ▪ Business development for SP & TC - barrier to market entry and/or termination of contract ▪ Loss of investments of TC & of SP ▪ Expenses - cost for EETS system development

Mitigation actions/ Countermeasures: EU legislation and monitoring			
Action	Description	In charge	
1	Any EETS provider will always have to face national interoperability projects as they exist today and will continue to develop if a need from the customers emerges. There will be no protection from such a risk unless the MS/TCs are not allowed to have national schemes which contradicts EETS.	EU	National Government
2	The national systems can cater more efficiently to local customers than to remote customers, but this should be controlled by e.g. conciliation bodies.		
3	Fair play rules to be foreseen in contact framework (trustworthiness)		

Annex I – Glossary

The following table consists of the commonly agreed terms and definitions in the REETS project.

No.	Terminus	Ab-brev.	(short) description
1	Service Provider	SP	<p>Company / Entity offering the services of an EETS-Provider but not necessarily formally registered as an EETS-Provider.</p> <p>Since the REETS Project shall facilitate the transition to EETS, it is recommended, to generally use "Service Provider (SP)", except if "EETS-Provider shall be explicitly addressed (e.g. in the context of registration).</p>
2	EETS-Provider	EP	A legal entity fulfilling the requirements of Art 3 and registered in a Member State where it is established, which grants access to EETS to an EETS user (see Art 2 b) Decision 2009/750/EC).
3	Member State	MS	EU Member State
4	European Electronic Toll Service	EETS	The abbreviation EETS stands for European Electronic Toll Service. It is a service that enables the payment of tolls with a single contract at a single EETS provider and just one on-board unit throughout the European Union.
5	Regional European Electronic Toll Service	REETS	The REETS-TEN project aims at deploying EETS compliant services in a cross-border regional project. The Project shall cover the electronically toll network of 7 Member States (Austria, Denmark, France, Germany, Italy, Poland and Spain) and Switzerland.
6	Toll Charger	TC	Public or private organisation which levies tolls for the circulation of vehicles in a toll domain (see Art 2 k) Decision 2009/750/EC)
7	User		Physical or legal person who subscribes a contract with a Service Provider in order to have access to EETS compliant services (see Art 2 c) Decision 2009/750/EC).

No.	Terminus	Ab- brev.	(short) description
8	On Board Equipment	OBE	The complete set of hardware and software components required for providing EETS compliant services which is installed in a vehicle in order to collect, store, process and remotely receive/transmit data (see Art 2 e) Decision 2009/750/EC)
9	Interoperability constituents		Any elementary component, group of components, subassembly or complete assembly of equipment incorporated or intended to be incorporated into EETS upon which the interoperability of the service depends directly or indirectly, including both tangible objects and intangible objects such as software, see Article 2 of the EETS Decision. Examples of interoperability constituents are on-board equipment (including connected back office systems), roadside equipment (including charging beacons, localization augmentation beacons and enforcement devices), EETS Providers' and Toll Chargers' back-office data exchange systems.
10	Toll		A charge, tax or duty levied in relation with circulating a vehicle in a toll domain (see Art 2 j) Decision 2009/750/EC)
11	Toll domain		An area of EU territory, a part of the European road network or a structure (such as a tunnel, a bridge, a ferry,..) where toll is collected (see Art 2 n) Decision 2009/750/EC).
12	Tariff class		The set of vehicles treated similarly by a Toll Charger (see Art 2 g) Decision 2009/750/EC).
13	Vehicle classification parameters		The vehicle related information according to which tolls are calculated based on the Toll Context Data (see Art 2 q) Decision 2009/750/EC).
14	Certification		Certification is defined as an EETS Provider's or its representative's official written statement that its interoperability constituents comply with the associated specified (technical) requirements.

No.	Terminus	Ab- brev.	(short) description
15	Technical accreditation		Technical accreditation covers the technical aspects of the accreditation of an already registered EETS Provider in individual toll domains under responsibility of a Toll Charger (or a cluster of Toll Chargers).
16	Technical requirements for registration		Requirements defined by the Member State responsible for the registration to check against Article 3b of the EETS decision
17	Toll domain independent specifications		Technical specifications for interoperability constituents that are defined by technical standards or other regulations or specifications independently from individual toll domain requirements
18	Toll domain specific specifications		Technical specifications for interoperability constituents that comprise requirements that are specific to the needs of a toll domain
19	Security Policy		A Security Policy is a set of requirements and applicable counter measures specified by the party responsible for the security in a system exposed to threats. These counter measures are based upon a risk analysis of the system in order to protect those data exposed to threats in the relationships between TC and SP.

No.	Terminus	Ab- brev.	(short) description
20	Cluster		<p>A cluster of ETC Toll Domains is a set of Toll Domains, interconnected or not, which feature the same or very similar ETC toll collection context(s) in a contractual framework like Memorandum Of Understanding or any other agreement between the Toll Domain representatives, <i>i.e.</i> the Toll Chargers.</p> <p>This agreement specifies the rules regarding interoperability and its management within that cluster of ETS Toll Domains; it includes references to mutually agreed and shared detailed contractual, procedural and operational documentation as well functional and technical specifications (particularly, interfaces for OBU // RSE and for Toll Charger // Service Provider central systems). A cluster of Toll Domains may have a unique representative for some common subjects.</p> <p>Relationship between Toll Domains and Service Providers are fixed by bilateral contracts. Common validity periods of bilateral contracts with a given ETC Provider allow the interoperability for the global cluster.</p>
21	Accreditation		<p>The Accreditation covers the whole procedure (contractual and technical) to be successfully fulfilled by a Service Provider in order that its technical system could be accepted on a Toll Domain and that the TC entrusts the SP with the toll collection and the invoicing process to the SU.</p> <p>When the Accreditation is successfully completed, the Service Provider is “accredited” in the relevant Toll Domain.</p>