

# THALES



**PROJECT WA119  
NATIONAL TRAFFIC INFORMATION SERVICE  
TRANSFORMATION PROJECT**

**EXTERNAL INTERFACE DESIGN DOCUMENT**

**Publish Services: Email**

**E46-EmailSubscribers**

WA119-08-007-002-03-03-46 v3.00

18 January 2018

Originator's signature & date

Approver's signature and date

.....  
Ian Moffitt

.....  
Nathan Williams

## DISTRIBUTION

1	Project Master File	6	Software Engineering Manager
2	Programme Manager	7	Quality Assurance Manager
3	Systems Engineering Manager	8	NIS PMO
4	Project Design Authority		
5	IVVQ Manager		

## ISSUE RECORD

Issue	Date	Purpose
V0.01	03/10/13	First draft issue. Mark McMullen
V0.02	17/10/13	Added the publication of alternate route information in Event Data emails. (Section 4.3.1) Added Subscription Update Notification emails. (Sections 4.4, 4.3.4, 4.4.1.5) Refined Event location description, contained in Event Data emails. (Section 4.3.1) Refined description of Area of Interest Subscription Option. (Section 7.2.2.2) Mark McMullen
V0.03	05/02/14	Updated the System Interfaces (Section 3.1) and associated reference documents (Section 2). Modified 'Unforecast' Events to 'Unplanned' Events (4.3.1). Added text in the Subscription Update email to state that 'MIDAS' data is also included in catch-up data (4.3.4). Completed Internet Addresses section (Annex A). Mark McMullen
V1.00	25/03/14	All comments on v0.03 addressed: <ul style="list-style-type: none"> <li>- Minor typos, corrections.</li> <li>- Added references to AIL Events (4.3.1 Event Data Emails)</li> <li>- E49-MIDASCatchUp interface added to the Interface Overview and References Sections; for information/completeness only, as it does not affect the rest of the document.</li> </ul> <p>None of the changes require further comment/review; document issued at v1.00.</p> <p>Mark McMullen</p>

V2.01	04/09/14	Modified the Event Data Email subject line to include the Confirmed/Unconfirmed status of the published Event (Section 4.3.1). Mark McMullen
V3.0	20/12/17	NTIS Model web service URL corrected

### APPROVAL RECORD

	<b>Name</b>	<b>Position</b>	<b>Signature</b>
Prepared by	Ian Moffitt	NTIS System Designer	
Approved by	Nathan Williams	Software Engineering Manager	

# CONTENTS

<b>1.SCOPE</b>	<b>1</b>
1.1 Identification	1
1.2 System Overview	1
1.3 Document Overview	1
1.4 Relationship to Other Documents	2
<b>2.REFERENCES</b>	<b>3</b>
<b>3.INTERFACE OVERVIEW</b>	<b>5</b>
3.1 System Interfaces	5
3.2 Description of the Interface between the NTIS System and Subscriber Systems	6
3.3 Description of the NTIS System	7
3.4 Description of the Subscriber System	7
<b>4.INTERFACE DETAILS</b>	<b>8</b>
4.1 Physical	8
4.2 Interface Protocols	9
4.3 Interface Messages/Data Exchange	10
4.3.1 Event Data Emails	10
4.3.2 NTIS Model Update Notification Emails	14
4.3.3 General Communications Emails	16
4.3.4 Subscription Update Notification Emails	18
4.4 Interface Functionality	22
4.4.1 Publication Operation	22
4.4.2 Message Sequences	27
4.5 Sequence Diagrams	28
<b>5.MESSAGE DEFINITIONS</b>	<b>29</b>
5.1 Message Transfer	29
5.2 Message Lists	29
5.3 Byte Ordering Policy	29
<b>6.QUALIFICATION</b>	<b>30</b>
<b>7.LIST OF ANNEXES</b>	<b>31</b>
7.1 Annex A – Internet Addresses	31
7.2 Annex B – Subscription Information	33
7.2.1 Subscriber System	33
7.2.2 Subscription Options	33
7.2.3 On-line Resources	34
7.3 Annex C – Abbreviations and Glossary	36

# EXTERNAL INTERFACE DESIGN DOCUMENT

## PUBLISH SERVICES: EMAIL

### E46-EMAILSUBSCRIBERS

## 1. Scope

### 1.1 Identification

This External Interface Design Document (EIDD) specifies the Email interface between the National Traffic Information Service (NTIS) system and Subscriber systems. The document defines the characteristics of the interface in sufficient detail to provide a common understanding across the interface boundary.

The interface is uniquely identified within the NTIS system as E46-EmailSubscribers and referred to throughout this document, for brevity, as 'the interface'.

### 1.2 System Overview

The NTIS system is described in the NTIS SSDD [ref 3].

The NTIS system includes a Publish Services subsystem. The primary operation of the Publish Services subsystem is to publish real-time data to Subscribers and to provide a reference data set, in the form of the NTIS Model, for subscribers to relate the real-time data to the NTIS road network.

The E46-EmailSubscribers interface is a component of the Publish Services subsystem; responsible for publishing data and information to Subscribers via email.

### 1.3 Document Overview

This document is based on the Interface Control Document Template [ref 12] and Interface Control Document Writing Guide [ref 13], components of the Thales Chorus 2.0 process management system. The document is tailored to accommodate NTIS-specific documentation guidelines.

The document is structured as follows:

- Section 1: Scope and introduction
- Section 2: References - documents and resources referenced from this document
- Section 3: Interface Overview - basic function and context of the interface
- Section 4: Interface Details - protocols, messages, operation and message sequences
- Section 5: Message Definitions - message content listings and descriptions
- Section 6: Qualification of the interface

## Section 7: List of Annexes

Annex A: Internet Addresses – listing static URLs and addresses employed by the interface

Annex B: Subscription Information – Subscriber options, system requirements and on-line resources

Annex C: Abbreviations and Glossary

### **1.4 Relationship to Other Documents**

This EIDD documents the interface design based on the system requirements specified in the corresponding interface requirements specification [ref 5]. The EIDD is one of a suite of EIDDs describing the design of the external interfaces of the NTIS system.

## 2. References

The following table lists the documents and resources referenced from this document.

Ref	Title	Document ID/Reference	Originator
1	Traffic Information 2011 Taxonomy	V4.0 20/09/2010	HA
2	NTIS Test Strategy	WA119-08-008-001	Thales
3	System/Subsystem Design Description for NTIS	WA119-08-007-002-02-02-04	Thales
4	NTIS Infrastructure – Architecture Definition	WA119-08-007-008-01	Thales
5	NTIS E46 Email Subscribers External Interface Requirements Specification	WA119-08-006-03-02-46	Thales
6	NTIS External Interface Design Document Publish Services: NTIS Model Download E18-PublishNTISModel	WA119-08-007-002-03-02-18	Thales
7	NTIS External Interface Design Document Publish Services: DATEXII Webservice E21-DATEXIISubscribers	WA119-08-007-002-03-02-21	Thales
8	TMU Handler Interface Specification	RFC01421	Serco
9	NTIS HATMS Gateway Service Functional Specification	Project ref: 1240/001 Document ref: FS007	IPL
10	NTIS Traffic Data Service Functional Specification	Project ref: 1240/001 Document ref: FS006	IPL
11	RFC01419 – JTMS Handler Interface Specification	IFS00001	Serco
12	Chorus 2.0 Interface Control Document (ICD) Template	83510877-DDQ-GBR-EN-001	Thales
13	Chorus 2.0 Interface Control Document (ICD) Writing Guide	83511164-DDQ-GBR-EN-001	Thales

14	DATEXII website	<a href="http://www.datex2.eu">http://www.datex2.eu</a>	DG MOVE
15	IEEE 802.3 Standard for Ethernet	<a href="http://standards.ieee.org/about/get/802/802.3.html">http://standards.ieee.org/about/get/802/802.3.html</a>	IEEE
16	Transmission Control Protocol: DARPA Internet Program Protocol Specification	<a href="http://www.ietf.org/rfc/rfc793.txt">http://www.ietf.org/rfc/rfc793.txt</a>	Network Working Group
17	Internet Protocol: DARPA Internet Program Protocol Specification (IPv4)	<a href="http://www.ietf.org/rfc/rfc791.txt">http://www.ietf.org/rfc/rfc791.txt</a>	Network Working Group
18	Simple Mail Transfer Protocol (SMTP)	<a href="http://www.ietf.org/rfc/rfc5321.txt">http://www.ietf.org/rfc/rfc5321.txt</a>	Network Working Group
19	Multipurpose Internet Mail Extensions (MIME) 1.0	<a href="http://www.ietf.org/rfc/rfc2045.txt">http://www.ietf.org/rfc/rfc2045.txt</a>	Network Working Group
20	Internet Message Format	<a href="http://www.ietf.org/rfc/rfc5322.txt">http://www.ietf.org/rfc/rfc5322.txt</a>	Network Working Group
21	Traffic England Website	<a href="http://www.trafficengland.com">http://www.trafficengland.com</a>	Thales
22	NTIS External Interface Design Document Publish Services: Daily Aggregated Traffic Data E33-PublishDATD	WA119-08-007-002-03-03-33	Thales
23	NTIS External Interface Design Document Event Collection E35-EventsInput	WA119-08-007-002-03-02-35	Thales
24	Traffic Control Centre TAME Project Data Extraction	TCC-TAME-0006	Serco
25	NTIS External Interface Design Document MIDAS Catch-Up E49-MIDASCatchUp	WA119-08-007-002-03-02-49	Thales



### 3. Interface Overview

#### 3.1 System Interfaces

Figure 3-1 illustrates the context of the interface (E46-EmailSubscribers) within the overall operation of the NTIS system.

The boundary of the interface is defined as the network interface on which the NTIS system sends email communication to Subscriber systems.

The context diagram also includes the NTIS system external interfaces that are related to, or impact on, the function of this interface. The E<number>-<descriptor> ID is a unique external interface identifier within the NTIS system.

Note that the diagram omits any interface or external system that does not directly affect the Publish Services provided by the NTIS system.

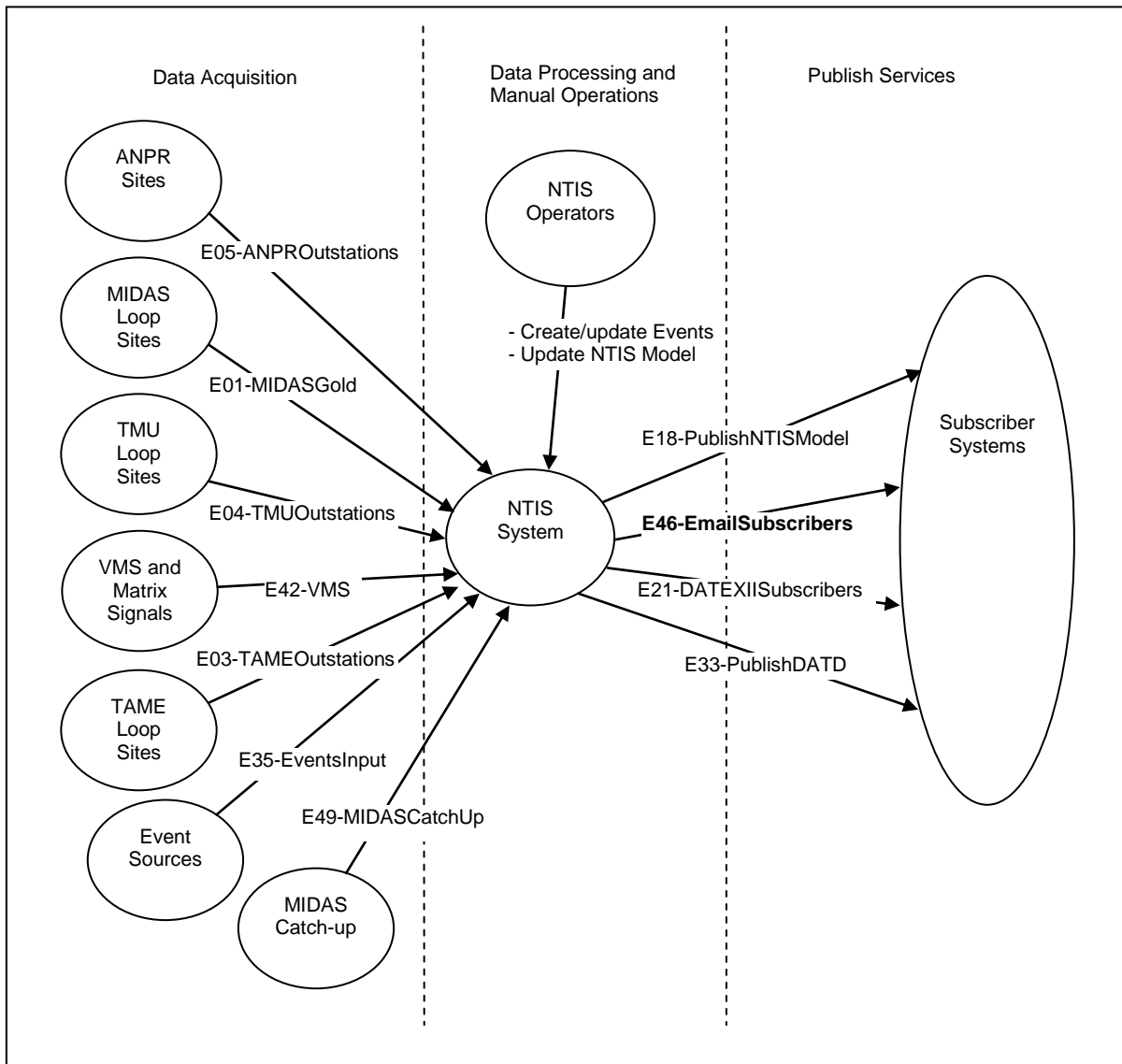


Figure 3-1 : Publish Services Context Diagram

#### Data Acquisition External Interfaces:

- E01-MIDASGold: the interface used to collect real-time traffic data from MIDAS Gold outstations. The interface is documented in [ref 10].
- E03-TAMEOutstations: the interface is used to collect daily traffic data from TAME outstations. The interface is documented in [ref 24].
- E04-TMUOutstations: the interface used to collect real-time traffic data from TMU outstations. The interface is documented in [ref 8].
- E05-ANPROutstations: the interface is used to collect real-time travel times from ANPR outstations. The interface is documented in [ref 11].
- E42-VMS: the interface is used to collect real-time VMS and Matrix Signal display status information. The interface is documented in [ref 9].
- E35-EventsInput : the interface is used to collect Events data and information from external sources. The interface is documented in [ref 23].
- E49-MIDASCatchUp : the interface is used to collect catch-up data from the MIDAS historical data repository [ref 25].

Note: the data received on interfaces E01, E03, E04, E05 and E42 are not published by this interface, but are included in other Published Services and so are included for completeness.

#### Publish Services External Interfaces:

- E18-PublishNTISModel: this interface is utilised to publish the NTIS Model to Subscribers. The NTIS Model contains reference data that is required to interpret the real-time data published on the E21-DATEXIISubscribers interface and is documented in [ref 6].
- E21-DATEXIISubscribers: this interface is utilised to publish real-time data to Subscribers via a DATEXII-compliant [ref 14] web service. [ref 7].
- E33-PublishDATD: this interface is used to publish the Daily Aggregated Traffic Data (DATD) to Subscribers. The DATD interface and publication are detailed in [ref 22].

The data acquisition source systems and interfaces, and the facilities provided to operators, are outside the scope of this document and are only detailed in this document where this affects the functionality of the interface.

### **3.2 Description of the Interface between the NTIS System and Subscriber Systems**

The interface is utilised to publish data and information to multiple Subscriber systems via the internet.

The interface employs a SMTP-based email service to deliver the published data.

The scope of this interface does not include the receipt, storage or management of emails sent from Subscribers to the NTIS system.

The interface is employed to deliver the following email communications to Subscribers:

1. Event Data: automated, near real-time emails describing Events affecting the traffic status of the road network. Events are manually created and modified by operators of the NTIS system. Subscription Options, held and managed by the NTIS system, are utilised to personalise the Event Data published to each Subscriber. Refer to Section 7.2 for details.
2. NTIS Model Update Notifications: automated emails informing Subscribers that a new NTIS Model is available for collection from the NTIS system.
3. General Communications: free format emails, utilised by system administrators to communicate general information about the system or services to Subscribers.
4. Subscription Update Notifications: automated emails, delivered to a specific Subscriber when the Subscription is created, deleted or modified. The email contains information describing the current status of the Subscription and associated Subscription Options.

### **3.3 Description of the NTIS System**

The NTIS system function and operations are described in the NTIS SSDD [ref 3].

### **3.4 Description of the Subscriber System**

A Subscriber system is any system employed by a registered NTIS Publish Services Subscriber to receive published data. The Subscriber system must be capable of receiving the emails sent by the NTIS system.

The NTIS system maintains a number of Subscription Options for each Subscriber (refer to Section 7.2). The Subscription Options include a single email address to which all email communications provided by this interface are delivered.

## 4. Interface Details

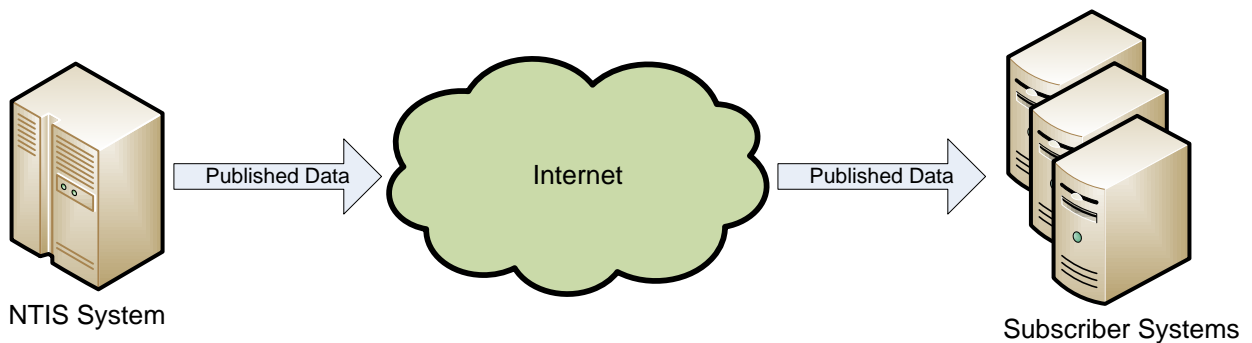
### 4.1 Physical

The NTIS system exchanges data with Subscriber systems via the internet.

The physical interface comprises standard networking components and transport mechanisms and protocols. The system network components provide a virtualised connection to the internet in a single interface.

This infrastructure provides a transparent communication path for the interface that requires no direct management from the interface itself. Hence, the physical make-up of the interface is not detailed further in this document. The networking components, mail transfer agents and servers, and system infrastructure are described in detail in [ref 4].

A simplified schematic representation of the physical interface is illustrated below.



**Figure 4-1 : Physical Interface Schematic**

## 4.2 Interface Protocols

The interface employs the protocols and specifications listed below.

Network Layer	Protocol	Utilisation
Link	Ethernet [ref 15]	Utilised for all network communications by the NTIS system; refer to the system infrastructure document [ref 4].
Transport	TCP [ref 16]	
Internet	IPv4 [ref 17]	
Application	SMTP [ref 18]	The SMTP Internet standard protocol is utilised for all email transmissions from the NTIS system on this interface.
	MIME v1.0 [ref 19]	The content of all emails transmitted on this interface are formatted to the MIME Internet standard.
	Internet Message Format [ref 20]	The headers included in emails transmitted on this interface utilise the standard field name and field body syntax defined in the Internet Message Format specification.

**Table 4-1 : Interface Protocols**

### 4.3 Interface Messages/Data Exchange

Note that the following sections do not describe the SMTP messages, only the content of the emails transmitted by the system. The standard SMTP messages are managed by local (NTIS system), intermediate (Internet) and remote (Subscriber system) mail agents and are transparent to the publication mechanism.

Message Headers: the following sections list MIME and Internet Message headers included in emails transmitted on the interface. The listed headers include only those explicitly and intentionally set by the NTIS system. The relaying of the email, via the Internet, to the recipient will result in more header fields being added to the message; however, this is outside the scope or influence of this interface.

Static NTIS websites, email addresses and URLs described in this section are listed explicitly in Section 7.1.

*bold italics* in the message header and body listings indicate substitutable parameters, described further in the 'Notes' sections. All normal-font text is static and included in all emails.

#### 4.3.1 Event Data Emails

Event Data emails are used to publish Events to Subscribers. Refer to Section 4.4.1 for details of the publication operation.

##### Message Header:

```
From: National Traffic Information Service <NTIS_address>  
To: subscriber_id <subscriber_email_address>  
Message-ID: message_id  
Subject: event_subject_line  
MIME-Version: 1.0  
Content-Type: text/plain; charset=us-ascii  
Content-Transfer-Encoding: 7bit  
X-Priority: priority
```

##### Notes:

1. MIME Headers: the email utilises MIME v1.0 and contains plain text only, with content utilising the default 7-bit encoding and US-ASCII character set.
2. *NTIS\_address* : the NTIS Publish Services email address, included as the From header value in all emails. The address is system configurable and hence cannot be explicitly stated in this document. Adhering to the SMTP RFC [ref 18], the NTIS email address provides a valid return path to an active mailbox that can receive replies. The administration of the mailbox, including the operational procedures for interrogating received emails and acting on any content therein, is outside the scope of this document.
3. *subscriber\_id* : the unique username of the target Subscriber, as stored in the Subscription Options on the NTIS system.
4. *subscriber\_email\_address* : the email address of the target Subscriber, as stored in the Subscription Options on the NTIS system.

5. **message\_id** : a unique message ID automatically added by the local NTIS mail transfer agent to enable identification of the transmitted email.
6. **event\_subject\_line** : formatted text describing the Event in summary:  
*event\_reference* : *location* : *event\_type\_desc* - *event\_subtype\_desc* : *status* : *confirmed\_status*
  - a. *event\_reference* is the unique NTIS reference for the Event:  
*event\_type-YY-MM-DD-NNNNN*
    - i. *event\_type* defines the Event Type: 'AL' Abnormal Loads, 'MO' Major Organised, 'RW' (Roadworks), 'UF' (Unplanned), or 'WE' (Weather).
    - ii. *YY-MM-DD* is the year, month and day of creation of the Event in the NTIS system.
    - iii. *NNNNN* is a non-negative integer, unique for the Event Type and date of creation. The value is reset to 0 at the start of each day and increments for each Event created. The number comprises 6 digits and is right justified and padded with leading zeros.
  - b. *location* is a brief, textual description of the location of the Event. The NTIS system automatically derives location text based on the network location(s) of an Event. A location text can also be manually added to an Event by operators. If no textual description of the location is automatically or manually specified in the NTIS system, the following text replaces the location:
    - i. For Weather Events: 'Non-specific Location' (Weather Events do not have an automatically-derived location text as they affect a typically large area, so any location text will be set by operators).
    - ii. For Non-Weather Events: 'Off Network' (only non-Weather Events which are off-network will have no automatically-derived location text).
  - c. *event\_type\_desc* is a textual description of the Event Type: 'Abnormal Load', 'Roadworks', 'Major Organised', 'Unplanned' or 'Weather'.
  - d. *event\_subtype\_desc* is a textual description of the Event Sub-Type. The Event Sub-Types are dependent on the Event Type. The Sub-Types and associated textual representations are outside the scope of this document.
  - e. *status* is the current status of the Event:
    - i. 'Planned' (Abnormal Loads, Major Organised or Roadworks Events only): the Event is either still in the future or is between periods of activity (for example, a Roadworks Event may be active (Current) between defined times each night; between these active periods, the status will be set to Planned to indicate that the next active period is in the future).
    - ii. 'Predicted' (Weather Events only) : the Event is still in the future.
    - iii. 'Current': the Event is currently active.
    - iv. 'Complete': the Event has completed its lifecycle.

- v. 'Deleted': the Event has been cancelled/deleted.
  - f. *confirmed\_status* specifies whether or not the Event has been confirmed. Values: 'Confirmed' or 'Unconfirmed'.
7. *priority* : a priority value reflecting the severity of the Event:
- a. Very High severity: *priority* = 1
  - b. Very Low severity: *priority* = 5
  - c. High, Medium and Low severity: the X-Priority field is omitted from the email. Email clients interpret this as 'normal' priority.

Message Body:

Advance Warning Plan (AWP):

***AWP\_key : AWP\_value***

...

***AWP\_key : AWP\_value***

General Default Plan (GDP):

***GDP\_key : GDP\_value***

...

***GDP\_key : GDP\_value***

Alternate Routes:

From: ***alt\_route\_origin***      To: ***alt\_route\_dest***

...

From: ***alt\_route\_origin***      To: ***alt\_route\_dest***

Additional Information:

***additional\_info***

***event\_url***

***disclaimer***

Notes:

1. ***AWP\_key/AWP\_value*** : a series of textual, human-readable key/value pairs listing the attributes (keys) and corresponding values that describe the Advance Warning Plan associated with the Event. The keys/attributes are system configurable and cannot be explicitly listed in this document.
2. ***GDP\_key/GDP\_value*** : a series of textual, human-readable key/value pairs listing the attributes (keys) and corresponding values that describe the General Default Plan associated with the Event. The keys/attributes are system configurable and cannot be explicitly listed in this document.
3. An Event is associated with:
  - a. An AWP only, if the Event is still planned/predicted.



- b. A GDP only, if the Event is currently active and has no future, planned periods of activity.
  - c. Both an AWP and GDP, if the Event is currently active and has one or more future, planned period(s) of activity (for example, a Roadworks Event that recurs each night).
4. If there is no AWP associated with the Event, the format of the message is preserved but the key/value pairs are replaced with the static text 'N/A'. Similarly for GDP.
  5. **alt\_route\_origin/alt\_route\_dest** : alternate routes may be defined for the Event as part of the Strategic Response assigned to the Event. The alternate routes specify other routes that can be used to minimise or avoid the effects of the Event.
    - a. The **alt\_route\_origin/alt\_route\_dest** fields are textual, human-readable descriptions of the start and end points of the alternate route.
    - b. 0, 1 or multiple alternate routes may be specified for an Event. If no alternate routes are specified, then the 'From...To...' text is replaced with 'N/A'.
    - c. The NTIS system can generate multiple recommended alternate routes for an Event; only those routes *accepted* and *implemented* as part of a Strategic Response Plan are included in the Event publication.
    - d. Only alternate routes that are wholly contained within the NTIS road network are published.
  6. **additional\_info** : additional descriptive text, adding information to the standard AWP and GDP attributes.
  7. **event\_url** : a URL that can be used to locate the Event on the Traffic England website [ref 21].
  8. **disclaimer** : a textual disclaimer, terminating the email body. The disclaimer text is system configurable and hence cannot be explicitly specified in this document.

Restricted Data Management:

If restricted data is suppressed to a Subscriber, via the Subscription Options, the following item is omitted from the publication:

1. Additional description text, as this will include text with journalistic colour:

Additional Information:  
**additional\_info**

Refer to Section 4.4.1.2 for a description of the suppression of restricted data.

### 4.3.2 NTIS Model Update Notification Emails

NTIS Model Update Notifications are standard-formatted emails used to inform Subscribers that a new NTIS Model is available for download via the E18-NTISModelDownload interface [ref 6]. Refer to Section 4.4.1 for details of the publication operation.

#### Message Header:

```
From: National Traffic Information Service <NTIS_address>
To: subscriber_id <subscriber_email_address>
Message-ID: message_id
Subject: subject_line
MIME-Version: 1.0
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit
```

#### Notes:

1. MIME Headers: the email utilises MIME v1.0 and contains plain text only, with content utilising the default 7-bit encoding and US-ASCII character set.
2. *NTIS\_address* : the NTIS Publish Services email address, included as the From header value in all emails. The address is system configurable and hence cannot be explicitly stated in this document. Adhering to the SMTP RFC [ref 18], the NTIS email address provides a valid return path to an active mailbox that can receive replies. The administration of the mailbox, including the operational procedures for interrogating received emails and acting on any content therein, is outside the scope of this document.
3. *subscriber\_id* : the unique username of the target Subscriber, as stored in the Subscription Options on the NTIS system.
4. *subscriber\_email\_address* : the email address of the target Subscriber, as stored in the Subscription Options on the NTIS system.
5. *message\_id* : a unique message ID automatically added by the local NTIS mail transfer agent to enable identification of the transmitted email.
6. *subject\_line* : the subject comprises text formatted as follows:
  - NTIS Model Update Notification : *vmodel\_version*
  - a. *model\_version* is the new version of the NTIS Model that is available for download.

#### Message Body:

The following version of the NTIS Model is now available for download from the NTIS system: *vmodel\_version*.

Download Options:

- Website: *NTIS\_model\_website*
- Web service: *NTIS\_model\_webservice*

For information on how to download the NTIS Model using the website or web service, refer to the Traffic England website Subscriber information pages: ***NTIS\_traffic\_england\_subscribers***

***disclaimer***

Notes:

1. ***model\_version*** : the new version of the NTIS Model that is available for download.
2. ***NTIS\_model\_website*** : the URL of the website that can be accessed by Subscribers to manually download the latest, and previous versions of, the NTIS Model. Refer to the E18-NTISModelDownload interface specification [ref 6] for details.
3. ***NTIS\_model\_webservice*** : the URL of the web service that can be accessed to automatically download the latest NTIS Model. Refer to the E18-NTISModelDownload interface specification [ref 6] for details.
4. ***NTIS\_traffic\_england\_subscribers*** : the URL of the location on the Traffic England website [ref 21] where help and information is provided to Subscribers.
5. ***disclaimer*** : a textual disclaimer, terminating the email body. The disclaimer text is system configurable and hence cannot be explicitly specified in this document.

### 4.3.3 General Communications Emails

General Communications publications are emails with unstructured content created and defined by a system operator to convey general messages to Subscribers. Refer to Section 4.4.1 for details of the publication operation.

#### Message Header:

```
From: National Traffic Information Service <NTIS_address>
To: subscriber_id <subscriber_email_address>
Message-ID: message_id
Subject: subject_line
MIME-Version: 1.0
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit
X-Priority: priority
```

#### Notes:

1. MIME Headers: the email utilises MIME v1.0 and contains plain text only, with content utilising the default 7-bit encoding and US-ASCII character set.
2. *NTIS\_address* : the NTIS Publish Services email address, included as the From header value in all emails. The address is system configurable and hence cannot be explicitly stated in this document. Adhering to the SMTP RFC [ref 18], the NTIS email address provides a valid return path to an active mailbox that can receive replies. The administration of the mailbox, including the operational procedures for interrogating received emails and acting on any content therein, is outside the scope of this document.
3. *subscriber\_id* : the unique username of the target Subscriber, as stored in the Subscription Options on the NTIS system.
4. *subscriber\_email\_address* : the email address of the target Subscriber, as stored in the Subscription Options on the NTIS system.
5. *message\_id* : a unique message ID automatically added by the local NTIS mail transfer agent to enable identification of the transmitted email.
6. *subject\_line* : the subject comprises free text, created by the system operator sending the email.
5. *priority* : a priority value for the email:
  - a. High priority: *priority* = 1
  - b. Low priority: *priority* = 5
  - c. Medium priority: the X-Priority field is omitted from the email. Email clients interpret this as 'normal' priority.

#### Message Body:

*message\_body\_text*

*disclaimer*

Notes:

1. *message\_body\_text* : free text, created by the system operator sending the email.
2. *disclaimer* : a textual disclaimer, terminating the email body. The disclaimer text is system configurable and hence cannot be explicitly specified in this document.

### 4.3.4 Subscription Update Notification Emails

Subscription Update Notifications are standard-formatted emails used to inform a Subscriber that the associated Subscription has been created, changed or deleted. Refer to Section 4.4.1 for details of the publication operation.

#### Message Header:

```
From: National Traffic Information Service <NTIS_address>
To: subscriber_id <subscriber_email_address>
Message-ID: message_id
Subject: NTIS Subscription Update Notification
MIME-Version: 1.0
Content-Type: text/plain; charset=us-ascii
Content-Transfer-Encoding: 7bit
```

#### Notes:

1. MIME Headers: the email utilises MIME v1.0 and contains plain text only, with content utilising the default 7-bit encoding and US-ASCII character set.
2. *NTIS\_address* : the NTIS Publish Services email address, included as the From header value in all emails. The address is system configurable and hence cannot be explicitly stated in this document. Adhering to the SMTP RFC [ref 18], the NTIS email address provides a valid return path to an active mailbox that can receive replies. The administration of the mailbox, including the operational procedures for interrogating received emails and acting on any content therein, is outside the scope of this document.
3. *subscriber\_id* : the unique username of the target Subscriber, as stored in the Subscription Options on the NTIS system.
4. *subscriber\_email\_address* : the email address of the target Subscriber, as stored in the Subscription Options on the NTIS system.
5. *message\_id* : a unique message ID automatically added by the local NTIS mail transfer agent to enable identification of the transmitted email.

#### Message Body:

```
Your Subscription to the NTIS Published Services has been
type_of_change.
```

```
Current Subscription:
=====
```

```
Identification:
-----
```

```
Username: subscriber_id
Email: subscriber_email_address
```

```
Email Delivery Channel:
-----
```

```
Event Data:
```

- Received Event Types: **event\_types**
- Receive Unconfirmed Events? **option\_yes\_no**
- Include Restricted Information? **option\_yes\_no**
- Geographical Area of Interest Filters:
  - HA Areas: **ha\_area\_list**
  - RCC Regions: **rcc\_region\_list**
  - Counties: **county\_list**
  - User Defined Areas: **user\_area\_list**

DATEXII Webservice Delivery Channel:

-----

Event Data:

- Received Event Types: **event\_types**
- Target URL: **target\_url**
- Receive Unconfirmed Events? **option\_yes\_no**
- Include Restricted Information? **option\_yes\_no**
- Geographical Area of Interest Filters:
  - HA Areas: **ha\_area\_list**
  - RCC Regions: **rcc\_region\_list**
  - Counties: **county\_list**
  - User Defined Areas: **user\_area\_list**

ANPR Travel Times:

- Receive ANPR Data? **option\_yes\_no**
- Target URL: **target\_url**
- Geographical Area of Interest Filters:
  - HA Areas: **ha\_area\_list**
  - RCC Regions: **rcc\_region\_list**
  - Counties: **county\_list**
  - User Defined Areas: **user\_area\_list**

MIDAS Loop Data:

- Receive MIDAS Data? **option\_yes\_no**
- Target URL: **target\_url**
- Geographical Area of Interest Filters:
  - HA Areas: **ha\_area\_list**
  - RCC Regions: **rcc\_region\_list**
  - Counties: **county\_list**
  - User Defined Areas: **user\_area\_list**

NTIS Model Update Notifications:

- Receive NTIS Model Update Notifications? **option\_yes\_no**
- Target URL: **target\_url**

Processed Traffic Data:

- Receive FVD-based Data? **option\_yes\_no**
- Receive Sensor-only Data? **option\_yes\_no**
- Target URL: **target\_url**

- Geographical Area of Interest Filters:
  - HA Areas: **ha\_area\_list**
  - RCC Regions: **rcc\_region\_list**
  - Counties: **county\_list**
  - User Defined Areas: **user\_area\_list**

TMU Loop Data:

- Receive TMU Data? **option\_yes\_no**
- Target URL: **target\_url**
- Geographical Area of Interest Filters:
  - HA Areas: **ha\_area\_list**
  - RCC Regions: **rcc\_region\_list**
  - Counties: **county\_list**
  - User Defined Areas: **user\_area\_list**

VMS and Matrix Signal Data:

- Receive VMS/Matrix Data? **option\_yes\_no**
- Target URL: **target\_url**
- Geographical Area of Interest Filters:
  - HA Areas: **ha\_area\_list**
  - RCC Regions: **rcc\_region\_list**
  - Counties: **county\_list**
  - User Defined Areas: **user\_area\_list**

Catch-up Data:

- Receive ANPR, MIDAS and TMU Catch-Up Data? **option\_yes\_no**

Previous Subscription:

=====

(only changed items are listed)

**previous\_subscription**

**disclaimer**

Notes:

1. **type\_of\_change** : one of 'created', 'changed' or 'deleted'. Note:
  - a. If the change type is 'created' then no 'Previous Subscription' section is included in the email.
  - b. If the change type is 'deleted' then no 'Current Subscription' section is included in the email.
2. **subscriber\_id** : the unique username of the target Subscriber, as stored in the Subscription Options on the NTIS system.
3. **subscriber\_email\_address** : the email address of the target Subscriber, as stored in the Subscription Options on the NTIS system.



4. **option\_yes\_no** : indicates whether a Subscription Option is true/active ('Yes') or not ('No').
5. **event\_types** : a comma-separated list of the Event Types that are received on the Delivery Channel. Each Event Type is presented as a textual description (as opposed to an ID or code). If no items are specified, then the list is replaced with the text 'None'.
6. **ha\_area\_list** : a comma-separated list of the HA Areas specified to filter data for the Delivery Channel and Published Data Type. Each area is presented as a textual description. If no items are specified, then the list is replaced with the text 'None'.
7. **rcc\_region\_list** : a comma-separated list of the RCC Regions specified to filter data for the Delivery Channel and Published Data Type. Each region is presented as a textual description. If no items are specified, then the list is replaced with the text 'None'.
8. **county\_list** : a comma-separated list of the Counties specified to filter data for the Delivery Channel and Published Data Type. Each county is presented as a textual description. If no items are specified, then the list is replaced with the text 'None'.
9. **user\_area\_list** : a comma-separated list of the User Defined Areas (refer to Section 7.2.3) specified to filter data for the Delivery Channel and Published Data Type. Each area is presented as a textual description. If no items are specified, then the list is replaced with the text 'None'.
10. **target\_url** : the target URL, hosted by the Subscriber, to receive the published data for the Delivery Channel and Published Data Type. If no URL is specified, then the text 'None' is displayed.
11. **previous\_subscription** : a list of all changed Subscription Options. The original, pre-change values are listed. The list is presented in the same format as the 'Current Subscription' section, including titles and sections, but, for clarity, only includes those items that have changed. Example:

```

Previous Subscription:
=====
(only changed items are listed)

Processed Traffic Data:
- Receive Sensor-only Data: Yes

VMS and Matrix Signal Data:
- Target URL: mydomain.com/myendpoint
- Geographical Area of Interest Filters:
  - Counties: West Sussex

```

12. **disclaimer** : a textual disclaimer, terminating the email body. The disclaimer text is system configurable and hence cannot be explicitly specified in this document.

Details of the Subscription Options contained in the email can be found in Section 7.2 (Email options, specific to this interface) and [ref 7] (DATEXII Webservice-specific options).

## 4.4 Interface Functionality

The interface utilises unsolicited emails to transmit the following types of publication to Subscribers:

1. Event Data
2. NTIS Model Update Notifications
3. General Communications
4. Subscription Update Notifications

The publication operations and message sequences are described in the following sections.

### 4.4.1 Publication Operation

#### 4.4.1.1 Common

1. Each publication operation can send an email to one or more Subscribers. Separate emails are sent to each individual target Subscriber, to support the following good practices:
  - a. The other usernames and email addresses of other recipients are not exposed to the target Subscriber, as would be the case if a single email was sent to a group list.
  - b. A personalised 'To' header value can be included, to confirm to the Subscriber that the email is for the intended mailbox/recipient.

Note that using a blind copy (BCC) email to a group list would solve the problem of exposing personal information to other Subscribers (point 1) but would not enable the inclusion of a 'To' value (point 2).

2. All email publications are sent to the single email address associated with the Subscription. Refer to Section 7.2 for details.

#### 4.4.1.2 Event Data

##### 4.4.1.2.1 Overview

The interface publishes Event Data emails whenever an Event is created or updated in the NTIS system.

The Event Data emails are published to whichever Subscribers have the appropriate Subscription Options specified to receive the Event. Subscription Options are set up for each Subscriber and enable Subscribers to filter in/out what Events are received, using a number of different filter criteria.

Refer to Section 7.2 for a list of Subscription Options applicable to this interface.

The publication operation, including the application of filter options, is illustrated in the Activity Diagram, below.

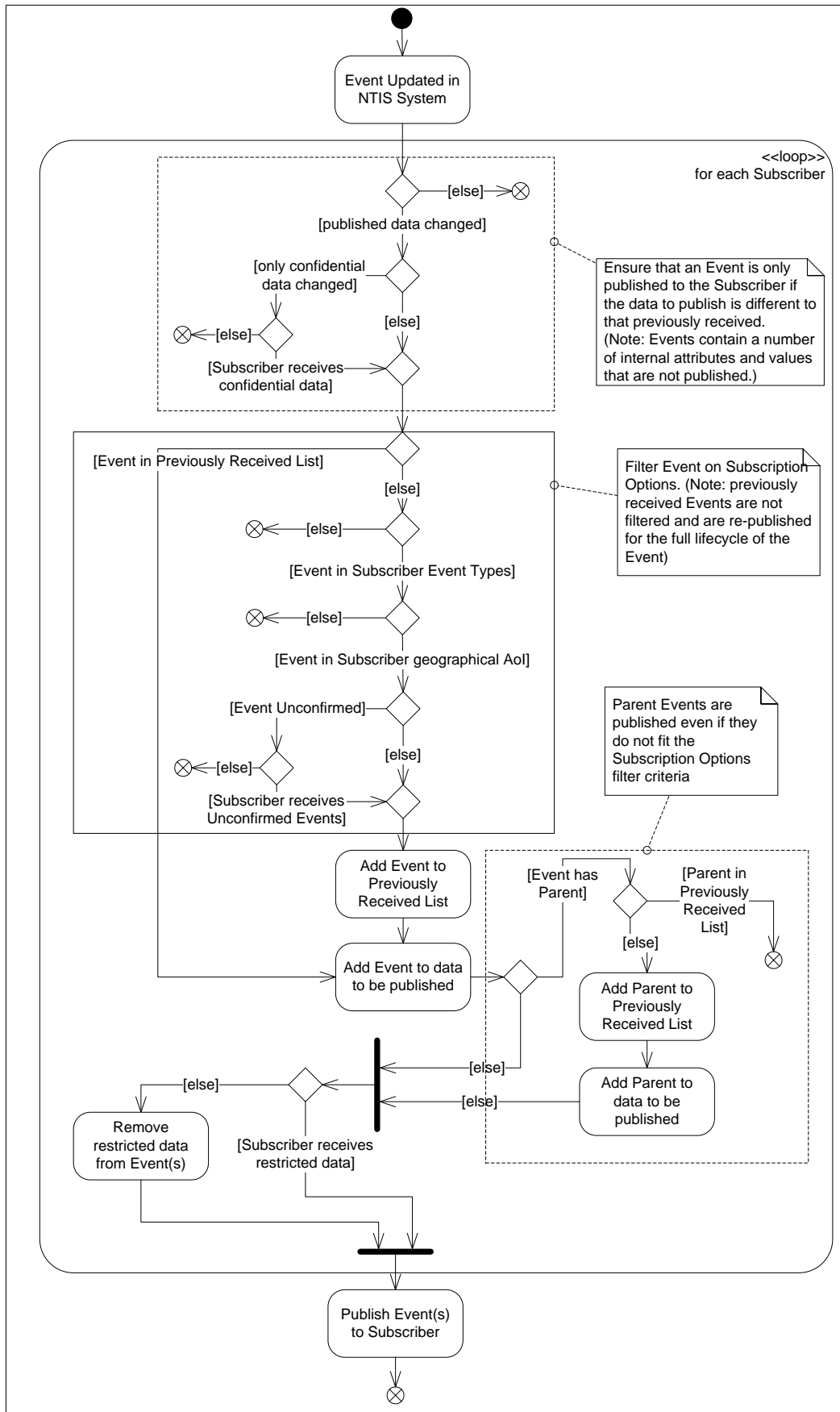


Figure 4-2 : Event Data Update and Publication

#### **4.4.1.2.1.1 Publication On Change**

An Event Data message is only published to a target Subscriber if the data contained in the publication differs from that previously received by the Subscriber:

1. Previously published data item(s) change in value.
2. New data item(s) are included in the publication.
3. Data item(s) are removed from the publication.

This determination is made on a per-Subscriber basis, as different Subscribers may receive different data content (the Subscription Options specified for the Subscriber may suppress certain data items, such as restricted information).

An update for a newly-created Event is always published as the Event has not previously been received by any Subscriber.

#### **4.4.1.2.1.2 Event Lifecycle**

Once an Event has been published to a Subscriber, the Subscriber continues to receive Event Data updates for the Event for the complete lifecycle of the Event.

The first time an Event is published to a Subscriber, the Event is added to a Subscriber-specific Previously Received List.

Updates for an Event in the Subscriber's Previously Received List are published to the Subscriber, even if the updated Event now falls outside the filter criteria specified in the associated Subscription Options.

#### **4.4.1.2.1.3 Event Types**

The Events Published Data Type can be filtered on the Event Type(s) specified in the Subscription Options (refer to Section 7.2).

Events that do not match the Event Type(s) specified in the Subscription Options are filtered out of publications to the Subscriber.

#### **4.4.1.2.1.4 Completion and Deletion**

An Event can be set to Completed (the Event has terminated) or Deleted (the Event is no longer valid) in the NTIS system. Once Completed or Deleted in the NTIS system, the Event is considered to be at the end of its lifecycle.

The transition to a Completed or Deleted state cannot be reversed.

The Event Completion or Deletion state change is communicated in an Event Data email publication, to inform Subscribers that the Event has reached the end of its lifecycle. This publication is only sent once.

#### **4.4.1.2.1.5 Event Confirmation**

Events can be in either a Confirmed or Unconfirmed state. Once Confirmed, Events can be reset to Unconfirmed at any time; and vice versa.

A Subscription Option is used to specify whether a Subscriber receives Unconfirmed Events.

#### **4.4.1.2.1.6 Event Associations – Tight Coupling**

Tightly-coupled associations between Events take the form of a parent-child relationship. There is a single level of association: a parent Event cannot have a parent, a child event cannot have a child.

This type of association is applicable to:

1. Roadworks Events: the parent Event is the roadworks scheme, the child Events are the individual roadworks.
2. Major Events: the parent Event is the Major Event itself, the child Events are the consequential Events, caused by the Major Event.

When a child Event is published, the parent Event is automatically published to the Subscriber; even if the parent Event falls outside the filter criteria specified in the Subscription Options. This enables Subscribers to relate the child Event to the overarching or governing Event. The parent Event is added to the Subscriber-specific Previously Received List.

Note: if the parent Event has already been added to the Previously Received List (it may fall within the filter criteria specified for the Subscriber, or a child/parent update has already been published), then it is not published with child updates.

#### **4.4.1.2.1.7 Restricted Information**

Events may contain restricted information; not intended for consumption by the general public.

The restricted information contained in Events is only published to Subscribers that are configured, via the associated Subscription Options, to receive restricted data. For a Subscriber without permission to receive restricted information, the Event is published with the restricted data items removed.

The filtering out of restricted data items in a publication is dependent on the data items included in the publication and the Event Type; refer to Section 4.3.1 for details.

#### **4.4.1.3 NTIS Model Update Notifications**

The NTIS system sends an email to inform Subscribers that a new NTIS Model is available for download from the NTIS system.

The email is sent to all Subscribers currently registered with NTIS system, regardless of Subscription Options or preferences.

The email is automatically triggered whenever a new published NTIS Model is made available by the NTIS system.

The NTIS Model Download service is detailed in the corresponding interface specification [ref 6].

Refer to Section 4.3.2 for details of the email message sent for this type of publication.

#### **4.4.1.4 General Communications**

The NTIS system provides a facility for system operators to select one or more Subscribers and generate and send an email to those Subscribers.

The operator can set the following prior to sending the email:

1. The Subject header, as free text.
2. The X-Priority header (high, normal, low).
3. The main body of the email, as free text.

Refer to Section 4.3.3 for details of the email message sent for this type of publication.

#### **4.4.1.5 Subscription Update Notifications**

The NTIS system sends an email to a single Subscriber to inform the Subscriber of any changes to the associated Subscription.

The email is automatically triggered whenever a new Subscription is created, an existing Subscription modified, or a Subscription is removed from the system.

The email contains the current status of the Subscription and the associated Subscription Options.

Refer to Section 4.3.4 for details of the email message sent for this type of publication.

#### 4.4.2 Message Sequences

Note that this document does not describe the underlying SMTP or TCP messages or message sequences; these are standard messages and data exchanges, transparent to the interface and outside the scope of this document.

The interface employs a simple, single transaction, unidirectional message sequence for all types of email communications:

1. The NTIS system issues the email transmission onto the interface boundary; the network interface connecting the NTIS system to the Internet.
2. Response to the originally transmitted email, in the form of an email reply to the 'From' address of the original email, is received and stored. However, the response is not automatically processed or acted upon by the system. Any manual, human interaction with the received emails is outside the scope of this document.
3. Unsolicited email deliveries to the 'From' email address contained in emails generated by the NTIS system are treated as per response/reply messages, above.

## 4.5 Sequence Diagrams

This section is not applicable to the document. The simple message sequence, employed for all email communication on this interface, is described in Section 4.4.2.



## **5. Message Definitions**

### **5.1 Message Transfer**

This section is not applicable to the document. The messages are sufficiently defined in content and format in Section 4.3.

### **5.2 Message Lists**

This section is not applicable to the document. The messages are sufficiently defined in content and format in Section 4.3.

### **5.3 Byte Ordering Policy**

The interface utilises standard interoperable transport and application layer protocols; no specific byte ordering policy is required.

## 6. Qualification

The interface is designed to meet the system requirements specified in [ref 5].

The validation and testing of this and all other system interfaces are described in the NTIS Test Strategy [ref 2].

## 7. List of Annexes

### 7.1 Annex A – Internet Addresses

Internet Address	Description
<NTIS email address>	<p>The email address included in the 'From' field of all published emails (Section 4.3).</p> <p>The value is system-configurable by NTIS system administrators and hence cannot be explicitly specified in this document.</p>
<a href="http://www.trafficengland.com/?evtID=&lt;event ID&gt;">http://www.trafficengland.com/?evtID=&lt;event ID&gt;</a>	<p>The hyperlink included in Event Data email publications, to enable the Subscriber to navigate directly to the Event (with the ID &lt;event ID&gt;) on the Traffic England website [ref 21].</p> <p>Event Data email publications are detailed in Section 4.3.1.</p>
<a href="https://trafficengland.info/subscriberportal">https://trafficengland.info/subscriberportal</a>	<p>The URL utilised by Subscribers to access the NTIS Model download website via a browser.</p> <p>The URL is included in NTIS Model Update Notification emails (Section 4.3.2).</p> <p>Note: the website is employed to download both NTIS Model [ref 6] and DATD [ref 22] data files.</p>
<a href="https://trafficengland.info/app/ntismodel/currentmodel">https://trafficengland.info/app/ntismodel/currentmodel</a>	<p>The URL utilised by Subscribers to access the web service to download the current version of the NTIS Model [ref 6].</p> <p>The URL is included in NTIS Model Update Notification emails (Section 4.3.2).</p>
<a href="http://www.trafficengland.com/subscribers">http://www.trafficengland.com/subscribers</a>	<p>The URL of the root Subscribers Page on the Traffic England website. From this page, Subscribers can navigate to information pages</p>

	<p>concerned with Publish Services and Subscriptions.</p> <p>The URL is included in NTIS Model Update Notification emails (Section 4.3.2).</p>
--	--

## 7.2 Annex B – Subscription Information

### 7.2.1 Subscriber System

To receive data published on the interface, the Subscriber system is required to adhere to the following criteria:

1. The consumer is a registered Subscriber to the NTIS Published Services. An email address is a mandatory Subscription Option, required for registration to the service. It is this email address that is used as the target address for all email publications on this interface.
2. Internet access: the system has network access to the internet.
3. Mail access: the system can receive emails. The system can employ a local mail agent or utilise an Internet-resident mail service provided by an ISP, or similar. The type of protocol used by the Subscriber to receive emails (POP3, IMAP, other) does not affect the operation of the interface.

### 7.2.2 Subscription Options

A number of Subscription Options are utilised by the NTIS system to personalise the data published to each Subscriber on this interface.

#### 7.2.2.1 Universal Options

The following options are applicable to all publications on this interface.

Option	Values	Description
Username	A string, containing 5-20 characters, utilising only lowercase letters [a-z] and numeric characters [0-9]	<p>The username of the Subscriber. The username is included in all email communications, for positive identification purposes.</p> <p>The name is unique within the list of Subscribers maintained by the NTIS system.</p> <p>The username is a mandatory Subscription Option, required to register for NTIS Published Services.</p>
Email Address	Valid email address string	<p>The email address associated with the Subscriber.</p> <p>The email address is a mandatory Subscription Option, required to register for NTIS Published Services.</p>

#### 7.2.2.2 Event Data Email Options

The following options are applicable to the publication of Event Data Emails.

Option	Values	Description
Event Types	n/a	Specifies one or more Event Types to be received by the Subscriber.
Include Unconfirmed Events	true/false	Specifies that the Subscriber receives Unconfirmed Events in addition to Confirmed Events (always published).  The default value is false.
Include Restricted Information	true/false	Specifies that the Events published to the Subscriber include restricted/sensitive information. If set to false, the Events are still published to the Subscriber, but with the restricted information omitted.  The default value is false.
Geographical Areas of Interest (AoI)	n/a	Multiple AoIs can be specified for a Subscriber, using one or more of the following area definitions: <ul style="list-style-type: none"> <li>• HA Areas</li> <li>• RCC Regions</li> <li>• Counties</li> <li>• User Defined Regions</li> </ul> <p>Event Data published to a Subscriber is filtered on the AoI(s) specified for the Subscriber. An Event with an associated location that falls partly or wholly within one or more of the specified AoI(s) is published to the Subscriber.</p> <p>A maximum of 10 AoIs can be specified, per Subscriber, to filter Event Data published on this interface.</p> <p>If no AoI is specified, then there is no filtering of published data on geographic location.</p> <p>A User Defined Region is a custom geographical area specified by the Subscriber: refer to Section 7.2.3.</p>

### 7.2.3 On-line Resources

A number of on-line resources are available to Subscribers on the Traffic England website:

<http://www.trafficengland.com/subscribers>

General Information: information regarding the facilities and services provided by the NTIS Publish Services component.

Subscription Requests: a facility is provided to request a new Subscription or a modification to an existing Subscription.

User Defined Regions: User Defined Regions can be created to filter the received published data on geographical Areas of Interest. The User Defined Regions form part of the Subscription Options specified for each Subscriber.

A maximum of 10 User Defined Regions can be created, per Subscriber.

### 7.3 Annex C – Abbreviations and Glossary

Industry-standard and HA terms and abbreviations used within this document are listed in the HA Taxonomy [ref 1].

Terms and abbreviations specific to this document, or not included in the Taxonomy, are listed below.

Term	Description
DATEXII	European-wide 2 <sup>nd</sup> generation Data Exchange specification for traffic information. Official website: <a href="http://www.datex2.eu">http://www.datex2.eu</a>
DG MOVE	European Commission Directorate-General for Mobility and Transport. The body that oversees the DATEXII specification.
EIDD	External Interface Design Document. A Thales document for describing an external system interface.
EIRS	External Interface Requirements Specification. A Thales document for defining the requirements of an external system interface.
ISP	Internet Service Provider
MIME	Multipurpose Internet Mail Extensions
SMTP	Simple Mail Transfer Protocol
Subscriber	An individual, organisation or body that has registered to receive published data. The term is also applied to the system utilised by the Subscriber to receive published data.
SSDD	System/Subsystem Design Document. A Thales document for describing the function and overall design of a system.