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# **OPERATOR HANDBOOK FOR THE INTEGRATED TRAFFIC MANAGEMENT COMPUTER (ITMC)**

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## **1. INTRODUCTION**

### **1.1 Purpose**

This document describes the Operator interface and facilities of the Integrated Traffic Management Computer (ITMC) system.

### **1.2 Related Documents**

- |       |                  |                                                                            |
|-------|------------------|----------------------------------------------------------------------------|
| 1.2.1 | 666/UH/16940/000 | System Requirements Specification for an STCL Urban Traffic Control System |
| 1.2.2 | 666/KE/16066/000 | UTC Glossary of Terms                                                      |
| 1.2.3 | 666/HG/16940/000 | System Management Guide                                                    |
| 1.2.4 | 667/HD/24802/000 | ITMC Relational Database Description                                       |

### **1.3 Definitions**

For standard definitions, see Reference 1.2.2. Additional definitions and abbreviations used in this document are :

ARTEMIS	Automatic Road Traffic Event Monitoring and Information System
ASTRID	Automatic SCOOT Traffic Information Database
BDIS	Bus Display Information System
EMD	Environmental Monitoring Database
IDU	Information Display Unit
RDBMS	Relational Database Management System
TTIS	Traffic and Travel Information System

### **1.4 Issue History**

Issue A	Draft issue
Issue 1	First issue

## **2. General Description**

### **2.1 Introduction**

ITMC is a collection of software facilities designed to form the central core of an integrated Traffic and Travel Information System (TTIS). It has been created in such a way that it is installed as an additional software product within an STCL UTC system, sharing the MMI facilities as the means of access. The purpose of ITMC is to provide facilities which link various systems and their data in such a way that added value is achieved through the integration. ITMC consists of three basic elements as described briefly below and in more detail in later sections.

### **2.2 Data Collection, Collation and Storage**

ITMC has a database designed to hold a variety of traffic information derived from a number of different sources. This database is based on the Oracle relational database. Data is received automatically from other systems connected to ITMC and also from the operator/user. Examples of this data are count, queue and occupancy data from the UTC system and police incident messages from a travel terminal. In the former case, data updates are regular (typically every 5 minutes) and only the latest values are stored. In the latter case, all data is preserved for many days as determined by user configurable values.

### **2.3 System /Functional Interfaces**

ITMC has the ability to interface with a number of functions/products both those of STCL and of other manufacturers supply. These interfaces are a combination of uni-directional (usually receiving data) and bi-directional ones. Each interface and its data content is detailed later in this handbook.

Other TTIS applications can access ITMC data through a defined set of “public views”. These definitions guarantee the availability of certain data types and formats. Thus remote applications can be written independently of evolving developments of ITMC.

### **2.4 User Facilities**

ITMC has user facilities which allow access to the stored data and allow particular functions to operate. Access is based on forms which have been designed to have a common look and feel using tools provided with the Oracle toolset. Some facilities are outlined below.

#### **2.4.1 Incident Management**

Reports of incidents can be received by ITMC either directly from input by the user or automatically from tools such as INGRID. Reports are stored, referenced by location and integrated as appropriate. The result is an on-going record of the status of major irregularities in the road network.

#### 2.4.2 Strategy Management

Strategies can be configured to provide sets of commands which are expected to be effective in solving particular problems, both unanticipated and regularly occurring. These commands can then be executed under the appropriate conditions with entries identified for other systems/functions, e.g. UTC, SIESPACE, being automatically actioned simply by running the strategy.

#### 2.4.3 Route Journey Time Management

Journey time information is a key feature which can help assess the status of an urban network. ITMC provides the ability to configure a route consisting of many links and to evaluate the current journey time on a regular basis. Where links on a route have real-time information available, for example from the SCOOT model, journey times are calculated using the up to date model data.

#### 2.4.4 ITMC Log

All significant ITMC activities are stored in a central log. Added to this are all significant activities of other system connected to ITMC. This, together with contributions from the operator, provides a central register of all network events which is essential for post mortem assessments.

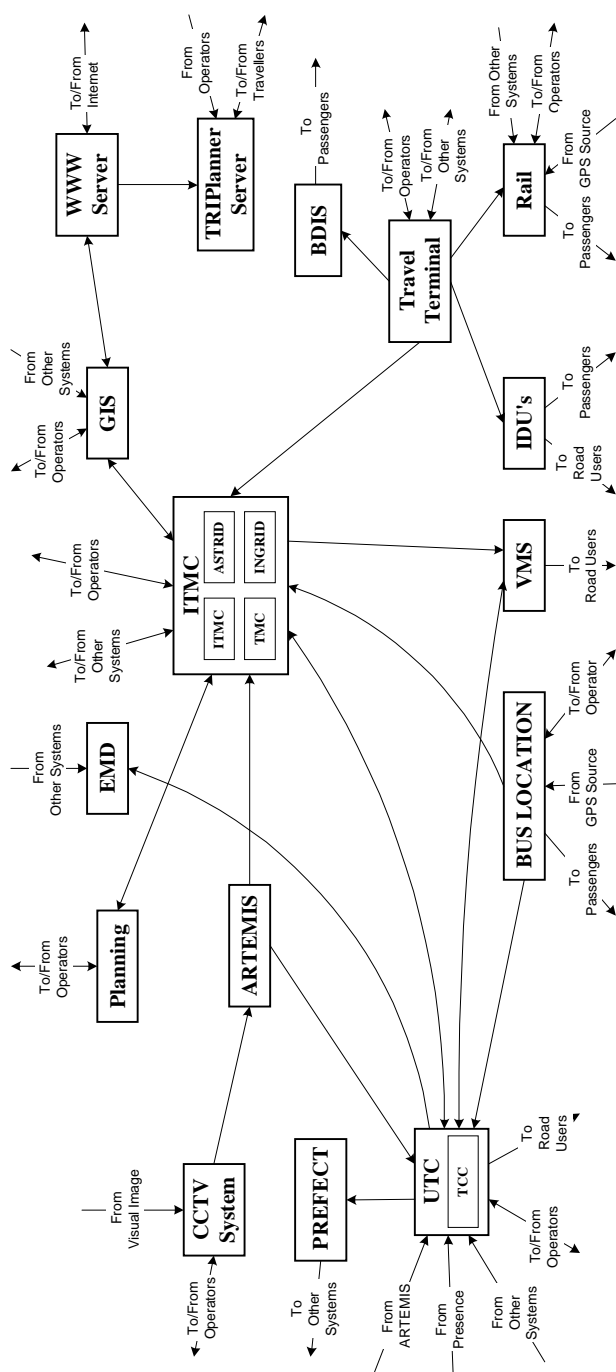


### 3. System Physical Integration Diagram

The following diagram (Figure 1) is a schematic representation of the ITMC system and interconnections with other systems in a major installation. Normally an installed system would only have a sub-set of these interconnected systems. ITMC is open-ended and additional systems may be added as and when these become available with the respective communication protocols. See section 7 on External Interfaces and 7.9 on Public Views.

Section 1.3 lists the definitions and abbreviations on the diagram.

**Figure 1 - ITMC Physical Integration**



25th June 1999

## 4. User Interface

### 4.1 Introduction

The Oracle Forms 4 applications provide a new method of accessing ITMC facilities. The facilities covered by the forms are as follows:

- Incident Management (current and archive data)
- Strategy Management
- Route Journey Times
- ITMC Log (current and archive data)
- Public Transport Log
- Sign Status
- Last Updates

### 4.2 MMI Screen

The UTC MMI screen consists of a number of a number of pull-down menus and input and output windows. A typical screen is displayed below, in Figure 2.

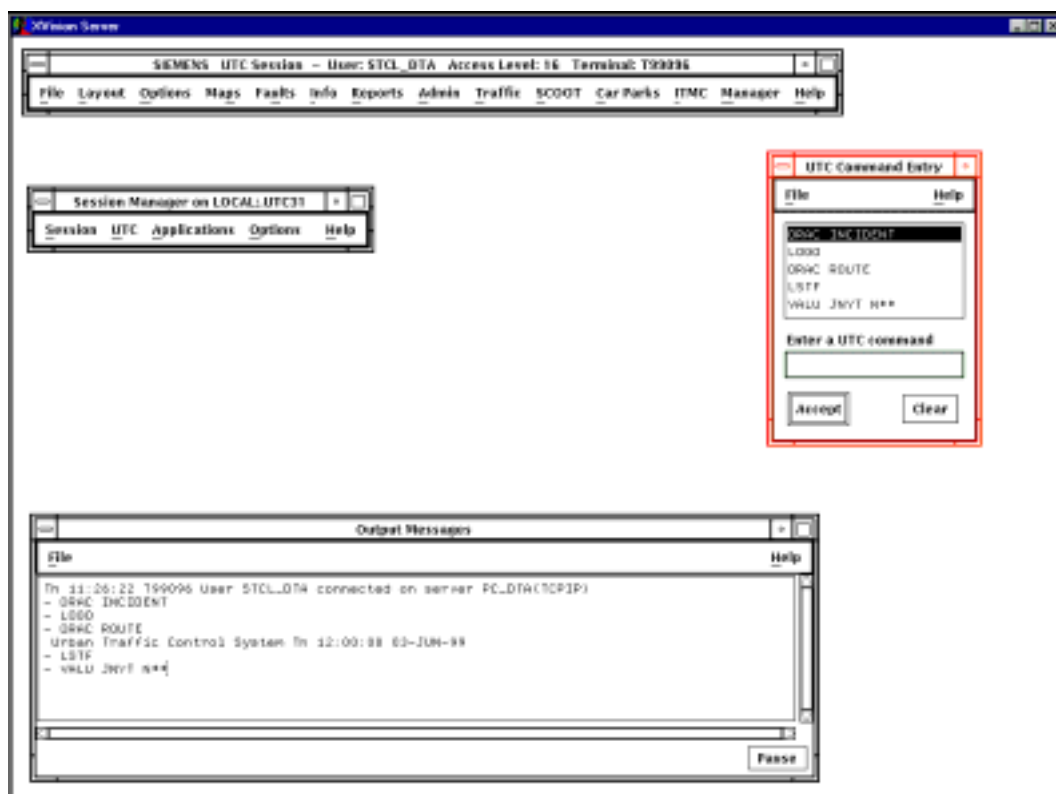


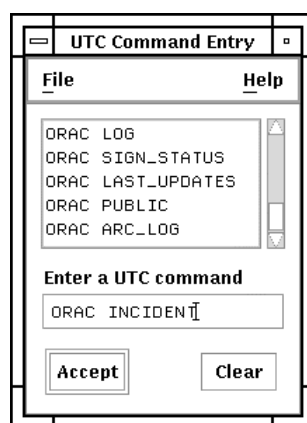
Figure 2 - Main UTC screen

### 4.3 Starting the Forms

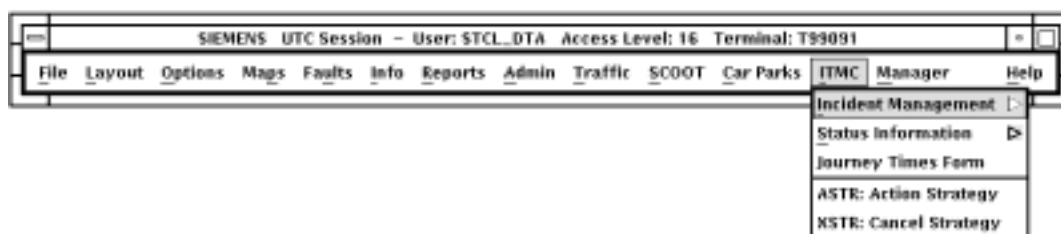
There are two methods of starting the forms. From the UTC command entry window, type the ORAC command followed by the form of your choice, i.e.

- Incident
- Strategy
- Route
- Log
- Public
- Arc\_Incident
- Arc\_Log

An example of the Command Entry window with one of the commands entered into the input box is shown below. To execute the command in this manner, click on the "Accept" button.



Alternatively, each form can be found on the ITMC MMI menu. Simply select the required option from this menu.



## 4.4 General Form Characteristics

### 4.4.1 Field Types

There are a number of types of field found on the forms. Each is described below by reference to the sample forms shown in Figure 3 and Figure 4.

- a) **Buttons.** These are rectangular boxes with black text on an orange (or occasionally yellow) background. The text describes the action which will be performed if the user clicks the left mouse button when pointing to the button. Buttons either perform a function, e.g. save data entered, or call another screen within the form, e.g. display the help screen.

The screenshot shows the 'Incident Management' form with the following fields and annotations:

- Incident ID:** 329 (Light Pink, optional)
- Type (1):** Breakdown (Light Pink, optional)
- Description (1):** Test incident (Light Pink, optional)
- Location Information:**
  - Building Name (50 characters maximum):** 30 (Light Pink, optional)
  - Organization Name (60 characters maximum):** (Light Pink, optional)
  - Post Address (98 characters maximum):** HIGH FIRS ROAD (Light Pink, optional)
  - Town (30 characters maximum):** SOUTHAMPTON (Light Pink, optional)
  - Equipment S/N:** SO198HA (Yellow, automatically filled)
  - Post Code:** SO198HA (Yellow, automatically filled)
  - Sorting:** 1120945 (Yellow, automatically filled)
  - Ending:** 4450670 (Yellow, automatically filled)
- Status Information:**
  - Tire/Terrain ID:** None (Yellow, automatically filled)
  - Current Validity:** 0 (Yellow, automatically filled)
  - Medium Validity:** 0 (Yellow, automatically filled)
  - Maximum Validity:** 0 (Yellow, automatically filled)
  - Validity Status:** Not Valid (Yellow, automatically filled)
  - State:** Historic (Yellow, automatically filled)
  - Creation Time:** 27-May-1999 13:50 (Yellow, automatically filled)
  - Start Time:** 27-May-1999 13:50 (Yellow, automatically filled)
  - End Time:** 27-May-1999 14:20 (Yellow, automatically filled)
- Buttons:** Reports, Merge, New, Delete, Summary, Historic, Exit, Save, Re-Display, Select, Set-up, Help.

Figure 3 - Example ITMC form (1)

- b) **Database fields.** These are the most common fields on the forms. Each represents a field in the Oracle database. These fields are presented in 4 different colours depending on their usage:
  - i) **Light Pink.** These are fields available to the user and are considered as optional, i.e. need not be entered. An example would be an incident description.
  - ii) **Blue.** These fields are also available to the user but are considered as mandatory, i.e. the data record will not be valid unless data is entered in these fields. An example would be a strategy number.
  - iii) **Yellow.** These fields are not available to the user and will be filled automatically by the ITMC when other data is saved. An example would be the creation date of the record.

- iv) **Green.** These fields are display only and are used in functions such as merge and copy (see section 4.5.3 and Figure 16).

Figure 4 - Example ITMC form (2)

Once selected, data can be entered into database fields by typing. Some fields (marked with L) have a list of options generated at run-time from which the user can make selections as an alternative to keyboard input.

Some fields (marked with E) are unable normally to show all the data they contain due to space availability on the form. These can be expanded in order to view all the data. This will cause temporary obscuring of some other fields.

#### c) User input fields

These fields are blue and are used to obtain user input. Mostly, they appear on screens where a function is to be applied which requires further definition from the user. An example of this would be a Copy action where from and to selections need to be made.

#### d) Checkboxes

These fields are green and are used primarily in selection operations. In simple terms, the checkbox indicates whether a particular item is to be considered as selected or not. Clicking with the left mouse button toggles the state between selected and de-selected. All checkboxes initially default to selected

Selected :

☒ Yes

De-selected:

☐ Yes

#### 4.4.2 Main Input Operations

The following facilities are available:

- a) Mouse double-click - expand field (marked with E) to large size OR display run-time generated list of items (field marked L).
- b) Mouse button click - select the field underneath the pointer OR return field to normal size if expanded
- c) Tab - move to the next logical field on the form (except in expandable fields).
- d) Keyboard input - can be in lower, upper or mixed case. Some fields will only accept upper case. The ITMC will automatically convert from lower case in these instances.

#### 4.4.3 Common Form Facilities

All forms have some of the following common buttons :

- a) **Exit Button.** This will allow exit from the form. A prompt may be issued to remind the user if there are outstanding changes which have not been saved.
- b) **Close Button.** This will close an overlaid page and return to the underlying page.
- c) **Save Button.** This will save any new input to the database and populate some fields with standard entries where no input has been offered.
- d) **Re-Display Button.** This refreshes the current display with the latest database records according to the selections made (see Select button). **NB - Remember to use Re-display to see changes just saved or the latest real-time values.**
- e) **Select Button.** This presents the user with a screen with selection options. The user can then choose which database records will be retrieved when the Re-display button is pressed. Remember that a selection will remain in force until a further selection is made. The Clear button on the select page will erase any selections previously made.
- f) **Summary Button.** For some forms, this offers a screen with an alternative viewing method. A summary of several database records can be seen at once with the ability to scroll up and down through the available records.
- g) **Help Button.** This presents the user with a screen of helpful information on the current form. An example **Help** screen is shown in Figure 5 on page 15.
- h) **Setup Button.** For some forms, this offers a screen where configuration data relevant to the form can be established.
- i) **New Button.** For some forms, this creates a new data record and allows new input.

#### 4.4.4 "Shortcut" Keys

Shortcut keys can be used to move around and manipulate the forms. The following keys are common to all forms :

**Direction Keys** - Left, Right, Up and Down. These are used to move around the form.

**Control-K** - displays all the available short-cut keys for the current form. Note that these can vary from form to form.

#### 4.4.5 Help Screens

All forms have a "Help" screen accessed via the respective button. Each help screen contains information for the respective form. An example Help screen is shown in Figure 5 below.

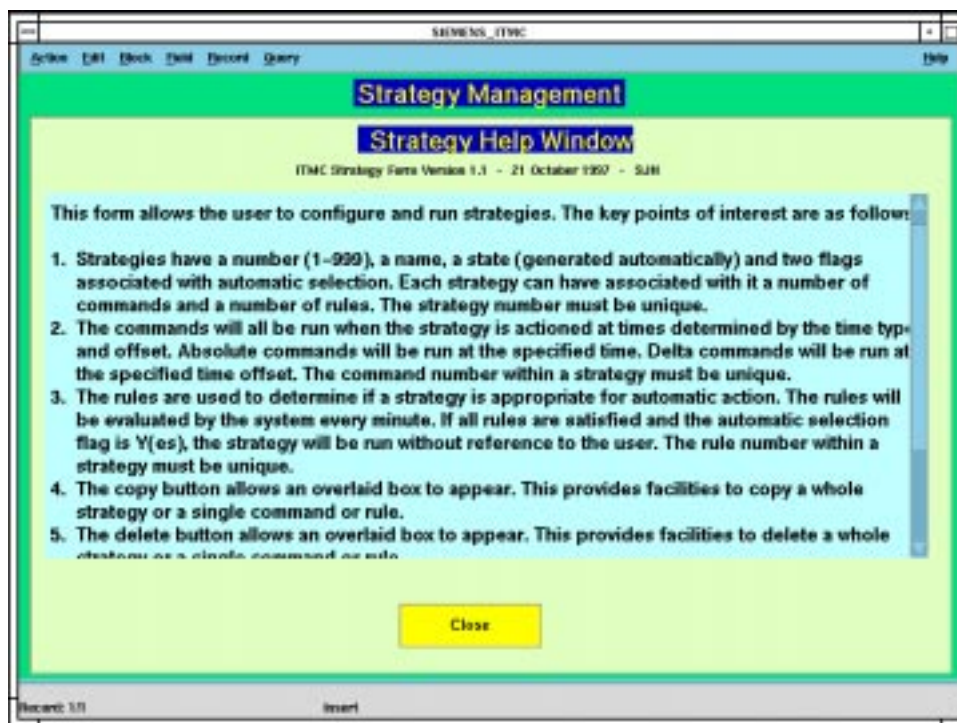


Figure 5 - Example "Help" screen

## 4.5 The Incident Form

### 4.5.1 General Description

Incident Management is concerned with the collation of incident information. Incidents may be input by the operator or automatically by the ITMC system on receipt of data from other systems, e.g. ARTEMIS.

Incidents are considered to be unique if their location differs from other incidents. Similarly, if ITMC decides that 2 incidents share the same or similar locations, they will be automatically combined.

Each incident has four main data sections which are :

a) **Headline.** This includes the description and type.



- b) **Location.** This is address or equipment type information which is used to obtain a common location reference, a grid reference in this system.
- c) **Status.** This data includes time, status and validity data.
- d) **Reports.** An incident consists of one or more reports from one or more sources. The validity of an incident is determined from the combination of the reports data.

The screenshot displays the 'Incident Management' form within a window titled 'SIEMENS ITMC'. The form is organized into several sections:

- Incident Management:** Contains fields for 'Incident ID', 'Type (1)', and 'Description (1)' with a large 'Headline' label.
- Location Information:** Includes fields for 'Building No.', 'Building Name (50 characters maximum)', 'Organisation Name (50 characters maximum)', 'Postal Name (50 characters maximum)', 'Town (30 characters maximum)', 'Equipment ID', 'Post Code', 'Holding', and 'Easting'.
- Status Information:** Features fields for 'Travel Terminal ID', 'Current Validity', 'Maximum Validity', 'Minimum Validity', 'Validity Status', 'Status', 'Creation Time', 'Start Time', and 'End Time'.
- Reports:** A central section with a large 'Reports' label and buttons for 'New', 'Delete', 'Summary', 'Historic', 'Edit', 'Save', 'Re-Display', 'Select', 'Set-up', and 'Help'.

At the bottom, a status bar indicates 'Welcome to Incident Management. Press Re-display to view the current incidents. Press Help for more information.' and 'Record: 1/1'.

**Figure 6 - Incident Management form - data sections**

There are a number of specific features of the incident form as follows, which are covered below :

- Setup
- Merge
- Reports
- Summary
- Select



## 4.5.2 Setup

Incident Types (40 chars max)	Incident Report Sources (20 chars max/Reliability)	Reliability	Validity Threshold	Clearance Threshold	Default Duration	Finished Lifetime	Historic Lifetime	Easting Range	Northing Range	Archive Lifetime
Accident	Artemis	8	10		30					
Roadwork	CCTV	10								
Public Transport	Fire	5		6						
Queue	Ingrid	5								
Event	Police	8								
Incident	Public	2								
Breakdown	RDB	7		200			30			
Road Closure	SIS	7								
Congestion	TTM	5								
	Test	1		200			30			

Figure 7 - Incident Management: Setup form

The setup page allows the definition of incident types and incident report sources. These definitions are then made available in a list when it is needed to input data in the main form (see mouse double-click above).

The other fields on the setup page are used in determining the functionality of incident management. They include validity thresholds, common location reference bounds and data life-times. Some data life-times are also used by the ITMC log.

In the above form, the various numerical fields use the following units :

- **Validity Threshold** and **Clearance Threshold** - "Reliability Units". The Reliability values from the **Incident Report Sources** must exceed (increasing) the **Validity Threshold** to be considered a valid incident, and fall below the **Clearance Threshold** to be considered cleared.
- **Default Duration** - minutes.
- **Easting Range** and **Northing Range** - metres.
- **Finished Lifetime**, **Historic Lifetime** and **Archive Lifetime** - days.

## 4.5.3 Merge

The merge function allows the user to manually combine 2 incidents which are deemed to be the same but which the ITMC is unable to resolve as such. The reports of the "from" incident are added to the "to" incident. The "from" incident is then deleted.

Figure 8 shows the merge page after clicking on the Merge button of the Incident Management form. The operator has decided that incidents 14259 and 14260 refer to the same occurrence and should be merged together. The "From Incident" field has been inserted with the value "14259" and the "To Incident" field with the value "14260".

The screenshot displays the 'Incident Merge Page' within the 'SIEMENS ITMC' application. The page features a table of incidents and two input fields for merging.

Incident Id	Incident Type	Description
14264	31general	Road Works: Long Tailbacks Are Evident On The A31 \
14263	32motorwayrta	MOTORWAY TRAFFIC ACCIDENT: The M3 from JCT
14262	Road Traffic	Abnormality Detected By Ingrid
14261	31general	Thomas Lewis Way, Southampton: The Traffic Lights O
14260	Road Traffic	Abnormality Detected By Ingrid
14259	Road Traffic	Abnormality Detected By Ingrid

Below the table, the 'From Incident' field contains '14259' and the 'To Incident' field contains '14260'. At the bottom, there are four buttons: 'Re-Display', 'Execute', 'Cancel', and 'Help'. The 'Execute' button is highlighted in yellow.

**Figure 8 - Merge form : before**

After clicking on the "Execute" button, incident 14259 has been merged with 14260 and removed from the database.

**Incident Management**

**Incident Merge Page**

Incident ID	Incident Type	Description
14264	31general	Road Works: Long Tailbacks Are Evident On The A31
14263	32motorway	MOTORWAY TRAFFIC ACCIDENT: The M3 from JCT
14262	Road Traffic	Abnormality Detected By Ingrid
14261	31general	Thomas Lewis Way, Southampton: The Traffic Lights O
14260	Road Traffic	Abnormality Detected By Ingrid
14259	Road Traffic	Abnormality Detected By Ingrid

Incident 14259 has been merged with 14260

From Incident:  To Incident:

Re-Display Execute Cancel Help

Record: 1/1 Insert

Figure 9 - Merge form : after

## 4.5.4 Reports

**Incident Management**

**Incident Reports Page**

Source (S)	Report Clear Count	Status Count	Count	Description (80 chars max) (E)	Operator ID	Update Time
Police	1	1	5	General Congestion		03-Jun-1999 21:31

Cancel Delete Execute Help

1 reports retrieved. Add, delete or modify the reports of incident 14270

Record: 1/1 Insert

Figure 10 - Incident Management : Report form

The reports page allows the entry/viewing of reports. Reports can refer to either the occurrence or clearance of an incident. Each report has a source and a

reliability. It is the combination of the reliability and the number of occurrences and clearances summed over all report sources which determines the incident's validity.

#### 4.5.5 Historic

Incidents which are marked as "Finished" can and should be confirmed as such by the user when they are complete. Historic incidents will eventually be archived and moved from the current database to the archive area.

To display "Historic" click on this button on the form. In the example screen shot below, Figure 11, the Historic button was clicked on the Incident Management form. It shows one historic record, and also that a total of seven records are available for display (shown in the bottom left corner of the form).

The screenshot shows a software window titled "INCIDENTS - ITMC" with a menu bar (Action, Edit, Block, Detail, Record, Query) and a Help button. The main form is titled "Incident Management" and contains several sections:

- Incident Details:** Incident Id (14270), Type (33gencong), Description (GENERAL CONGESTION: Because of the heavy flow of traffic).
- Location Information:** Building No., Building Name (30 characters maximum), Organisation Name (30 characters maximum) (HAMPSHIRE POLICE), Road Name (30 characters maximum) (M3 'B' CARRIAGEWAY), Town (30 characters maximum), Equipment IDCN, Post Code, Startday (-1), and Easting (-1).
- Status Information:** Travel Terminal Id, Current Validity (0), Minimum Validity (0), Maximum Validity (5), Validity Status (Not Valid), and State (Historic).
- Time Information:** Creation Time (03-Jun-1999 21:31), Start Time (03-Jun-1999 21:33), and End Time (03-Jun-1999 22:03).
- Action Buttons:** Reports, Merge, New, Delete, Summary, Historic, Exit, Save, Re-Display, Select, Set-up, and Help.

At the bottom left, it says "Record: 1/7" and "Insert" is visible at the bottom center.

Figure 11 - Incident Management : Historic

## 4.6 The Strategy Form

### 4.6.1 Introduction

The strategy form manages the configuration of strategy data. It is also possible to action and cancel strategies from within the form, although ITMC command facilities also exist for these functions.

10,000 strategies are available. Each consists of a number of commands. A command consists of a time action (absolute or delta), a destination system for the action, e.g. UTC, and a command string to be executed on the destination system (**NB - this string is not validated by ITMC**).

Each strategy can also have a number of rules associated with it. These consist of triggers with a type (e.g. incident), an equipment (e.g. SCOOT Link SCN) and one

or two threshold values. Rules are continually checked by ITMC. If all rules for a strategy are satisfied simultaneously, the strategy is deemed appropriate for executing. If the auto-action flag is set, the system will action the strategy without any user intervention. If not, an information message will be output to invite the user to action the strategy manually.

Figure 12 shows an example Strategy form. The following is a breakdown of the forms usage :

- Strategy Number =1 and its description
- Automatic Selection - the strategy will be executed if set to "Y" and the conditions in ALL the Selection Rules are met.
- Re-enable delay - the minimum period (in minutes) after the strategy has been executed until the next one can run.
- Strategy commands. Enter the sequence of commands to be sent to the respective system when the conditions in the Selection Rules are fulfilled. The syntax of these commands are **NOT** verified in the ITMC and their validity should be verified by the operator.
- Selection Rules. One to four rules that must ALL be fulfilled in order for the Strategy to be ready for execution. It will not be executed if "Automatic Selection" is set to "N", but a message will be output on the system screen to show it is available for execution.

The screenshot displays the 'Strategy Management' form within the ITMC interface. The form is organized into several sections:

- Strategy Details:** Includes fields for Strategy Number (1), Strategy Name (STRATEGY NUMBER 1), Automatic Selection (Y), Re-enable Delay (5), and Current State (Inactive).
- Strategy Commands:** A table with columns for Command Number, Time Type (L), Time (L) (HHMM), System (L), and Command String (80 characters maximum, no system checking). The commands listed are:
 

Command Number	Time Type (L)	Time (L) (HHMM)	System (L)	Command String
1	D	00:00	SVMS	ST0002 00M1
2	A	12:34	UTC	ACAS 202
3	D	00:00	ITMC	STRATEGY NUMBER 1 IMPLEMENTED
- Selection Rules:** A table with columns for Rule Number, Trigger Type (L), Trigger SCH (L), Up Threshold, Up Count, Down Threshold, and Down Count. The rule listed is:
 

Rule Number	Trigger Type (L)	Trigger SCH (L)	Up Threshold	Up Count	Down Threshold	Down Count
1	Flow	D43131	50	2		

At the bottom of the form, there are buttons for 'Cancel', 'Action', 'Delete', 'Summary', 'Copy', 'Exit', 'Save', 'Re-Display', 'Select', and 'Help'. A status bar at the very bottom indicates 'Enter the command string to be executed on the destination system (Recent: 3/3)'.

Figure 12 - Strategy form



#### 4.6.2 Walked-through Strategy Configuration Example

The following example shows how a typical strategy is configured and used.

- a) Using the above blank form as the starting point, the following information is added :
- (i) **SCN** = A numerical value. In this example strategy number 1 is being created. However, it is good policy to choose a 5-digit value in the form of a UTC SCN, e.g. 99111.
  - (ii) Give this a descriptive name in the **Strategy Name** field.
  - (iii) Decide if this is to be selected automatically when the conditions in the Selection Rules are fulfilled, setting **Automatic Selection** to Y or N.
  - (iv) Enter the **Re-enable delay** value. For example 5 minutes. So when the Strategy is implemented there will be a delay of at least 5 minutes before this can be implemented once more.
  - (v) Define the **Strategy Location** and **Incident type**. This last can be typed in or selected from a pull-down list by double-clicking inside the Incident Type box. A list of all the available types will open up (see Figure 13) and any one of these can be selected. Click on the OK button and the selected option will be displayed in the field.

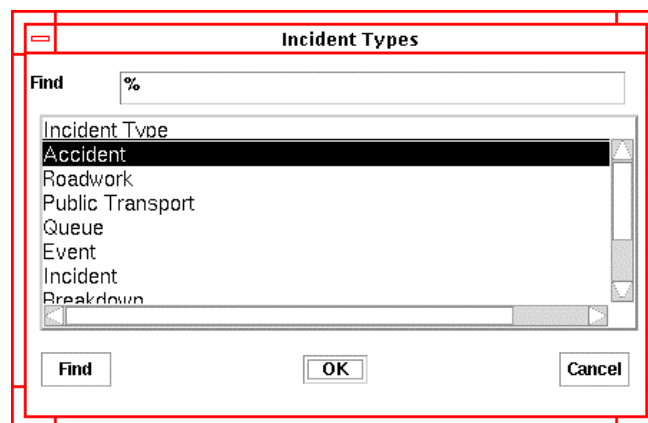


Figure 13 - Incident Type selection

- (vi) In the **Strategy Commands** section, define 1 or more commands that will be executed automatically if **Automatic Selection** is "Y". Enter the **Command Number**, starting at 1 for the first, then the **Time Type** from one of the following (or double click in the field to display a list of the possible values) :
- **A = Absolute**. Enter an absolute time when the command will be executed. For example, enter the value **12:30**. When the time next reaches 12:30 this will be executed.
  - **D = Delta**. The time interval between the Strategy being implemented and the command being executed. If the value 00:05 is

entered, the command will be executed 5 minutes after the Strategy has been actioned.

- **R = Repeat.** The interval at which the command will be executed successively until the strategy is cancelled. If **00:30** is entered, the command will be executed immediately the strategy is implemented, and then every 30 minutes until the strategy is cancelled.
- (vii) Continue by entering the **Time** associated with the **Time Type**, using the 24-hour clock, and then the destination **System** (or double-click) to execute the command. The list of available Systems will depend on the configuration, but will include ITMC and UTC as a minimum.
- (viii) The **Command String** is the command to be executed on the destination System. Care must be taken with the syntax as this is NOT verified on the ITMC system.
- (ix) Enter the **Selection Rules**, which is a list of 1 or more definitions. Every one of these must be satisfied for the Strategy to be implemented. Continue with the **Trigger Type**, which can also be selected from the menu by double-clicking in the entry box. The possible values are Flow (count detector), Incident (entered into ITMC), Congestion (SCOOT link), and Queue (queue detector). In the example screen in Figure 13 a Flow detector has been selected.
- (x) Double-click on **Trigger SCN** to select the equipment SCN from the pull-down list.
- (xi) Enter the **Up Threshold** value. This is the value at which this single rule will be satisfied. Use the correct range of values for each **Trigger Type**. For example vehicle counts for Flow, etc.
- (xii) The **Up Count** value refers to the number of intervals of 5 minutes that need to be satisfied for the rule in question. In the example below, the Up Count value is 2.
- (xiii) The **Down Threshold** and **Down Count** are optional, and refer to decreasing values.

Figure 14 - Strategy: example completed form

### Explanation on the Strategy implementation

1. In the example, the count detector D43131 must have flow values above 50 for a total of 2 x 5 minutes to implement the strategy.
2. When this period has been completed and, as the **Automatic Selection** is set to Y the three **Strategy Commands** will be executed.
3. Command 1 will be executed immediately and the command "ST0002 00M1" will be sent to the SVMS system.
4. Command 2 will be executed when the system clock next reaches 12:34. At this time the "ACAS 202" command will be sent to the UTC system.
5. Command 3 will be executed immediately, and the command "STRATEGY NUMBER 1 IMPLEMENTED" will be sent to the ITMC system. The result of this particular command will be to display the text message on the operator's screen.

#### 4.6.3 Strategy Summary form

An example of the Summary operation on the Strategy form is shown in Figure 15



**Strategy Management**

**Strategy Summary Window**

Strategy Number (1-99999)	Strategy Name (48 chars maximum)	State	Automatic Selection?	Re-usable Period
1	STRATEGY NUMBER 1	Inactive	Y	5
2	STRATEGY NUMBER 2	Inactive	N	5
3	CAUTION FREEZING FOG (WILDCARD)	Inactive	N	60
10	test	Inactive	N	5
11	STRATEGY NUMBER 11	Inactive	N	5
12	STRATEGY NUMBER 12	Inactive	N	5
13	STRATEGY NUMBER 13	Inactive	N	5
14	STRATEGY NUMBER 14	Inactive	N	5
111	BLANK DOWN SIGN	Inactive	N	60
112	SIGN UNDER TEST	Inactive	N	60
114	NO PROBLEMS TO REPORT	Inactive	N	60
115	ALL ROUTES FREE FLOWING	Inactive	N	60
121	CAUTION FREEZING FOG	Inactive	N	60

Buttons: Close, Save, Re-Display, Action, Cancel

Footer: Edit, modify or view strategy data. Record: 1/7

Figure 15 - Strategy : Summary

#### 4.6.4 Strategy Copy

The Copy function on the Strategy form is used for copying one or more Rules and Commands from one Strategy to another. A sample screen is shown in Figure 16 below.

**Strategy Management**

**Strategy Copy Window**

SOI: 1 Strategy Name: STRATEGY NUMBER 1 Automatic Selection? Y Re-usable Policy 5 Current State Inactive

Strategy Location: Strategy Type (L): Time Of Day (L):

From Strategy	To Strategy	Strategy Number	Strategy Name
		1	STRATEGY NUMBER 1

From Command	To Command	Command Number	Time Type	Command String
		1	D	ST0002 00M1

From Rule	To Rule	Rule Number	Trigger Type	Trigger SOI
		1	Flow	D43131

Buttons: Re-Display, Execute, Cancel, Help

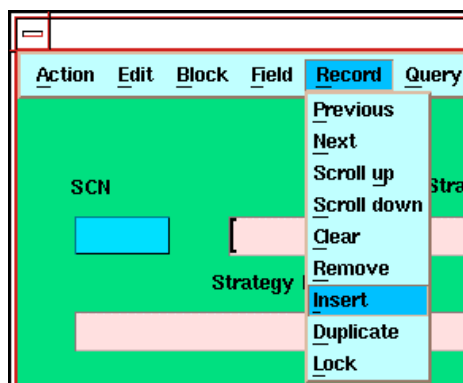
Footer: Select desired Strategy/Command/Rule by entering values in the blue boxes. Record: 1/3

Figure 16 - Strategy : Copy

#### 4.6.5 Walked-through Strategy Copy Example

In this example, a command and a rule will be copied from an existing strategy to a newly created strategy. The same operation can also be executed to copy to an existing strategy.

1. First - create a new strategy. Select "Strategy Form" from the ITMC pull down menu. Select "Insert" from the Record pull-down menu on the Strategy form.



2. Give the new blank strategy an SCN and a name. In the example, Strategy 7 is created.

 A screenshot of the 'Strategy Management' form. The title bar reads 'STRATEGY - ITMC'. The form has a green background and contains several sections:
 

- Strategy Information:** SCN (7), Strategy Name (STRATEGY 7), Automatic Selection? (N), Re-usable Policy (S), Current State (Never Run).
- Strategy Location:** Strategy Location (empty), Incident Type (L) (empty), Time Of Day (L) (empty).
- Strategy Commands:** A table with columns: Command Number, Time Type (L), Time (L) (HHMM), System (L), and Command String (80 characters maximum, no system checking). The table is currently empty.
- Selection Rules:** A table with columns: Rule Number, Trigger Type (L), Trigger SCN (L), Up Threshold, Up Count, Down Threshold, and Down Count. The table is currently empty.
- Buttons:** Cancel, Action, Delete, Summary, Copy, Exit, Save, Re-Display, Select, and Help.

 At the bottom, a status bar reads: 'Undefined function key. Press Control-k for list of valid keys. Record: 5/7 Insert'.

3. Re-display the **Strategy** to copy from. In this example, **Strategy 1** is being used as the source, and **Command 2** will be copied to **Command 1** in **Strategy 7**, and also **Rule 3** will be copied into **Rule 1**.

The screenshot shows the 'Strategy Management' window. At the top, 'Strategy Name' is 'STRATEGY NUMBER 1'. Below it, 'Strategy Location' and 'Incident Type (L)' are empty. 'Time Of Day (L)' is also empty. The 'Automatic Selection?' checkbox is checked (Y), and 'Re-enable Delay' is '5'. The 'Current State' is 'Inactive'. Below this is the 'Strategy Commands' section with a table:

Command Number	Time Type (L)	Time (L) (HH:MM)	System (L)	Command String (80 characters maximum, no system checking)
1	D	00:00	SVMS	ST0002 00M1
2	A	12:34	UTC	ACAS 202
3	D	00:00	ITMC	STRATEGY NUMBER 1 IMPLEMENTED

Below the table are buttons: Cancel, Action, Delete, Summary, Copy, Edit, Save, Re-Display, Select, and Help. At the bottom, there is a 'Selection Rules' section with a table:

Rule Number	Trigger Type (L)	Trigger SCH (L)	Up Threshold	Up Count	Down Threshold	Down Count
1	Flow	D43131	50	2		

At the bottom of the window, there is a status bar with 'Recent: 3/3' and 'Insert'.

4. Click on the **Copy** button. Complete the data fields in the form.

The screenshot shows the 'Strategy Copy Window'. It has fields for 'From Strategy' (1), 'To Strategy' (7), 'Strategy Number' (1), and 'Strategy Name' (STRATEGY NUMBER 1). Below this are fields for 'From Command' (2), 'To Command' (1), 'Command Number' (1), 'Time Type' (D), and 'Command String' (ST0002 00M1). At the bottom are fields for 'From Rule' (3), 'To Rule' (1), 'Rule Number' (1), 'Trigger Type' (Flow), and 'Trigger SCH' (D07142). There are buttons: Re-Display, Execute, Cancel, and Help. At the bottom, there is a status bar with 'Recent: 1/1' and 'Insert'.

The "**From**" boxes have the data entered with respect to the source Strategy, and the "**To**" boxes the final Strategy.

5. Press the **Execute** button. After completion, the **Strategy** form is re-displayed. Use the arrow keys to locate the modified Strategy.

This procedure may be repeated a number of times to copy specific commands and rules from one or more strategies to another.

## 4.7 Route Journey Time Form

### 4.7.1 Introduction

The route journey time form allows the user to configure routes made up of one or more links. The ITMC system will then regularly evaluate the current journey time for each route based on data from the SCOOT model in the UTC system. The current **Now** value may be compared to the +5 to +60 minute values to identify any possible abnormalities in the traffic flow.

Routes consist of a number of links which can be either SCOOT links, using the same SCN as in the UTC system, or non-SCOOT links in which case default fixed journey times are input for different times of day. The current route journey time consists of the sum of the travel times for each link. If a SCOOT link is faulty, the default fixed journey times will be used in the calculation.

Both copy and delete functions also exist. It is possible to copy or delete a whole route or a single link segment. A set-up page is available for the configuration of the start and end times of the daily peak periods.



This form is selected either from the Command Entry window or from the ITMC menu on the UTC pull-down menu bar.

Incident Management	▶
Status Information	▶
<b>Journey Times Form</b>	
ASTR: Action Strategy	
XSTR: Cancel Strategy	

**Route Journey Time Management**

Route ID (1 - 999): 55    Route SCN: N99999Z    Route Name (48 characters maximum): Northern Ring Road to City Centre

Route Start (40 characters max): M123 Junction 4    Route Via (40 characters max): SCOOT region AA    Route End (40 characters max): City Centre

**Journey Time Profile**

Now	+ 5 min	+10 min	+15 min	+20 min	+25 min	+30 min	+35 min	+40 min	+45 min	+50 min	+55 min	+60 min
142	68	31	46	62	78	74	71	68	61	54	47	47

**Route Details Definition**

Segment ID (1 - 40)	Link SCN (L)	Link Start Point (30 characters max)	Link End Point (30 characters max)	Acc.JT	Off.JT	Pen.JT	Real.JT
1		M123 Junction 4	Junction J05121	40	30	30	0
2	N05121A			25	10	15	56
3	N05131E			30	15	20	0
4	N05111A			45	20	20	21
5		Junction J05111	City Centre	30	20	25	

Buttons: Set-up, Copy, Delete, Summary, Exit, Save, Re-Display, Help

Figure 17 - Route Journey time form

The fields in the form correspond to :

- Route description - Route ID, SCN, Name, Start, via and End
- **Journey Time Profile.** The values displayed in the **Journey Time Profile** correspond to the current calculated value using live data (the **Now** value), and the estimated values for the next 5 minutes, 10, 15, etc., up to 1 hour. The current value is calculated by summing the time values for each node or fixed section, where no SCOOT detector exists. The **+5** to **+60min** values are extracted from
- **Route Details Definition.** A route is made up from one or more segments. These can consist of a SCOOT link with journey times calculated from real-time data, or a non-SCOOT segment. The fields in this definition are :

- a) **Segment ID** - a sequential number, starting at 1, and increasing to a maximum of 40.
- b) **Link SCN**. Enter the SCOOT link number, if this is a SCOOT link, or leave blank if a non-SCOOT segment.
- c) **Link Start Point, Link End point**. Enter text descriptions. This is not necessary for SCOOT segments, but it is suggested that a description is entered for non-SCOOT segments to identify the section of road being used.
- d) **Am Jt**. The AM Peak journey time. For non-SCOOT segments this is the estimated value that will be used for calculating the route journey time for this segment. For SCOOT segments, this value will be used if the SCOOT detector(s) is (are) faulty.
- e) **Off Jt**. The Off-peak journey time, used in the same manner as the AM Journey time above.
- f) **Pm Jt**. The PM Peak Journey time, used as above.
- g) **Real Jt**. The real journey time for the SCOOT segment only. The values here are summed with the respective non-SCOOT segment from the other 3 journey time fields, depending on the time of day, and this is transferred to the "Now" field in the **Journey Time Profile**.

Example calculation - Figure 17 is a snapshot of a Route Journey Time form. The **Now** value is 142 seconds, and is calculated in the following manner :

- First - what time of day is it? The period falls within the Off Peak times, and so these values will be used in the calculation.
- The non-SCOOT segments are the 1st and 5th. The Off Peak values for these are 30 and 20 respectively.
- The SCOOT segments are 2, 3 and 4. Segment 3 is faulty, displaying the value "0" in the **Real Jt** column. So the Off Jt value must be used, which is 15.
- The non-faulty SCOOT segments have the values 56 and 21 respectively.
- The total is therefore (from segment 1 to 5) :  $30 + 56 + 15 + 21 + 20 = 142$  seconds

#### 4.7.2 Route Journey Set-Up Form

The two peak and off-peak times are configured in this form. The time values are entered in the 24 hour form, such as "15:30" = 3:30 pm. The fields are:

AM Peak            AM Start time, AM Finish time

PM Peak            PM Start time, PM Finish time

Use Peaks?        Weekdays only, if set (a tick appears), otherwise NO.

Figure 18 is an example of the form with a configuration set-up.

Figure 18 - Route Journey Set-up form

#### 4.7.3 Route Journey Summary Form

Figure 19 - Route Journey Summary

This form displays a summary of the current calculated Route Journey times for all routes. Use the scroll bar on the left hand side of the screen to view other routes that are not currently displayed.

## 4.8 ITMC Log

The ITMC log consists of two sets of information - current and archive. These are described in sections 4.8.1 and 4.8.2 below.

### 4.8.1 The Log Form

#### 4.8.1(a) Introduction

The ITMC Log is intended to be a record of all significant system events. The log holds data input by the user as well as messages received from other sub-systems such as UTC. The log principally holds textual descriptive information. Other data such as address, type and action taken can additionally be supplied by the user.

The log holds current and recent log records. After a configurable time records are marked for Archive and are subsequently copied to the Log Archive area. These records can be viewed through the Archive Log form. Eventually, old archive records are deleted from the system.

**Figure 20 - Log form**

The above form displays a single log entry. Further entries may be viewed by scrolling up and down with the arrow keys on the keyboard.

The keys perform standard functions as described earlier, but briefly, these are :

- **Delete.** Delete the current record
- **New.** Add a new blank log record. After creation data may be entered into the fields.



- **Select.** Filter the log entries by certain criteria. See 4.8.1(4.8.1(c)).
- **Summary.** Display a form with one record per line. See 4.8.1(4.8.1(b)).
- **Exit / Save / Re-Display / Help.** The standard keys as displayed on most forms

#### 4.8.1(b) Log Summary Form

This form is a summary of all the log entries, one per line, which can be scrolled up and down. This is displayed by clicking on the Summary button on the ITMC Log form above. An example display is shown in Figure 21.

Message ID	Logged Date/Time	Source	Description
17298	08-Jun-1999 16:39:1	ITMC	Strategy Control : Failed to cancel inactive Strategy 1
17297	08-Jun-1999 16:34:4	ITMC	Incident 334 : Manually inserted
17296	08-Jun-1999 14:45:2	ITMC	Parent External Interface : Unable to send a Strategy command 1
17295	08-Jun-1999 14:45:2	ITMC	Strategy Control : Finished strategy 1
17294	08-Jun-1999 14:45:2	ITMC	Strategy Advice : WARNING - STRATEGY NUMBER 1 IMPLEM
17293	08-Jun-1999 14:45:2	ITMC	Strategy Control : Started Strategy 1
17292	08-Jun-1999 14:26:2	UTC	Tu 14:26:27 H99009 ROMANSE ITMC System startup
17291	08-Jun-1999 14:26:1	ITMC	Success: Astrid flow processing now in operation
17290	08-Jun-1999 14:27:4	ITMC	Strategy Rule Manager : Module Startup...
17289	08-Jun-1999 14:27:3	ITMC	Strategy Control : Module Startup...
17288	08-Jun-1999 14:27:3	ITMC	Success: Incident Management Task Started and Connected to
17287	08-Jun-1999 14:27:3	ITMC	Location Ref : Module Startup...
17286	08-Jun-1999 14:27:3	ITMC	Strategy Handler : Module Startup...

25 Log records retrieved out of a total of 25. This page displays a summary of the log messages as determined by the current selection criteria.  
Records: 1/7

**Figure 21 - Log Summary form**

The **Report** button will output a complete list of all records to the respective printer, if configured.

#### 4.8.1(c) Log Select Page

The records can be filtered to display a sub-set of all available records. This selection can then be applied to both the **ITMC Log** form and the **Log Summary** form.

Complete one or more fields with the required filter information. For example, entering "MJC" in the **Operator ID** field and "UTC" in the **System Source** field, the filtered records will be reduced to the sub-set of all log records to those that fulfil both these requirements.

In Figure 22 below, the **System Source** field has been filled with "ITMC". After clicking on the **Execute** button, the **ITMC Log** form will be displayed with only those records having "ITMC" in this field.

The screenshot shows a window titled "SELECT LOG - ITMC". The main area is titled "ITMC Log Select Page". It contains several input fields: "Operator ID", "Message Type", "Equipment ID", "Lower Log ID", "System Source" (which is filled with "ITMC"), and "Upper Log ID". Below these fields are four buttons: "Last Month", "Last Week", "Today", and "Yesterday". There are also two date pickers: "Logged Date : After" (set to "01-Jan-1997 00:00:00") and "Logged Date : Before" (set to "01-Jan-2100 00:00:00"). At the bottom are four buttons: "Execute", "Cancel", "Clear", and "Help". The status bar at the bottom shows "Record: 1/1" and "Insert".

Figure 22 - Log Select form

#### 4.8.2 ITMC LOG Archive Form

The screenshot shows a window titled "SELECT LOG - ITMC". The main area is titled "ITMC Log Archive". It contains a table with the following data:

Message ID	Status	Source	Operator ID	Create Date	Logged Date
17237	Archive	ITMC		03-Jun-1999 09:44:40	03-Jun-1999 09:44:35

Below the table is a text area labeled "Description (F3)" containing the text "Strategy Control : Module Startup....". Below this is a text area labeled "Action Taken". Below the "Action Taken" area is a text field labeled "Address (58 characters maximum)". To the right of this field are two buttons: "Equipment ID" and "Message Type" (which is filled with "Dig Strategy Cont"). Below these fields are four buttons: "Delete", "Flow", "Select", and "Summary". At the bottom are four buttons: "Exit", "Save", "Re-Display", and "Help". The status bar at the bottom shows "Record: 3/7" and "Insert".

Figure 23 - Log Archive form

The Log Archive form is used to display Log entries that have been removed from Current list of events.

## 4.9 Public Transport

This form allows the user to view public transport messages received via the Travel Terminal. The form is read only.

The screenshot shows a window titled "SEARCHES - ITMC" with a menu bar containing "Options", "Edit", "Block", "Unblock", "Record", and "Query". The main area has a green background and is titled "Public Transport Events". It contains three input fields: "Incident ID" (empty), "State" (set to "Historic"), and "Route" (set to "Route not relevant"). Below these is a large text area labeled "Description" containing the text: "TUESDAY 25TH MAY 1999: Dry with sunny spells. Winds light/moderate NW. Maximum temperature 17C." At the bottom, there are three time fields: "Start Time" (25-May-1999 10:42), "End Time" (25-May-1999 11:12), and "Create Time" (25-May-1999 10:43). Below these are three buttons: "Exit", "Re-Display", and "Help". The status bar at the bottom shows "Record: 13/79" and "Insert".

#### 4.10 Sign Status Form

This form is read-only, and displays the current state of VMS signs on the system. See Figure 24 below for an example screen.

Equipment Id	Logged Date	Source	Description
99002	04-JUN-1999 06:56	SVMS	"NO REPORTED * INCIDENTS "
99005	03-JUN-1999 07:13	SVMS	FAULTY
99006	04-JUN-1999 11:15	SVMS	"NO REPORTED * INCIDENTS "
99007	04-JUN-1999 06:56	SVMS	"NO REPORTED * INCIDENTS "
99010	04-JUN-1999 11:09	SVMS	"NO REPORTED * INCIDENTS "
99011	04-JUN-1999 07:10	SVMS	ROAD WORKS "BEYOND VL RD" CLOSED "
99012	04-JUN-1999 06:56	SVMS	"NO REPORTED * INCIDENTS "
99013	04-JUN-1999 06:56	SVMS	"NO REPORTED * INCIDENTS "
99014	04-JUN-1999 06:55	SVMS	"NO REPORTED * INCIDENTS "
99015	04-JUN-1999 06:56	SVMS	"NO REPORTED * INCIDENTS "
99011	04-JUN-1999 06:13	SVMS	FAULTY
99012	04-JUN-1999 06:13	SVMS	FAULTY
99013	04-JUN-1999 06:13	SVMS	FAULTY
99014	04-JUN-1999 06:13	SVMS	FAULTY
99992	20-APR-1999 17:04	SVMS	FAULTY
99993	20-APR-1999 17:05	SVMS	FAULTY

Figure 24 - Sign Status form

#### 4.11 Last Updates Form

This form is selected from the ITMC menu on the UTC pull-down menu bar.

The form displays the last time that each data set was updated. In Figure 25 below, for example, ARTEMIS counts was last updated on 5th August 1998.

Data Type	TCC	Date/Time
ARTEMIS Counts		06-AUG-1998 11:21
ARTEMIS Incident		06-AUG-1998 11:21
ASTRID Flow		26-MAY-1999 12:31
Car Park Occupancies	A	04-JUN-1999 11:11
Car Park Occupancies	B	04-JUN-1999 11:11
Car Park Predictions	A	04-JUN-1999 11:11
Car Park Predictions	B	04-JUN-1999 11:11
Flow	A	04-JUN-1999 11:11
Flow	B	04-JUN-1999 11:11
IDU Log		06-MAR-1999 11:30
INGRID Incident		22-MAY-1999 06:34
Link Travel Times	B	04-JUN-1999 11:05
Link Travel Times	A	04-JUN-1999 11:05
Motorway EMS Replies		06-AUG-1998 11:21
Occupancy	A	04-JUN-1999 11:11

Figure 25 - Last Updates

## 4.12 Action Strategy

Action Strategy executes a Strategy that has been configured via the Strategy Form (see section 4.6).

This command is selected either by entering the command in the Command Entry or from the ITMC menu on the UTC pull-down menu bar.

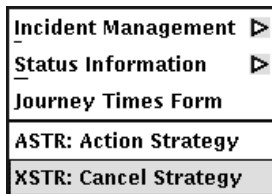
Enter the Strategy Number to be implemented in the **Strategy Identifier** box and click on OK.

The Strategy will be executed immediately and will remain active whilst the System continues in operation. Cancelling the Strategy is described below.

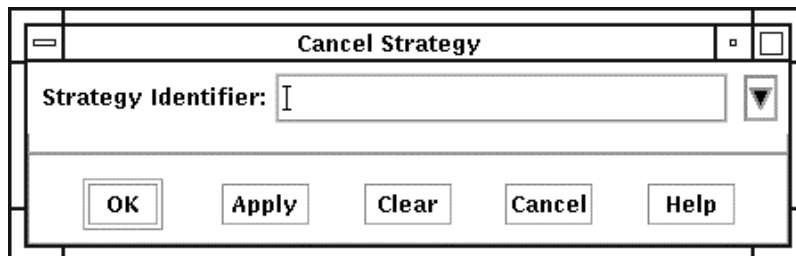
#### 4.13 Cancel Strategy

Cancel Strategy executes a Strategy that has previously been actioned by the **Action Strategy** command.

This command is selected either by entering the command in the Command Entry or from the ITMC menu on the UTC pull-down menu bar.



Enter the Strategy Number to be cancelled in the **Strategy Identifier** box and click on OK.



## **5. Detailed Description of Facilities**

### **5.1 Introduction**

The purpose of this section is to describe the expected usage of the major ITMC facilities based on the experience gained to date. Clearly users and their organisations will have differing policies on how to manage such things as incidents and may wish to tailor their use of ITMC accordingly. These sections should therefore be taken as guidelines/examples rather than definitive procedures.

### **5.2 Incident Management**

#### **5.2.1 General Description**

Incident Management is concerned with the collation of incident information. Incident data may be received and input by the operator or may be assimilated automatically by the ITMC on receipt of data from other functions or systems, e.g. INGRID.

An incident is defined as an occurrence in the real world which is abnormal and worthy of note. This covers a wide variety of circumstances from road works to accidents, extreme weather to major events. Incidents can be spontaneous or well planned and can last for as little as a few minutes or as much as several weeks.

Typically, an incident becomes known when a report arrives in the control room. This can either be a report to an operator, perhaps by telephone or maybe by viewing CCTV or an automatically detected report, perhaps by INGRID. Subsequently, further reports of the same incident may arrive. Some of these may indicate the clearance of the problem. The Incident Management function of ITMC allows all reports of the same incident, both occurrence and clearance, to be integrated and managed throughout the lifecycle of the incident.

#### **5.2.2 Incident Referencing**

Incidents are considered to be unique if their location differs from other incidents. Consequently, if 2 reports of an incident share the same or similar locations, they should be considered to be the same.

To enable reports from a variety of sources to be compared, a common location reference needs to be established. In the UK, this is the national grid reference. ITMC therefore needs to be able to convert location information supplied with each report of an incident to the grid. For reports which are manually entered, the location information will typically be focussed on a street name. In this instance, ITMC can make use of the Ordnance Survey Addresspoint gazetteer (if available) to convert to grid reference. For reports which are automatically generated, an equipment reference, perhaps a UTC SCN, will normally be included. ITMC then needs to be configured with a look-up table which can convert SCNs to grid references. A typical source of such a table would be a GIS or similar system.

Incident data which can be referenced as described above is then able to be integrated automatically by ITMC. The Incident Management function regularly assesses the current incidents to see if any share the same or similar location. This



is done by comparing grid references bearing in mind thresholds of proximity which are configured by the user. When two incidents are found with a common reference, the report(s) of the more recent incident are combined with the report(s) of the older incident and the more recent incident is deleted. This process is known as merging. For incidents which cannot be referenced, a manual merge facility exists to allow the user to perform the same function when it is deemed that two incidents are in fact the same.

### 5.2.3 Incident Lifecycle

Incidents have a lifecycle. This means that they have different states as time progresses. These states are :

- **Planned**     An anticipated incident has not yet started
- **Current**     The incident is in progress
- **Finished**     The expected duration of the incident has expired
- **Historic**     The user has confirmed that the incident is complete
- **Archive**     The incident is to be moved to the archive area

ITMC will continuously evaluate the state of an incident based on the current time and data entered or amended by the user. States of planned, current and finished are calculated using the incident start and end times. Historic is achieved using the appropriate button on the form. It is important that incidents which are really finished are made historic so that the process of archiving can begin. This then minimises the number of incidents “on-line”.

There are also a number of “lifetime” values associated with the lifecycle process. These are found on the set-up page of the incident form. The finished lifetime determines how long an incident will remain in the finished state before being automatically made historic. This is a fallback to cover the possibility that the user does not make appropriate use of the historic button. The historic lifetime determines how long the incident will remain historic (and hence on-line) until changing to archive. When this happens, the incident is moved to the incident archive area and can only be viewed through the incident archive form. Finally, the archive lifetime determines how long the incident will remain in the archive area. After this time it will be deleted. Archived incidents can be backed up onto tape through the DBAS function of UTC.

### 5.2.4 Incident Validity

Incidents can be of a variety of types and hence can vary significantly in importance. The user is unlikely to want to pay direct attention to all incidents. Therefore the degree of importance is relevant. This is known as incident validity.

The user is able to define, through the set-up page, two thresholds for validity. The first indicates a level of importance above which the incident is of significance (valid). A typical default for this is 10. The second indicates a level of importance below which the incident is no longer significant (not valid). A typical default for this is 6.



Each report of the incident comes from a source. These sources vary in type and reliability. ITMC allows the user to define incident sources and allocate them a default reliability factor. For example if the operator sees an incident on CCTV, the source is clearly very reliable. Hence the operator could have a rating of 10 (all such reports would then immediately be valid incidents). Alternatively, calls from the public may be considered to be generally unreliable. Hence a rating of 4 could be appropriate. This means that a single call would not make a valid incident. However, 3 similar calls reporting the same occurrence ( $3 \times 4 = 12$ ) would indeed make a valid incident.

ITMC continuously assesses the validity of all incidents based on their reports, the report sources and the reliability of those sources. As more reports of an incident occur, so the validity increases. Similarly, the reverse process happens if reports of clearance arrive. These cause the validity to be reduced, eventually returning the incident to being not valid when the total validity (sum of all occurrence reports less sum of all clearance reports) drops below the clearance threshold.

Validity can therefore be used as a means of filtering out only the more important incidents and is one of the key fields on the select page.

#### 5.2.5 Expected Usage

This section tries to pull together the basic functions described in section 3 with the more detailed description earlier in this section and tries to outline how the Incident Management is expected to be used.

On first entry, it is important to ensure that an appropriate set-up is available. If not, the fields on the set-up screen should be changed to the desired values. Once established, it is expected that most of these values will remain unchanged.

Thereafter, incidents will be continuously added to the ITMC database both manually and automatically. The form can be used to view the current status of incidents. The summary page provides a good starting point. Use of the select facility will enable you to filter out unwanted incidents from the view.

If it is determined that a new incident needs to be added, the New button will allocate a blank record. The user can then add as much or as little detail to the fields on the form as is appropriate. However, in order for an incident to be location referenced, the location detail must be sufficient to obtain a match in the Addresspoint gazetteer. No referencing will be attempted unless at least the town field is entered.

ITMC will automatically assign a start and end time for a new incident, based on the current time and the default duration specified on the set-up page. These can then be modified as required. These fields will then be used to determine the state of the incident.

When all initial data for the incident has been input, the Save button will store the values and execute location referencing.

Incidents will be combined automatically where they share a common reference. If the user determines that two incidents are the same but ITMC is unable to resolve their references, a manual merge can be executed, combining the data of the “from” incident into the “to” incident. Note that in actioning a merge the basic

incident data of the “from” incident will be lost, so any useful text will need to be re-entered. This loss of data can often determine which way a merge should be done, i.e. the incident with the least useful description should normally be the “from” incident.

An incident can either be valid or invalid. This is determined by the number of reports associated with the incident and the reliability of each report. The user should add reports to the incident both for its occurrence and subsequently for its clearance. Once an incident is deemed to be over, the user should check that its state is finished (if not adjust the end time) and use the Historic button to confirm completion. ITMC will then start an automatic process which will result in the incident changing to the Archive state and then being moved to the Incident Archive area. This ensures that only current and recent incidents are held in the main incident area.

Archived incidents can be viewed through the Archive Incident form. No changes can be made to this data. After a configurable period, old archive records will be deleted.

## **5.3 Strategy Management**

### **5.3.1 Introduction**

The Strategy Management function handles the configuration of strategy data. Strategies consist of one or more commands. It is possible to action and cancel strategies using the strategy form, although ITMC command line and menu facilities also exist for these functions. A strategy will remain active until all commands in it have been actioned or until a cancel command is issued. A total of 10000 strategies are available.

### **5.3.2 Command Configuration**

Each strategy consists of a number of commands. A command consists of a time action (absolute, delta or repeat), a destination function for the action, e.g. UTC, and a command string to be executed on the destination system.

The time action determines when the command will occur relative to the point when the strategy is actioned. (A)bsolute commands will be actioned once per day at the specified time. (D)elta commands will be actioned once only at the specified time offset from when the strategy is actioned. (R)epet commands will be continually actioned at the time frequency specified. A strategy with repeat commands will only terminate when cancelled by the operator or timetable.

The destination field identifies the function or system where the command is to be actioned. The most common uses of this would be UTC or ITMC (i.e. action locally). In the latter case, the typical usage would be to output a message to the user to prompt a particular action to be taken, e.g. telephone the police.

The command string is a sequence of characters which will be recognised by the function which will perform the action. ITMC is unable to verify the validity of command strings - it is the responsibility of the user to ensure the syntax and semantics are correct.

### 5.3.3 Automatic Actioning

Each strategy can have a number of rules associated with it. These consist of triggers with a type (e.g. incident), an equipment (e.g. SCOOT Link SCN) and threshold values. Rules are continually checked (every minute) by ITMC. If all rules for a strategy are satisfied simultaneously, the strategy is deemed appropriate for actioning. If the auto-action flag is set, the system will action the strategy without any user intervention. If not, an information message will be output to invite the user to action the strategy manually.

The trigger types available are based on data either from the UTC system or from within ITMC itself. Typical examples are flow, queue and incident. Whichever of these is chosen, an appropriate SCN known to ITMC must be supplied.

The threshold values identify the conditions under which a rule will be satisfied. Up threshold and up count are used together to cover conditions of increasing data. If the up threshold is exceeded for up count consecutive minutes then the rule is satisfied. A similar test is applied in the case of the down threshold and down count.

## 5.4 Route Journey Time Management

### 5.4.1 Introduction

The route journey time form allows the user to configure routes made up of one or more links. The ITMC system will then regularly (every 5 minutes) evaluate the current journey time for each route based on data from the SCOOT model in the UTC system.

Routes consist of a number of links which can be either SCOOT links, using the same SCN as in the UTC system, or non-SCOOT links in which case default fixed journey times are input for different times of day. The current route journey time consists of the sum of the travel times for each link.

### 5.4.2 Route Configuration

To configure a route, the user needs to identify all the link segments that make up the route. If a typical route is chosen, perhaps from the periphery to the centre of the urban area, it is likely to consist of a combination of SCOOT links and non-SCOOT links.

SCOOT links are configured using the SCN known to the UTC system. Default journey times for such links are supplied to cater for times when the link is faulty. Other links do not have an SCN. Here a description of start and end are supplied together with the default values by time of day which will always be used. Peak period start and end times can be configured on the set-up page.

### 5.4.3 Methods of Calculating Link Travel Times

For links defined as “SCOOT”, i.e. with a SCOOT SCN, there are 3 different methods of evaluating the link journey time. These can be selected on the UTC system with the LTTT parameter.

The standard and default method is from SCOOT's model of delay (LTTT=DELAY). The link journey time is the sum of the validated journey time (JNYT), the journey time offset (JNYO) which represents the part of the link not covered by SCOOT (e.g. upstream stop-line to detector) and the average delay per vehicle based on modelled flow and delay.

The two alternative methods are based on an algorithm for assessing average speed over a SCOOT loops. Taking the average speed over a single loop and a user specified link length (LLEN), the journey time for the link can be determined. This is method 2 with LTTT=SPEED1.

In some special cases, two detection points may be available on the link. In this case, a weighted average of the speed values over both loops can be determined. Here LTTT is set to SPEED2 and LTTF determines the relative weighting to be applied to the two speed values. To identify which pair of loops are involved in the calculation, the two links are associated in the SCOOT data in DBAS using the main downstream link facility.

#### 5.4.4 Journey Time Values

When routes have been configured and ITMC is operating normally, the route journey time management form will display various journey time values. For each link, the current real-time value will be displayed for links where this data is available. For the route, the current journey time is shown together with 12 values at 5 minute intervals representing the expected journey times at this time of day. These values are extracted from ASTRID provided this tool is configured to store route journey time data.

It is important to remember that due to the nature of the operation of Oracle and the forms, it is necessary to use the re-display button at regular intervals to ensure that the data displayed is up to date.

## 6. Advanced Query Facilities

### 6.1 Introduction

The database Query facility allows the user to interrogate the database to obtain reports not covered by the standard forms. See section 6.3 for a demonstration of the use of this facility.

Query mode is entered by pressing the F11 key or clicking on the "Query" option on the pull-down menu on the top line (see Figure 26 below). Click on the "Enter" option to start entering the Query information on the form.

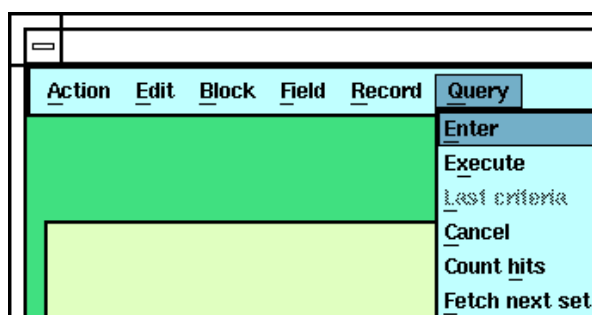


Figure 26 - Query from the main menu

When a query is executed it generates a snapshot report at the time it is requested. No live update is made of the data. If you wish to update the report with the latest data the query should be executed again.

You can check the number of records that will be included in the query response by pressing the **PF3** key.

A query may be performed on one form field, or on a combination of fields.

### 6.2 String Searching

- a) **Wild cards** - may be used for locating a sub-string within the field in which it is placed. For example, to search all records containing "traf" as part of the data field, use the "%" sign either side of the search string. In this case, enter :

"%traf%"

Note that the sub-string is case-sensitive, such that only "traf" will be included in the search result, and not "Traf" or "TRAF" etc.

- b) **Numeric comparison** - Enter one of the comparison operators to limit the search to a range, such as :

">20"

will include all records having values greater than 12 in the field.

- c) **Dates** - There are two alternative methods, the first using a wild-card as above.

(i) Use the "%" to identify a date string, e.g. "%12-APR-1994%" or "%-APR-%". This will report all incidents that occurred on the 12-APR-1994.

- (ii) Search for a range - this is more complex. First enter ":date" and press **F12**. This then allows a more complex format to be entered. Then type :

```
":date between TO_DATE('12-APR-99 12:00','DD-MON-YY HH24:MI')
AND TO_DATE('18-APR-94 13:12','DD-MON-99 HH24:MI')"
```

and commit the query. This will report all records in the database between the dates and times specified. Note: every character between " " must be entered.

### 6.3 Example Query

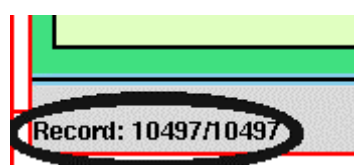
The following screens show how a query is executed step-by-step.

In this example, the ITMC Log Archive form has been displayed. The output screen is shown below in Figure 27.

Message ID	Logged Date/Time	Source	Description
17286	08-Jun-1999 14:27:3	ITMC	Strategy Handler : Module Startup...
17285	08-Jun-1999 14:27:3	ITMC	Success: Travel terminal processing now in operation
17284	08-Jun-1999 14:27:2	ITMC	Success: Map data processing now in operation
17283	08-Jun-1999 14:27:2	ITMC	Success: Link travel time processing now in operation
17282	08-Jun-1999 14:27:1	ITMC	Success: Route journey time Task Started and Connected to th
17281	08-Jun-1999 14:26:5	ITMC	System Monitor received invalid internal message.
17280	08-Jun-1999 13:38:3	ITMC	Strategy Control : Module Shutdown... Successful
17279	08-Jun-1999 13:38:2	ITMC	Strategy Handler : Module Shutdown... Successful
17278	08-Jun-1999 13:38:2	ITMC	Strategy Rule Manager : Module Shutdown... Successful
17277	08-Jun-1999 13:38:2	ITMC	Location Ref : Module Shutdown... Successful
17276	08-Jun-1999 13:38:2	ITMC	WARNING: Travel terminal processing closing down
17275	08-Jun-1999 13:38:2	ITMC	WARNING: Map data processing closing down
17274	08-Jun-1999 14:27:3	ITMC	ITMC Log now in operation

Figure 27 - ITMC Log Archive screen example

At the bottom left corner the number of records in the log is displayed, i.e. 10497.



A query is to be executed. Click on "Query" on the pull-down menu at the top of the screen, and then click on "Enter".

<u>A</u> ction	<u>E</u> dit	<u>B</u> lock	<u>F</u> ield	<u>R</u> ecord	<u>Q</u> uery
					<u>E</u> nter
					<u>E</u> xecute
					<u>L</u> ast criteria
					<u>C</u> ancel
					<u>C</u> ount hits
					<u>F</u> etch next set

A blank form will be displayed as shown below.

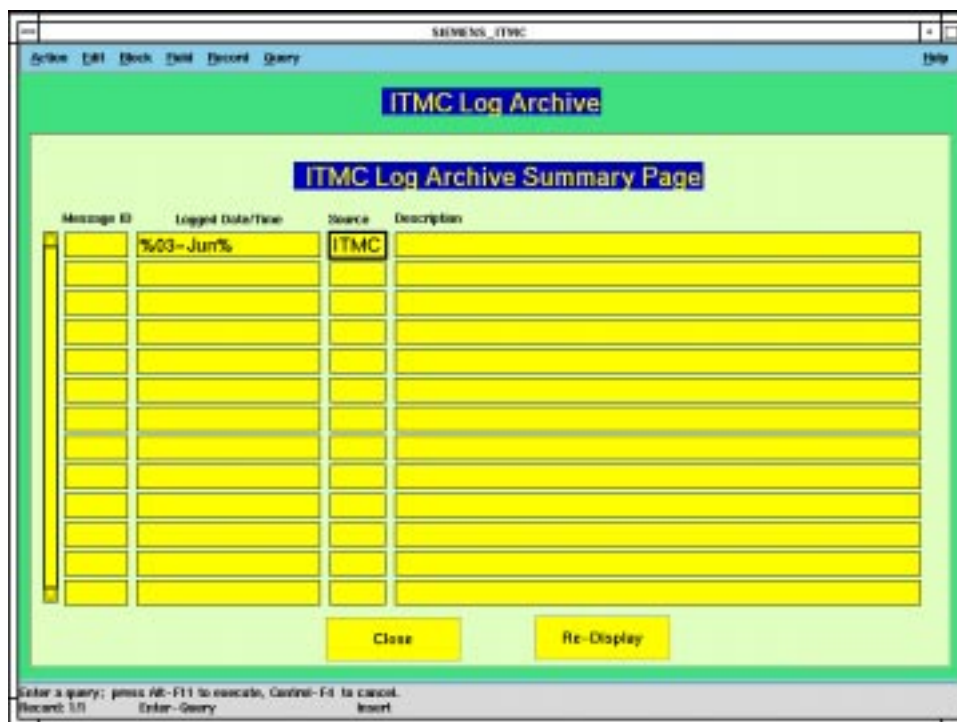
Enter data into one or more fields as required. In the example we are looking for all records logged on "3rd June" from the source "ITMC". In the fields "Logged Date/Time" and "Source" are entered the respective values:

%03-Jun%

and

ITMC





The query is executed by pressing ALT F12. The resulting screen is shown below. The query results below show that there are 11 records that meet the criteria.

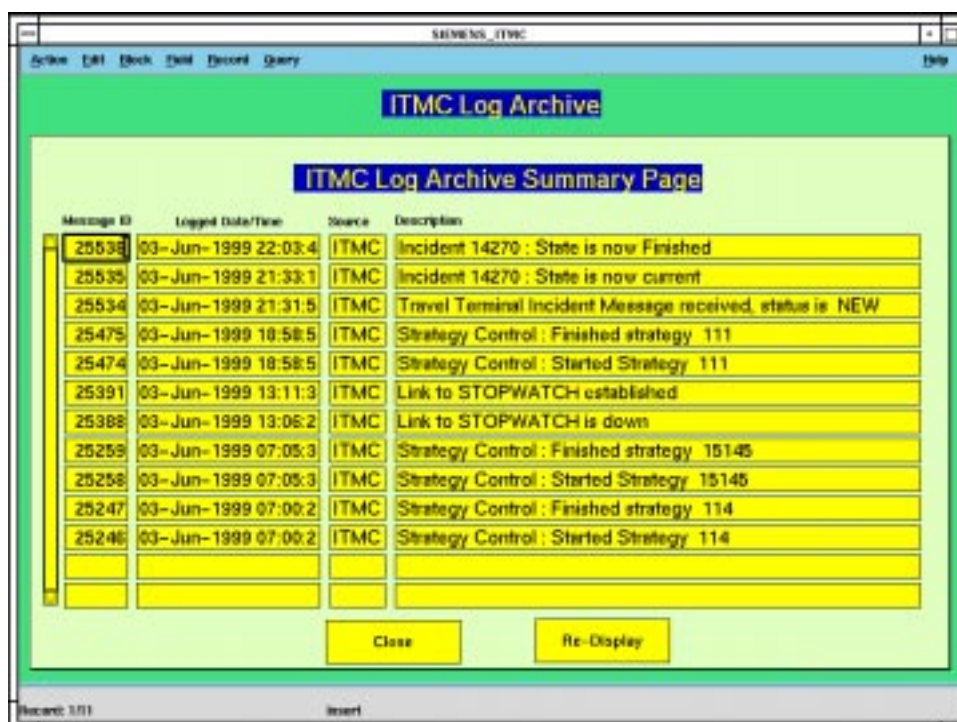


Figure 28 - Results of Query

## **7. External Interfaces**

### **7.1 Introduction**

Apart from data entered manually into the ITMC system by operators, data is also received from and transmitted to other systems, as shown in Figure 1 on page 9. A brief description of the currently available interfaces are described below. Note that the list may be increased and that not all facilities may be available on a particular ITMC system.

### **7.2 UTC**

Data is received by the ITMC system from the UTC system log and combined to form the System log. To prevent the System log from filling with non-essential information, the UTC system filters the log messages before transmitting these to the ITMC system.

Real-time link travel time, flow, occupancy, congestion and car park data is received from the UTC system, principally for access by external applications. This data is transient and only the latest set of data is stored. As soon as new data is received, the previous set is deleted.

Control strategies generated by the ITMC are sent to the UTC. These consist of standard UTC commands which are implemented whenever certain conditions on the system meet the strategy's configuration.

### **7.3 ASTRID**

Journey times are sent to ASTRID and journey time profiles are extracted from ASTRID as are also Current and Profile Flow Data.

### **7.4 INGRID**

Incidents are automatically output from INGRID to the ITMC for storing in the Incident table.

### **7.5 SIESPACE**

Signs may be set automatically through SIESPACE using pre-defined strategies. The Sign setting status is received from SIESPACE and added to the log.

### **7.6 ARTEMIS**

ARTEMIS sends a message to the System when a lane blockage is detected, and an incident is added to the database. Before being added to the database the incident message is compared with other existing records such that multiple occurrences of the same incident will be combined to a single record.

Count data is received at 5 minute intervals.

### **7.7 Travel Terminal**

Information received from the Travel Terminal is integrated into the database incident table. Public Transport problems are entered into the Public Transport

table. Police messages are entered into the Incident table and User Messages into the Log.

## **7.8 Bus Location Information System**

Fault data is received from the Bus Location Information System which is then integrated into the fault table.

## **7.9 Public Views**

Data may be viewed externally on Internet Web Sites, for example. This data is provided via defined interfaces between the ITMC database and external browsers. These external public view definitions are intended to be constant, even though the internal database structure may be modified during the life-time of ITMC. A brief description of these views is given below, but for more detailed information see the ITMC Relational Database Description, reference 1.2.4.

### **7.9.1 Public View All Incidents**

Information on incidents, consisting of a unique incident identification number, status, text description, location and other details.

### **7.9.2 Public View Astrid**

Current and trend flows, derived from the ASTRID database. The data is updated every 5 minutes.

### **7.9.3 Public View Car Parks**

Current state of Car Parks, based on the unique car park identification number. The data consists of the capacity, current occupancy, occupancy status (Faulty, Spaces, Almost Full, Full, Closed) and predicted information.

### **7.9.4 Public View Car Park Predict**

Predicted occupancy values for the car parks based on historical data.

### **7.9.5 Public View Counter Flows**

5 minute count and occupancy data from count detectors.

### **7.9.6 Public View IDU Messages**

IDU (Information Display Unit) data.

### **7.9.7 Public View ITMC Log**

The contents of the ITMC log containing messages, logged time, type of log entry, equipment identification and status.

### **7.9.8 Public View Last Updates**

The time and date when the values of certain data types was last updated.

- 7.9.9      Public View PT Incidents  
Public Transport information received via the Travel Terminal.
- 7.9.10     Public View Queues  
Queue detector information.
- 7.9.11     Public View Route Link Times  
Information from a link that forms part of a route, consisting of default and calculated travel times.
- 7.9.12     Public View Route Times  
Details of the route journey times, composed of all the links that make up each route.
- 7.9.13     Public View SCOOT Congestion  
SCOOT congestion data.
- 7.9.14     Public View SCOOT Speed  
SCOOT speed and travel time for a link.
- 7.9.15     Public View Sign Status  
Legends currently being displayed on Urban Variable Message Signs.

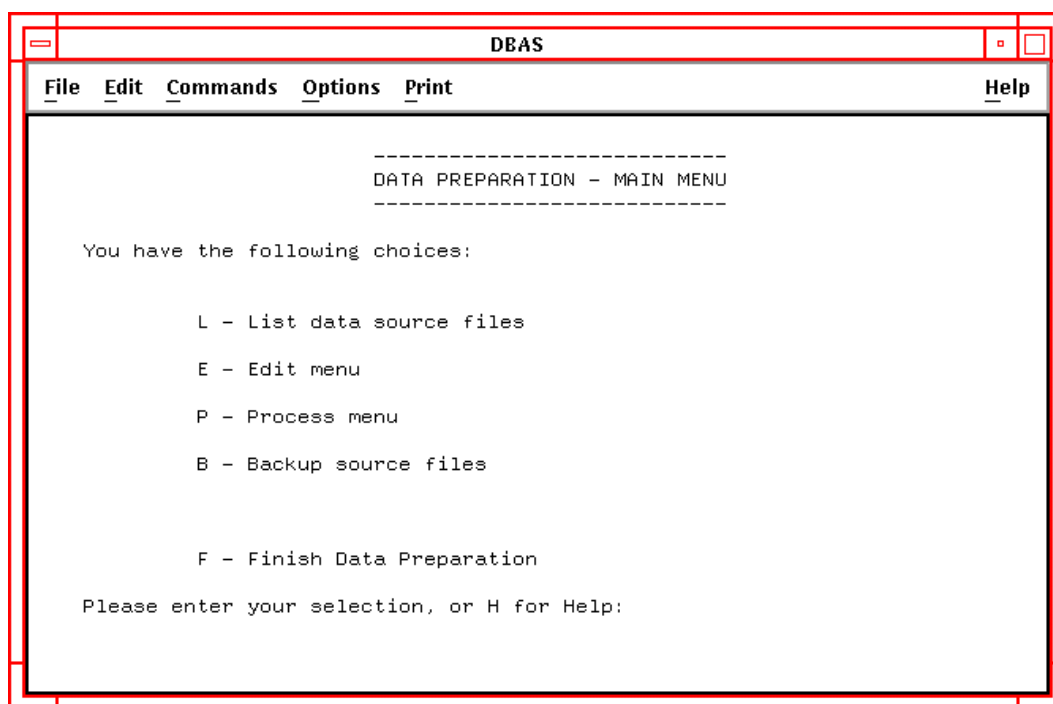
## 8. Back-up and Restore

### 8.1 System Data Backup Procedure

Data backup can take place with the System running normally. Before starting, ensure that a suitable magnetic cartridge or tape is available for this purpose. The user should note that

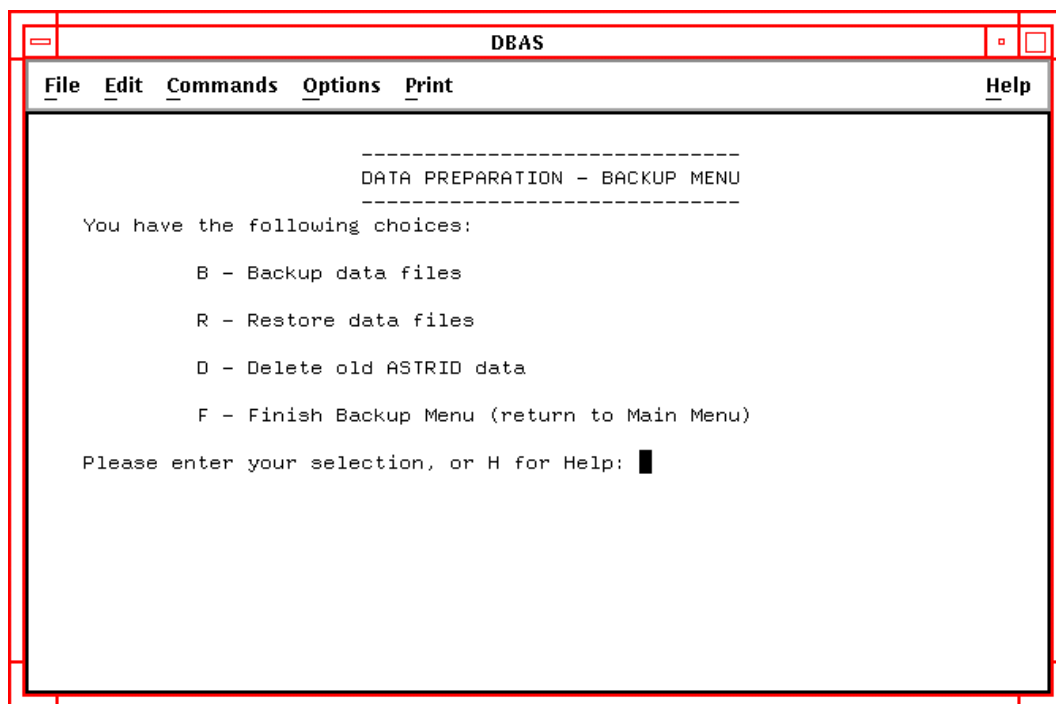
**ALL DATA, PREVIOUSLY STORED ON THE MAGNETIC MEDIA, WILL BE OVERWRITTEN AND COMPLETELY DESTROYED.**

Select the DBAS (Data Preparation) option from the Manager Menu. After a short delay the data preparation menu will be shown in a window with the following options:



**Figure 29 - Data Preparation menu**

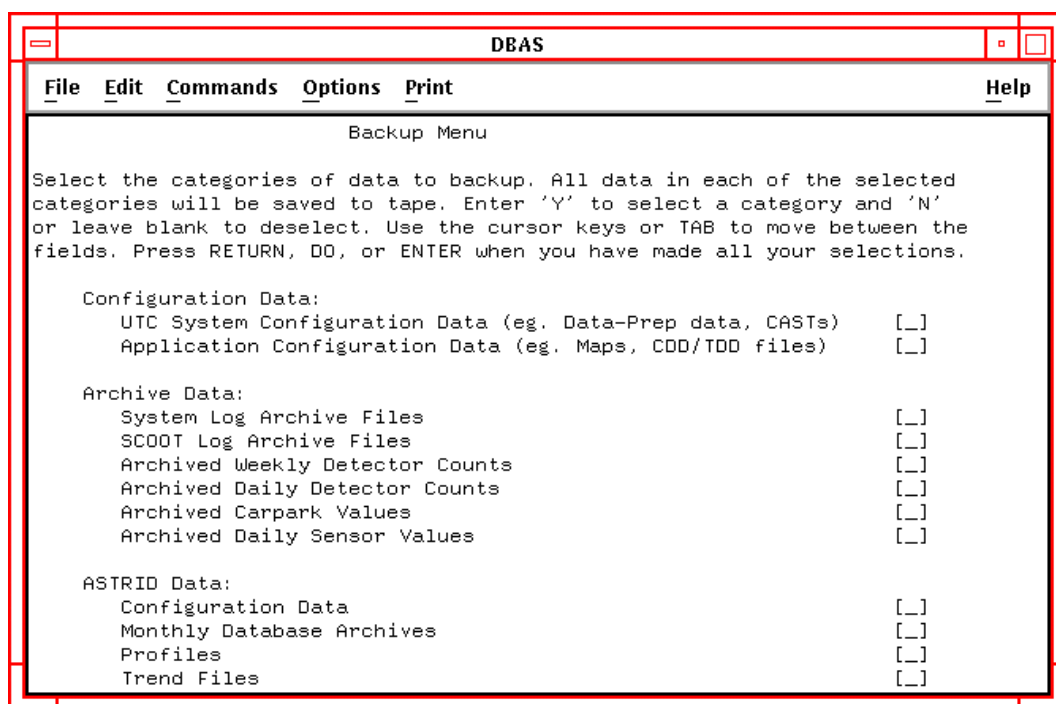
Select the option B. The BACKUP menu will appear :



**Figure 30 - Backup menu**

Select option B.

Insert the tape into the drive. Ensure that the write-protect tab is in the write-enable position. Select the data types to be backed up. Enter "Y" for each category to be backed up or "N" (or blank) otherwise. Press the TAB key to jump to the next selection.



The categories referring to ITMC are reached by continuing to press the TAB key.

INGRID Data:	
INGRID Configuration Data	[Y]
ITMC Data:	
ITMC Configuration Data	[Y]
ITMC Strategy Data	[Y]
ITMC Route Data	[Y]
ITMC Log Data	[Y]
ITMC Incident Data	[Y]
Miscellaneous:	
UGE MAPS directory (DXF, NTF files &c)	[Y]

Press Return to start the backup process, or Control/Z to exit. The tape will be initialised and temporary data files created on the disk, followed by copying to the tape. The data being stored will be shown item by item. After the copying process, a verification pass will be performed to check that the data has been correctly stored on the tape and all the temporary data erased. Remove the tape.

## 8.2 System Data Restoration Procedure

Before starting the restore process, ensure that the tape is write-protected. Then place it in the tape drive.

Select the DBAS (Data Preparation) option from the Manager Menu. Repeat the selection for Backup as shown in Figure 29 and Figure 30 above. Select the "R" option to restore the data.

Select the data to be restored, in a similar manner to that for data backup in section . Note that certain items of ITMC data cannot be restored on a running system, which can be seen from the list of available data sets, shown in Figure 31.

ASTRID Data:	
Configuration Data	[_]
Monthly Database Archives	[_]
Profiles	[_]
Trend Files	[_]
INGRID Data:	
System Configuration Data	[_]
ITMC Data:	
ITMC Log Data	[y]
ITMC Incident Data	[y]
Miscellaneous:	
UGE MAPS directory (DXF, NTF files &c)	[■]

**Figure 31 - Restore options**

There are 5 *Backup* options for ITMC but, for a running UTC system there are only 2 *Restore* options - **ITMC Log Data** and **ITMC Incident Data**. The other 3 sets of data - **ITMC Configuration Data**, **ITMC Strategy Data** and **ITMC**



**Route Data** - **CANNOT** be restored on a live system as these are in constant use. The only means of restoring all data is by shutting down the UTC system. Please consult the Siemens Help Desk should this option be required.

### **8.3 System Image Back Up and Restore**

This procedure is described in detail in the System Management Guide, reference 1.2.3.

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