THALES

SEGUR + CLAIRE
Traffic Management system

References

- Provider and Installer of systems since 1971 (over 50 reference systems)
- Large systems:
  Paris (2000 traffic controllers), SITER – Hauts de Seine (600 traffic controllers), PARCIVAL – Val de Marne (500 traffic controllers), GERFAUT - Seine-St-Denis (500 traffic controllers)
- Reference systems for congestion management with the CLAIRE expert system: Paris, London, Strasbourg Rennes, Toulouse, Hauts-de-Seine (Paris area), Brussels,…


Ville de Paris


Control Centre of Strasbourg

- **Latest installations**
  Amiens (150 traffic controllers), in operation

  Strasbourg (800 traffic controllers), in operation, upgrade in progress

  Rennes (250 traffic controllers)

  Rouen (250 traffic controllers) in progress

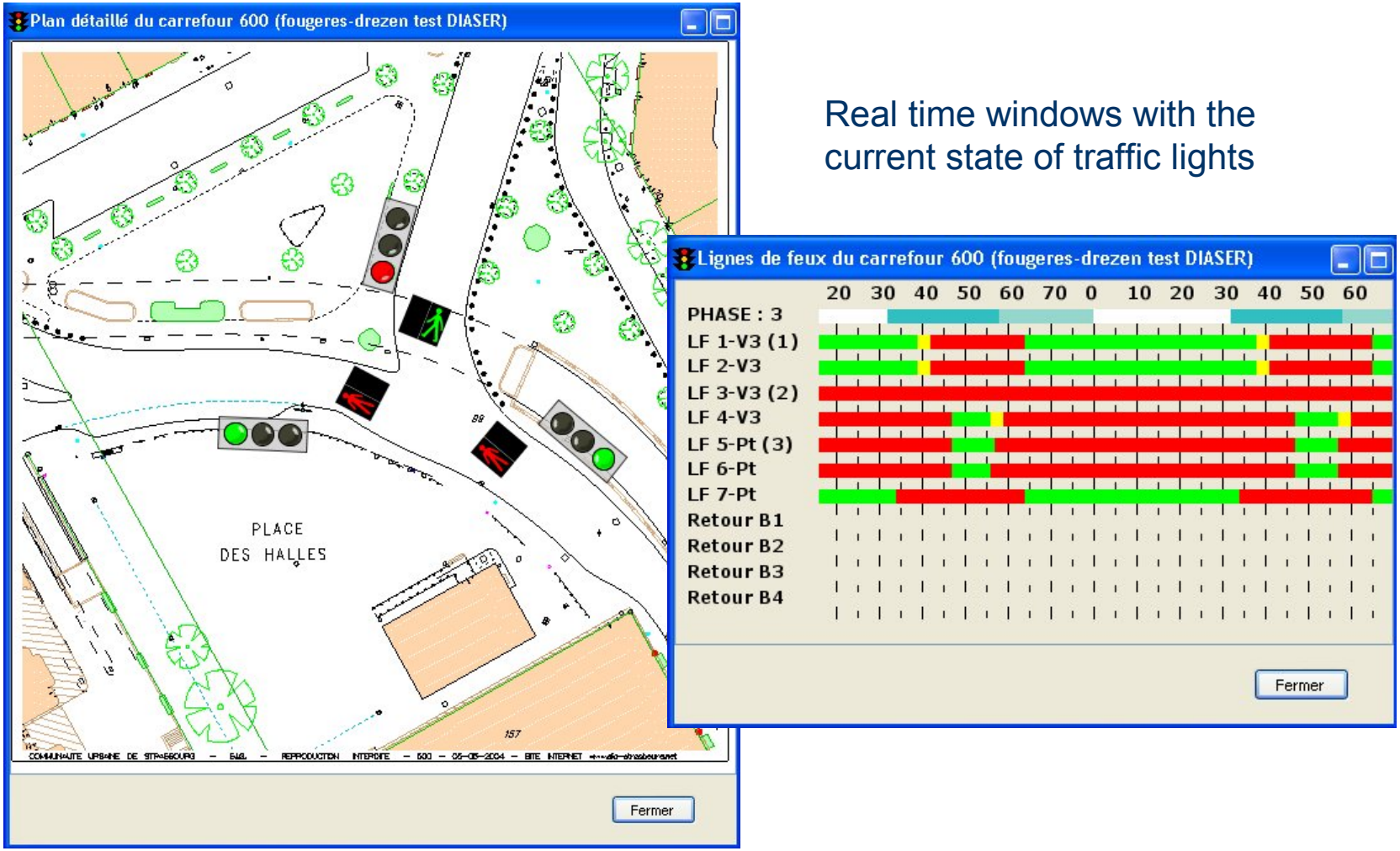
Advantages of THALES traffic control systems

- System optimised for automatic operation
- System allowing different levels of operation
- Priority for manual over-ride
- Integrates tools for traffic plan design and system performance evaluation
- Integrates VMS management, dynamic signs for car park, delivery of traffic information for Web provider and/or GSM and GPS services operators
- Based on industrial equipment

Main Design Features

- Centralised system
  - Overview and diagnostic view of the traffic flow
  - Global optimisation for giving priority to public transport vehicles
- Networking compatibility and compliance with standard protocols
  - DIASER, DIASER/IP for real time communication with road equipment
  - PSTN or TCP/IP for remote control
- Integrated real time management functions
  - Frequency of communication with roadside equipment as required: from each second for real time to daily for remote control
  - Real time management of controllers every second (management of stages or communication of traffic plans – offset, cycle and split)
  - Collection of traffic data every second (every minute for vehicle classification)
  - Remote control and remote configuration of distant equipment
  - Priority for public transport included in the kernel: detection of vehicles and on-line traffic plan calculation
- Congestion management with the CLAIRE expert system

MMI for real time control of traffic controllers



Real time windows with the current state of traffic lights

Screen shots from SIRAC - Strasbourg traffic control system

Advantages of centralised management

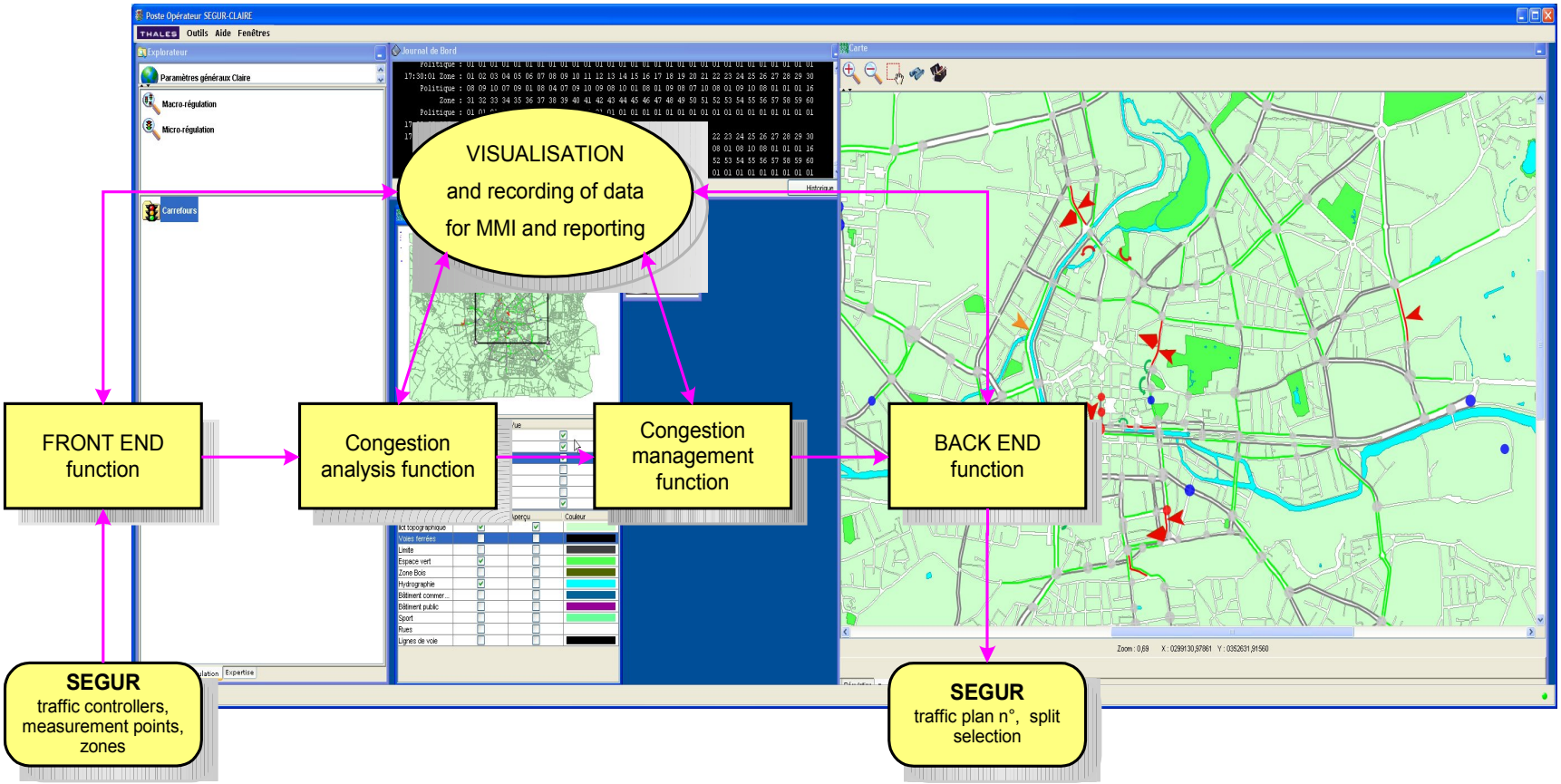
- Launch actions from events/detection coming from a wider area than a single junction
- Allows different pieces of roadside equipment to function in a similar manner including:
  - Management of transitory periods when new traffic plans are applied
  - Management of priority for public transport vehicles
- Allows a cycle to cycle control of each junction in accordance with the general state of the traffic
- Analysis and management of congestion can be performed on the entire road network

Advantages of centralisation for Public Transport priority

- PT Vehicles are not always in dedicated lanes: centralised priority management allows control of saturation on routes where PTV's are located
- A centralised system can take into account events over a wide area: actions based solely on local events may impact PTV performance
- Central management allows better overall system performance when demands conflict at the local level
- Parameterisation through a central system is easier and gives consistent system-wide performance
- Statistical data derived from a centralised system are more detailed

Congestion management

- CLAIRE: developed in collaboration with INRETS (National Transportation Research Institute)
- An advanced analysis of congestion with automatic launch



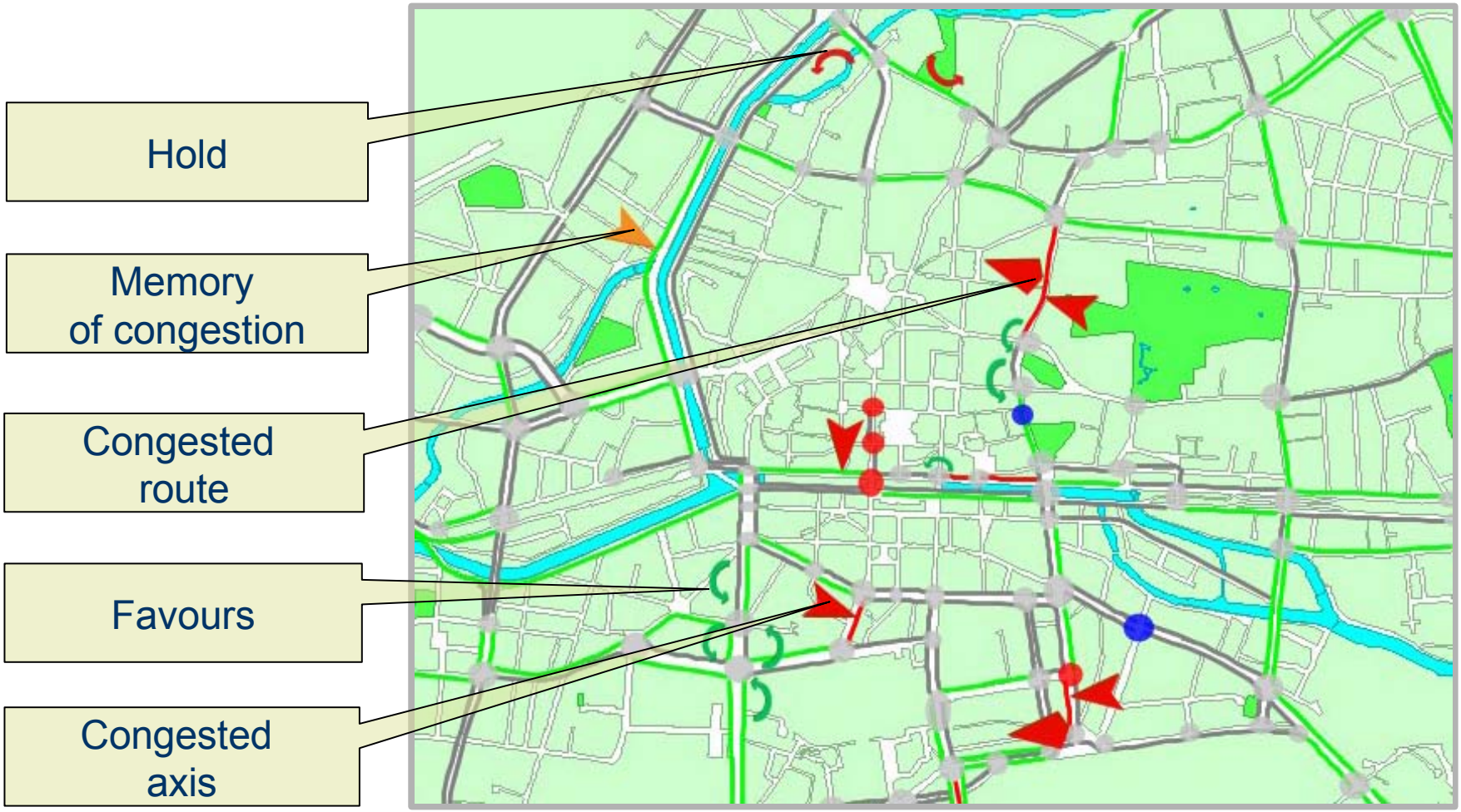
Screen shots from ARTHUR Rennes traffic control centre

Congestion management

- CLAIRE enables:
  - Detection and follow-up of congestion regarding time and space
  - Memorisation of the origin of each congestion
  - Determination of the relationship between each congestion
  - The automatic choice of the best solution in real time based on pre-defined strategies
  - Applies the strategy by selecting the best split for the traffic plan
  - The continuation of actions while traces of congestion still exist

- The congestion management model gives:
  - Keys for decision making in concordance with traffic allocation planning
  - Methodical approach for congestion management
  - Visibility on the strategic choices

Congestion management



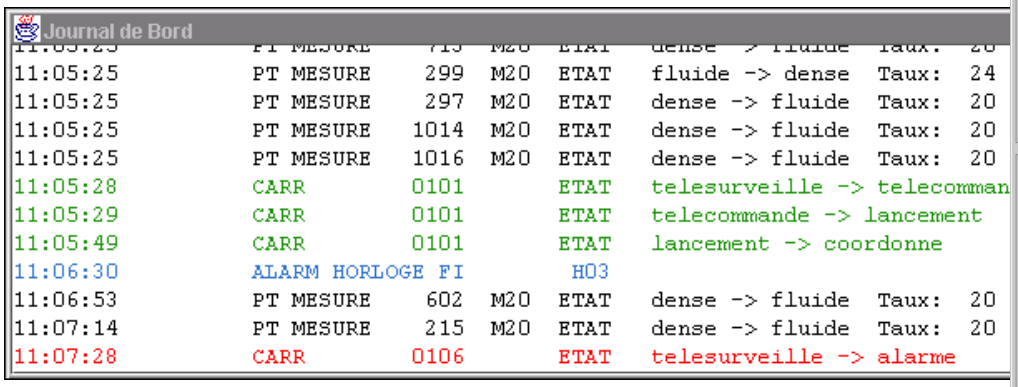
Screen shot from Rennes captured Friday August 25th 2006 5:30 p.m.

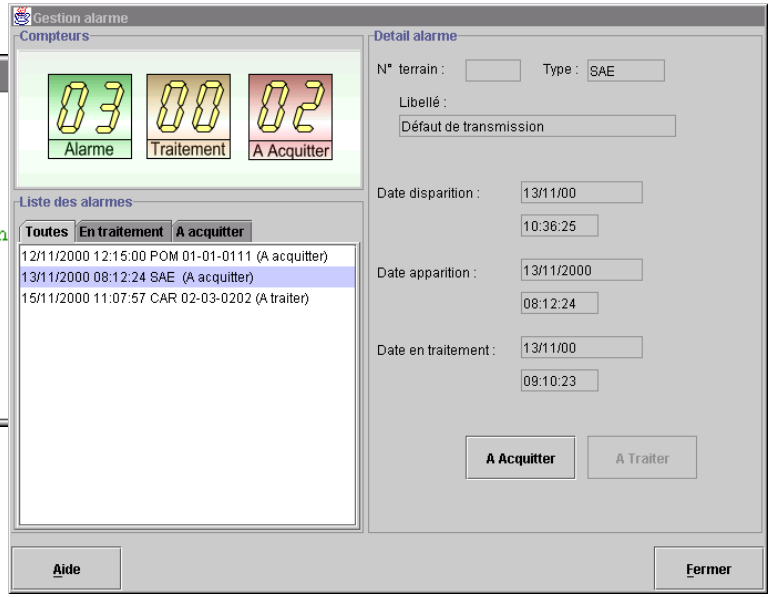
Communication with other systems

- May be linked with Fleet Management System to give priority to public transport vehicle:
  - Experimentation STIF: linkage of Hauts-de-Seine SITER system with the RATP SIEL Bus system (DIASER compatible)
- May be linked with Traffic Information Systems:
  - Providing of information on congested areas, travel times, …
  - Existing linkages for Paris, SITER, Brussels
- May integrate traffic data from an external system:
  - Control of junction with urban highways

Log book and management of equipment defects

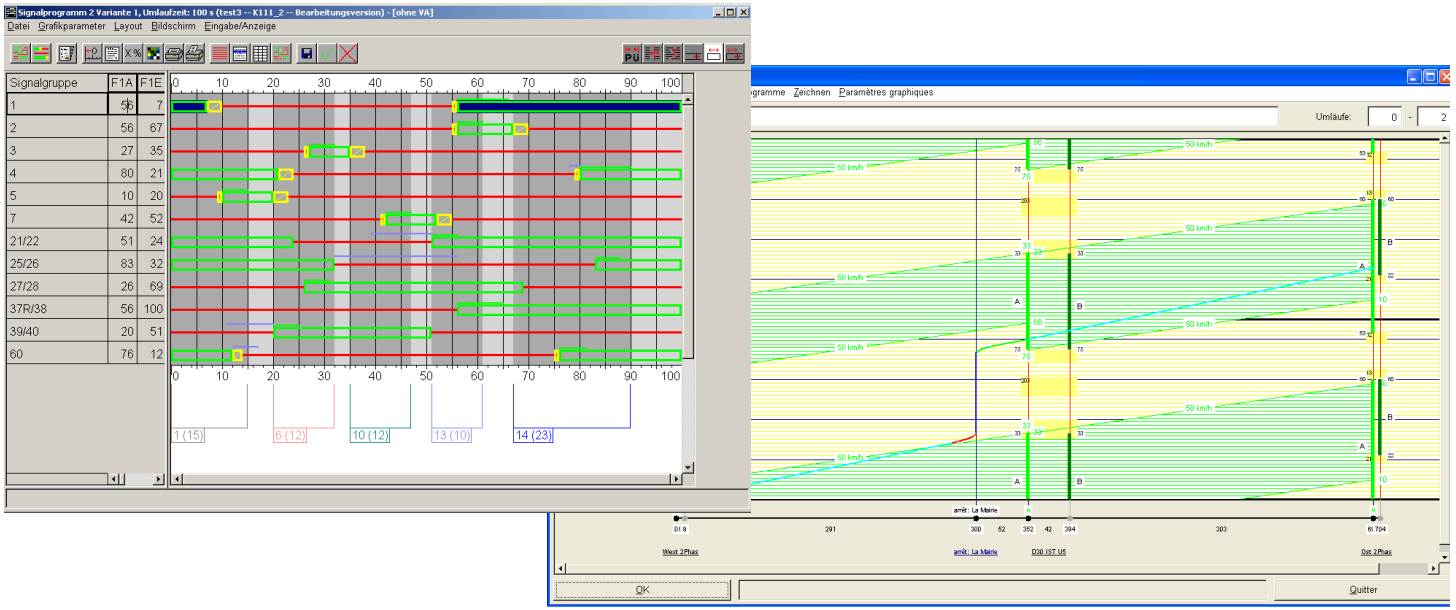
- The system records every single event
- A log file window displays selected events
- A Defect panel is updated in real-time with beginning/end of equipment defects
- The system can automatically call maintenance agents:
  - With team management depending on geographical location of type of equipment
  - With management of team rotation and telephone numbers





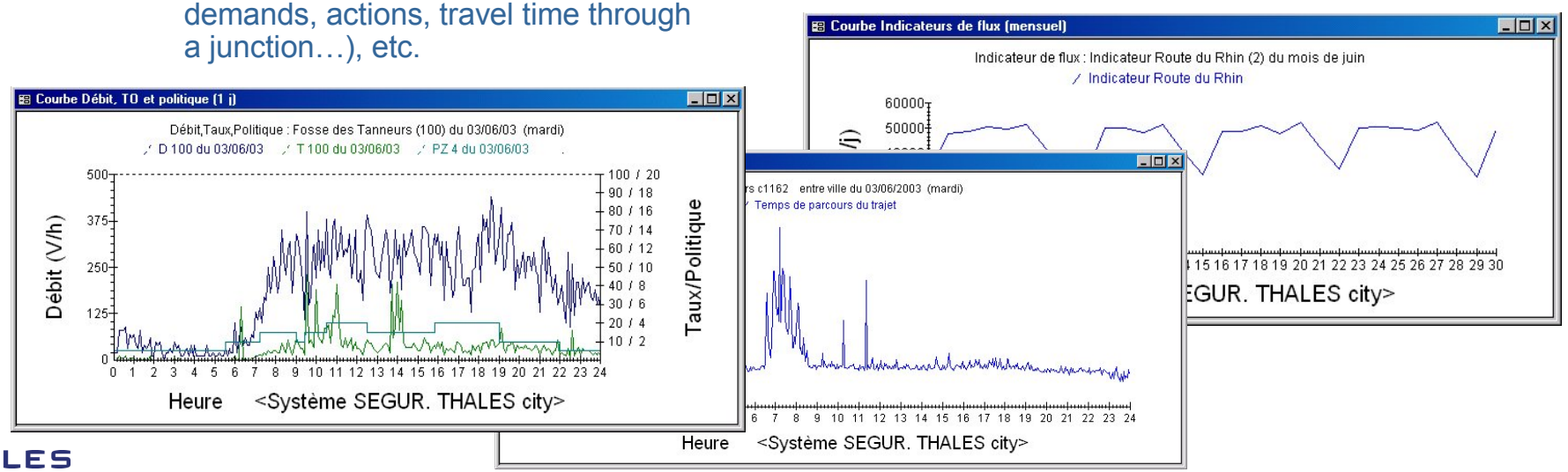
Back office traffic plan calculation

- Integrates a generic interface which is implemented with CROSSIG
  - CROSSIG is a well know international reference
  - Allows traffic plan calculation including green waves for public transport vehicles
  - Can be coupled with the microscopic traffic simulation tools (VISSIM…)
  - Generates traffic plan data from SEGUR with DIASER compatibility



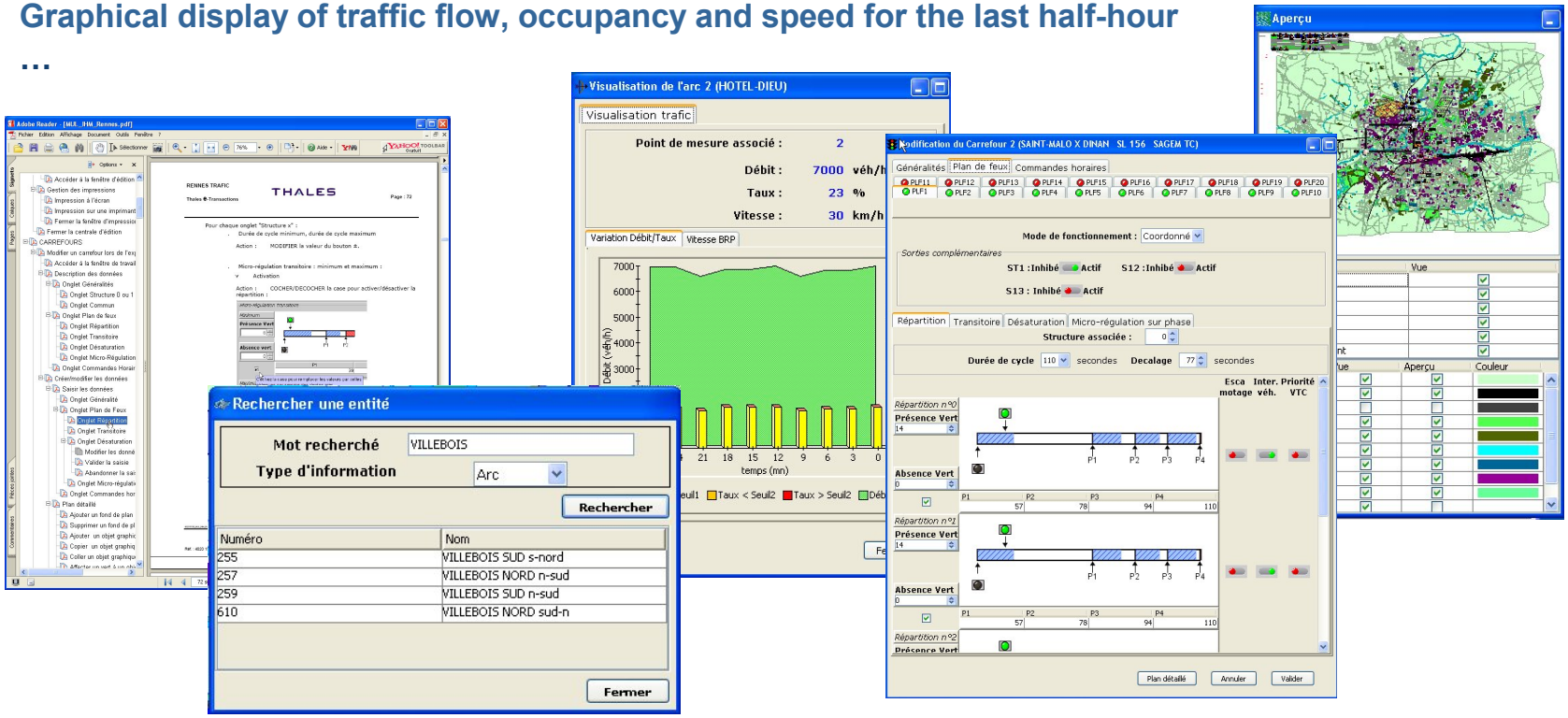
Reporting and statistics

- Development based on Microsoft Office
  - Data management through MS ACCESS
  - Data and report export to Word and Excel
  - Daily report configured by user by selecting the desired reports
  - Possible issue of report for the current day
  - Numerous reports and graphs available to cover operational and maintenance requirements
    - Seek of events
    - Availability of equipment
    - Traffic state reports and graphs
    - Reports and graphs on travel times, speed, congestion lengths
    - Vehicle classification regarding vehicle speeds and lengths using the EYEWAY DIASER measurement stations
    - Reports and graphs on effectiveness of actions for public transport vehicles (number of demands, actions, travel time through a junction…), etc.



Other specific points

- On-line configuration: configuration allows objects to be added or deleted without restarting the system
- Replay function: display recorded data from previous days in three minute steps
- Cartography including GIS searching functions
- User's access rights management
- User management of cartographical layers
- On-line help
- Total independence between communications and equipment within zones
- On-line access to traffic plans independently from the back office plan
- Graphical display of traffic flow, occupancy and speed for the last half-hour
- …



System architecture

Windows XP workstations

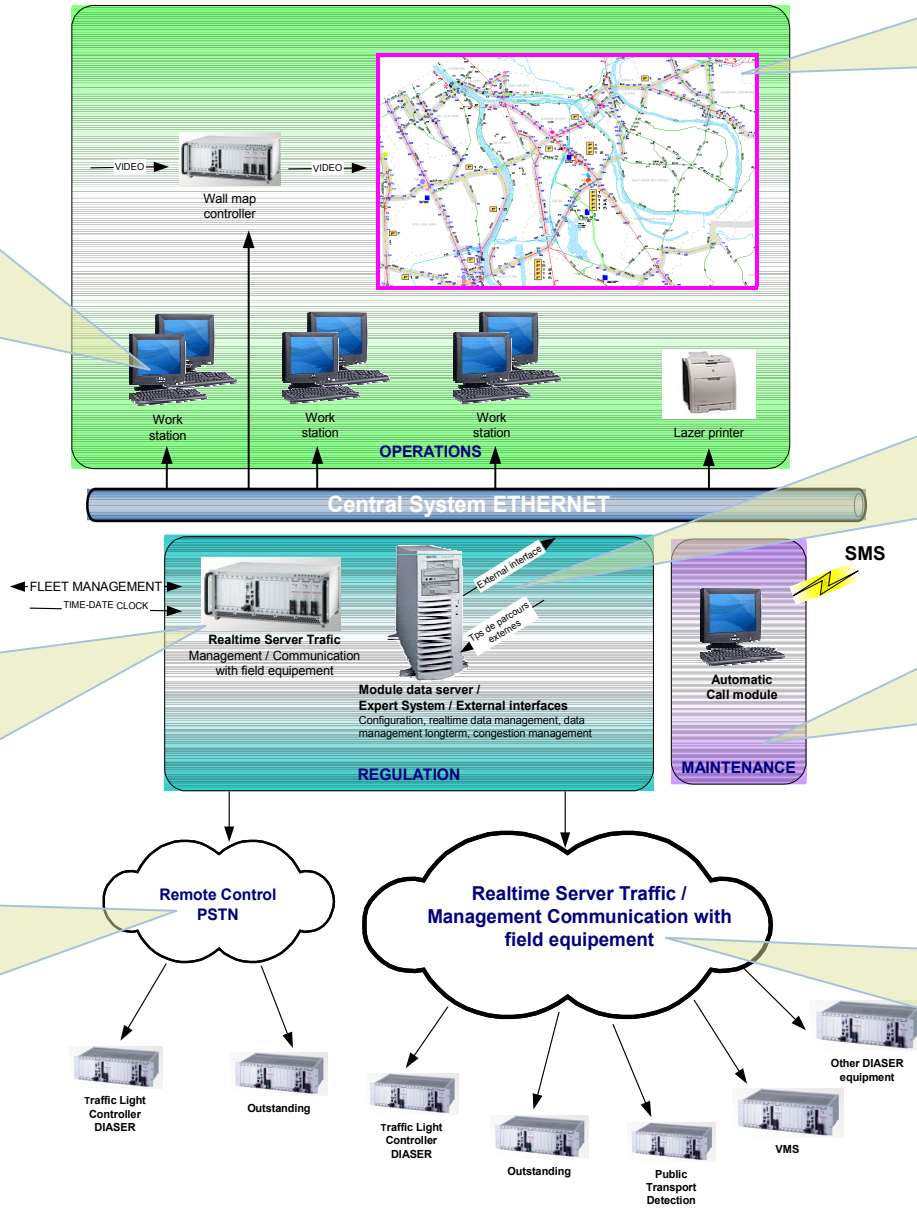
- 2 screens for an enlarged working surface
- User friendly interface
- MS Word-Excel compatible for data export

Real Time Server

- Operates under VxWorks
- Stable operating system
- High reliability and easy to maintain
- Standalone control in downgraded mode
- Management of public transport vehicle priorities

PSTN network

- Remote control of traffic controllers and measurement stations
- Remote configuration of equipment
- Collection of traffic data



Wall map

- Integrated as a standard client operator's console
- Uses specific profile for the display

Data Server

- UNIX operating system
- Stable operating system
- Real time multi-tasking
- Strength of a well known standard
- Manage all data, workstations and external linkages

Maintenance agents management

- Automatic calls
- Allows management of several teams & rotations
- Controls the Real Time Server

DIASER under IP network

- Compatibility to all types of equipments
- Customisable for existing equipment

Results of some on-site evaluations

Paris - SURF 2000

- Improvement of safety and driver/passenger comfort
- Reduction of stopping by about 25% implying reduction in petrol consumption
- Reduction of bus travel times by 3%

CG92 - SITER

- Accuracy of calculated mean speed (BRP formula) better than 20% under all traffic conditions (generally between 10 and 15%)

CLAIRE

- ZELT of Toulouse: Reduction of travel times for cars up to 20% on certain routes
- Rennes: Reduction of travel times for buses up to 20% when mixed with general traffic
- Experiment in London and Leeds: emissions reduced by 5%

Ile-de-France STIF

Priority for bus line No.171 through SITER and RATP SIEL-Bus systems:

- Buses pass 85% of traffic signals at green instead of 35% previously