Detailed Project Update

1. Background

A contract for the Design, Supply Installation and Maintenance (for 5 years, extendable to 7 years) of a Real Time Passenger Information (RTPI) system was signed with ACIS Ltd (Advanced Communication and Information Systems Ltd) on 4 September 2009. This followed a period of negotiation, arising from an extensive tender development and evaluation process begun at the end of 2008.

ACIS Ltd is a highly experienced and leading specialist supplier of RTPI systems. ACIS is UK-based, and is working in Wellington with the broadcast and communications company Kordia as implementation partner, together with other subcontractors.

2. Project scope

The RTPI system will provide accurate arrival time information for bus and local rail services at up to 250 fixed display sites at railway stations, interchange sites and major bus stops. It will also provide the information for every one of the Region's nearly 3000 stations and bus stops, via mobile phone SMS (text) messaging and through the Metlink website.

In addition, the system will provide participating transport operators with operational management tools and reporting capabilities. An aggregated analysis and reporting capability for GW is a fundamental component, and it is expected that the availability and acceptable use of the data generated by the system, will in partnership with operators, enable progressive optimisation of the public transport network.

3. How the system works

Most RTPI systems utilise the same basic principle, with detail variations in the means of determining vehicle location and of communicating the necessary data between vehicles, the central system, and displays and presentation media.

The GW system utilises the geographical location of each vehicle (bus or train), which is constantly and frequently updated via an on-vehicle GPS (Global Positioning Satellite) unit. The unit combines position information with information specific to the route, journey and duty that the vehicle is engaged upon, and communicates the data over the Vodafone mobile phone (GPRS) network to the Central Control and Management System (CCMS).

The CCMS is the heart of the RTPI system, in which the information is used in conjunction with other inputs (such as actual and historic traffic speeds on the relevant network links) to predict journey times, and consequently the time of arrival at the next stop. The prediction information is communicated back out to the fixed street sign locations, and also to interfaces where it feeds the SMS (text) service and Metlink website. The prospective public transport user sees a regularly updated predicted arrival time, which becomes progressively more accurate as the vehicle approaches.

Data can also be communicated back out to vehicles in order to inform drivers of (for example) their schedule adherence, and the relative locations of other vehicles on the same route (to help avoid 'bunching' of buses and so enhance service reliability).

The CCMS performs other important functions, including monitoring of the system performance, and supporting a range of management and reporting tools. These are available to GW as the system owner, and to participating transport operators (as part of their operational interaction with the system), with suitable access controls to ensure that data is protected where appropriate.

A further interface from the CCMS is that with the SCATS traffic light control system. This will be used to generate priority calls into the signal cycle at certain intersections and under defined criteria, for buses running behind their schedules.

4. Structure of the Contract

The RTPI contract comprises a Supply Agreement, covering the design, supply and installation of the System. This is structured to include phases for planning and design, System pilot, and then subsequent roll-out of the system to its full implementation scope.

The contract also incorporates a Maintenance and Support Agreement, which is entered at the point of GW's final acceptance and system takeover, and is valid for a period of five years. Provision is made for extension to seven years, by mutual agreement.

Two formal variations to the contract have been agreed to date. At the time of signature, it was agreed that further evolution of the Schedule covering Service Levels and Key Performance Indicators was possible, and that GW and ACIS would work together to achieve this. A revised Schedule was consequently agreed in January, and provides an enhanced basis for 22 monitored elements of the performance of the system (such as the availability of the system), and for services associated with the ongoing support (such as reactive maintenance response). The resulting performance regime is stringent by industry standards but a mechanism for further evolution is included. There is also a service credit payment structure, providing a defined scale of financial penalties for under-achievement of target service levels.

The second variation covers the Schedule containing the contract payment plan. The original set of payment milestones had been broadly aggregated, and included some of the development work for later activities in early milestones. It has been desirable to isolate a small number of activities from the original milestones, and to establish them as discrete milestones. This is purely a change in the payment profile and has no effect on the overall contract price.

5. Progress to date

In headline terms, the project is proceeding to the contract programme, and is within budget. The majority of activities in the Planning and Design phase are complete, and preparation for the live running element of the Pilot phase is

well advanced. Planning for, and facilitation of, certain activities in the Roll-out phase is taking place in a number of areas.

Progress to date has encountered no insurmountable problems, and the programme has demonstrated its resilience to minor differences in the rates of progress of certain project tasks. The approach and performance of the Supplier have been exemplary, and the deployment of experienced and capable staff, together with an established product, has consistently met or exceeded expectations. In nearly all cases, the interaction with the variety of stakeholders has proceeded on a highly constructive and collaborative basis.

There are several instances where this has meant it has been possible to overcome issues in areas that had been expected to be more problematic. One example of this is in the integration with Metlink systems, where the Supplier's experience with similar systems has allowed the integration to proceed more smoothly than anticipated. This also provides a high level of confidence for dealing with issues that may inevitably arise as the project evolves.

ACIS project engineers have spent three periods in Wellington, and in addition to day-to-day communications, regular weekly project meetings are carried out by phone conference. As the project progresses, and particularly in areas such as the display sign programme (and eventually the maintenance and support functions), local interaction with Kordia will increase significantly.

However, it must not be forgotten that this project is complex and involves a wide range of activities, technologies, interfaces with existing systems and practices, and a number of stakeholders. Some flexibility within the project plan is desirable in order to deal with situations should they arise, without becoming critical.

There has been some recent press comment over 'delays' to the real-time project. This has been in response to the live running element of the Pilot phase being moved slightly further back (by a period of 5 weeks) than was programmed at the time of contract award. It is important to note that the live running element of the Pilot is an activity within the implementation of the overall project, and that the overall completion timetable is not affected by its rescheduling.

This rescheduling is primarily due to the dependence of the Pilot upon the availability of the interface required between the RTPI system and the Snapper on-bus equipment. Development of the interface has been very satisfactorily scoped and specified, is progressing well and simulation testing has been successfully completed. However, it is part of a broader development programme being carried out by a third party, which dictates the timing of its availability.

A benefit of this is that longer-term system benefits arise from the status of the interface as an integrated component of the Snapper system, and in its consequent ongoing support.

This ability to avoid impact on the overall project timeline has been possible due to the incorporation early in the original project plan of a number of activities that were not required until the main roll-out phase. It was considered prudent by the Supplier for scoping and development work on them to begin earlier, due to their relatively unknown content. These include, for example, the interface with the Wellington City Council SCATS traffic control system, and that with the ONTRACK Kupe operational train management system.

5.1 Planning and Design Phase

Although there is little physical evidence, the development of the system components and provision for their integration is well advanced, and is approaching readiness for hosting of the Pilot phase.

There are too many individual project activities to list here, but the following are the main progress highlights for the Planning and Design activities;

- Project baseline documentation has been completed and agreed, including Final System Specification, Pilot Phase Plan, Draft Implementation Plan and Safety Management Plan;

- Draft testing documentation for Pilot acceptance is under review;

- 90% of data flows are successfully established in test environments, with the exception of (commercially sensitive) Go Wellington scheduling data for the Pilot phase;

- GPS performance trials have been completed successfully, and the refinement of GW bus stop GPS database initiated;

- Test integration with Metlink systems has been completed successfully, including data feed from operator systems into the Trapeze scheduling applications, and also into the Metlink website and the SMS (text) aggregation service;

- Seven Territorial Authorities have agreed to the principle of granting generic approvals and consents for display installation works, and work is continuing with Wellington City Council on the unique requirements of the central city area;

- Contractual arrangements between ACIS and their implementation partner and subcontractors are complete;

- Work has begun on development of the interface with the SCATS traffic control system, in liaison with Wellington City Council. The developer's licence has been obtained, but the protocol between the SCATS vendor and Wellington City Council as the licensed user is currently hampering technical development. The interface is not yet a critical element, however.

- Development of the interface with the Snapper on-bus equipment is in progress, and successful simulation testing has been completed;

- Technical exchanges are taking place on the specification and development of the interface with the ONTRACK Kupe operational train management system.

5.2 Pilot Phase

The contract requirements include a Pilot phase. This is designed to evaluate and prove the capability of the system as locally implemented, and in all relevant aspects is an early implementation of the full system. Successful completion of the Pilot requires its operation over a defined period while meeting the range of performance criteria specified in the Contract, and is the basis for the acceptance of the System and approval for its progression to its full roll-out.

The Pilot implementation is being developed in partnership with Go Wellington, and will be hosted on the Route 14 (Kilbirnie to Wilton) service. This service was originally selected as it provides a typical range of operating environments (including terrain, city streets with tall buildings, and transfer through CBD, as well as various vehicle types).

RTPI equipment will be fitted to 25 buses (20 are needed for Route 14 at its peak, but a further 5 provide greater vehicle allocation flexibility for the operator). In addition, a single trolleybus will also be fitted and monitored in parallel with the Pilot. Although not part of the Pilot scope, this is a prudent action to ensure that no trolley-specific RTPI issues are present (although none are anticipated).

The bus equipment consists of a single small electronic unit that houses the GPS, communications, and on-bus computer. It also has a touch-screen driver display (driver interaction is required only if more advanced capabilities are adopted).

The Pilot phase has low visibility from a public point of view, but permits end-to-end testing of all aspects of the entire production-ready system over a continuous period of 30 days, and monitoring for assessment against the agreed key performance criteria.

It is intended that stakeholder inputs that have been developed for the various project activities will be drawn together into a wider project forum as the Pilot phase progresses.

Again, there are too many individual project activities to list, but the following represent the main progress highlights of the Pilot phase;

- The CCMS central server is complete, and was commissioned on 27 January. It is hosted in a dedicated facility managed by Kordia networks at Avalon in the Hutt Valley (which also hosts the National Maritime Operations Centre, and the control centre for the New Zealand television broadcast system). End-to-end testing has been successfully completed and acceptance testing with ACIS applications is currently underway;

- ACIS software for central, local and vehicle applications is installed on the CCMS and is awaiting activation of licences;

- Access to the Vodafone GPRS communication network has been arranged and successfully tested;

- Surveys and method statements for the installation of equipment to Pilot vehicles are complete, and local procurement of wiring looms by specialist subcontractors has begun;

- Arrangements for the installation of Pilot demonstration display sign in GW offices are in hand, with installation expected later in March;

- Workstations at the operator's depot and GW offices are being procured ready for installation;

- The Service Delivery (fault management) Plan, including incident and problem management for GW is under review;

- Pre-Pilot acceptance testing of the necessary system components is partly complete, and the preparation of the Pilot acceptance testing documentation is underway.

The live running trial element of the Pilot phase is scheduled to commence on 29 April.

6. Operator Participation

The hosting of the Pilot phase with Go Wellington is the subject of a formal participation agreement between GW and the operator. The Agreement will apply initially to the execution of the Pilot phase, and is currently under joint development by Go Wellington and GW, with review by other operators.

Since there are a number of areas that the operator will be able to fully assess only once the system is in operation, provision is included for subsequent development of the Agreement using experience gained in the Pilot implementation. This information will be shared with other operators and used to establish a definitive Agreement, which will be consistent between all operators and cover participation in the full roll-out.

The Operator Agreement covers a range of areas, including the operator's use of the system and associated obligations, responsibility for the equipment, its installation and access to maintenance services, how data is handled and protected, training, and health and safety.

Clearly it is necessary to ensure that the parameters for, for example, performance monitoring and data security, are suitably dealt with and do not exceed limits already specified in existing Service contracts. As Service contracts are progressively re-negotiated the RTPI provisions will become integral to them, and it is also expected that the consistently demonstrated operational, management and customer benefits to operators of maximising the

use of such systems and their capabilities, will provide a compelling basis for operators to maintain the system across all of their services, including commercial ones.

In daily use the system is designed to be as automated as possible from the operational management point of view, with buses signing on and off the system automatically via the existing driver journey log-on, which will be unchanged. However, there is the facility for the operator to monitor fleet or service activity in real-time using a range of graphical reporting tools on a dedicated workstation (and to analyse and report on it afterwards). They may also resolve situations by direct communication with the driver, such as advising of incorrect journey sign-on.

The Agreement provides the opportunity for an operator to procure additional equipment or functionality from the Supplier for integration into the System, at their own cost. A large range of functions designed to improve operational efficiency, reliability and business intelligence for the operator are available beyond the RTPI contract scope. Examples include in-vehicle 'next stop' display signs, two-way driver communication, integration with vehicle monitoring systems (such as engine management and maintenance scheduling), driver 'panic' or duress alarm and on-board CCTV integration.

7. System Roll-Out

7.1 Display Signs

The contract provides for the installation of a total of up to 250 real-time display signs, at selected rail stations, interchanges and major bus stops.

Council agreed the ceiling figure of 250 display signs on 30 July 2009, and the contract pricing has been flexibly structured to enable the selection of sites providing the most effective combination of utility for passengers to be balanced with the cost of installation.

The standard street display sign, which will be employed at the majority of locations, is a pole-mounted flag sign, with 3 lines of LED information up to 32 characters in width. It can be configured so the third line provides a scrolling message. The display may also be mounted onto a suitable existing structure, such as a station canopy. Versions of the same sign with either 6 or 9 lines are also available, as are various types of flat ('TFT' type) screens, capable of displaying considerable amounts of data very flexibly, and suitable for use in indoor environments such as concourses.

In addition to the suitability of a particular site from a public transport service point of view, the selection of sites for display installation also needs to take into account factors such as the availability of a suitable power supply (some supplies such as those for street lighting are not permanent and are switched off during daylight hours). Consequently, a programme of site evaluation is underway, which by assessing the relevant factors will generate a schedule of suitable sites for acceptable display installation.

A range of options is also under investigation, which will reduce dependence on the proximity of suitable power supplies, or avoid the cost of having to bring supplies to preferred sites. These include solar-powered units, and a battery-based power supply housed in the sign casing, that accumulates charge from a non-permanent supply during the night, and uses it to power the display during the day.

Initial indications are that the breakdown of sign types will be around 180 pole-mounted 3-line units, a further 20 3-line units mounted on structures (primarily at railway stations), 35 6-line displays at major bus stops with many bus routes, and 15 displays of a suitable flat-screen type, at major interchange locations and at the busiest CBD bus stops.

Although not unique, Wellington is unusual in having such a concentration and high frequency of different bus services on the 'golden mile' section of its CBD. This provides significant challenges for the display of arrival information, since the few lines of even a large display may easily be taken up with services arriving in only the next few minutes. Means of dealing with this problem include 'scrolling' the display of arrivals, but it is the primary reason why the largest flat screen type displays are required for the busiest CBD stops. It also introduces complications for the audio function of the display signs, as an audio presentation of many imminent arrivals can be outdated before it is complete.

Agreement has been reached in principle with 7 of the 8 Territorial Authorities that the necessary approval for the installation of standard signs can be given under a generic consent. In Wellington CBD, there is a requirement that consents are obtained on a site-specific basis, due to the variation in solutions, the need to integrate aesthetically with existing street furniture and urban design criteria, and to co-ordinate with other streetworks.

For some time, the opportunity has been taken to anticipate the future requirements of the installation of display signs. Consequently, where possible in the programme of rail station improvements, suitable ducting has been incorporated in the sub-surface works in order to minimise subsequent disturbance for sign installation. Similarly, the requirements for installation of signs within the proposed Manners Street improvements have been incorporated into the design and costing process for that scheme, and will ensure that suitable foundations and electrical supply are available without the need for further disturbance or expenditure.

Work on the display sign roll-out would be expected to commence alongside the fitting programme for vehicle equipment, which on the current programme would be from October 2010. Sign installations would be expected to take almost a year, with a programme completion date of August 2011.

7.2 Metlink Website and Text (SMS)

An interface between the CCMS and Metlink systems includes a feed to the Metlink website, and has been successfully developed and demonstrated. This will permit the display of predicted arrival times of services on the website

itself, through the Google Transit viewer, and also enable the Service centre staff to relay real-time information to callers.

Although not part of the Pilot phase requirements, the web interface will be operational (though not available for public view) during the live running phase of the Pilot.

Similarly, the real-time feed into the existing aggregation service for txtBUS and txtTRAIN has been established. This will permit users to obtain real-time prediction of arrival time via SMS (text). Currently, the user pays a 20c charge per text transaction (levied by their network provider) to receive Metlink (scheduled) information, and no alteration to the pricing structure is proposed.

The rise of browser-based mobile phone capability, together with the newer generation of I-Phone type handsets, make it highly likely that many people will wish to access Metlink web information from their mobile phone. They will then be subject only to relatively cheap data transmission fees based on usage, rather than a fixed SMS (text) charge.

7.3 Real-time for trains

The scope of the Contract provides for the development of an industry standard interface with ONTRACK's Kupe operational train management system. This interface is currently being developed by ACIS, through technical engagement with ONTRACK. The Kupe system has been developed to obtain real-time data from trains in operation, including their geographical position, direction of travel and proximity to stations, and to assist with management of vehicle maintenance programmes. It does not provide safety-related train control. So far, relatively few trains are Kupe-fitted, but those that are include the Wairarapa and Capital Connection train sets, and the SE train. The Matangi trains will also be Kupe fitted. An earlier generation system based on equipment known as 'Tranzlogs' is fitted to the GANZ suburban train fleet (and the entire diesel locomotive fleet), but will eventually be superseded by Kupe. Both systems will be capable of feeding the RTPI system via the interface being developed under the contract.

The missing component which would allow either Kupe or the Tranzlog system to provide the basis of reliable arrival prediction, is the automatic association of a particular train set to a given journey. Without this linking, the RTPI system will know the position of a train, but not definitively which service it is providing (such as express to Upper Hutt).

In the bus scenario this linking of vehicle location with schedule data is achieved by the RTPI equipment acquiring the information automatically from the ticket machine (for which the correct journey and duty details are fundamental to the validation and sale of tickets). There is no such automated linking on train services, and suitable means of developing manual (driver or train crew) or despatch (train control) methods of achieving this outcome are being investigated with ONTRACK and KiwiRail. Integration of the information with existing platform displays is also under investigation.

Clearly, when the network is operating as intended, the association of specific trains to specific services will be to a predefined plan, which can be utilised to provide the necessary input to the real-time system. However, if and when service disruptions occur (such as train failure or other delay), the predefined plan may require manual updating by train control staff

The development of service linking options would be expected to lead to one or more limited in–service trials, prior to the adoption of a suitable solution. This work also involves Auckland Regional Transport Authority (ARTA) which has similar requirements for the integration of train real-time information into its RTPI system. As this development 'upstream' of the interface with the RTPI system is not included in the contract, its parallel development with ONTRACK and KiwiRail is being progressed to ensure that real-time arrival information can be displayed at stations.

7.4 Bus/Rail Interchange locations

It is desirable for people changing from a bus to a train (or vice versa) to be able to determine how long they need to wait for their connecting service. At bus/rail interchanges, displays are planned both at bus stops and on train platforms, which will provide customers with reassurance over their connection.

The system also has the capability to provide information to bus drivers, by displaying connecting train services in real-time. This will permit bus drivers to know if the train they are timetabled to connect with has arrived yet, and if not, how many minutes away it is.

Monitoring tools would allow GW to monitor the reliability of bus/rail connections, and where necessary refine connecting bus timetables to ensure that services connect reliably.

8. Next steps and timeline

The next major step is the physical preparation for the live running part of the Pilot phase, beginning with the fitting of equipment to the pilot vehicles.

The Pilot phase will be closely monitored throughout its operation, and continually assessed against pre-defined acceptance criteria. Acceptance of the Pilot phase and the subsequent authority to proceed to full roll-out will depend upon its satisfactory performance.

Experience from the Pilot will be taken forward into the main roll-out, and will include the findings which will be used to finalise the Operator Agreement from its Pilot status to the substantive one covering the full roll-out with all operators.

A broad outline of the major next steps and timeline is shown below:

Task	Date
Fitting of equipment to Pilot vehicles	From 24 March 2010
Commencement of Pilot phase live running trial	29 April 2010
Completion of Pilot phase live running trial	29 May 2010
Pilot acceptance and authority to proceed to full roll-out	From mid-June 2010
Completion of Kupe rail interface	From Aug 2010
Progressive availability of Web and SMS (text) information	From Sept 2010
Fitting of vehicle equipment (Go Wellington in 5 tranches)	Sept 2010 to Feb 2011
Fitting of vehicle equipment (Valley Flyer in 3 tranches)	Feb 2011 to April 2011
Fitting of vehicle equipment (Mana Coaches in 4 tranches)	April 2011 to July 2011
Installation of Displays	Oct 2010 to Aug 2011
Final Acceptance and System Takeover	Sept 2011
Period of Maintenance and Support Contract Validity	Sept 2011 – Sept 2016 (or 2018 if extended)

Note that dates from June 2010 are dependent upon successful Pilot acceptance. Also note that no precise 'go-live' date for the system is quoted above. This is because there are a number of possible approaches to phasing the roll-out, which are discussed below.

9. Communication

One feature of the project is that to date, there is little or no physical evidence of its progress, since most activities have of necessity been carried out behind the scenes, or are concerned with the development of ICT-based solutions that will only come into their own as the project develops further.

As there is intentionally no public 'face' to the Pilot phase, the communications requirements are likely to be associated primarily with regular updates and the communication of significant progress milestones, such as the Pilot acceptance. As well as authorising the full roll-out, the Pilot acceptance will include a detailed roll-out plan with 'go live' options developed from the Pilot experience. It will therefore be possible to be more specific about plans and programming as the time approaches.

The development of an associated Communications Plan in partnership with operator stakeholders, following the Pilot acceptance, will be a critical element of the roll-out phase. There are a number of possible approaches to how and when the system formally goes 'live', based on a sign installation programme

related to the planned sequence of bus equipment installations in operator/depot tranches.

Approaches range from a gradual or phased introduction from late 2010, to waiting until all components are installed and operational for a 'big bang' system switch-on from September 2011. Options between these extremes will require as much co-ordination as possible between the vehicle fitting programme and that for the installation and commissioning of display signs. However, there is an underlying logic in essentially working outwards from Wellington CBD, while ensuring that major interchanges and local centres are also prioritised.

Acknowledging that the completion of any of these elements cannot take place 'overnight', even with a phased 'go-live,' there will inevitably be times and locations when for example, displays may be in place and operational for some routes, but not all of the buses passing the site will be real-time equipped. In this transition stage, scheduled times may be displayed. Website and SMS (text) information will be progressively available as buses are fitted and join the system, but it will clearly be undesirable for display signs to be in place, unused, for any significant period prior to commissioning.

Implementation of the rail-based part of the system will be the last phase, and the most appropriate means of rolling it out will be developed in due course. If installed, display signs at stations will be capable of providing scheduled information until full roll-out is complete. Again, a progression outwards from Wellington station on a line-by-line basis is considered to be the most logical and easily communicated option.

10. Real-time images

Fig 10.1: The RTPI central control and management system server, recently commissioned and hosed in Kordia networks dedicated facility at Avalon

Fig 10.2: 'Ashby' pole-mounted display sign (in 3 and 6 line variants) of the type to be installed at the majority of locations

Fig 10.3: On-bus computer and driver display unit

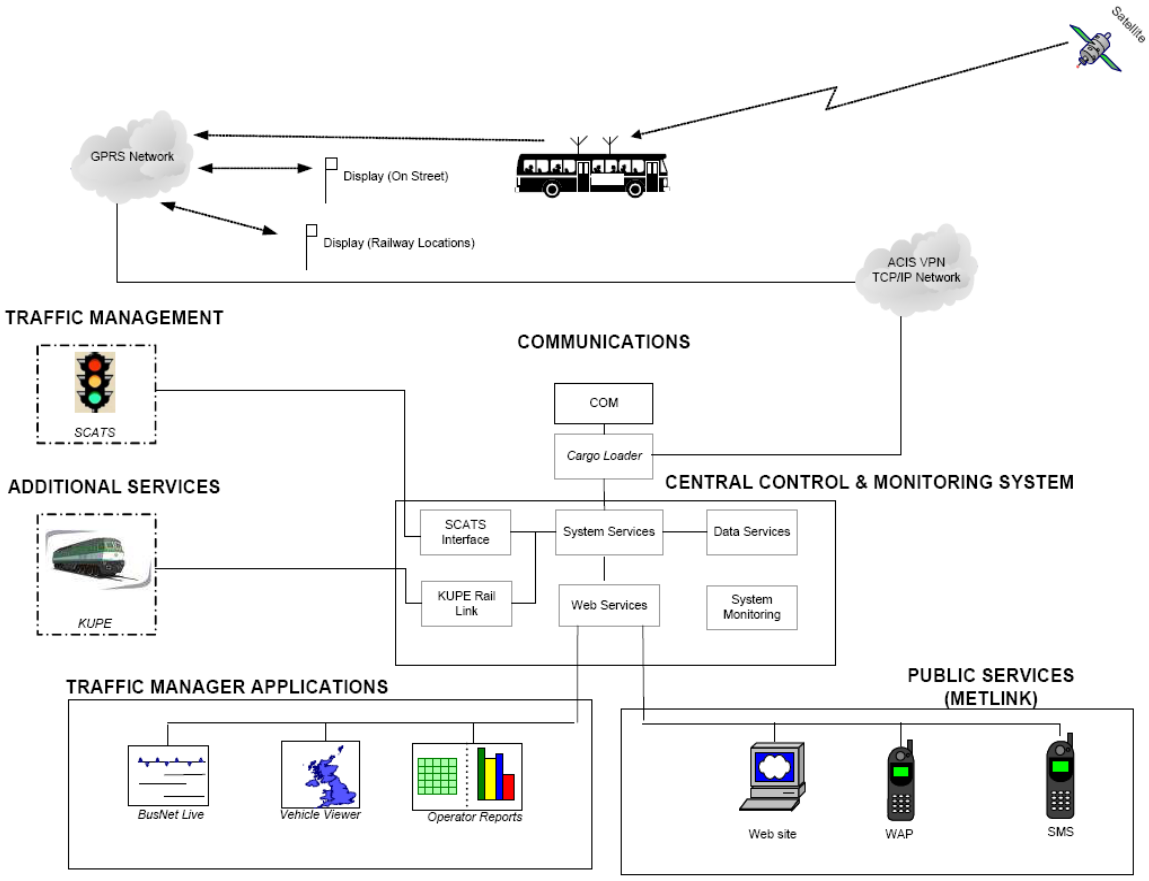

Fig 10.4: Schematic diagram showing the main components of the RTPI system