Service Number	Service Description	Category	Threat Number	Threat Description	Consequences of the Threat	Explanation of the Probability of Occurrence	Explanation of the Level of Impact	Risk rating scheme	Strategy Risk Number	Strategy Sequence Number	Strategy Action (1)	Strategy Action By Whom (1)	Action Category (1)	Strategy Action (2)	Strategy Action By Whom (2)	Action Category (2)	Strategy Action (3)	Strategy Action By Whom (3)	Action Category (3)	Strategy Action (4)	Strategy Action By Whom (4)	Action Category (4)	Strategy Action Type	Strategy Scenario
0	General risks	Framework Architecture	0.1.1	The KAREN Framework Architecture does not include all current transport policies and ITS services implemented in Europe.	The KAREN Framework Architecture will not apply to the transport policies and ITS services implemented across Europe.	There are a large number of different traffic policies and ITS services implemented across Europe.	The overall acceptance within Europe of the KAREN Framework Architecture will be decreased because it will not be applied consistently.	*ORANGE*	0.1.1A	1	The KAREN Functional Architecture must be capable of accommodating the different transport policies and ITS services that exist across Europe.	KP	1. Ensure KAREN Architecture is capable of beeing evolved.	Road owners/operators across Europe must be encouraged to adapt their transport policies and the ITS services that they support so that there is more commonality.	LA, NG, RO	2. Enforce KAREN Architecture Adoption							RA	7714
0	General risks	Framework Architecture	0.1.2	The KAREN Framework Architecture is found to be unable to accommodate new transport management policies and ITS services devised for Europe.	The KAREN Framework Architecture cannot be used as the intended starting point for the development of all ITS service providing systems.	In the future transport management polices and ITS services to be devised are outside those expected to be accommodated by the KAREN Framework Architecture.	Decay begins in the standardisation of ITS service provision across Europe that is based on systems developed from the KAREN Framework Architecture.	*ORANGE*	0.1.2A	2	The KAREN Functional Architecture must be adaptable in the future to the different transport policies and ITS services that may be devised across Europe.	KP	1. Ensure KAREN Architecture is capable of beeing evolved.	Road owners/operators across Europe must be encouraged to adapt their transport policies and the ITS services that they support so that there is more commonality.	LA, NG, RO	2. Enforce KAREN Architecture Adoption							RA	7713
0	General risks	Safety	0.10.1	Poorly designed in-vehicle systems and information can affect driver behaviour.	Vehicle safety and the safety of pedestrians and other road users is reduced due to poor driver behaviour.	It is difficult to design an ITS service that is totally safe.	Governments and users will reject the systems and ITS services because they endanger lives.	*ORANGE*	0.10.1A	25	Proper safety assessments and exhaustive testing by accredited authorities must be mandatory before any systems providing ITS services are installed in vehicles.	NG	10. Define ITS Failure Policies	Resources must be provided to put in place authorities with the necessary training and accreditation to provide safety assessments for in-vehicle systems.	NG	8. Address Competencies Issues							RA	7617
0	General risks	Safety	0.10.2	Safety related data, or data containing personal information, may be corrupted.	Corrupted data could endanger the health and lives of ITS users.	There is no safety standard or corruption checking facilities for the some communication protocols.	Consumers will reject systems and ITS services because of concerns about safety and privacy.	*RED*	0.10.2A	26	Safety provision and corruption checking must be a required feature of all communications standards used within Europe.	EC	10. Define ITS Failure Policies	All standards creation activities must include resource to check that facilities to provide protection against corruption are included and that any safety implications arising from corruption or failure are protected.	EC	5. Found Research & Standardisation	Communications equipment must be designed to exploit the corruption protection facilities included in communications protocols, and must not endanger user safety when failures occur.	MI	4. Adopt ITS Systems Common Requirements				RA	7717
0	General risks	Stakeholder Acceptance	0.11.1	Manufacturers want to sell their own systems and establish their own semi-standards to protect their share of the markets.	Manufacturers will work to hinder, delay, prevent the implementation of open standards generated by the KAREN Framework Architecture.	Manufacturers always reject open standards because they fear that they will loose their market shares.	Because of their influence manufacturers could slow the implementation of ITS services and systems based on the KAREN Framework Architecture.	*ORANGE*	0.11.1A	13	Resource must be provided to enable standards other than those that only apply to the products of a particular manufacturer to be developed before a particular manufacturer dominates a market.	EC	5. Fund Research & Standardisation	Manufacturers must be positively and actively encouraged to make their own proprietary standards public and available for use by other competing manufacturers.	EC, NG	4. Adopt ITS Systems Common Requirements							RA	7717
0	General risks	Stakeholder Acceptance	0.11.4	Companies or authorities may not want to make data that they have produced available to other ITS services.	Some data may not be available which will degrade the performance and delivery of some ITS services.	There are already situations in Europe where this is already happening.	There may be significant disruption to the implementation and use of some ITS services.	*RED*	0.11.4A	28	A climate of opinion must be cultivated amongst all providers of ITS services that is in their collective best interests to exchange as much information as possible.	EC, ISP, NG, RO	9. Promote ITS & Define Pricing	In order to encourage the exchange of information, a uniform mechanism for establishing the "value" of information must be established. This will enable a standard cost to be fixed for certain types of data thus further promoting its exchange.	EC, NG, RO	9. Promote ITS & Define Pricing							RA	7517
0	General risks	Standardisation	0.12.1	Failure to approve and implement European standards in the appropriate time window may mean that any standards that are created do not take account of European needs.	It will be more difficult to obtain systems to provide ITS services from suppliers that are either located outside Europe, or who do not have Europe as their main business area.	European participation in standards making activities is not as strong and widespread as it should be.	European manufacturers will be less able to compete in World-wide markets because their systems will be tailored to European requirements.	*RED*	0.12.1A	29	More efforts need to be made to encourage European participation in standards making activities. If necessary this must be pro-active and include providing resources for this type of activity, regardless of whether it is in the CEN or ISO areas.	EC	5. Found Research & Standardisation	Users need to encourage the EU and the EC to be more active in standards making activities, regardless of whether it is in the CEN or ISO areas.	ESP, FO, ISP, LA, NG, PTO, RO	5. Found Research & Standardisation							RC	7717
0	General risks	Standardisation	0.12.2	Various data formats are used in various systems that need to communicate as part of several ITS services.	There will be problems in the exchange of data between systems.	No communication standard what so ever exists to regulate any European data exchange regarding traffic.	Communication between different computer systems and systems produced by different companies requires specific protocols preventing the widespread acceptance and implementation of new ITS systems.	*RED*	0.12.2A	4	Resource must be provided to continue the work already carried out (e.g. DATEX) to enable a full European (and World wide) standard for communications between systems providing ITS services.	EC	5. Found Research & Standardisation	Manufacturers must help work towards the establishment of a European (and World-wide) standard for communications between systems providing ITS services.	MI	5. Found Research & Standardisation	Pressure must be put on both the EC and the Manufacturers to ensure that systems providing ITS services work across the whole of Europe.	ISP, RO	5. Found Research & Standardisation				RA	7717
0	General risks	Standardisation	0.12.3	Distance measurement and labelling of roads differs from country to country within Europe.	Confusion in respect of exact location of facilities on the roads. This may cause problems if systems located in different countries and using different road labelling systems have to co-operate.	Different labelling systems already exist within Europe, e.g. between the UK and the Continent.	Poor ITS system performance and in some cases the provision of misleading information to travellers.	*ORANGE*	0.12.3A	31	A common standard for road identification must be required throughout all European countries.	EC	5. Found Research & Standardisation	Resource must be provided to determine a standard method of road identification across Europe, with minimum cost and disruption to existing methods.	EC	5. Found Research & Standardisation							RA	7347
0	General risks	Standardisation	0.12.3	Distance measurement and labelling of roads differs from country to country within Europe.	Confusion in respect of exact location of facilities on the roads. This may cause problems if systems located in different countries and using different road labelling systems have to co-operate.	Different labelling systems already exist within Europe, e.g. between the UK and the Continent.	Poor ITS system performance and in some cases the provision of misleading information to travellers.	*ORANGE*	0.12.3B	32	Road identification and distance measurement information need to be provided in a way that minimises any problems created by differences in road identification methods in use across Europe.	ISP, RO	4. Adopt ITS Systems Common Requirements										RC	7317
0	General risks	Traveller Acceptance	0.14.2	Despite the availability of ITS services, everyone will still make their commuting or leisure journeys at the same time of day and day of week.	ITS services will have a lower than expected impact on mobility, security, and environment degradation.	ITS services that try to offset the impacts of travel are not effective leading to congestion of transport networks.	ITS services are not seen to produce the promised benefits and do not therefore get the expected funding.	*RED*	0.14.2A	33	It must become mandatory for European employers to offer flexible working arrangements to reduce the volume of peak time travel.	NG	3. Enforce European ITS Deployment	The culture of flexible operating must be spread outside traditional areas to places such as schools, public facilities and tourist attractions.	NG	3. Enforce European ITS Deployment	In their interfaces to travellers, ITS services must highlight the benefits of making arrangements to travel outside the traditional times.	ISP, RO	3. Enforce European ITS Deployment				RA	7147

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0	General risks	Traveller Acceptance	0.14.3	There are not enough information sources to make sufficient data available for ITS services to be provided.	End users will be reluctant to use ITS services because of the poor quality of information that they provide.	It will not be possible for all information to be provided for all ITS services throughout Europe.	Deployment of ITS services will be slowed down or may not take place in some areas of Europe.	ORANGE	0.14.3A	34	A climate of opinion must be cultivated amongst all providers of ITS services that it is in their collective best interests to exchange as much information as possible.	EC, ISP, NG, RO	9. Promote ITS & Define Pricing	In order to encourage the exchange of information, a uniform mechanism for establishing the "value" of information must be established. This will enable a standard cost to be fixed for certain types of data thus further promoting its exchange.	EC, NG, RO	9. Promote ITS & Define Pricing							RA	7417
0	General risks	Traveller Acceptance	0.14.5	End users cannot cope with the facilities provided by some ITS services.	End users may be put under pressure that leads them to take actions compromising their safety and the safety of others.	Due to the wide spectrum of user capability and the lack of familiarity with ITS service facilities this situation must exist.	Deployment of ITS services based on systems using the functionality provided by the KAREN Framework Architecture will suffer because users will not understand what is being provided and not want it installed.	RED	0.14.5A	35	Resource need to be provided to determine the best form(s) of HMI in order to get a greater and more widespread use of ITS services in Europe, particularly by those without direct access to or experience of computer technology.	EC	5. Fund Research & Standardisation	A more active participation in the current work being carried out by ISO into the standardisation of HMI needs to be developed and monitored	EC	5. Fund Research & Standardisation	There needs to be some investigation into more innovative and less intrusive methods of providing HMI, particularly to vehicle drivers.	MI	5. Fund Research & Standardisation				RC	7417
0	General risks	Organisation and institutional issue	0.15.2	Despite efforts in some countries, the allocation of roles and responsibilities for the provision of ITS services is the subject of competition by (National and Local) Government agencies, or is simply misunderstood by some or all the parties.	Providing ITS services becomes a hazardous area of business for the private sector.	Some private sector service providers have had experiences of contracts covering the provision of ITS services that have gone wrong due to major miss-understandings on the part of the participants from Government agencies.	Service Providers in the private sector do not trust National or Local Government agencies and are not willing to invest in ITS service provision without strong guaranties about the participation of the Government agencies.	RED	0.15.2A	18	A campaign must be organised to educate National and Local Government Agencies in their potential roles and responsibilities as partners in the provision of ITS services.	ISP, RO	3. Enforce European ITS Deployment	Resource must be made available to provide case studies describing the way in which partnerships between National and Local Government agencies and the private sector have worked to successfully provide ITS services.	EC	3. Enforce European ITS Deployment							RA	7717
0	General risks	Organisation and institutional issue	0.15.3	There is a disparity between the aims and objectives of the public and private sectors that neither understands.	The lack of understanding between public and private organisations makes it difficult to deploy some ITS services.	The lack of understanding already exists between some Governments and some parts of the private sector who are involved in providing ITS services.	The lack of understanding breads a lack of confidence of the private sector in Government that impedes the deployment of ITS services.	ORANGE	0.15.3A	17	A campaign must be organised to educate National and Local Government Agencies in their potential roles and responsibilities as partners in the provision of ITS services.	ISP, RO	3. Enforce European ITS Deployment	Resource must be made available to provide case studies describing the way in which partnerships between National and Local Government agencies and the private sector have worked to successfully provide ITS services.	EC	3. Enforce European ITS Deployment							RA	7737
0	General risks	Organisation and institutional issue	0.15.4	There is no commitment or willingness on the part of EU Member States to use Telematics to exchange data about cross-border traffic rather than traditional data exchange systems.	The efficiency and benefits arising from the deployment of some ITS services will be jeopardised.	At the moment there is no commitment to the exchange of data about cross-border traffic by EU Member States.	ITS services do not achieve their full potential benefits because there are "gaps" in the European data exchange network.	RED	0.15.4A	20	A commitment to the exchange of data about cross-border traffic must be included in European law.	EC	3. Enforce European ITS Deployment	Pressure must be put on the EU to make member States enter into the commitment to exchange data about cross-border traffic.	ESP, FO, ISP, MI, RO	3. Enforce European ITS Deployment							RA	7717
0	General risks	Organisation and institutional issue	0.15.4	There is no commitment or willingness on the part of EU Member States to use Telematics to exchange data about cross-border traffic rather than traditional data exchange systems.	The efficiency and benefits arising from the deployment of some ITS services will be jeopardised.	At the moment there is no commitment to the exchange of data about cross-border traffic by EU Member States.	ITS services do not achieve their full potential benefits because there are "gaps" in the European data exchange network.	RED	0.15.4B	21	Manufacturers need to design systems which can estimate the data that is missing for traffic across particular borders.	MI	4. Adopt ITS Systems Common Requirements										RC	7727
0	General risks	Organisation and institutional issue	0.15.5	Due to the subsidiary principle, the EU is not able to release recommendations obliging Member States to make use of certain systems or to promote or support certain ITS services.	The implementation of systems and the ITS services that they provide will be held back.	This is understood to be the current situation within the EU.	The deployment of ITS services does not take place in all EU Member States. This may damage their success in States where they are deployed.	RED	0.15.5A	22	Resources must be provided to enable the benefits of deploying ITS services to be given more prominence. More information on these benefits may have to be obtained from a wider selection of European Projects to provide a more comprehensive picture.	EC	9. Promote ITS & Define Pricing	Greater efforts must be focused on publicising the advantages of using the systems that they provide for ITS services. This activity needs to be targeted at EU States where there is no interest in, or resistance to ITS service deployment.	MI, RO	9. Promote ITS & Define Pricing							RA	7717
0	General risks	Communication	0.2.1	ITS services are not available in some parts of Europe because suitable wireless technologies are...	ITS services do not provide their full level of benefits uniformly across the whole of Europe.	Wireless technologies capable of supporting systems providing ITS services are not...	There is some unwillingness to invest in ITS services at the moment because...	RED	0.2.1A	3	National and Local Governments must ensure that the necessary facilities are...	LA, NG	3. Enforce European ITS Deployment	Manufacturers must design systems that provide ITS services capable of being...	MI	4. Adopt ITS Systems Common Requirements	Resource must be provided to establish the minimum level of facilities needed to...	EC	3. Enforce European ITS Deployment				RA	7717
0	General risks	Communication	0.2.2	Different areas in Europe use different incompatible data communications mechanisms particularly for links between the roadside and the vehicle.	Some ITS services will not be available in some areas of Europe.	Common standards for communications mechanisms are not in place for all European countries.	There is a very large amount of travel around Europe that will suffer because of the non-availability of some ITS services in some countries.	ORANGE	0.2.2A	4	Resource must be provided to continue the work already carried out (e.g. DATEX) to enable a full European (and World wide) standard to be established for communications between systems providing ITS services.	EC	5. Found Research & Standardisation	Manufacturers must help work towards the establishment of a European (and World-wide) standard for communications between systems providing ITS services.	MI	5. Found Research & Standardisation	Service Providers must put pressure on both the EC and the Manufacturers to ensure that systems providing ITS services work across the whole of Europe.	ISP, RO	5. Found Research & Standardisation				RA	7717
0	General risks	Cost Benefit	0.3.4	There is no payback in deploying ITS services for commercial vehicles on secondary transport axes.	Commercial vehicles will be constrained to use primary transport axes.	It will be difficult to justify the deployment of ITS services on secondary transport axes.	There will be some degradation of the efficiency of the primary transport axes.	ORANGE	0.3.4A	5	Efforts must be made to find cheaper ways of providing ITS services, particularly on secondary transport axes.	MI	6. Define Secondary Axes Policies	Freight Operators must deploy their vehicle resources to take account of the lack of efficiency in using secondary transport axes.	FO	6. Define Secondary Axes Policies	Resource must be provided to enable research to be carried out into defining the minimum level of ITS services that are needed to ensure that secondary transport axes can be efficiently used by commercial vehicles.	EC	6. Define Secondary Axes Policies				RA	3216
0	General risks	Deployment & Operation	0.4.1	The information available from some systems providing ITS services is of poor quality because the data on which the information is based is also of poor quality.	Service Providers find that their ITS services are under utilised because they cannot provide information of sufficiently good quality.	Service Providers have little or no control over the quality data that is provided to systems from which ITS services are available.	ITS services will not be used so that the benefits that they provide are not realised.	RED	0.4.1A	6	Manufacturers must ensure that the systems that they design to provide ITS services are capable of using poor quality data without degradation to the service provided.	MI	4. Adopt ITS Systems Common Requirements	National and Local Governments must implement policies that actively encourage organisations to provide high quality data for use by ITS services.	LA, NG	7. Define Data Control & Exchange Policies							RA	7717

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0	General risks	Deployment & Operation	0.4.2	No organisation exists within Europe to measure the quality of the information available from systems providing ITS services.	Information available from some end users providing ITS services is of poor quality and of little value to end users.	The required organisation does not exist within Europe.	ITS services will be ignored by end users because they are not seen to provide any of the expected benefits.	*RED*	0.4.2A	7	Resources must be provided to enable the development of criteria for the measurement of the performance of all types of ITS services.	EC	5. Found Research & Standardisation	Organisations to monitor the operation and quality of information produced by ITS services must be created at European or national level, and be given clear direction about the actions they can take to rectify poor situations	EC, NG	7. Define Data Control & Exchange Policies	Actions must be taken to establish mechanisms through which the operation and quality of ITS services can be monitored and where necessary improved.	ISP, RO	7. Define Data Control & Exchange Policies				RA	7717
0	General risks	Deployment & Operation	0.4.3	Lack of a sufficient number of skilled workers will hamper Manufacturers and Service Providers in the development, deployment and/or operation of new systems providing ITS services that are based on the KAREN Framework Architecture.	Some of the ITS services that can be provided by systems developed from the KAREN Framework Architecture will not be available.	In other technology areas there is already a "skills shortage" of people with the knowledge needed to develop, deploy and/or operate systems such as those used to provide ITS services.	Deployment of some ITS services based on parts of the KAREN Framework Architecture will be impeded.	*ORANGE*	0.4.3A	8	National and Local Governments within Europe must be encouraged to promote policies that increase the numbers of workers with the skills to develop, deploy and/or operate systems providing ITS services.	LA, NG	8. Address Competencies Issues	Manufacturers must develop systems providing ITS services so that their operators need few if any technical skills, or they can operate completely un-attended.	MI	4. Adopt ITS Systems Common Requirements							RA	7777
0	General risks	Deployment & Operation	0.4.4	There is a continued lack of general advertising devoted to the facilities and benefits provided by ITS services.	ITS services do not deliver the expected benefits because travellers do not know of their existence.	Some Service Providers may provide the level of advertising required for ensuring that the ITS services they provide are known to travellers.	If the availability of ITS services is not known then they will not deliver the expected benefits and will cease to be available.	*ORANGE*	0.4.4A	9	Service Providers must actively promote the availability and benefits of the ITS services that they provide to travellers so that they are well used.	ISP	9. Promote ITS & Define Pricing	National and Local Governments must promote policies that encourage travellers to investigate the availability, use and benefits of ITS services.	LA, NG	9. Promote ITS & Define Pricing							RA	7717
0	General risks	Deployment & Operation	0.4.5	Static information (e.g. road infrastructure details) used by systems that provide ITS services is not regularly updated and becomes obsolete.	ITS services do not continue to provide their initial benefits or perform satisfactorily, so that they become under-used by end users.	Updating static information used by systems providing ITS services is a time consuming and costly task to which sufficient resources are not allocated.	Some ITS services will progressively become unused to the point that they are not worth providing.	*RED*	0.4.5A	10	Manufacturers must ensure that systems providing ITS services have mechanisms for updating the static data that they use that are simple and require few resources.	MI	4. Adopt ITS Systems Common Requirements	Resource must be provided to educate Service Providers in order to ensure that the static data used by systems providing ITS services is kept up to date.	EC	8. Address Competencies Issues							RA	7517
0	General risks	Deployment & Operation	0.4.5	Static information (e.g. road infrastructure details) used by systems that provide ITS services is not regularly updated and becomes obsolete.	ITS services do not continue to provide their initial benefits or perform satisfactorily, so that they become under-used by end users.	Updating static information used by systems providing ITS services is a time consuming and costly task to which sufficient resources are not allocated.	Some ITS services will progressively become unused to the point that they are not worth providing.	*RED*	0.4.5B	11	Manufactures need to decrease the reliance that systems providing ITS services have on static data, so that there is less of it to keep up to date.	MI	4. Adopt ITS Systems Common Requirements	Manufacturers need to investigate the possibility of enabling systems that provide ITS services to give warnings when they think that the static data that they are using needs updating.	MI	4. Adopt ITS Systems Common Requirements							RC	7523
0	General risks	Deployment & Operation	0.4.6	Data provided by some organisations may not be used by some Service Providers because it is not available free of charge, or the charge cannot be recovered from the use of the ITS service(s).	Some ITS services do not deliver their full potential benefits and are therefore under utilised by travellers and other Service Providers.	Some of the information used by some ITS services will be available at no cost, whilst other information will only be available on payment of a fee.	Some important ITS services will not provide their full potential benefits and will not be deployed.	*ORANGE*	0.4.6A	12	Resources must be provided to enable a scale of realistic charges to be produced for the provision of all types of data to ITS services.	EC	9. Promote ITS & Define Pricing	A programme must be put in place to educate end users that some currently free ITS services are now worth paying for because of the increased benefits that they provide. This will enable the charges for information needed by the services to be funded.	EC, ISP	9. Promote ITS & Define Pricing							RA	7417
0	General risks	Funding Provision	0.5.2	Some national and private funding may not be sufficient to cover the costs of implementing and	Implementation of new or improved ITS services is jeopardised in some parts of Europe.	National and private funding is often available for implementation of new and improved ITS	Implementation of systems that provide new and improved ITS services will be	*ORANGE*	0.5.2A	13	The KAREN Project must clearly define the migration process to enable existing systems	KP	2. Enforce KAREN Architecture Adoption	The KAREN Project must liase with Manufacturers through its Permanent	KP, MI	2. Enforce KAREN Architecture Adoption	There must be a concerted effort to promote the benefits of new and improved ITS	EC	9. Promote ITS & Define Pricing				RA	7717
0	General risks	ITS Infrastructure	0.6.1	The infrastructure installed as part of systems providing ITS services rapidly becomes obsolescent due to the fast pace of technology	Service Providers and Network Operators will not be able to recover the initial capital investment in the infrastructure before it becomes obsolete.	This depends upon the market demand for ITS services that do not use the existing infrastructure.	Replacing the existing infrastructure will take an important part of the funds that Service Providers are ready to invest in new ITS	*ORANGE*	0.6.1A	14	Manufacturers must find way of reducing the purchase, installation and operating costs of the new infrastructures needed to support ITS	MI	9. Promote ITS & Define Pricing	Manufacturers must design their systems that provide ITS services so that infrastructures can be shared with other (non ITS) services.	MI	9. Promote ITS & Define Pricing	Resources must be provided to promote the use of existing and new infrastructures by the new services being developed through	EC	9. Promote ITS & Define Pricing				RA	7717
0	General risks	Legacy	0.7.1	Some of the existing systems that provide ITS services cannot migrate to become compatible with newer systems developed from the KAREN	Some manufacturers and ITS service providers become excluded from the benefits of compliance with the KAREN Framework Architecture.	Some of the existing systems providing ITS services were developed for past objectives and possibly without any thought of any need to be	There will be no development of some ITS services following the launch of the KAREN Framework Architecture.	*ORANGE*	0.7.1A	13	The KAREN Project must clearly define the migration process to enable existing systems that provide ITS services to be compatible with	KP	2. Enforce KAREN Architecture Adoption	The KAREN Project must liase with Manufacturers through its Permanent Consultative Group to ensure that the	KP, MI	2. Enforce KAREN Architecture Adoption	There must be a concerted effort to promote the benefits of new and improved ITS services across the whole of Europe, with the	EC	9. Promote ITS & Define Pricing				RA	7717
0	General risks	Legacy	0.7.2	The regulations for dealing with the consequences resulting from the failure of systems providing ITS	National and Local Government agencies refuse to licence the use of system for ITS services,	The systems for ITS services are beginning to be implemented and so some National and Local	Systems to provide ITS services will not be implemented and will not be developed into	*ORANGE*	0.7.2A	16	Road owners/operators must be required to develop regulations to	LA, NG, RO	10. Define ITS Failure Policies	Manufacturers must design their systems that provide ITS services so that the consequences of	MI	4. Adopt ITS Systems Common Requirements							RA	7717
0	General risks	Politics	0.8.1	Political changes to a National or Local Government agency that is partnering the private	Providing ITS services becomes a hazardous area of business for the private sector.	Changes to the political characteristics of National or Local Government agencies	Service Providers in the private sector do not trust National or Local Government agencies	*ORANGE*	0.8.1A	17	A campaign must be organised to educate National and Local Government Agencies in	ISP, RO	3. Enforce European ITS Deployment	Resource must be made available to provide case studies describing the way in which	EC	3. Enforce European ITS Deployment							RA	7737
0	General risks	Privacy	0.9.1	Existing legislation in respect of privacy and data protection is not complete enough to cover the data	Travellers have a lack of confidence in the use of ITS services because the existing laws will not provide all the protection	ITS is still a new area and therefore the existing laws that collect data about travellers' movements will not be	ITS services using systems that collect data about travellers' movements will not be	*ORANGE*	0.9.1A	23	A legal framework that protects the privacy of data collected by systems implementing	NG	7. Define Data Control & Exchange Policies	Service providers and road operators must create their own monitoring and policing	ISP, RO	7. Define Data Control & Exchange Policies	Manufacturers must produce systems for use in ITS services that have comprehensive data	MI	4. Adopt ITS Systems Common Requirements				RA	7517
0	General risks	Privacy	0.9.2	Travellers have concerns about the misuse of information collected by ITS services such as origin	Travellers will be reluctant to use ITS services because they believe that their privacy will be	There will always be some areas of Europe where the pressure of the "civil liberties" and	ITS services that use systems which collect data about travellers' movements will not be	*ORANGE*	0.9.2A	23	A legal framework that protects the privacy of data collected by systems implementing	NG	7. Define Data Control & Exchange Policies	Service providers and road operators must create their own monitoring and policing	ISP, RO	7. Define Data Control & Exchange Policies	Manufacturers must produce systems for use in ITS services that have comprehensive data	MI	4. Adopt ITS Systems Common Requirements				RA	7517
1	Pre-trip driver Information	Standardisation	1.12.1	This system will have to manage huge amounts of data from all Europe making data processing	Information for all of a trip will not be available because the data on which it is based is not processed	No data processing hierarchy for this type of information exists in Europe.	Pre-trip information will not be properly provided and will not be useful to travellers.	*RED*	1.12.1A	38	A network of stand-alone regional system must be established and linked together so that data can	ISP, LA, NG, RO	1. Ensure KAREN Architecture is capable of beeing evolved.	Agreements be made (through CEN and ISO) about the standardisation of the	EC, NG, RO	5. Found Research & Standardisation	Resources must be made available to develop and improve the communication network	EC	3. Enforce European ITS Deployment				RA	7417
1	Pre-trip driver Information	Standardisation	1.12.1	This system will have to manage huge amounts of data from all Europe making a data processing hierarchy difficult to establish.	Information for all of a trip will not be available because the data on which it is based is not processed and distributed correctly.	No data processing hierarchy for this type of information exists in Europe.	Pre-trip information will not be properly provided and will not be useful to travellers.	*RED*	1.12.1B	39	An organisation needs to be established that is responsible for promoting and managing the exchange of information between Countries and organisations at European level.	EC, NG, RO	7. Define Data Control & Exchange Policies										RC	7417

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1	Pre-trip driver Information	Standardisation	1.12.2	It will not prove possible to create and provide the very complex communications mechanism needed to link data sources across Europe and within some Countries.	Information for all of a trip will not be available because it will not be possible to communicate with some data sources.	Is to be expected, that huge amounts of data have to be exchanged in between the computers all over Europe	Pre-trip information will not be properly provided and will not be useful to travellers.	RED	1.12.2A	38	A network of stand-alone regional system must be established and linked together so that data can be exchanged according to European wide agreements about the responsibilities for the management of the data.	ISP, LA, NG, RO	1. Ensure KAREN Architecture is capable of beeing evolved.	Agreements be made (through CEN and ISO) about the standardisation of the identity, quantity, frequency and format of data that is exchanged between systems across Europe.	EC, NG, RO	5. Found Research & Standardisation	Resources must be made available to develop and improve the communication network (e.g. band-width), to enable the expected amounts of data to be exchanged between systems.	EC	3. Enforce European ITS Deployment				RA	7417
1	Pre-trip driver Information	Standardisation	1.12.2	It will not prove possible to create and provide the very complex communications mechanism needed to link data sources across Europe and within some Countries.	Information for all of a trip will not be available because it will not be possible to communicate with some data sources.	Is to be expected, that huge amounts of data have to be exchanged in between the computers all over Europe	Pre-trip information will not be properly provided and will not be useful to travellers.	RED	1.12.2B	41	The data to be exchanged between systems across Europe needs to be prioritised so that only the data with the highest priorities will be transmitted.	ISP, EC, NG, RO	4. Adopt ITS Systems Common Requirements	The communication capacity that is available for the exchange of data between systems across Europe needs to be assigned to the most important data.	NG, RO	3. Enforce European ITS Deployment	Resources need to be made available in order to develop intelligent systems that can deduce and generate data that is not included in that exchanged between systems across Europe.	EC	5. Found Research & Standardisation				RC	7417
1	Pre-trip driver Information	Traveller Acceptance	1.14.1	The presentation of the information to the user will differ from one country to another, or from one city to another, so that it will not be easily understandable for foreign or not local travellers	ITS services will have a lower impact due to the lack of confidence	There is no standard for presenting this information	Despite the absence of standardisation, local users will benefit from the ITS service	ORANGE	1.14.1A	112	Adopt common rules for presenting the information to travellers particularly in PT.	EC, NG, LA, PTO	5. Found Research & Standardisation										RC	7717
1	Pre-trip driver Information	Cost Benefit	1.3.1	The cost of equipment to obtain and provide pre-trip information and the cost of the information itself where it be perceived by travellers to be too high.	The service will be under utilised because travellers wil have to pay a high cost to obtain any information.	It is likely that access to pre-trip information will need a PC coupled to the Internet and will not be free.	A significant number of travellers will not have the financial resources to use the service.	ORANGE	1.3.1A	36	Pre-trip information must be easily available to travellers via simple, cheap and where possible existing equipment, such as telephones, interactive television, radio, teletext and GSM.	ISP, RO	9. Promote ITS & Define Pricing	When pre-trip information is offered through subscription this must include the cost of both the equipment and the information, so that less initial investment needs to be made by travellers intending to use the information.	ISP	9. Promote ITS & Define Pricing	When not available in the home or work place, pre-trip travel information must be readily available to intending travellers from central points such as travel interchanges, tourist centres and other public places.	ISP, RO	9. Promote ITS & Define Pricing				RA	7417
1	Pre-trip driver Information	Cost Benefit	1.3.1	The cost of equipment to obtain pre-trip information and the cost of the information itself will be perceived by travellers to be too high.	The service will be under utilised because travellers wil have to pay a high cost to obtain any information.	It is likely that access to pre-trip information will need a PC coupled to the Internet and will not be free.	A significant number of travellers will not have the financial resources to use the service.	ORANGE	1.3.1B	37	The distribution of pre-trip information to travellers should be licenced to commercial organisations if that will make its provision cheaper.	ISP	9. Promote ITS & Define Pricing	Road owners/operators must offer a minimum level of free access information.	LA, NG, RO	9. Promote ITS & Define Pricing	If commercial organisations are unable to provide pre-trip travel information in a way that ensures its wide-spread use, Public Authorities must offer it as a free service.						RC	7417
10	Policing/enforcing traffic regulations	Technological Maturity	10.13.1	Development of sensors that can reliably and accurately count the number of vehicle	The control of high occupancy vehicle lanes, priorities, etc. will be inhibited.	It will prove impossible to develop sensors the number of vehicle occupants under many	Deployment of ITS services covering Enforcement that use systems based on	ORANGE	10.13.1A	61	Resources must be made available to research and develop sensors based on	EC	5. Found Research & Standardisation	A plan for the implementation of detectors to count the number of vehicle	EC, NG, RO				5. Found Research & Standardisation				RA	7317
10	Policing/enforcing traffic regulations	Technological Maturity	10.13.1	Development of sensors that can reliably and accurately count the number of vehicle occupants under all operating conditions will be impossible.	The control of high occupancy vehicle lanes, priorities, etc. will be inhibited.	It will prove impossible to develop sensors the number of vehicle occupants under many conditions.	Deployment of ITS services covering Enforcement that use systems based on functionality from within the KAREN Framework Architecture will suffer because it will be seen that they have to be particular to each customer.	ORANGE	10.13.1B	62	The sanctions that can be imposed for non-compliance with traffic regulations relating to the use of High Occupancy Vehicle (HOV) lanes need to be increased to act as a deterent.	LA,NG	10. Define ITS Failure Policies	Alternative human based methods for determining the number of vehicle occupants need to be devised and implemented so that violations of the use of High Occupancy Vehicle (HOV) lanes can be determined.	LA,NG, RO	4. Adopt ITS Systems Common Requirements							RC	7317
10	Policing/enforcing traffic regulations	Technological Maturity	10.13.2	The reliable detection of different sub-types of vehicle will not be possible with any degree of accuracy.	Enforcement of access control, vehicle priority etc. will not be possible without manual intervention.	It will not prove possible to develop sensors to distinguish between every type of vehicle that uses controlled access.	The deployment of ITS systems using this functionality from within the KAREN Framework Architecture will be unattractive because of the cost of using continuous human back-up for the detection.	ORANGE	10.13.2A	61	Resources must be made available to research and develop sensors that can accurately detect and differentiate between all of the possible sub-types of vehicles.	EC	5. Found Research & Standardisation	A plan for the implementation of detectors to different sub-vehicle types for access control and road lane use monitoring must be devised and implemented.	EC, NG, RO	3. Enforce European ITS Deployment							RA	7317
10	Policing/enforcing traffic regulations	Technological Maturity	10.13.2	The reliable detection of different sub-types of vehicle will not be possible with any degree of accuracy.	Enforcement of access control, vehicle priority etc. will not be possible without manual intervention.	It will not prove possible to develop sensors to distinguish between every type of vehicle that uses controlled access.	The deployment of ITS systems using this functionality from within the KAREN Framework Architecture will be unattractive because of the cost of using continuous human back-up for the detection.	ORANGE	10.13.2B	62	The sanctions that can be imposed for non-compliance with traffic regulations relating to incorrect vehicle types gaining access or using un-authorised road lanes need to be increased to act as a deterent.	LA, NG	10. Define ITS Failure Policies	Alternative human based methods for determining the all vehicle sub-types need to be devised and implemented so that violations of vehicle access and road lane use restrictions can be determined.	LA,NG, RO	4. Adopt ITS Systems Common Requirements							RC	7317
10	Policing/enforcing traffic regulations	Technological Maturity	10.13.3	A reliable technique will not be found for measuring the emissions of all vehicles under all operating conditions.	It will be difficult to determine that vehicle are producing illegal emissions except under closely controlled conditions.	It will not prove possible to develop sensors that can recognise and take account of vehicle operating conditions when measuring their output of pollutants.	Deployment of ITS systems using this functionality from within the KAREN Framework Architecture will suffer because it will be seen that there is no accurate method of measuring compliance.	ORANGE	10.13.3A	61	Resources must be made available to research and develop sensors that can accurately measure all types of vehicle emissions regardless of their current operating states.	EC	5. Found Research & Standardisation	A plan for the implementation of detectors to accurately and reliably measure vehicle emissions under all operating conditions must be devised and implemented.	EC, NG, RO	3. Enforce European ITS Deployment							RA	7317
10	Policing/enforcing traffic regulations	Technological Maturity	10.13.3	A reliable technique will not be found for measuring the emissions of all vehicles under all operating conditions.	It will be difficult to determine that vehicles are producing illegal emissions except under closely controlled conditions.	It will not prove possible to develop sensors that can recognise and take account of vehicle operating conditions when measuring their output of pollutants.	Deployment of ITS systems using this functionality from within the KAREN Framework Architecture will suffer because it will be seen that there is no accurate method of measuring compliance.	ORANGE	10.13.3B	62	The sanctions that can be imposed for non-compliance with regulations relating to incorrect vehicle emissions need to be increased to act as a deterent.	LA,NG	10. Define ITS Failure Policies	Alternative methods for determing vehicle emissions using a combination of both human and equipment based methods need to be devised and implemented so that violations can be determined.	LA,NG,RO	4. Adopt ITS Systems Common Requirements							RC	7317
10	Policing/enforcing traffic regulations	Technological Maturity	10.13.4	It may be difficult to devise a method for the control of travellers (as opposed to vehicles) in a way that enables accurate and reliable images of violators to be obtained.	Systems will not be able to accurately detect travellers who are violating instructions.	It will not prove possible to develop mechanisms that ensure that appropriate traveller identification can be easily and passively obtained under most conditions.	The deployment of ITS systems using this functionality from within the KAREN Framework Architecture will be unattractive because of the cost of using continuous human back-up for the detection.	ORANGE	10.13.4A	61	Resources must be made available to research and develop methods of reliably and accurately obtaining images of travellers when they have commited offences.	EC	5. Found Research & Standardisation	A plan for the implementation of methods for obtaining accurate and reliable images of travellers who have committed offences must be devised and implemented.	EC, NG, RO				5. Found Research & Standardisation				RA	7317

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10	Policing/enforcing traffic regulations	Technological Maturity	10.13.4	It may be difficult to devise a method for the control of travellers (as opposed to vehicles) in a way that enables accurate and reliable images of violators to be obtained.	Systems will not be able to accurately detect travellers who are violating instructions.	It will not prove possible to develop mechanisms that ensure that appropriate traveller identification can be easily and passively obtained under most conditions.	The deployment of ITS systems using this functionality from within the KAREN Framework Architecture will be unattractive because of the cost of using continuous human back-up for the detection.	*ORANGE*	10.13.4B	62	The sanctions that can be imposed on travellers who break regulations covering the use of the transport network need to be increased to act as a deterent.	NG	10. Define ITS Failure Policies	Alternative human based methods for identifying travellers who violate the regulations covering the use of the transportation network need to be devised and implemented so that violations can be determined.	NG, RO	4. Adopt ITS Systems Common Requirements							RC	7317
10	Policing/enforcing traffic regulations	Legacy	10.7.2	There will be inconsistencies in the way in which traffic regulations are enforced within the different EU States.	It will be unattractive to develop Enforcement Systems as they will have to be tailored to suit the individual requirements of each State or Country.	The various EU member states have different ways of applying traffic regulations.	Deployment of ITS services covering Enforcement that use systems based on functionality from within the KAREN Framework Architecture will suffer because it will be seen that they have to be particular to each customer.	*ORANGE*	10.7.2A	59	Any new traffic regulations and enforcement of traffic redulations must be made consistent and coherent across all parts of the EU.	EC, NG, RO	2. Enforce KAREN Architecture Adoption	A series of plans must be defined that enable all countries in the EU to migrate their national traffic regulations towards a common European wide standard.	EC, NG, RO	3. Enforce European ITS Deployment							RA	7347
10	Policing/enforcing traffic regulations	Legacy	10.7.2	There will be inconsistencies in the way in which traffic regulations are enforced within the different EU States.	It will be unattractive to develop Enforcement Systems as they will have to be tailored to suit the individual requirements of each State or Country.	The various EU member states have different ways of applying traffic regulations.	Deployment of ITS services covering Enforcement that use systems based on functionality from within the KAREN Framework Architecture will suffer because it will be seen that they have to be particular to each customer.	*ORANGE*	10.7.2B	60	Road users need to be informed clearly about local traffic regulations when entering in each EU country, with emphasis being placed on the differences from those in their country of origin.	NG, RO	4. Adopt ITS Systems Common Requirements										RC	7347
11	Infrastructure Maintenance Management	Technological Maturity	11.13.1	The automatic detection of dirty or damaged static highway signs will be difficult because of the lack of reliable and cost effective sensors.	The effectiveness of these signs will be reduced and may invalidate the assumptions made about traveller route choice.	It will not prove possible to develop sensors that can detect the state of highway signs in an accurate and reliable and cost effective manner.	The effectiveness of ITS services based on systems using this functionality from the KAREN Framework Architecture will not reach their full potential because it will be impossible to predict how mush information travellers will gain from highway signs.	*ORANGE*	11.13.1A	71	Resources must be made available to develop methods to detect and forecast changes in the readability of static highway signs so that an optimal maintenance strategy may be defined.	EC	5. Found Research & Standardisation										RA	3317
11	Infrastructure Maintenance Management	Technological Maturity	11.13.1	The automatic detection of dirty or damaged static highway signs will be difficult because of the lack of reliable and cost effective sensors.	The effectiveness of these signs will be reduced and may invalidate the assumptions made about traveller route choice.	It will not prove possible to develop sensors that can detect the state of highway signs in an accurate and reliable and cost effective manner.	The effectiveness of ITS services based on systems using this functionality from the KAREN Framework Architecture...	*ORANGE*	11.13.1B	73	In the absence of any automatic prediction of detection mechanisms, procedures for manually	LA,NG, RO	10. Define ITS Failure Policies	Mechanisms must be devised to encourage road users to report problems with the	LA,NG, RO	4. Adopt ITS Systems Common Requirements							RC	2347
11	Infrastructure Maintenance Management	Technological Maturity	11.13.2	The maintenance of the infrastructure used by travellers will be difficult because of the lack of	Inaccurate assumptions will be made about traveller journeys because it will not be possible to determine	It will not prove possible to develop sensors that can detect the state of the infrastructure used	The prediction of the throughput of travellers by the infrastructure will be inaccurate which will	*ORANGE*	11.13.2A	71	Resources must be found to develop methods to forecast the infrastructure status,	EC	5. Found Research & Standardisation										RA	3317
11	Infrastructure Maintenance Management	Technological Maturity	11.13.2	The maintenance of the infrastructure used by travellers will be difficult because of the lack of reliable and cost effective sensors to detect when repair is necessary.	Inaccurate assumptions will be made about traveller journeys because it will not be possible to determine that the travellers have received information which may cause them to change their travel plans.	It will not prove possible to develop sensors that can detect the state of the infrastructure used by travellers.	The prediction of the throughput of travellers by the infrastructure will be inaccurate which will degrade the performance of ITS services based on systems using this functionality from within the KAREN Framework Architecture.	*ORANGE*	11.13.2B	73	In the absence of any automatic prediction of detection mechanisms, procedures for manually checking the status of the highway infrastructure must be developed and implemented.	LA,NG, RO	10. Define ITS Failure Policies	Mechanisms must be devised to encourage road users to report problems with the state of highway infrastructure.	LA,NG, RO	4. Adopt ITS Systems Common Requirements							RC	2347
11	Infrastructure Maintenance Management	Deployment & Operation	11.4.1	It will not be possible to control the start, location and duration of road works, especially when they are carried out by organisations not connected with traffic and travel management.	It will be impossible to forecast and manage the impact of road works, resulting in congestion and travel delays.	It will not be possible to exercise control over all the organisations that create road works on the highway infrastructure.	The prediction of the throughput of vehicles by the highway infrastructure will be inaccurate which will degrade the performance of ITS services based on systems using this functionality from within the KAREN Framework Architecture.	*ORANGE*	11.4.1A	69	Resources must be made available to develop and implement new tools for the planning of road (maintenance) works.	EC	5. Found Research & Standardisation	Financial incentives, such as bonuses for early completion and penalties for late completion, must be provided for the observation of the agreements regarding the planning and operation of roadworks.	NG	9. Promote ITS & Define Pricing							RA	7347
11	Infrastructure Maintenance Management	Deployment & Operation	11.4.1	It will not be possible to control the start, location and duration of road works, especially when they are carried out by organisations not connected with traffic and travel management.	It will be impossible to forecast and manage the impact of road works, resulting in congestion and travel delays.	It will not be possible to exercise control over all the organisations that create road works on the highway infrastructure.	The prediction of the throughput of vehicles by the highway infrastructure will be inaccurate which will degrade the performance of ITS services based on systems using this functionality from within the KAREN Framework Architecture.	*ORANGE*	11.4.1B	70	A central point for the planning, co-ordination and supervision of the road works needs to be created and actively employed.	LA, NG, RO	3. Enforce European ITS Deployment	Methods and procedures for co-ordination between organisations responsible for the implementation of road works and those responsible for the implementation of the traffic management measures must be implemented.	LA, NG, RO	3. Enforce European ITS Deployment							RC	7347
11	Infrastructure Maintenance Management	Deployment & Operation	11.4.2	There will be insufficient probe vehicles to make it possible to establish the optimum timing and location of road works in inter-urban and rural areas.	Road travellers may experience unforeseen and unacceptable delays.	It will not be possible to obtain accurate values for vehicle speeds through the highway infrastructure.	The prediction of the throughput of vehicles by the highway infrastructure will be inaccurate which will degrade the performance of ITS services based on systems using this functionality from within the KAREN Framework Architecture.	*ORANGE*	11.4.2A	71	Resources must be found to develop methods to forecast the infrastrucuture status, using traffic flow and vehicle weight data plus external factors such as weather conditions and sub-soil type, in order to define an optimal maintenance strategy.	EC	5. Found Research & Standardisation										RA	3317
12	Vision Enhancement	Technological Maturity	12.13.1	It will not prove possible to produce a cost effective vision enhancement systems that can be fitted to all vehicles for use by all physical sizes of driver.	Lack of a "standard" system will make its use unattractive to vehicle manufacturers.	It will prove impossible or not cost effective to produce a vision enhancement system that works for all vehicle drivers.	Deployment of the Vision Enhancement Systems will be prevented.	*RED*	12.13.1A	76	A vision enhancement system for drivers must be developed that is flexible and can be adjusted to different vehicle types and driver types.	MI	4. Adopt ITS Systems Common Requirements	At first a vision enhancement system for drivers with a limited market must be developed, then a completed system addressing a larger market.	MI	3. Enforce European ITS Deployment	Encourage Research and Development in this domain as the potential benefits are high and the market is there.	EC, NG	5. Found Research & Standardisation				RA	7227

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13	Automated vehicle operation	Deployment & Operation	13.4.2	Certain gaps in certification procedures and missing information how the products are used by the drivers are existing.	The introduction of advanced driver assistance systems might be delayed.	These gaps exist.	The delay will diminish the revenues for the prodcing companies and cause some further problems.	*ORANGE*	13.4.2A	117	For automatic vehicle control systems an extension of the ECE recommendation for the certification of new vehicle related products is needed (e.g. steer or break by wire).	MI	10. Define ITS Failure Policies	Criteria and procedures for the field trial of new products have to be defined (similar to long-term tests for new drugs etc., implemented to estimate the risks on a broad basis).	EC, NG, MI	10. Define ITS Failure Policies	The regular vehicle checks have to include comprehensive checks of the advanced driver assistance systems.	NG, LA	10. Define ITS Failure Policies				RA	7717
13	Automated vehicle operation	Safety	13.10.1	Drivers might fully thrust the proper operation of automatic vehicle control systems disregarding the possibility of the necessity of manual interference.	Less attentive driving and increase of reaction times in case of system malfunctions and irregular driving conditions will decrease driving safety.	The trust in the existing vehicle technology and other high-tech systems (e.g. Computers) is very distinct. Hence it is to be expected that this also applies to automatic vehicle control systems.	The duties these systems fulfil are very safety critical.	*RED*	13.10.1A	115	It has to avoided that systems which cannot detect malfunctions and erroneous conditions quickly are deployed.	MI	4. Adopt ITS Systems Common Requirements	The operation of automatic vehicle control systems has to be compatible to long-term used skills in order to retain instinctive and correct driver interference.	MI	4. Adopt ITS Systems Common Requirements							RA	7227
13	Automated vehicle operation	Safety	13.10.2	The functionality of advanced driver assistance systems is highly complex.	The majority of the drivers does not understand their operation and thereby might not be able to recognise conditions under which a human interference is required quickly.	Most people do also not understand the functionality of the vehicles they are currently driving.	The duties these systems fulfil are very safety critical.	*RED*	13.10.2A	116	Profound education and training of the drivers is required.	NG, LA, MI	4. Adopt ITS Systems Common Requirements	The design of the systems has to take into account the skills of the "least informed user".	MI	4. Adopt ITS Systems Common Requirements							RC	7227
13	Automated vehicle operation	Standardisation	13.12.1	A common standard will not be achieved for communication between the automatic control functions in vehicles that are part of platoons.	It will be difficult to form a random mix of vehicles into a platoon for automatic vehicle operation, even if they are all equipped with the required in-vehicle functionality.	Vehicle and equipment manufacturers will not be keen to develop a common inter-vehicle communication standard because it will be seen as eroding their individual market shares.	Deployment of Automatic Vehicle Control Systems will be impeded because they will not be seen to provide any benefits.	*ORANGE*	13.12.1A	79	Specifications and directives for mutual communications between vehicles in platoons must be developed and brought into use as a standard within Europe.	EC, MI	4. Adopt ITS Systems Common Requirements										RA	2213
13	Automated vehicle operation	Technological Maturity	13.13.2	In will not be possible to develop sensors and transponders to provide accurate vehicle positioning information under all operating conditions.	Vehicles will have collisions when their drivers might have expected the Automatic Vehicle Control System to have taken corrective action.	It will prove impossible to develop an Automatic Vehicle Control System that will prevent collisions under all circumstances.	Deployment of Automatic Vehicle Control Systems will be impeded because they will not be seen to prevent collisions occurring.	*ORANGE*	13.13.2A	80	Resources must be provided to enable the development of sensors and transponders for use in the safety critical systems used to provide automatic vehicle operation facilities.	EC	5. Found Research & Standardisation	An Automated Vehicle Operation development and deployment plan must be defined where the different factors that influence the automatic operation are considered and given implementation priorities.	EC, NG, RO	3. Enforce European ITS Deployment	Only safety-critical automated vehicle operation systems must be deployed	MI, NG	10. Define ITS Failure Policies				RA	2213
13	Automated vehicle operation	Technological Maturity	13.13.2	In will not be possible to develop sensors and transponders to provide accurate vehicle positioning information under all operating conditions.	Vehicles will have collisions when their drivers might have expected the Automatic Vehicle Control System to have taken corrective action.	It will prove impossible to develop an Automatic Vehicle Control System that will prevent collisions under all circumstances.	Deployment of Automatic Vehicle Control Systems will be impeded because they will not be seen to prevent collisions occurring.	*ORANGE*	13.13.2B	81	All automatic vehicle control systems must provide facilities that indicate to the driver when safety of its own or related vehicle systems has reduced, and enable the driver to intervene and overrule the system at this or any other time.	MI	4. Adopt ITS Systems Common Requirements	All vehicles fitted with automatic control systems must be subjected to mandatory periodic safety checks to enable their continued use.	NG	10. Define ITS Failure Policies							RC	2213
13	Automated vehicle operation	Technological Maturity	13.13.3	The development of vehicle control systems that have 100% reliability will prove to be impossible or too costly.	There will always be a degree of uncertainty about the operation of Automatic Vehicle Control Systems that drivers will find unacceptable.	It will prove impossible to develop a totally reliable Automatic Vehicle Control System.	Deployment of Automatic Vehicle Control Systems will be impeded because they will not be seen to be any less hazardous than driver operation.	*ORANGE*	13.13.3A	80	Resources must be provided to determine realistically what level of unreliability will be acceptable in vehicle control systems.	EC	5. Found Research & Standardisation	A vehicle control systems development and deployment plan must be develeoped where the different factors that influence the automatic operation are considered and given implementation priorities.	EC, NG, RO	3. Enforce European ITS Deployment	Only safety-critical automated vehicle operation systems must be deployed	MI, NG	10. Define ITS Failure Policies				RA	2213
13	Automated vehicle operation	Technological Maturity	13.13.3	The development of vehicle control systems that have 100% reliability will prove to be impossible or too costly.	There will always be a degree of uncertainty about the operation of Automatic Vehicle Control Systems that drivers will find unacceptable.	It will prove impossible to develop a totally reliable Automatic Vehicle Control System.	Deployment of Automatic Vehicle Control Systems will be impeded because they will not be seen to be any less hazardous than driver operation.	*ORANGE*	13.13.3B	81	All automatic vehicle control systems must provide facilities that indicate to the driver when safety of its own or related vehicle systems has reduced, and enable the driver to intervene and overrule the system at this or any other time.	MI	4. Adopt ITS Systems Common Requirements	All vehicles fitted with automatic control systems must be subjected to mandatory periodic safety checks to enable their continued use.	NG	4. Adopt ITS Systems Common Requirements							RC	2213
13	Automated vehicle operation	Technological Maturity	13.13.4	It may prove impossible or too costly to develop roadside or in-vehicle units that can exchange all the required data with vehicles that are passing at high speeds, e.g. in excess of 60mph/96kph.	Vehicles travelling at high speeds will be impossible to control using roadside sensors.	Processors with the required speed will not be available because the development and/or production costs are too high.	Deployment of Automatic Vehicle Control Systems will be impeded because they will not be seen to operate at all vehicle speeds.	*ORANGE*	13.13.4A	84	Resources must be provided for the development of both in-vehicle and roadside based systems that can exchange large amounts of data at high speed.	EC, MI, NG	5. Found Research & Standardisation	Resources must be provided to enable the development of sensors, transponders and processors that are compatible with high data exchange rates.	EC, NG	5. Found Research & Standardisation	Communications networks must be made avaialable with sufficiently high band width to permit the high speed exchange of data between systems at the roadside and in vehicles.	MI, NG, RO	4. Adopt ITS Systems Common Requirements				RA	2213
13	Automated vehicle operation	Deployment & Operation	13.4.1	Only a small number of vehicles will be equipped with automatic operation functionality.	The automatic vehicle operation functionality will not provide the expected benefits because some facilities such as vehicle platoons, will not operate efficiently if at all.	The growth of the numbers of vehicles equipped with automatic vehicle operation will be slow because the benefits are not realised due to the small number of vehicles.	Automatic Vehicle Operation Systems will not be developed to their full potential because the market does not materialise in the expected size.	*RED*	13.4.1A	77	Automated vehicle operations facilities that can be deployed on infrastructures and vehicles, even if all vehicles are not equipped, must be defined and developed	MI, NG, RO	3. Enforce European ITS Deployment										RA	2213
13	Automated vehicle operation	Deployment & Operation	13.4.1	Only a small number of vehicles will be equipped with automatic operation functionality.	The automatic vehicle operation functionality will not provide the expected benefits because some facilities such as vehicle platoons, will not operate efficiently if at all.	The growth of the numbers of vehicles equipped with automatic vehicle operation will be slow because the benefits are not realised due to the small number of vehicles.	Automatic Vehicle Operation Systems will not be developed to their full potential because the market does not materialise in the expected size.	*RED*	13.4.1B	78	Information must be provided to end users about the benefits of automated vehicle operation for each individual user (e.g. comfort, safety, fuel consumption) and for society (e.g. environment, safety, total traffic performance).	PTO	9. Promote ITS & Define Pricing	Incentives such as tax reduction and priority at junctions need to be offered to users of vehicles equipped for automatic operation during the initial implementation phase.	NG	9. Promote ITS & Define Pricing							RC	2243

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14	Longitudinal collision avoidance	Technological Maturity	14.13.1	The development of longitudinal collision avoidance functionality with 100% reliability will prove to be impossible or too costly.	There will always be a hazard arising from the use of this functionality that drivers will find unacceptable.	Development of a longitudinal collision avoidance functionality with 100% reliability will prove to be impossible.	The deployment of Longitudinal Collision Avoidance Systems will not take place because they will be seen by vehicle owners as unsafe.	*ORANGE*	14.13.1A	85	Resources must be provided to develop sensors and transponders for use in the safety-critical systems used to provide Longitudinal Collision Avoidance in vehicles.	EC	5. Fund Research & Standardisation	A vehicle Longitudinal Collision Avoidance system development and deployment plan must be defined in which the different factors that influence the detection are considered and given implementation priorities.	EC, NG	3. Enforce European ITS Deployment	Only vehicle Longitudinal Collision Avoidance systems that are safety-critical in operation must be deployed.	MI, NG	10. Define ITS Failure Policies				RA	7213
14	Longitudinal collision avoidance	Technological Maturity	14.13.1	The development of longitudinal collision avoidance functionality with 100% reliability will prove to	There will always be a hazard arising from the use of this functionality that drivers will find	Development of a longitudinal collision avoidance functionality with 100% reliability will prove to	The deployment of Longitudinal Collision Avoidance Systems will not take place because	*ORANGE*	14.13.1B	86	All vehicle Longitudinal Collision Avoidance systems must provide facilities that enable the	MI	4. Adopt ITS Systems Common Requirements	All vehicle Longitudinal Collision Avoidance systems must indicate to the driver when safety of	MI	4. Adopt ITS Systems Common Requirements	All vehicles fitted with Longitudinal Collision Avoidance systems be subjected to	NG	10. Define ITS Failure Policies				RC	7213
14	Longitudinal collision avoidance	Traveller Acceptance	14.14.1	Not enough vehicles are equipped with the same longitudinal collision avoidance capability so	Drivers will be reluctant to use a system that can only be efficient if every vehicle has the same capability.	No common standard exists for the functionality and performance required by	The deployment of Longitudinal Collision Avoidance Systems will not take place because	*ORANGE*	14.14.1A	87	Resources must be provided for the development of longitudinal collision	EC, MI, NG	5. Fund Research & Standardisation	Resource must be provided to enable the development and introduction of common	EC, MI, NG	5. Found Research & Standardisation							RA	7213
14	Longitudinal collision avoidance	Traveller Acceptance	14.14.1	Not enough vehicles are equipped with the same longitudinal collision avoidance capability so that collisions between equipped vehicles do occur.	Drivers will be reluctant to use a system that can only be efficient if every vehicle has the same capability.	No common standard exists for the functionality and performance required by vehicle longitudinal collision avoidance functionality.	The deployment of Longitudinal Collision Avoidance Systems will not take place because vehicle owners will perceive that they do not prevent all collisions.	*ORANGE*	14.14.1B	86	All vehicle Longitudinal Collision Avoidance systems must provide facilities that enable the driver to intervene and overrule the system at any time.	MI	4. Adopt ITS Systems Common Requirements	All vehicle Longitudinal Collision Avoidance systems must indicate to the driver when safety of its own or related vehicle systems has reduced.	MI	4. Adopt ITS Systems Common Requirements	All vehicles fitted with Longitudinal Collision Avoidance systems must be subjected to mandatory periodic safety checks to enable their continued use.	NG	10. Define ITS Failure Policies				RC	7213
14	Longitudinal collision avoidance	Deployment & Operation	14.4.1	The deployment of system acting in place of the driver will be impossible due to existing traffic regulations	The systems will be limited to the warning of the drivers	Development of automatic braking impossible	The deployment of the system will be hindered	*RED*	14.4.1A	114	Information on the benefits obtained thanks to automatic systems should be disseminated	MI	9. Promote ITS & Define Pricing	Adapt the traffic rules to new systems	EC, NG	3. Enforce European ITS Deployment							RA	7213
15	Lateral collision avoidance	Technological Maturity	15.13.1	It will prove impossible to develop lateral collision avoidance systems that have a level of hazard that is low enough to be acceptable by vehicle drivers.	Vehicle accidents will occur due to failures in the operation of lateral collision avoidance functionality.	Development of a lateral collision avoidance system with 100% reliability will prove to be impossible.	The deployment and development of Lateral Collision Avoidance Systems will not take place because they will be seen by vehicle owners as unsafe.	*RED*	15.13.1A	93	Only vehicle Lateral Collision Avoidance systems that are safety-critical in operation must be deployed.	MI, NG	10. Define ITS Failure Policies										RA	7211
15	Lateral collision avoidance	Technological Maturity	15.13.1	It will prove impossible to develop lateral collision avoidance systems that have a level of hazard that is low enough to be acceptable by vehicle drivers.	Vehicle accidents will occur due to failures in the operation of lateral collision avoidance functionality.	Development of a lateral collision avoidance system with 100% reliability will prove to be impossible.	The deployment and development of Lateral Collision Avoidance Systems will not take place because they will be seen by vehicle owners as unsafe.	*RED*	15.13.1B	94	All vehicle based Lateral Collision Avoidance systems must provide facilities that indicate to the driver when safety of its own or related vehicle systems has reduced, and enable the driver to intervene and overrule the system at this or any other time.	MI	4. Adopt ITS Systems Common Requirements	Only safety critical vehicle based Lateral Collision Avoidance systems must be developed and deployed.	MI	4. Adopt ITS Systems Common Requirements	All vehicles fitted with Lateral Collision Avoidance systems must be subjected to mandatory periodic safety checks to enable their continued use.	NG	10. Define ITS Failure Policies				RC	7211
15	Lateral collision avoidance	Traveller Acceptance	15.14.1	Not enough vehicles are equipped with the same lateral collision avoidance capability so that collisions between equipped vehicles do occur.	Drivers will be reluctant to use functionality that can only be efficient if every vehicle has the same capability.	No common standard exists for the functionality and performance required by vehicle lateral collision avoidance functionality.	The deployment of Lateral Collision Avoidance Systems will not take place because vehicle owners will perceive that they do not prevent all collisions.	*ORANGE*	15.14.1A	95	Resources must be provided for the development of lateral collision avoidance facilities that can be deployed on infrastructures and vehicles, and successfully operated even if all vehicles are not equipped.	EC, MI, NG	5. Fund Research & Standardisation	Resource must be provided to enable the development and introduction of common standards for the functionality and performance of longitudinal collision avoidance systems.	EC, MI, NG	5. Found Research & Standardisation							RA	7211
15	Lateral collision avoidance	Traveller Acceptance	15.14.1	Not enough vehicles are equipped with the same lateral collision avoidance capability so that collisions between equipped vehicles do occur.	Drivers will be reluctant to use functionality that can only be efficient if every vehicle has the same capability.	No common standard exists for the functionality and performance required by vehicle lateral collision avoidance functionality.	The deployment of Lateral Collision Avoidance Systems will not take place because vehicle owners will perceive that they do not prevent all collisions.	*ORANGE*	15.14.1B	94	All vehicle Lateral Collision Avoidance systems must provide facilities that enable the driver to intervene and overrule the system at any time.	MI	4. Adopt ITS Systems Common Requirements	All vehicle Lateral Collision Avoidance systems must indicate to the driver when safety of its own or related vehicle systems has reduced.	MI	4. Adopt ITS Systems Common Requirements	All vehicles fitted with Lateral Collision Avoidance systems be subjected to mandatory periodic safety checks to enable their continued use.	NG	10. Define ITS Failure Policies				RC	7211
15	Lateral collision avoidance	Cost Benefit	15.3.1	The cost to equip and maintain sensors and transponders used for vehicle lane keeping in the highway infrastructure will be very high.	Deployment of sensors and transponders will be poor and will restrict the ability of drivers use vehicle lateral collision avoidance functionality.	EU states will take differing views on the cost effectiveness of deploying these highway sensors.	There will be little or no deployment of Lateral Collision Avoidance Systems because of the high cost of providing the associated infrastructure in relation to the benefits.	*ORANGE*	15.3.1A	89	Resource must be provided to enable the development and deployment of lateral collision avoidance systems that do not use (very) expensive transponders and sensors for vehicle lane keeping.	EC, MI, NG	4. Adopt ITS Systems Common Requirements	The development of cheap transponders and sensors for vehicle lane keeping must make use of current advanced technologies such as those from air- and space technology.	MI	4. Adopt ITS Systems Common Requirements							RA	2221
15	Lateral collision avoidance	Cost Benefit	15.3.1	The cost to equip and maintain sensors and transponders used for vehicle lane keeping in the highway infrastructure will be very high.	Deployment of sensors and transponders will be poor and will restrict the ability of drivers use vehicle lateral collision avoidance functionality.	EU states will take differing views on the cost effectiveness of deploying these highway sensors.	There will be little or no deployment of Lateral Collision Avoidance Systems because of the high cost of providing the associated infrastructure in relation to the benefits.	*ORANGE*	15.3.1B	90	Mechanisms and procedures must be put in place that enable the sharing of the cost to deploy sensors and transponders between public authorities and the industry.	MI, NG	9. Promote ITS & Define Pricing	To keep overall costs down, only major freeways need to be equipped with transponders and sensors for lateral collision avoidance systems.	NG	3. Enforce European ITS Deployment							RC	2211
15	Lateral collision avoidance	Deployment & Operation	15.4.1	Equipment for use by lateral collision avoidance systems will be impossible to design or locate in the highway infrastructure so that they cannot be damaged by accidents, or vandalism.	Lateral collision avoidance functionality that use roadside equipment will be unreliable and may lead to accidents.	Development of a totally reliable and crash-proof and vandal-proof equipment will not be economically possible.	The deployment of Lateral Collision Avoidance Systems will not take place because of doubts about its reliability.	*RED*	15.4.1A	91	Resources must be provided to develop vandal proof and fault tollerant sensors and transponders that can be located in the highway infrastructure for use by vehicle based safety-critical Lateral Collision Avoidance systems.	EC	5. Fund Research & Standardisation	Vehicle based safety critical Lateral Collision Avoidance systems must be developed that are tollerant of failure by some sensors and transponders that are located in the highway infrastructure.	EC, NG	5. Fund Research & Standardisation							RA	2211
15	Lateral collision avoidance	Deployment & Operation	15.4.1	Equipment for use by lateral collision avoidance systems will be impossible to design or locate in the highway infrastructure so that they cannot be damaged by accidents, or vandalism.	Lateral collision avoidance functionality that use roadside equipment will be unreliable and may lead to accidents.	Development of a totally reliable and crash-proof and vandal-proof equipment will not be economically possible.	The deployment of Lateral Collision Avoidance Systems will not take place because of doubts about its reliability.	*RED*	15.4.1B	92	All vehicle Lateral Collision Avoidance systems must provide facilities that enable the driver to take control of the vehicle if any infrastructure based sensors or transponders fail.	MI	4. Adopt ITS Systems Common Requirements	All sensors and transponders used by vehicle based Lateral Collision Avoidance systems must immediately indicate their failure to an appropriate maintenance organisation.	MI	4. Adopt ITS Systems Common Requirements	All sensors and transponders used by vehicle based Lateral Collision Avoidance systems must be subjected to mandatory periodic safety checks to enable their continued use.	NG	10. Define ITS Failure Policies				RC	2211

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16	Safety Readiness	Safety	16.10.1	It will prove impossible to develop safety readiness systems that have a level of hazard that is low enough to be acceptable by vehicle drivers.	Vehicle accidents will occur due to failures by safety readiness systems.	Development of a vehicle based safety readiness systems with an acceptable level of reliability will prove to be impossible.	The deployment of Vehicle Safety Readiness Systems will not take place because vehicle owners will perceive it as unsafe and not want to have it fitted.	*RED*	16.10.1A	97	All vehicle based Safety Readiness systems must provide facilities that indicate to the driver when safety of its own or related vehicle systems has reduced, and enable the driver to intervene and overrule the system at this or any other time.	EC	5. Fund Research & Standardisation	Only safety critical vehicle based Safety Readiness systems must be developed and deployed.	MI	4. Adopt ITS Systems Common Requirements	All vehicles fitted with Safety Readiness systems must be subjected to mandatory periodic safety checks to enable their continued use.	NG	10. Define ITS Failure Policies				RA	7417
16	Safety Readiness	Standardisation	16.12.1	There will be no common standard for the type of safety readiness systems fitted to vehicles.	Drivers may make erroneous assumptions about the safety readiness functionality in each vehicle leading to situations that may cause injury or endanger life.	Vehicle and equipment manufacturers will not want to develop a common vehicle safety readiness functionality standard because it will be seen as eroding their individual market differentiation.	Deployment of Vehicle Safety Readiness Systems will be limited to expensive "top of the range" or "special purpose" vehicles.	*ORANGE*	16.12.1A	98	Resources must be made available to enable the development and introduction of a common functionality standard for safety readiness systems.	EC, MI, NG	5. Found Research & Standardisation										RA	7417
2	On-trip driver information	Organisation and institutional issue	2.15.1	The infrastructure to collect information is not optimal because the private sector will not be allowed to install monitoring equipment on public roads.	There will be a lack of good quality travel information.	Some countries within Europe do not allow the private sector to have access to the road network to collect meaningful traffic and travel data.	The travel information will be of poor quality and accuracy so that the Service will not be used by travellers.	*YELLOW*	2.15.1A	42	Agreements must be made between public and private organisations to promote and expedite the exchange or mutual use of data on which on-trip driver information can be based.	MI	4. Adopt ITS Systems Common Requirements	Agreements must be made between public and private organisations to promote and expedite the exchange or mutual use of data on which on-trip driver information can be based.	MI, NG, RO	9. Promote ITS & Define Pricing							RA	7617
2	On-trip driver information	Communication	2.2.1	It will be difficult for emerging traffic information services to rely on a unique telecommunication bearer, due to the technological development in telecom in Europe.	There will be an increase of the investment costs for launching the first services	Telecommunication facilities are exploiting in Europe	Service Providers in the private sector are not willing to invest in ITS service provision without strong guarantees about the choice of the telecommunication bearer.	*RED*	2.2.1A	113	Maintain the pressure to achieve a Pan-European traffic information services using RDS/TMC.	EC, NG	3. Enforce European ITS Deployment	Commitment of public authorities to provide basic data for a sufficient time period in order for service operators to have payback on their preliminary investments before transferring the service on other communication means	NG, LA	7. Define Data Control & Exchange Policies							RC	7717
22	Commercial Fleet Management	Traveller Acceptance	22.14.1	There are insufficient information sources to make sufficient data available for the service to be provided.	End users will be reluctant to use the service.	It will not be possible for all information to be provided for all services in all geographic locations.	Deployment of services will be slowed down.	*ORANGE*	22.14.1A	99	Policies must be established to encourage operators to develop and use Commercial Fleet Management services must be established, using incentives such as tax or petrol price reduction.	NG	9. Promote ITS & Define Pricing	A central organisation must be created which is given responsibility for maintaining a store of data about commercial transport requirements and commercial vehicle availability, and of matching this demand with the supply of vehicles.	FO, NG	7. Define Data Control & Exchange Policies							RA	7477
23	Public transport management	Traveller Acceptance	23.14.1	The management of public transport services is poor.	Public transport services are unreliable.	In some countries an acceptable public transport service is provided.	The end users will not use an unreliable system.	*ORANGE*	23.14.1A	100	Mechanisms must be put in place or enhanced to enable there to be more contact between Public Transport organisations of various countries, so that experiences can be exchanged.	EC, NG, PTO	3. Enforce European ITS Deployment	Organisations providing Public Transport services need be made more achievement-oriented, such as by introducing the active financial involvement of private industry.	PTO	3. Enforce European ITS Deployment	Ensure KAREN architecture will take carefully into account Public Transport	KP	2. Enforce KAREN Architecture Adoption				RC	7177
24	Demand responsive system	Traveller Acceptance	24.14.2	Park and Ride sites have insufficient in capacity, poor security, or are not located in the right quantity nor in the most appropriate location to meet demand.	Car drivers will refuse to use alternative transport modes available from Park and Ride sites.	There are often insufficient facilities and alternative transport modes available for use by Park and Ride operations.	High congestion leading to pollution and inefficient use of the road network will continue to be a feature of many urban environments.	*RED*	24.14.2A	101	The capacity of Park and Ride sites must be more than adequate to meet the expected demand for their use from travellers	LA, NG, PTO, RO	4. Adopt ITS Systems Common Requirements	Park and Ride sites must be sited and designed to offer more than one alternative transport mode for use by private car travellers for their onward journeys.	LA, PTO, RO	4. Adopt ITS Systems Common Requirements	The siting of Park and Ride sites must be such that they are in locations that are best able to serve the expected demand for their use from travellers	LA, NG, PTO, RO	4. Adopt ITS Systems Common Requirements	More research and development must be carried out into the ways of determining the location, size and services to be provided by Park and Ride sites.	NG, PTO	5. Found Research & Standardisation	RA	6117
24	Demand responsive system	Traveller Acceptance	24.14.2	Park and Ride sites have insufficient in capacity, poor security, or are not located in the right quantity nor in the most appropriate location to meet demand.	Car drivers will refuse to use alternative transport modes available from Park and Ride sites.	There are often insufficient facilities and alternative transport modes available for use by Park and Ride operations.	High congestion leading to pollution and inefficient use of the road network will continue to be a feature of many urban environments.	*RED*	24.14.2B	102	Adequate information about Park and Ride sites and alternative transport modes they provide must be made available to travellers.	LA, NG, PTO, RO	4. Adopt ITS Systems Common Requirements	Facilities must be provided at Park and Ride sites to enable parking places to be booked in advance by intending travellers.	ISP, LA, NG, RO	4. Adopt ITS Systems Common Requirements							RC	6717
27	Emergency Vehicle Management	Stakeholder Acceptance	27.11.1	The forecast of the arrival of emergency vehicles at traffic signals will not be accurate due to their unpredictable interaction with other road users.	The application of vehicle priority requests will therefore not be completely effective.	Traffic congestion levels and lack of universal automatic vehicle control will make vehicle behaviour un-predictable.	The deployment of systems that depend on predictions of emergency vehicle arrival times will be impeded.	*ORANGE*	27.11.1A	104	Resources must be provided to enable research to be carried out into vehicle behaviour and the interaction with emergency vehicles to enable more accurate forecasts of emergency vehicle arrival times to be produced.	EC	5. Found Research & Standardisation	Traffic management system manufacturers must make the emergency vehicle priority functionality within their systems better able to tolerate last minute changes in the arrival of these vehicles at traffic signals.	MI	4. Adopt ITS Systems Common Requirements							RA	6316
27	Emergency Vehicle Management	Stakeholder Acceptance	27.11.2	The provision of route guidance that takes account of current traffic conditions will be inaccurate due to lack of suitable vehicle detection on all parts of all routes.	Vehicles will not always use the optimum route, increasing journey times and negating the benefits of route guidance. This will be particularly important for emergency vehicles.	There will be some part of Europe in which the deployment of the required sensors will not be sufficient to support reliable and effective route guidance.	The deployment of vehicle route guidance systems will be impeded as they do not appear to provide the forecast benefits.	*ORANGE*	27.11.2A	105	Very low cost vehicle position sensors and communications equipment need to be developed and fitted as standard to all vehicles to enable accurate position reporting to be provided without driver involvement.	MI	5. Found Research & Standardisation	Route guidance systems that use in-vehicle position sensors to detect traffic conditions without reference to the identity of the vehicle or its sensor, need to be developed	MI	4. Adopt ITS Systems Common Requirements	The EC needs to promote dynamic route guidance systems as a means of providing more efficient road transport (and saving lives in the case of emergency vehicles) to increase the demand for this type of system and thus reduce equipment costs.	EC	9. Promote ITS & Define Pricing				RC	7717
29	Electronic financial transactions	Standardisation	29.12.1	There is no application of any standards for smart cards and the interfaces with in-vehicle systems across Europe preventing the implementation of a common pan-European system	The use of automatic tolling is not as efficient as it could be because there is no European standard.	There appears to be incentive to adopt the European standard for smart cards and their interfaces to in-vehicle systems.	Pressure from vehicle manufacturers and users will eventually force the European standard to be adopted.	*ORANGE*	29.12.1A	106	Resource must be provided to enable the development of a comprehensive set of standards for systems that provide electronic transactions. Focus must be on achieving interoperability of smart cards, including their interface to in-vehicle systems.	EC, MI	5. Found Research & Standardisation										RA	7317

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29	Electronic financial transactions	Standardisation	29.12.2	Each country within the European Union has a different policy covering charging for road usage.	It will not provide possible to provide all the required functionality within the KAREN Framework Architecture so that systems can be produced which accommodate all the policies used by countries in the European Union.	There will be no agreement of a common road use tolling policy amongst the members of the European Union.	Deployment of ITS services in this area using systems based on the KAREN Framework Architecture will not take place reducing the benefits of ITS to Europe.	*ORANGE*	29.12.2A	108	ITS architecture and systems should be design in order to meet the best the various transport policies in Europe, and particularly the tolling strategies .	KP, PP	4. Adopt ITS Systems Common Requirements	As a minimum the common European road usage charging policy must define the basis for charging and the data needed for prosecution	EC	9. Promote ITS & Define Pricing	Resources must be provided to enable the common European road use charging policy to be defined using representatives of toll road operators, Service Providers, Manufacturers, road users and Governments.	EC	5. Found Research & Standardisation				RA	7347
29	Electronic financial transactions	Legacy	29.7.1	There are many systems currently deployed that provide electronic transactions without any standardisation of their interfaces and methods of charging.	Users will be reluctant to upgrade their existing systems just to implement new standards, unless other benefits can be shown.	Most current systems were developed for specific applications and deployments so that there are important differences between them.	Deployment of ITS services using systems based on the common functionality within the KAREN Framework Architecture will be slowed down.	*ORANGE*	29.7.1A	106	Resource must be provided to enable the development of a comprehensive set of standards for systems that provide electronic transactions. Focus must be on achieving interoperability of smart cards, including their interface to in-vehicle systems.	EC, MI	5. Found Research & Standardisation										RA	7317
30	Public Travel Security	Standardisation	30.12.1	There is no compatibility between data transmission formats used by the large variety of electronic surveillance systems currently in use.	Integration of existing systems and their components is difficult to achieve.	There are a large number of different systems already in existence, not developed to any common standard.	It will not be possible to provide security systems that integrate components from different suppliers which will reduce the possibility of getting best value for money.	*ORANGE*	30.12.1A	109	Resources must be provided to enable the establishment of a specification of standards for the communication interfaces used between components in electronic surveillance systems and between the systems themselves.	EC	5. Fund Research & Standardisation	Any standards that are developed for electronic serveillance systems must enable components from different manufacturers to operate together as part of a system, and such systems to operate together.	EC, MI	5. Fund Research & Standardisation							RA	7614
31	Safety Enhancements for Vulnerable Road Users	Standardisation	31.12.1	There will not be a common policy across the EU regarding the degree and form of protection that is to be provided to vulnerable road users.	Systems that support ITS services in this area will not include functionality that can accommodate all the policies of the members of the European Union.	There are currently no European standards for the protection of vulnerable road users.	Deployment of ITS services for vulnerable road users using systems based on parts of the KAREN Framework Architecture will not take place.	*ORANGE*	31.12.1A	110	Resources must be provided to enable a common policy for the protection of vulnerable road users to be established for adoption by all states in the EU.	EC	5. Found Research & Standardisation	As a minimum the European vulnerable road users protection policy must include a definition of what is a vulnerable road user, from what they should be protected, and the extent of protection to be provided.	EC	3. Enforce European ITS Deployment							RA	7744
32	Intelligent Junctions and Links	Standardisation	32.12.1	Standardisation within Europe of interfaces to on-board vehicle systems does not materialise in the short term.	The end user will receive different information in different countries (or not receive anything) through the vehicle on-board equipment.	In-vehicle systems are already in place and European standardisation policy will be difficult to implement.	Deployment of in-vehicle systems based on the KAREN Framework Architecture will be slowed down.	*ORANGE*	32.12.1A	111	Resources must be provided to promote and agree upon a standard for interfaces between central and on-board vehicle systems.	EC	5. Found Research & Standardisation	Manufacturers must provide the standards makers with information that enables the standard for interfaces between central and on-board vehicle systems to be defined.	MI	4. Adopt ITS Systems Common Requirements							RA	7714
8	Incident management	Technological Maturity	8.13.3	It will prove to be too difficult to predict where and when incidents will occur so that the strategies can be devised in advance.	Strategies will have to be devised during or after the event which will make them less effective.	Predicting in advance the location and occurrence of incidents is notoriously difficult	The deployment of ITS services providing incident management will be impeded because they will not be seen to alleviate the effects of incidents.	*ORANGE*	8.13.3A	44	Resources must be made available to develop and improve tools that support the generation of accurate incident management strategies, to be used either on-line or off-line.	EC	5. Found Research & Standardisation	Incident detection equipment that is cheap to buy and install, and offers improved performance must be developed and installed so that incidents may be detected as soon as they occur.	MI	4. Adopt ITS Systems Common Requirements							RA	7117
8	Incident management	Technological Maturity	8.13.3	It will prove to be too difficult to predict where and when incidents will occur so that the strategies can be devised in advance.	Strategies will have to be devised during or after the event which will make them less effective.	Predicting in advance the location and occurrence of incidents is notoriously difficult	The deployment of ITS services providing incident management will be impeded because they will not be seen to alleviate the effects of incidents.	*ORANGE*	8.13.3B	47	If there is an increased probability of an incident, traffic operators and ESP vehicles need to be kept under alert	ESP, LA, PTO, RO	4. Adopt ITS Systems Common Requirements	Whenever an incident occurs immediate alert and appropriate information need to be provided	ESP, LA, PTO, RO	4. Adopt ITS Systems Common Requirements							RC	7147
8	Incident management	Technological Maturity	8.13.5	The cost of providing comprehensive network monitoring will mean that parts of the network are devoid of sensors.	Some incidents will go undetected and it will be difficult to manage the effects of others.	Financial constraints will mean that detection will not be deployed where incidents and their impacts occur.	The deployment of ITS services providing incident management will suffer because they will be seen not to provide all the benefits that can be gained from proper incident management.	*ORANGE*	8.13.5A	48	Resources must be made available to research and develop tools that can determine that incidents have taken place using the minimum amount of detection equipment within the road network.	EC	5. Fund Research & Standardisation	Incident detection equipment that is cheap to buy and install, and offers improved performance must be developed and installed so that incidents may be detected as soon as they occur.	MI	5. Fund Research & Standardisation	Alternate methods of finance such as public/private partnerships must be investigated so that it becomes possible to install incident detection equipment at all the required locations within the road network.	EC, NG, RO	9. Promote ITS & Define Pricing	Resources must be provided to develop tools that can analyse road networks and determine the best places to deploy incident detection equipment.	MI, NG, RO	5. Fund Research & Standardisation	RA	7717
8	Incident management	Technological Maturity	8.13.5	The cost of providing comprehensive network monitoring will mean that parts of the network are devoid of sensors.	Some incidents will go undetected and it will be difficult to manage the effects of others.	Financial constraints will mean that detection will not be deployed where incidents and their impacts occur.	The deployment of ITS services providing incident management will suffer because they will be seen not to provide all the benefits that can be gained from proper incident management.	*ORANGE*	8.13.5B	47	Improved practices must be developed for the speedy deployment of Emergency Services as soon as an incident occurs.	ESP, LA, PTO, RO	4. Adopt ITS Systems Common Requirements	Procedures must be developed for the speedy and timely supply of information to travellers about incidents, taking into account that it may not always be possible to immediately detect their occurrence.	ESP, LA, PTO, RO	4. Adopt ITS Systems Common Requirements							RC	7147
8	Incident management	Communication	8.2.1	A common location referencing standard will not be available for use by systems.	This will make it difficult to relate several incident reports to one incident when they are provided by different systems.	A common location referencing standard has yet to be implemented across Europe.	Deployment of ITS services providing incident management will suffer because it will be seen that they do not provide all the benefits that can be gained from incident management.	*ORANGE*	8.2.1A	43	The development and introduction of a common location referencing standard for use by Incident Management systems must be accelerated within Europe.	EC, MI, NG, RO	5. Found Research & Standardisation										RA	7717
8	Incident management	Cost Benefit	8.3.1	The cost and complexity of providing accurate on-line strategy development tools will inhibit the use of this method as an alternative to off-line modelling.	The development of strategies will only be possible as an off-line activity which will mean that no strategy will be available in time to help mitigate some incidents.	The creation of on-line strategy development tools will require skills and techniques outside those found in the Telematics industry. Organisations with these attributes will consider the returns insufficient to justify the creation cost and effort.	Deployment of ITS services providing incident management will suffer because they will not provide all the potential benefits.	*ORANGE*	8.3.1A	44	Resources must be made available to develop and improve tools that support the generation of accurate incident management strategies, to be used either on-line or off-line	EC	5. Found Research & Standardisation	The exploration of new avenues of research must be promoted to find a cheap and cost effective way of providing accurate on-line incident management strategy development tools.	MI	5. Found Research & Standardisation	If cheap, accurate on-line incident management strategy development tools cannot be produced, then research must be promoted into ways of making off-line tools faster and more accurate so that they can be used in near on-line situations.	EC, NG, RO	5. Fund Research & Standardisation				RA	7117

Service Number	Service Description	Category	Threat Number	Threat Description	Consequences of the Threat	Explanation of the Probability of Occurrence	Explanation of the Level of Impact	Risk rating scheme	Strategy Risk Number	Strategy Sequence Number	Strategy Action (1)	Strategy Action By Whom (1)	Action Category (1)	Strategy Action (2)	Strategy Action By Whom (2)	Action Category (2)	Strategy Action (3)	Strategy Action By Whom (3)	Action Category (3)	Strategy Action (4)	Strategy Action By Whom (4)	Action Category (4)	Strategy Action Type	Strategy Scenario
8	Incident management	Cost Benefit	8.3.1	The cost and complexity of providing accurate on-line strategy development tools will inhibit the use of this method as an alternative to off-line modelling.	The development of strategies will only be possible as an off-line activity which will mean that no strategy will be available in time to help mitigate some incidents.	The creation of on-line strategy development tools will require skills and techniques outside those found in the Telematics industry. Organisations with these attributes will consider the returns insufficient to justify the creation cost and effort.	Deployment of ITS services providing incident management will suffer because they will not provide all the potential benefits.	ORANGE	8.3.1B	45	Large numbers of pre-defined incident management strategies for specific situations, conditions and locations must be developed and made readily available for use in advance of any incidents occurring.	ESP, LA, NG, RO	5. Found Research & Standardisation	Mechanisms must be developed that enable the production of procedures and directives for the on-line use of previously developed incident management strategies so that they can be provided in advance to traffic operators.	ESP, LA, NG, RO	5. Found Research & Standardisation							RC	7147
9	Demand management	Standardisation	9.12.1	When deployed the Systems that contain the demand management functionality will be the responsibility of different organisations.	The organisations will not perceive it to be in their individual best interests to work together to provide coherent and multi-modal demand management strategies.	Demand Management System implementation and operation will not be the responsibility of a single organisation.	ITS services providing demand management based on systems using functionality specified by the KAREN Framework Architecture will not fully produce their promised benefits.	ORANGE	9.12.1A	51	The KAREN Functional Architecture must ensure that clear boundaries are defined for the Demand Management facilities across all travel modes so that they can be implemented individually but can also be naturally linked in order to ease co operation.	KP	1. Ensure KAREN Architecture is capable of being evolved.	National and Local Governments across Europe must define policies which encourage the different organisations to co-operate in the implementation of Demand Management.	LA, NG	9. Promote ITS & Define Pricing							RA	7147
9	Demand management	Standardisation	9.12.2	Organisations that do not actively participate can cause significant flaws in demand management strategies because their uncoordinated actions may be disruptive.	The assumptions on which Demand Management strategies have been devised may not be valid, possibly invalidating the strategies themselves.	Not all the relevant organisations will participate in the deployment of demand management strategies.	ITS services providing demand management based on systems using functionality from the KAREN Framework Architecture will not fully produce their promised benefits.	ORANGE	9.12.2A	51	The KAREN Functional Architecture must ensure that clear boundaries are defined for the Demand Management facilities across all travel modes so that they can be implemented individually but can also be naturally linked in order to ease co operation.	KP	1. Ensure KAREN Architecture is capable of being evolved.	National and Local Governments across Europe must define policies which encourage the different organisations to co-operate in the implementation of Demand Management.	LA, NG	9. Promote ITS & Define Pricing	Resources must be provided to enable tools to be provided that enable Demand Management strategies to be determined and successfully implemented even though not all of the required organisations participate.	EC, MI	5. Fund Research & Standardisation	RA	7147
9	Demand management	Technological Maturity	9.13.2	Sensors to accurately detect the numbers of travellers using different transport modes will be unavailable.	This will mean that ITS services providing demand management will produce incorrect transport mode use analysis and future demand forecasts.	It will prove impossible to develop sensors for the detection of all types of traveller under all conditions.	ITS services providing demand management using systems based on functionality from the KAREN Framework Architecture will not fully produce their potential benefits.	RED	9.13.2A	53	Resources must be provided to develop sensors that accurately detect and count the numbers of travellers using different transport modes.	EC, MI	5. Found Research & Standardisation	A Demand Management development and deployment plan in which the different factors that influence the management are considered and given implementation priorities must be defined.	EC, NG, RO	3. Enforce European ITS Deployment							RA	7117
9	Demand management	Technological Maturity	9.13.2	Sensors to accurately detect the numbers of travellers using different transport modes will be unavailable.	This will mean that ITS services providing demand management will produce incorrect transport mode use analysis and future demand forecasts.	It will prove impossible to develop sensors for the detection of all types of traveller under all conditions.	ITS services providing demand management using systems based on functionality from the KAREN Framework Architecture will not fully produce their potential benefits.	RED	9.13.2B	54	Demand Management strategies must be devised so that they do not need data to be available from all travellers using all modes.	NG, RO	4. Adopt ITS Systems Common Requirements	Statistical methods and procedures need to be developed to estimate data about travellers using different modes of transport that is not currently available from sensors.	NG, PTO, RO	4. Adopt ITS Systems Common Requirements							RC	7117
9	Demand management	Technological Maturity	9.13.4	Development of sensors to reliably determine Public Transport vehicle passenger loading may prove difficult for those with more than one or a wide entry/exit.	There will be no reliable data on passenger loading so that the usefulness of the Demand Management Systems will be reduced.	It will not prove possible to develop sensors that can accurately and reliably detect the numbers of passengers onboard Public Transport vehicles.	ITS services providing demand management using systems based on functionality from the KAREN Framework Architecture will not fully produce their potential benefits.	ORANGE	9.13.4A	53	Resources must be provided to develop sensors that accurately detect the numbers of travellers using Public Transport vehicles.	EC, MI	5. Found Research & Standardisation	Must define a Demand Management development and deployment plan where the different factors that influence the management are considered and given implementation priorities	EC, NG, RO	3. Enforce European ITS Deployment							RA	7117
9	Demand management	Technological Maturity	9.13.4	Development of sensors to reliably determine Public Transport vehicle passenger loading may prove difficult for those with more than one or a wide entry/exit.	There will be no reliable data on passenger loading so that the usefulness of the Demand Management Systems will be reduced.	It will not prove possible to develop sensors that can accurately and reliably detect the numbers of passengers onboard Public Transport vehicles.	ITS services providing demand management using systems based on functionality from the KAREN Framework Architecture will not fully produce their potential benefits.	ORANGE	9.13.4B	54	Resources must be provided to enable the development of Demand Management systems that can successfully operate without any data being available about the numbers of travellers using some modes of Public Transport.	NG, RO	4. Adopt ITS Systems Common Requirements	Statistical methods and procedures must be developed to estimate the numbers of travellers using Public Transport vehicles so that this data may be used instead of actual detection data by Demand Management systems.	NG, PTO, RO	4. Adopt ITS Systems Common Requirements							RC	7117
9	Demand management	Traveller Acceptance	9.14.1	End users will not accept pricing for road usage if the level of other road related taxation remains high.	End users will influence politicians to reject deployment of road toll collection systems.	This is the current situation at least in some countries.	Demand management based on road use pricing will be difficult to implement.	RED	9.14.1A	57	The benefits of imposing road-pricing in addition to other road related taxation need to be	NG, RO	9. Promote ITS & Define Pricing	The charges imposed as part of road pricing need to be reflected in a corresponding	PTO, RO	9. Promote ITS & Define Pricing	The end-users need to have a clear visibility of the different road-pricing charges that are	LA, NG, PTO, RO	9. Promote ITS & Define Pricing				RC	6147
9	Demand management	Traveller Acceptance	9.14.1	End users will not accept pricing for road usage if the level of other road related taxation remains high.	End users will influence politicians to reject deployment of road toll collection systems.	This is the current situation at least in some countries.	Demand management based on road use pricing will be difficult to implement.	RED	9.14.1B	58	The charges imposed for road-pricing must be compensated by reduction in other taxation levied on end users unless there is a demonstrable increase in the efficiency with which they can travel.	NG	9. Promote ITS & Define Pricing	The income from road pricing charges must be re-invested in improvements to the transport network (leading to greater efficiency) if they are to be acceptable to end users.	PTO, RO	9. Promote ITS & Define Pricing							RA	6147
9	Demand management	Cost Benefit	9.3.1	The variety and number of factors that must be combined to create a viable demand management strategy may require very complex System functionality.	Suppliers will be reluctant to develop the demand management systems.	Suppliers will perceive that there is insufficient commercial pay-back from the development of Demand Management Systems.	ITS services providing demand management based on systems using functionality from within the KAREN Framework Architecture will not be fully deployed.	ORANGE	9.3.1A	50	Resources must be made available to develop and improve tools that support the generation of accurate demand management strategies.	EC, MI	5. Found Research & Standardisation	A development and deployment plan for Demand Management systems must be defined in which the different factors that influence their operation are considered and given implementation priorities.	EC, NG, RO	3. Enforce European ITS Deployment							RA	7117