

# ITS Progress Report 2017

## Documentation Page

Report No: MNEPR_ItsProgressReport_01/2017	Document Title: ITS Progress Report 2017
Author/s: Kurt Vella St John	Designation: Transport Planner (ITS)
Date: 28 <sup>th</sup> December 2017	

Reviewed by: Kenneth Spiteri	Designation: Manager (ITS)
Approved by: Peter Paul Barbara	Designation: Director, Sustainable Mobility Unit

## Table of Contents

<b>1</b>	<b><u>EXECUTIVE SUMMARY</u></b>	<b>7</b>
<b>1.1</b>	<b>THE DEPLOYMENT PHASES</b>	<b>8</b>
1.1.1	PHASE ONE (2013-2017)	8
1.1.2	PHASE TWO (2017-2020)	10
<b>1.2</b>	<b>THE MNEP</b>	<b>11</b>
<b>2</b>	<b><u>INTRODUCTION AND BACKGROUND</u></b>	<b>12</b>
<b>2.1</b>	<b>TRANSPORT MALTA</b>	<b>12</b>
2.1.1	ROAD TRANSPORT	12
2.1.2	ROAD-BASED PUBLIC TRANSPORT	16
2.1.3	INTERMODAL TRANSPORT	20
2.1.4	NATIONAL POLICY ON SAFE AND SUSTAINABLE MOBILITY	23
<b>2.2</b>	<b>TRANSPORT MALTA</b>	<b>24</b>
<b>2.3</b>	<b>ITS ACTION PLAN</b>	<b>25</b>
<b>3</b>	<b><u>CURRENT STATUS OF ITS IN MALTA</u></b>	<b>28</b>
<b>3.1</b>	<b>CONTROLLED VEHICULAR ACCESS (CVA)</b>	<b>28</b>
<b>3.2</b>	<b>ITS DEPLOYMENT IN PUBLIC TRANSPORT</b>	<b>30</b>
3.2.1	ITS-ENABLED PUBLIC TRANSPORT BUSES	31
3.2.2	AUTOMATED PASSENGER COUNTING (APC) SYSTEM	31
3.2.3	AUTOMATIC VEHICLE LOCATION (AVL) SYSTEM	31
3.2.4	REAL-TIME PASSENGER INFORMATION (RTPI)	31
3.2.5	PARK & RIDE (P&R)	32
<b>3.3</b>	<b>BATTERY ELECTRIC VEHICLES (BEVs)</b>	<b>32</b>
3.3.1	ITS ENABLED PUBLIC TAXI AND MONITORING (PTM) SYSTEM	34
3.3.2	ITS DEPLOYMENT IN THE PTM SYSTEM	34
<b>3.4</b>	<b>ITS DEPLOYMENT PHASE II</b>	<b>35</b>

<b>3.5 ITS PERIPHERAL NETWORKS.....</b>	<b>36</b>
3.5.1 SPEED CAMERA NETWORK .....	36
3.5.2 CCTV NETWORK .....	39
3.5.3 VMS NETWORK.....	41
3.5.4 PARALLEL TM INFRASTRUCTURE PROJECTS .....	42
3.5.5 STANDARDISATION OF ITS TECHNICAL SPECIFICATIONS .....	45
<b>3.6 ASSESSMENT OF ITS CONDITIONS AND FUNCTIONS .....</b>	<b>48</b>
3.6.1 TRAFFIC MANAGEMENT .....	50
3.6.2 INCIDENT MANAGEMENT .....	52
3.6.3 PUBLIC TRANSPORT MANAGEMENT .....	53
3.6.4 SAFETY.....	54
3.6.5 ELECTRONIC PAYMENT .....	54
3.6.6 TRAVEL INFORMATION.....	55
3.6.7 DATA WAREHOUSE MANAGEMENT.....	56
<b><u>4 MALTA'S ITS FRAMEWORK .....</u></b>	<b><u>57</u></b>
<b>4.1 BUSINESS FRAMEWORK .....</b>	<b>57</b>
4.1.1 TRAFFIC MANAGEMENT .....	57
4.1.2 INCIDENT MANAGEMENT .....	57
4.1.3 PUBLIC TRANSPORT MANAGEMENT .....	58
4.1.4 ORDER AND SAFETY .....	58
4.1.5 ELECTRONIC PAYMENT .....	58
4.1.6 TRAVELLER INFORMATION .....	58
4.1.7 DATA WAREHOUSE MANAGEMENT .....	59
<b>4.2 ORGANISATIONAL FRAMEWORK .....</b>	<b>59</b>
4.2.1 TRAFFIC AND INCIDENT MANAGEMENT.....	<b>ERROR! BOOKMARK NOT DEFINED.</b>
4.2.2 PUBLIC TRANSPORT MANAGEMENT .....	59



4.2.3	SAFETY .....	60
4.2.4	CONTROLLED VEHICLE ACCESS.....	60
<b>4.3</b>	<b>LEGAL ITS FRAMEWORK .....</b>	<b>60</b>
<b>4.4</b>	<b>TECHNICAL ITS FRAMEWORK .....</b>	<b>61</b>
<b>5</b>	<b><u>FUNDING .....</u></b>	<b><u>63</u></b>
<b>6</b>	<b><u>UPDATES ON THE PRIORITY AREAS FOR ACTION AND RELATED MEASURES .....</u></b>	<b><u>64</u></b>
<b>6.1</b>	<b>ACTION AREA 1: OPTIMAL USE OF ROAD, TRAFFIC AND TRAVEL DATA .....</b>	<b>64</b>
6.1.1	WHAT? .....	65
6.1.2	WHY? – A CONNECTED ISLAND .....	68
6.1.3	PROVISION OF REAL TIME INFORMATION TO THOSE WHO NEED IT .....	68
6.1.4	HOW?.....	69
6.1.5	DATA FORMATS.....	70
6.1.6	DATA COLLECTION AND DISSEMINATION .....	70
6.1.7	WHEN?.....	71
6.1.8	WHERE? .....	71
6.1.9	SUMMARY.....	71
<b>6.2</b>	<b>ACTION AREA 2: CONTINUITY OF TRAFFIC AND FREIGHT MANAGEMENT ITS SERVICES ON EUROPEAN TRANSPORT CORRIDORS AND IN CONURBATIONS .....</b>	<b>73</b>
6.2.1	WHAT? .....	75
6.2.2	WHY?.....	77
6.2.3	WHERE? .....	78
6.2.4	HOW?.....	79
6.2.5	INCIDENT MANAGEMENT CORE NATIONAL SERVICE .....	79
6.2.6	WHEN? .....	80
6.2.7	SUMMARY.....	80
<b>6.3</b>	<b>ACTION AREA 3: ROAD SAFETY AND SECURITY.....</b>	<b>82</b>

6.3.1	WHAT? .....	83
6.3.2	WHY? .....	86
6.3.3	HOW?.....	87
6.3.4	WHEN? .....	87
6.3.5	SUMMARY.....	87
<b>6.4</b>	<b>ACTION AREA 4: INTEGRATION OF THE VEHICLE INTO THE TRANSPORT INFRASTRUCTURE .....</b>	<b>90</b>
6.4.1	WHAT? .....	91
6.4.2	WHY? .....	93
6.4.3	SUMMARY .....	93
<b>6.5</b>	<b>ACTION AREA 5: DATA SECURITY AND PROTECTION, AND LIABILITY ISSUES .....</b>	<b>95</b>
6.5.1	WHAT? .....	95
6.5.2	WHY? HOW? WHEN? .....	96
6.5.3	SUMMARY .....	96
<b>6.6</b>	<b>ACTION AREA 6: EUROPEAN ITS COOPERATION AND COORDINATION .....</b>	<b>97</b>
6.6.1	WHAT? .....	98
6.6.2	WHY? .....	99
6.6.3	HOW?.....	100
6.6.4	SUMMARY.....	100

# 1 Executive Summary

This report is submitted by Transport Malta in accordance with Paragraph 3 of Article 17 of Directive 2010/40/EU which requires Member States to submit to the European Commission, a report every three years on the progress made in ITS deployment of the respective actions referred to in Article 17(1) following the Initial five-year Report for ITS Deployment in the form of a National Action Plan Published on the 27<sup>th</sup> of August, 2014.

The information in this report is to be considered as a guidance and is provided by Transport Malta on an 'as is' basis and commitment for such deployment depends on the availability of funds to the Transport Authority in Malta.

While the National ITS Action Plan is currently being reviewed and updated, this report is being based on the deployment of Intelligent Transport System (ITS) as indicated in the current 2013-2017 National ITS Action Plan for Malta. The 2013-2017 National ITS Action Plan is a synthesis of how Transport Malta has intended to roll out Malta's first phase of ITS deployment over the referred four-year period. The second phase of ITS deployment shall be tackled in the 2018-2020 period with administrative preparations having been underway since 2016.

In light of the above, this document is an updated version of the National ITS Action Plan first submitted in 2012 and the ITS Progress Report of 2014 for reporting purpose in line with the ITS Framework Directive, 2010/40/EU. It is to be noted, however, that since the submission of the 2013-2017 National ITS Action Plan, a number of developments have taken place as far as ITS deployment is concerned and that these shall be reflected in this report and the 2018-2020 National ITS Action Plan, being now under review.

This report includes updated data and revised timeframes as far as implementation of the ITS Action Plan for Malta is concerned. In the meantime, it is to be noted that this Action Plan is being continuously updated to reflect any changes in the plan including any additional ITS deployment plans.

The implementation of this action plan has started being carried out at a time when the provision of new road infrastructure, for the creation of additional road capacity, is being

supplemented with the introduction of new sustainable mobility services, since physical or environmental restrictions of the existing road network preclude or limit road or junction widening in most cases. This is particularly the case through increased focus on the improvement traffic management and control on existing infrastructure, and the introduction of measures which support multimodality and mass transit.

The Action Plan builds on Malta's experience over the past seven years of successfully piloting and operating a small number of independent road-based ITS applications, provided for the deployment of missing components and developing Malta's ITS in a more integrated and holistic manner.

The current Government's policy aims to deploy ITS to assist in achieving a bigger modal shift onto public transport and reduce the level of harmful emissions from transport, easing traffic congestion, alleviating traffic bottlenecks, improving journey times of public transport, improving road safety and influencing travel behaviour through the provision of real-time travel information.

The ITS Action Plan is cognisant of the important work being carried out at a European Union level which aims to achieve European wide harmonisation and interoperability for ITS deployment of road transport and has been initially built over the considerations of the practical deployment guidance emanating from the *EasyWay* project.

Malta's ITS Action Plan is being developed within the framework of the six main priority areas split into a number of actions contained in Directive 2010/40/EU which was planned to be carried out over a seven-year timeframe, from 2013 through 2020. The current developments within the respective priority areas are tabulated at the end of the report.

## 1.1 The Deployment Phases

### 1.1.1 Phase One (2013-2017)

**Phase One of Malta's ITS deployment included the laying down of the foundations for the national ITS mainframe and open system architecture.** The main system was divided

into a number of sub-systems that form part of a comprehensive Urban Traffic Management and Control (UTMC) system that is being tailored to fit the specific needs of the Maltese Islands, focusing at a strategic level on Malta's TEN-T Core and Comprehensive networks. This direction sought innovation in traffic management to help make transport more sustainable and more efficient as well as operate cleaner, safer and seamlessly.

As indicated in the original ITS Action Plan, the sub-systems planned in Phase One had included:

1. The deployment of the first phase of a national CCTV network, composed of various types of cameras with an array of functionalities and capabilities intended for specific uses for traffic and incident monitoring and for the facilitation of effective coordination of the deployment of emergency services;
2. A Variable Message Sign (VMS) network which will provide road users with indispensable real-time information on traffic conditions including traffic congestion and road closures as well as other road safety related to real-time information such as electronic lane changing information and dynamic electronic speed signs;
3. A partial Urban Traffic Management and Control System (UTMC) specifically designed for Malta's road network which will introduce demand-responsive, synchronised traffic signal junctions that are capable of giving priority to public transport and emergency vehicles.

The planned Road Flooding Alert Management system indicated in the original Action Plan and which will be rolled out in the most vulnerable road sections prone to flooding and as one of the measures put forward by Transport Malta to adapt Malta's national transport infrastructure to climate change in line with EU Policy on infrastructure resilience to the negative impacts of Climate Change, which was originally planned to be implemented in the Phase I, will now be implemented in Phase II, due to unexpected financial and budgetary constraints. This was due to the fact that government had implemented a flood relief system nationwide, by tunnelling underground systems for the catchment of rainwater. Hence a 'wait and see' approach was adopted to test the efficiency of this system before resorting to ITS infrastructure.

All of the indicated sub-systems are pilot projects in their own right, which upon deployment will be monitored to assess their individual and combined effectiveness and with a view to better assess further expansion of each respective sub-system components to other areas of the road network.

The planned UTMC has been designed to interface with all existing ITS applications used in traffic and vehicle management in public transport services, taxi services, speed cameras, Controlled Vehicle Access System (CVA) and the new National Electromobility Network.

Through this deployment and because of the small and manageable size of its transport network, Malta will be one of the first European countries to have all of its main road network, its transport hubs and termini seamlessly connected in real time at a national level.

The roll-out of ITS at national level in the first phase will generate vast quantities of raw travel and traffic data which can be filtered and structured to provide a vital monitoring and assessment tool for transport planners and operators, emergency services, policy makers and control bodies.

#### *1.1.2 Phase Two (2017-2020)*

Initial preparations and the design for the implementation of Phase two had started in 2016, allowing for some overlap between the two phases. The second phase of the ITS Action Plan is envisaging further enhancements and additions to Phase I as far as the deployment of ITS elements is concerned, especially in the rest of the main arterial and distributor roads as well as extending the network to Malta's main urban core areas.

The main aims of Phase II will be to further improve public transport efficiency, increase road safety including reduction of traffic accidents, and reduce road fatalities as well as to improve local air quality levels. All of this will be pushed through the strengthening of what will be the core of the ITS ecosystem in Malta.

In addition, Phase II will also see, the set-up of a National Traffic Control Centre (NTCC) which will take on the role of real-time traffic management, control and enforcement operations, leaving the Traffic Control Centre (TCC) at the TM Paola Facility to act as a silver suite, offering the possibility of prospective planning and historic studies based on the collected

datasets and CCTV footage. The TCC at the TM Paola Facility is thus being referred to as the Auxiliary Traffic Control Centre (ATCC). The way the NTCC and ATCC complement each other gives a strong measure of redundancy and resilience which is important due to the operation being an imperative part of national security. The NTCC will include the 112 centre and e-call centre and will be con-jointly operated and managed between TM and the Police / Emergency Services.

## 1.2 The MNEP

In the meantime, in December 2013, the Ministry for Transport and Infrastructure together with Transport Malta set up the Malta National Electro mobility Platform (MNEP) under which future planning of the introduction of Electromobility and Intelligent Transport Systems in Malta. One of the main objectives of the MNEP is to implement the Malta National Electromobility Action Plan (MNEAP) which was also launched in December of 2013.

Currently the Platform is identifying a number of projects from the action plan which can be immediately rolled out subject to the availability of funds and additional Human Resources since at the moment it has only been allocated with a skeleton staff.

Since 2013, the ITS unit within the MNEP was strengthen with two additional members of staff and an ITS consultant.

## 2 Introduction and Background

As a relative newcomer to the world of Intelligent Transport Systems (ITS), Malta has seen substantial roll out of ITS on a national level. For its small size, what is planned for ITS deployment is also substantial, both in terms of the expected impact on the transport system as well as the level of investment.

For a holistic approach to planning and effective widespread deployment of ITS, it is important to examine and understand the nature of the trends and changes that have taken place in our transport system in recent years and how this has effected travel patterns and behaviour.

Through this action plan, Transport Malta intends to continue with ITS deployment over the coming years to prepare for a transport systems based on the “smart city” concept.

### 2.1 Transport Malta

#### 2.1.1 *Road Transport*

The Maltese transport system is characterised by the predominance of road-based transport, with private cars, buses, road freight, cycling and walking representing 98% of all internal travel movements in a typical day. The analyses performed through the National Transport Master Plan 2025 have led to the identification of both the strengths of road transport that can be built upon as well as the main issues and problems that need to be addressed in relation to the supply and demand for road transport, the degree of utilisation and functionality of road transport and its organisation.

Road transport infrastructure in Malta, comprises of a well-developed, strategic road network with few missing links and, in general, provides an adequate level of connectivity between the main towns and from the smaller urban and rural settlements. The total extent



of the Maltese road system is about 2,410 km, with approximately 762 km of roads/100 km<sup>2</sup>; this represents the densest road system in the European Union.

Another important factor impacting the road transport sector is population density. With an average of 1,341 inhabitants per square kilometre, Malta has by far the highest population density of any country in the European Union. These unique factors, along with Malta's small country size, present practical difficulties when comparing the performance of Malta's internal transport system with that of the other EU countries.

For instance, the short travel distances mean that marginalisation of rural communities is not a major issue compared with most other EU countries but, the lack of high-speed, inter-regional roads in Malta naturally gives rise to slower nationwide journey times and congestion levels which are akin to congestion levels found in medium and large cities in Europe, rather than at a country level. Malta's very high road network density ever increasing, high population density and urban agglomeration patterns result in a scarce availability of land for road network improvements, as well as conflicting needs between the road network and its surroundings.

The key strategic sections of the Maltese road network form the Trans-European Transport Network. Malta's original TEN-T road network comprised 51km of strategic road in Malta and Gozo, main sections of which were upgraded through a series of investments supported by the European Union under successive programs since 2004. In 2013, EU legislation on the TEN-T was revised and this had resulted in an extension of Malta's TEN-T road network to cover more than 112km.

The revised TEN-T network is divided into two components:

1. The Core TEN-T Network which provides strategic connections between Malta's airport, the Port of Valletta (freight and passenger) and the Port of Marsaxlokk (freight); and
2. The Comprehensive TEN-T Network which connects the rest of the territory to the Core TEN-T network and the inter-island ferry ports of Cirkewwa and Mgarr, Gozo.

Currently, with the recent completion of the TEN-T Coast Road project, over 38% of Maltese TEN-T network has now been completed.

Demand analyses carried out for the purposes of Malta's National Transport Strategy have shown that, in the absence of railway or inland waterway links, domestic transport is mainly served by road (internal sea transport representing less than 2% of total travel). This modal share, as reported by the last National Household Travel Survey 2010 (NHTS 2010) revealed that around 74% of all internal trips are undertaken using private passenger cars. Moreover, when considering trips by car, it is notable that only a small proportion of total trips are made as a car passenger (15%). In fact, average car occupancy in a typical weekday has decreased from 1.33 persons per car in 1990 to 1.25 persons in 2014 alone, no new data in this regard is available until next NHTS.

Car occupancy levels in Malta are now much lower than those typically found in European countries and cities. Over the next 10 years, particular attention needs to be given to increasing the average car occupancy rates, particularly during peak hours so as to increase the efficiency of usage of the limited road space available. However, latest data being acquired shows that patronage for public transport and scheduled maritime ferry services is increasing and this is mainly brought about by an expanding economy nearing full employment.

In recent years, Malta has been affected by a trend of increasing road traffic volumes. This is mainly as a result of three key growth factors: population, economy and tourism. From the demographic point of view, it is important to underline that today, people are far more mobile than they ever were in the past. The average number of daily car trips performed by each driver in Malta today is 3.20, which is notably higher than the average number of car trips / person recorded in 1990. This was mainly brought about by the introduction of incentives given to housewives to return to employment, meaning that over 13,000 people returned to the job market thus increasing the demand for transport services.

The predominance of road transport is confirmed by the high rate of motorization, which currently stands at 799 motor vehicles/1000 residents as at 2016 (NSO, 2016). This represents one of the highest per capita rates of the 28 EU member states. The highest increase in

motorisation levels occurred in the second part of the 1990s and, although the percentage increase has reduced in recent years, the trend is still that of increasing vehicle ownership.

The increasing volume of traffic on the roads is closely associated with the year-on-year growth in private car ownership and usage coupled by full employment. Private cars account for 79.4% of total licensed vehicles (NSO, 2016). From the direct comparison between vehicle ownership growth and demographic trend, it results that the number of passenger cars has been increasing at a rate that exceeds population growth and/or the working population.

The existence of a highly pronounced and concentrated travel demand peak is an undesirable feature in any transport system. New road infrastructure needs to be designed to accommodate these maximum traffic flows during this short period of heavy congestion.

When this peak period is excessively disproportionate to the rest of the day, the cost of remedial solutions becomes artificially high and the design solutions become increasingly difficult to find. To this end, Government is seeking to comprehensively tackle through policies and measures aimed to improve the management of peak hour travel by private cars.

Such measures and policies are intended to encourage car drivers to avoid the need to travel during the peak hours, travel outside of peak hours, introduce new and innovative mobility services, with the aim to increase a modal shift onto more efficient modes of transport. In doing so, high levels of mobility services can be sustained, provide value for money for the investment in new transport infrastructure and foresee a more efficient utilisation of existing transport infrastructures facilitated.

One important characteristic of Maltese mobility, is journey length, which on average is 5.5km. The private car is nowadays more commonly used for very short distance trips where, in the past, walking or cycling would have been the preferred mode. This situation should be revised so that such trips and even more, shorter trip, are carried out without resorting to the use of personal passenger car. With an average travel time of around 19 minutes for the private car during the morning peak and unrestricted free public car-parking facilities available in many localities, car travel has become the preferred modal choice for many travellers at national and inter-regional levels.

In today's time-conscious society, the time taken travelling by bus (including walk to/from bus stop, waiting, changing buses and the ride-time) is much slower than travelling by car for the equivalent journey, especially since public transport is being caught up in traffic congestion. The time taken by car drivers cruising in search of an available parking space is highly unpredictable and seldom influences modal choice decisions, however, car parking has become a problem. Cycle speeds compare favourably with those of the car, with an average trip duration being 11 minutes if travelling at 32km/h and 18 minutes when travelling at 18 km/h (Bicycle Advocacy Group, Malta). Studies have shown that in busy town centres, bicycle speeds are faster than those of cars (Jensen et al. (2010). Characterizing the speed and paths of shared bicycle use in Lyon <sup>1</sup>. As far as the degree of utilisation and general level of functionality of Maltese road transport is concerned, the growing level of motorisation and the increased dependency on private transport, over the years, have both led to the development of a number of traffic bottlenecks at key sections of the strategic road network.

#### *2.1.2 Road-based Public Transport*

Maltese public transport is primarily road based and comprises both scheduled (Regular) services, which follow pre-determined fixed routes with pre-defined set times of day organised in a scheduled time table, and unscheduled (Occasional and Special Regular) services using minibuses, coaches and taxis which are more flexible in their operations. Over the last five years, both scheduled and unscheduled public transport sectors have been restructured in order to operate along more competitive, market driven lines. The Supply of scheduled public transport services in Malta and Gozo comprises of two distinct networks of bus routes. In Malta, bus services are broadly divided into services operating to and from Valletta and between other interchange hubs, park and ride services, express routes and

---

<sup>1</sup> Transportation research part D: transport and environment, 15(8), 522-524).

night time services. In Gozo, the service network is more of a conventional hub and spoke layout with Victoria serving as the Central Bus Station.

During the last few years, public transport bus routes and frequencies of service have been reconfigured and re-tuned in order to better meet today's complex mobility patterns and demands. Public transport has, over the years, rarely featured in land use planning decisions. Main development growth over the last twenty (20) years or so, has taken place in areas outside of the inner harbour regions in places such as Malta International Airport, Mater Dei, University, Smart City, Birzebbugia and Bugibba which were not particularly well served by public transport. Service in flexibility to meet changing demands that had characterised the old monopolistic, uncomfortable and unreliable bus service inevitably contributed to trends of increased car dependency and increased pressure to provide more parking spaces.

Following the radical reform starting in 2011, today's bus network in Malta and Gozo retains an element of the traditional 'hub and spoke' system. The densest level of bus services are provided around the main urban agglomeration which then spread out along the main roads to connect outlying towns and villages and with good levels of convergence along most strategic corridors.

The new bus network in Malta also provides good levels of public transport access to most new development growth areas and new public transport hubs have been developed at these locations which are now becoming highly patronised. The regulatory model has changed from an indefinite, rigid public transport contract to a finite, competitively-awarded, service concession contract which sets out a clear compensation methodology to modify, remove or add bus routes and change service frequencies. This can be exploited to further enable a timelier response to demand changes through route and frequency adaptation.

There has been continued, significant investment in the upgrading of bus service infrastructure since 2009, both by Government as well as by the public transport operator. For public transport to be considered as a viable alternative to the private car the quality of the facilities (comfort, safety, security and convenience) used for waiting and changing buses needs to be of the highest standard. The principal public transport hubs (Valletta, Bugibba, Malta International Airport, Mater Dei/University, Cirkewwa, Mgarr and Victoria) were fully

re-planned and designed to enable improved bus access, safe segregation between vehicles and bus users, shelter from the elements, seating and clear travel information.

Secondary hubs at Mosta Technopark, Paola Square, Attard and Rabat were upgraded along the same lines with improved pedestrian provision for crossing busy roads with room for further enhancement. Recent infrastructure investment has resulted in a significant, systemic advancement in the quality of the main bus service infrastructure with the possibility to further develop infrastructure to include public conveniences and consider alternative forms of financing to ensure long term sustainability of these infrastructures. Consideration could also be made to apply the same approach for the upgrading of tertiary infrastructures and add further convenience to facilities.

The bus ticketing system was radically overhauled in 2015 through the introduction of the pre-paid 'Tallinja' travel card. This pre-paid ticketing system has reduced cash handling on board the buses, has speeded up boarding times (and therefore improved journey times), simplified travel planning and significantly reduced the incidence of fare theft for the transport operator, who retains the fare box. The uptake of the 'Tallinja' card has been very high with over 230,000 cards now in circulation in Malta and Gozo. The use of the card has now penetrated across all the main bus user categories and its deployment over the past year is considered to be one of the main achievements of the present public transport service. More recently, the 'Tallinja' card can now also be used for the scheduled maritime ferry services, thus the concept of an intermodal ticket was introduced in Malta for the first time.

Today, the travelling public are clearly guided on all aspects of the bus service and patrons are able to plan their journeys in advance of travel through a user-friendly website and mobile application. Travellers are also informed in advance of any major permanent operational changes through the distribution of information brochures to households, on any temporary disruptions to the service through the various media and during their travel through accessible timetable information at bus stops and real-time information displays at main bus

stops and on-board the buses. Information provision today is of the standard to be expected of a modern, well developed European public transport system.

The use of roadside Real-Time Information (RTI) displays indicating estimated time of bus arrival at bus stops has now been successfully piloted on around 5% of the bus stops. Following this pilot, the public transport operator has mainly shifted their focus onto the development of online provision of this data through their Tallinja App. The further deployment of RTI displays to other key parts of the bus network is now possible and better harnessing of the data acquired automatically during daily bus service operation through the on-board vehicle location devices and ticketing machines will improve service operation.

The capacity to accommodate the demand for travel by bus is currently being provided through a fleet of 374 modern, lower floor, low emission (Euro 6 engine) and fully accessible buses. These buses are of different sizes and capacity and are deployed according to specific operating environment, (i.e. small buses for operation in villages where roads are narrow or on routes or at times of day where demand is low). All buses are equipped with closed circuit cameras for security and incident reporting, passenger announcement and safety equipment. The current bus fleet conforms to the highest environmental, safety and accessibility standards. It is also envisaged that, in the future, Wi-Fi services will also be available on the buses to further improve the journey experience for patrons on board a bus.

TM's national transport model is forecasting that by the year 2025 average bus speeds will reduce to 13km/h during peak hours unless there are transport policy changes. In critical parts of the road network, traffic is expected to grow by 5-6% during the peak hours over the next ten years in a scenario with no further investment in road infrastructure, no further policies to discourage peak hour travel by car and no further implementation of bus priority measures. These make the deployment of ITS services more justifiable.

The public transport bus services in Malta and Gozo share the road space with general traffic and this has the most significant impact on the degree of utilisation and functionality of the service each day. The average journey time for bus users during the peak hours is around 22 minutes and, at an average speed of 15km/h during peak hours, bus services travel at

approximately 33% slower than private cars. However, when other factors such as the time taken to walk to the bus stop and the time taken waiting for a bus or changing buses to reach the final destination are taken into account, average journey times increase to over 45 minutes.

As the majority of bus stops are within a five-minute walking distance from most parts of the urban area, the main variable journey component is the waiting time. Analysis of the situation in 2014 revealed that 55% of the main bus routes and 77% of secondary routes have a frequency of less than two buses an hour. Low frequency of service mainly occurs in the last section of a route in the outlying parts of Malta and Gozo. Although low frequency of service was cited by many (in Eurobarometer survey 422a on the quality of transport published in December 2014), by far, the main reason cited for not using public transport has been poor bus service punctuality and reliability.

### *2.1.3 Intermodal Transport*

The provision of Intermodal Transport in Malta is available both on a domestic as well as at international level. The existing Internal Intermodal transport for passengers includes:

- 1) land private transport and land public transport at Park & Ride hubs in Floriana and Marsa and Pembroke.
- 2) internal maritime transport and land public transport at the quaysides in Cospicua, Lascaris, Marsamxett, and Sliema for maritime scheduled ferry services.
- 3) inter-island ferry services backed by land public transport at the Mgarr and Cirkewwa ports.

This established intermodal network for passengers could be further developed and government is currently moving in this direction.

In the past, seaplane and helicopter operations operated between the Port of Valletta and just outside the Port of Mgarr. Mainly leisure or tourism related but not exclusive to, these



operations were moved to be not viable and the operations were discontinued. However, a limited number of passenger intermodal opportunities do exist.

Intermodal transport for freight had been provided between the Port of Mgarr and Sa Maison quay until 2015. This allowed the interchange of freight between the road network and the maritime inter-island service. Since the Sa Maison quay has been converted into a yacht marina, the internal sea freight transport between the two islands has ceased and alternative links for freight to the Inner Harbour Region remain to be identified, though mostly moved to Cirkewwa.

External intermodal transport for passengers occurs between:

- 1) External maritime transport and land public transport at the cruise liner passenger terminals in the Port of Valletta;
- 2) Air transport and land public transport at MIA Airport, and;
- 3) Air transport and maritime transport between MIA Airport and International

As far as the cruise terminal is concerned, the airport – cruise liner terminal is not a direct one and transfer of passengers is done either through the main bus terminal at Valletta or by direct bus shuttle in case of cruise trips operated by liners on a 'Home Port' basis. Also other services are provided by 'taxi'.

External intermodal transport for freight is only provided at the main cargo terminals for both ports and the airport. No direct sea-air intermodal transport exists.

Limited data on freight movement patterns across the Maltese islands is available. This makes it difficult to analyse and suggest potential policy options to improve the use of maritime transport to move freight between the islands. This unclear understanding of freight movements is a challenge for the system and for the Authority.

From a demand point of view, even though some timetables e.g. those for inter-island ferries and scheduled public transport are synchronised, the real-time details of vessel timetables are not available as yet. Arrangements between the land and maritime services are not flexible enough to cater for possible delays. These issues will be addressed over the coming few months as ferry service connections are set to increase and real-time information per site will be deployed.

Inner harbour ferry demand is limited to the walking distance catchment in the vicinity of the harbour. Due to the continued trend of dispersion of the population away from the harbour areas, the ability to utilise intermodal linkages as part of an efficient commute is limited.

The introduction of a real-time journey planner, intended to be introduced between 2018 and 2019, indicating the synchronisation of timetables and possible incorporation of multimodal ticketing (to cater for all modes of transport), would improve the degree of utilisation.

Together with an integrated travel card, the improved timetabling information would provide a better seamless intermodal experience. This is currently being tackled within the SMITHS project (refer to Section 3.4) and in close co-operation between the different operators.

There is also a great potential for the development of cycling as part of an integrated and intermodal transportation system. This would entail improving bicycle infrastructure to and at public transportation and land transport hubs, improving both accessibility and the ability to securely park and/or store bicycles. Agreements must also be made with public transport operators enabling carrying or storage of bicycles in their vehicles.

Existing ferry landing places are set to be improved in terms of accessibility and services, and a budget for this has already been earmarked. Experience has shown that low cost interventions can lead to an increased accessibility, thereby increasing the popularity of various transport modes with the public. This is thus an opportunity which can be exploited to improve the efficiency of the various intermodal transport hubs.

The location of these intermodal transport hubs frequently coincides with main tourism areas. The allocation of physical space for all the competing activities taking place in a particular area has always proved to be challenging for Malta, where the availability of public space is very restricted. This may lead to a limited provision of intermodal facilities.

As far as the general level of functionality is concerned, Maltese intermodal transport needs improvement through the introduction of more intermodal transport hubs. The experiences learnt through the implementation of various P+R facilities, public transport interchanges and the improvement of ferry landing places creates an opportunity to improve

existing facilities and introduce more intermodal transport hubs, especially in relation to the identified main hub. This is again being tackled within the SMITHS project.

#### *2.1.4 National Policy on Safe and Sustainable Mobility*

In 2005, the traditional 'predict and provide' policy approach to tackle road traffic problems made way for a new transport policy framework that placed more emphasis on safe and sustainable mobility for goods and persons through better management of traffic using existing infrastructure.

The objective behind this policy was to encourage a modal shift away from the use of the private car to non-car modes (public transport, walking, cycling and internal ferry travel) as well as to introduce a more technological approach to enforcement of traffic relating offences especially those relating to road safety.

The policy was planned and implemented as a demonstration project or case study in the capital city of Valletta. It was implemented in different phases over a five-year time frame. These phases included:

1. The pedestrianisation of most of the main shopping streets in Valletta;
2. The provision of off-street parking in a peripheral part of the peninsula;
3. Operating small buses;
4. Providing park and ride connections to the inner part of the city;
5. The implementation of vehicle access charging system (CVA);
6. The provision of electric minicabs for services within the city;
7. The re-introduction of a high-capacity lift providing access to central Valletta from harbour level to city level in the fortifications ditch;
8. The introduction of inner harbour ferry and water taxi services and improved public transport facilities.

The 2010 National Household Transport Survey clearly demonstrated the success, in policy terms, of the sustainable mobility strategy adopted for Valletta. Against all national trends, the modal share of bus travel to Valletta compared with 1998 levels increased by more than 9% and the modal share of cars trips to and from Valletta had decreased by over 9%. Valletta,

which is an important retail, shopping, business and cultural centre, has experienced a net increase in the total number of trips when compared with 1998. This highlights the policy aim that it is possible to increase mobility in a sustainable manner.

## 2.2 Transport Malta

Transport Malta (TM) has been entrusted with the coordination of ITS deployment for the next operational programming period up to 2020. The first phase of the ITS Action Plan covered the period from 2013 through to 2017 while the second phase is being carried out over the period from 2017 through to 2020, with some overlapping between Phase I and Phase II, as expected.

TM was established by Government through Act XV of 2009 and is the national regulator for all modes of transport, including land transport, maritime transport and Civil Aviation. The role of the Authority for Transport in Malta, as directed by Government is to:

1. Develop integrated transport policies aimed at achieving modal shifts that favour the use of public transport and safe, non-polluting strategies;
2. Ensure the development of an efficient, integrated and socially sustainable public transport system for the Maltese Islands, that meets the traveller's needs and expectations;
3. Provide an effective regulatory framework for land transport with road safety as a top priority, whilst at the same time promoting socio-economic development and protection of the environment;
4. Promote the maritime and civil aviation facilities of Malta and the registration of ships and aircraft under the Maltese flag;
5. Encourage Malta to become a maritime hub in the Mediterranean and an entreep-port to the EU;
6. Encourage measures for the development of civil aviation and ancillary services, and in particular, of air transport services of both passengers and cargo;

7. Promote the efficient and cost-effective running of the administration, services and operations of ports and yachting centres locally;
8. Provide a solid financial base from where the Authority can achieve target returns and investments; and
9. Standardise practices in the transport sector in Malta, in line with international norms and with those of the EU in particular.

TM has developed the ITS Action Plan and is laying out ITS deployment in a manner that will facilitate ease of information integration between the different travel modes for seamless inter-modal journey planning.

### 2.3 ITS Action Plan

This report is a follow up to the first ITS Action plan and ITS report submitted by Malta to the European Commission in 2014 , in accordance with requirements and obligations as laid down in Directive 2010/40/EU on the framework for the deployment of Intelligent Transport Systems in the field of road transport interfaces with other modes of transport.

The Malta ITS Action Plan, is not simply a product of Directive 2010/40/EU, but it also stems from a national conviction and transport policy commitment to improve and better manage traffic congestion and transport related externalities to reduce greenhouse gas emissions and improve road safety, security and the quality of life in the Maltese Islands as well as to provide ITS related service to whoever requires it.

The Action Plan aims to provide a sound foundation for the medium-term deployment of ITS in the road transport sector. It is a dynamic road map that builds on existing ITS deployment in order to develop a comprehensive and integrated national ITS tailored to meet the local societal, environmental and travel needs and will be continuously updated as needed in order to include any changes as they happen or that are foreseen.

The Malta ITS Action Plan broadly follows the *EasyWay* Guidelines for Deployment<sup>2</sup>, built around the four major questions:

1. The 'What?';
2. The 'Where?';
3. The 'How?'; and
4. The 'When?'

It must be pointed out, however, that there are a number of elements in the ITS Framework Directive that are of less relevance to the travel and traffic conditions prevailing in the small island state that is Malta than to other larger EU member states. A case in point is the provision of secured parking installations for freight transport vehicles which are intended for truck drivers, driving for long hours on continental Europe. Malta, due to its geographic realities and limitations, does not have the need for such infrastructure. In this respect, a fifth question, in addition to the 4 major questions as in the *EasyWay* Guidelines, came into play; the 'Why?'. The priority areas and measures contained in the National ITS Action Plan were originally derived from a careful selection and out of extensive consultation in order to ensure their value-added contribution to national policies on safe and sustainable mobility.

The legacy of this approach was built over with the consultation process that has taken place in 2016-2017 which sought to understand the existing gaps in Phase I and ways forward in ITS implementation in Phase II.

The original National ITS Action Plan was structured as follows:

**Section 2** of the Plan examined the then existing state of affairs with respect to ITS in Malta;

**Section 3** outlined the then existing national technical and legal frameworks that regulated the different aspects of ITS deployment;

**Section 4** detailed the national ITS priority areas and actions;

**Section 5** provided an overview of the ongoing deployment of ITS; and, as a conclusion,

---

<sup>2</sup> The *EasyWay* Project is a European initiative for a co-ordinated approach to ITS deployment and ITS Core Services across the EU in view of the European ITS Action Plan and the Multi Annual Programme of the Trans European Network (TENS)' budget

**Section 6** discussed future possible plans and proposals for further development of the Urban Traffic Management and Control system beyond 2017.

During 2014, the ITS Action Plan was revised to also include updates reflecting the planned deployment of each component and sub-system. The revised document also included additional ITS infrastructure deployment which is not included in the original Action Plan. For the formulation of this report and imminent updates, TM will continue to refer and use the current EasyWay Guidelines until such time that they are updated again. The updates to the National ITS Action Plan for Malta are also indicated in this updated report for ease of reference.

Of particular importance since the first Action Plan was published, is the setting up of an inter-ministerial committee that also includes, besides Transport Malta, the Civil Protection Department and other emergency services providers as well as the Malta Police Force. The latter's inclusion is especially important in view of the work that needs to be carried out in order to fully implement the e-Call solution as indicated in the ITS Framework Directive. Both the Civil Protection Department, Emergency Services providers as well as the Malta Police Force will be the main while and operators of the e-Call system as well as the 112 Centre will be operated by the Malta Police.

### 3 Current Status of ITS in Malta

Innovation in traffic management will help to make transport more sustainable, which means a transport system that is efficient, clean, safe and seamless. The refocusing of national transport policies in order to bring about safe and sustainable mobility in 2005 coincided with the local introduction of ITS information and communication technologies to road transport. Phase one of ITS deployment, marked by the MODUS project, which contained a number of ITS sub-systems, has been rolled out and Malta is currently in Phase II of ITS deployment.

This deployment has been greatly aided by the existence of the national **Vehicle Registration and Administration (VERA)** system, a robust and accurate national database of licensed motor vehicles that is continuously updated with data concerning new vehicle registrations, scrapped vehicles and transfers of ownership on a daily basis. Plans are currently in the pipeline to give the VERA system a technological injection in order to modernise it and make it into a stronger tool in the hands of TM. It is to be noted that this system is also in the process of being overhauled to include a new vehicle technology and propulsion systems coming into market, such as the various forms of electric vehicles

Over this time, Transport Malta officials have been exposed to a number of different facets of ITS-enabled traffic management and control peripherals using computers, electronics, satellites and sensors, in-vehicle and at the roadside. Transport planners and policy makers are now starting to build up vast amounts of raw traffic and travel-related data which may be appropriately filtered and structured for transport system research and development.

#### 3.1 Controlled Vehicular Access (CVA)

The award-winning Valletta Controlled Vehicular Access System (CVA) was Malta's first foray into a standalone ITS system and, at an international level, this system was considered and voted as a best practice solution. The CVA saw the replacement of an access charging



system based on an annual, flat-fee for vehicles to enter the Capital city with a 'pay-as-you-use' system.

The CVA system was launched in May 2007 and makes use of Automatic Number Plate Recognition (ANPR) technology and an unobtrusive dedicated camera system in a World Heritage Site, to monitor and photograph vehicles entering and exiting all access points to the capital city. The system is designed to automatically calculate the time each vehicle remains inside the assigned boundary and finally computes the fee due for access and parking based on established tariffs. Although bills are regularly sent by post, vehicle owners have the possibility to check their CVA account status by either contacting the CVA helpdesk centre or by logging into the relevant section on the CVA System website.

The Valletta CVA uses Automatic Number Plate Recognition (ANPR) to monitor all the entry and exit points from the city, (14 locations with over 23 ANPR cameras). The system components monitor the sites using specialized infra-red illuminating cameras and interpret the number plates of the vehicles passing the camera's field of view. On an annual basis, the system captures between 12 and 14 million vehicles entering and exiting the zone.

This interpreted data is supplied to the imaging database on the imaging server which automatically identify the vehicle against the national vehicle registration database, with manual verification (if necessary) and further processing. Each camera covers a field of view of approximately 1.5m and multiple cameras are utilized at several sites to ensure effective coverage.

The CVA Billing System automatically calculates the amounts to every registered owner of a vehicle that accesses the Charging Zones, based on the time in and time out of the respective zone. These charges are based on all the data retrieved from the imaging database. The rates and rules used for the access fee calculation are inputted by the Contracting Authority and can be updated easily depending on requirements.

The system automatically registers a number of exemptions which are already fed into the system including:

1. Residency exemptions;
2. Ad-hoc exemptions (one off / for a short period);
3. Special needs/disability exemptions;

4. Medical and administrative exemptions;
5. Public transport exemptions (related to public transport vehicles); and
6. Time-based exemptions (based on specific time ranges).
7. Real time Parking Information System

The CVA system is currently being extended to also include real-time information on the availability of on-street car-parking spaces before one enters Valletta, thus reducing traffic congestion created by the search of free car-parking spaces. The real-time parking information system will now be implemented for the whole of the Valletta peninsula with the deployment of on-street parking sensors. This project will be integrated with the VATIS app, which has been developed by the Valletta local council and funded by Transport Malta.

### 3.2 ITS Deployment in Public Transport

The public transport scene is seeing major improvements while facing the challenges associated with the supply and demand of Malta's transport system. Together with the development of road infrastructure, public transport service is an integral part of the national strategy for modal shift which is based on policies aimed at restraining unnecessary car use on the one hand whilst promoting use of public transport and other sustainable modes of internal transport on the other.

The current public transport system has seen the introduction of a new fleet of ITS-enabled buses for Malta and Gozo equipped with latest Euro VI engine technology and on-board ITS components. The new bus fleet, as a standalone measure, has significantly reduced emissions from public transport over the past 12 months. This is combined with a matrix network of termini and interchanges designed to facilitate nationwide accessibility. The buses are also designed for easier access to users with impaired mobility.

The public bus transport operator is providing a modern public information system for scheduled public transport users. The core operating system of the national public transport system includes a number of ITS related components that are listed below.

### *3.2.1 ITS-Enabled Public Transport Buses*

Set with an on-board visual and audible information system to advise public transport users of the next bus-stop as well as the final destination. The bus fleet is equipped with tracking devices which are linked to the operator's central control room as well as to TM's National Traffic Control Centre (NTCC) for traffic management, control and enforcement purposes.

### *3.2.2 Automated Passenger Counting (APC) System*

To keep track of passenger movements on the public transport network and improve the monitoring of passenger flows and provision of accurate data acquisition. All of the public transport bus fleet is equipped with an APC system. The system is comprised of a sensor on each door which provides real-time detection of the number of passengers boarding and alighting the bus, providing the operator with information on the capacity status of the service. This enables him it to fine tune and improve the service by deploying extra services where required so as to improve the overall efficiency of the service.

### *3.2.3 Automatic Vehicle Location (AVL) System*

The AVL is used to monitor all timetabled bus services and is designed to ensure maximum operating efficiency. The AVL also allows the operator to follow its buses and to effectively plan services with respect to unforeseen events such as emergency road closures, traffic accidents or even breakdown of buses. This also provides input for the RTPI (refer to 3.2.4) for passengers at the bus termini and interchanges.

### *3.2.4 Real-Time Passenger Information (RTPI)*

The central control room system allows operational staff to provide an interactive input into any of the RTPI passenger displays as and when required. Other important messages concerning route and other network updates can also be delivered to these in-bus electronic signs.

### 3.2.5 *Park & Ride (P&R)*

The status of the P&R sites is monitored throughout their opening hours, and motorists are advised of actual availability of car parking spaces through VMSs on the approaches to the sites. It is expected that the P&R facilities will be bolstered with ITS infrastructure to give pre-notifications to drivers on the availability of parking spaces on the approach road to the facilities.

## 3.3 Battery Electric Vehicles (BEVs)

Another important development was the awarding of EU funds for a demonstration project under the LIFE+ action, titled Demo-EV, where TM and the Ministry of Resources and Rural Affairs (responsible for Climate Change mitigation) demonstrated the use of the latest Full Electric Vehicles and the use of the respective EV charging infrastructure around Malta and Gozo, so as to encourage public take-up of this technology. In fact, through this project, the foundations of the national EV charging network was also put in place.

Another Project, the Port-PVEV Project was another EU funded project under the Italy-Malta Fund, to demonstrate the use of electric vehicle and photovoltaic infrastructures in port areas in both Malta and Sicily, Italy.

This project also included the use of the latest technology on the market as well as a demonstration project using electric car charging directly through solar energy with the use of PV in order to achieve carbon neutral transportation as well as adding up different types of electric car charging infrastructure.

These projects are also being used to demonstrate how ITS can be applied in the area of charging facilities for electric powered motor vehicles. As part of this project, 90 public smart charging points were deployed across Malta and Gozo. The network will be expanded to include 500 charging points by 2020 in time with the European Directive for the Department of Alternative Fuel Infrastructure for Road Transport.

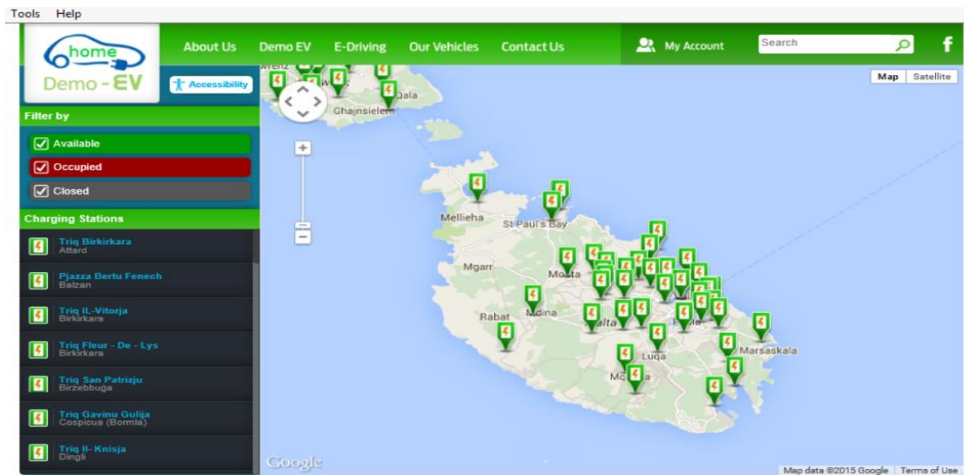
The charging point network will also be linked with the new National Traffic Control Centre (NTCC) that will host an ITS Platform once all work on it will be completed by end mid 2018.

Through its new NTCC, TM will be able to monitor the performance of the vehicles as well as their charging status.

TM will also demonstrate and test the effectiveness of Full Electric Goods Carrying Vehicles. The data gathered from Electric Vehicles in this project will contribute to the improvement of the data available in the NTCC and will provide additional data for policy decision-making processes.



<http://www.electricvehiclesmalta.eu/>



<http://www.electricvehiclesmalta.eu/chargingstations>

### 3.3.1 ITS Enabled Public Taxi and Monitoring (PTM) System

In-vehicle ITS deployment of peripherals and on-board nomadic devices will only be available when these devices to users are provided at source as part of a vehicle's standard installation or when such devices are included as add-on installation for existing vehicles.

As part of its efforts to improve transport car passenger safety, Transport Malta has also introduced new legal provisions which require taxi service operations to be ITS enabled.

### 3.3.2 ITS Deployment in the PTM System

All public taxi services operators are obliged to deploy a number of ITS based devices in their vehicle including:

- i. a taximeter with, amongst others, such facilities as printing of fiscal receipts and acceptance of payments through the use of credit debit cards, as well as tools providing means for driver recognition;
- ii. tracking devices, including transmission of tracking data via GPRS, as well as transmission of such data as ignition status, speed of vehicle and also the ability of a 24x7 automatic real-time retrieval of data through Transport Malta's central data hub;

- iii. on-board CCTV camera which triggers automatic recording on a change of the taximeter's operating system, opening of doors or the activation of the emergency button.
- iv. two way-communications system capable of operating over the GSM network to allow TM to audibly communicate with the driver through a normal telephone line
- v. emergency buttons accessible to each of the passengers and the driver that triggers the CCTV camera and transmits a distress signal to the control centre.

The regulator also obtains real-time information on speed and direction of the vehicles to monitor compliance of taxi operations with traffic regulations and to provide further informative data on road traffic conditions. As of August 2012, a new examination and certification system for taxi drivers was established which addressed both driving and social skills.

### *3.3.3 National e-car sharing services*

In 2017, TM published a concession tender for the provision of a national car sharing service. Through this tender the operator is mandated to offer such services in specific urban cores and other strategic areas where road traffic congestion is high. It is a fact that part of road traffic congestion is brought about by vehicle drivers hunting for car parking spaces by providing car sharing services and exclusive car parking in pre-defined space, this will entice car users to shift towards car sharing service. The service will be operated at first by 150 electric vehicles and the operator will also deploy an e-car charging network for the fleet.

## 3.4 ITS Deployment Phase II

Phase II of ITS Deployment will see a second generation of projects that build on the foundation already in place through Phase I. This generation of projects will be included in the SMITHS project.

Through the SMITHS project, TM will be carrying out a number of ITS deployments that will help propel ITS further in Malta and assists in the improvement of public transport services. The main two foci of this deployment are the procurement of state-of-the-art equipment to set up a Traffic Control Centre (TCC) at the TM Sa Maison Facility and the expansion of the CCTV peripheral network on Malta's road network in order to improve the visual capacity of traffic controllers at the TCC, on main and selected bus corridors.

Parallel to this deployment, TM is in the process of renovating its Sa Maison Facility in order to retro fit the TCC within it as a National Traffic Control Centre and include all necessary offices and amenities for its operation. This project is financed nationally.

The renovated facility will be ready for the installation of all the equipment being procured under the SMITHS project. When all the equipment is ready for operation, the TCC at the TM Sa Maison Facility will take on the role of real-time traffic management, control and enforcement operations including all online functionalities and will be regarded as the National Traffic Control Centre (NTCC). At this stage, the traffic controllers currently operating from the TM Paola Facility TCC will be moved to the NTCC. The current TM Paola Facility TCC will be shifted to the new TM HQ in Lija, will it take on the role of a silver suite, giving the NTCC operational redundancy while focusing its normal operation on all offline traffic management, control and planning functions mainly using historic datasets and captured video footage. The TM Lija Facility TCC will therefore be referred to as the Auxiliary Traffic Control Centre (ATCC).

I. The Sustainable Multimodal Intelligent Transport Hubs (SMITHs) project will also deliver a multimodal journey planner and various roadside ITS peripherals that will be linked to the ITS architecture being built by the SMITHS Project.

## 3.5 ITS Peripheral Networks

### 3.5.1 *Signalised Junctions*

Adaptive Traffic Signalised Junctions have been deployed as part of the 1<sup>st</sup> Phase of ITS deployment in clusters as in the below figure.



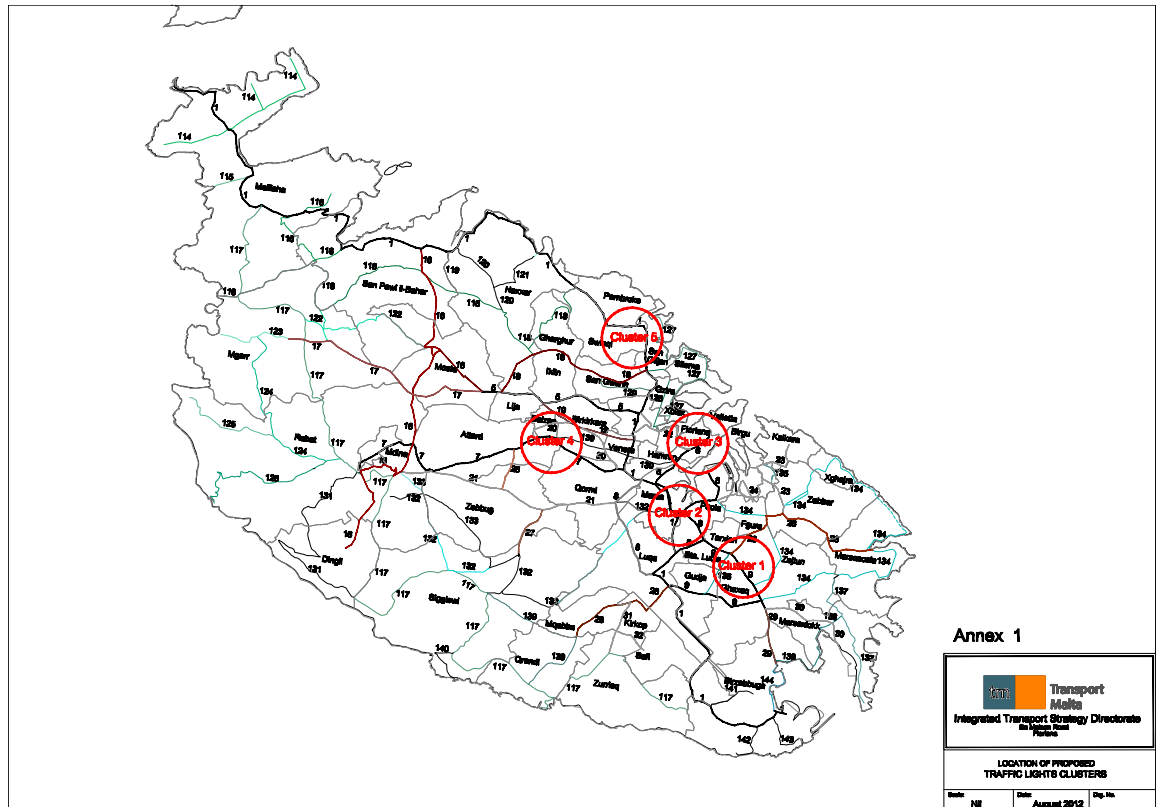


Figure 1: Adaptive Signalised Junction Clusters

Priority at junctions is imminent with public transport vehicles using RFID technology and eventual integration of the AVM system from the public transport operator with the ITS Platform at the NTCC. In addition, safe-cycling routes are being planned under the SMITHs project (refer to Figure 2: Safe-cycling routes as planned under the SMITHs project) which will include elements of ITS at specific junctions in order to provide safety and priority of cyclists.

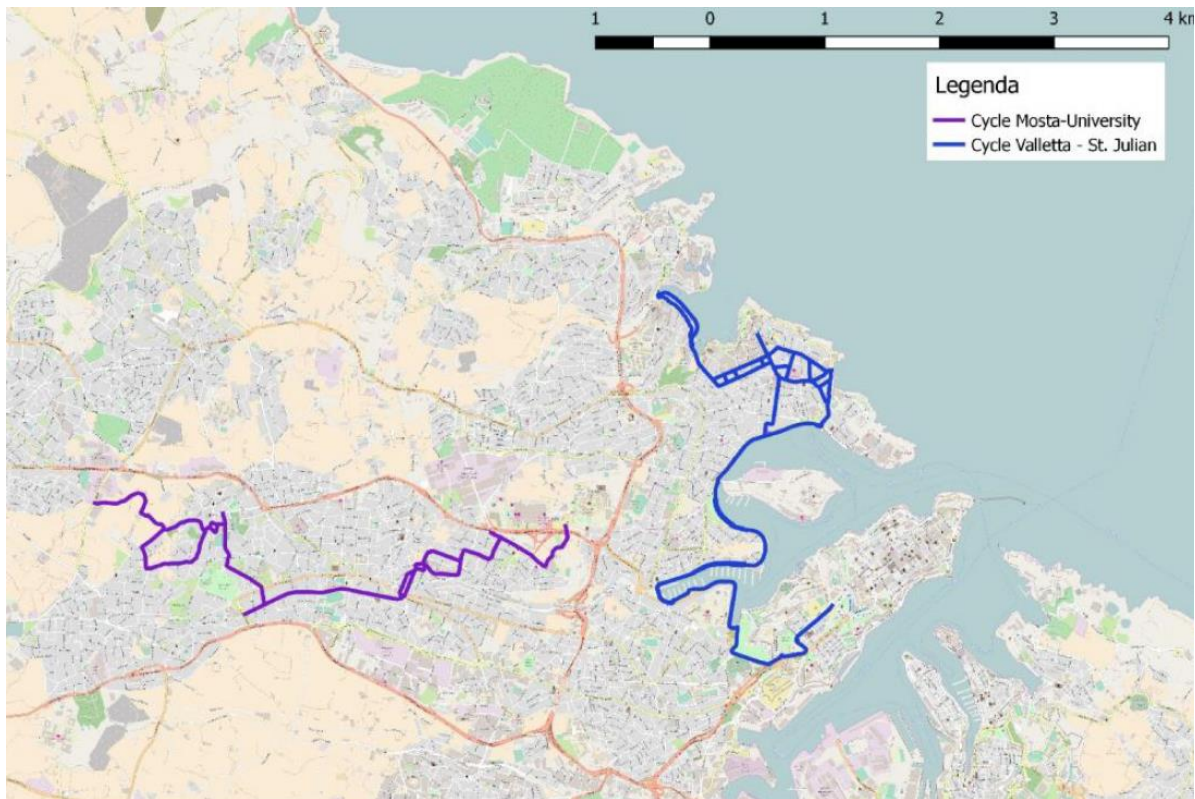


Figure 2: Safe-cycling routes as planned under the SMITHs project

### 3.5.2 Speed Camera Network

Since 2005 more than 13 speed cameras have been permanently fixed on stretches of road that have both a poor record for road safety and where the 85<sup>th</sup> percentile traffic speeds are well above the legal speed limit for the section of road. On the whole, over the past 7 years, the introduction of speed cameras has effectively reduced both the travelling speeds of vehicles and the number of road traffic accidents within the catchment area of the speed camera. Plans are underway to introduce wide deployment of mobile speed cameras and to pilot average speed cameras. These will be deployed on the identified safe cycling route corridors stretching over 22km of urban roads to enforce lower speed limits and increase road safety for cyclists.

The speed cameras that are currently deployed around Malta are radar-based. The data relating to motorists in vehicles caught travelling in excess of the speed limit is automatically communicated from the roadside camera to an administration centre in real-time using wireless technology. ANPR software is used to match the vehicle registration plate with the registration number contained in the VERA system. The postal address of motor vehicle

owner is extracted and the fine is automatically communicated to the postal address of the registered vehicle owner.

### 3.5.3 CCTV Network

The main system objective has been to install cameras for visual monitoring of traffic conditions and events unfolding on the road network. In parallel, a few cameras also provide automatic incident detection and number plate recognition capabilities. This has been carried out under the MODUS project with the installation of 27 CCTV cameras and 5 Automatic Incident Detection (AID) cameras. Visual connectivity has been setup at the TM Paola Facility which houses the current Traffic Control Centre (TCC).

The location of deployed CCTV cameras is illustrated in Figure 3 - Phase I Deployment CCTV locations.

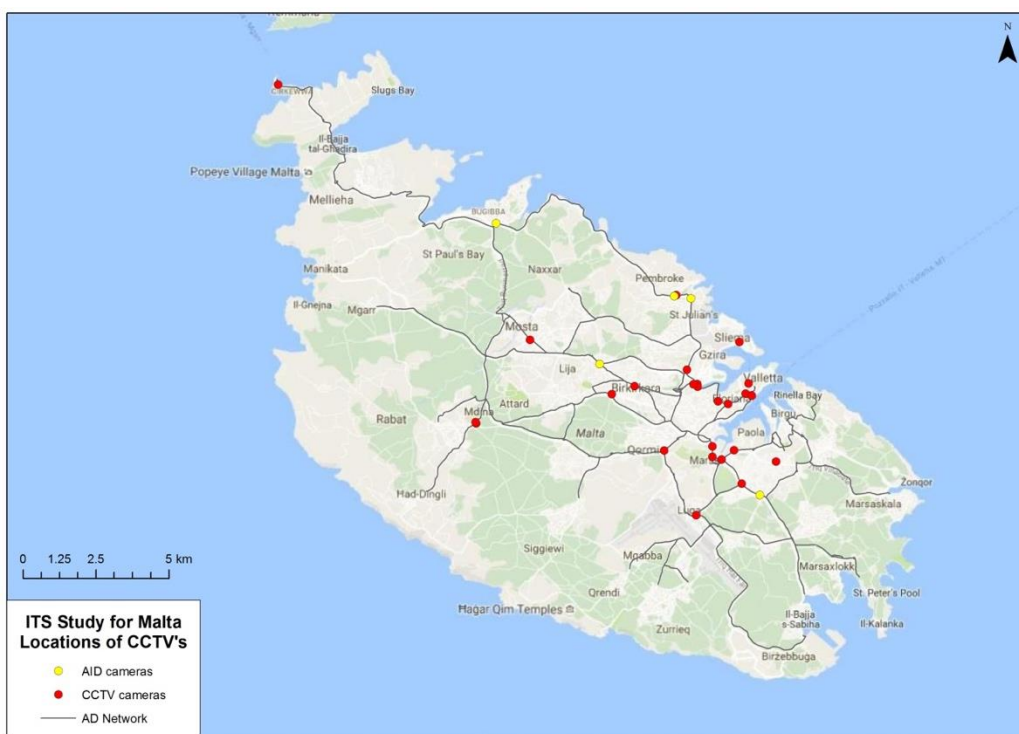


Figure 3 - Phase I Deployment CCTV locations

With the ITS Department in Phase II, through the SMITHs Project, the current CCTV Network is scheduled to be expanded in order to increase visual capacity at the NTCC.

A camera system expansion is planned for development throughout Malta's arterial road while covering also a significant number of main bus corridors. The camera network will build on the existing network developed during the first phase of ITS deployment. The geographical areas covered include various areas of Malta such as Saint Paul's Bay, Mgarr, Mosta, Birkirkara, Msida and Sliema.

The cameras network system will include:

1. CCTV for visual monitoring and verification of traffic conditions and incidents: 46 cameras in total, 17 of which will be PTZ CCTV cameras and 29 will be static CCTV cameras;
2. 14 traffic detection cameras for permanent and continuous recording of traffic flows and other relevant traffic data;
3. 50 Automatic Incident Detection (AID) cameras for the provision of real-time recording of road incidents which provide prompt alarms and warnings when triggered.

Refer to Figure 4 - Phase II Deployment CCTV locations (SMITHS) and Figure 5 – Future deployment of CCTV.

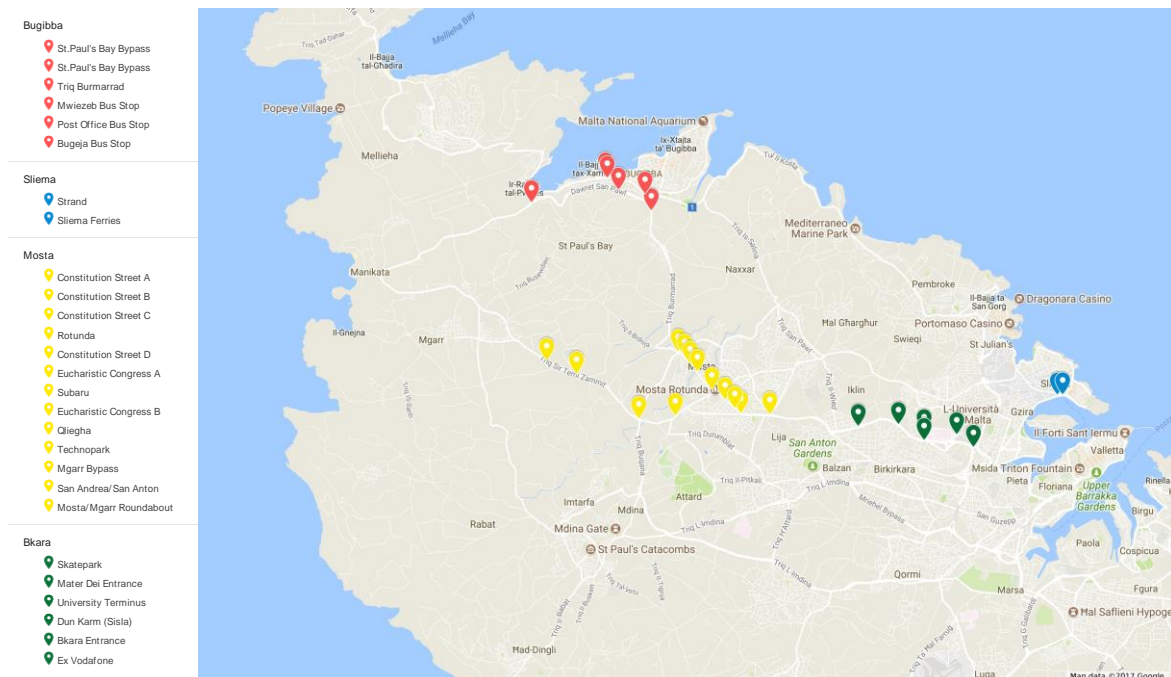


Figure 4 - Phase II Deployment CCTV locations (SMITHS)

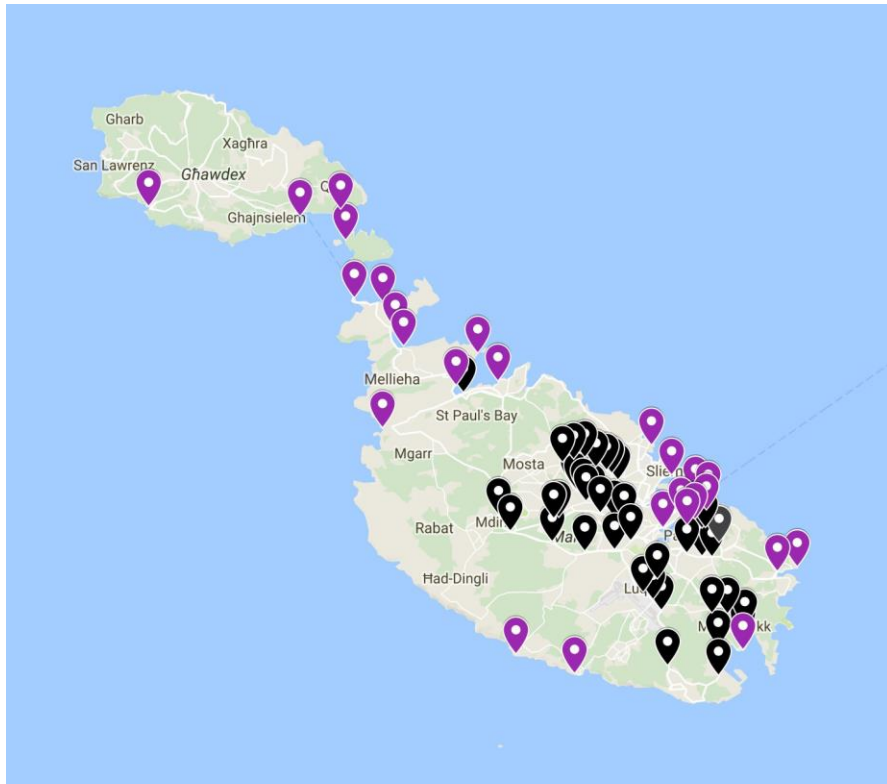


Figure 5 – Future deployment of CCTV

#### 3.5.4 VMS Network

The system’s objective has been to provide en-route real-time information to road users. The current VMS network has been installed as part of the first phase of ITS deployment. The network is made up of the following:

1. 32 small VMSs, the dimensions of which are 1100mm wide by 2100mm high. A single colour matrix with yellow LEDs displays pictograms, messages and animations in full matrix. Three lines of text can be displayed with 14 characters per line (character height 7 pixels or 105mm);
2. 2 medium-sized VMSs, the dimensions of which are 1175mm wide by 3100mm high. A single colour matrix with yellow LEDs displays pictograms, messages and animations in full matrix. Three lines of text can be displayed with 23 characters per line (character height 7 pixels or 105mm);
3. 47 Lane Change Signs (LCS) mainly at tunnel portals. The dimensions of the LCS are 1250mm wide by 1250mm high. The LCS have a full colour matrix with a resolution



of 32x32 LEDs, a pixel pitch of 20mm, and the ability to display all traffic sign pictograms.

Development of central management system software with GUI and GIS interface where all installed at the National Traffic Control Centre (NTCC). VMS and LCS can be monitored and controlled by the TCC. Messages to all Dynamic Message Signs (i.e. VMS and LCS) can be configured and sent by the TCC while diagnostic functions for the status of actual on-site equipment is available. Electronic communication between Dynamic Message Signs and the TCC is undertaken by means of the GPRS (2.5G) and 3G-mobile networks.

The location of the VMS signs deployed is illustrated in Figure 6 - Phase I Deployment VMS locations.

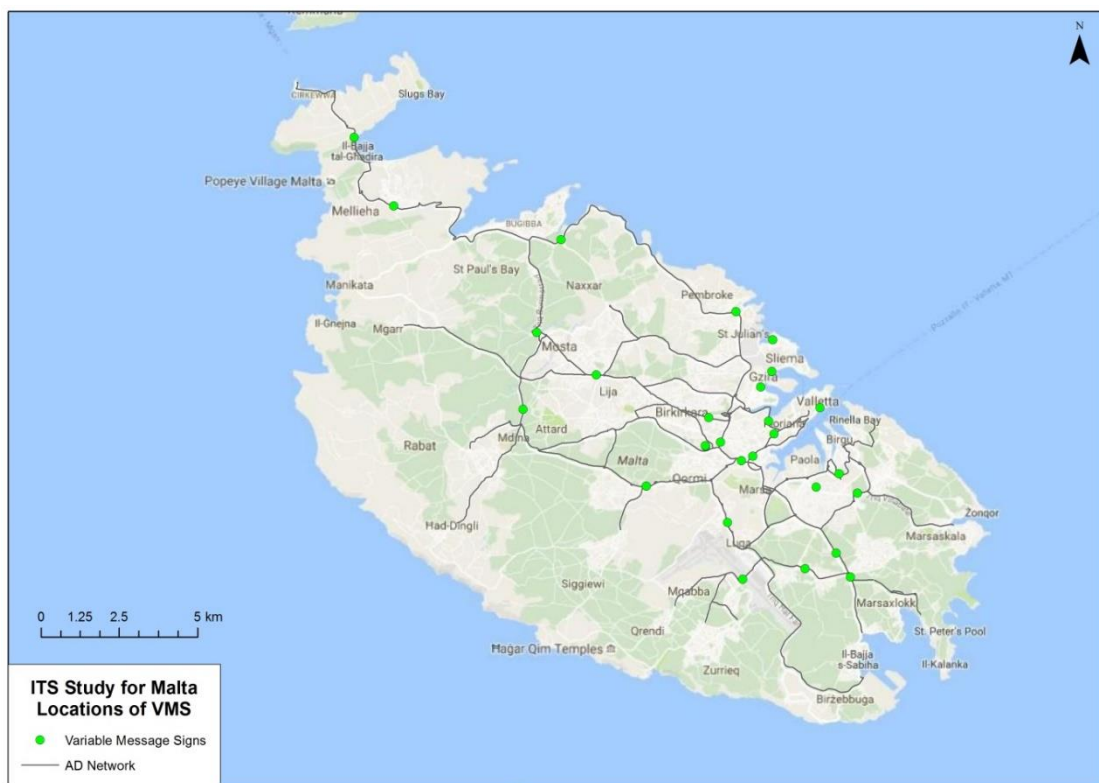


Figure 6 - Phase I Deployment VMS locations

### 3.5.5 Parallel TM Infrastructure Projects

Parallel projects with the scope of improving road sections and junctions are being passed through the ITS section in the MNEP unit for ITS recommendations. Through the process, an ITS proposal is constructed based on inter-departmental consultations as well as an ITS

consultant to Transport Malta. The final proposal of the ITS section is passed to the project team making the request. Through this consultation process and assuming no funds for the procurement of ITS equipment are available, Transport Malta will be benefiting by preparing the necessary civil works for future ITS installation where roads and junctions are revamped.

This consultation process is currently being drawn up into a Standard Operating Procedure in order to streamline the procedure and optimize the process in order to reach all stakeholder goals more satisfactorily. The list of Stakeholders and related responsibilities are as follows:

1. *Initiator of Request*  
To make the Formal Request for Recommendation;
2. *ITS Section, MNEP Unit*  
To devise the recommendations that constitute the ITS Proposal and to manage the operational procedure being described in this document once a formal request is made and the consultation process has been launched;
3. *ITS Consultant*  
Responsible for the Vetting & Verification of the recommendations as proposed in the ITS Proposal;
4. *Head Traffic Controller*  
To give Feedback on the recommendations that constitute the ITS Proposal;  
and
5. *Head of Maintenance*  
To give Feedback on the recommendations that constitute the ITS Proposal.

The current draft Operational Procedure Flowchart may be found illustrated in Figure 7 - Internal ITS Consultation Operational Procedure Flowchart.

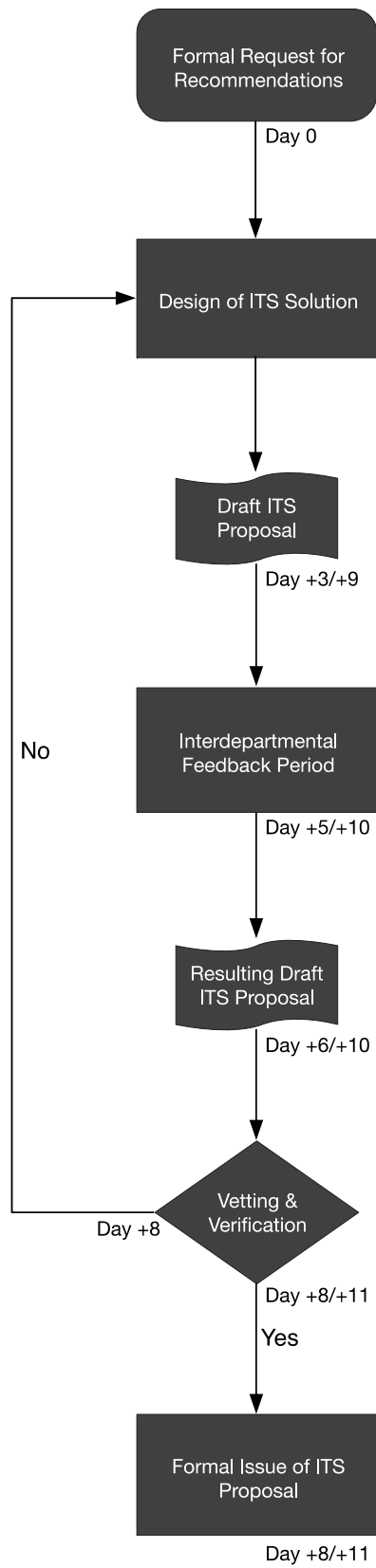


Figure 7 - Internal ITS Consultation Operational Procedure Flowchart



### 3.5.6 Standardisation of ITS technical specifications

The ITS Section has recently started working on standardising technical specifications for future ITS procurement as well as for the scope of internal consultations for parallel projects as mentioned in Section 3.5.5. The first iteration of these standard specifications has already been used for projects which are now in tender stage.

The current depository is made up of standard specifications for CCTV cameras, CCTV poles, VMSs, LCSs, traffic lights controllers and signal heads.

The ITS Section will be keeping this depository of standard specifications updated and will add on additional specifications when this becomes necessary.

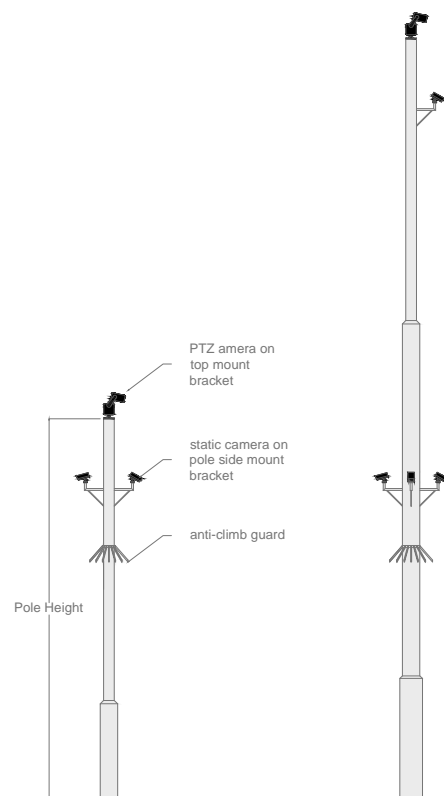


Figure 8 - Standardised illustration of CCTV pole configurations

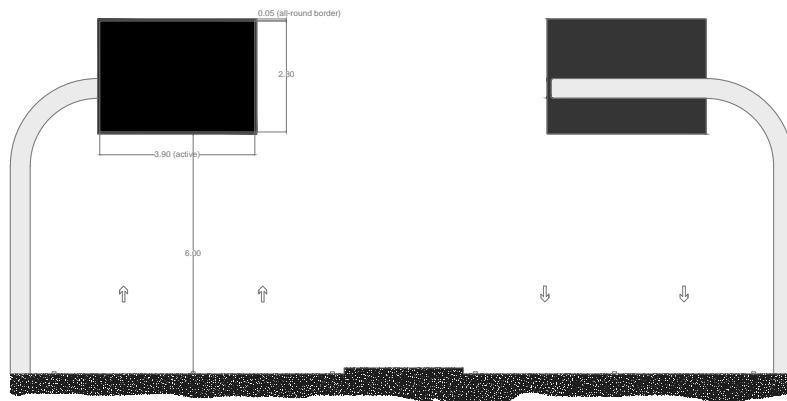


Figure 9 - Standardised illustration of roadside VMS configuration

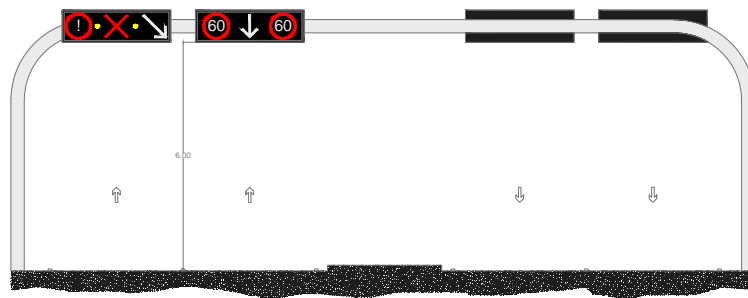


Figure 10 - Standardised illustration of roadside LCS configuration fitted on portal

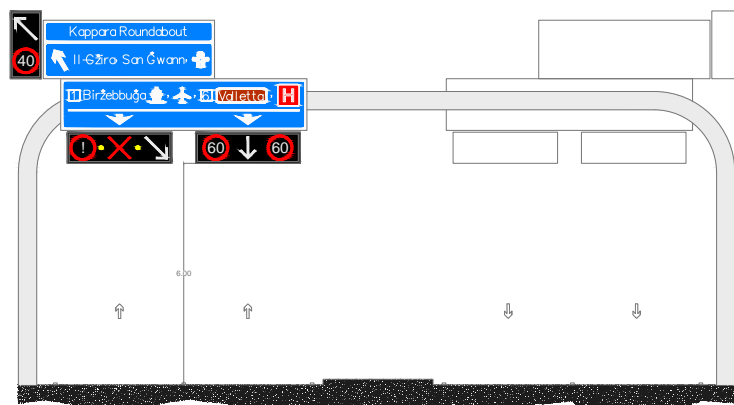


Figure 11 - Standardised illustration of roadside LCS fitted on portal with example directional signage

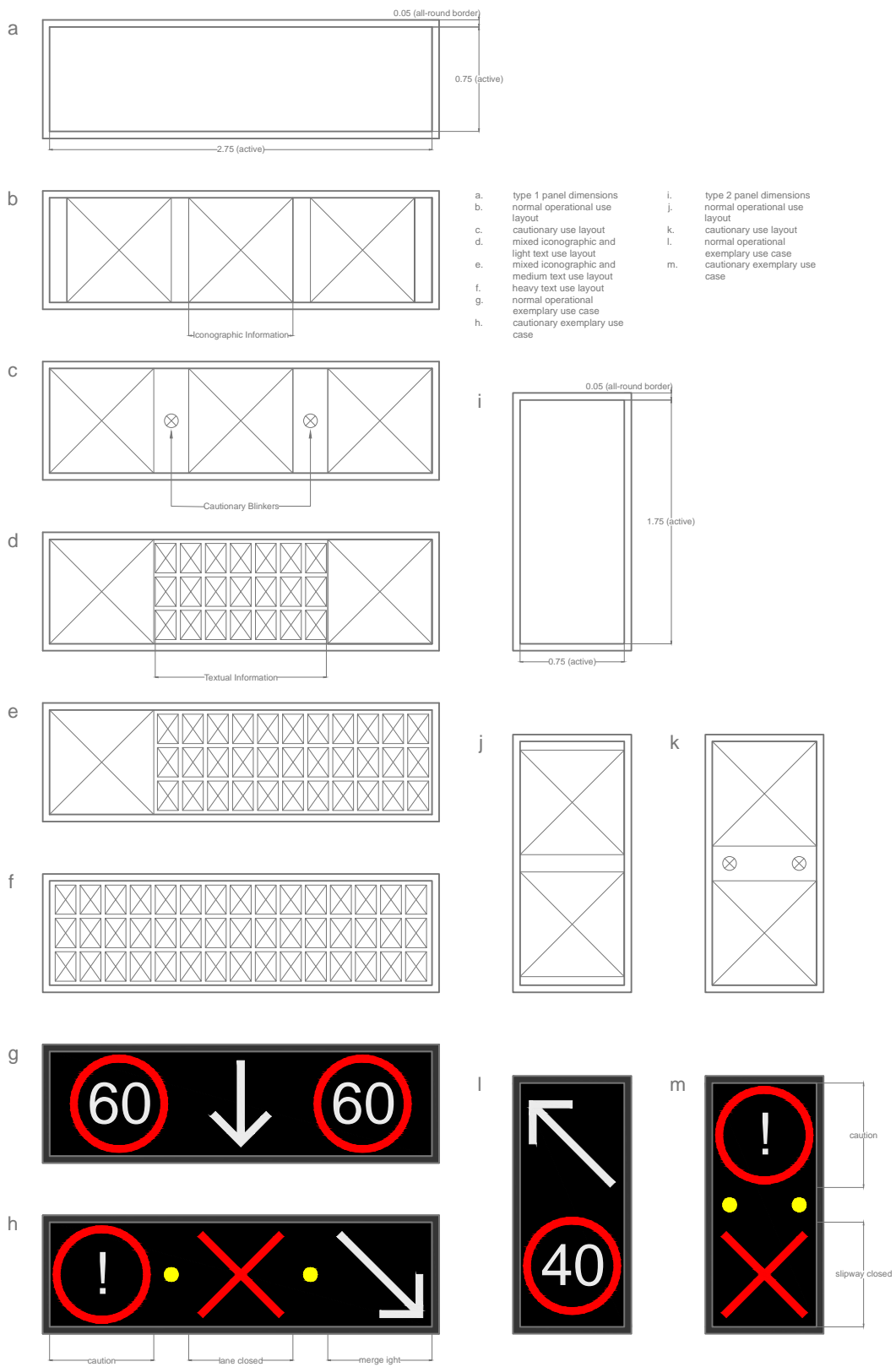


Figure 12 - Indicative standardised LCS design

### 3.6 Assessment of ITS Conditions and Functions

The main ITS functions recognised, based on the recording of existing systems and systems under development, are listed hereunder. These functions are also included as ITS priorities within the recently-published National Transport Plan:

1. Traffic Management;
2. Incident Management;
3. Public Transport Management;
4. Safety;
5. Electronic Payment;
6. Traveller Information;
7. Data Warehouse Management.

The positioning of ITS systems in this ITS functional classification scheme is outlined in Table 1 - Existing ITS in Malta per ITS Function. Each of the above functions is tackled in the subsequent sub-sections.

*Table 1 - Existing ITS in Malta per ITS Function*

Code	ITS Systems	Systems Objectives	Existing/ External Systems	MODUS Project
<b>ITS Function: 1. Traffic Management</b>				
1.1	Adaptive Traffic Signalling System	Dynamic traffic signals activation based on pertaining traffic conditions and traffic simulation in order to optimise traffic flows on road arterials with central control of the entire operation		✓
1.2	Traffic Detection Systems	Real-time detection of traffic flows in order to dynamically activate the traffic signal plans at each traffic signalised intersection		✓
1.3	Bus Priority Measures	Provision of bus priority at traffic signalised intersections and bus priority measures with Vehicle to Infrastructure Communication		✓
1.4	CCTV Cameras	Real-time visual monitoring of current traffic conditions		✓
1.5	ANPR Cameras	Real-time detection of vehicles licence plates for recording travel times between specific segments		✓
1.6	Lane Change Management System	Dynamic traffic lanes allocation system regarding direction of traffic according to traffic patterns and information of drivers regarding traffic lanes' arrangement by LED signs	✓	

Code	ITS Systems	Systems Objectives	Existing/ External Systems	MODUS Project
1.7	Controlled Vehicle Access	Controlled Vehicle Access with implementation of urban road pricing scheme aiming to reduce congestion within Valletta.	✓	
1.8	Battery Vehicles Electrical Charging Areas	Development of Battery Charging Zones within Malta for Electrical Vehicles	✓	
<b>ITS Function: 2. Incident Management</b>				
2.1	Automatic Incident Detection Cameras (AID)	Automatic real-time detection of traffic incidents on the road network		✓
2.2	Automated Vehicle Location Systems/ Emergency Fleet Management	Real-time detection of emergency vehicles location in order to optimise the emergency fleet management and to continuously track the vehicles' location on the road network	✓	
<b>ITS Function: 3. Public Transport Management</b>				
3.1	Bus Automated Vehicle Location System	Central real-time monitoring of bus location to achieve optimum fleet management allocation and optimum bus route travel times	✓	
3.2	In-vehicle Bus Security Systems	In-vehicle real-time monitoring of passenger security	✓	
3.3	Electronic Signs at bus stops	Provision of dynamic bus arrival time information at bus stops and bus terminals	✓	
3.4	Web Services for public transport	Provision of pre-trip/ on-trip dynamic information to passengers related to expected bus arrival time at each bus stop and dynamic bus journey planner	✓	
3.5	Electronic Signs within the Bus	Electronic displays informing drivers about the next stop and possible bus transit information in real-time	✓	
3.6	Taxi Automated Vehicle Location system	Taxi fleet management	✓	
3.7	CCTV Cameras	Cameras within the vehicle to ensure the passengers' and drivers' security	✓	
<b>ITS Function: 4. Safety</b>				
4.1	ANPR Cameras	Real-time detection of vehicles exceeding speed limits and recording of the vehicles registration plates for issuing penalties	✓	

Code	ITS Systems	Systems Objectives	Existing/ External Systems	MODUS Project
<b>ITS Function: 5. Electronic Payment</b>				
5.1	Bus Ticketing System	Advanced ticketing system for issuing and payment (e.g. via smart travel cards)	✓	
5.2	Parking Ticketing System	Advanced parking ticketing systems via web services, bar code cards, SMS for on-street and off-street parking	✓	
5.3	Controlled Vehicle Access	Controlled Vehicle Access with implementation of urban road pricing scheme aiming to reduce congestion within Valletta.	✓	
<b>ITS Function: 6. Travellers Information</b>				
6.1	Variable Message Signs	On-trip travellers' dynamic information regarding real-time traffic conditions and incidents on the road network		✓
6.2	Lane Change Signs	On-trip travellers' dynamic information regarding traffic lane signage		✓
6.3	Electronic Signs at bus stops	Provision of dynamic bus arrival time information at bus stops and bus terminals	✓	
6.4	Web Services for scheduled public transport	Provision of pre-trip/ on-trip dynamic information to passengers related to expected arrival time at each bus stop and ferry landing site and a dynamic journey planner	✓	
<b>ITS Function: 7. Data Warehouse Management</b>				
7.1	PT Databases	Storage of static public transport databases for transport planning and other purposes (inspections)	✓	
7.2	GIS system	Various transport data representation in advanced Geographical Information System databases which can be used for planning purposes	✓	

### 3.6.1 Traffic Management

Since Malta suffers from significant traffic congestion in peak hours, ITS interventions in the traffic management area are likely to be effective.

Adaptive traffic signalling control systems and bus priority systems have been installed at some traffic signalised intersections. The adaptive traffic signalling system is based on receiving real-time data through inductive loops installed on the pavement close to the traffic signalised intersections. The bus priority system uses RFID technology to create a communication link between public transport buses and traffic light controllers. Additionally, CCTV cameras have been installed for visual monitoring of traffic conditions

and traffic events. ANPR cameras are intended to record travel times among road segments. The extension of the CCTV network is currently in the pipeline with the SMITHs project.

Traffic management functionalities are a core element for the adequate operation of the two TCCs currently being developed by TM. For the TCCs to have satisfactory traffic management functionalities, some important issues will be addressed.

1. No traffic detectors have been installed at critical road segments to record traffic flows, average mean speed and traffic composition. The traffic detectors' objective is to monitor real-time traffic data so that a TCC can, at any instance, use the information to take traffic management actions. In order to satisfy the statistical requirements for traffic management functionalities, algorithms will be used to process video footage from CCTV cameras in order to extract valuable datasets for statistical inputs for the TCC functionalities.
2. TM is missing a central traffic management platform that will allow the regulator to: (a) receive all available data sources from the road network, such as traffic detectors, camera feeds and data, incident detection data, and information by other sources (e.g. other authorities); (b) process and combine the data received; (c) disseminate the data to available communication channels such as variable messages through VMS, radio, and web-services. All the relevant ITS equipment installed on different sites should ideally be integrated within this platform. This central traffic management platform is an essential tool for the operation of the TCC as it will allow operators to take informed traffic management decisions and corresponding actions. The SMITHS project is tackling this gap by housing and ITS platform at the NTCC which will be able to satisfy the centralisation of all traffic and travel-related data in real-time.
3. Interventions for a parking guidance system for significant off-street parking areas/ Park & Ride locations are missing. Malta's road network is highly congested. The parking guidance system can be considered as an effective measure to avoid delays caused by moving vehicles searching for available parking slots where and when none are available. The deployment of a

parking management system where parking space availability within off-street parking areas is recorded in real-time, as well as the installation of Dynamic Electronic Signs at strategically located road sections displaying the parking space availability is suggested for consideration in future deployment. A pilot project in this respect has very recently been implemented in Qormi and will inform future iterations of such parking guidance systems.

### *3.6.2 Incident Management*

A relatively small number of AID cameras have been installed on Malta's road network. These cameras are intended to automatically record current traffic incidents on the road network. The installation of this system is considered essential to serve the TCC's traffic management operation and to achieve a better response rate and response time for accidents. Such cameras will be increased on specific road sections.

The function of incident management is considered crucial not only for the improvement of reaction times of emergency authorities, but also for effective TCC operation and the prompt implementation of traffic management actions. Regarding incidents management, the following issues have been identified and will be addressed:

1. A manual way for relevant parties to insert traffic incidents and events into a platform in real-time does not exist but is planned as an extension of the TM GIS Portal GUI. The intention of this system is to provide real-time accident information via web to all relevant authorities. The information collected will be used to determine the necessary traffic management actions and for the minimisation of the incident's impact on the road network. Specific details of any event or incident will be able to be inserted when this system is in place. These shall include the start time, end time, location of event, validation of event, status of event, type of event, traffic impact, etc. The type of information also relates to the scheduled maintenance works or other scheduled events (such as village feasts) taking place. The relevant information will be able to be made available to all the recipients that could



make use of this information, such as local councils and the enforcement services. In addition to this, TM will be making efforts to integrate this system with the ITS Platform at the NTCC in order to make it possible to map the relevant cartography data and specify the various data details.

2. An emergency priority system is being considered at least as a pilot system in some traffic signalised intersections. Through this system, emergency vehicles will receive priority at the traffic lights during emergency occurrences. The system will initially be installed at dedicated lanes for buses and emergency vehicles. The implementation of such a system will reduce the emergency vehicles' reaction time. This system will incorporate RFID technology.
3. The implementation of eCall is a vital system which will allow Malta to satisfactorily carry out incident management and response upon incidents. The full-scale deployment of this system is expected to take a considerable amount of time. Across Europe, pilot actions have been undertaken for this system (such as the EU HeERO Action). The EU has delayed imposing this system on Member States for various reasons, including car manufacturers' inability to implement this system in the short-term. The next milestone for car manufacturers is set for April of 2018. Relevant plans for the implementation of the eCall system in Malta is well underway and the new digital 112 and e-Call has been procured and is currently being installed as at December 2017. It is expected that the new 112 and e-Call facility will be fully functional by the first quarter of 2018. The service will be incorporated in the Sa Maison Facility with a dedicated secondary control room.

### *3.6.3 Public Transport Management*

As described in Section 3.2, significant ITS interventions have been undertaken by the bus operator. The national scheduled bus transport operation is undertaken by a separate entity which possesses its own operational control centre. To achieve an integrated transport management operation, the NTCC will be able to coordinate and manage all land

transportation modes effectively to achieve better traffic results and to promote bus transport through its traffic management, control and enforcement practices. This coordination will include the integration of the NTCC with the bus operator's systems. This integration will facilitate data exchange and communication between the two centres to capitalise on the data generated by and available to both. To achieve this objective, the two entities concerned will collaborate closely to determine the data holdings of both and to see how both entities can make the best use of such data within a framework of a clear allocation of responsibilities. The bus operator will be given the option to assign personnel to the NTCC in order to enable communication among the entities as well as to streamline any real-time operational procedures between the two.

#### *3.6.4 Road Safety*

A speed limit enforcement system has been operational for several years and is managed by a separate private entity. The system is using a Radar with Doppler effect technology to detect cars travelling at speeds over the speed limit. Images of illegal vehicles with registration number plates are sent to a control centre for processing. The data is cross-checked with the national VERA system, with the relevant penalties subsequently being issued and sent by post to the corresponding vehicle owner. This system will be suggested for integration with the ITS Platform and NTCC operation. Following the implementation of the ITS Platform, all ANPR cameras installed as part of ITS deployment will be made available for speed limit enforcement purposes as well.

Another issue related to safety and road durability is the introduction of weight-in-motion to ensure that there are no violations with respect to loading limits. Such a system is currently being considered as part of the scheduled Marsa Junction project which is being co-financed by the EU.

#### *3.6.5 Electronic Payment*

Electronic payment relates to advanced payment methods for bus transport, parking operation and road pricing. At the moment, bus transport uses smart travel cards. The off-

street parking pricing system depends on the parking operator, while road pricing systems do not exist in Malta.

As previously mentioned in Section 3.1, a Controlled Vehicle Access zone has been introduced in Valletta based on ANPR technology cameras in order to discourage private car use within the city. This system is operated successfully by another entity which has its own control centre. This system will be suggested for integration with the ITS Platform and NTCC operation. This would allow traffic data to be fed into the ITS Platform together with additional visual capacity afforded to the NTCC from CVA.

### *3.6.6 Travel Information*

The introduction of VMSs on Malta's road network has afforded dissemination of information to road users. Valuable messages could be informative, such as current traffic conditions, cautionary, such as incident warnings, or advisory, such as re-routing guidance.

Additionally, Malta has a system for multi-modal traveller information via a web platform. A multi-modal journey planner has been implemented through the EU funded STREETS project. This platform provides multi-modal routing information within Malta to provide routing guidance with the estimation of travel times per trip-pair within Malta. The input data is based on static road times (e.g. free flow speed) and scheduled bus services. This system will be suggested for integration with the ITS Platform and NTCC operation. If this occurs, the multi-modal journey planner will be able to provide real-time data to the users. The SMITHS project will put in place a new generation of multi-modal journey planning, in the form of a new web and mobile app, being fed data from the ITS Platform for true multi-modal journey planning. The service will incorporate bus, ferry, bicycle, car and walking routes, and will include the SMITHS intermodal hubs. In the meantime, real-time information is also being provided through the first iteration of the National Access Point at [news.transport.gov.mt/data](https://news.transport.gov.mt/data) or [news.transport.gov.mt/tcc](https://news.transport.gov.mt/tcc).

### *3.6.7 Data Warehouse management*

TM has developed a Geographical Information System (GIS) portal which is regularly upgraded with additional data and functionalities. TM will be making efforts to integrate the GIS with the ITS Platform in order to create the possibility of merging the two systems and both of their benefits. In so doing, the GIS GUI will be able to act as the front-end of the ITS Platform in the NTCC becoming an invaluable tool, both for real-time traffic management as well as for traffic planning purposes based on historic traffic and travel-related datasets.

The Bus Operator is obliged to provide TM with data such as actual schedules and bus routes. TM maintains this data for historic and inspection purposes. Having said that, the bus operator does not provide TM with daily data. Instead, data is provided following a delay of several days. When integration between the operator's control centre and the NTCC is achieved, the NTCC could be made to store datasets from the bus operator in real-time, to be used for real-time traffic management, control and enforcement that is directly effective for public transport operational efficiency and reliability.

## 4 Malta's ITS Framework

Before 2012, the regulation of ITS operation was largely provided for under *ad hoc* legal, technical and contractual provisions relating to the application of the specific ITS measures that have been deployed as summarised in this report

### 4.1 Business Framework

The business framework contained in this section is based on the different ITS functional areas identified and outlined in Section 3.6. The basic sub-functions of each ITS function and the relevant stakeholders for different levels of ITS has been delineated in the following sub-sections.

#### 4.1.1 *Traffic Management*

The traffic management function includes all actions for the optimisation of traffic and parking conditions. The traffic management function includes three (3) main sub-functions: Traffic signal control, Urban / Interurban traffic management (which is relevant despite the limited applicability of this in Malta), and Parking Management. For each ITS sub-function, basic ITS services are determined and key and supporting stakeholders are identified. As it stands, the key stakeholder for the function of traffic management is TM.

#### 4.1.2 *Incident Management*

The incident management function includes all actions for the management of incidents and traffic events on Malta's road network. There are 2 main sub-functions: incident/ events detection and incident response. For each ITS sub-function, basic ITS services are determined and key and supporting stakeholders are identified. As it stands, the key player that must be involved in incident management on the road network is TM, but coordination with emergency authorities is critical.

#### *4.1.3 Public Transport Management*

Public transport (PT) management includes all actions related to the enhancement of the bus operation in the Maltese transportation network. For each ITS sub-function, the basic ITS services are determined and both key and supporting stakeholders are identified. The main stakeholders are the bus operator, the taxi operators, and TM as the responsible regulatory body.

#### *4.1.4 Order and Safety*

Public transport management includes all actions that relate to the upkeep of law and order and the enhancement of road safety in the Maltese transportation network. For each ITS sub-function, its basic ITS services are determined and both key and supporting stakeholders are identified. There are various bodies that are normally involved in the upkeep of law and order and the enhancement of road safety such as the police, private operators that carry out ANPR camera operations for Local Councils, the recently set-up Local Enforcement System Authority (LESA) and TM.

#### *4.1.5 Electronic Payment*

The electronic payment includes all actions related to the advanced pricing mechanism for the provision of transportation services within Malta. For each transport service, different stakeholders are identified and TM is the overall regulatory body.

#### *4.1.6 Traveller Information*

The Traveller information function includes all actions pertaining to the dynamic provision of transportation and incident information through various communication channels. For each ITS sub-function, basic ITS services are determined and both key and supporting stakeholders are identified. Both TM and the relevant Local Councils play a significant role with regards to the dynamic provision of traveller information services.

#### *4.1.7 Data Warehouse Management*

The data warehouse management function includes all actions related to data collection and data processing. This data can be used for various purposes such as statistical purposes, transport planning purposes, and road maintenance purposes. For each ITS sub-function, basic ITS services are determined and both key and supporting stakeholders are identified. TM is considered as a key stakeholder due to its role in maintaining and updating the relevant data sets and sources.

## 4.2 Organisational Framework

The ITS organisational framework is closely related to the transportation functions covered in Section 3.6. Current ITS interventions relate to Traffic Management, Incident Management and Traveller Information, all within TM's remit and jurisdiction.

The NTCC is to achieve a fully integrated transportation management centre which will enable TM to coordinate transport within its jurisdiction. A significant worldwide problem is that various authorities develop individual systems without any coordination and without any integration functions, resulting in technological "islands". In those cases, the problem is not usually the technology but the lack of clear organisational framework that allows for synergies to be obtained by linking the systems together.

The issues for the relevant functions are addressed in the below sub-sections.

#### *4.2.1 Public Transport Management*

Clearly, Public Transport management is the responsibility of the bus (from the land side) and ferry (from the maritime side) operators. To achieve integrated transportation management, it is important to ensure that the majority of real-time bus data is made available to the NTCC. Additionally, TM plans to invite a representative of the bus operator within the NTCC. This would be an ideal scenario to implement real transport integration in

practice. Through this solution, the problems currently faced by public transportation services will be addressed more effectively.

#### *4.2.2 Safety*

ITS operation in this field is represented by the implementation of a speed limit enforcement system which is operated by a third party company on behalf of Transport Malta. In many countries, this seems to be the status quo since they tend to prefer this option because it is considered as an effective and efficient solution.

#### *4.2.3 Controlled Vehicle Access*

This system is in line with what is considered to be best practice across Europe. A local control centre operates for the system monitoring and the back-office. Since system implementation is strictly limited to Valletta urban vehicular access management, the current status operation should remain.

### 4.3 Legal ITS Framework

In 2012, the legal framework for the development and deployment of ITS services was established under the Authority for Transport in Malta Act as Subsidiary Legislation S.L. 499.61 "Deployment and Use of Intelligent Transport Systems Regulations".

Where these regulations do not yet prescribe standards and specifications, reference is made to the relevant sections of the Design Manual for Road and Bridges, a technical guidance manual for road infrastructure designers which has a legal basis through Subsidiary Legislation S.L. 499.57 "New Roads and Road Works Regulations".

Over the coming months, it is planned that the subsidiary legislation 65.05 "Traffic Signs and Carriageway Markings Regulations" that govern the type and sizes of road shall be revised in order to provide the legal basis for messages and pictograms intended to be displayed on the planned dynamic digital traffic signage.



S.L 499.61 on the Deployment and Use of Intelligent Transport Systems Regulation will be further amended in 2013 is being amended to reflect the latest developments of ITS in Malta as necessary. A regulatory framework, including standards to be adopted, shall be developed for all ITS related on-road infrastructure including, those relating to CCTV cameras and other on-road peripherals.

In addition, the following delegated acts are currently being implemented:

- Commission Delegated Regulation (EU) No 305/2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the harmonised provision for an interoperable EU-wide eCall;
- Commission Delegated Regulation (EU) No 886/2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to data and procedures for the provision, where possible, of road safety-related minimum universal traffic information free of charge to users;
- Commission Delegated Regulation (EU) No 885/2013 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of information services for safe and secure parking places for trucks and commercial vehicles;
- Commission Delegated Regulation (EU) No 962/2015 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide real-time traffic information services;
- Commission Delegated Regulation (EU) 2017/1926 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regards to the provision of EU-wide Multimodal Travel Information Services.

#### 4.4 Technical ITS Framework

A small number of ITS-related businesses are set up in Malta where such companies are involved in the development and production of both hardware components and software for ITS applications.

Like most of the EU Member States, Malta strongly supports the value of harmonisation of international standards and facilitation of the effective operation of an open market. Malta will do this in a number of ways, including:

- Identifying established *de facto* standards for national deployment, through consultation with public-private bodies;
- Establishing further national specifications; where particular to Malta
- Participating in European and/ or international standards related *forums*.

Transport Malta will identify and publish key standards and specifications, which are in line with counterparts from the EU ITS framework, to be implemented in Malta for:

- Urban Traffic Management Control (UTMC) systems, which are used principally on the national and local road network;
- DATEX II (European), used principally on the Strategic Roads Network (SRN) for traffic management systems;
- Specifications and standards for public transport operations and passenger information, enabling data to be shared and exchanged and also for systems to be able to request and respond to enquiries related to travel information and journey planning architecture;
- traffic advisory systems;
- general ICT industry standards (fixed and mobile internet, fixed and mobile telecommunications);
- Local standards for strategic road network systems, especially covering safety issues.

## 5 Funding

The financing for Malta's current and planned national ITS deployment is coming from a mix of national funds, ERDF funds and private investment. This includes on-going ITS development commitments to be undertaken by the private sector through concession contracts with Government (mainly public passenger transport, Controlled Vehicle Access, Speed Camera network) and the use of national funds with EU co-financing through ERDF funded projects entitled SMITHS as detailed in section 5. Public sector investment in ITS over the Action Plan period is indicated in the graph below.

Between 2013 and 2014, dedicated funds for ITS were increased especially where these pertained to the Road and Infrastructure Directorate, the Traffic Management and Enforcement Directorate as well as for the GIS Unit within the ICT Directorate of TM.

For the years 2016 to 2018, the level of further capital investment is estimated based on current plans to extend the ITS ecosystem including peripheral networks. These plans and their related levels of investment are to be considered as indicative.

The SMITHS project is currently in advanced tender compilation stage, with the respective tenders about to be published soon. This project is divided into 3 main parts each having its own tender/s. The parts of the SMITHS project being referred to are:

1. The stripping, restoration and renovation of the TM Sa Maison Facility into a NTCC (referred to as the NTCC tenders);
2. The procurement of ITS equipment relating to the NTCC at the TM Sa Maison Facility (referred to as the ITS Equipment tender); and
3. The extension of the ITS peripheral CCTV Network (referred to as the CCTV tender).

All tenders are awaiting DOC vetting prior to publication. The NTCC tenders shall be financed through national funds while the ITS Equipment tender shall be co-financed with national and ERDF funds. The CCTV tender will amalgamate all CCTV infrastructure under the SUMMITS I project together with all CCTV infrastructure under the SMITHS project, both of which are co-financed with national and ERDF funds.

## 6 Updates on the Priority Areas for Action and Related Measures

### 6.1 Action Area 1: Optimal use of road, traffic and travel data

ITS applications rely on an accurate knowledge of both the characteristics of the road network and the traffic regulations applicable (e.g. one-way streets and speed limits). While in the past the bulk of this knowledge was provided by authorities, there is a trend towards the increased utilization of commercially-available sources of such information.

Where road safety is at stake it is essential that this information is validated and made available to all players on a fair and equitable basis, in view of the need to ensure a safe and orderly management of traffic. This applies, in particular, to digital mapping, including its inherent processes for data collection, validation and timely updating.

Similar considerations apply to the provision of (real-time) traffic and travel information services. Specific issues include the notion of “universal traffic messages”, i.e. the type of messages to be provided free of charge to all road users as a public information service, the consistency of the information between the various sources, and the need to comply with prescriptions imposed by network management operations.

The National ITS Action Plan and the applied ITS interventions are clearly geared towards the provision of traffic and travel-related data for real-time traffic information and real-time multi-modal traveller information services. This policy direction is similar to the one taken by other EU Member States. Moreover, at the policy level, as a first step, increased attention is required for traffic and travel data exchange among various stakeholders as well as for the exchange of cartographical data. Additionally, at the policy level, the requirement for

universal traffic messages related to traffic events, traffic information and multi-modal travel information seems has been adopted.

ITS interventions related to the provision and exchange of traffic data are mainly being made through the projects being currently developed under the SMITHS project. For multi-modal traveller information, a strong foundation has been formed by the introduction of ITS in-bus operation. In parallel, there is a national GIS database that is continuously in the process of being updated. With respect to the traffic data exchange and the development of universal traffic messages. The DATEX II protocol is foreseen within the interventions made under the SMITHS project.

The presence of the pre-mentioned ITS interventions do not imply that no further investments are required within those areas. On the contrary, since TM has laid the groundwork through various ITS interventions, further implementation actions should be undertaken to achieve increased functionalities, greater geographical coverage and data exchange between the various stakeholders (which is the subject of the SMITHS Programme). These suggested actions will serve the strategic objective of an increasingly integrated transportation operation. Finally, by utilising the existing GIS databases with continuous incremental improvements, procurement provisions should be made so that new ITS interventions, particularly the ITS Platform to be implemented in the NTCC as part of the SMITHS project, will be able to exchange data with the GIS database and its various layers, as GIS could be the aggregator for all the information being collected and could serve as the central data repository and visualisation tool that enables efficient, effective, synergistic and coherent decisions to be made as quickly as possible.

#### 6.1.1 What?

The following are actions in the ITS Framework Directive under Action Area 1. The actions listed below have been fully or partially implemented in Malta as part of its planned ITS National priorities between 2013- 2017.

Action 1.2	YES	NO	MAYBE/
------------	-----	----	--------

			PARTIAL
<p>Definition of procedures for the provision of EU-wide real-time traffic and travel information services, addressing notably the following aspects:</p> <ul style="list-style-type: none"> <li>• provision of traffic information services by the private sector</li> <li>• provision of traffic regulation data by the transport authorities</li> <li>• guaranteed access by public authorities to safety-related information collected by private companies</li> <li>• guaranteed access by private companies to relevant public data</li> </ul>	<p>✓</p> <p>✓</p>		<p>✓</p> <p>✓</p>

Action 1.3	YES	NO	MAYBE/ PARTIAL
------------	-----	----	-------------------

Optimization of the collection and provision of road data and traffic circulation plans, traffic regulations and recommended routes (in particular for heavy goods vehicles)	✓		
--	---	--	--

Action 1.4	YES	NO	MAYBE/ PARTIAL
------------	-----	----	-------------------

Definition of specifications for data and procedures for the free provision of minimum universal traffic information services (including definition of the repository of messages to be provided)	✓		
---	---	--	--

Action 1.5	YES	NO	MAYBE/ PARTIAL
------------	-----	----	-------------------

Promotion of the development of national <b>multimodal</b> door-to-door <b>journey planners</b> , taking due account of public transport alternatives, and their interconnection across Europe	✓		
--	---	--	--

### 6.1.2 Why? – A Connected Island

Given that Malta is a small island, it is relatively more possible to connect the whole of the road network and transport services through ITS, provided that funding is available. Malta's long term vision is to provide better urban and inter-urban connectivity.

With respect to Action 1.2 and 1.4, it is a priority for Malta that the procedures for the provision of national real-time traffic and travel information services including data are defined and put in place on a national level and in line with the rest of the EU Member States in a universal manner. The same applies to Action 1.3. The collection and provision of road data should be optimized and standardised so that it can be shared with all Member States in one format. This especially applies for road freight transport since a particular journey may take place through a number of Member States.

The promotion of the development of a national multimodal door-to-door journey planner which takes into account other public transport modes is important to promote a modal shift from the use of the private passenger car on to various forms of public transport. Multimodal journey planners make it easier for commuters to shift through different modes to complete a journey.

### 6.1.3 Provision of real time information to those who need it

In October 2012, the private sector operator of public passenger transport services in Malta and Gozo had introduced a new real-time information service called 'SMS Your Next Bus'.



This service enables bus travellers to obtain the estimated time of arrival of a bus at any particular bus stop at any time of day.

The provision of traffic regulation by Transport Malta is intended to be introduced over the next few years through the National Traffic Control Centre (NTCC) and will provide a number of outputs through its ITS platform, The data provided will:

- include the provision of accurate real-time based traffic information to the public and different road users in various forms through open and accessible formats;
- help to minimise traffic congestion and bottlenecks caused by traffic incidents or other road related activities such as road works and other scheduled and unscheduled events happening on the road network;
- be filtered, processed and managed;
- facilitate improved road transport operations such as through automated incident detection, acquired through the deployment of Automatic Incident Detection (AID) CCTV equipment in specific areas of the road network and on-road sensors as well as from other sources of information (such as that collected manually by Transport Malta officers and Police officers) as well as road flooding;
- contribute to a single strategic overview of the network enabling the transport authority to identify traffic events, patterns and common occurrences and develop and monitoring strategies to better manage traffic flows and manage road users based on extensive traffic data;
- Inform other stakeholders such as the Police and Emergency Services, the media and the general public of traffic related measures and actions.

#### *6.1.4 How?*

Travel Information Services (TIS) will be part of Malta's solution to make transport, including public transport more accessible and efficient. It will combine all forms of public transport services, including the domestic ferry services that operates between Malta and Gozo and

the harbour ferry service operating between the villages, towns and cities within the harbour areas.

TM will be working on the development of a multimodal journey planner as part of the SMITHS project (refer to Section 3.4), This particular deliverable will make relevant traffic and travel-related datasets available to the general public as collected and stored by the ITS Platform in the NTCC. This will be delivered in 2018.

The service will enable users to compare different journey times as well as costs, including that of personal transport. The TIS will be developed by bringing together an existing journey planner and data, implemented through the STREETS project, and their through standard data protocols.

Through better TIS, it is expected that further modal shift between the various modes of transport will result since users can take informed decisions on the move without requesting prior knowledge of options and their respective scheduling. Leveraging through high mobile telephony penetration, Malta will capitalise on this by providing transport users real-time information on the move.

#### *6.1.5 Data Formats*

Data will be provided through established DATEX II protocol that will facilitate transport authorities and private sector stakeholders to access the data in a universal manner, not only in between national stakeholders but also with EU Member States. DATEX II allows the data feeds transferred between the information sources and ICT systems without any intervention from the TCC or the end receivers of the information.

#### *6.1.6 Data Collection and Dissemination*

Data collection will derive from a number of peripheral sensors located in road and other transport infrastructures; these peripheral sensors will include CCTV cameras with ANPR and AID capabilities. Dissemination of information to road users will initially be made through

various types of Variable Messages Signs (VMS) as well as radio broadcasts and web /smartphone based applications.

6.1.7 *When?*

Deployment had started towards the end of 2013 and has been maturing ever since, and it will reach full maturity by-2020.

6.1.8 *Where?*

All relevant actions within Action Area 1 have been implemented on the selected road sections, nationwide as indicated in the MODUS project and applied across all modes of land transport and road users. These actions have also been applied at multi-modal hubs, including ferry services.

6.1.9 *Summary*

Action 1.2	Malta – Implementation status
<p>Definition of procedures for the provision of <b>EU-wide real-time traffic and travel information services</b>, addressing notably the following aspects:</p> <ul style="list-style-type: none"> <li>• provision of traffic information services by the private sector</li> <li>• provision of traffic regulation data by the transport authorities</li> <li>• guaranteed access by public authorities to safety-related</li> </ul>	<p>The SMITHS project is, amongst other things, delivering an ITS Platform which will house the domain of the National Access Point (NAP), having direct access to relevant traffic and travel related data. The current NAP will therefore migrate to the ITS Platform at the NTCC in the Sa Maison Facility and be boosted with respect to the datasets made directly available to it. Planned to be fully operational by 2018.</p>

<p>information collected by private companies</p> <ul style="list-style-type: none"> <li>• guaranteed access by private companies to relevant public data</li> </ul>	
--	--

Action 1.3	<b>Malta – Implementation status</b>
<p>Optimisation of the collection and provision of <b>road data</b> and traffic circulation plans, traffic regulations and recommended routes (in particular for heavy goods vehicles)</p>	<p>TM will be working on drawing up circulation plans on to the GIS Portal. These will be integrated in the ITS Platform at the NTCC.</p> <p>Planned to be fully operational by end 2018-Q1 2019.</p>

Action 1.4	<b>Malta – Implementation status</b>
<p>Definition of specifications for data and procedures for the free provision of <b>minimum universal traffic information services</b> (including definition of the repository of messages to be provided)</p>	As above

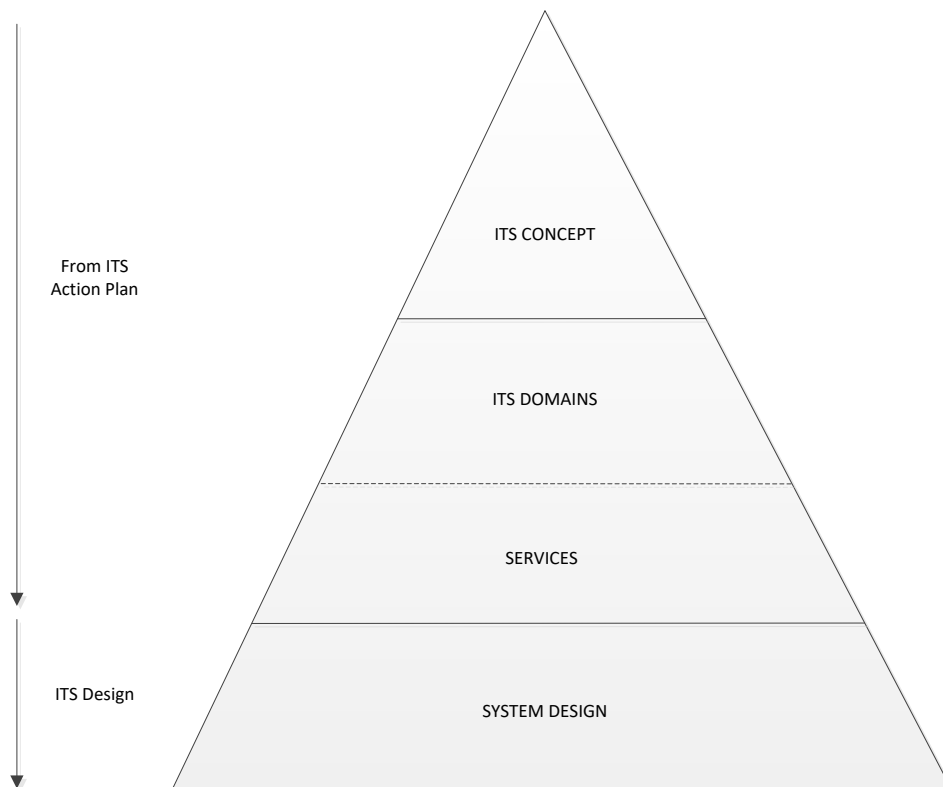
Action 1.5	Malta – Implementation status
Promotion of the development of national <b>multimodal door-to-door journey planners</b> , taking due account of public transport alternatives, and their interconnection across Europe	The SMITHS project will be addressing the deliverable of a national Mobile Travel Information Service (MTIS) which will be the basis of the national journey planner.  Planned to be developed by _.

## 6.2 Action Area 2: Continuity of Traffic and Freight Management ITS Services on European Transport Corridors and in Conurbations

At the policy level, within the 2012 – 2017 period, attention was mainly given to the deployment of an updated multi-modal ITS architecture framework for urban mobility. This included an integrated approach for travel planning, transport demand, traffic management, emergency management, road pricing, and the use of parking and public transport facilities. A specific unit responsible for ITS policy and implementation has been set up in the third (3<sup>rd</sup>) quarter of 2017.

The relevant ITS interventions cannot be considered complete at this stage. A significant amount of additional investment is required in order to deploy the ITS architecture framework and another significant investment is required to maintain it. Current relevant ITS interventions include the development of the ATCC at the TM Paola Facility and the development of the NTCC at the TM Sa Maison Facility. This will enable the integrated approach for multi-modal transport management. Another essential step is the collaboration and coordination among the various stakeholders to serve the objective of integrated transport management.

To reach this objective, the development and adoption of a national ITS architecture framework is considered to be essential if it is to enable the various authorities to plan future ITS interventions in a coordinated manner. The framework will also provide a common vocabulary among stakeholders and will develop synergies between them. A national ITS architecture framework is also needed to improve communication between various ITS interventions, to reduce design costs and implementation time, as well as to reduce risks. TM is well positioned to initiate such actions with stakeholders. The development of a national ITS architecture should take into account the stakeholders' aspirations and the users' needs in a systematic procedure. The objective of such an approach is to link the overall ITS concept with the system design as schematically illustrated in Figure 13 - Typical High-Level ITS Architecture Layers.



*Figure 13 - Typical High-Level ITS Architecture Layers*

### 6.2.1 What?

The following are the actions proposed in the ITS Framework Directive under Action Area 2. The actions listed below have been envisaged to be implemented in Malta as part of its National Priorities between 2013 and 2017.

Action 2.1	YES	NO	MAYBE/ PARTIAL
Definition of a set of common procedures and specifications to ensure the continuity of ITS services for passenger and freight in transport corridors and in urban/interurban regions. This work should include benchmarking and standardisation on door-to-door information flows, interfaces, traffic management and travel planning, and, in particular, evt and emergency planning			✓

Action 2.2	YES	NO	MAYBE/ PARTIAL
------------	-----	----	-------------------

<p>Identification of ITS services to be deployed in support of freight transport (eFreight) and development of appropriate measures to progress from concept to realisation. Particular attention will be given to applications for goods tracking and tracing using state-of-the-art technologies such as RFID and EGNOS/Galileo-based location devices</p>			✓
--	--	--	---

Action 2.3	YES	NO	MAYBE/ PARTIAL
------------	-----	----	-------------------



Support for the wider deployment of an updated multimodal European ITS Framework architecture for intelligent transport systems and definition of an ITS framework architecture for urban transport mobility, including an integrated approach for travel planning, transport demand, traffic management, emergency management, road pricing, and the use of parking and public transport facilities	✓		
--	---	--	--

Action 2.4	YES	NO	MAYBE/ PARTIAL
Implementation of the interoperability of electronic road toll systems		X	

### 6.2.2 Why?

Malta will partially implement Action 2.1 in working at a national and contributing at an EU level towards development of a set of common procedures and specifications. This work will include benchmarking and standardisation on door-to-door information flows, interfaces, traffic management and travel planning, and, in particular, event and emergency planning. These defined and clear procedures are considered to be of absolute importance especially

in the case of emergency services Transport Malta may develop policy guidance for the facilitation multi-modal ticketing between private operators of public transport services.

With respect to Action 2.2, as far as Identification of ITS services to be deployed in support of freight transport (eFreight) and development of appropriate measures to progress from concept to realisation, Malta will wait for further developments in this regard. TM will consult on this action with its stakeholders, in particular freight forward companies who operate on the European mainland.

As far as Action 2.3 is concerned, Malta will support the wider deployment of an updated multimodal European ITS Framework architecture for intelligent transport systems and definition of an ITS framework architecture for urban transport mobility, including:

- an integrated approach for travel planning;
- transport demand;
- traffic management;
- emergency management.

Malta will not however implement any road pricing infrastructure, at least in the foreseen future. Safe and secure parking for freight forwarders may be included in the Marsa Junction Project, however this is not currently confirmed. In whichever case, Malta will support the provision of such facilities at a European level. Malta's position on road charging is taken on a case-by-case basis and upon consultation with its stakeholders.

With respect to Action 2.4, Malta does not plan to implement any national electronic road toll systems during the ITS Action Plan period. Malta will, however, continue to strongly support the development of interoperable toll systems at an EU level, since this would reduce delays and administrative burdens for road haulage companies.

### 6.2.3 *Where?*

Actions 2.1 and 2.4 in this Priority Area will be implemented and deployed, as appropriate, on a selected number of road sections and designated areas nationwide.

#### 6.2.4 *How?*

Malta will continue to support the deployment of a national open multimodal ITS system architecture for intelligent transport systems (Action 2.3), an Urban Transport Management and Control System (UTMC) as well as an integrated approach for travel planning, transport demand, traffic management for emergency services, public transport management and the use of parking and public transport infrastructure.

#### 6.2.5 *Incident Management Core National Service*

This will give TM Incident Management capabilities on Malta's National Road Network including Malta's TEN-T Road Network. This will give the respective authorities:

- Real-time visibility;
- map the level of incident detection, notification;
- the time to detect an incident;
- improved reaction time for emergency and rescue services;
- road clearance.

With respect to the promotion of eFreight services in Action 2.2, Malta shall be extending its online PortNET system into a transport and customs Single Window to alleviate barriers and bottlenecks at Malta's external sea borders. TM will continue to encourage private sector road haulage operators to invest in ITS and vehicle tracking devices, particular in the operation of carriage of dangerous goods by road.

With respect to Action 2.3, Transport Malta has deployed on-road sensors for automatic traffic counting as part of Phase I of its ITS deployment. Through these counters, it is intended that Malta will be in a position to ascertain counts of vehicles employed in freight transport to determine the strategic network priority for freight transport by road. This will serve to guide planners and policy makers in respect of any future deployment of ITS on the road network aimed at reducing delay and improving safety for road haulage operations.

Action 2.3 also refers to emergency management. In this regard, one has to note that the ITS deployment envisaged under this Action Plan will also cater for improved management for

emergencies. In this regard, the system has been adapted to take into consideration safety issues relating to flash floods at certain times of years on roads in low lying areas.

#### 6.2.6 When?

The above measures have been deployed. TM is in a position to monitor the efficiency of the system before taking any decisions on further measures to be put in place during the second phase.

#### 6.2.7 Summary

Action 2.1	Malta – Implementation status
Definition of a set of common procedures and specifications to ensure the <b>continuity of ITS services</b> for passenger and freight in transport corridors and in urban/interurban regions. This work should include benchmarking and standardisation on door-to-door information flows, interfaces, traffic management and travel planning, and, in particular, event and emergency planning	<p>Awaiting from the EU Commission for the definition of a set of procedures and specifications.</p> <p>Emergency planning will be completed by end 2016.</p> <p>Information flows. Interfaces, traffic management and travel planning will be drawn up by 2017.</p>

Action 2.2	Malta – Implementation status
<p>Identification of ITS services to be deployed in support of freight transport (eFreight) and development of appropriate measures to progress from concept to realisation. Particular attention will be given to applications for goods tracking and tracing using state-of-the-art technologies such as RFID and EGNOS/Galileo-based location devices</p>	<p>Awaiting further communication from the Commission on this Action. Malta is already applying similar ITS mobile devices on the public passenger transport service and in new taxi vehicles.</p> <p>Plans are to enter into consultations with stake holders employed in the transport of goods once this action is more defined.</p>

Action 2.3	Malta – Implementation status
<p>Support for the wider deployment of an updated multimodal <b>European ITS Framework architecture</b> for intelligent transport systems and definition of an <b>ITS framework architecture for urban transport mobility</b>, including an integrated approach for travel planning, transport demand, traffic management, emergency management, road pricing, and the use of parking and public transport facilities</p>	<p>With respect to parking, Malta is currently reviewing its car parking policy and this will be dealt with once the outcome of this policy is known.</p> <p>Smart parking incorporating smart FEV charging infrastructure is already being implemented.</p> <p>With respect to the ITS architecture, this is going to be tackled holistically imminently with the SUMMITS I project and the implementation of the ITS Platform at the NTCC. The mentioned integrated approach will be physically centralised at the NTCC.</p>

<b>Action 2.4</b>	Malta – Implementation status
Implementation of the interoperability of <b>electronic road toll</b> systems	Malta does not operate electronic toll systems.

### 6.3 Action Area 3: Road Safety and Security

The Government of Malta and TM are supportive of ITS technologies through which both road safety and security are increased.

ITS-based road safety and security applications have proved their effectiveness, but the overall benefit for society depends on the scale of their deployment. Issues that require additional attention include designing a safe Human Machine Interface (HMI) (using the work done on the “European Statement of Principles”), integrating nomadic devices and ensuring the safety of vulnerable road users (such as the elderly).

Efforts to promote best practices in these areas are therefore crucial to address these issues. Transport systems may also be under security threats. Transport security, especially the need to protect travellers and transport workers and to secure transport facilities and assets, must be taken into account without jeopardising efficient and effective transport operations.

National Priorities are closely coherent with the EU Directive Priority Actions at policy level as expected. In the case of Malta as well as the majority of EU Member States, the planned ITS interventions in this area are low, based on National ITS Reports of the Member-States.

Refer to Figure 14 - EU Priority Action III - Level of Planned Interventions according to National Reports.

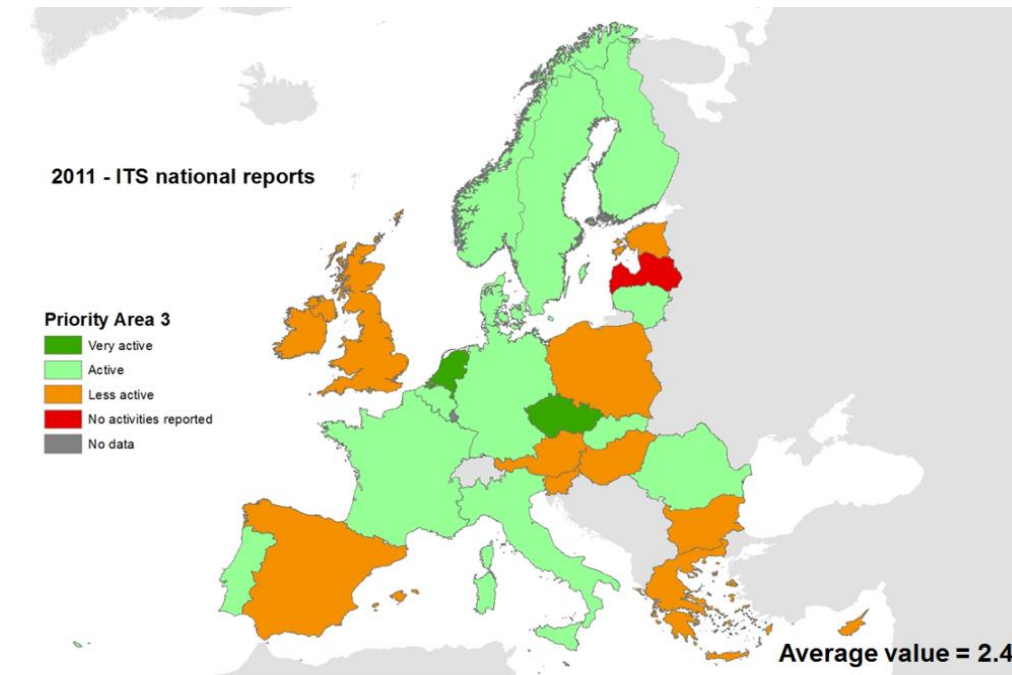


Figure 14 - EU Priority Action III - Level of Planned Interventions according to National Reports

In Malta, a Speed Enforcement System is in operation to enhance road safety at recognized critical road segments (accident blackspots). Moreover, preparations for eCall are well underway with significant presence planned for the service at the NTCC. These preparations are being made in order to introduce this system at national level. In this regard, Malta is in line with most European countries. The system has been procured and installed as at December 2017. The system will be fully functional during the first quarter 2018, as testing of the system is underway.

### 6.3.1 What?

The following are the actions proposed in the ITS Framework Directive under Action Area 3. The ticked actions in the tables below are the identified measures which have been considered as a National Priority to be implemented in Malta.

Action 3.1	YES	NO	MAYBE/ PARTIAL
Promotion of deployment of advanced driver assistance systems and safety and security related ITS systems, including their installation in new vehicles (via type approval) and, if relevant, their retrofitting in used ones	✓		

Action 3.2	YES	NO	MAYBE/ PARTIAL
Support the Implementation Platform for the harmonized introduction of pan-European eCall, including awareness campaigns, upgrading Public Service Access Points' infrastructures and an assessment of the need for regulation.	✓		



Action 3.3	YES	NO	MAYBE/ PARTIAL
Development of a regulatory framework on a safe on-board Human-Machine-Interface and the integration of nomadic devices, building on the European Statement of Principle on safe and efficient in-vehicle information and communication systems			X

Action 3.4	YES	NO	MAYBE/ PARTIAL
Development of appropriate measures including best practice guidelines concerning the impact of ITS applications and services on the safety and comfort of vulnerable road users.	✓		

Action 3.5	YES	NO	MAYBE/ PARTIAL
Development of appropriate measures including best practice guidelines on secure parking places for trucks and commercial vehicles and on telematics parking and reservation systems			X

### 6.3.2 Why?

As a signatory to the MoU on eCall, under Action 3.2 Malta will be promoting the service, encouraging that vehicles are equipped with the appropriate devices and to set up a PSP facility to handle eCall emergency calls. With the latter falling under the responsibility of the Police and the Ministry of Home Affairs, due to the high level of motorisation in Malta and a rather short road network, emergency services would further benefit if they are quickly alerted to road accidents through a speedier response. The introduction of eCall service is in a very advanced stage and will be deployed and fully functional by the first quarter of 2018.

Action 3.4 – road safety of vulnerable users is a priority action under the current transport policy framework. ITS work in the area of speed management and enforcement, particularly in relation to effective enforcement to protect vulnerable road users such a motor cyclists, cyclists and pedestrians, is being tackled primarily through the SMITHs project and its deliverables – most especially the NTCC, its operation and the ITS Platform. In addition, ITS peripheral networks are being extended on the road in order to infiltrate the infrastructure further and have the benefits of the NTCC operation reach more of the road network.

Action 3.5 – the provision of safe and secure parking areas for trucks and commercial vehicles is not a priority action under the current ITS Action Plan. The reason for this is that the actual

demand for the provision of safe and secure public parking areas for the parking of trucks and commercial vehicles during the day and overnight is negligible in Malta. This largely emanates from Malta's small geographical size and peripheral location which leads to little or no demand for international driver-accompanied vehicles used in road haulage or commercial transport and from the fact that national operators use their own operating centre facilities for parking of vehicles given the short distance of trips. With this said, the Marsa Junction project may incorporate such a facility, although it is currently still not confirmed.

### *6.3.3 How?*

The deployment and implementation of eCall (Action 3.2) will be rolled out in the first quarter of 2018. In order to be fully functional, the already purchased 112 PSAP is e-call enabled. With the setting up of the NTCC, the eCall service will move to the Sa Maison Facility where it will benefit from being directly connected to the real-time operation at the NTCC.

Action 3.4 –Malta has an extensive network of Speed Cameras deployed at specific road sections where there is excessive speeding or which have poor speeding and accident records.

Malta is currently in the process of establishing a Road Safety Agency...

### *6.3.4 When?*

Action 3.2 - Once the digital PSP facility in Malta is set up and vehicles equipped with the respective eCall technology are being rolled out, this action will be reviewed to determine any further action required. The full digital PSP facility inclusive of eCall will be fully functional by the first quarter of 2018.

### *6.3.5 Summary*

<b>Action 3.1</b>	Malta – Implementation status
Promotion of deployment of advanced driver assistance systems and safety and security related ITS systems, including their installation in new vehicles (via type approval) and, if relevant, their retrofitting in used ones	This is not applicable to Malta since there are no car manufacturers set up in Malta and thus have little control over this action.

Action 3.2	Malta – Implementation status
Support the Implementation Platform for the harmonized introduction of pan-European <b>eCall</b> , including awareness campaigns, upgrading Public Service Access Points' infrastructures and an assessment of the need for regulation.	<p>An inter-ministerial working committee in preparation for the eventual directive / regulation has already been established. The committee is made up of representatives from the law enforcement and civil protection agencies as well as the Malta Communications Authority.</p> <p>Malta is signatory to the eCall MoU. Malta is working on the setting up of a National Traffic Control Centre in 2017/18. When this is completed, the eCall service will move its operation to these premises, benefiting from proximity to real-time operation of traffic management, control and enforcement.</p>

Action 3.3	Malta – Implementation status
------------	-------------------------------

Development of a regulatory framework on a safe on-board <b>Human-Machine-Interface</b> and the integration of nomadic devices, building on the European Statement of Principle on safe and efficient in-vehicle information and communication systems.	Malta has little control over this action however will wait further communications from the Commission on this action.

Action 3.4	Malta – Implementation status
Development of appropriate measures including best practice guidelines concerning the impact of ITS applications and services on the safety and comfort of <b>vulnerable road users</b>	Malta will incorporate these measures and best practices with respect to vulnerable road users.

Action 3.5	Malta – Implementation status
------------	-------------------------------

<p>Development of appropriate measures including best practice guidelines on <b>secure parking places</b> for trucks and commercial vehicles and on telematics-controlled parking and reservation systems</p>	<p>The action for the provision of safe and secure parking facilities for freight forwarders is not applicable to Malta due to the maximum distance that any operator can travel from its base is less than 50km. However, the upcoming Marsa project may still be incorporating a parking facility for freight forwarders.</p>
---	---

#### 6.4 Action Area 4: Integration of the vehicle into the transport infrastructure

The use of ITS components or systems is stipulated in several existing or planned legal acts and voluntary agreements applicable to commercial or private vehicles. Examples include the provisions on the transport of dangerous goods and live animals, digital tachograph, electronic toll collection and eCall. Most of these legal instruments and agreements have evolved independently of each other, so there is little synergy between the instruments.

Further streamlining and integration within a coherent, open-system architecture could yield better efficiency and usability, reduced costs and enhanced extensibility, enabling a “plug and play” integration of future new or upgraded applications such as those in nomadic devices and those utilising GNSS services for advanced positioning and timing. This open system architecture would be embodied in an open in-vehicle platform, guaranteeing interoperability/interconnection with infrastructure systems and facilities. With this modular approach, additional functionalities could be integrated later for in-vehicle safety, safe Human Machine Interfacing, personal mobility, logistics support and access to multimodal information and possibly electronic vehicle identification.

It is envisaged that this platform could be introduced in commercial vehicles first as there is much to gain from improving freight and passenger transport. Positive feedback from these applications would help speed up the uptake of integrated ITS applications in private vehicles, therefore stimulating a Europe-wide market for original and after-market in-vehicle products and services. The development of cooperative systems, based on an exchange of information and communication between vehicles and with the road infrastructure, is also progressing rapidly, and needs to be further promoted.

#### 6.4.1 What?

The following are the actions proposed in the ITS Framework Directive under Action Area 4. The listed actions below have been envisaged to be implemented in Malta as part of its National priorities.

Action 4.1	YES	NO	MAYBE/ PARTIAL
Adoption of open in-vehicle platform architecture for the provision of ITS services and applications, including standard interfaces. The outcome of this activity would then be submitted to the relevant standardization bodies.			X
Action 4.2	YES	NO	MAYBE/ PARTIAL

Development and evaluation of cooperative systems in view of the definition of a harmonized approach; assessment of deployment strategies, including investments in intelligent infrastructure			X
--	--	--	---

Action 4.3	YES	NO	MAYBE/ PARTIAL
------------	-----	----	-------------------

Definition of specifications for infrastructure-to-infrastructure (I2I), vehicle-to- infrastructure (V2I) and vehicle-to-vehicle (V2V) communication in co-operative systems			X
--	--	--	---

Action 4.4	YES	NO	MAYBE/ PARTIAL
------------	-----	----	-------------------

Definition of a mandate for the European Standardization Organizations to develop harmonized standards for ITS implementation, in particular regarding cooperative systems.			X
---	--	--	---



#### 6.4.2 Why?

Malta will not be carrying out any direct initiatives under this Action Area for the primary reason that it does not have a vehicle manufacturing base. Government however is committed to ensuring that any ITS related system architecture to be deployed nationally would be open, modular and interoperable.

#### 6.4.3 Summary

Action 4.1	Malta – Implementation status
Adoption of an <b>open in-vehicle platform architecture</b> for the provision of ITS services and applications, including standard interfaces. The outcome of this activity would then be submitted to the relevant standardisation bodies.	Malta will await further communication from the EU Commission on this Action, however Malta is already moving in this direction.

Action 4.2	Malta – Implementation status
Development and evaluation of <b>cooperative systems</b> in view of the	

definition of a harmonised approach; assessment of deployment strategies, including investments in intelligent infrastructure	Malta will await further communication from the Commission on this Action
---	---

Action 4.3	Malta – Implementation status
Definition of specifications for infrastructure-to-infrastructure (I2I), vehicle-to-infrastructure (V2I) and vehicle-to-vehicle (V2V) communication in co-operative systems	<p>Malta will await further communication from the Commission on this Action with respect to V2I and for I2I.</p> <p>With respect for V2V, Malta does not have any car manufacturing industry set up on its territory.</p>

Action 4.4	Malta – Implementation status
Definition of a <b>mandate for the European Standardisation Organisations</b> to develop harmonized standards for ITS implementation, in particular regarding cooperative systems.	Malta will await further communication from the Commission on this Action.

## 6.5 Action Area 5: Data security and protection, and liability issues

The handling of data (notably personal and financial data) in ITS applications raises a number of issues, as citizens' data protection rights are at stake. At the same time, data integrity, confidentiality and availability must be ensured for all parties involved, especially citizens.

Finally, the use of ITS applications creates additional requirements in terms of liability. These issues can be a major barrier to wide market penetration of some ITS services if citizens' rights are not shown to be fully protected. Transport Malta carries out continuous discussions with the commissioner for Data Protection.

### 6.5.1 What?

The following actions proposed in the ITS Framework Directive under Action Area 5 listed below have been envisaged to be implemented in Malta as part of its national priorities.

Action 5.1	YES	NO	MAYBE/ PARTIAL
Assess the security and personal data protection aspects related to the handling of data in ITS applications and services and propose measures in full	✓		

compliance with Community legislation.			
--	--	--	--

Action 5.2	YES	NO	MAYBE/ PARTIAL
Address the liability issues pertaining to the use of ITS applications and notably in vehicle safety systems	✓		

### 6.5.2 Why? How? When?

Currently the only related legislation in place relates to generic data protection and data security. No ITS specific legislation has been developed in Malta yet.

### 6.5.3 Summary

<b>Action 5.1</b>	Malta – Implementation status
	Malta will await additional communication from the EU Commission on this action.

<b>Action 5.2</b>	
-------------------	--

	Malta – Implementation status
Address the <b>liability</b> issues pertaining to the use of ITS applications and notably in vehicle safety systems	Malta will await additional communication from the EU Commission on this action.

## 6.6 Action Area 6: European ITS cooperation and coordination

Coordinated deployment of ITS in the EU calls for intensive and effective cooperation between all parties involved at European level, ideally leading to rapprochement on deployment requirements, better synchronization of deployment activities and avoidance of national and proprietary silo solutions that constitute barriers to European integration. Dissemination of the best available knowledge as to the costs and benefits of ITS projects from a full life-cycle perspective and feedback on relevant experience are needed to support informed investment decisions by public authorities across Europe.

To make EU-wide deployment a reality, agreements on common assessment methods and uniform tools for decision support are therefore crucial. Such coordinated deployment of ITS throughout Europe also requires greater involvement of cities and regional authorities, notably at urban and at inter-urban level. Guidance and technical support should be provided to facilitate and underpin consensus building and decision-making processes.

Finally, the implementation of the measures in this Action Plan will call for an adequate governance structure. Member States should aim at reaching

agreement on a common ITS agenda and on methods to proceed from plans to coordinated implementation, for example by way of concerted investments or harmonization initiatives.

6.6.1 What?

The following actions proposed in the ITS Framework Directive actions under Action Area 6. The actions listed below have been envisaged to be implemented in Malta as part of its National priorities.

Action 6.1	YES	NO	MAYBE/ PARTIAL
Proposal for a legal framework for European coordination on the Europe-wide deployment of ITS	✓		

Action 6.2	YES	NO	MAYBE/ PARTIAL
Development of a decision-support toolkit for investment decisions in ITS applications and services. This should include a quantified evaluation of the economic, social, financial and operational impact and cover aspects such as user acceptance, life-cycle cost/benefit as well as the identification and evaluation of			✓

best practice for facilities procurement and deployment			
---	--	--	--

Action 6.3	YES	NO	MAYBE/ PARTIAL
Development of guidelines for the public funding from both EU (e.g. TEN-T and Structural Funds) and national sources of ITS facilities and services based on an assessment of their economic, social and operational value			✓

Action 6.4	YES	NO	MAYBE/ PARTIAL
Set-up of a specific ITS collaboration platform between Member States and regional/ local governments to promote ITS initiatives in the area of urban mobility	✓		

### 6.6.2 Why?

Malta has already transposed the ITS Framework Directive and will continue to update its national legislation as deployment of ITS takes place. Transport Malta believes that the national development of ITS could benefit from the development of closer technical and

operational collaboration between central and local authorities and between Malta and other EU member states through knowledge transfer and exchanges of best practices.

### 6.6.3 How?

Malta has an 'observer' country status in the *EasyWay* project for European-wide ITS deployment on TEN-T corridors. The Deployment Guidelines DG2012 based on best practices across Europe have been used as a basis for ITS deployment in Malta.

### 6.6.4 Summary

<b>Action 6.1</b>	<b>Malta – Implementation status</b>
Proposal for a legal framework for European <b>coordination</b> on the Europe-wide deployment of ITS	Malta has transposed the ITS Directive and will wait for further communication from the Commission on this action concerning a proposal for more coordination between Member States.

<b>Action 6.2</b>	<b>Malta – Implementation status</b>
Development of a <b>decision-support toolkit</b> for investment decisions in ITS applications and services. This should include a quantified evaluation of the economic, social, financial	Malta will wait for further communication from the Commission on this action.



and operational impact and cover aspects such as user acceptance, life-cycle cost/ benefit as well as the identification and evaluation of best practice for facilities procurement and deployment	
--	--

<b>Action 6.3</b>	<b>Malta – Implementation status</b>
Development of <b>guidelines</b> for the public <b>funding</b> from both EU (e.g. TEN-T and Structural Funds) and national sources of ITS facilities and services based on an assessment of their economic, social and operational value	Malta is currently awaiting allocation of both EU and National funds.

<b>Action 6.4</b>	<b>Malta – Implementation status</b>
Set-up of a specific <b>ITS collaboration platform</b> between Member States and regional/ local governments to promote ITS initiatives in the area of <b>urban mobility</b>	Malta plans to establish a platform by 2018.