

PROJECT FINAL REPORT

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1. Final publishable summary report

1.1. Executive Summary

Major events are chances to give local transport services a boost in host cities. The STADIUM project applied intelligent transport systems (ITS) to manage transport at large events in London Summer Olympics 2012, in Cape Town FIFA World Cup 2012 and in Delhi Commonwealth 2012, aiming to improve the performance of transport systems for a wide range of users during those large sports events. First, in Cape Town hosting several 2010 FIFA World Cup games, a new ITS telematics tool and an innovative technological control centre has been used in support of a 'demand-responsive' transport service, providing key information helping to improve the efficiency of public transport. The proposed solution has been implemented on a fleet of minivan taxis and demonstrated in Cape Town during the FIFA games. opening to the possibility of integrating the taxi service with local public transport using a telematics tool for the management of the service. This demonstration opened after the games, a wide range of services to improve the local transport system through the innovative control centre supporting bookings and vehicles routing

A second demonstration took place during the 2010 Commonwealth Games in Delhi. The India demonstrator has been deployed and tested to evaluate the improvement of the transport public services, based on Paratransit (Taxis, Autorickshaw) and on bus and metro transport system, with the introduction of innovative ITS application based on timetables, real time GPS localization of buses and real time forecast of bus arrival time at stops. The integration with paratransit service booking and use, promoted the paratransit as the feeder service to reach the Public Transport infrastructures. The demonstrator was not only targeted at the Games alone, but also aimed at showing that long term benefits are achievable in the day to day duties of public transport in Indian cities; by using the very same technologies, the availability of good information and good public transport quality attract more passengers and contribute to sustainability and to reduction of congestion.

The final demonstration took place during the London Olympic Games in 2012. A system based on visual scene analysis has been used to monitor vehicle congestion and the propagation of congestion across and within multi-modal road transport networks. The demonstration deployed 12 existing traffic cameras and 6 smart cameras TV cameras along the Olympic route network and around Olympic venues. It allowed the automatic notifications of congestion the image recognition server IRID processes data from the cameras. Such smart video analytics can alert the team in the case of issues and highlights congested locations on maps, activating recovery strategies.

Based upon the demonstrations outcomes and the input from a user group of cities interested in co-operation with STADIUM in view of the preparation of future events (Glasgow (Commonwealth Games 2014); Warsaw, Krakow, Poznan, Kiev and Kharkov (Euro 2012); Milan (World Expo 2015); and Madrid), the project has also produced an online Handbook for cities hosting large events, including guidelines and solutions for selecting, designing and implementing ITS applications. Then the potential use of the Handbook have been exploited through a feasibility study involving the city of Curitiba – State of Parana-Brazil, chosen as host city for the next FIFA Soccer World Cup in 2014 and is now working on the definition of a transport plan to organize mobility during the large event.

1.2. Summary Description of Project Context and Objectives

The ultimate goal of STADIUM project has been to improve the performance of transport systems made available to a wide and differentiated range of users in the framework of large events hosted by big cities.

The term “performance” is intended here as covering several dimensions, including the efficiency of the transport services (frequency, punctuality, reliability, etc.), their comfort, affordability and ease of use, their safety and security as well as their impact on the broader community of involved citizens in such areas as congestion, air quality, accident risk which affect both users and non-users of transport services.

Hosting a large event for a city it is at the same time a challenge and a big opportunity. The latter because is an occasion to improve both the infrastructures, beyond the dedicated ones, and services to bring the city to a higher level of efficiency after the events.

The challenges come from the exceptional rise of transport resources allocations in a limited time due to the superimposition of the event’s connected impacts over the normal city functions.

Transport is always one of the most complexes, critical and sensitive sectors in the hosting of large events, regardless of the size and level of development of the Host City.

The level of complexity of the transport sector depends upon the specific event typology;

- Summer Olympic Games (SOG) are at large the most demanding, standing the large number of participants, staff, press and spectators during a limited period of time and venues all over the city. Similar situations stand for Winter Olympic Games (WOG) and Commonwealth Games (CGF), even if the lower number of disciplines significantly reduces the overall people involved.
- Football events such as World Cup (under FIFA) and European Championship (under UEFA) are involving more cities in a country each one coping with a limited number of games over a longer period and in a, generally, single venue.
- Another typology of events relevant for hosting cities are the World Exhibitions (ruled by BIE, Bureau International des Expositions) held every 5 years and lasting a minimum of six months; in these cases the impacts over the transport system is less acute, still being a key element for the success.

Most of the complexity of the transport sector are deriving from the obligations set by the International Bodies (i.e. IOC, CGF, FIFA, UEFA, BIE) over the Local Organizing Committee (LOC), responsible in full of all the transport services functional to the event to be harmonized to the transport system under the responsibility of the Local Authorities.

Local Organizing Committees are rather big bodies in charge to manage and to realise the total event organisation (Torino 2006 had more than 1.200 employees, Athens 2004 about 5.000 during Games Time). Several divisions are looking after all different kind of aspects such as sport,

accommodation, volunteers, technology, protocol/international relations, print and broadcast media, marketing and transport. Transport division within the LOC has the difficult mission to network multiple venues with transport service dedicated to single client groups such as athletes, media, VIP and staff. Usually, transport exercises about 20% of a LOC budget. The core business of transport of a LOC is to move in a safe and efficient manner any person (“guest”) with any kind of event accreditation. Depending on the accreditation scheme and service level agreements usually standardised by international bodies (i.e. IOC accreditation guide), transport service levels are linked to the accreditation, defining what kind of service each accredited person is in right to use.

Budget of LOCs is composed basically out of private investments through sponsorship agreements made on international scale through International Bodies such as IOC or UEFA and on a national scale arranged directly by LOCs. Sponsorship can be arranged on cash flow or VIK (value in kind). For transport usually vehicles (busses and cars) are coming from local sponsorship agreements. (i.e. Fiat / Iveco / Irisbus for Torino 2006; Hyundai for Athens 2004 and Fifa 2006 and Hyundai and Kia for Euro 2008, Volkswagen China for Beijing 2008). Transport IT applications are introduced through VIK by international sponsorships such as Athos Origin (for Olympic Games). These applications offer systems for the management of fleet and bus operations as well as staff / driver rostering. Once a LOC has the availability of a VIK sponsor for some of its operations, strategically this sponsorship should be used even if it might not be the best solution for LOC’s operations.

Spectator transport is traditionally business of public bodies of the host city, as ticketed spectators are not considered accredited guests. LOC will only provide general information and communication tools to public entities to best design the spectator transport system and to avoid interference with dedicated transport systems for event guests. The information will consist in time schedules, number of spectators, routes and roads for venue access, parking and holding areas, taxi and shuttle bus load zones, as well as security regulations. Its then up to local authorities to design a cost efficient transport network that suites the rules and needs given by LOCs. As local public authorities are usually getting involved into LOC’s planning phase less than 18 to 12 months before the event, very few times is at disposal to set up such a complex transport network.

The most relevant experiences before the implementation of STADIUM, mainly SOG (Atlanta, Sydney, Athens) have demonstrated the crucial necessity for the Local Authorities to develop an integrated transport management system to monitor and control road traffic, public transport services harmonizing them with the dedicated services and delivering the appropriate information to support the smooth rolling of the daily events minimizing and/or managing the onset of critical situations.

In some of the past experiences evidence of the effectiveness of ICT, even if based on very limited number of applications, as supporting tools (currently identified as ITS – Intelligent Transportation Systems) for the fulfilment of the traffic management functions has been reported (Atlanta¹ carried on a specific assessment on ITS).

Event planning and operational implementation are fast moving environments. Lots of information will be defined shortly before the event itself. Security measures might inflict also in day by day planning before and during event time. Succeeding planning and implementation of spectator

transport systems are often the challenge for the host cities of big events. Anyhow, any transport management system put in place to realize a successful transport operation of a host city need to be “flexible” and “dynamic”. During operations change request procedures need to be implemented in very short time. The obvious choice to invest into ITS systems to manage complex transportation systems need to integrate the special need of big events to guarantee the principle of flexibility.

In most of the host cities of recent big events, LOCs are condemned to vanish after finalizing the event. Lots of now how and investments undertaken are always on high risk to get lost during this dismantling phase. Local public or private entities involved in realising services dedicated to the event (such as spectator transport systems) will there against improve their knowledge and level of service. Investments undertaken for big events are not going to be lost and will help in creating higher standards for day by day operations of transportation for the future.

The project has been set out to contribute to the achievement of the above general objectives by pursuing a twofold concrete aim:

1. the identification, design and implementation of demonstrators in selected sites (India, South Africa, London) where large events are planned within the timeframe of the project. These demonstrators will concentrate on specific applications, involving the innovative use of advanced technologies and solutions that are expected to contribute to increasing the level of performance of transport services in all or most of the targeted performance dimensions, together with the appropriate level of security.
2. the design, development and testing of an integrated handbook to support all players involved in the organisation and implementation of transport services for large events.

More in details, STADIUM rationale consist of:

- Implementing “tailored” ITS applications at large events outside Europe (South Africa & India):
 - Demonstration of valuable technologies not yet diffused in those countries.
 - Promotion of European know how.
- Deploy advanced applications in a technology mature context (London):
 - Added value of large ITS applications integration.
- Develop a tool to guide large events hosting cities in choosing appropriate ITS applications to optimize their transport strategies implementations

The successful achievement of these goals requires a strongly integrated approach, whereby the demonstrators can produce original evidence feeding directly into the handbook preparation, while the process of designing, documenting and testing the handbook can help guiding the demonstrations and ensuring that these are designed and developed in accordance with sound, general principles, technological choices and organisational instruments.

Only through such an integrated approach it has been possible to ensure that the added value of the project reaches beyond the individual events taking place within the project timeframe, and

that the time and resource constraints attached to the project do not hinder its overall ambition, which is to address the full set of possible applications: while the demonstrators will inevitably be limited to specific – though meaningful and important – application areas, the handbook can be comprehensive in addressing the full range of possible applications.

1.3. Description of the main S&T results/foregrounds

The Stadium Project aimed at analysing the mobility management implications for the organisation and execution of large events, with a special focus on Intelligent Transport Systems (ITS). It included both the state of the art aspects and the user needs analysis. The appraisal of the mobility requirements coming from the user needs of past, current and future large events provides the basic information needed for the organisation and implementation of the project activities.

Through a State-of-the-Art report The State-of-the-Art Report a comprehensive review of the use of Intelligent Transport Systems (ITS) in supporting large events to date and to indicate the potential use of ITS in support of future large events has been provided.

All stages of the life cycle (from the requirements analysis all the way to post event evaluation) of both Events and Intelligent Transport Systems have been in fact addressed. Moreover, the main challenges experienced have been assessed (both at the level of individual ITS applications and for what concerns their integration in the overall transport system), as well as the measures adopted to overcome them and their consequences on the performances achieved.

From the analysis of the requirements of past events the following key messages emerged:

- Plan well and start planning far enough in advance to achieve the goals, however lofty the goals may seem when they first start to take shape. Identify all the necessary roles and responsibilities and establish effective channels of communication between the bodies carrying out those tasks. Coordination efforts should not be underestimated and will continue to bear legacy benefits long after the event.
- Use simple and clear slogans if you have a need to communicate ideas to large numbers of people. Remember that language is a major barrier and devise effective visual displays for signage, route guidance and way finding that is language independent (e.g. use color coding and pictorial displays).
- Achieving public support for a large event is essential. China was very successful in this for the Beijing Olympics. One would need to go deep into the countryside to find someone who did not have an awareness of or interest in this major national under-taking.
- Provide adequate resources for the project. About \$40 billion dollars was invested in the Beijing Olympic Games by the Chinese. Great planners, architects, engineers, administrators and professionals of all types were brought in or consulted on all aspects of the Games.
- Sufficiently developed infrastructure. The lesson here is to ensure that there is sufficient infrastructure in place for there to be no lack of suitable facilities for whatever is to be accomplished. China provides an extreme example. Along with new railways, airports and roadways, the whole nation's plumbing system was reworked as part of the preparations for

the Games. Entire river systems were altered with water, sewage and industrial wastewater pollution standards substantially upgraded.

- For many events the creation of new ITS solutions will not be appropriate. Most major cities will have existing mobility platforms that offer the necessary support to those managing mobility at a large event. Events with a long lead time will offer an opportunity to extend the range of applications, or increase the scope of existing tools. Rarely will a new ITS solution be available off the shelf, as customization to the character of the city will be needed, or to the specifications of existing systems it must link to.

Furthermore a sample of major events that would take place years after the project ended have been examined. This was aiming to elicit from the future host cities their basic, high level requirements and assessing the extent that these were consistent with previous experiences and lessons learned; to identify specific constraints arising in each of the cities and the extent that such constraints bear on the final specification of requirements; to carry out a preliminary assessment of the concrete opportunities for knowledge transfer, specifically in the requirement analysis phase. The events identified have included the 2014 Commonwealth Games Glasgow, 2014 Winter Olympic Games Sochi, 2014 FIFA World Cup, 2015 Universal Exposition Milan, 2016 Olympic Games, 2022 FIFA World Cup Qatar. It was felt these major events that have long lead times offered the best prospect for validating the State-of-the-Art conclusions and provided an easily identifiable community to be invited to form STADIUM User Group to guide the project research and be initial recipients of the projects output through knowledge transfer actions.

In this framework particular attention has been paid to transport mobility provision, ticketing provision, information provision and command and control. From the investigation it has been clear that the drivers of ITS implementations seen in earlier studies remain valid for future events. Attention was in fact very much focused upon updating/upgrading existing systems and on the implementation of proven technology where such facilities have not been previously installed. Hence it came out that the main ITS systems that are attracting attention from host cities include:

- Traffic Control Centre enhancements and integration of data/information feeds from other control centers run by transport operators, emergency services and event managers.
- Implementation of real-time traffic and travel information services through a variety of medium, like Variable Message Signs (VMS), mobile internet devices (Apps), web-based pre-journey planning applications, navigation support applications, and real-time public transport schedule displays.
- Integrated ticketing systems to enhance public transport service delivery and encourage greater usage, especially during events by coming venue ticketing with that of bus/tram/train operators.
- Extension of video surveillance for traffic management (e.g. congestion charging or traffic regulation enforcement), incident detection, emergency response, and security.

The research has found universal acceptance of the value ITS solutions offer cities to improve the management of large events, and more importantly the potential for such installations to offer a legacy benefit in day-to-day management of urban mobility. There is, therefore, no shortage of

cities with an interest in identifying and implementing the best case solutions for individual local conditions.

Examples of the main ITS solutions have been found in all host cities. Differences in take-up are seen in the levels of sophistication or coverage of systems in use today. As ITS is subject to rapidly changing technology a move by cities to continually look for enhancements to their traffic control centers and the support systems that feed them with data/information can be observed.

Events are also a driver of system implementation in respect to integrated electronic ticketing where benefits are being identified in terms of: increased public transport usage and consequent environmental improvements, together with security considerations. As transport users become more connected with the network through e-tickets and mobile devices there is a greater quantity of data about travel conditions (e.g. flows on links) with which to build better automatic incident detection systems and mitigation strategies to manage the network. Similarly, with more data from the network it becomes more practical to provide accurate real-time information to users who are better able to access that information throughout their journey. This symbiotic relationship is fostering growth in ITS take-up and multiplies the benefits that are being derived from the implementations.

As a result major events are chance to give local transport services a boost in host cities as shown by the three STADIUM local demonstrators: the South Africa world Cup (2010), the India Commonwealth Games (2010) and the London Olympics (2012).

The demo activities in Cape Town, South Africa, dealt with the introduction of an ITS solution in the context of an Emerging country and during a big event (FIFA Soccer World Cup). The pilot project included various objectives:

- Analysis of requirements and study for the integration of an ITS solution able to support local public transport;
- Study of a solution supporting management of mobility during a big event in an emerging country (South Africa);
- Realization of an operational service/system during Soccer World Cup 2010 in Cape Town;
- Analysis and implementation of new services for the use of the system beyond the SWC.

Therefore, among the purposes of the testing in Cape Town, there was a specific task dedicated to the sustainability of the solution meant as:

- technological solution supplied;
- type of services using the system provided.

The partners involved worked together with the local transport operator Peninsula Holdings in the realization of a business plan including the activation of new services for flexible transport. A monitoring system for a fleet of minibus taxis has been implemented together with a booking system for the transport service. A monitoring control center for a fleet of 19 Peninsula Holdings' minibus taxis was installed at the new Peninsula Holdings' premises in Saint Peter's Square, Observatory, Cape Town.

The introduction of an ITS system within transport services performed by minibus taxis in Cape Town was then adapted to a new set of services provided by Peninsula. Once having verified the validity of the DRT service in support of BRT lines within big events, on the basis of actual use of the service and bookings received directly by the drivers during FIFA SWC, additional data were collected in order to evaluate the system and the service acceptance. A business plan was discussed with the local transport operator including plans to improve user acceptance of flexible transport services as well as the convenience of using automated dispatching systems. The need of a DRT service and a system managing the service was automatically assessed through initial surveys performed during the STADIUM project. Particularly, it was necessary for the drivers to count on a “basic” number of clients to serve throughout the day along an itinerary scheduled upon requests. A DRT service integrating the regular minibus taxi service could allow the drivers to work in less stressful and less dangerous conditions, as the driver does not constantly have to worry about drawing the attention of potential clients met along the route, and therefore avoid distractions when driving. Additionally, a DRT service managed by call center and with high-tech on-board devices for security (webcam), infotainment (monitor) and fare rules (printer and contactless validator) would make transport through minibus taxis more appealing to a wider range of passengers. The DRT service operating from and to main tourist attractions, proposed as a service for hotels, restaurants and guest-houses, can then offer access to new market shares for transport operators. An important outcome achieved through the South Africa Demonstrator is actually the validity of the DRT model applied to the BRT architecture.

Finally, within the framework of local public transport in Cape Town, the architecture of the BRT system has generated the necessity of an integrated transport system linking the areas closed to the BRT line with the BRT stations. A widespread system of minibus taxis can supplement mass transport lines and is able to serve even the most remote areas if optimized with a DRT service minimizing misuse (vacant buses operating) and providing the service only if necessary.

The Delhi demonstrator was successfully implemented during the CGW2010. The strategy has been taken into consideration, by selecting for the demonstration a number of metro and bus lines that are a sort of backbone for transporting passengers to the main venues. In order to provide vehicles for the demonstration three different taxi companies have been involved and 4 bus lines have been identified, in order to integrate the GPS real time information into the demonstration platform. Moreover, an extended real time control module has been included in the demonstration to show additional functionalities.

The advanced info-system platform has been based on a mobile web application targeted at smart phones, but also accessible from fixed computers. Moreover the demonstrator showed how real time information can be given through bus stop displays, by using a demonstration display, and also through onboard announcements by using a demonstration vehicle also to validate additional technologies that might be assessed for long terms benefits such as onboard video surveillance, automatic passenger counting, and real-time communication between driver and control center. The demonstration vehicle run in a controlled situation along a so called “STADIUM Line”. A new booking system has been implemented in Delhi according to monitoring Paratransit from a web platform to allow the preliminary implementation of a booking service integrated within the other

transport modes, for additional evaluation and assessment. The system is based on a central system and 59 Paratransit vehicles (taxi and auto-rickshaw) equipped with OBU unit.

The Delhi demonstrator showed that a good transport management could be achieved through advanced planning, real-time monitoring and information provision. A key aspect has been the importance to develop a new technology by always taking into account the region specific demography, topology and environment. This is much relevant in India where cities unlike western countries are densely populated and even each city is unique.

The possibility to record, save and analyze such a large amount of real-time data, as those provided by the above mentioned system, can provide operators a straightforward knowledge on the transportation system. The possibility to have a clear snapshot of an ex-ante situation can be very valuable when planning the next event; for the same reason, the analysis of real-time data gathered during the large event itself is very important to understand the efficacy and efficiency of the planned and implemented measures, providing a valuable knowledge base when planning for the next large event.

From an analysis of the services came out that passengers potentially take the most out of the infomobility services both during and after the event, when benefits are perceived to be acquired. Then passengers can continue to get advantage from the implemented ITS even in case of any planned event or even more relevant during any unplanned event affecting city mobility; well informed users could in fact self-regulate their mobility choices according to the situation. This limits the number of complaints towards the public transport system, and maximize its efficiency.

It is worth noting that the introduction of ITS can be significantly easier for countries like India that are starting to introduce ITS now because:

- ITS equipment and systems are cheaper and more refined than in the past. Partly this results from the general decrease in the cost of information technology (IT) and already achieved economies of scale.
- Communications technologies like cellular phones and the internet are spreading rapidly independent of ITS. Their existence allows many kinds of ITS applications to be introduced without the need for significant investment in separate communications infrastructure.
- Developing countries are able to install ITS infrastructure at the same time that physical infrastructure is being built. This allows for far cheaper deployment than introducing ITS subsequently.
- Experiences in developed countries can serve as the basis for successful ITS deployment in developing countries. This makes it easier to assess expectations realistically, both in terms of benefits and costs.

Considering the result of the project and the benefits collected, and taking into account other cooperation research project, it could be of value to consider the STADIUM demonstrator as a system as an upper level of the existing ones, as part of an UTCM system, Urban Traffic Control Management System. This could allow previously disparate data from multiple sources such as VM system, traffic system, Variable-message sign (VMS), car parks, traffic signals, air quality monitoring

stations and meteorological data, to be merged into a central console or database. This in order to maximize road network potential to create a more robust and intelligent system that can be used:

- to meet current and future management requirements;
- to extend the solution with real time traffic information in order to enhance the quality of the information provided, considering other transport research project;
- to integrate such a solution with both existing and future systems (AVL/AVM providing information on position of buses/metro and system for monitoring of paratransit), and other existing or future systems providing data on traffic, with the goal to provide an integrated view and providing integrated infomobility services;
- to consider the importance of the planning of the transport service and implementation in common platform in order to improve the quality of the transport service provided and consequently the passenger demand and the reduction of pollution and traffic congestion;
- to extend the solution to all the city; to consider that there are example in other big cities where the transport service is operated by several companies (public/private), and this could be a natural evolution in New Delhi transport policy;
- the implementation of an UCTM upper level and the relevant integration is the smoothest way for service integration;
- if GPS is installed on paratransit, to use the information as FCD data for traffic analysis;
- to integrate the paratransit service for booking purpose for the ones interested.

The third demonstration took place during the London Olympic and Paralympic Games in 2012. This was a huge undertaking and has had a massive impact at a number of levels, including transportation. Transport for London (TfL) was dedicated to providing an excellent level of service to both the athletic family and the general public during these games, guaranteeing the movement of the Olympic Family without delays or unexpected incidents. In order to manage this huge operation, suitable levels of Intelligent Transport Systems (ITS) were required to monitor, assess, impact, react, and coordinate the network.

One of the imperative aspects to successfully coordinating road users in London during the Olympic period has been the work undertaken by Traffic Control Operators in the LSTCC. Existing infrastructure depends on human involvement and the burden on operators of CCTV and other monitoring mechanisms is huge. To offset this burden but improving the effectiveness of ITS is a challenge, especially during a time of large people and traffic movement associated with the Olympic Games. This demonstrator proposed the use of both existing and novel technologies that reduces the requirement of 24/7 operator intervention and placed intelligence in the technology itself so that it alerts the operator in a 'need to know' basis. This helped to streamline business, align technology responses, and creates an effective mechanism for the use of ITS in a real time scenarios.

Hence a system based on visual scene analysis has been used to monitor vehicle congestion on the Olympic route network and/or around Olympic venues. The demonstration allowed notifications of congestion to be displayed to LSTCC operators from an approved image recognition system using existing traffic cameras and smart cameras. TfL used 12 existing traffic camera feeds and 6 x SMART

3G cameras along the ORN and/or around Olympic venues. The aim is to automatically alert LSTCC operators of congestion on these cameras using image recognition hardware.

The demonstrator had and impacted a number of stakeholders, including traffic operators, event coordinators, and the travelling public. Intelligent CCTV, using video analytics that provide information to the user on a 'need to know' basis, allowed the operator to manage their time effectively, concentrating on key locations whilst still having relevant information provided in a timely fashion when an incidents occurred in areas that were not examined on a regular basis.

The demonstrator concentrated on the Traffic Road Network in London, with a high proliferation of CCTV cameras in TRLN but not enough operators to examine them on a 24/7 basis, it was vital that those areas that were not a first order of priority but still had an interest in terms of traffic flow were effectively managed. When an incident occurs, it will now be notified to the operator who can then react in a timely and effective fashion. The ability to co-ordinate events and proactively manage anomalies to the network depends on the provision of information in a real time environment. SMART technology provides this intelligence conduit to the operator such that effective strategies are implemented rather than waiting for the situation to exacerbate and wait for other mechanisms, such as media or the travelling public, to inform. This timely response allowed TfL to help meet the requirement of delivering the Olympic family without delay and at the same time provide journey time reliability to the general public. The research objective of the demonstration was to analysis of the added value of the VA components in areas where the effects of traffic in large events need monitoring. The benefits of the system was explored by comparing journey times using TfL's LCAP system where available, for a selected route and for a specific video analytics camera.

The outcome of the project will not only deal more effectively with real-time traffic management but could provide the Traffic Directorate with incident and traffic data. This would contribute towards the Traffic Directorate's London Traffic System Vision (LTSV). Within the LTSV one of the foundation activities is Network Monitoring. The aim is that "data collected will provide dynamic and real time operational information". The STADIUM project could help to provide some of this data about the network.

The LTSV also highlights that *"Research, Development and Intelligence gathering is an activity that is not in the direct line of the means to manage street space but it is a vital support activity to improve the efficiency and effectiveness of those activities. It is important to continue research to improve those activities that contribute to Understanding the Network and in developing better ways of achieving Informed Choice and Compliance"*. The deployment of image detection systems could enhance the work of many TfL employees who work daily to meet the Mayor's objectives of moving people more efficiently throughout the capital. The internal development of technology helps *"To support the vision of London" and "provide the world class system the Capital needs"*. In line with the Mayor's priorities of reducing congestion, the use of image recognition systems will allow LSTCC to monitor a wider scope of roads to enhance both the mitigation of congestion, due to incidents on the Network, and the reduction of any congestion present. One of the Traffic Directorate's goals is to provide 24/7 real time traffic operations to give journey time reliability". The use of automatic congestion monitoring would allow prompter detection of congestion

allowing remedial action to commence quickly, thus leading to reduced congestion and improved journey time reliability.

The phases of demonstrators evaluation provided a good picture of the implemented system and technology applied and has been mainly based on a comprehensive user and customer inquiry. Operator, bus driver and end-user have been interviewed with tailor-made questionnaires. The demonstrations had to deal with delays in setting up the entire service caused by a late project start and organizational issues in relation with the local administration. However, based on the data collected before, during and after the events and the questionnaires available, it was established that there is generally a demand for the service from both operators and passengers. Summarizing the results it can be concluded that the system perception by the user is very positive when experiencing the system. The potential of the system to improve the current transport situation is due. Better information regarding the PT and tailored to suit the market needs will support an expansion of the implemented system with an increasing use of PT. Hence, continuously improvements of the quality and performance of the system are necessary for the success.

At the end of the demonstration it has been assessed that the it was established the operators would like to use the system to improve their financial performance in the off-peak period and approach a wider portfolio of users, while passengers would appreciate its convenience. Pricing the service is very important for customers and therefore, much attention needs to be placed on competitively designing competitive pricing packages without compromising the sustainability of the service.

The developed and deployed demonstration in Delhi was set into operation before the beginning of the CGW. Besides the conducted field survey with about 200 collected questionnaires the evaluation of the demonstration used the information collected through the assessment of passengers perception and it can be concluded that the implemented system met the passengers expectations. The analysis of the questionnaires illustrated a very positive assessment. Continuously improvements and expansions of the system will support the acceptance by the customer. In addition, the implementation of an infomobility system with a wide range of functionalities would need to be set in operation long before the event starts.

Based on the experience made in the past project years, and on the input from a user group of cities interested in co-operation with STADIUM in view of the preparation of future events (Glasgow (Commonwealth Games 2014); Warsaw, Krakow, Poznan, Kiev and Kharkov (Euro 2012); Milan (World Expo 2015); and Madrid), the project has also produced an online Handbook to support all those involved in the organization of transport services for large events.

The Handbook – available since April 2013 (www.largeevents.eu) in four languages, i.e. English, Spanish, Portuguese and Russian – provides cities planning to host large events with a specific tool and a set of guidelines to identify and implement the most suitable ITS applications. The guide works as a decision support system for administrators of candidate cities at different stages of decision, planning and implementation process of intelligent transport systems.

To support the delivery and the management of the mobility strategy for a large event, the online handbook covers the features and typologies of large events and reports on many past events. It addresses their basic characteristics, the planning process, the classification of the most proven ITS application, a methodology for impact evaluation and benefits to the transport systems. Furthermore, it reports on the STADIUM demonstrations deployed during recent large sport events (FIFA World Cup 2010 in Cape Town, Commonwealth Games 2010 in Delhi, Olympics 2012 in London). The Handbook also includes a reference list of ITS suppliers and main event organizers.

Practically spoken, handbook users are guided through a four-step assessment process. To each typology of events (four typologies have been identified according to their magnitude, duration, multiple events,...) corresponds a set of transport requirements, ranked by relevance to the specific event. For each of the requirements, the most suitable responding mobility strategies are presented and classified by priority set by the proven effectiveness in a large number of cases. Finally, the selection of the ITS solutions, proved to have successfully supported the delivery of selected strategies, is proposed to the user with the description of the technologies available and references to 'best cases'.

The ITS Decision Support Tool features more than 30 ITS applications. They respond to challenges in domains such as:

- Dynamic traffic management systems & real-time traffic information.
- Public transport:
 - tracking and tracing, fleet management,
 - demand-responsive transport,
 - integrated ticketing and information for taxis and buses,
 - bus and special vehicle priority,
 - inner-city public transport services implemented along major axes, with links to district hubs, modal interchange points and other centres (e.g. stadium, Olympic village etc.).
- Tools to optimize operational transport plans according to historic and real-time demand data.
- Web-based systems to integrate public transport and traffic management; operations, and provide sources of data for delivery to mobile users, both private and commercial.
- Travel information services based on mobile communications, for real-time traffic and public transport service information, mobile payment, special event information and booking, etc.
- Demand management strategies based on economics and measures to influence travel behavior.

To test the Handbook benefits the World Cup 2014 and Olympic Games 2016 have been selected as a source of venues for feasibility studies in Brazil where sustainable transport planning, mobility management technologies and techniques from around the globe could be examined in a new context. The main objects have been to:

- Exploit Stadium results by using of the handbook toolbox and outcomes of pilot activities in International Cooperation Partner Countries (ICPC);

- To strengthen the dissemination of the role of the EU in supporting mobility management related to FIFA 2014, to local stakeholders in a Brazilian city hosting an event; and
- To exploit dissemination in an ICPC country hosting one of the major events foreseen in the future.

Therefore the Handbook has been tested during the process of planning the event in Curitiba in the last term of 2012 and first part of 2013, when the transport plan for the FIFA World Cup 2014 was already drafted. The feasibility study identified an extended election of ITS for potential deployment in Curitiba, without any evaluation of priority in terms both of funding and implementation schedule. The STADIUM handbook permitted the selection of the event, the identification of transport requirements and the selection of the strategies. As a result of this integrated process, the focus of Curitiba converged on two priority ITS interests: collective transport and traffic management.

For the “Collective Transport” priority the focus was on “Public Transport Monitoring” since the “Public Transport Delivery” strategy is already quite advanced. Focus of local stakeholder was on the “Availability of Transport Resources”, in terms of real-time information on the status of transport demand, i.e. a passenger counter system that can provide both real-time information and the long-term statistics to improve transport planning. The ITS architecture of the solution has been exploited and passenger counter solution implemented in buses. As main benefits can be highlighted a better public transport management, with elimination of field surveys with personnel (internal or external) for collecting occupancy level, the possibility to optimize the personnel/bus shift thanks to detailed information on passenger flow, the use of historical data to provide a better service, especially during large events, the possibility to provide easily correction to the service thanks to real time data relevant to passenger flow.

For what concerns the “Traffic Management” requirement, the interest of Curitiba was placed on “Parking Management”, one of the high priority strategies. Curitiba is already structured to host a huge tourist flow since it has often hosted various events, including soccer ones. The main interest was on a specific application for the management of Terminal: the city has a strategic HUB, fundamental for passenger transport: the Rodoferroviária, where thousands of buses arrive and depart and where it is possible to find intercity and interstate transport, as well as railway transport. During large events, the regularity of an entire city can be upset and there can be possible inconveniences for the local population. Gate optimization is highly interesting and extremely useful not only during large events, but also in ordinary management of the terminal. Main goals of the proposed system are thus the better management of the terminal, especially during large events and to provide real-time data to end users in the terminal. The ITS solution that allows the terminal management is “Optimized planning of gate allocation”, considered a part of the Parking Management solution in the Stadium Handbook.

Additionally an analysis and feasibility study on the Rio de Janeiro Transport Plan in view of the FIFA 2014 and Olympic Games 2016 has been performed. In conducting the research into the plans of the city for these events particular attention was paid to:

- Identifying measures that can be implemented to improve a sustainable transport system;

- Assessing the sustainability of different concepts, for example:
 - Organization of parking for everyday use.
 - Intermodal urban transport systems.
 - Development of soft mobility (signalling walkways, bicycle hire, etc.)
 - Pricing systems and coordination with other cities in order to unify the systems for better readability of the visitors (signage, rental systems, pricing, etc.).

The main barriers to the take-up of ITS that cities face are its cost, justification for replacement/upgrading of systems (sustainability) and an awareness of state-of-the-art developments. It is evident from this and other research in STADIUM that cities are keen to implement ITS solutions to overcome their mobility management challenges, and that most cities already deploy a wide range of ITS solutions. Rio is no exception. In its planning process the city is constantly seeking new ways to improve the transport infrastructure and to manage traffic flows. Information contained within the STADIUM Handbook is therefore a useful resource to identify options.

Much is being done to upgrade the traffic control system, to fully integrate the different modes of travel and to use tracking technology and integrated ticketing systems to promote public transport. Although the major schemes (e.g. BTR and Metro) attract attention the city is also actively promoting softer measures to promote cycling and aid pedestrian movement. In these fields ITS has a use for way finding and signage. Overall, the use of ITS is supporting the city with its drive for sustainability, reducing congestion, improving air quality and generally enhancing the quality of life for its citizens.

It is clear from our study in Rio that the transport plans embrace a wide variety of modes and technologies; all of which are covered by components of the STADIUM Handbook. It is, therefore, possible to utilise individual aspects of the Handbook to identify options from other city implementations as a means of locating alternative solutions to satisfy sustainability goals.

It is also clear that a user such as Rio has a well elaborated transport infrastructure with operational applications of ITS. The rationale for using the Handbook in such a case has to be to find specific applications (enhancements of existing solutions) rather than identification of wholly new solutions to mobility issues. In such a role the handbook becomes a useful resource to identify proven technology options that benefit day-to-day management of urban mobility.

The STADIUM Handbook is an important guide for any city that might be considering extending their ITS capabilities. Whilst it has been created from the perspective of ITS application in the field of mobility management for large events it need not be exclusively used in that context. Opportunities for the STADIUM handbook to be used in future event planning are evident. Cities such as Rio de Janeiro and Curitiba are a good example of the guide's broad applicability and its "mix & match" capability to aid cities in selecting the best technologies.

The STADIUM Handbook does not replace the transport planning guidelines issued by event owners, such as FIFA and IOC that are integral to the transport planning component of bids to organise events. What the STADIUM Handbook does is supplement those guidelines with an

interactive resource to help bidders both identify best practice from previous events to build into their submissions, and more importantly supports the detailed planning for selected hosts.

1.4. Potential Impacts

A wide range of impacts can be expected from the successful implementation of a project like STADIUM.

STADIUM has been designed to address all impact levels thus identified:

- Immediate effects at the demo sites that are the direct result of the demos implementation, and the extent of their achievement is clearly dependent on the quality of the design, implementation and management of the demos themselves, and of the technological and organizational solutions adopted.
- Perpetuation at the demo sites, that mainly depends on the quality of the demonstration process, which has been implemented to ensure that novel applications are integrated in the overall mobility system of the concerned sites. Specifically, by recognizing and distinguishing at the outset three basic layers (the existing system, its enhancement and reinforcement for the planned event, and the additional, dedicated services developed on a temporary base), STADIUM sets the scene for the above mentioned perpetuation.
- The extension to large events other than the three demonstration sites requires, on one hand, that the lessons learned from the demos are duly interpreted and exploited. The demos are however limited in scope, and a full-fledged transferability and generalization process calls for significant supplementary efforts, which STADIUM has explicitly considered both with the Handbook development and the test of it in the Brazilian cities which will host FIFA World Cup 2014 and Olympic Games 2016.

The most obvious and immediate impacts relate to the improvement of the performance of transport systems at the targeted demonstration sites (New Delhi, Cape Town and London) so that the large events planned in these sites can benefit from smooth, efficient and sustainable mobility services.

The analysis in Delhi and Cape Town has shown a clear picture of the passengers' expectation regarding public transport. The service affordability, frequency and the punctuality were rated high. These are correlating indicators to a high expectancy of travel time reliability. All of the mentioned indicators have been rated high after experiencing these services. Both, the Delhi and also the Cape Town demonstration realized a high quality of service. There was no negative appraisal made by the customers. Even the drivers, although generally indifferent, draw the conclusion that the system and services provided could contribute to their daily working conditions and provide additional income. The implemented systems provide additional features for future service enhancements. Additional services (e.g. dial a ride for disabled, school groups) have the potential to access new markets through the focus on different target groups. The analyses of the implemented systems have shown a high potential of managing transport in emerging cities via ITS. Although that, additional marketing effort and quality improvements of services are crucial for raising the users interests and acceptance. Finally, as a result a higher market penetration would have an

increasingly positive impact on public transport with effects on the overall road transport congestion, pollution, energy consumption, safety).

On the other hand, the analysis in London was focused at general traffic management, but can also affect an improved situation of street based public transport systems. The most benefit of a smart camera system is the possibility, that the traffic managing operators are able to focus their attention on other bottle necks in the road network and are always in a 'need to know' basis of not periodically monitored locations, regardless of whether a large event occurs or not. Through a tested definition of traffic conditions a reliable automatic detection of congestions is possible, which benefit in a quick realization of countering measures. This will improve the traffic flow, journey times and finally the traffic quality in London. It is conceivable that this autarkical ITS solution will be expanded, because it has been established during the evaluation process. Therefore the system also has potential to be transferred to other large cities with upcoming large events or general high amounts of traffic in the normal days.

Intelligent transport systems in general have high potential to increase the effectiveness of public transport systems and also the general traffic. This can affect a higher transportation quality in every traffic section. The implemented systems show a high user acceptance and are able to reduce journey times and traffic emissions. The implemented systems of the three STADIUM demonstrators are proved successful under special traffic conditions like large events. The results can be used for decision makers of upcoming large events and also in other large cities without large events. This is the first step to implement intelligent transport systems also in other large cities with high traffic density. The project demonstrated different opportunities for innovative and sustainable strategies and measures which will help to create efficient future traffic planning in cities with and without future events.

STADIUM is an RTD project, and accordingly features both a Research and a Demonstration component, which are closely interlinked. STADIUM has been set out to generate new and innovative knowledge that will be made available to the RTD community.

Science and Technology: novel ITS applications have been designed, tested, demonstrated and validated at the demo sites. While the basic S+T behind these applications is mostly available at the project outset, a major added value will result from its use in the specific contexts of the New Delhi, Cape Town and London events, characterized by new sets of constraints that challenge the effectiveness and efficiency of the adopted technological solutions.

Management Science: in addition to the innovative contents of the ITS applications, STADIUM had explicitly tackled the issue of complexity associated to the organization and management of large events: the demonstrations within the project lifetime provide challenging opportunities to show how innovative, hi-tech developments in the field of urban sustainable mobility can be integrated in the overall transport systems of large cities. Even more importantly, such integrated approach has been adopted in the development of the Handbook, which has all the features to provide researchers and practitioners involved in the organization of future events with a wealth of methodological and practical guidelines for the effective and efficient management of large events.

Socio-economic and sustainability science: carrying out comprehensive and reliable assessments of the socio-economic impact of complex mobility systems (including security) is a major challenge, for which the currently available body of knowledge is known to be hardly definitive.

STADIUM is set out to develop a methodological evaluation framework addressing this challenge, and, more importantly, to test it – to the extent that the demos allow it – in real life, providing useful inputs to future events and, more in general, contributing to the advancement of RTD in this area.

STADIUM is a SICA, and as such one of its major “raison d’etre” is to contribute to the development and strengthening of international cooperation beyond the EU borders. In this framework STADIUM has established direct cooperation mechanisms with a variety of partners in the two targeted SICA countries (South Africa and India). Local partners, representing the RTD community, administrations and operators, have been involved in the project and contributed substantive inputs, their role being paramount in the achievement of the project objectives. This led to the consolidation over time of cooperation between EU and the IC partners.

The technological and organizational solutions developed in the demonstration sites are largely based on know how that originates from EU partners (both RTD and industry). The successful implementation of the planned applications can then pave the way to further, larger scale cooperation and trade agreements, that are expected to materialize in a more visible and stable presence of EU industry in the targeted regions.

Finally, despite the prevailing focus on International Cooperation, STADIUM is expected to generate advancements in the area of sustainable urban mobility that can contribute to the pursuance of EU policies on many accounts, with specific reference to:

- The Green Paper on Urban Mobility
- The 6th Environment Action programme (2000 – 2012)
- EC Thematic Strategy on Air Pollution and Air quality regulation
- The Air Quality Directive
- The EU Sustainable development Strategy
- The White Paper on the CTP – Time to decide



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2. Use and dissemination of foreground

Dissemination activities and the exploitation of the project results aim at encouraging the use of major special events in cities as a catalyst to improve transport networks locally. Major special events require the development of new tools, and often investments in the transport network, and therefore create opportunities:

- for European companies to enter or grow on emerging markets;
- to upgrade urban mobility network to achieve long term objectives such as containing the negative effects of transport on the environment in the city and containing the impact of urban transport on climate change.

STADIUM dissemination and exploitation activities have been therefore designed to be part of Europe's effort to respond to the global need to address climate change through an upgrading of urban mobility network management. Dissemination related to demonstration activities in South Africa and India and to non-European cities has been developed to support European companies' excellence and stress their position for the upgrading of urban mobility networks across the world.

The specificity of the STADIUM project, which focuses on the mobility management of large events, restricts the target groups for dissemination and exploitation activities to a specific audience. The dissemination and exploitation strategy and tools have been designed taking this factor into account.

In this framework the overall aim of STADIUM dissemination and exploitation activities has been:

- to establish the project as a reference among interested cities and international organizations and associations involved in organizing large events, and building up capacities and skills in the target group of cities;
- to communicate on the role of the EU in supporting mobility management in relation to the organization of the Commonwealth Games in New Delhi and the World Cup in South Africa, and on a second level the London Olympics;
- to develop effective communication interfaces and dissemination channels.

In order to reach its goals of establishing the project as a reference, to communicate the role of the EU in activities outside Europe, to develop effective communication channels, STADIUM aimed at addressing the following main 5 target groups:

1. the STADIUM Exploitation group, engaging specifically cities which will be involved in the organization of large events from 2012 onwards;
2. stakeholders relevant to large events organization;
3. specialist audience, urban transport and ICT/ITS professionals in Europe;
4. specialist audience, Urban transport and ITS professionals in India and South Africa;
5. the general public, end beneficiary of the ITS applications deployed at demonstrator site level.

The aim and content of dissemination differs with the 5 target groups.

STADIUM exploitation group

The target group for the exploitation of the project results has been well defined: it consists mainly in cities involved, applying for or planning to apply for the organisation of large events. Exploitation consists in the use by the city of the STADIUM handbook as a reference document for the management of mobility in relation to large events.

The first target group comprised the cities involved in the demonstration activities. Exploitation consisted in their use of the draft handbook for local activities for the preparation of the large event they are organizing. The evaluation work aimed to provide a feedback on their contribution to the draft of the handbook.

STADIUM has also implemented an exploitation strategy specifically aimed at committing cities involved in the organisation of large events from 2012 onwards to the process and to use as one of their reference the STADIUM handbook. The goal was to allow these cities to provide inputs and requirements concerning the content of the handbook for them to find direct added value in this reference document to use its draft and then final version for the organisation of their event. This for helping to guarantee the exploitation of the results of STADIUM beyond the life of the project. It would also contribute to establish the STADIUM handbook as a reference for professionals of the sector on mobility and large events for the years to come.

To achieve this objective, a group of reference and exploitation cities has been constituted and coordinated by Polis. They helped the Consortium by providing input for the users' and requirements' analysis and feedback on the draft handbook. Benefiting from the experience of the other STADIUM partners, and attending the organised workshops, they committed to use the draft handbook as one of their reference, which is necessary for a constructive and efficient feedback.

The reference and exploitation group also included cities such as Glasgow, which is involved in the organisation of the Commonwealth Games in 2014 and Milan, which is organising the World EXPO 2015. Further cities has been invited to join this group. Invitations have been sent systematically to cities applying officially to organise an event of the scale of those considered in STADIUM.

The reference and exploitation group coordinated the relation between STADIUM and these cities and reinforced the exploitation of the project results, in particular the long term use of STADIUM handbook as a reference. This activity ultimately aimed at creating a reference platform for the exchange of experiences and information between cities on the mobility management and the

organisation of large events with a core of European cities and partners. Under this respect a targeted exploitation activity has been developed and focussed to the Brazilian cities of Curitiba and Rio de Janeiro carrying on jointly two feasibility studies on the applications of the STADIUM outcomes to the mobility organization of the FIFA 2014 (both) and Summer Olympics 2016 (Rio).

Stakeholders relevant to large events

STADIUM wanted to address International Bodies with their respective Local Organizing Committee, Transport professionals from public authorities and events initiators, in order to promote ITS tools for large events mobility management.

Communication towards this target group aimed at:

- fostering a policy framework which is favorable for the deployment of ITS systems;
- raising awareness for the potential benefits of ITS technologies for large events.

Thus, dissemination towards these professionals has focused on:

- the systems and services tested in STADIUM;
- potential business cases and steps for further deployment and commercial uptake;
- STADIUM events.

Specialist audience: urban transport and ICT/ITS professionals in Europe

This target group includes ICT/ITS professionals in public and private sectors, including ITS manufacturers and service providers, research, and public authorities. These professionals are involved in the development, testing, and deployment of ITS technologies.

Towards this target group, STADIUM aimed at:

- highlighting the information resources made available by STADIUM;
- showing the societal benefits of applications and systems specific to large events, tested in the demonstration sites to this target group in order to promote their uptake as commercial products.

Specialist audience: urban transport and ICT/ITS professionals in India and South Africa

Thetis and Pluservice developed concrete dissemination activities targeted at the urban transport and ITS professionals in the countries where the demonstration sites are located, namely in Delhi and Cape Town respectively.

The general public: end beneficiary of the ITS applications deployed at demonstrator site level

The general public, visiting the large event in question, has not been the principal target group of STADIUM dissemination. Communication with this target group rather aimed at raising awareness

on the role of the EU in supporting mobility management in relation to the organization of the Commonwealth Games in New Delhi and the World Cup in South Africa.

Relevant dissemination tools have been defined and adapted to the communication needs of the 5 target groups described. The following table gives an overview of the dissemination tools and which target group(s) they address.

Tool	STADIUM exploitation group	Stakeholders large events	Specialist audience EU	Specialist audience South Africa and India	General Public
STADIUM corporate identity	X	X	X	X	X
STADIUM leaflet	X	X	X		
STADIUM Demonstration site leaflet	X	X		X	
STADIUM website	X	X	X	X	
Handbook	X	X	X	X	
STADIUM exploitation group seminars	X	X			
Press releases to specialized press / Articles / Scientific papers			X	X	
Press releases to general media					X
Others: Partners' dissemination tools	X	X	X	X	

The exploitation group has gathered for the first time in Rome in October 2009. At that time the STADIUM project was presented to the following cities: Kiev (EURO2012), Warsaw (EURO2012), Madrid, and Cracow (in addition to the project cities Rome, London and Glasgow). Since participants were very enthusiastic about the meeting, the consortium decided to organise an additional meeting in Glasgow in October 2010. A specific focus was given to the STADIUM Handbook and the exchange with experts from Brazil (FIFA WORLD CUP 2014 + Olympic Games). The following cities were present (in addition to the project cities Rome, London and Glasgow): Warsaw (EURO2012), Madrid and Berlin. Other cities were not able to participate in the two meetings but are kept informed of STADIUM activities: Lviv (EURO2012), Kharkov (EURO2012),

Strasbourg (EURO2016), Nancy (EURO2016), Lyon (EURO2016), Lille (EURO2016), Bordeaux (EURO2016), Marseille (EURO2016), Saint-Etienne (EURO2016), Toulouse (EURO2016), Paris (EURO2016), Milan and Dublin.

The 3rd meeting of the end user cities group of the STADIUM project took place on 12 and 13 September 2011 in Senigallia, Italy. The state of the STADIUM Handbook was presented towards the participants and views, comments and expectations of the User Group cities were collected. Cities which hosted extraordinary events shared their experiences; cities going to host the FIFA World Cup as well as Summer and Winter Olympics presented their traffic management plans for the events. Participants of the third User Group meeting came from Curitiba, Krakow, London, Rio de Janeiro and Sochi. For the first time, a representative of the Winter Olympic Games in Sochi (Russia) was among participants of the User Group. Contacts with Brazilian partners had been strengthened and resulted in strong involvement of Brazilian cities. Ukrainian cities involved in the European football championship for 2012 could not participate but have expressed a strong interest in liaising with the group and using the handbook. First contacts have been made with French cities which will be involved in the European football championship 2016.

The 4th and final STADIUM User Group meeting took place on 10 December 2012 in London. It was hosted by Transport for London (TfL) who shared experiences from the Olympics 2012 and reported on road network operations during the 2012 Olympics. Furthermore, lessons learnt during the EURO 2012 in Poland and Ukraine were shared as well as the challenges cities in Brazil and Russia face looking towards the upcoming FIFA World Cup 2014, Olympic Games 2016 and the 2014 Olympic Winter Games. Both experienced cities and those planning to host large events attended the meeting, incl. representatives from the cities of Curitiba and Kiev.

The ITS online handbook was presented to the cities, who used this final occasion to share their comments, needs and wishes to be incorporated in the ITS decision support tool. All participants have been informed when the handbook and the tool had been made available.

While the description of work forecasted 2 meetings of the user groups, the project has been able to organise four of them, spreading the resources allocated to this activity more evenly over four years. This allowed to maintain a momentum strengthening the group and reinforcing its participation to the project, in the form of input and comments on the handbook and exchanges with partners and between members of the user group.

With its presence at major events (such as ITS World Congress and TRA 2012) and in scientific and transport related publications STADIUM has become a reference project towards cities, international organisations and associations (e.g. UITP) involved in the organisation of large events. Support from the European Commission has constantly been highlighted demonstrating the EU's international support in transport planning during large events. Contact has been established and consolidated with cities going to host large events in the future and associated stakeholders, namely with Sao Paulo, Curitiba, Rio de Janeiro, Kiev and ITS Russia.

A channel to provide input and to steer the development of the STADIUM Online Guide has been provided to cities through the STADIUM User Group. With the release of the STADIUM Online Guide

a comprehensive has been established to support cities in their planning process, which has been made accessible to relevant cities and stakeholders through the STADIUM workshop, User Groups and mailings, and is also in the pipeline in the collection of useful tools for transport practitioners at www.eltis.org. No long version of the printed handbook has been produced as it has been decided in agreement with the coordinator and the PO that a short version of the handbook introducing the online full version of the document would be more appropriate. This has allowed to produce translated version of the document in several languages.

STADIUM corporate identity

To give the project a visual identity, a project logo and a general design outline have been created. a template for PowerPoint presentation has been developed and used for all STADIUM related presentations of consortium members. Finally, a word template for deliverables has been produced to have a common format for all reports produced by the Consortium.

A project leaflet has been produced to describe the project objectives and expected outcomes in a concise way and highlighting the test sites that are participating in the project. Polis has been responsible for developing the content of the leaflet, which has been professionally designed and printed on 500 copies. All partners have been contacted to provide high quality pictures. An electronic version is also available on the STADIUM website.

Two leaflets have also been developed focusing on Indian and South African demonstration sites, detailing the demonstration activities and the role of the partners in relation to the large event. Thetis and Pluservice have been responsible for developing the content of the leaflets respectively for India and South Africa, in the local language if necessary in South Africa. The leaflets used the same design provided by Polis and 500 copies of each of the two leaflets have been printed by Thetis. They are available electronically on the project website.

The leaflets have been the only stand-alone dissemination material for the whole duration of the project. The leaflet aimed to inform a wide audience about the project's objectives and offers for the specialist audience and decision makers. The leaflet has been used for distribution at key events, both on the European, national and local levels by all project partners.

A brochure of 12 pages has been developed and professionally designed to explain, summarize and promote the STADIUM Online Handbook. The brochure has been made available in English, Spanish, Brazilian Portuguese and Russian. All language versions are available in digital format on the STADIUM website. Printed copies (300 copies in English and 100 in Spanish, Portuguese and Russian each) have been distributed at key events such as the 9th ITS European Congress in Dublin and the Smart Cities Stakeholder Platform 2013 Annual Conference in Budapest. A preliminary version of the brochure was distributed at the final STADIUM workshop on 24 April 2013.

The website has been built around four pillars:

1. The STADIUM demonstrations: most visible and tangible element of the project;
2. Learning from Stadium: bringing forward the handbook and the exploitation group activities;
3. European ITS solutions for large events management;

4. Project information.

The website includes a public and private area. The public area presents information on project objectives, progress and outputs as well as other interesting links and information related to the topic, including links to organizations sponsoring events (UEFA, FIFA, IOC, etc.). All public project reports and publications are available online.

The private area has been designed to facilitate dialogue and exchange between the project partners and experts. It wanted to help to streamline the flow of information between all group of partners (demonstration sites, handbook preparation, reference and exploitation group, etc.). It allowed for a dynamic exchange of information actively supporting the users' needs analysis, the draft of the handbook and the relation with the reference and exploitation group of cities.

2.1. Section A (public)

template A1: list of scientific (peer reviewed) publications, starting with the most important ones										
NO.	Title	Main author	Title of the periodical or the series	Number, date or frequency	Publisher	Place of publication	Year of publication	Relevant pages	Permanent identifiers ² (if available)	Is/Will open access ³ provided to this publication?
1	ITS mini-bus taxis and the 2010 World Cup	Pluservice	The CAAST-Net Bulletin	-	-	South Africa	2010	-	-	No
2	After South Africa, EU Panel to ensure seamless travel for Games	-	Express NewsLine	-	-	India	2010	-	-	No
3	STADIUM project: demonstration activities in South Africa for the FIFA Soccer World Cup	-	Paper for ITS World Congress	-	-	-	2010	-	-	No
4	Online application to make travel easier during Games	-	The Indian Express	-	-	India	2010	-	-	No

² A permanent identifier should be a persistent link to the published version full text if open access or abstract if article is pay per view) or to the final manuscript accepted for publication (link to article in repository).

³ Open Access is defined as free of charge access for anyone via Internet. Please answer "yes" if the open access to the publication is already established and also if the embargo period for open access is not yet over but you intend to establish open access afterwards.

template A1: list of scientific (peer reviewed) publications, starting with the most important ones

NO.	Title	Main author	Title of the periodical or the series	Number, date or frequency	Publisher	Place of publication	Year of publication	Relevant pages	Permanent identifiers ² (if available)	Is/Will open access ³ provided to this publication?
5	An ITS integrated solution to the IRT architecture in Cape Town within the FP7 project STADIUM	M. Giannini, K. Van Zyl	Paper for ITS World Congress	-	-	-	2010	-	http://www.stadium-project.eu/site/fileadmin/Presentations_and_Publications/2010-10_ITS_Conference-Paper.pdf	Yes
6	STADIUM: ITS for large events	A. Ricci, M. Tomassini, M. Giannini, P. Squillante	Paper for International congress on Big Events	-	-	-	2010	-	http://www.stadium-project.eu/site/fileadmin/Presentations_and_Publications/2010-11_Paper_-_Internat_Congress_on_big_events.pdf	Yes
7	Motivating a transition from informal to formal public transport in South Africa	J. Meyers, G. Behardien	Paper for 59th UITP World Congress	-	-	-	2011	-	-	No
8	Demand Responsive Transport as integration to urban regular transport service: a case in Cape Town	M. Giannini	8th ITS Europe	-	-	-	2011	-	-	No
9	N.A.	M. Giannini, P. Gilka	Paper for 18th World Congress on ITS (2)	-	-	-	2011	-	-	No

template A1: list of scientific (peer reviewed) publications, starting with the most important ones

NO.	Title	Main author	Title of the periodical or the series	Number, date or frequency	Publisher	Place of publication	Year of publication	Relevant pages	Permanent identifiers ² (if available)	Is/Will open access ³ provided to this publication?
10	Project STADIUM: Smart transport applications for large events	D. Röller, A. McCann	Cities for Mobility eMagazine; issue 2/2012	-	-	-	2012	-	-	No
11	EU project kept Olympic traffic flowing (based on press release)	POLIS	Traffic Technology Today	-	-	-	2012	-	http://www.trafficechnologytoday.com/news.php?NewsID=41902	Yes
12	EC Project STADIUM: Grounds for Optimism	D. Röller	Thinking Highways	-	-	-	2012	-	http://thinkinghighways.com/articles/article/?id=6308	Yes
13	Stadium: smarter transport management for global events	A. Fletcher	European Commission Website	-	-	-	2013	-	http://ec.europa.eu/research/transport/projects/items/stadium_en.htm	Yes

template A2: list of dissemination activities

NO.	Type of activities ⁴	Main leader	Title	Date/Period	Place	Type of audience ⁵	Size of audience	Countries addressed
1	Presentation + dissemination materials	SAHA	SA-EU SME Event – Cape Town	10/09/2009	Cape Town, South Africa	ITS stakeholders	50	
2	Dissemination of materials at ERTICO stand	ERTICO - ITS Europe	ITS World Congress	21-25/09/2009	Stockholm, Sweden	ITS community	3000	
3	STADIUM presented in the discussion	Impact Europe	Meeting with official delegation from Kiev about the organisation of the EURO 2012 in Kiev	28/10/2009	Brussels, Belgium	High level delegates from Kiev	n.a.	
4	Presentation + dissemination materials	ERTICO - ITS Europe	SIMBA II EU-Russia ITS Workshop	18/11/2009	Moscow, Russia	ITS stakeholders	25	
5	Presentation + dissemination materials	ERTICO - ITS Europe	SIMBA II EU-Brazil ITS Workshop	25/11/2009	São Paulo, Brazil	ITS stakeholders	18	

⁴ A drop down list allows choosing the dissemination activity: publications, conferences, workshops, web, press releases, flyers, articles published in the popular press, videos, media briefings, presentations, exhibitions, thesis, interviews, films, TV clips, posters, Other.

⁵ A drop down list allows choosing the type of public: Scientific Community (higher education, Research), Industry, Civil Society, Policy makers, Medias, Other ('multiple choices' is possible).

template A2: list of dissemination activities

NO.	Type of activities ⁴	Main leader	Title	Date/Period	Place	Type of audience ⁵	Size of audience	Countries addressed
6	Presentation	THETIS	ITS Conference & exhibition "ITS for mobility & safety management"	1-2 December 2009	New Delhi, India	Scientific Community, Industry, Civil Society, Policy makers, Medias	n.a.	
7	Dissemination materials	THETIS	Auto Expo	5-11 January 2010	New Delhi, India	Industry, Civil Society, Medias, general public	n.a.	
8	Presentations, workshops	CSIR, Impacts Europe	SIMBA II workshop	15/02/2010	University of Stellenbosch, South Africa	Professors, researchers, programmers, EU delegation, transport operator	30	
9	Presentations, workshops	CSIR, Impacts Europe, Pluservice, SAHA, MMIV	Stadium Local dissemination meeting	16/02/2010	University of Stellenbosch, South Africa	Professors, researchers, programmers, EU delegation, transport operator	30	
10	Presentation	Pluservice, Thetis	SIMBA II Final Workshop	26/03/2010	Brussels, Belgium	ITS Community, EC	40	
11	Presentation	Polis	ECOMM 2010	5-9/5/2010	Graz, Austria	Mobility Managers	n.a.	
12	Dissemination of materials	THETIS	SAFE Annual Convention	17-18 May 2010	Chandigarh, India	local authorities, public transport operators, mobility experts, community groups, general public	n.a.	
13	Dissemination of materials at the EC stand	ERTICO - ITS Europe	Challenge Bibendum	30/05 - 05/06/2011	Rio de Janeiro, Brazil	Transport community	1000	

template A2: list of dissemination activities

NO.	Type of activities ⁴	Main leader	Title	Date/Period	Place	Type of audience ⁵	Size of audience	Countries addressed
14	Presentation + dissemination materials	Mizar	Viajeo Seminar: EU - Brazil Cooperation on Urban Mobility and ITS	02/06/2010	Rio de Janeiro, Brazil	ITS community	30	
15	Paper + presentation	ISIS, Pluservice	TRA Conference	10/06/2010	Brussels, Belgium	transport research community	15	
16	Dissemination of materials	ERTICO - ITS Europe	ERTICO general assembly and Forum	14-16/06/2010	Brussels, Belgium	ITS community	100	
17	Presentation	ISIS	IMPACTS Europe Annual conference	30/06-2/07/2010	Rome, Italy	Mobility experts of 12 big European cities	98	
18	Presentation	PluService	2010 South Africa – European Union Summit, " <i>Beyond the Vuvuzelas: Unleashing sport as driver for research and innovation</i> "	29/09/2010	Brussels, Belgium	Professors, researchers, programmers, EU delegation, transport operator	n.a.	
19	Dissemination of materials at ERTICO stand	PluService, ERTICO - ITS Europe	ITS World Congress	26-29/10/2010	Busan, South Korea	ITS community	3000	
20	Presentation	SAHA, Pluservice, CSIR	Visit of Andràs Siegler	29/10/2010	University of Stellenbosch, South Africa	Researchers, EU delegation, transport operator	35	

template A2: list of dissemination activities

NO.	Type of activities ⁴	Main leader	Title	Date/Period	Place	Type of audience ⁵	Size of audience	Countries addressed
21	Presentation	ISIS, Pluservice	Public Seminar on The Evolution of Demand-Responsive Transport Services	09/11/2010	Rome, Italy	local authorities, public transport operators, mobility experts, community groups, general public	100	
22	Paper	Pluservice, ISIS, THETIS	International congress on Big Events	29/10/2010	Venice, Italy	local authorities, public transport operators, mobility experts, community groups	30	
23	Seminar	Pluservice	International Seminar on Flexible Transport	24/01/2011	Asti, Italy	local authorities, public transport operators, mobility experts, community groups, general public	150	
24	Presentation	Pluservice, ISIS	Brazil-EU Cooperation on Sustainable Transport	12/04/2011	Sao Paulo, Brazil	Researchers, EU delegation, transport operator	n.a.	
25	Paper and Presentation	SAHA	59th UITP World Congress	10-14/04/2011	Dubai, UAE	Researchers, transport operator, mobility experts	n.a.	
26	Presentation	Impact Europe	Jornada ITS para la Movilidad Urbana - Lima, Peru (as part of the Brussels Region's actions in mobility)	31/05/2011	Lima, Peru	Urban specialists in urban mobility and ITS coming from Latin America and the USA	100	

template A2: list of dissemination activities

NO.	Type of activities ⁴	Main leader	Title	Date/Period	Place	Type of audience ⁵	Size of audience	Countries addressed
27	Presentation + paper, Dissemination of materials at ERTICO stand and at Pluservice stand	ERTICO, TUB, Pluservice	8th ITS European Congress	06-09/06/2011	Lyon, France	ITS community: local authorities, public transport operators, mobility experts, community groups, general public	3000	
28	Presentation	ISIS	ICT Challenges for Innovation Fostering S&T Cooperation between the European Union, Latin America and the Caribbean	6-7/06/2011	Santiago de Chile, Chile	Researcher	n.a.	
29	Dissemination of materials	-	STADIA & ARENA 2011	15-17/06/2011	Marseille, France	Entertainment and sports venue industry	n.a.	
30	Presentations	TUB, SAHA (paper presented by SAHA and Pluservice), IMPACTS, EC	18th World Congress on ITS	17-19/10/2011	Orlando, USA	local authorities, public transport operators, mobility experts, community groups, general public	n.a.	

template A2: list of dissemination activities

NO.	Type of activities⁴	Main leader	Title	Date/Period	Place	Type of audience⁵	Size of audience	Countries addressed
31	Presentation	IMPACTS	ITS Conference	01/02/2012	Brasil	ITS community: local authorities, public transport operators, mobility experts, community groups, general public	n.a.	
32	Presentations during strategic session	IMPACTS, POLIS, Pluservice	TRA 2012	23-26/04/2012	Athens, Greece	local authorities, public transport operators, mobility experts, community groups	300	
33	Presentation	ERTICO	ERTICO-ITS Russia 3rd bi-lateral meeting	06/06/2012	Moscow	ITS Russia staff	n.a.	
34	Presentation at Contact Forum, leaflets distribution	Polis	Cities for Mobility World Congress	2-4/07/2012	Stuttgart	Cities from across the world	200	
35	Distribution of leaflets	Polis	FP7 Transport: Briefing on cooperation opportunities with South Africa	20/07/2012	Brussels, Belgium	European and SA transport stakeholders	4	
36	presentation in session 3: BRT and integrated public transport systems	SAHA and Pluservice	2nd UATP African Congress	7-11/10/2012	Johannesburg, SA	African public transport stakeholders	n.a.	

template A2: list of dissemination activities

NO.	Type of activities⁴	Main leader	Title	Date/Period	Place	Type of audience⁵	Size of audience	Countries addressed
37	Special Session on STADIUM planned	ERTICO and others	19th ITS World Congress	22-26/10/2012	Vienna, Austria	local authorities, public transport operators, mobility experts, community groups, general public	n.a.	
38	Presentation and technical tour with one of the minibus taxis of Peninsula Holdings	SAHA, Pluservice, CSIR	Visit of Commissioner Maire Geoghegan-Quinn	07/11/2012	Cape Town, South Africa	EC Delegation, Italian Consul in Cape Town, local minibus taxi operator Peninsula Holdings	15	
39	presentation/lecture/paper	Prof. Richter TUB	Urban Transport Conference	29-31 May 2013	Kos, Greece	local authorities, public transport operators, mobility experts, community groups	n.a.	
40	distribution of STADIUM Handbook brochure	Polis, Pluservice	9th ITS European Congress	4-6 June 2013	Dublin	European ITS professionals	n.a.	
41	distribution of STADIUM Handbook brochure	Polis	Smart Cities Stakeholder Platform Annual Conference	5-6 June 2013	Budapest, Hungary	Transport and Energy professionals from across Europe	300	
42	Presentation	ERTICO	ERTICO general assemblies	-	-	-	n.a.	
44	Presentation	IMPACTS	SIMBA workshops	-	-	-	n.a.	

template A2: list of dissemination activities

NO.	Type of activities⁴	Main leader	Title	Date/Period	Place	Type of audience⁵	Size of audience	Countries addressed
45	Presentation	-	TRB events	-	-	-	n.a.	
46	Presentation	IMPACTS	IMPACTS General Assembly	-	-	-	n.a.	

2.2. Section B (Confidential⁶ or public: confidential information to be marked clearly)

Template B1: List of applications for patents, trademarks, registered designs, etc.					
Type of IP Rights ⁷ :	Confidential Click on YES/NO	Foreseen embargo date dd/mm/yyyy	Application reference(s) (e.g. EP123456)	Subject or title of application	Applicant (s) (as on the application)
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

⁶ Note to be confused with the "EU CONFIDENTIAL" classification for some security research projects.

⁷ A drop down list allows choosing the type of IP rights: Patents, Trademarks, Registered designs, Utility models, Others.

Part B2

Please complete the table hereafter:

Type of Exploitable Foreground ⁸	Description of exploitable foreground	Confidential Click on YES/NO	Foreseen embargo date dd/mm/yyyy	Exploitable product(s) or measure(s)	Sector(s) of application ⁹	Timetable, commercial or any other use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary(s) involved
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-

In addition to the table, please provide a text to explain the exploitable foreground, in particular:

- Its purpose
- How the foreground might be exploited, when and by whom
- IPR exploitable measures taken or intended
- Further research necessary, if any
- Potential/expected impact (quantify where possible)

¹⁹ A drop down list allows choosing the type of foreground: General advancement of knowledge, Commercial exploitation of R&D results, Exploitation of R&D results via standards, exploitation of results through EU policies, exploitation of results through (social) innovation.

⁹ A drop down list allows choosing the type sector (NACE nomenclature) : http://ec.europa.eu/competition/mergers/cases/index/nace_all.html

2.3. Report on societal implications

Replies to the following questions will assist the Commission to obtain statistics and indicators on societal and socio-economic issues addressed by projects. The questions are arranged in a number of key themes. As well as producing certain statistics, the replies will also help identify those projects that have shown a real engagement with wider societal issues, and thereby identify interesting approaches to these issues and best practices. The replies for individual projects will not be made public.

A General Information (completed automatically when Grant Agreement number is entered).	
Grant Agreement Number:	234127
Title of Project:	STADIUM – Smart Transport Applications Designed for large events with Impacts on Urban Mobility
Name and Title of Coordinator:	Mr. Maurizio Tomassini – ISIS
B Ethics	
1. Did your project undergo an Ethics Review (and/or Screening)? • If Yes: have you described the progress of compliance with the relevant Ethics Review/Screening Requirements in the frame of the periodic/final project reports? Special Reminder: the progress of compliance with the Ethics Review/Screening Requirements should be described in the Period/Final Project Reports under the Section 3.2.2 'Work Progress and Achievements'	0 Yes X No
2. Please indicate whether your project involved any of the following issues (tick box) :	

Research on Humans	
• Did the project involve children?	
• Did the project involve patients?	
• Did the project involve persons not able to give consent?	
• Did the project involve adult healthy volunteers?	
• Did the project involve Human genetic material?	
• Did the project involve Human biological samples?	
• Did the project involve Human data collection?	
Research on Human embryo/foetus	
• Did the project involve Human Embryos?	
• Did the project involve Human Foetal Tissue / Cells?	
• Did the project involve Human Embryonic Stem Cells (hESCs)?	
• Did the project on human Embryonic Stem Cells involve cells in culture?	
• Did the project on human Embryonic Stem Cells involve the derivation of cells from Embryos?	
Privacy	
• Did the project involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)?	
• Did the project involve tracking the location or observation of people?	
Research on Animals	
• Did the project involve research on animals?	
• Were those animals transgenic small laboratory animals?	
• Were those animals transgenic farm animals?	
• Were those animals cloned farm animals?	
• Were those animals non-human primates?	
Research Involving Developing Countries	

• Did the project involve the use of local resources (genetic, animal, plant etc)?		
• Was the project of benefit to local community (capacity building, access to healthcare, education etc)?		X Yes
Dual Use		
• Research having direct military use		X No
• Research having the potential for terrorist abuse		X No
C Workforce Statistics		
3. Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).		
Type of Position	Number of Women	Number of Men
Scientific Coordinator	-	1
Work package leaders	2	5
Experienced researchers (i.e. PhD holders)	3	9
PhD Students	1	2
Other	5	15
4. How many additional researchers (in companies and universities) were recruited specifically for this project?		n.a.
Of which, indicate the number of men:		n.a.
D Gender Aspects		
5. Did you carry out specific Gender Equality Actions under the project?	☐ Yes ☒ No	☐ Yes ☒ No
6. Which of the following actions did you carry out and how effective were they? Not effective at all Very effective ☐ Design and implement an equal opportunity policy X ☐ ☐ ☐ ☐ ☐ ☐ Set targets to achieve a gender balance in the workforce X ☐ ☐ ☐ ☐ ☐ ☐ Organise conferences and workshops on gender X ☐ ☐ ☐ ☐ ☐ ☐ Actions to improve work-life balance X ☐ ☐ ☐ ☐ ☐ ☐ Other:		
7. Was there a gender dimension associated with the research content – i.e. wherever people were the focus of the research as, for example, consumers, users, patients or in trials, was the issue of gender considered and addressed?		

☐ Yes- please specify		
☒ No		
E Synergies with Science Education		
8. Did your project involve working with students and/or school pupils (e.g. open days, participation in science festivals and events, prizes/competitions or joint projects)?		
☒ Yes- please specify	UITP Youth Parliament Group in New Delhi (January 2010).	
☐ No		
9. Did the project generate any science education material (e.g. kits, websites, explanatory booklets, DVDs)?		
☒ Yes- please specify	The STADIUM Online Handbook.	
☐ No		
F Interdisciplinarity		
10. Which disciplines (see list below) are involved in your project?		
☒ Main discipline ¹⁰ : Engineering and technology		
☐ Associated discipline ¹⁰ :	☐ Associated discipline ¹⁰ :	
G Engaging with Civil society and policy makers		
11a Did your project engage with societal actors beyond the research community? (if 'No', go to Question 14)	☒	Yes
	☐	No
11b If yes, did you engage with citizens (citizens' panels / juries) or organised civil society (NGOs, patients' groups etc.)?		
☐ No		
☐ Yes- in determining what research should be performed		
☐ Yes - in implementing the research		
☒ Yes, in communicating /disseminating / using the results of the project		
11c In doing so, did your project involve actors whose role is mainly to organise the dialogue with citizens and organised civil society (e.g. professional mediator; communication company, science museums)?	☐	Yes
	☒	No
12. Did you engage with government / public bodies or policy makers (including international organisations)		
☐ No		
☐ Yes- in framing the research agenda		
☐ Yes - in implementing the research agenda		

¹⁰ Insert number from list below (Frascati Manual).

X Yes, in communicating /disseminating / using the results of the project	
13a Will the project generate outputs (expertise or scientific advice) which could be used by policy makers? ☐ Yes – as a primary objective (please indicate areas below- multiple answers possible) ☒ Yes – as a secondary objective (please indicate areas below - multiple answer possible) ☐ No	
13b If Yes, in which fields?	
Agriculture Audiovisual and Media Budget Competition Consumers Culture Customs Development and Economic and Monetary Affairs Education, Training, Youth Employment and Social Affairs	Energy Enlargement Enterprise Environment External Relations External Trade Fisheries and Maritime Affairs Food Safety Foreign and Security Policy Fraud Humanitarian aid
Human rights Information Society Institutional affairs Internal Market Justice, freedom and security Public Health Regional Policy Research and Innovation Space Taxation X Transport	
13c If Yes, at which level?	
☒ Local / regional levels ☐ National level ☐ European level ☐ International level	
H Use and dissemination	
14. How many Articles were published/accepted for publication in peer-reviewed journals?	13
To how many of these is open access ¹¹ provided?	5
How many of these are published in open access journals?	2

¹¹ Open Access is defined as free of charge access for anyone via Internet.

How many of these are published in open repositories?	3						
To how many of these is open access not provided?	8						
Please check all applicable reasons for not providing open access:							
☐ publisher's licensing agreement would not permit publishing in a repository ☐ no suitable repository available ☐ no suitable open access journal available ☐ no funds available to publish in an open access journal ☐ lack of time and resources ☒ lack of information on open access ☐ other ¹² :							
15. How many new patent applications ('priority filings') have been made? ("Technologically unique": multiple applications for the same invention in different jurisdictions should be counted as just one application of grant).	0						
16. Indicate how many of the following Intellectual Property Rights were applied for (give number in each box).	<table border="1"> <tr> <td>Trademark</td> <td></td> </tr> <tr> <td>Registered design</td> <td></td> </tr> <tr> <td>Other</td> <td></td> </tr> </table>	Trademark		Registered design		Other	
Trademark							
Registered design							
Other							
17. How many spin-off companies were created / are planned as a direct result of the project?	0						
Indicate the approximate number of additional jobs in these companies:							
18. Please indicate whether your project has a potential impact on employment, in comparison with the situation before your project:							
<table border="1"> <tr> <td> ☐ Increase in employment, or ☐ Safeguard employment, or ☐ Decrease in employment, ☒ Difficult to estimate / not possible to quantify </td> <td> ☐ In small & medium-sized enterprises ☐ In large companies ☐ None of the above / not relevant to the project </td> </tr> </table>	☐ Increase in employment, or ☐ Safeguard employment, or ☐ Decrease in employment, ☒ Difficult to estimate / not possible to quantify	☐ In small & medium-sized enterprises ☐ In large companies ☐ None of the above / not relevant to the project					
☐ Increase in employment, or ☐ Safeguard employment, or ☐ Decrease in employment, ☒ Difficult to estimate / not possible to quantify	☐ In small & medium-sized enterprises ☐ In large companies ☐ None of the above / not relevant to the project						
19. For your project partnership please estimate the employment effect resulting directly from your participation in Full Time Equivalent (FTE = one person working fulltime for a year) jobs:	Indicate figure:						

¹² For instance: classification for security project.

Difficult to estimate / not possible to quantify		☒
I Media and Communication to the general public		
20. As part of the project, were any of the beneficiaries professionals in communication or media relations? ☐ Yes ☒ No		
21. As part of the project, have any beneficiaries received professional media / communication training / advice to improve communication with the general public? ☐ Yes ☒ No		
22 Which of the following have been used to communicate information about your project to the general public, or have resulted from your project?		
☒ Press Release	☒ Coverage in specialist press	
☒ Media briefing	☐ Coverage in general (non-specialist) press	
☐ TV coverage / report	☐ Coverage in national press	
☐ Radio coverage / report	☐ Coverage in international press	
☒ Brochures /posters / flyers	☒ Website for the general public / internet	
☐ DVD /Film /Multimedia	☒ Event targeting general public (festival, conference, exhibition, science café)	
23 In which languages are the information products for the general public produced?		
☐ Language of the coordinator	☒ English	
☒ Other language(s)		

Question F-10: Classification of Scientific Disciplines according to the Frascati Manual 2002 (Proposed Standard Practice for Surveys on Research and Experimental Development, OECD 2002):

Fields of science and technology

1. Natural Sciences

1.1 Mathematics and computer sciences [mathematics and other allied fields: computer sciences and other allied subjects (software development only; hardware development should be classified in the engineering fields)]

1.2 Physical sciences (astronomy and space sciences, physics and other allied subjects)

1.3 Chemical sciences (chemistry, other allied subjects)

1.4 Earth and related environmental sciences (geology, geophysics, mineralogy, physical geography and other geosciences, meteorology and other atmospheric sciences including climatic research, oceanography, vulcanology, palaeoecology, other allied sciences)

1.5 Biological sciences (biology, botany, bacteriology, microbiology, zoology, entomology, genetics, biochemistry, biophysics, other allied sciences, excluding clinical and veterinary sciences)

2 Engineering and technology

2.1 Civil engineering (architecture engineering, building science and engineering, construction engineering, municipal and structural engineering and other allied subjects)

2.2 Electrical engineering, electronics [electrical engineering, electronics, communication engineering and systems, computer engineering (hardware only) and other allied subjects]

2.3. Other engineering sciences (such as chemical, aeronautical and space, mechanical, metallurgical and materials engineering, and their specialised subdivisions; forest products; applied sciences such as geodesy, industrial chemistry, etc.; the science and technology of food production; specialised technologies of interdisciplinary fields, e.g. systems analysis, metallurgy, mining, textile technology and other applied subjects)

3. Medical Sciences

3.1 Basic medicine (anatomy, cytology, physiology, genetics, pharmacy, pharmacology, toxicology, immunology and immunohaematology, clinical chemistry, clinical microbiology, pathology)

3.2 Clinical medicine (anaesthesiology, paediatrics, obstetrics and gynaecology, internal medicine, surgery, dentistry, neurology, psychiatry, radiology, therapeutics, otorhinolaryngology, ophthalmology)

3.3 Health sciences (public health services, social medicine, hygiene, nursing, epidemiology)

4. Agricultural sciences

4.1 Agriculture, forestry, fisheries and allied sciences (agronomy, animal husbandry, fisheries, forestry, horticulture, other allied subjects)

4.2 Veterinary medicine

5. Social sciences

5.1 Psychology

5.2 Economics

5.3 Educational sciences (education and training and other allied subjects)

5.4 Other social sciences [anthropology (social and cultural) and ethnology, demography, geography (human, economic and social), town and country planning, management, law, linguistics, political sciences, sociology, organisation and methods, miscellaneous social sciences and interdisciplinary , methodological and historical S1T activities relating to subjects in this group. Physical anthropology, physical geography and psychophysiology should normally be classified with the natural sciences].

6. Humanities

6.1 History (history, prehistory and history, together with auxiliary historical disciplines such as archaeology, numismatics, palaeography, genealogy, etc.)

6.2 Languages and literature (ancient and modern)

6.3 Other humanities [philosophy (including the history of science and technology) arts, history of art, art criticism, painting, sculpture, musicology, dramatic art excluding artistic "research" of any kind, religion, theology, other fields and subjects pertaining to the humanities, methodological, historical and other S1T activities relating to the subjects in this group]