CHARM ATMS System Provider

HA Interface Requirements Specification

Tender and Award Phase

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Reviewer List

Name	Role
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Approvals

Name	Role	Date	Version
Mark Austin	Team Leader for Architecture and Technology within	20th March 2015	3.1

	CHARM		

Table of Contents

1. Scope

1.1. Identification

The identification for this document is:

CHARM.IRS.EXTERNAL Requirements specification for all external data and road-side interfaces of the Charm ATMS.

1.2. System overview
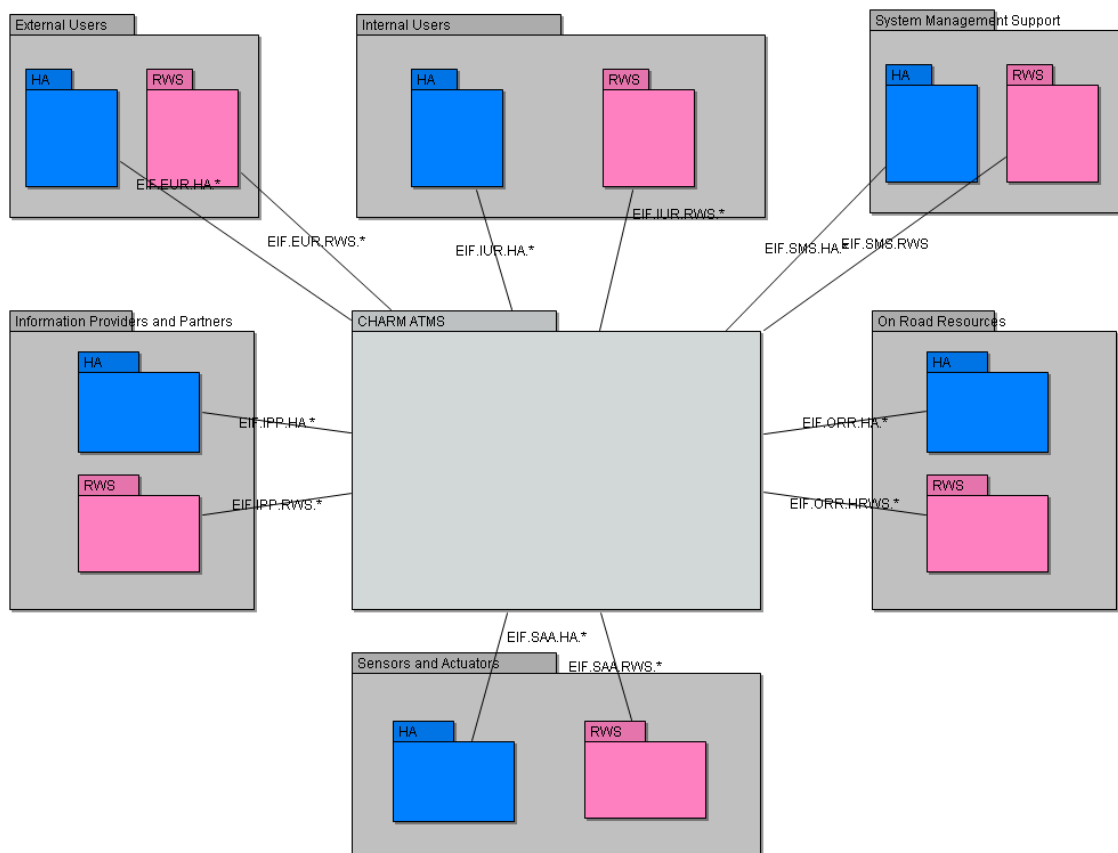
Figure 1 - System Overview

In Figure 1 above, the CHARM ATMS is the system for which this Interface Requirements Specification (IRS) is written and the arrows classify the categories of interfaces.

1.2.1. Interface Identifiers

The interfaces are grouped under a set of identifiers. In this context "external" means external to the Highways Agency. Interfaces within CHARM are the responsibility of the CHARM supplier.

Identifier	Name	Description
EUR	External Users	These interfaces allow third parties, such as local authorities or the public to access CHARM data or functions. With the HA the viewing, and control, of Closed Circuit Television (CCTV) cameras is an example
IPP	Information Providers and Partners	These interfaces relate to organisations and systems that exchange information with the HA. Examples include the HA's HAWCS weather system and the TrafficEngland websites
IUR	Internal Users	These are interfaces to HA internal systems, such as HATRIS and Streamlined Data Services (SDS)
ORR	On Road Resources	These are dedicated interfaces for on-road resources. At present only the radio services provided by TETRA through Airwave are included. New channels to on-road resources will be provided as part of CHARM
SAA	Sensors and Actuators	This group includes all of the on-road devices including signals, VMS and dedicated Emergency Roadside Telephones
SMS	System Managers	These are the defined interfaces for use in managing the system. These are not currently provided by HA systems. CHARM will define new interfaces in this group

Table 1 - Interface Identifiers

1.3. Document overview

1.3.1. **Purpose of this IRS**

This document gives an overview of all the external interface requirements for the CHARM ATMS. The Highways Agency will use this requirement specification within the procurement of the CHARM package.

1.3.2. **Document Structure**

This document is part of a set of documentation following the J-STD-016 standard. (See [J-STD]). The diagram below shows in bold the position of the underlying document in the complete set.

	concept	requirements		design		
System	OCD	SSS	IRS (external)	SSDD	IDD (extern)	
Software Item		SRS	IRS (internal)	SDD	IDD (intern)	DBDD

2. Referenced documents

2.1. Normative

Ref.	Reference, Revision and Issue Date	Title	Source
[J-STD]	EIA/IEEE J-STD-016:1995	Standard for Information Technology – Software Life Cycle Processes – Software development: Acquirer-Supplier Agreement	Withdrawn standard not currently available
[ONVIF]	ONVIF Network Interface Specification Set, version 2.4.1, Dates December 2013	ONVIF Network Interface Specification Set	http://www.onvif.org/
[TETRA]	ETSI EN 300 392 series, Current versions	Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D);	www.etsi.org
[UTMC-FS]	TS003:2009	The Framework Specification	www.utmc.uk.com
[UTMC-OR]	TS004.005.2009	The Objects Registry	www.utmc.uk.com
[UTMC-PR]		The Products Registry	www.utmc.uk.com
[MEYERSYS]	Issue 3.5.0.1.	Meyertech Video Matrix System Protocol Document	Highways Agency, in agreement with Meyertech
[MEYERMST]	Issue 3.5.0.1	Meyertech Video Matrix Master Protocol Document	Highways Agency, in agreement with Meyertech
[RCC BBN]	Marconi RCC-Services Over BBN Issue 2.doc	RCC and HA Services Over the Broadband Network	Data Room

Ref.	Reference, Revision and Issue Date	Title	Source
[NRTS-ERT]	NRTS – ICCS Aggregate Interface description	2-1237-NRTS2-DOC-1305 NRTS ICCS Aggregate Interface v1.0	Data Room
[NTISDATEX]	WA119-08-007-002-03-02-21 v1.00 12 September 2013	External Interface Design Document Datex II Webservice E21-DATEXIISubscibers	Data Room
[NTISMIDAS]	WA119-08-007-002-03-02-01 R2.E01-MIDASGOLD v 1.0 05/02/2014	NIS EIDD NTIS 001	Data Room
[NVRM]	CC4667 HA NVRM Requirements Phase 2 Stage 2 v1 0.pdf	Schedule 1 Statutory Removal Service Append 1 Command & Control Interface Specification	Data Room
[NVRMIF]	C&C/CC4667-002 Issue 1 dated 23/07/2009	Customer Requirements: National Vehicle Recovery Manager Phase 2 Stage 2	Data Room
[PAL]		Recommendation ITU-R BT.470-6, Conventional Television Systems	ITU
[PSNP]	Public Services Network - Protected	Currently available details about the PSNP – however only accredited suppliers (or those passing through accreditation can gain access)	https://polka.pnn.police.uk

Ref.	Reference, Revision and Issue Date	Title	Source
[H264]	H.264 (02/14)	Advanced video coding for generic audiovisual services	ITU
[NTISNOMS]	NIS TECH NTIS 015 Revision 1.0 dated 24/01/14	Functional Design Specification – NOMS to NTIS Events Import	Data Room

Table 2 - References

2.2. Informational

Ref.	Reference, Revision and Issue Date	Title
[AIRWAVE]		http://www.airwavesolutions.co.uk
[DATEX2]	DATEX II Version 1, DATEX II Version 2.3	http://www.datex2.eu
[ESMCP]	Information on future ESMCP requirements.	https://gpsesourcing.cabinetoffice.gov.uk
[TTCQT]	Telephone Text Controller – Question Tree	TTC-QT.zip
[TTCDS]	Telephone Text Controller – Question Tree Design Specification	Telephone Text Controller – Question Tree Design Specification
[TTCSC]	Telephone Text Controller – Source Code	Telephone Text Controller – Source Code
[As-Is applications]	Issue 0.11	HA As-Is Application Descriptions and Requirements
[REQ]	Baseline	CHARM Requirements Catalogue
[HA INFO SEC]	HA Information Security	Requirements in catalogue linked to SSS Requirements SSS.82.1 to 82.29 and those under HA Contract Schedule 2.6

Table 3 - CHARM documents

2.3. Highways Agency Standards and Specifications

These documents are available through one of the following sources:

• Plans Registry - https://tssplansregistry.dft.gov.uk/homepage.asp

- Traffic Technology Division Change Control Board (CCB)
- CHARM Data Room

Ref.	Reference, Revision and Issue Date	Title	Source
[HGS]	1240/001/FS007 issue 2.0	HATMS Gateway Service Functional Specification	Data Room
[5000IMS]	5000/A/01/IMS	Emergency Roadside Telephone Type 354 Inter-Processor Message Schedule	Plans Registry
[AWE3598]	AW3598//1010-002	Highways Agency ICCS/C&C IP Network Design	Plans Registry
[MCE0127]	MCE0127A	MIDAS GOLD System Specification	Plans Registry
[MCE1063]	MCE1063A	NMCS Tunnel Subsystem Specification	Plans Registry
[MCE2201]	MCE2201E	NMCS2 Meteorological Subsystem Functional Specification	Plans Registry
[MCE2212]	MCE2212B	NMCS2 Meteorological Subsystem Third Party System Link Specification	Plans Registry
[MCE2547]	MCE2574A	Hard Shoulder Management Subsystem Server Technical Requirements	Plans Registry
[MCH0018P1]	MCH 0018B (Part 11)	Metrological Subsystems	Plans Registry
[MCH1818]	MCH 1818B	NMCS2 Meteorological Subsystem Site and Configuration Data Document	Plans Registry
[MCH1853]	MCH 1853A	Command, Control and Communications Requirement Overview	Plans Registry
[MCH1506]	MCH1506A	NSPIS C&C Interforce Incident Exchange Interface	Plans Registry
[MCH1514]	MCH1514D	Code of Connection	Plans Registry
[MCH1748]	MCH1748G	NMCS2 System Data Organisation and Format	Plans Registry

Ref.	Reference, Revision and Issue Date	Title	Source
[MCH1856]	MCH1856C	NMCS2 Meteorological Subsystem Overview	Plans Registry
[MCH1959]	MCH1959E	Second Generation CCTV Interface of the CCTV System to the National Roads Telecommunications Contract	Plans Registry
[MCH1960]	MCH1960B	HA 2nd Gen CCTV Management Overview	Plans Registry
[MCH1965]	MCH1965D	Ramp Metering System Requirements Specification	Plans Registry
[MCH1983]	MCH1983A	Emergency Roadside Telephone Type 354 Implementation Guide	Plans Registry
[TR2020]	TR2020I	NMCS2 Message Control Point to Point	Plans Registry
[TR2046]	TR2046J	NMCS Standard Local Communications Controller IP Enabled (LCC-IP)	Plans Registry
[TR2072]	TR2072H	NMCS2 Signal Subsystem	Plans Registry
[TR2132]	TR2132G	NMCS2 Control Office Base System	Plans Registry
[TR2133]	TR2133J	NMCS2 Instation LAN Data Transmission	Plans Registry
[TR2139]	TR2139G	NMCS2 Message Sign Subsystem	Plans Registry
[TR2142]	TR2142F	NMCS2 Motorway Message Control Message Sign Equipment	Plans Registry
[TR2167]	TR2167G	NMCS2 MIDAS LCC Specification	CCB
[TR2173]	TR2173L	NMCS2 MIDAS Message Specification	Plans Registry
[TR2174]	TR2174C	NMCS2 MIDAS System Performance Specification	Plans Registry
[MCH2592]	MCH2592A	HAWIS Data Exchange Manual	Plans Registry

Ref.	Reference, Revision and Issue Date	Title	Source
[NTISDATEX]	WA119-08-007-00-03-02-21 v1.00 Dated 12 September 2013	NTIS Transformation Project, External Interface Design Document: Datex II Webservice, E21-DATEXII Subscribers	Data Room
[NTIS]	NTIS Agreement	NTIS Agreement, in particular schedule 2.3	Data Room

Table 4 - Standards and Specifications

3. Requirements

This section describes each interface identified in the As-Is description [As-Is applications] document, a small number of interfaces that have already been identified as required for CHARM deployment. All mandatory requirements are presented with a prefixed identifier of the form *M:[IRS.xxx.y.z]* and are reproduced from [REQ].

Each interface definition includes:

General Description – providing a background to the purpose of the interface and how it is used.

Sources and Sinks – identifying where the interface information originates and where it is consumed.

Status – a short statement explaining whether it must be supported by CHARM, or expected to be superseded. In some cases the interface will be required immediately on deployment, in other cases it may be possible to defer the support.

Specifications – identifying any documents that define the interface, or provide further information on the interface.

Security Requirements – identifying any specific security arrangement, such as the HA Code of Connection, that the interface will have to meet.

Performance Requirements – a guide to the performance, for example speed of response, that the interface will have to meet.

Quantitative Information – any information on the numbers, volume, capacity etc that will be of use to the CHARM supplier.

Table 5 below lists the interfaces, and when and if they must be provided by CHARM.

Table 5 - Summary of Interface Status

Identifier	Name	Exists	Required
EIF.SAA.HA.NMCS2	Roadside NMCS2	Yes	First deployment
EIF.EUR.HA.VMS	Removed	Removed	Removed
EIF.SAA.HA.MIDAS	Roadside MIDAS	Yes	First deployment
EIF.IPP.HA.MIDAS	MIDAS GOLD	Yes	First deployment
EIF.SAA.HA.MET	Roadside Met	Yes	First Deployment
EIF.SAA.HA.TUN	Tunnel Systems	No	Met by UTMC / DATEX II.
EIF.SAA.HA.UTMC	UTMC I/F	Currently standalone	First deployment
EIF.SAA.HA.LIGHT	Removed	Removed	Removed
EIF.SAA.HA.RAMP	Interface Removed	Interface Removed	Interface Removed
EIF.SAA.HA.MVMS	Interface Removed	Interface Removed	Interface Removed
EIF.SAA.HA.DDS	Dynamic Display System	Yes	First deployment
EIF.IPP.HA.HGS	RCC LAN to NTIS HGS	Yes	First deployment
EIF.EUR.HA.CCTV	TVBS to HA CCTV	Yes	First deployment
EIF.EUR.HA.HVCG	HVCG to HA CCTV	Yes	First deployment
EIF.SAA.HA.VIA	Removed	Removed	Removed

Identifier	Name	Exists	Required
EIF.SAA.HA.CCTV	Roadside CCTV	Yes but may be changed to new ONVIF standard	First deployment
EIF.SAA.HA.NVR	NVR - Video Recording	Yes	First deployment
EIF.SAA.HA.LVM	Local Video Matrix	Yes but the HA are open to options that remove the need for the Local Video Matrix (LVM)	First deployment
EIF.SAA.HA.ERT	Motorway ERT (Voice)	Yes	First deployment
EIF.SAA.HA.TTC	Motorway ERT (Data)	Yes	First deployment
EIF.SAA.HA.PSTN	PSTN	Yes	First deployment
RCC Cross-Boundary	Removed	Removed	Removed
EIF.ORR.HA.TETV	Airwave (Voice)	Yes	First deployment
EIF.ORR.HA.TETD	Airwave (Data)	Yes	First deployment
EIF.IPP.HA.POLICE	C&C system, including the Police and HA Legacy C&C	Yes	First deployment
EIF.IPP.HA.NVRM	C&C to NVRM	Yes	First deployment

Identifier	Name	Exists	Required
EIF.IPP.HA.PNC	Police National Computer	Yes	First deployment
EIF.SAA.HA.VIDEO	Video streaming	Yes	First deployment
EIF.SAA.HA.TMU	Removed	Removed	Removed
EIF.SAA.HA.TAME	Removed	Removed	Removed
EIF.SAA.HA.ANPR	Interface Removed	Interface Removed	Interface Removed
EIF.IPP.HA.INRIX	Removed	Removed	Removed
EIF.IPP.HA.HAWCS	HAWCS Services	Yes	First deployment, but will not be used until 2018
EIF.IPP.HA.DTX2	Datex II V2.0 Service	Yes	First deployment
EIF.IPP.HA.DTX1	Datex II V1.0 Service	Yes	First deployment
EIF.IUR.HA.HATRIS	NTIS traffic data to HATRIS	Yes	First deployment
EIF.IUR.HA.EXTRACT	Removed	Removed	Removed
EIF.IUR.HA.DW	Removed	Removed	Removed
EIF.IUR.HA.EMAIL	E-Mail	No	First deployment
EIF.IPP.HA.WEB	Removed	Removed	Removed

Identifier	Name	Exists	Required
EIF.IUR.HA.SDS	Streamlined Data Services	Interface Removed	Interface Removed
EIF.ORR.HA.ESN	Removed	Removed	Removed
EIF.IUR.HA.NOMS	Removed	Removed	Removed
EIF.IPP.HA.TMC	Non-HA TMC Information Exchange	No	First deployment
EIF.IUR.HA.TRAFFIC	Removed	Removed	Removed
EIF.IPP.HA.EXCHANGE	Removed	Removed	Removed
EIF.IPP.HA.DVLA	Vehicle Information	Yes	First deployment

3.1. EIF.SAA.HA.NMCS2 – Roadside NMCS2

3.1.1.   General description

The National Motorway Communications System 2 (NMCS2) describes the architecture and protocols for managing roadside devices. Within that architecture the National Roads Telecommunications Service (NRTS) provides an interface between the existing Highways Agency Traffic Management System (HATMS) Local Communication Controllers (LCC) and a set of roadside devices including:

- Signals – displaying advisory/mandatory speed limits and lane controls;
- Variable Message Signs (VMS) – displaying text and pictograms;
- Fog Detectors – measuring visibility, specifically fog;
- Ambient Light Monitors (ALM) – measuring illumination levels at the road side.

NRTS supports a network of IP Translators (IPT) that provide the physical communication path to the devices while providing a conventional IP network interface for CHARM. Figure 2 illustrates the As-Is infrastructure and the elements to be replaced by CHARM.

The LCC and Control Office Base System (COBS) are responsible for maintaining communications with the roadside devices and for managing the ALM functions. However the HATMS subsystems, such as Met, Signals and Message Sign Subsystem (MSS) are responsible for monitoring the health of devices, reporting their status and managing output requests.

All of the roadside devices must be polled for status at frequent intervals because their health is critical to Regional Control Centre (RCC) management of the network. LCC and COBS perform the physical polling but the functional subsystems interpret and present the status information.

Signals and VMS are used to implement a range of operational regimes, including Managed Motorways and Queue Protection. The functional subsystems (signals and VMS) arbitrate requests and use business rules to determine the full set of outputs required. They then send device specific messages to the roadside, through COBS and the LCC.
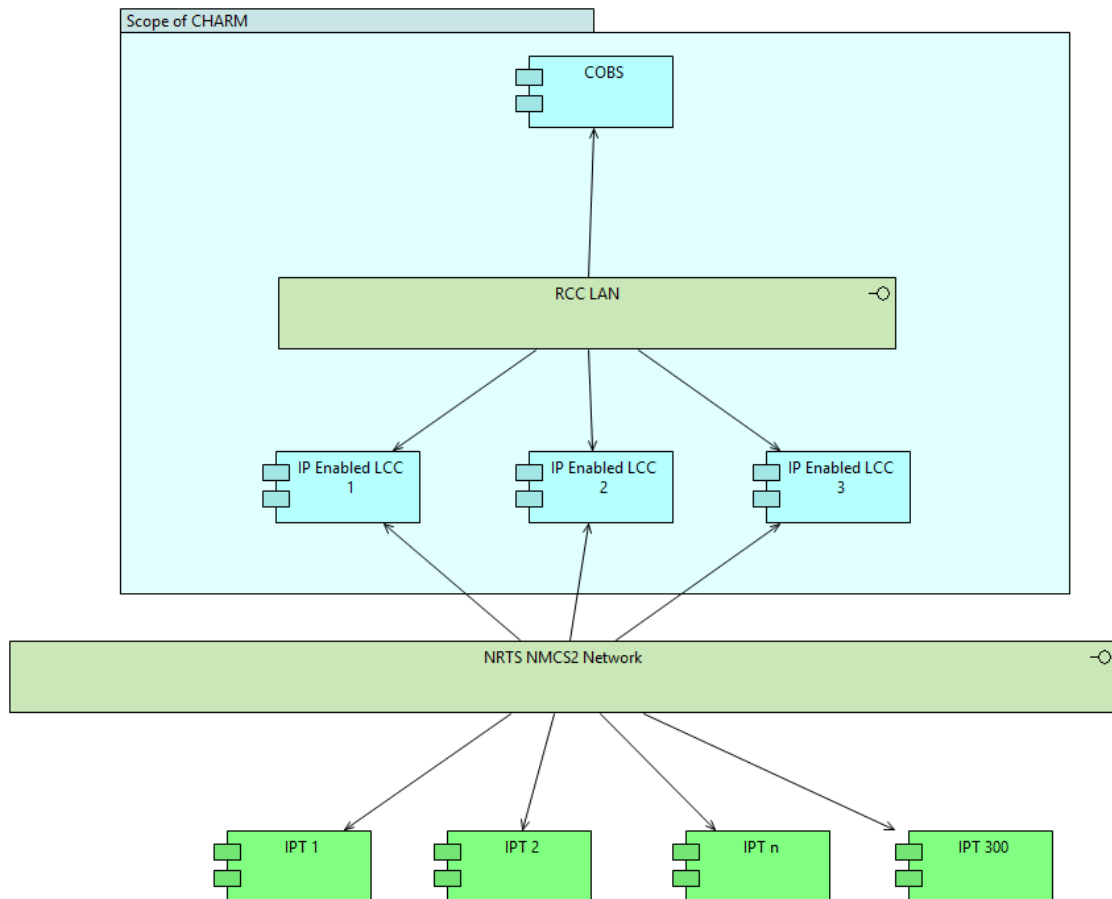
Figure 2 - Roadside NMCS2 Architecture

3.1.2. Sources and Sinks

All of the information obtained from the roadside devices will be consumed by the CHARM system.

Control information sent to roadside devices is used to drive the outputs on those devices. All of the roadside devices are owned and managed by the HA or under contract to the HA.

3.1.3. Status

Roadside devices have a life of up to 20 years and so the Roadside NMCS2 interface will have to be supported throughout the life of CHARM.

However there is an expectation that new devices will be different, perhaps reporting health separately to a new system while still providing more relevant status information to CHARM.

3.1.4. Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

- [TR2020], [TR2046], [TR2072], [TR2132], [TR2139]

3.1.5. Security Requirements

M:[IRS.116.1.1] *In addition to the overall security requirements identified in [HA INFO SEC] this interface uses connections to the NRTS roadside network and must therefore conform to the HA Code of Connection, [MCH1514].*

3.1.6. Performance Requirements

Response time required for the control and management of roadside devices are contained within the relevant specifications.

Operational regimes, such as Queue Protection, have defined performance measures that define a maximum time from detection of a condition to signal setting. In addition there is need for operator perception of the system response time to be similar or superior to the current HATMS implementation. The following requirements are indicative until agreed with the HA.

M:[IRS.116.2.1] *CHARM must be able to receive a request for a signal setting from either an automatic process or an operator, process the business rules to determine all of the device settings required and send the required setting requests within 1 second.*

M:[IRS.116.2.2] *CHARM must be able to manage the number of devices identified in the quantitative information for 2016 and the next 10 years*

M:[IRS.116.2.3] *CHARM must be able to meet performance requirements during times of peak loading. Information is available from the HA on setting requests that can be analyzed to identify peak loadings.*

3.1.7. Quantitative Information

The table below provides an estimate of the number of devices currently installed on the HA's network. It also provides a indicative forecast of device quantities in 2016 and 2026.

2016 and 2026 forecasts assume a steady deployment of Smart Motorways over the next 10-15 years.

Table 6 - Installed Devices

Number of Devices	2014	2016	2026
Signals	4987	6000	8000
Variable Message Signs	2702	3000	4000
- of which using multipart messages	2517	3000	4000
Fog Detectors	83	90	90
Ambient Light Monitors	423	500	600

The table below provides an estimate of the number of setting requests sent per month to roadside devices as a result of operator requests (manual) and those generated by systems (automatic).

Table 7 - Setting requests

Device Settings	2014	2016	2026
Signals - manual		275,000	330,000
Signals - automatic		1,800,000	2,700,000
VMS - manual			46,200
VMS - automatic		2,160,000	3,240,000

For information the sources of the automatic setting requests are broken down below:

Table 8 - Automatic Setting Sources

Settings by source	2014	2016	2026
VMS by NTIS	475,000	570,000	855,000
VMS by MIDAS	505,000	606,000	909,000
VMS by Met	11,000	13,200	19,800
VMS by HSM and Tidal Flow for lane control	13,000	15,600	23,400
VMS by business rules from signal settings	330,000	396,000	594,000
Signals by MIDAS	1,200,000	1,440,000	2,160,000
Signals by Met	140,000	168,000	252,000
Signals by HSM and Tidal Flow for lane control	120,000	144,000	216,000

Currently devices are polled for status very frequently, many times per second, but this is not felt to be necessary for CHARM and so current message volumes have not been provided. Suppliers can calculate the

required message load for status from the requirements identified for monitoring devices.

3.2. EIF.EUR.HA.VMS - ROAMS VMS Access - Removed

3.3. EIF.SAA.HA.MIDAS - Roadside MIDAS

3.3.1. General description

NRTS provides an interface between the existing HATMS Motorway Incident Detection and Automatic Signalling (MIDAS), Local Communication Controllers (LCC), and the MIDAS Outstations.

Where an installed MIDAS Outstation does not provide direct communication with the MIDAS LCC, NRTS provides IP Translators to emulate the direct communications.

Figure 3 illustrates the As-Is infrastructure and the elements to be replaced by CHARM.

The MIDAS LCC and MIDAS are responsible for maintaining communications with, and managing, the MIDAS Outstations including monitoring their health of devices, reporting their status and soliciting traffic data.

All of the MIDAS Outstations must be polled for status at frequent intervals to ensure that traffic data is collected in a timely manner. There are performance measures on the National Traffic Information Service (NTIS) that require Traffic Data to be collected within 1 second of the expected generation time.

Alert messages are generated by the MIDAS Outstations asynchronously as they are generated and so a permanent connection must be maintained to each MIDAS Outstation and IPT.

MIDAS Outstations are configured by MIDAS with a set of alerts algorithms, which can be disabled or enabled during operation. The algorithms are used to generate congestion and queue protection alerts.

The MIDAS Outstations also collate traffic data from each lane and against a set of vehicle types (as determined by length and number of axles) which is collected by the MIDAS LCC every minute.
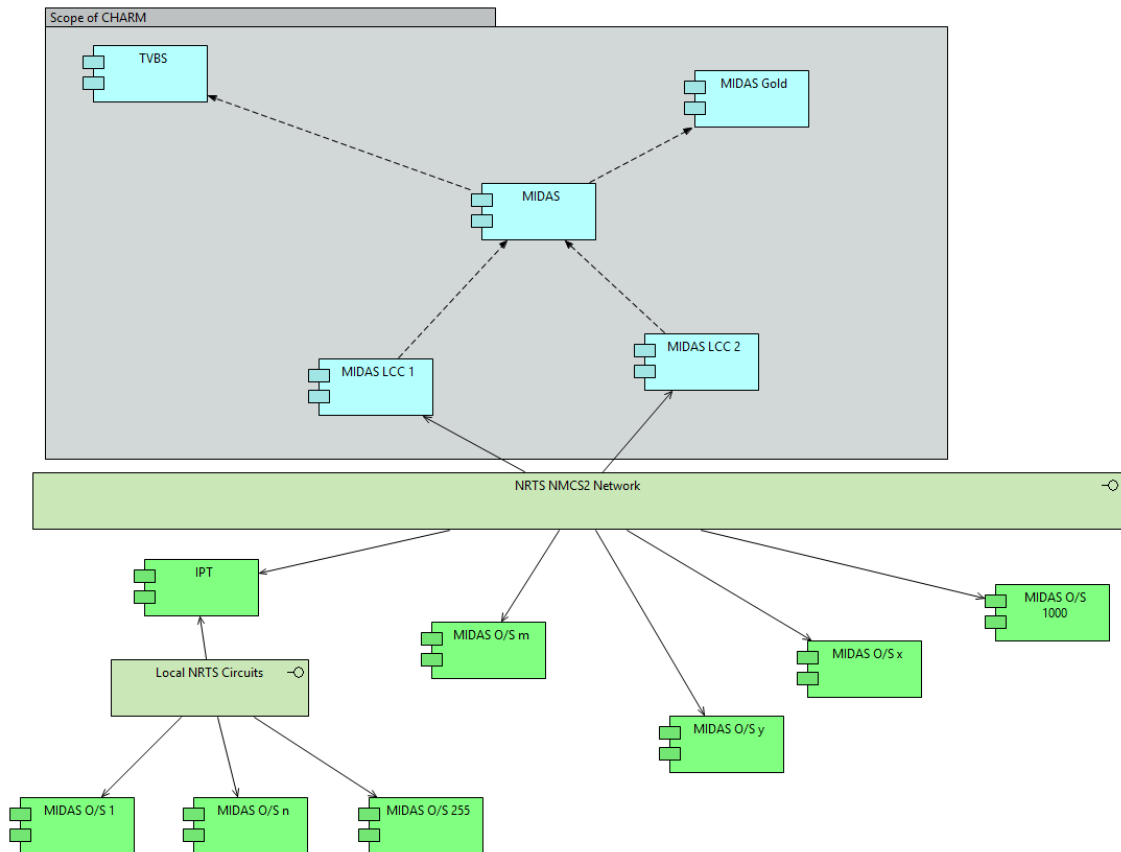
Figure 3 - Roadside MIDAS Architecture

3.3.2. Sources and Sinks

Traffic data is received from the MIDAS outstations. CHARM will receive other traffic information, but not on this interface.

The information is used internally for implementing operational regimes, such as Controlled Motorways. The data is archived for later analysis. It is also published immediately, using MIDAS GOLD, to NTIS and a small number of research organisations. Finally there is a bespoke link to the current CCTV system, the Television Base Station (TVBS), which processes traffic alerts to display images on the Dynamic Display System (DDS).

3.3.3. Status

Roadside devices have a life of up to 20 years and so the Roadside MIDAS interface will have to be supported throughout the life of CHARM.

New traffic measurement devices will be added to the Strategic Road Network (SRN) during CHARM's deployment that will employ different measurement techniques and technologies. However the physical interface to CHARM is expected to be similar.

However there is an expectation that new devices will be different, perhaps reporting health separately to a new system while still providing more relevant status information to CHARM.

3.3.4. Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

• [TR2167], [TR2173], [TR2174]

3.3.5. Security Requirements

M:[IRS.118.1.1] In addition to the overall security requirements identified in [HA INFO SEC] this interface uses connections to the NRTS roadside network and must therefore conform to the HA Code of Connection, [MCH1514].

3.3.6.   Performance Requirements

MIDAS has a number of performance requirements that affect CHARM. The following requirements have been extracted from existing specifications and are indicative until agreed with the HA.

M:[IRS.118.2.1] CHARM must initiate the planned response to an alert within 1 second of receiving the alert information.

M:[IRS.118.2.2] CHARM must solicit and process Traffic Data generated by MIDAS Outstations within 15 seconds.

M:[IRS.118.2.3] CHARM must be able to manage the number of MIDAS outstations and associated reporting sites identified in the quantitative information for 2016 and the next 10 years.

M:[IRS.118.2.4] CHARM must be able to meet performance requirements during times of peak loading. Information is available from the HA on the number of alerts received during peak periods.

3.3.7. Quantitative Information

The table below provides an estimate of the current number of outstations, with their commissioned sites, together with forecasts for 2016 and 10 years later, based on a steady roll-out of Smart Motorways. Traffic data is received for each lane at each site every minute.

Table 9 - MIDAS Devices and Sites

Number of Devices	2014	2016	2026
Outstations	4,771	6,000	8,000
Sites	9,000	12,000	16,000

MIDAS outstations are the principal source of signal and sign setting within HATMS. The trigger for this are the alerts for speed (low), flow (high), queues forming (slow vehicles) and vehicles presence (when vehicles use the closed hard shoulder). The tables below show the number of alerts in an average hour in one of the larger RCCs and a national figure. Peak time values will be much higher. Data is available from the HA that can be used to estimate peak-time load.

Table 10 - Alerts Raised per hour at West Midlands RCC

Alerts Raised	2014	2016	2026
Speed	150	180	270
Flow	299	359	538
Queue	2,500	3,000	4,500
Vehicle presence	500	600	900

Table 11 - Alerts raised across England each day

Alerts Raised	2014	2016	2026
Speed	11,250	13,500	20,250
Flow	22,425	26,910	40,365
Queue	187,500	225,000	337,500
Vehicle presence	37,500	45,000	67,500

3.4. EIF.IPP.HA.MIDAS - MIDAS GOLD

3.4.1. General description

MIDAS Traffic and alert data is published as a simple web service.

3.4.2. Sources and Sinks

The publication is generated by MIDAS GOLD and then re-published within NTIS as a DATEX II publication.

3.4.3. Status

The regional MIDAS GOLD publications to MIDAS Gold Central must be provided for each region as the ATMS is rolled out by TMC region.

3.4.4. Specifications

This document describes the internal web service for MIDAS data used by NTIS.

- [MCE0127]

3.4.5. Security Requirements

Not required

3.4.6. Performance Requirements

Not required

3.4.7. Quantitative Information

Not required

3.5. EIF.SAA.HA.MET - Roadside Met

3.5.1. General description

Alongside some motorways there are meteorological devices measuring fog (visibility), ice or wind levels. Some of these devices are connected by the NMCS2 LCC but this section is concerned with those connected directly to the Met application.

The Meteorological (Met) subsystem shows these devices on the WOIF maps and their status including wind speed and direction. It also automatically triggers plans, usually with operator assistance, when levels exceed specified limits. Fog detectors report a status that is related to visibility distance, known as the Measured Visibility Range (MVR), Anemometers measure the wind speed in miles per hour (mph) and the ice detectors measure the depth of ice in millimetres.

The Met subsystem currently provides a third party interface but this is not thought to be in use.

3.5.2. Sources and Sinks

Meteorological data, principally about wind and fog is received from the weather stations. CHARM will receive other weather information, but not on this interface.

The information is used internally for implementing processes, response plans, such as automatic fog signalling. The data is archived for later analysis. There is also bespoke link for 3rd parties to connect to, which is believed not to be in use at present.

3.5.3. Status

These devices will have to be supported by CHARM on deployment although in the longer term they may be taken over by the HA Weather Information Service (HAWIS).

The third-party link should not be needed as its functions can be provided through standard publications.

3.5.4. Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

- [MCH0018P1], [MCH1856], [MCE2201], [MCE2212], [MCH1818]

3.5.5. Security Requirements

M:[IRS.120.1.1] In addition to the overall security requirements identified in [HA INFO SEC] this interface uses connections to the NRTS roadside network and must therefore conform to the HA Code of Connection, [MCH1514].

3.5.6. Performance Requirements

M:[IRS.120.2.1] CHARM will have to monitor the roadside devices as least as often as the current systems, which are required to be able to monitor up to 500 devices for each RCC within 2 minutes. This equates to up to 1400 devices nationally in the same 2 minute window.

3.5.7. Quantitative Information

The table below provides an estimate of the current number of devices supported on this interface together with forecasts for 2016 and 10 years later. An assumption has been made that future meteorological information will be provided through web services from HA Weather Central System (HAWCS) or similar systems.

Table 12 - Installed devices

Number of Devices	2014	2016	2026
Anemometer	33	33	33
Fog Detectors	53	53	53
Ice Detectors	5	5	5
Present Weather detectors	13	13	13
Visibility sensors	25	25	25

3.6. EIF.SAA.HA.TUN - Tunnel Systems - Removed

3.7. EIF.SAA.HA.UTMC - UTMC I/F

3.7.1. General description

There are a small number of HA owned and managed Urban Traffic Management Centres (UTMC) systems, generally managing traffic lights on entry to motorway junction roundabouts. These are currently managed as separate installations, with no exchange or interaction with other RCC systems.

3.7.2. Status

Control of traffic lights at junctions will remain an RCC responsibility for many years. There will therefore be a need to provide a service to RCC operators to manage them.

It has been reported that the HA's UTMC systems support a number of other devices, including CCTV and traffic counters. These devices will be modified to use the HA's standard infrastructure.

The existing systems use a number of proprietary interfaces, with some use of UTMC standards. The HA will agree with the CHARM supplier the future role of UTMC and its interfacing with CHARM.

3.7.3. Sources and Sinks

UTMC is currently a separate system and therefore has no sources or sinks for data outside of the local system.

The data is used for operator displays in the RCC, which are currently unused.

3.7.4. Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

- [UTMC-FS], [UTMC-OR], [UTMC-PR]

3.7.5. Security Requirements

M:[IRS.122.1.1] The interface must meet the overall security requirements identified in [HA INFO SEC].

3.7.6. Performance Requirements

M:[IRS.122.2.1] UTMC systems are supervisory and so performance requirements relate to the timely presentation of traffic light status and prompt handling of operators requests.

3.7.7. Quantitative Information

UTMC systems are installed in three RCCs (South West, Eastern and South East) controlling lights on up to 10 junctions.

3.8. EIF.SAA.HA.LIGHT - Removed

3.9. EIF.SAA.HA.RAMP - Ramp Metering I/F

3.9.1. General description

Ramp metering is used by the HA to smooth traffic flows at junctions using specialist outstations. An application is provided to use a supervisory interface to view status and perform some simple management, such as changing the pre-set plan.

The HA do not expect CHARM to interface with the legacy ramp metering controllers, the requirement is to support the integration of new devices

3.9.2. Sources and Sinks

The existing Ramp Metering systems are standalone at the roadside with access through a browser interface from RCCs.

3.9.3. Status

The HA would like to integrate Ramp Metering devices in future, using either an existing ATMS interface such as UTMC / Datex II or alternatively implemented through a separate project to develop and implement a new interface. The functional requirements in the Requirements Catalogue apply, however as actual devices will not exist, the actual interface to the ramp metering controller is not defined and is out of scope.

3.9.4. Specifications

The HA do not expect CHARM to interface with the legacy ramp metering controllers.

3.9.5. Security Requirements

As no interface exists, there are no identified security requirements.

3.9.6. Performance Requirements

There are no identified performance requirements.

3.9.7. Quantitative Information

As no interface exists, there is no quantitative information.

3.10.   EIF.SAA.HA.MVMS - Mobile VMS

3.10.1.   General description

Mobile VMS are used across the network in variety of roles. They are set using proprietary methods, including text message and local set-up. Their locations are only recorded manually.

Currently the RCC have no access to or information about mobile VMS, except as noted by mobile patrols or provided informally by maintainers. This affects their ability to manage the network in those locations.

The HA do not expect CHARM to interface with the legacy Mobile VMS, the requirement is to support the integration of new devices.

3.10.2.   Sources and Sinks

The existing Mobile VMS systems are standalone at the roadside with limited remote access and are not expected to be connected.

3.10.3.   Status

The HA would like to integrate mobile VMS in future, using either an existing ATMS interface such as UTMC / Datex II or alternatively implemented through a separate project to develop and implement a new interface. The functional requirements in the Requirements Catalogue apply, however as actual devices will not exist, the actual interface to mobile VMS is not defined and is out of scope.

3.10.4.   Specifications

As no interface exists, there are no identified specifications.

3.10.5.   Security Requirements

As no interface exists, there are no identified security requirements.

3.10.6.   Performance Requirements

There are no identified performance requirements.

3.10.7.   Quantitative Information

As no interface exists, there is no quantitative information.

3.11. EIF.SAA.HA.DDS

3.11.1. General description

The DDS is a specialist product that can accept a large number of video inputs and organise them as a single large multi-screen image. A system interface is provided by each of the system providers to allow systems to manage the mapping and arrangement of video images within the multi-screen image. The various control centres have DDS from various manufacturers and at first implementation, the ATMS is expected to have implemented and tested interfaces to all the below types of DDS controller.

Six HA TMCs:

Electrosonic Quantum Elite ES3200 VN Commander

One HA TMC:

Mitsubishi VC-X3000 Display Wall Processor

There is a further bespoke DDS, that is currently out of scope as the specification cannot be located.

3.11.2. Sources and Sinks

Control is from the TVBS at present with commands accepted by the DDS equipment.

3.11.3. Status

The DDS equipment is expected to be retained and so will need to be controlled.

3.11.4. Specifications

The Electrosonic and Mitsubishi specifications are available from the respective companies.

3.11.5. Security Requirements

This system is internal to each TMC.

M:[IRS.155.1.1] The interface must meet the overall security requirements identified in [HA INFO SEC]

3.11.6. Performance Requirements

M:[IRS.155.2.1] The system must appear responsive to user commands.

3.11.7. Quantitative Information

Not applicable.

3.12. EIF.IPP.HA.HGS - RCC LAN to NTIS HGS

3.12.1. General description

Within the current RCC systems the NTIS systems communicate with HATMS using a bespoke subsystem, HATMS Gateway Service (HGS).

HGS appears to the COBS as a standard subsystem, conforming to TR2133 for messages. It also uses FTP access to HATMS configuration data, described in MCH1748 and associated documents. It appears to NTIS as a series of XML/SOAP web services to NTIS. These services include:

Publication of signal and VMS status

- Publication of hard shoulder status
- Service to enable NTIS to set message signs
- Publication of HATMS configuration data

3.12.2. Sources and Sinks

The HATMS application is the source of information on this interface.

NTIS is the sink for the information which it publishes on web services to the public and on the TrafficEngland website.

3.12.3. Status

The ATMS is expected to replicate the current web services interface provided by HGS. The NTIS service will be changed (under a separate project, out of scope of CHARM) to connect to ATMS in order to maintain communication until the ATMS application is rolled out into the NTIS function by the Agency in 2018."Specifications

The following documents are relevant to this interface

- [HGS]

3.12.4. Security Requirements

M:[IRS.127.1.1] *In addition to the overall security requirements identified in [HA INFO SEC] this interface uses connections to the NRTS Wide Area Network (WAN) and must therefore conform to the HA Code of Connection, [MCH1514].*

M:[IRS.127.1.2] *CHARM will also have to be compliant with the NTIS Code of connection, for which a specification is not yet available.*

3.12.5. Performance Requirements

M:[IRS.127.2.1] The interface must meet the performance requirements on the delivery of information as defined under the NTIS specification..

3.12.6. Quantitative Information

HGS has to pass information about each signal and VMS setting to NTIS. Earlier sections provide the number of those settings generated.

NTIS sets more than 450,000 VMS messages each month, mostly for the journey time displays.

3.13. EIF.EUR.HA.CCTV - TVBS to HA CCTV

3.13.1. General description

The HA provides video imagery to websites and other HA projects through the HA CCTV system. Currently HA CCTV has an interface to the TVBS to manage the imagery being displayed.

3.13.2. Sources and Sinks

The HA CCTV clients make requests for camera switches through a local TVBS. Switching is performed by NRTS outside the scope of CHARM.

3.13.3. Status

HA CCTV is a service that the HA intend to continue to provide and therefore one that CHARM will have to support through implementing the capabilities and interfaces of the TVBS.

3.13.4. Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

- MCE2239 – Television Base Station Specification
- [MCH1960] Section 2.2

3.13.5. Security Requirements

M:[IRS.128.1.1] In addition to the overall security requirements identified in [HA INFO SEC] this interface uses connections to the NRTS WAN and must therefore conform to the HA Code of Connection, [MCH1514].

3.13.6. Performance Requirements

None identified outside of those specified by the interface specifications.

3.13.7. Quantitative Information

The table below provides an estimate of the current number of cameras supported on this interface together with forecasts for 2016 and 10 years later. An assumption has been made that the number of cameras is likely to increase significantly. Fixed cameras are used to monitor the hard shoulder, an activity likely to become more important.

Table 13 - Installed devices

Number of Devices	2014	2016	2026
PTZ Cameras	3,500	4,000	5,000
Fixed cameras	628	1,000	2,000
Monitor outputs	500	500	600

CCTV is used extensively by operators the table provides an estimate on the number of switching requests per day over the next few years

Table 14 - Switching Requests per day

Number of Devices	2014	2016	2026
Switching requests	500,000	650,000	1,000,000

The table illustrates the average number of concurrent video connections per Regional Control Centre (RCC) at present and how it is forecast to increase.

Table 15 - Concurrent connections in a typical RCC

	2014	2016	2026
Average concurrent connections per RCC	280	300	400

3.14. EIF.EUR.HA.HVCG - HVCG to HA CCTV

3.14.1. General description

The HA provides video imagery to websites and other HA projects through the HA CCTV system. Currently HA CCTV has an interface to the Highways Agency video client access gateway (HVCG) to manage access rights and permissions of the imagery being displayed.

3.14.2. Sources and Sinks

The HA CCTV systems and TVBS make requests for CCTV permissions to the HVCG.

3.14.3. Status

HA CCTV is a service that the HA intend to continue to provide and therefore one that CHARM will have to support through maintaining existing capabilities and interfaces that the HVCG supplies. There is a single HCVG in use within the Agency's CCTV infrastructure and CHARM will need to replace its capabilities from first deployment. Whilst the CHARM ATMS is being rolled out, it will have to replace the existing HVCG in use by non-CHARM TMC TVBSs and other HA CCTV services and support all current HVCG functions. This is so HVCG services (such as arbitration between users, and blanking of required video streams) are maintained during the rollout. Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

- MCE2247 – Video Information Highway Video Client Gateway Specification

3.14.4. Security Requirements

M:[IRS.129.1.1] In addition to the overall security requirements identified in [HA INFO SEC] this interface uses connections to the NRTS WAN and must therefore conform to the HA Code of Connection, [MCH1514].

3.14.5. Performance Requirements

None identified outside of those specified by the interface specifications.

3.14.6. Quantitative Information

There are a relatively small number of users of HA CCTV who need access to the HVCG, less than 20 per RCC. It is reasonable to assume that there will be less than 1000 requests per day nationally, with most occurring between 8 and 9:30 each morning.

HA-IRS, Version 4.0, 14 April 2015

3.15. EIF.SAA.HA.VIA - TVBS to Video Incident Analysis

3.15.1. General description

The Video Incident Analysis application receives streams of video from NRTS and then, using image analysis, reports when an incident may have occurred. This trigger is sent to the TVBS.

3.15.2. Sources and Sinks

The Video Incident Analysis application is the source of information to the TVBS, which processes the trigger and then displays video to operators according to a set of business rules.

3.15.3. Status

The value of Video Incident Analysis is being considered by the HA, as well as how best to integrate it with other HA systems. CHARM will not need to meet the present interface, but will need to provide a facility for other systems to request camera switches (in line with the capabilities of the TVBS, that is in scope of CHARM)..

3.15.4. Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

- [MCH1960]

3.15.5. Security Requirements

M:[IRS.130.1.1] In addition to the overall security requirements identified in [HA INFO SEC] this interface uses connections to the NRTS WAN and must therefore conform to the HA Code of Connection, [MCH1514].

3.15.6. Performance Requirements

None identified outside of those specified by the interface specifications.

3.15.7. Quantitative Information

The current system in the North West RCC presents between 1 and 40 alerts per day, with an average of fewer than 10 per day.

3.16. EIF.SAA.HA.CCTV - Roadside CCTV

3.16.1. General description

Permanent (non-mobile) CCTV cameras, whether fixed hard shoulder or Pan-Tilt-Zoom (PTZ) cameras are controlled under a Highways Agency owned interface. Connection to cameras is managed through NRTS with telemetry passing over IP and analogue video in the PAL format. Whilst the NRTS network will digitise the video for transmission, on leaving the NRTS network, it is decoded back into analogue PAL video.

The figure below illustrates the CCTV architecture:

Figure 4 - CCTV Architecture

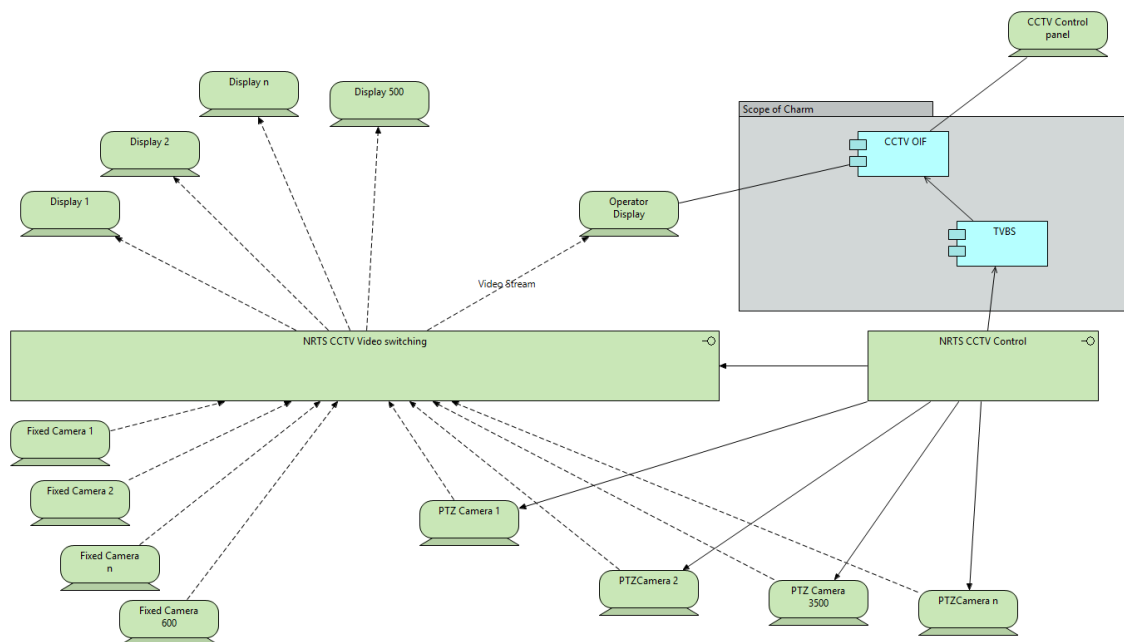### 3.16.2. Sources and Sinks

NRTS provides a number of video streams to existing RCCs that will have to be handled by CHARM as part of the operator desktop, not least for hard shoulder opening.

This is also a control interface allowing operators to select a camera and request it to be displayed on a number of outputs. Access to imagery and displays is governed by user roles and business rules.

3.16.3.   Status

The CHARM solution must implement adapters that maintain the CCTV capabilities of the instation. At present, each RCC operator's desk has an analogue video monitor output assigned to it however the Agency do not wish to retain the analogue monitors.

The Agency would like the CHARM solution to fully integrate CCTV footage into their solution and appreciate that depending upon how the CHARM supplier intends to integrate CCTV, specific hardware may be required to re-encode the PAL based footage into digital streams before display to the operator. The ATMS supplier is expected to identify the required hardware in the outline of their solution.

Whilst the CHARM ATMS is being rolled out, it will also have to interface to the existing TVBS in use in non-CHARM TMCs to exchange information to maintain the TVBS functions such as arbitration between who has control of a camera is maintained during the rollout.

In-flight projects (NRTS2) mean that in future, digital video streams (H264/ MP4) will be provided by the NRTS network instead. The NRTS2 solution will also implement the Open Network Video Interface Forum (ONVIF) certified control / switching / recording systems and CHARM will be expected to implement ONVIF at a future date (not yet identified).

In delivery of the CHARM solution, both the current (analogue video and 2nd Gen CCTV Interface based control) and future (digital video and ONVIF based control) are to be provided.

3.16.4.   Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

* [MCH1959], [ONVIF]
* [MCH1970] Highways Agency CCTV Notes for Guidance
* NRTS Service Category 10BD– PAL Based Analogue Video

3.16.5.   Security Requirements

M:[IRS.131.1.1] In addition to the overall security requirements identified in [HA INFO SEC] this interface uses connections to the NRTS WAN and must therefore conform to the HA Code of Connection, [MCH1514].

3.16.6.   Performance Requirements

M:[IRS.131.2.1] Operator switching of video imagery from cameras to monitors must conform to the overall usability requirements for CHARM. However, while NRTS will complete 99% of switch requests within 500ms, and all within 2s a significant proportion of switches take long enough to be noticed by a human operator. CHARM needs to take account of the potential variation in switching time.

M:[IRS.131.2.2] The CHARM solution must minimise any extra latency injected into Video switching performance of the NRTS network XST ensuring that the final solution is compliant with general usability requirements.

M:[IRS.131.2.3] The movement of PTZ cameras is controlled through a joystick and keyboard. The use of these controls will have to conform to the overall usability requirements for CHARM, which require the system to appear instantaneously responsive to operators. "Instantaneous" in this context means below the human detection threshold of 200ms. In this context the control path latency within NRTS is 20ms.

3.16.7.   Quantitative Information

The table below provides an estimate of the current number of cameras and forecasts for 2016 and beyond based on steady rollout of Smart Motorways.

Table 16 - Cameras and Monitors installed nationally

Number of Devices	2014	2016	2026
PTZ Cameras	3,500	4000	5000
Fixed cameras	628	1000	2000
Monitor outputs	500	550	600

The performance load on the system is determined by switching requests and the number of concurrent connections. The table below provides an estimate of the current position and forecasts going forward.

Table 17 - Concurrent Video Load

Concurrent Video	2014	2016	2026
Connections per RCC	280	300	400
Bandwidth per RCC (Mbp/s)	35	40	60

3.17. EIF.SAA.HA.NVR - NVR - Video Recording

3.17.1. General description

Network Video Recorders (NVR) are provided by the NRTS contract and CHARM will not need to record video directly from cameras. NRTS provides an interface for the tagging, request and retrieval of recorded footage from the appropriate NVR for the camera.

3.17.2. Status

An in flight project (NRTS2) will in future move the NVR interface from its current implementation to that of an ONVIF certified system. However the current interface must be supported on initial deployment of CHARM.

In delivery of the CHARM solution, both the current (analogue video and 2nd Gen CCTV Interface based control) and future (digital video and ONVIF based control) are to be provided.

3.17.3. Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

• [MCH1959], [ONVIF]

3.17.4. Security Requirements

M:[IRS.132.1.1] In addition to the overall security requirements identified in [HA INFO SEC] this interface uses connections to the NRTS WAN and must therefore conform to the HA Code of Connection, [MCH1514].

3.17.5. Performance Requirements

No identified requirements as recording is carried out by NRTS, away from the scope of CHARM.

3.17.6. Quantitative Information

The current system is used sparingly by a single operator. However there is an aspiration to include video clips as part of briefing packages and reports that is likely to increase the use of this interface.

3.18.   EIF.SAA.HA.LVM - Local Video Matrix

3.18.1.   General description

The Local Video Matrix (LVM) is a local facility for switching video to operator monitors during hard shoulder opening. It is currently required for two reasons:

- The decoders are limited in the number of switches that can be made each minute. Operators opening the hard shoulder can switch camera image every second, considerably exceeding that limit.
- The time taken to switch between images can vary considerably, and a significant proportion, about 1%, of switches take longer than the time operators generally view images (500ms). The current systems switch imagery to local video matrix inputs ahead of them being viewed by operators in order to create a buffer to average out the switching time. The local video matrix is then used for the final switch to the operator display.

3.18.2.   Sources and Sinks

This interface is purely a control interface for the local video matrix.

Video streams enter the local Video Matrix from NRTS and are switched to NRTS inputs, but this video would not be directly handled by CHARM.

3.18.3.   Status

The CHARM supplier must overcome the problems addressed by the Local Video Switch. It is therefore for the supplier to decide whether to continue to use them based upon their suggested method of integrating analogue CCTV video into CHARM.

3.18.4.   Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

- [MEYERMST], [MEYERSYS], [MCE2547]

3.18.5.   Security Requirements

M:[IRS.133.1.1] The interface must meet the overall security requirements identified in [HA INFO SEC].

3.18.6. Performance Requirements

M:[IRS.133.2.1] Any use of the Local Video Matrix will be included within the performance of hard shoulder opening and the overall usability requirements.

For information, a switch on the current Local Video Matrix takes 100ms to complete.

3.18.7. Quantitative Information

There is a Local Video Matrix within each RCC where Managed Motorways has been deployed, currently 5.

3.19.   EIF.SAA.HA.ERT - Motorway ERT (Voice)

3.19.1.   General description

The HA has a network of Emergency Roadside Telephones (ERT) which are connected to the relevant RCC via the NRTS network.

On the motorway network these phones appear as Voice Over IP (VOIP) telephones presented at an Integrated Communications Control System (ICCS) and are then routed to the relevant RCC.

There are also phones on the All Purpose Trunk Roads (APTR) but these are routed through the Public Switched Telephone Network (PSTN) and described below.

3.19.2.   Sources and Sinks

ERTs are presented to the ICCS (by the NRTS Infrastructure) as a DPNSS interface.

3.19.3.   Status

The provision of ERTs on the motorway network is a statutory requirement and so these telephones must continue to be supported by CHARM.

3.19.4.   Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

- [5000IMS], [MCH1983], [NRTS-ERT], [AWE3598], [RCC BBN], [MCH1853]

3.19.5.   Security Requirements

M:[IRS.134.1.1] The interface must meet the overall security requirements identified in [HA INFO SEC].

3.19.6.   Performance Requirements

3.19.7. Quantitative Information

The table below provides an estimate of the number of ERT (including those on the APTR) and forecasts for 2016 and beyond.

Table 18 - ERT Installed on the network

Number of Devices	2014	2016	2026
Motorway ERT	7,130	7,500	8,000
APTR ERT - GSM	251	275	300
APTR ERT - Landline	626	650	700

The table below indicates the number of telephone calls received or made each month.

Table 19 - Calls per month nationally

Number of calls	2014	2016	2026
Motorway ERT	15,000	15,000	15,000
APTR ERT	500	500	500
PSTN	150,000	165,000	198,000

3.20.   EIF.SAA.HA.TTC - Motorway ERT (Data)

3.20.1.   General description

This is the channel used to provide the exchange between ERTs and the RCC operators using the Telephone Text Controller (TTC).

The Highways Agency ERT phones have a multilingual text facility which allows operators to communicate with the motorist should they not be understood. This facility is provided by a Telephone Text Controller. This PC based system is designed to initiate and manage calls from ERTs where the operator has decided that the call should be switched to a text mode call. (For example, the hard of hearing or non- English speaking). Six languages are supported by the 354 ERT- English, French, German, Italian, Spanish and Welsh.

Currently there are a pair of standalone systems, connected to the ERT controller which the RCC operator switches to using a KVM switch. Each TTC system is connected to a different set of both APTR and ERT telephones.

3.20.2.   Sources and Sinks

TTC is currently a standalone system using PSTN and motorway telephone lines. The CHARM supplier should determine how the text facility is provided.

3.20.3.   Status

This facility and the interface will have to be provided by CHARM for the foreseeable future.

The modems currently in use are Multitech MT5656ZDX-V and the connection to the modems is RS232, based on IBM-AT and is interrupt driven.

The TTC PC (and existing software) that currently exists in the TMCs from which the serial connections to the modems are made, will not be retained. The CHARM system is expected to integrate this functionality, however considering that a serial connection must be made to the current modems, the system supplier may suggest that the Agency procure new modems to better integrate with their solution. This should be described in the CHARM system design and the Agency will procure the appropriate hardware.

The ERT Question Tree (and its design specification) is available in the CHARM data room for use (if desired) by the system supplier, and also the source code of the current TTC software.

3.20.4. Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

• [5000IMS][MCH1983][TTCQT][TTCDS][TTCSC]

3.20.5. Security Requirements

M:[IRS.135.1.1] The interface must meet the overall security requirements identified in [HA INFO SEC].

3.20.6. Performance Requirements

Beyond response and other timings defined in the interface specifications, there are no identified performance requirements.

3.20.7. Quantitative Information

The text facility is rarely used and two channels, for two discrete groups of telephones, have been more than sufficient in current implementations.

3.21.   EIF.SAA.HA.PSTN PSTN

3.21.1.   General description

PSTN calls, both from the general network and from the dedicated ERTs on the APTR, are received using the communications system (ICCS). The same system also handles motorway ERTs and calls on the Airwave provided TETRA network. Initiating and responding to these calls is recorded against incidents and other operational activity.

Information about calls is used to initiate a number of internal processes, including their display on maps where the location of the telephone is known.

3.21.2.   Status

PSTN will remain a very important channel for the HA, as can be seen by the number of calls made and received, more than 150,000 per month. CHARM must continue to integrate the handling of telephone and radio calls with the handling of incidents.

3.21.3.   Specifications

The connection to the PSTN is through standard telephony equipment via a DPNSS interface.

3.21.4.   Security Requirements

M:[IRS.136.1.1] The interface must meet the overall security requirements identified in [HA INFO SEC].

M:[IRS.136.1.2] CHARM will have to confirm to the code of connection for PSTN, including those related to automatic dialling.

3.21.5.   Performance Requirements

No specific performance requirements have been identified beyond those required by the standard interfaces.

3.21.6.   Quantitative Information

PSTN call information is provided under the earlier ERT section.

3.22. RCC Cross-Boundary - Removed

3.23. EIF.ORR.HA.TETV - Airwave (Voice)

3.23.1. General description

Airwave solutions provide the interface to the TETRA network provided in the UK by central government for emergency responders, which includes the HA.

Airwave delivers voice communications via the Airwave TETRA two-way radio network between the Highways Agency and its partners. All the HA traffic officers have access to the Airwave system.

3.23.2. Sources and Sinks

Radio calls made and received via Airwave are from both HA and other organisations on independent and joint talk groups. These organisations include the Police, Fire & rescue, Ambulance and MACs.

3.23.3. Status

Although the supplier of TETRA access will change through the Home Office ESN programme, from Airwave, the radio network will remain a critical part of the HA's operation and must be maintained for the foreseeable future.

Accreditation is required to connect to the Airwave TETRA network, and this is currently held by the Agency's Integrated Communications Control System supplier. The current ICCS in use by the Agency will not be retained following implementation of the CHARM ATMS (aside from being in use in non-CHARM TMCs during the rollout) and the CHARM supplier is expected to provide all functionality that the ICCS currently provides as part of its offer.

The ICCS implementation decided upon by the CHARM supplier is expected to join the existing talk groups – to allow communications between CHARM TMCs and non-CHARM TMCs (and all on-road officers and partner operations) during rollout.

3.23.4. Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

- [TETRA]
- Access to detailed Airwave requirements is available to accredited suppliers; or those in the process of gaining accreditation.
- For details on Airwave, please see [AIRWAVE]

3.23.5. Security Requirements

M:[IRS.138.1.1] The interface must meet the overall security requirements identified in [HA INFO SEC].

M:[IRS.138.1.2] CHARM will have to be compliant with the code of connection for the TETRA network.

3.23.6. Performance Requirements

Beyond the interface requirements no performance requirements have been identified.

3.23.7. Quantitative Information

There are a large number of Airwave handsets issued to Traffic Officers. The table below provides an estimate of current and future numbers.

Table 20 - Issued Airwave radios

Airwave Radios	2014	2016	2026
Radio handsets	3,000	3,300	3,960

Nationally there are a very large number of calls/transmissions made through the TETRA radio network. The table below shows the number of calls made in December 2013 and a forecast assuming that this will increase with the numbers of radios issued.

Table 21 – Airwave radio calls

Talk Group Calls	2014	2016	2026
Typical month	315,000	350,000	400,000
Typical busy day	11,000	12,000	16,000

3.24.   EIF.ORR.HA.TETD - Airwave (Data)

3.24.1.   General description

The access provided by Airwave includes the short messaging capability of TETRA and the ability for Airwave devices in the field to report location and other information. These are used extensively to provide updates from vehicles and Traffic Officers, including booking on and off shift, recording arrival at incidents etc.

Each vehicle regularly reports its position using the AVL capability.

3.24.2.   Sources and Sinks

Airwave data exchanges will take place between members of the configured groups. For example, Traffic Officer Vehicles will be providing Automatic Vehicle Location (AVL) data, and both Vehicles and Officers will be exchanging status messaging data with the control room officers.

3.24.3.   Status

Although the supplier of TETRA access may change from Airwave the radio network will remain a critical part of the HA's operation and must be maintained for the foreseeable future.

Accreditation is required to connect to the Airwave TETRA network, and this is currently held by the Agency's Integrated Communications Control System supplier. The current ICCS in use by the Agency will not be retained following implementation of the CHARM ATMS (aside from being in use in non-CHARM TMCs during the rollout) and the CHARM supplier is expected to provide all functionality that the ICCS currently provides as part of its offer.

The ICCS implementation decided upon by the CHARM supplier is expected to join the existing talk groups – to allow communications between CHARM TMCs and non-CHARM TMCs (and all on-road officers and partner operations) during rollout.

3.24.4.   Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

- [TETRA]

3.24.5.   Security Requirements

M:[IRS.139.1.1] The interface must meet the overall security requirements identified in [HA INFO SEC].

M:[IRS.139.1.2] CHARM will have to be compliant with the code of connection for the TETRA network.

3.24.6.   **Performance Requirements**

Beyond the interface requirements no performance requirements have been identified.

3.24.7.   **Quantitative Information**

Each Traffic Officer will use the message facility an estimated 20-30 times per shift. Currently more than 66,000 messages are transmitted per day.

In addition the AVL messages generate up to 500,000 messages per day with positional information from vehicles.

3.25. EIF.IPP.HA.POLICE - PSNP (Police Forces)

3.25.1. General description

The Command & Control system is a National Standard for Police Information Systems (NSPIS) application and connected to the Home Office managed Criminal Justice eXtranet. Before the deployment of CHARM the CJX will be replaced by the Police implementation of the Public Services Network (PSNP).

A simple XML message is used to pass information between the HA and currently, 27 police forces.

The ATMS will also need to exchange this information with the existing Command & Control system over this interface from the initial implementation in the first TMC until such time that the ATMS rollout across all TMCs completes (and is the only ATMS in use in the HA).

3.25.2. Sources and Sinks

The HA exchanges electronic information with 27 police forces nationally and will need to exchange the same information with the existing Command & Control system.

3.25.3. Status

This interface must continue to be supported once CHARM is deployed.

3.25.4. Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

- [MCH1506]

3.25.5. Security Requirements

Once the connection of CHARM has been accreditated by the PSNP each Police force will have to accept the interface separately.

The HA is currently intending to procure an accreditated connection to the PSNP from its own PSN connection.

M:[IRS.140.1.1] The interface must meet the overall security requirements identified in [HA INFO SEC].

M:[IRS.140.1.2] Any interface must conform to the requirements for the Public Services Network – Protected Layer..

M:[IRS.140.1.3] CHARM will have to adhere to the code of connection for PSNP.

3.25.6. Performance Requirements

There are no identified performance requirements.

3.25.7. Quantitative Information

Currently the HA is connected to 27 Police forces and exchanges on average 66,000 incident log lines each month.

The table below breaks down the incident log lines into new incidents and updates, and the source.

Table 22 - Incident Log Lines by Source

Incident reporting	2014	2016	2026
Incidents reported to the Police	3,000	3,300	3,960
Incidents reported By the Police	10,000	11,000	13,200
Incident updates reported to the Police	39,000	42,900	51,480
Incident updates reported by the Police	24,000	26,400	31,680

3.26.   EIF.IPP.HA.NVRM - C&C (PSNP) to NVRM

3.26.1.   General description

This is a bespoke 2 way interface (currently) over the CJX, but will be over the PSNP by the end of 2015 between C&C and the National Vehicle Recovery Manager (NVRM) providing details and statutory authority of the vehicle to be recovered.

3.26.2.   Source and Sinks

The NVRM system is used to exchange information with the current National Vehicle Recovery Manager supplier.

3.26.3.   Status

This service will have to be supported after the deployment of CHARM and the foreseeable future.

3.26.4.   Specifications

The following document is relevant to this interface (full references are found in chapter 2:

• Appendix 1 Command & Control Interface Specification [NVRM]

In addition the following document is provided as a more detailed guide to the interface.

> • **Customer Requirements: National Vehicle Recovery Manager Phase 2 Stage 2 [NVRMIF]**

3.26.5.   Security Requirements

M:[IRS.141.1.1] The interface must meet the overall security requirements identified in [HA INFO SEC].

The NVRM is currently accessed over the Criminal Justice eXchange (CJX) network which will be replaced by the Public Services Network – Protected layer in 2015. Any change to the status of the access will have to be agreed with the HA as part of a review of the security requirements for CHARM interfaces.

3.26.6.   Performance Requirements

There are no identified performance requirements.

3.26.7.   Quantitative Information

Currently RCCs make about 1200 recovery requests per month, with a steady increase, as traffic increases to 1600 requests per month in 2026.

HA-IRS, Version 4.0, 14 April 2015

3.27. EIF.IPP.HA.PNC - PNC (PSNP)

3.27.1. General description

The Command & Control system is a standard NSPIS application and connected to the Home Office managed Criminal Justice eXtranet. Before the deployment of CHARM the CJX will be replaced by the Police implementation of the Public Services Network – Protected layer (PSNP).

A set of specially trained and accredited TMC staff operate the PNC bureau for the HA. Using an application provided by Civica and separate from C&C, the bureau is able to update vehicle records on the PNC to show when a vehicle has been recovered. This capability must be maintained. In the next few months this facility is being enhanced to permit more enquiries and updates. This capability must also be maintained.

The Command & Control system is able to make simple enquiries from the PNC to check whether a vehicle has been marked as of interest to the Police.

3.27.2. Status

This interface must continue to be supported once CHARM is deployed and must continue to cover updates by the HA to a vehicle record, something that currently has to be done using a separate browser based web form.

Due to the onerous accreditation process it is expected that the ATMS system may need to use an existing product to access the PNC. There are a limited number of commercial products accredited to access the PNC. Bidders are free to select any product. The two known to the Highways Agency (although other may exist) are:

- Civica Lynk
- NDITech

3.27.3. Specifications

The following documents are relevant to this interface (full references are found in chapter 2:

Specification will depend on the selected commercial product, or if the ATMS supplier wishes to gain accreditation themselves, through the PNC accreditation process,

Information about the PSNP is available from [PSNP]

3.27.4. Security Requirements

M:[IRS.142.1.1] The interface must meet the overall security requirements identified in [HA INFO SEC].

M:[IRS.142.1.2] Any interface must conform to the requirements for the PSNP.

M:[IRS.142.1.3] CHARM will have to adhere to the code of connection for the PSNP

3.27.5. Performance Requirements

There are no identified performance requirements.

3.27.6. Quantitative Information

Currently RCCs make about 600 PNC requests per month, with a steady increase, as traffic increases to 800 requests per month in 2026.

A smaller number of updates are made.

3.28.   EIF.SAA.HA.VIDEO – Video streaming

3.28.1.   General description

NRTS provides streaming analogue video to the PAL standard, with a move to digital formats over the next five years. The HA is likely to use the H264/MP4 standard for digital video in future.

3.28.2.   Source and Sinks

NRTS provides all the sources of video from local decoders.

Video is consumed by all operators in both the RCC and National Traffic Operations Centre (NTOC) offices. Video should also be available wherever it forms a key part of the user's role. In the As-Is arrangement, video is streamed to the following components:

- TVBS OIF – for video in window on dedicated CCTV operator positions
- OIF – for video in window on RCC operator positions used for opening the hard shoulder
- LVM – as analogue video streams used as inputs to the local video matrix during hard shoulder opening
- Multi-Viewers – as analogue video streams to generate the picture over picture display used to check camera coverage as part of opening the hard shoulder
- NTIS – for display as video in window on NTOC operator positions

3.28.3.   Status

Streaming video will continue to be an important resource for operators throughout the HA for the foreseeable future and although the video is PAL on exit from the infrastructure, the ATMS supplier is expected to integrate the streamed video into the ATMS; for example by re-digitising the PAL streams. Please note that additional hardware required to meet the design is to be specified as part of the design, but will be procured by the Agency.

3.28.4.   Specifications

Video will be provided to internal standards as follows:

- [PAL]

3.28.5.   Security Requirements

M:[IRS.143.1.1] *Video streaming is a service provided by NRTS and it is solely responsible for security.*

3.28.6.   Performance Requirements

None identified.

3.28.7. **Quantitative Information**

There are likely to be some 500-600 video streams to CHARM workstations and displays, similar to the current numbers.

3.29. EIF.SAA.HA.TMU –Traffic Monitoring Units - Removed

3.30. EIF.SAA.HA.TAME – TAME Monitoring sites - Removed

3.31. EIF.SAA.HA.ANPR – ANPR Journey Time Cameras

3.31.1. General description

Automatic Number Plate Recognition (ANPR) cameras are installed at key nodes on the APTR to provide tags from vehicle number plates using lossy encryption. Currently, NTIS then matches to tags detected by other ANPR sites. This allows journey times along links to be calculated and used to identify congestion, and as a feed to the current journey time VMS displays.

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3.31.2. Source and Sinks

For this interface the source of the data will be the ANPR outstations once the interface has been specified (out of scope of ATMS delivery).

3.31.3. Status

This interface is out of scope of the CHARM system due to IPR and technical issues with the documentation. This chapter has been retained in this IRS due to functional requirements around ANPR still existing in the Requirements Catalogue. For example, the methodology of aligning a vehicle registration tag, with a location and a time and resolving this data into a journey time is still retained; however the actual interface to the ANPR outstations is removed (and will be implemented through a post ATMS delivery change). The NTIS Model in the data room provides locations between which journey time is calculated.

3.31.4. Specifications

- No interface to be implemented.

3.31.5. Security Requirements

No interface thus no security requirements.

3.31.6. Performance Requirements

No interface thus no performance requirements.

3.31.7. Quantitative Information

There are currently more than 1100 ANPR sites, serviced by 537 Outstations, each collecting, at peak times up to 5 tags per second.

3.32. EIF.IPP.HA.INRIX – INRIX Interface - Removed

3.33.   EIF.IPP.HA.HAWCS – HAWCS Services

3.33.1.   General description

HAWCS provides Datex II publications of data from a network of weather stations (Environmental Sensor Stations ESS) and weather forecasts received from a number of forecasters. The publications are:

- National forecast from the Met Office
- Area Forecasts, from a number of forecasters
- ESS Observation Data
- ESS Configuration Data
- ESS Camera Imagery (not Datex II)

3.33.2.   Source and Sinks

HAWCS provides all of the data on the interface, although the forecasts are originally generated by forecasters and some of the ESS are owned by other organisations, such as local authorities.

3.33.3.   Status

HAWCS will continue to provide the service for the foreseeable future.

3.33.4.   Specifications

The services provided by HAWCS are described in the Data Exchange Manual, [MCH2592].

3.33.5.   Security Requirements

M:[IRS.148.1.1] There are no specific HAWCS security requirements, authentication is by user name and password to a publically available web service.

M:[IRS.148.1.2] The CHARM interface will have to meet the requirements defined in the [HA INFO SEC].

3.33.6.   Performance Requirements

This is an inflow to CHARM and so there are no performance requirements.

3.33.7.   Quantitative Information

There approximately 400 weather stations, polled every 10 minutes, and there are 13 HA areas. The table below shows the frequency of data received from HAWCS.

Table 23 - Weather Related Publications

Publication (Daily)	2014	2016	2026
National Forecasts	4	4	4
Area Forecasts	40	40	40
ESS Observation Data	60,000	60,000	60,000
ESS Configuration Data	20	20	20

ESS Camera imagery is available on request and so the rate is determined by operator demand. The ESS cameras generate a new image every 10 minutes with each ESS having up to 2 cameras, although many ESS do not have any cameras.

3.34. EIF.IPP.HA.DTX2 – Datex II V2.0 Service

3.34.1. General description

NTIS provides a number of Datex II publications which are used by a number of other HA systems and by external subscribers, such as local authorities and Google. These publications include:

- Traffic speeds and flows per link
- VMS and Signals currently set
- Events on the network, with Time To Clear and Return To Normal
- NTIS Network Model

3.34.2. Source and Sinks

The data is collated from all the information received by NTIS and published as a publically accessible service.

3.34.3. Status

The Highways Agency intends to provide information contained within the ATMS as Datex II web services. The implementation of this interface must support the current implementation of Datex II specific to NTIS, and the full Datex II v2.3 specification...

3.34.4. Specifications

The service provided is described in the NTIS document [NTISDATEX].

The Datex II version 2.3 specifications are available through [DATEX2].

3.34.5. Security Requirements

M:[IRS.151.1.1] Any web service will have to meet the requirements defined in the [HA INFO SEC].

3.34.6. Performance Requirements

None identified.

3.34.7. Quantitative Information

There are approximately 300 current consumers of this output, of which around 200 consumers are currently subscribed to the v1.0 service described later.

Publications are updated as the result of incidents and device settings on the roadside. The sizes of each publication varies according to the type. The following assumptions about the size of Datex II publications can be used for estimating the size of the HA CHARM system:

- A full refresh of signs and signals set on the roadside is between 1.5Mb and 2Mb
- A full refresh of relevant incident information (as determined currently by NTIS) is between 5Mb and 10Mb

3.35.   EIF.IPP.HA.DTX1 – Datex II V1.0 Service

3.35.1.   General description

The Datex II v2.0 service meets the needs of most subscribers however a number of subscribers are only able to accept publications in the earlier version of Datex II. This service provides for those users, including the HA corporate web site.

3.35.2.   Source and Sinks

The data is collated from all the information received by NTIS and published as a publically accessible service.

3.35.3.   Status

The HA intend to retire this service as soon as subscribers can be moved to the existing NTIS Datex II v2.0 service, or the Datex II v2.3 service. This may be achieved before CHARM subsumes NTIS in 2018.

3.35.4.   Specifications

The service provided is described in the NTIS document [NTISDATEX].

3.35.5.   Security Requirements

M:[IRS.152.1.1] Any web service will have to meet the requirements defined in the [HA INFO SEC].

3.35.6.   Performance Requirements

None identified.

3.35.7.   Quantitative Information

There are a number of consumers, approximately 160 in 2014, all of whom should have been migrated to the v2.0 publication before CHARM is fully deployed in 2018.

3.36. EIF.IUR.HA.HATRIS – NTIS traffic data to HATRIS

3.36.1. General description

All of the existing systems provide data extracts for use by other HA projects, notably data warehouses of traffic data (HA Traffic and Roads Information Service HATRIS) and event information (Roads Information Framework RIF). CHARM will continue to provide these extracts.

3.36.2. Source and Sinks

By 2015 NTIS will collate all of the TMU, TAME, MIDAS and ANPR data to generate the data for RIF as a replacement for HATRIS.

3.36.3. Status

A Datex II based extract is provided from the current NTIS function within the HA. The interface (to the specification noted below) must be provided at first deployment, however will not be utilised under the CHARM system is rolled out to NTIS (the roll out is out of scope of CHARM).

3.36.4. Specifications

NTIS will be providing data in the format specified in WA119-08-007-002-03-02-33 R2.E33 Publish DATD EIDD.

3.36.5. Security Requirements

M:[IRS.153.1.1] Any process for generating data extracts will have to meet the requirements defined in the [HA INFO SEC].

3.36.6. Performance Requirements

M:[IRS.153.2.1] CHARM must be capable of delivering all of the traffic data received each hour to HATRIS within an hour of receipt.

3.36.7. Quantitative Information

The HATRIS traffic data is the sum of all of the traffic data received by CHARM, including TAME, TMU, ANPR and MIDAS.

3.37. EIF.IUR.HA.EXTRACT – Generic Data Extract - Removed

3.38. EIF.IUR.HA.DW –Data Warehouse - Removed

3.39.   EIF.IUR.HA.EMAIL –E-Mail

3.39.1.   General description

The system will be expected to automatically generate e-mails to individuals as alerts, or to prompt external parties, as part of configurable business processes. It should be noted that some of those business processes may need to limit the distribution of e-mails because they may contain personal or sensitive information.

3.39.2.   Source and Sinks

E-mails will be generated as part of business processes. They will be received by a wide range of individuals both internal to the HA and external.

3.39.3.   Status

Of the operational systems only NTIS currently uses e-mail. There will be a need to implement an e-mail capability as part of the initial deployment and develop that as the HA's reporting needs evolve.

3.39.4.   Specifications

The e-mail interface will have to confirm to industry standards but is otherwise the responsibility of the CHARM supplier.

3.39.5.   Security Requirements

M:[IRS.157.1.1] Any process for generating e-mails will have to meet the requirements defined in the [HA INFO SEC].

3.39.6.   Performance Requirements

M:[IRS.157.2.1] E-mails should be distributed in an appropriate timescale. This would be within a few minutes of their generation.

3.39.7.   Quantitative Information

The number of e-mails will need to be manageable for the individuals receiving them, and for HA staff dealing with the resultant activities.

Currently there are a significant of partners receiving e-mails when events are detected by systems. NTIS currently sends approximately 15000 e-mails daily to more than 170 organisations.

3.40. EIF.IPP.HA.WEB –Traffic England Services- Removed

3.41. EIF.IUR.HA.SDS – Streamlined Data Services

3.41.1. General description

The Streamlined Data Services (SDS) project is planned to replace the existing fault management systems before the initial deployment of CHARM. However CHARM will continue to be responsible for detecting faults from roadside devices. Once CHARM is deployed it will have to report those faults to the systems provided by SDS for management and resolution. The current interfaces, to Halogen, will be replaced by a new interface

CHARM will provide to the SDS the binary data on faults received through the interface together with an agreed set of context information about the device. This information will be provided whenever the fault information, which is contained within the binary data, changes. It should be noted that the binary data contains other status information which will change, but this should not be reported as a fault.

Context information will be used by SDS to determine the criticality of the fault. CHARM will be responsible for identifying fault conditions for CHARM users.

3.41.2. Source and Sinks

The systems will detect faults with roadside devices as part of their exchange on interfaces including:

- EIF.SAA.HA.MET
- EIF.SAA.HA.MIDAS
- EIF.SAA.HA.NMCS2
- EIF.SAA.HA.CCTV

It will deliver the information on fault detection, and clearance, to the SDS system.

3.41.3. Status

This interface does not currently exist and is not expected to be implemented. However this interface is mentioned as the fault data provided by end devices by the interfaces listed above (and where other interfaces to end devices implemented in future supply fault data) will need to be available within the system for routing to the SDS interface. The SDS interface will be implemented under a separate project, out of scope of initial CHARM delivery.

3.41.4. Specifications

Not available, but the interface when developed is expected to be an XML based web service pushing the appropriate data points to the SDS.

3.41.5. Security Requirements

M:[IRS.159.1.1] Any interface to external systems will have to meet the requirements defined in [HA INFO SEC].

3.41.6. Performance Requirements

M:[IRS.159.2.1] Fault reporting is currently a "real time" process, typically within less than 10 seconds. CHARM will have to meet those existing expectations.

3.41.7. Quantitative Information

In a typical hour the existing systems process more than 6,000 fault reports. Suppliers should assume that there could be up to 20,000 fault reports an hour at peak times.

3.42. EIF.ORR.HA.ESN – Emergency Services Network - Removed

3.43. EIF.IUR.HA.NOMS – Network Occupancy Management Service - Removed

3.44. EIF.IPP.HA.TMC – Exchange of Incidents

3.44.1. General description

This is a general service to exchange incident and event information with NTIS and any other non-Highway Agency TMCs, or interested organisations.

It will be a Datex II compliant service to publish incident information from CHARM and accept similar publications from other organisations.

3.44.2. Source and Sinks

CHARM will publish data to local authorities, NTIS and other organisations involved in traffic management, such as ports.

3.44.3. Status

This interface does not currently exist. It should be provided by CHARM as part of the initial deployment.

3.44.4. Specifications

The interface should confirm to the Datex II v2.3 standard for exchange between TMCs, available at www.datex2.eu.

3.44.5. Security Requirements

Any interface to external systems will have to meet the requirements defined in **Error! Reference source not found.**.

3.44.6. Performance Requirements

Publications need to be produced such that other organisations are able to respond in a timely manner. In practice this means that publications should be generated on change within CHARM and be available with a few minutes to the other organisation.

3.44.7. Quantitative Information

Publications may be generated every minute describing the current set of events and situations across the whole of CHARM.

3.45. EIF.IUR.HA.TRAFFIC – Traffic data Store – Removed

3.46. EIF.IPP.HA.EXCHANGE – Partner Information Exchange - Removed

3.47.   EIF.IPP.HA.DVLA – Vehicle Information

3.47.1.   General description

This is a service to provide vehicle details from the DVLA computer as part of the process for handling abandoned vehicles or to assist in identifying vehicles.

3.47.2.   Source and Sinks

CHARM will make an enquiry, based on the Vehicle Registration Mark and receive as set of information back, including body type, gross weight, make, model and colour.

3.47.3.   Status

This interface is currently provided by a company called CDL (www.cdlis.co.uk) to the current Command & Control provider. Suppliers should assume that CDL will remain the provider and the Elvis service is available on the public internet.

3.47.4.   Specifications

The interface conforms to an XML schema and common web service protocols. The detail of the CDL protocol is proprietary but a summary is provided below. The HA uses the Elvis protocol.

Requests to the Elvis service are as simple as appending the vehicle registration number to a URL query string:

http://cdl-elvis.cdlis.co.uk/cdl-elvis/elvis?vehicle_type=TYPE&userid=USERID&test_flag=N&client_type=TYPE&search_type=vrm&function_name=FUNCTION_NAME&search_string=

The following fields can be supplied in a request:

Field Name	Comments
USERID	Required. Identifies the feed account, must be included exactly as supplied. Will consist of only lowercase alphanumeric characters
test_flag	Should be set to 'Y' for any test cases (only be used for development) and 'N' for live cases (live cases have no restriction on volume)

Field Name	Comments
search_type	VRM for registration lookup
search_string	Vehicle registration number
vehicle_type	eg. PC,MC,GV
function_name	Name of CDL Elvis function, this will be supplied by CDL.

If the request fails the returned message will turn an empty response, as in the embedded example:

elvis_fail_response.x
ml

Otherwise the response will be a subset of the information in the embedded example.

elvis_repsonse.xml

The function names and their definition will be available from CDL post award.

3.47.5. Security Requirements

Any interface to external systems will have to meet the requirements defined in [HA INFO SEC]**Error! Reference source not found.**.

3.47.6. Performance Requirements

The CHARM system must not add appreciably to the time taken to provide the vehicle details.

3.47.7. Quantitative Information

The Highways Agency makes up to 1,000 enquires per day.

Appendix A. Abbreviations and Acronyms

Abbreviation		Description
ALM	Ambient Light Monitor	Road side device that measures the illumination level
ANPR	Automatic Number Plate Recognition	A system to read number plates at a location and match them to other sightings of the same number
APTR	All Purpose Trunk Roads	Motorways and major roads that are under the management of the Highways Agency.
ASC	Asset Support Contractor	An organisation maintaining the network infrastructure, both civil and electrical for the Highways Agency
C&C	Command and Control	The NSPIS based incident recording and computer aided despatch system used by the HA
CCI	Communications Control Interface	Interface to the Tetra network provided by Airwave
CCTV	Closed Circuit Television	Used to refer to the network of cameras maintained on private networks
CHARM	Common Highways Agency Rijkswaterstat Model	This project, delivering a common solution for traffic management centres in England and the Netherlands
CJX	Criminal Justice eXtranet	The Home Office equivalent to GSI, sometimes known as PNN2
CMSS	Campaign Message Setting System	Previous name for the interface used by 3rd party organisations to request VMS settings
COBS	Control Office Base System	The central management system within HATMS
DATEX II	Data Exchange II	A European standard for the exchange of traffic and travel information
DDS	Dynamic Display System	Large video displays within each RCC

Abbreviation		Description
DPNSS	Digital Private Network Signalling System	A network protocol used on digital trunk lines for connecting to PABX. It supports a defined set of inter-networking facilities.
ERT	Emergency Roadside Telephones	HA managed telephones principally on motorways but also elsewhere on the SRN
ESN	Emergency Services Network	Ongoing project to deliver the next generation of communications, replacing TETRA
ESS	Environment Sensor Station	A roadside system for measuring wind, rain etc for weather reporting
FTP	File Transfer Protocol	Widely used protocol for exchanging files
GSI	Government Secure Intranet	Central government standard for the secure exchange of e-mail etc.
HA	Highways Agency	An executive agency of the UK Department of Transport tasked with managing the SRN
HATMS	Highways Agency Traffic Management System	The set of core RCC systems used to sign signs and signals on the network
HATRIS	Highways Agency Traffic and Roads Information System	A system that collates traffic data for the HA
HAWCS	Highways Agency Central Weather System	A system that collates and publishes weather information for the HA as part of HAWIS
HAWIS	Highways Agency Weather Information Service	The service responsible for procuring, collating and distributing weather related information within the HA
HGS	HATMS Gateway Service	A specialist application that interfaces between HATMS and NTIS
HSM	Hard Shoulder Monitoring	A system that enables semi-automated opening and closing of the hard shoulder using cameras, signs and signals
HVCG	Highways agency Video Client Gateway	A system controlling access to the video imagery from cameras
I/F	Interface	Short form of interface

Abbreviation		Description
ICCS	Integrated Communications Control System	Central application switching voice calls within the RCC for PSTN, ERT and Airwave calls
INRIX		Name of the company providing floating vehicle data and traffic forecasts to NTIS
IPT	Internet Protocol Transponder	Device that provides a TCP/IP interface to all roadside devices
KVM	Keyboard Video Mouse	Used to describe a switch that is able to switch the operator keyboard, mouse and video display between different systems
LCC	Local Communications Controller	Device providing an interface to roadside devices from the RCC
LVM	Local Video Matrix	An analogue video switch used for monitoring the hard shoulder
MAC	Maintenance Area Contractor	Contractor maintaining the civil assets on the road network
MIDAS	Motorway Incident Detection and Automatic Signalling	System used to manage the loops in the road surface and set appropriate signals and VMS messages
MNSO	MidNight Switch Off	A system for managing street lighting on motorways. It automatically turns off lighting between configured hours.
MSS	Message Sign Subsystem	System used to manage and control the VMS
MVR	Measured Visibility Range	Describes the estimated distance that drivers can see, as determined by fog detectors
NMCS2	National Motorway Communication System 2	The set of systems and protocols used to manage and control the roadside devices
NOMS	Network Occupancy Management Service	A proposed system for tracking and reporting on events, including roadworks, that affect the road network capacity
NRTS	National Roads Telecommunications Services	A Highways Agency team and contract that provides telecommunications services to all operational instation and outstation systems.

Abbreviation		Description
NSPIS	National Standard for Police Information Systems	A system promoted as a national police standard
NTIS	National Traffic Information Service	The name of the contract that provides the the HA's traffic information services and the Traffic England web sites
NTOC	National Traffic Operations Centre	The building, used to accomodate NTIS operations and other national traffic management roles
NVR	Network Video Recorder	Set of equipment that records from all of the HA's cameras and makes that imagery available to RCC operators
NVRM	National Vehicle recovery Manager	A contracted out service to deal with abandoned vehicles on the motorways
OIF	Operator interface	Used within the Highways Agency to denote the Operator Interface for HATMS
ONVIF	Open Network Video Interface Forum	An organisation that publishes an open standard for control and distribution of cameras and their imagery
PAL	Phase Alternating Line	An analogue television standard
PNC	Police National Computer	System providing a central database for police services in the UK
PNG	Portable Network Graphic	A file format used to hold images
PSTN	Public Switched Telephone Network	The public telephone network, used for external calls.
PTZ	Pan Tilt Zoom	Used to describe cameras that can be remotely moved, horizontally (Pan), vertically (Tilt) and zoomed in or out
RCC	Regional Control Centre	An HA traffic management centre covering an HA region, generally aligned with Government regions
RIF	Roads Information Framework	Data extract application, taking C&C logs, Halogen logs and traffic data to provide management reporting on the traffic management services

Abbreviation		Description
RMO	Ramp Metering Outstation	Monitors loops and manages traffic light at the roadside to provide ramp metering.
ROAMSS	Remote Open Access Message Setting System	A means of setting VMS through a dedicated interface to the MSS subsystem
SaaS	Software as a Service	Cloud based application, such as Hotmail
SCADA	Supervisory Control And Data Acquisition	A standard for managing networks of devices generally distributed over an area.
SDS	Streamlined Data Services	An inflight HA project looking at fault management of roadside devices
SIP	Session Initiation Protocol	A telecommunications protocol for signalling and controlling multimedia communication sessions. The most common applications of SIP are in Internet telephony for voice and video calls, as well as instant messaging over Internet Protocol (IP) networks
SRN	Strategic Roads Network	Motorways and other roads defined as being of strategic importance
SRW	Scheduled Road Works	A system tracking roadworks and other events
TAME	Traffic Appraisal Modelling and Economics	The TAME Group is part of Network Planning and Performance Division (NPPD) of the Network Services Directorate. The TAME group originally installed the loops that were later transferred to NTCC then to NDD. NTIS now only collects the data from these loops to send to HATRIS and RIF. One of its first task was to establish a network of traffic measurement sites that is still in use
TCP/IP	Transport Control Protocol/Internet Protocol	Common protocol for guaranteed delivery of messages between points
TMC	Traffic Management Centre	Any location carrying out traffic management, including RCCs and NTOC

Abbreviation		Description
TMU	Traffic Monitoring Unit	A network of traffic measurement sites on the APTR, currently managed by NTIS
TTC	Telephone Text Controller	System used to communicate to ERT users unable to use audio communication
TVBS	Television Base Station	The system that manages CCTV within each RCC
UTMC	Urban Traffic Management and Control	A standard for systems and devices used in the UK urban environment. Commonly also used to refer to the managing system www.utmc.uk.com
VMS	Variable Message Signs	Road side device that displays text, and in some cases, pictograms on the road side
VOIP	Voice Over IP	Internet telephone protocol
VPL	Virtual Private LAN	A type of secure connection over the internet
WAN	Wide Area Network	A network over a very wide area, for example between RCCs

Appendix B. Glossary

Term	Definition
Airwave	Company used to provide access to the TETRA secure and resilient radio communications network dedicated to emergency service use.
All-Purpose Trunk Road *(All Purpose Trunk Road / APTR)*	A non-motorway road which is part of the Strategic Road Network.
application service *(service)*	A self-contained unit of functionality offered by the system
Automated Number Plate Recognition *(ANPR)*	Automatic Number Plate Recognition camera, systems and supporting infrastructure provide a means to "read" vehicle registration marks of moving vehicles. These systems are currently used by the Highways Agency to determine average journey times over links.
Capability	A set of related functions, processes and application services that the ATMS system needs to offer to deliver the business objectives
Command and Control *(C&C)*	a series of computer systems operated by the Agency's Highways Agencies Regional Response Centres, to manage their operations, log and store details regarding both traffic and non traffic related information
Common Highways Agency Rijkswaterstaat Model *(CHARM)*	A Programme of cooperation between the Highways Agency and Rijkswaterstaat to define, with a view to jointly procure a new generation of traffic management systems.
congestion *(queueing / traffic jam)*	a situation that occurs when a volume of traffic generates demand for space greater than the available road capacity
Control Office Base System	The central management system within HATMS
Criminal Justice eXtranet	The Home Office equivalent to GSI, sometimes known as PNN2
Emergency Response Telephones *(ERT)*	Telephones situated at regular intervals along the road network that can be used by road users to contact the Agency's Response Centres if they are in need of assistance
emergency roadside telephone	a statutory telephone in UK for emergency calls.

Term	Definition
Event	an occurrence located on or off the SRN with the potential to have a Material Effect on the SRN; Events include Current Events and Forecast Events
event information	used in the broadest sense possible referring to all information on something that has happened, is happening or will happen with an expected duration. Events may be planned or unplanned. Examples of events are: football match, incident, fire, road maintenance.
Fault Management System *(FMS)*	Part of the Agency's NTCC Instation; the system for monitoring faults in technology.
forecast	estimation, prognosis
General Packet Radio Service *(GPRS)*	Packet oriented Mobile Data Service available to users of Global System for Mobile Communications.
HA Weather Central System	The system collecting weather information from a network of weather stations, other weather systems and forecasters before publishing that information on a website and with web services.
HA Weather Information Service	The internal HA service to collect and deliver weather related information among the HA and its suppliers, which manages HAWCS
HATMS Gateway Service	A specialist application that interfaces between HATMS and NTIS
Highways Agency Traffic Management System *(HATMS)*	A set of systems used in the Agency's Regional Control Centres to undertake traffic and incident management activity using signs and signals.
Highways Agency *(Agency / HA)*	The organisation responsible for building, maintaining and operating the Strategic Road Network in England
infrastructure *(traffic infrastructure)*	the interconnected structural elements that support a society, in our context typically referring to roads, tunnels, bridges and equipment for traffic management, should not be confused with IT infrastructure
Integrated Communications Control System *(ICCS)*	The Agency system used to control communications (both telephony and radio) between the on-road Traffic Officers, RCCs and the Police.

Term	Definition
Key Performance Indicator *(KPI)*	a Performance Measure for which performance below the Target Service Level leads to the accrual of Service Points by the Service Provider
log	an official record of events, usually including a time stamp, the events may relate to system events (system log) or traffic events, i.e. incidents (action log)
Managing Agent Contractor *(MAC)*	Combination of Managing Agent and Term Maintenance Contractor forming a single operating company to maintain the network and its structures on behalf of the Agency.
Meteorological Devices	Roadside devices to monitor weather conditions such as fog and wind
MidNight Switch Off	A system for managing street lighting on motorways. It automatically turns off lighting between configured hours.
National Standard for Police Information Systems	A system promoted as a national police standard
National Traffic Control Centre *(National Traffic Management Centre / NTCC)*	The Agency's National Traffic Control Centre, which delivers information about network conditions to customers (both road users and within the Agency) through identified delivery channels
National Traffic Operations Centre *(NTOC)*	The location at which centralised operational activity is undertaken in England
National Vehicle recovery Manager *(NVRM)*	A contracted out service to recover vehicles on the motorways
Network Video Recorder	Set of equipment that records from all of the HA's cameras and makes that imagery available to RCC operators
Operator	general classification for the internal user of the ATMS, responsible for one or more regions, roads and/or processes and a person who works in traffic control centre and is responsible for accessing updated information related to traffic to assess strategic response required, setting strategic signs and signals e.g. National Traffic Operator, Regional Traffic Operator,
Police	Organisations that provide services which ensure public safety and health by addressing different emergencies, in particular Safety and crime prevention

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Term	Definition
process *(business process)*	groups behaviour based on an ordering of activities (workflow) specific, the ordering may be specific for an implementation site
Ramp Metering	A system located at the roadside that are used to relay a message to the travelling public about road conditions ahead or strategically on other parts of the network. There are a variety of versions in which all can display text and some can also display pictures as well as text. Some VMS is also being used to display signals
Ramp Metering Outstation	Monitors loops and manages traffic light at the roadside to provide ramp metering.
Recovery	The recovery of vehicles, loads, obstacles and debris from the carriageway and the carrying out of essential repairs to the infrastructure
Regional Control Centre *(RCC / Regional Traffic Management Centre)*	Regionally based traffic operations control rooms responsible for managing incidents and ensuring the smooth operation of the motorway network and trunk roads.
resource	reference only personnel & staff
response plan *(scenario)*	a set of instructions that will be used by the ATMS (fully- or semi-automated) or operator (manual process) to response to an event
Roads Information Framework	Data extract application, principally taking C&C logs
sign	an instruction for dynamic travelers having a conventional meaning and used in place of words
Signal	the command send to a traffic signal
status information	structured information about the functioning (behaviour) of road side equipment and sensors
Strategic Road Network *(SRN)*	All roads maintained and operated by the agencies
System provider	party that is responsible for the delivery and support of systems, services and or IT infrastructure within their area of scope

Term	Definition
System *(software system)*	A logical entity that could be comprised of extant applications as-is, enhancements to existing applications, new applications, shared components/common services between multiple systems or any combination thereof.
Telephone Text Controller	A systems for initiating simple exchanges with the ERTs, including PSTN phones on APTR roads, allowing non-English speakers and the deaf to use ERTs
traffic control centre *(TCC / TMC / Traffic Management Centre)*	the buildings from which the agencies deliver their traffic management services
traffic light	A traffic signal with red, amber and green light.
Traffic Management Unit *(TMU)*	A system, used by the Agency's NTCC, comprising of loops to collect Traffic Data.
Traffic officer *(road inspector)*	A person (operating from a roadside locations) that liaise with the police commander at scene to establish the details of when any closed carriageways or lanes will reopen and when other specialist resources are required to be deployed.
Variable Message Sign *(VMS)*	Variable Message Signs, being electronic roadside signs that convey messages
Virtual Private LAN	A type of secure connection over the internet.
Voice Over IP	Internet telephone protocol

Appendix C. Index

No index entries found.