



Traffic Management ***– Incident Management Perspectives***

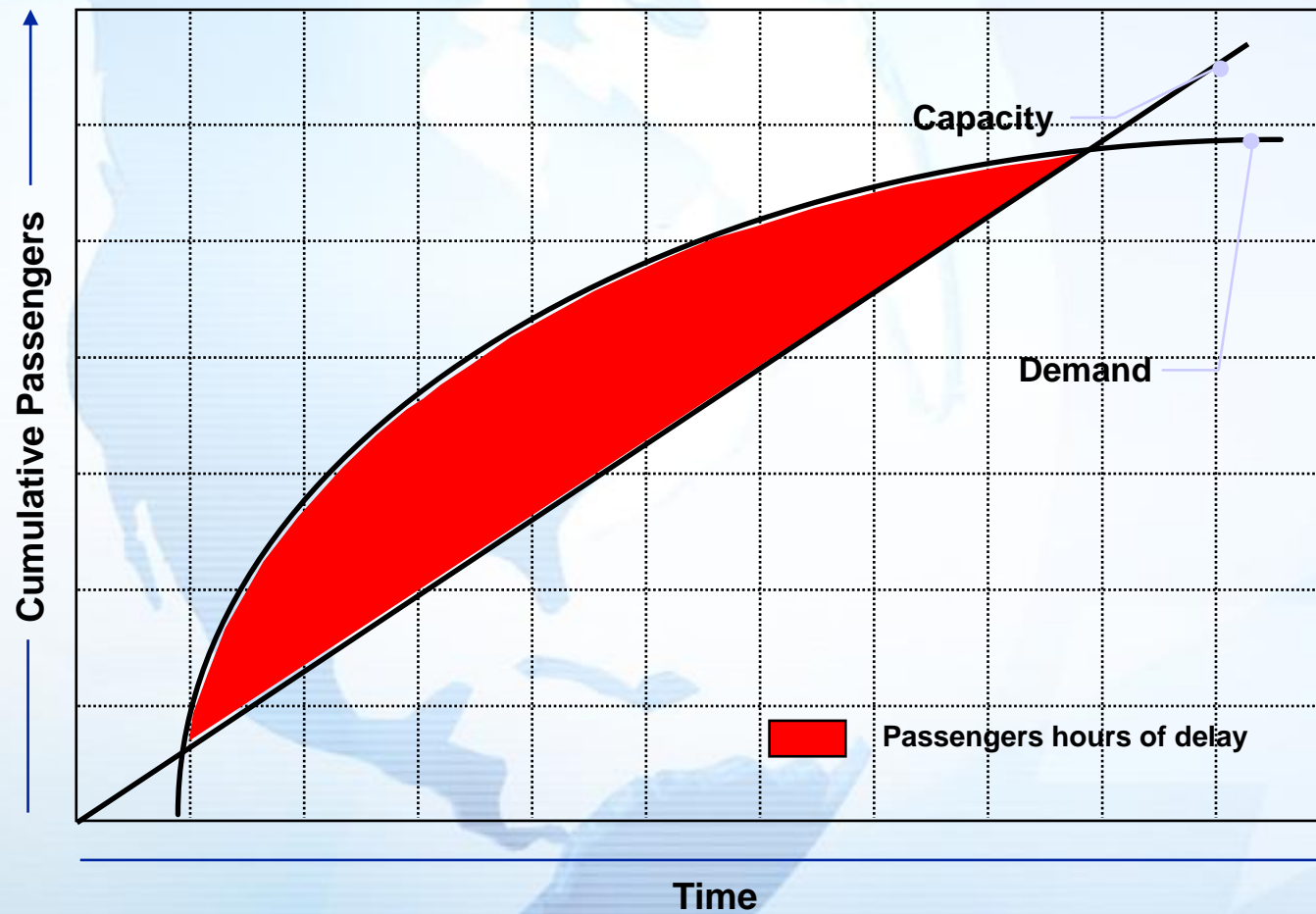
ITS Workshop
Belgrade, 4 April 2009

Incident Management Operation Process


- ◆ **Incident Detection/Confirmation**
 - Police
 - CCTV
 - AID, etc.
- ◆ **Response Generation**
 - Data input
 - Response either manually or by system
- ◆ **Response Implementation**
 - Controlling field equipment
 - Disseminating information to motorists

Roadway Capacity vs Traffic Demand

Recurring Congestion





 Ontario

EXPRESS AND COLLECTOR
MOVING WELL
BEYOND NEXT TRANSFER

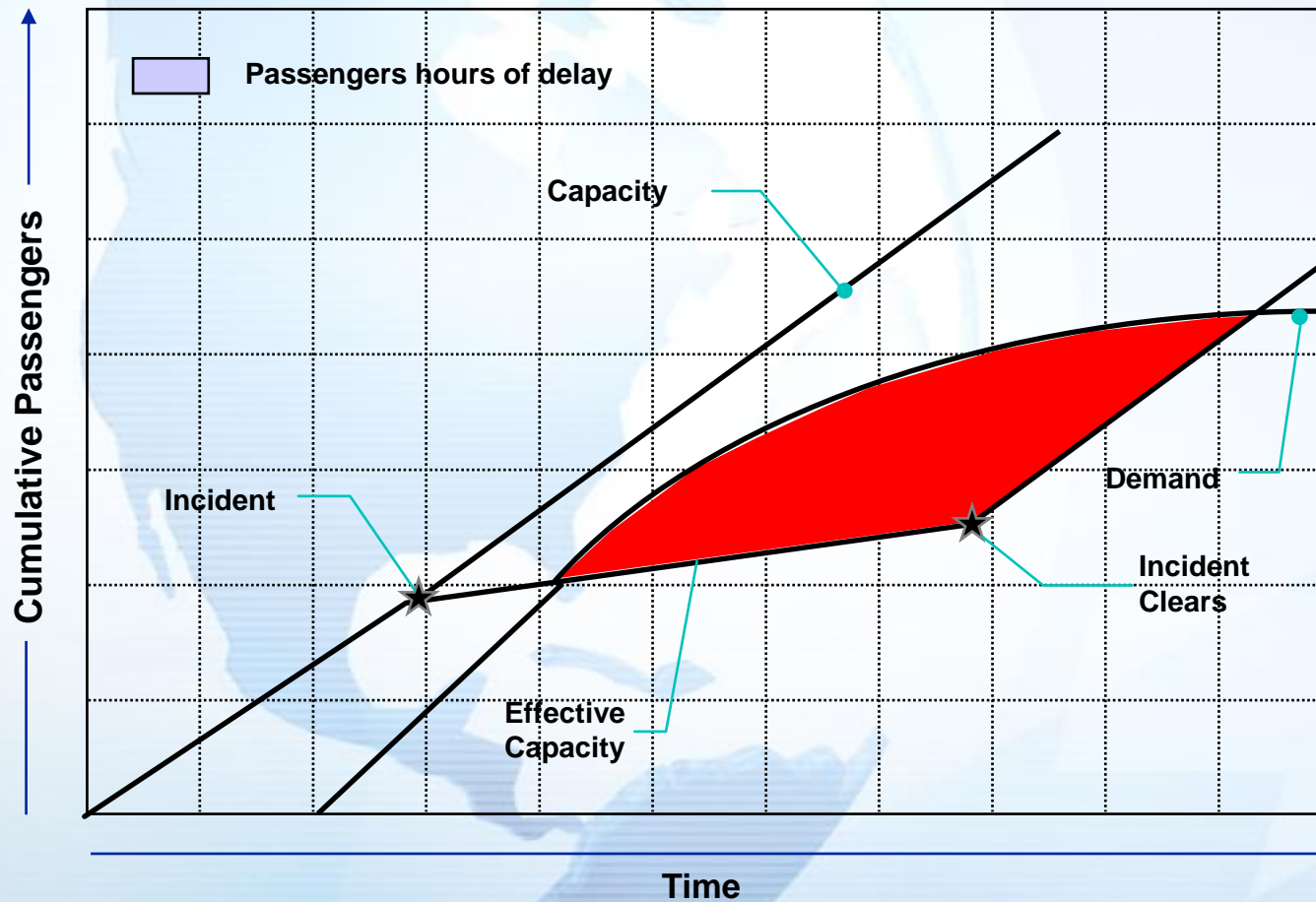
Leslie St.
Dufferin St. 1 km
Allen Road





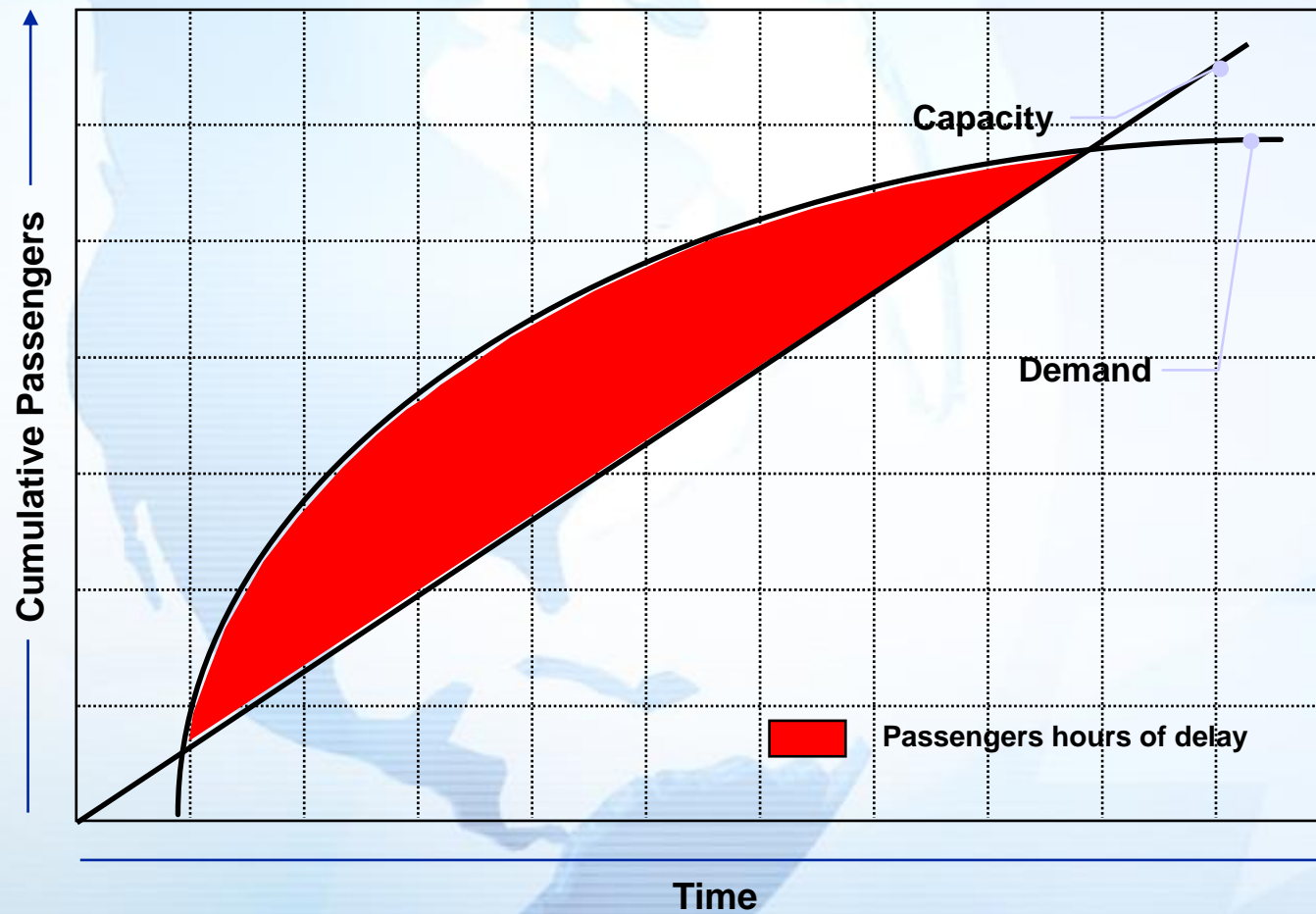
Roadway Capacity vs Traffic Demand

Non-Recurring Congestion



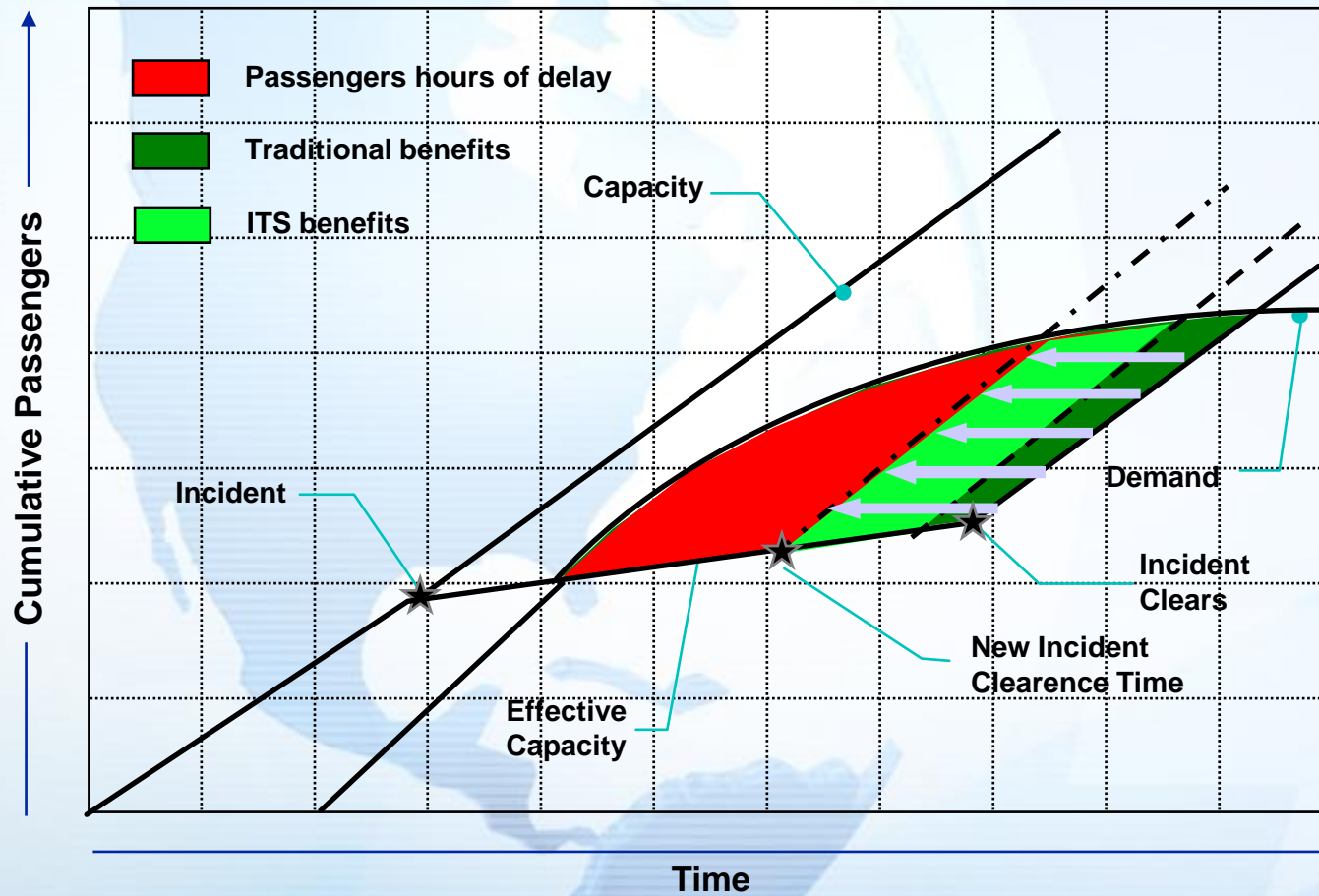
Roadway Capacity vs Traffic Demand

Recurring Congestion



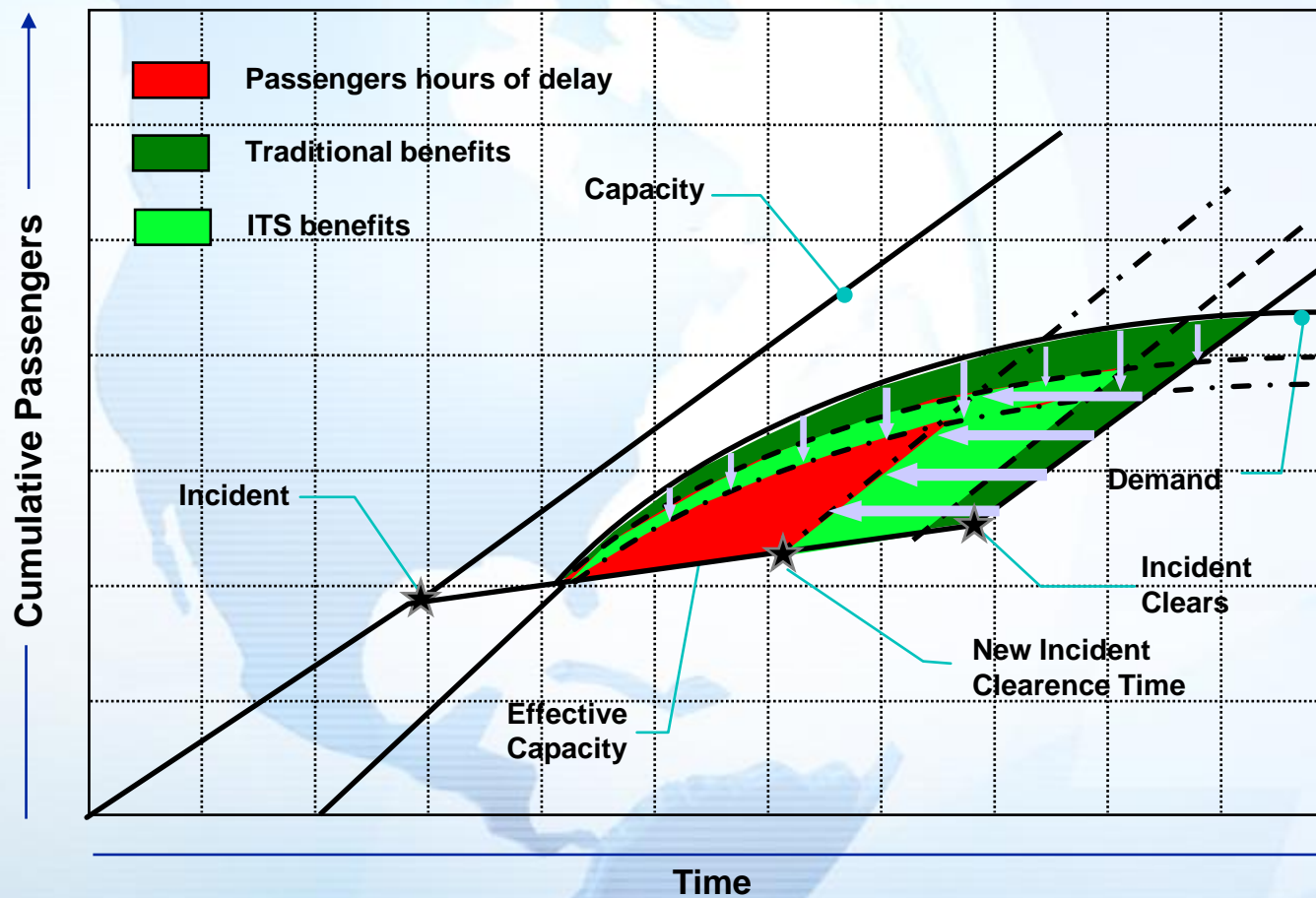
Benefits of Incident Management

Non-Recurring Congestion



Benefits of Incident Management

Non-Recurring Congestion



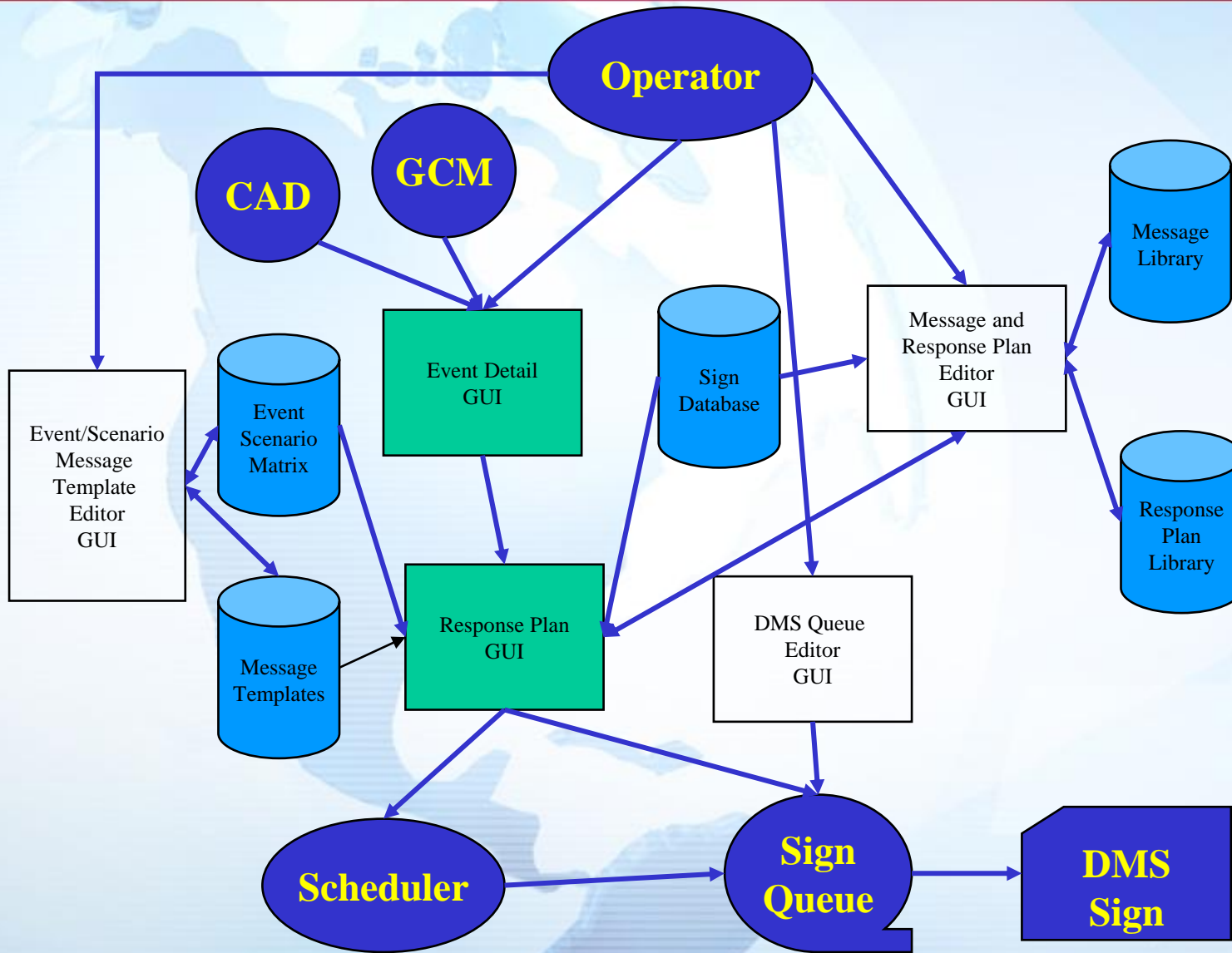
Typical Input Requirements

The screenshot displays the 'Event Management' software interface. The window title is 'Event Management' and it features a menu bar with options: Event List, Event Details (selected), Plan Synopsis / Site Management, Log, Schedule Event, Event History, and Traffic Plan. The interface is divided into several sections:

- Status:** Contains fields for Event ID (859), Type (Queue), Start Date (5/30/2007), Start Time (13:18:21), Blockage Type (N/A), Source (Operator), Estimated Duration (1 hour), and Periodic Prompt (min) (0).
- Location:** Contains fields for Area (Nam Wan Tunnel), Direction (EastBound), Road Type (Tunnel), Queue Head Location Reference (NWT-E04), Queue Head Relative Distance(m) (UpStream, 2), Area (Nam Wan Tunnel), Direction (EastBound), Road Type (Tunnel), Queue End Location Reference (NWT-E08), and Queue End Relative Distance(m) (DownStream, 6).
- Details:** Contains fields for Severity (Low) and Causes (Accident).
- Additional Information:** A large text area for entering extra details.

At the bottom of the window, there are buttons for 'Undo', 'Apply', 'New Event', 'Next', and 'Terminate'. The status bar at the very bottom shows 'User: Unknown' and 'Mode: Normal'.

Typical Implementation Decision Process



DMS EVENT & RESPONSE PLAN FLOW

Field Equipment and Sensors

- VMS
- Prismatic Signs
- Lane Control Signals
- Speed Control Signs
- Vehicle Detectors
- CCTVs
- Emergency Telephone
- Traffic Signals
- Pavement Lighting
- Barriers & Gates
- AID Systems
- Over-height Detectors
- Environmental Sensors
- Solar Sensors
- Power Circuits
- Switches
- Master Clocks
- Fire Alarms & Equipment
- Graphic Video Walls
- SCADA

Effective Incident Management - Benefits

- ◆ **Reduced delay;**
- ◆ **Improved response time;**
- ◆ **Improved air quality;**
- ◆ **Reduced occurrence of secondary incidents;**
- ◆ **Improved safety;**
- ◆ **Reduced recovery time;**
- ◆ **Enhanced traveller information services;**

Effective Incident Management - Benefits

- ◆ **Improved co-ordination and co-operation of response agencies;**
- ◆ **Improved public perception of agency operations;**
- ◆ **Reduced driver frustration; and**
- ◆ **Increased survival rate of crash victims.**

Traffic Management Differences

- ◆ **North American approach vs European approach**
- ◆ **Active Diversion vs Passive Diversion**
- ◆ **Statutory vs Informative**
- ◆ **Coordinated vs Stand-alone**
- ◆ **Automatic vs Operator's Intervention**

Project Cases

- ◆ **Videos on the Recent Incident Management System in Asia**
 - **Malaysia**
 - **North American approach**
 - **Hong Kong**
 - **European approach**

Project Cases

Route 8 - Traffic Control and Surveillance System (TCSS) AID

System Traffic Management Event Management Report Help

The interface displays a map of Route 8 with several traffic signs and camera icons. The signs include 'Tsing Yi Lantau' (青衣大嶼山) and 'Tsing Yi & Lantau' (青衣及大嶼山). The right sidebar contains a 'Simulation' panel with a 'View Name' list, 'Graphics' tools, 'Alarms' status (0 alarms), and 'Events' status (0 active, 0 scheduled).

View Name

- TMCA Area (North)
- TMCA Area (South)
- NWT (North)
- NWT (Tunnel)
- NWT (South)
- ETV
- SCB (Bridge)
- NSC Viaduct (West)
- NSC Viaduct (East)
- NSC / LK Interchange
- LCK Viaduct
- ENT (West)
- ENT (Tunnel W)
- ENT (Tunnel E)
- ENT (East)
- SHT

Alarms

Mar 31, 2008 15:40:41

0 alarms [Page Ack](#)

[Maximize Alarm Window](#)

Events

0 active [List](#)

0 scheduled [List](#)

Variable Message Sign & Matrix Signals



The Trend of Incident Management

◆ Applications Driven

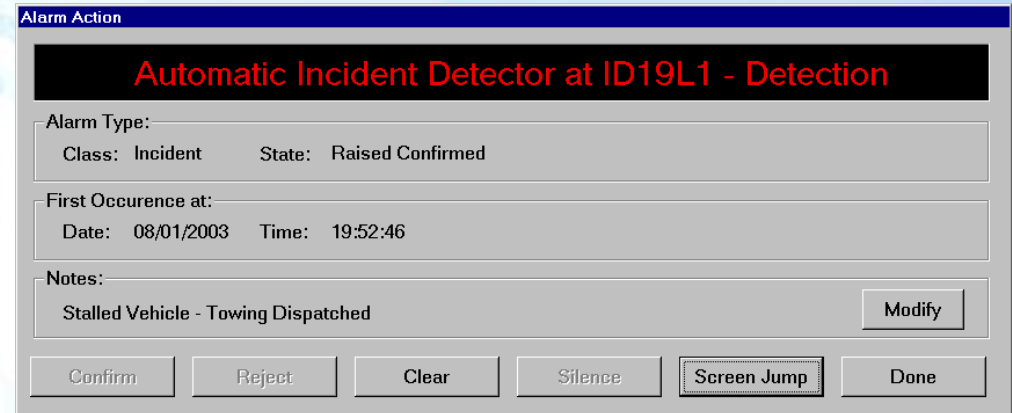
- Driven by Traffic management applications instead of technology;
- Emphasise on:
 - Safety: interlock check, safety alarms;
 - User friendly: graphical interface, point and click operations;
 - Operations assistance: operators - consistency; maintenance staff - fast response

◆ Automation as possible

- Minimum operator's intervention in daily operations

Traffic Management

- **Automatic Incident Detection Algorithm**



The screenshot shows a software window titled "Alarm Action". At the top, a black bar contains the text "Automatic Incident Detector at ID19L1 - Detection" in red. Below this, the "Alarm Type:" section shows "Class: Incident" and "State: Raised Confirmed". The "First Occurrence at:" section shows "Date: 08/01/2003" and "Time: 19:52:46". The "Notes:" section contains the text "Stalled Vehicle - Towing Dispatched" and a "Modify" button. At the bottom, there are six buttons: "Confirm", "Reject", "Clear", "Silence", "Screen Jump", and "Done".

- **Traffic Management Response Plans**
 - Sequenced Multiple Aspect Change
 - Operator Assistance: Advise/instruct
 - Step-through, Preview and Simulation
- **Safety Check on Sign Displays**

Integrated Control and Video Display

The screenshot displays a software interface for traffic management, titled "Oui". The main window shows a map with various traffic elements. A "CCTV" window is open, showing a live video feed of a road intersection with a blue truck and several cars. The CCTV window includes a list of cameras and an "Alarms" section.

System Menu: System, Traffic Management, Incident Management, Report, Help

CCTV Window:

- Cameras:** ENT, C0140E, C0150E, C0160E, C0170E, C0180E, C0180W, C0190E, C0190W, C0200E, C0200W, C0210E, C0210W
- Alarms:** [EMT M0750E]

Control Panel:

- Simulation:** Page Displays, Layers, Views
- Layer Name / Type Table:**

Layer Name	Type
Main Gantries	Background
LCS Gantries	Background
Traffic_Flow	Background
SubControlA...	Background
Vehicle Det...	Icon
AID	Icon
Visibility Se...	Icon
CCTV Came...	Icon
Speed Enfor...	Icon
Telephones	Icon
Barriers	Icon
Overheight...	Icon
Fully Variabl...	Icon
Prismatic Va...	Icon
Lane Control...	Icon

Visibility Control: On Off Auto

Datatypes:

Graphics: [Navigation icons: pan, zoom in, zoom out, home, refresh, etc.]

Alarms: Jul 05, 2006 15:53:49, 1 alarm, Page Ack, Maximize Alarm Window

Events: 0 active, 0 scheduled

Status Bar: RUS (1) 05/07/2006 15:53:30 M0750E Emergency Telephone 2 at SHT-E02 (F) (Off-Hook)

Real Time Traffic Information Display

VDS Status

Area: Internal Name:
Location: Last Update:

Lane	Status	Volume (5 Minute)	Volume (30 Second)	Occupancy (%)	Speed (km/hr)	Vehicle Length (m)
1	OK	0	13	23	5	0.0
2	OK	0	5	28	7	0.0
3	OK	0	8	30	7	0.0
Summary		0	26	27	6	—

- Disable AID
 Disable Detector

Target Change Display

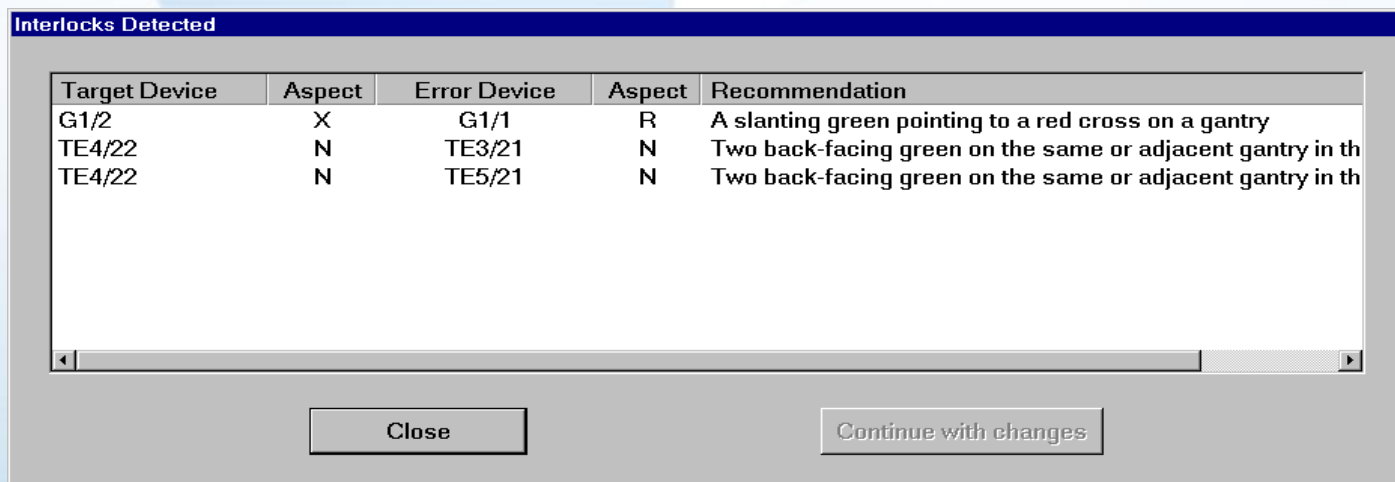
The screenshot displays the Ovi traffic management software interface. The main window shows a map of a road network with various traffic signals and control points. Two specific control points are highlighted: **GT706** and **ADS1**. The map shows a road with multiple lanes, and the control points are represented by icons with arrows and text labels. The **ADS1** icon shows a speed limit change from 80 to 40. The **GT706** icon shows a signal change from red to green. The interface includes a menu bar with options: System, Traffic Management, Event Management, Report, Help. A control panel on the right side contains the following sections:

- Manual_Control** (Red header)
- Plan Control | Layers | Views
- Execution: Implement, Hold, Resume, Cancel Plan
- Modification: Modify, Verify, Cancel
- Step Display: Top: 0, Next, Bottom: 1, Specific, Priority Filter, View Changes List
- Plan Notes: Manual Control plan for Cross_City_Tunnel
- Graphics: Single Window
- Alarms: Sep 26, 2006 17:22:55, 1 alarm, Page Ack, Maximize Alarm Window
- Incidents: 0 active
- Simulation (Red button)

The status bar at the bottom of the window displays the following text: **RM (1) 26/09/2006 17:19:04 Response Plan at Operator WS 12 (In Use) Manual_Control/Manual_Control/R8/All_States/Manual_Co**

Safety Checks on Sign/Signal Control

- ◆ **The system checks every signal control defined in the plan or any manual controls against a safety matrix and safety rules**
 - two slanting arrows pointing to each other
 - consistency between the displays on signals and signs on the same or adjacent gantries



The screenshot shows a window titled "Interlocks Detected" with a table containing the following data:

Target Device	Aspect	Error Device	Aspect	Recommendation
G1/2	X	G1/1	R	A slanting green pointing to a red cross on a gantry
TE4/22	N	TE3/21	N	Two back-facing green on the same or adjacent gantry in th
TE4/22	N	TE5/21	N	Two back-facing green on the same or adjacent gantry in th

At the bottom of the window, there are two buttons: "Close" and "Continue with changes".

Alarm Management

- ◆ **to allow traffic operator & system manager to have total control of the entire system**
- ◆ **to provide full details of the problems for ease of further action**
- ◆ **all the alarms are prioritised and colour-coded to represent different levels of severity and stages of the alarms**

On-Screen Traffic Statistics

SYSTEM
TRAFFIC MANAGEMENT
MANUAL CONTROL
EDITOR

AKLEH

Traffic Statistic

	East Bound	West Bound
1	█	█
2	█	█
3	█	█
4	█	█
5	█	█
6	█	█
7	█	█
8	█	█
9	█	█
10	█	█
11	█	█
12	█	█
13	█	█
14	█	█
15	█	█
16	█	█
17	█	█
18	█	█
19	█	█
20	█	█
21	█	█
22	█	█
23	█	█
24	█	█
25	█	█
26	█	█
27	█	█
28	█	█
29	█	█
30	█	█
31	█	█
32	█	█
33	█	█
34	█	█
35	█	█
36	█	█
37	█	█
38	█	█
39	█	█
40	█	█
41	█	█
42	█	█
43	█	█
44	█	█
45	█	█
46	█	█
47	█	█
48	█	█
49	█	█
50	█	█

VDS Status
 Area:
 Location: Last Update:

Lane	Status	Volume (5 Minute)	Volume (30 Second)	Occupancy (%)	Speed (km/hr)	Vehicle Length (m)
1	OK	0	5	16	102	5
2	OK	0	7	17	103	6
3	OK	0	4	9	101	4
Summary		0	16	14	102	5

RC (1) 18/04/2000 11:45:53 Node at WS 2 (INTERNAL FAILURE)

RC (1) 18/04/2000 11:43:59 Node at WS 1 (INTERNAL FAILURE)

RC (1) 18/04/2000 11:36:18 VPXF_VMS_EB1605_1_Pixel Status at EB1605 (PIXEL FAILURE)

18 Apr 2000 11:38:04

Total No of Alarm 2

Maximize Alarm Window ON OFF

Work Station Information



Thank you!

**ITS Workshop
Nicosia, 3 April 2008**