

Young Researchers Seminar 2009

Torino, Italy, 3 to 5 June 2009

Dynamic Traffic and Safety Management in Brussels

Van Damme Olivier



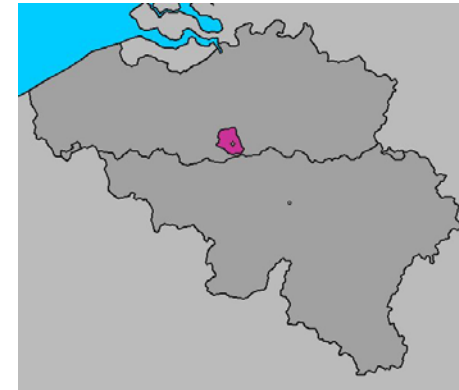
Presentation Overview

- Study area
- Objectives
- Methodology
 - Diagnosis
 - Scenarios
 - Proposals for VMS locations
 - Selection and installation of the VMS
- Conclusion

The study area

- **Brussels Capital Region:**

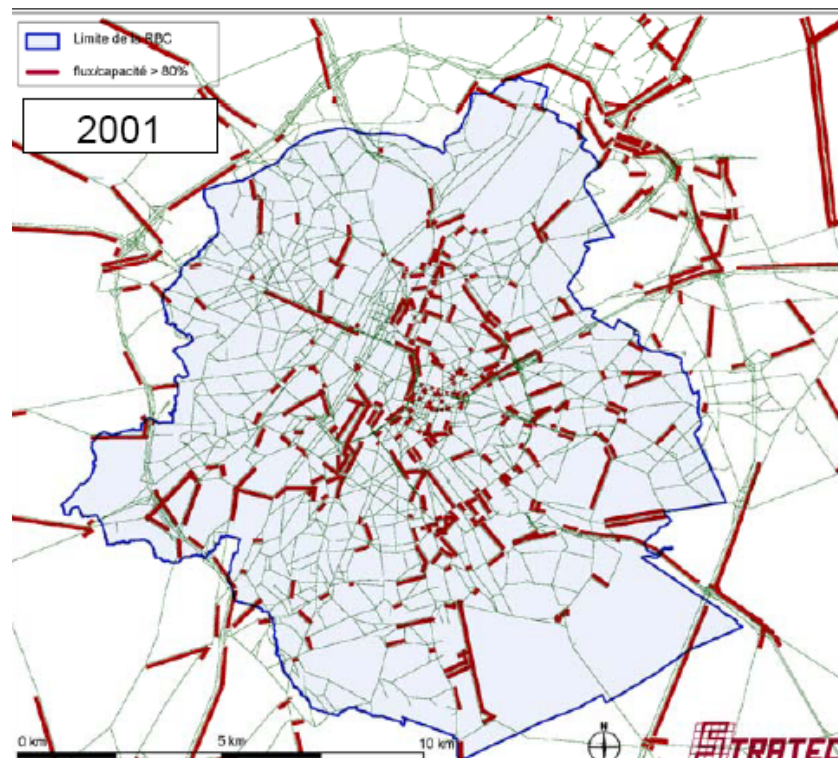
- 19 municipalities
- Surface area: 162 km²
- Total population: 1.018.000
- Jobs: 682.000
- Schoolchils: 241.000
- Cars: 343.000
- Road network: 1881km
- Road managing: 331km.
 - Motorways (black)
 - Metropolitan roads (red)
 - Main roads (orange)



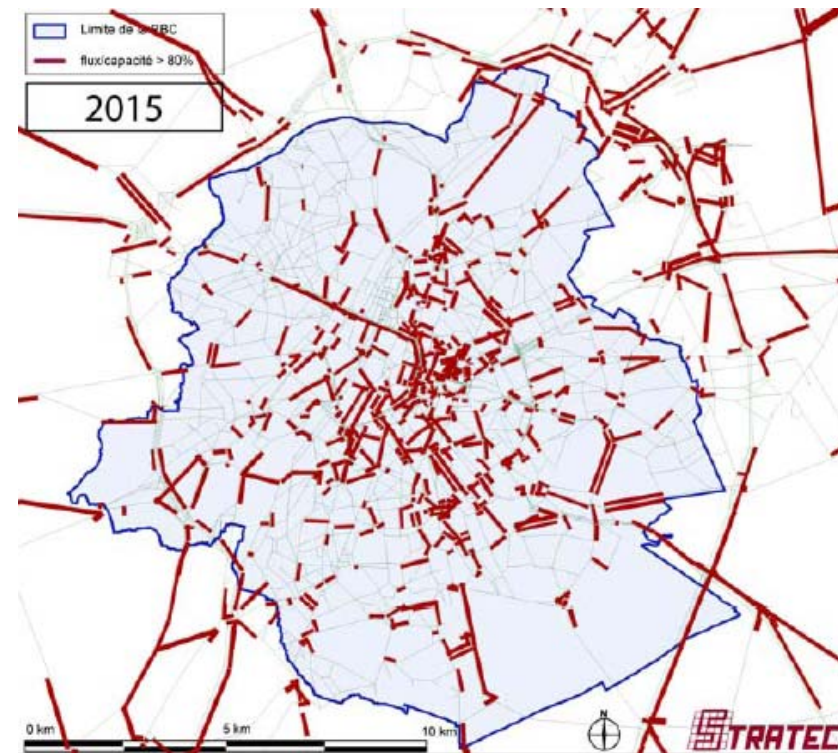
The study area

- Brussels traffic situation and projection

Congestion between 8h-9h
in 2001



Congestion between 8h-9h
in 2015



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Objectives

- To **inform** road users in real time
 - On present traffic conditions
 - On potential hazards
 - ▶ ↑ **security**
 - ▶ ↓ pollution
- Multi-modal possibilities
 - Information on public transports
 - Parking possibilities
- Technological solution : the Variable Message Signs (VMS)
 - Big challenge : the maximum information with minimum of VMS



Methodology

- Collecting informations (diagnosis)
- Determination of interventions scenarios
- Proposals for VMS locations
- Selection and installation of the VMS

Diagnosis

- Existing equipment for dynamic management:

- 51 VMS (tunnels)

- In tunnels
 - Pivotal flap signs
 - ▶ provide information



- Detection systems:

- Detection loops
 - Cameras
 - ▶ provide input data



Diagnosis

- Events on the network:
 - Damage-only and personal injury accidents
 - Traffic problems
 - Social demonstrations
 - Sporting events
 - Hazardous spots

Meetings with police,
mobility managers,
municipalities

► 45 locators



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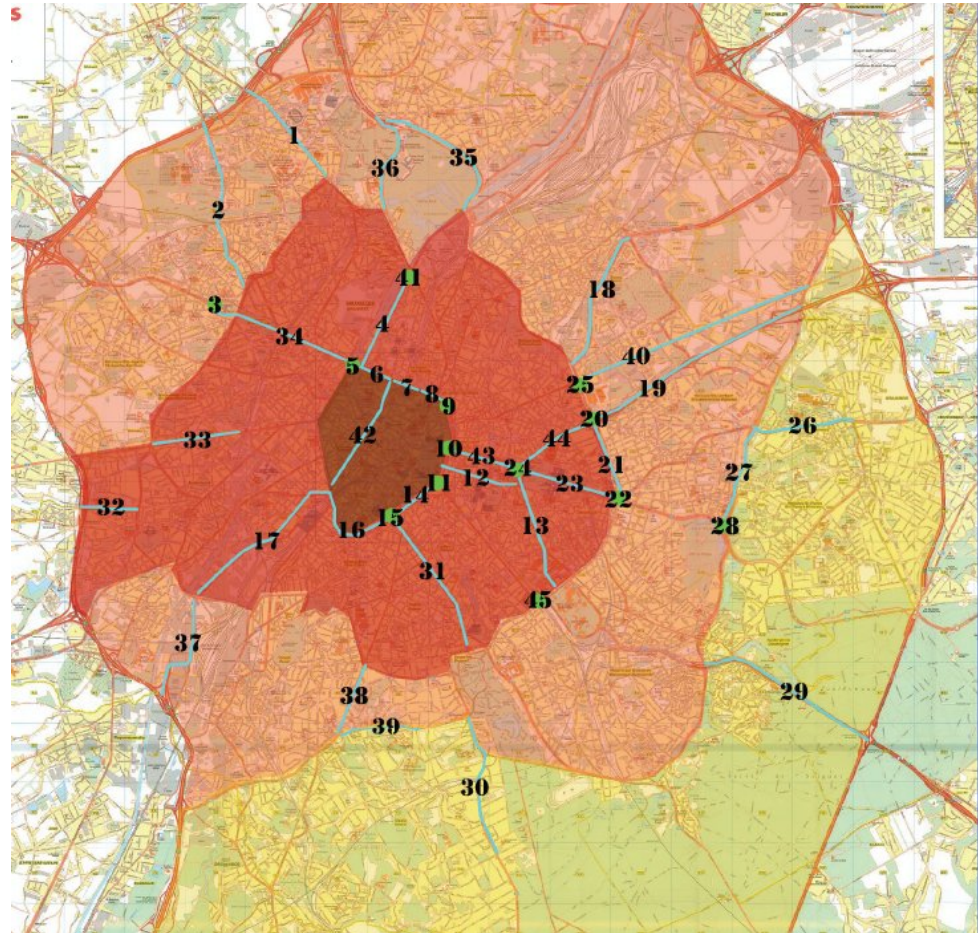
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Scenarios

- The logic of rings:
 - Pentagon (the city center)
 - Ring motorway
 - Two more rings (not complete)

► Geometric structure of the study area



Scenarios

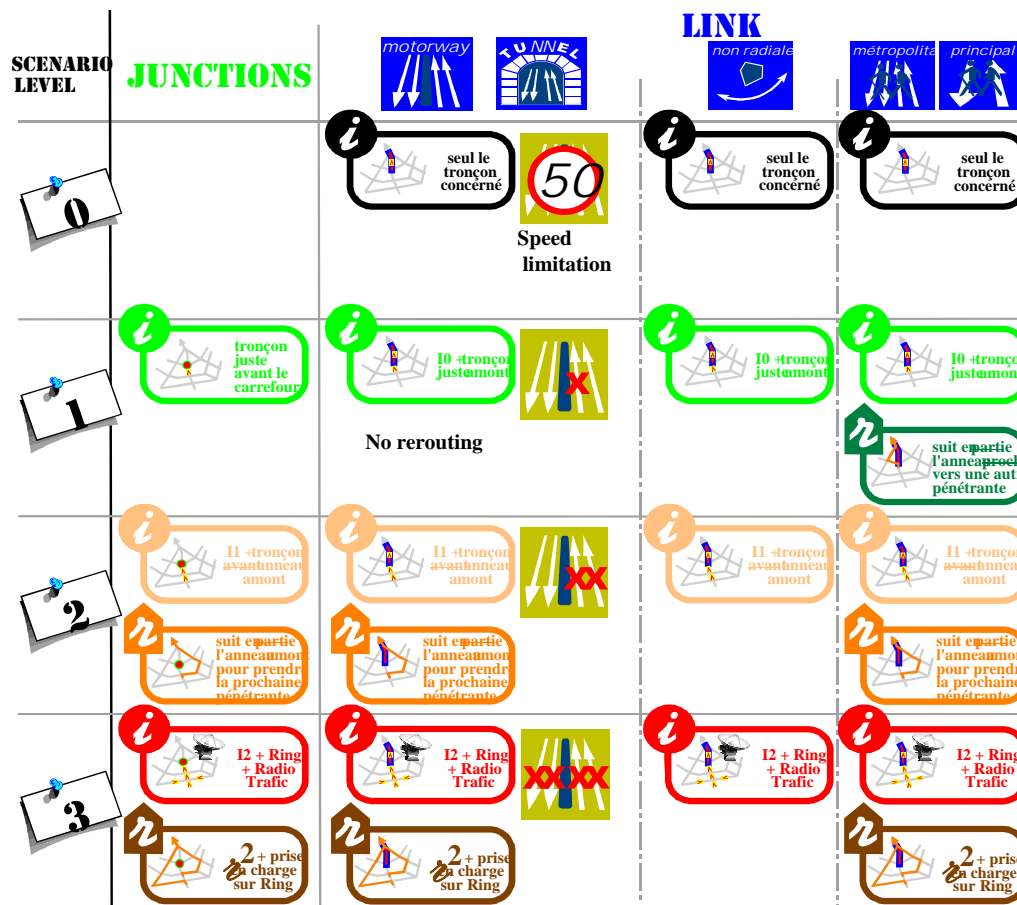
- ▶ Gradation of scenarios with four different levels
 - Level 0 : action at the link level
 - Level 1 : as level 0 + the upstream ring
 - Level 2 : as level 1 + the upstream ring
 - Level 3 : as level 2 + the upstream ring

Ex : locator n°43. If scenario of level 1 → action at the link level (red ring) + the upstream ring (pink ring)



Scenarios

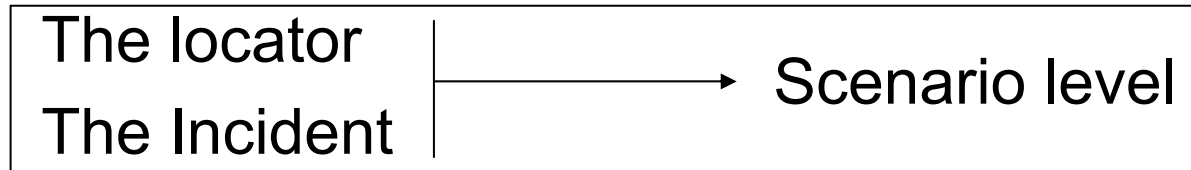
- The logic of scenarios: three components:
 - Information
 - Rerouting
 - Special



Scenarios

- Determination of scenarios:

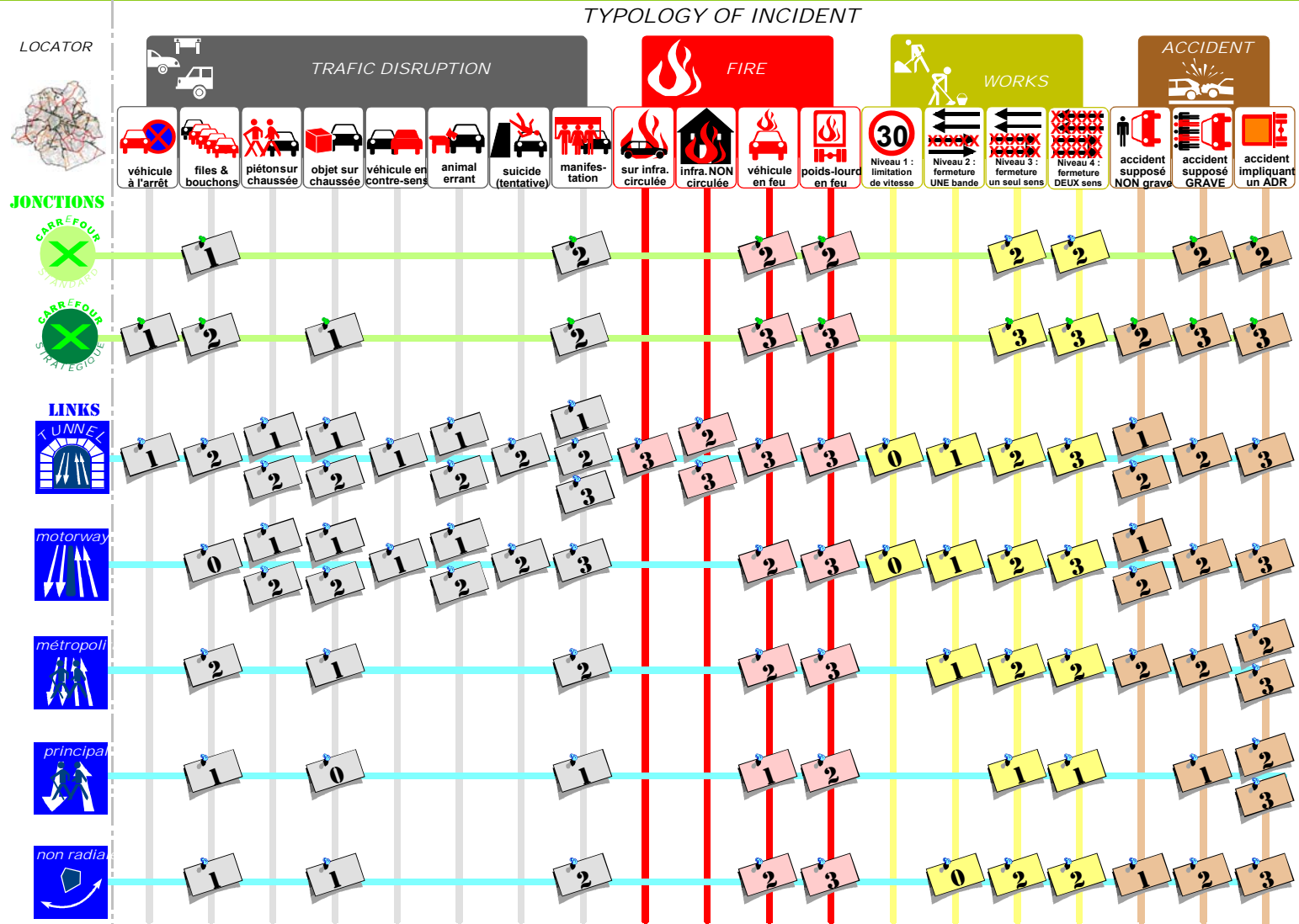
Determination table



Four types of incident:

- Traffic disruption
- Fire
- Works
- Accident

Scenarios



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Proposals for VMS locations

- Analysis of each locator:
 - For each of 45 locators:
 - Analysis of scenarios for all possible type of incident
 - Propositions of display on the VMS
 - Propositions of a location for the VMS
 - Suggestion of diversion routes

Proposals for VMS locations


Source : carte Michelin 44

LOCATOR 23



Localisation : Av. tunnel de Tervueren et tunnel du Cinquantenaire

Zone de Police : Montgomery

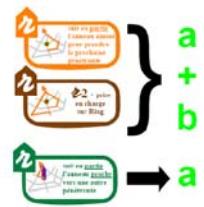
Commune : Etterbeek et Bruxelles



reroutages possibles

	Niveau	INFORMATION			REROUTAGE	SPECIAL			
		Type	Pictogrammes à afficher	Cause: typologie (BLOC1)			Conséquences (BLOC5)		
TRAFFIC DISRUPTION	1				2>1	VEHICULE ARRETE	2>1 BANDE	pas de reroutage proposé car 1 bande reste ouverte	fermeture d'1 bande en section (par SAV)
	2					FILE		pas de reroutage proposé : sortie de ville	fermeture d'1 sens en section (par SAV et barrière)
	2				X (coupure)	PIETON SUR CHAUSSEE	FERME OU	pas de reroutage proposé car 1 bande reste ouverte	fermeture sens complet OU une seule bande
	2				X (coupure)	OBJET SUR CHAUSSEE	FERME OU	pas de reroutage proposé car 1 bande reste ouverte	fermeture sens complet OU une seule bande
	1					VEHICULE FANTOME	PRUDENCE		fermeture d'1 bande en section (par SAV)
	2				X (coupure)	ANIMAL ERRANT	FERME OU	pas de reroutage proposé car 1 bande reste ouverte	fermeture sens complet OU une seule bande
	2				X	INCIDENT	FERME		fermeture d'1 sens en section (par SAV et barrière)
	3				X (coupure)	MANIFESTATION	FERME OU	pas de reroutage proposé car 1 bande reste ouverte	fermeture un ou des deux sens complet OU une seule bande



BLOC3 TUNNEL CINQUENTAIRE

BLOC3 abrégé TUN. CINQUENTAIRE

Message sur PMT 4 lignes de 21

M1 - M2

TUNNEL CINQUENTAIRE	BLOC 1	BLOC 5
BXL - CENTRE	PRENDRE	
E 4 1 1 CH. DE WAVRE		

M3

TUNNEL CINQUENTAIRE	BLOC 1	BLOC 5
BXL - CENTRE	PRENDRE	
RO E 4 1 1 CH. DE WAVRE		

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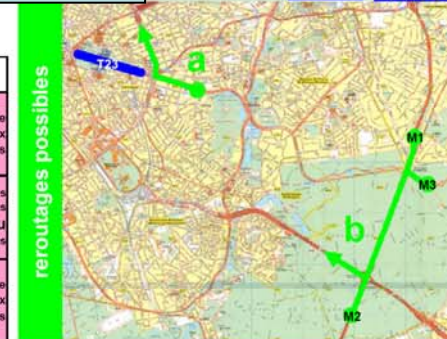
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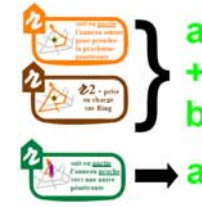
Proposals for VMS locations

		INFORMATION					REROUTAGE		SPECIAL	
		Type	Pictogrammes à afficher	Cause - typologie (BLOC1)	Conséquences (BLOC5)					
FIRE	sur infra. circulée	3	I2 - Ring + Radio Trafic	INCIDENT	FERME	2	2 - prise en charge sur Ring	XXXX	fermeture des deux sens	
	infra. NON circulée	3	OU	INCIDENT	FERME	2	2 - prise en charge sur Ring	XXXX	fermeture des deux sens	
	véhicule en feu	3	I2 - Ring + Radio Trafic	INCIDENT	FERME	2	2 - prise en charge sur Ring	XXXX	fermeture des deux sens	
	poêle-Jourdain en feu	3	I2 - Ring + Radio Trafic	INCIDENT	FERME	2	2 - prise en charge sur Ring	XXXX	fermeture des deux sens	
WORKS	Niveau 1 : limitation de vitesse	0	seul le tronçon concerné	TRAVAUX	VIT. LIMITEE			30	limitation de vitesse en section (police variable)	
	Niveau 2 : fermeture UNE bande	1	2>1	TRAVAUX	2 > 1 BANDE	pas de reroutage proposé car 1 bande reste ouverte		XXXX	fermeture d'1 bande en section (par SAV)	
	Niveau 3 : fermeture DEUX sens	2	I2 - Ring + Radio Trafic	TRAVAUX	FERME	2	2 - prise en charge sur Ring	XXXX	fermeture d'1 sens en section (par SAV et barrière)	
	Niveau 4 : fermeture DEUX sens	3	I2 - Ring + Radio Trafic	TRAVAUX	FERME	2	2 - prise en charge sur Ring	XXXX	fermeture des deux sens	
ACCIDENT	accident supposé NON grave	2	OU	ACCIDENT	FERME	OU	pas de reroutage proposé car 1 bande reste ouverte	XXXX	fermeture sens complet	
	accident supposé GRAVE	2	I2 - Ring + Radio Trafic	ACCIDENT	FERME	2	2 - prise en charge sur Ring	XXXX	fermeture d'1 sens en section (par SAV et barrière)	
	accident impliquant un ADR	3	I2 - Ring + Radio Trafic	ACCIDENT	FERME	2	2 - prise en charge sur Ring	XXXX	fermeture des deux sens	

LOCATOR 23



reroutages possibles



BLOC3 TUNNEL CINQUENTAIRE
BLOC3 abrégé TUN. CINQUENTAIRE

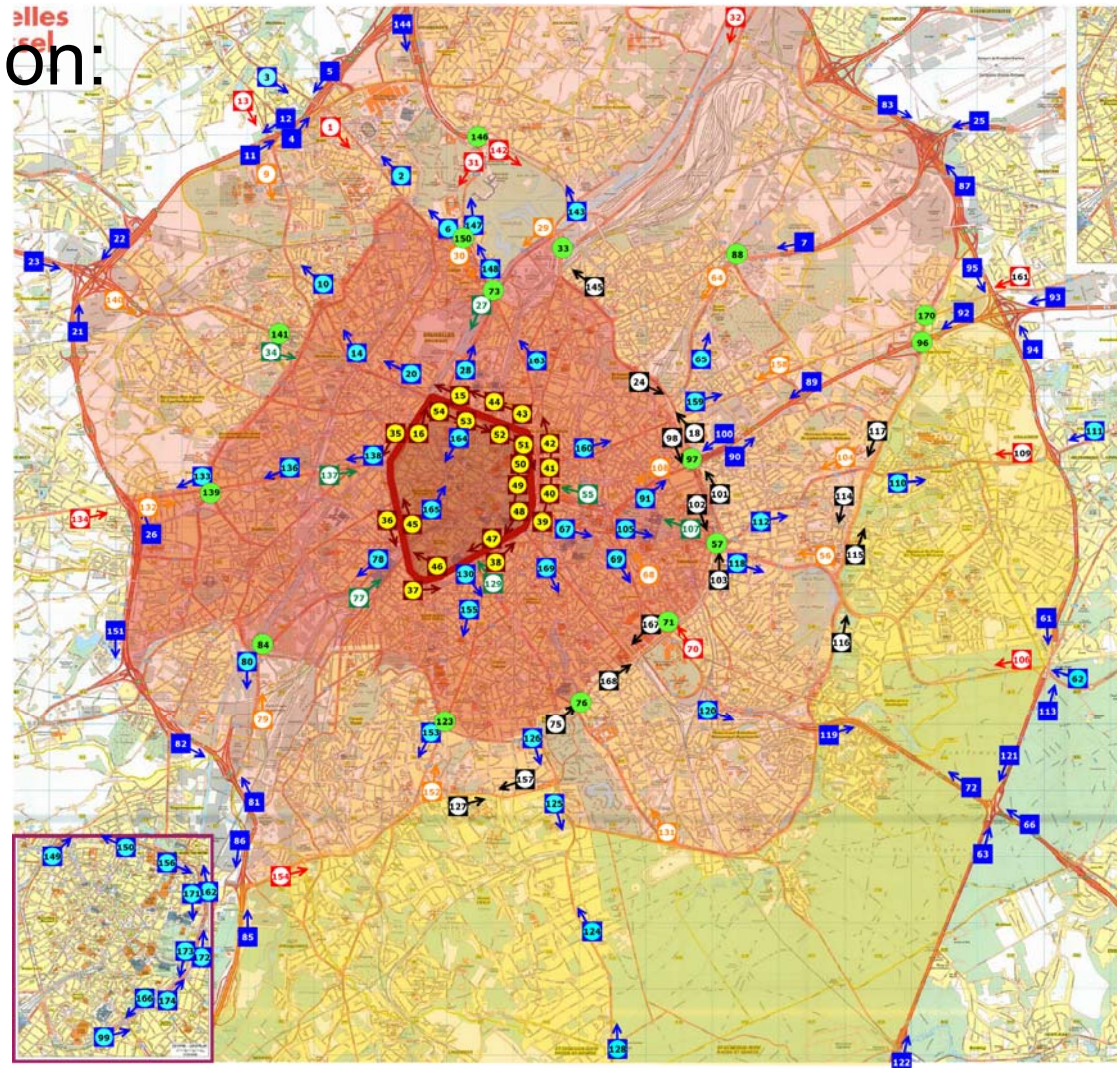
Message sur PMT 4 lignes de 21

M1 - M2
TUNNEL CINQUENTAIRE
BLOC 1 : BLOC 5
BXL - CENTRE PRENDRE
E 411 CH. DE WAVRE

M3
TUNNEL CINQUENTAIRE
BLOC 1 : BLOC 5
R0 E 411 CH. DE WAVRE

Proposals for VMS locations

- Choice of VMS location:
 - 174 signs
 - 6 different model of signs



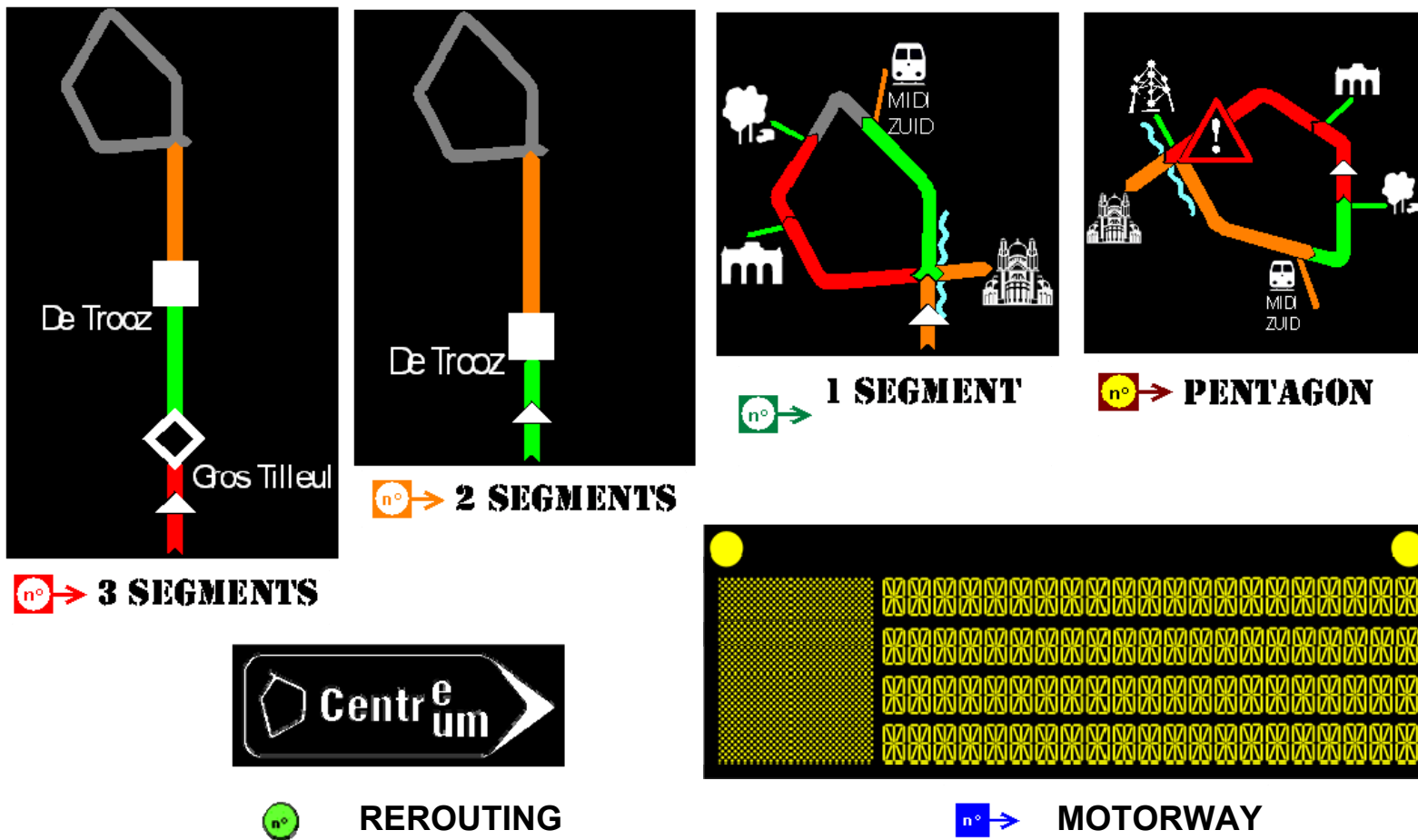
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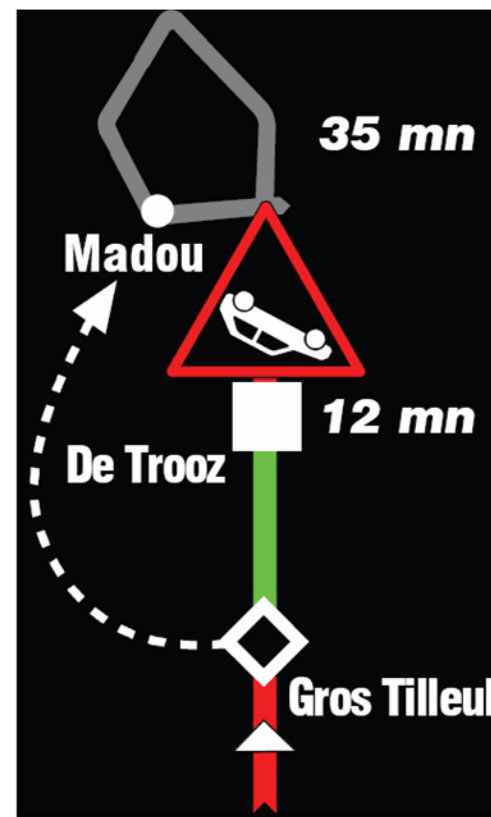
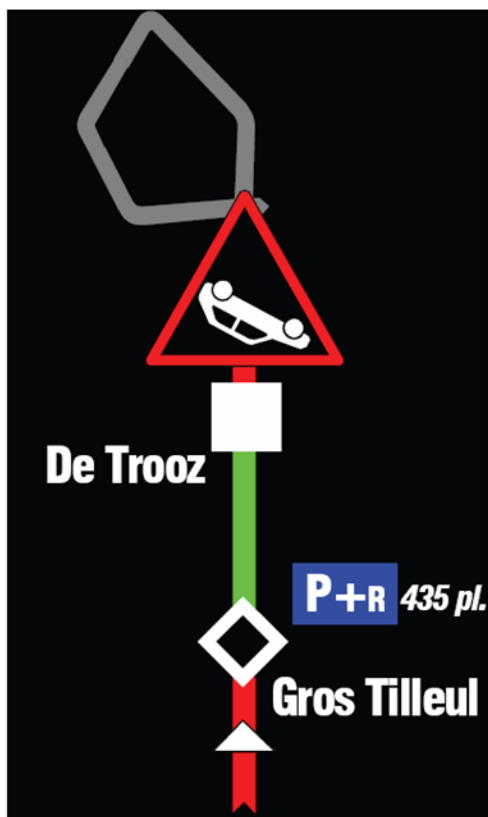
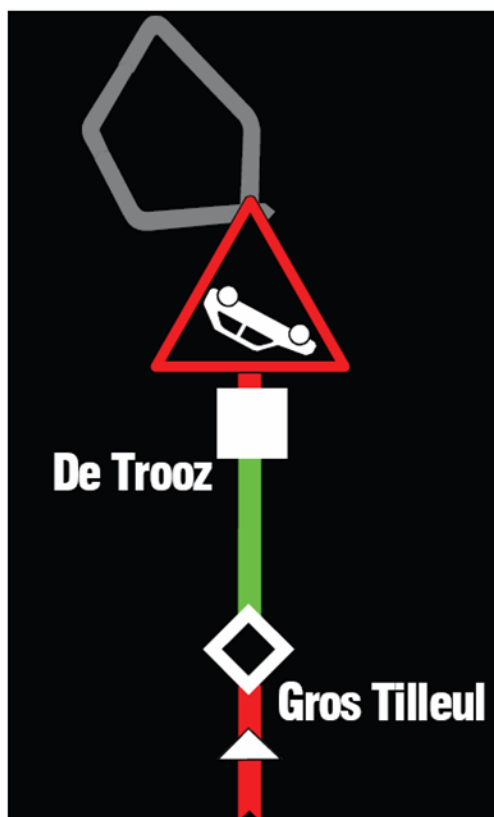
Proposals for VMS locations

- Different types of VMS (mainly full-matrix diode screens)



Proposals for VMS locations

- Operation of the various signs:



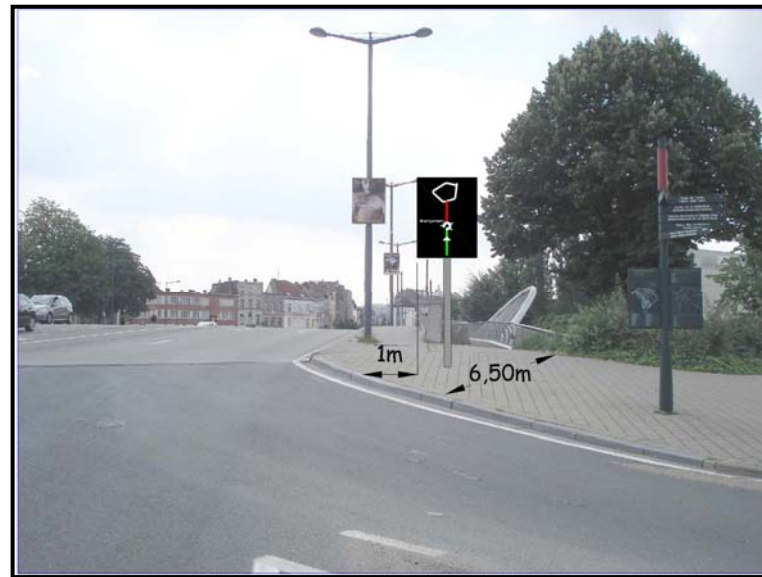
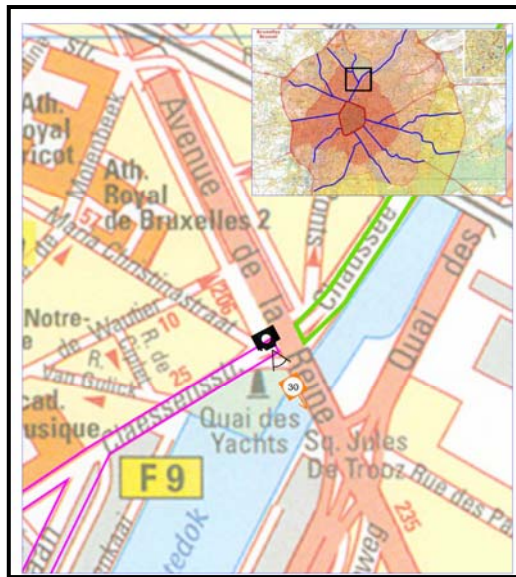
Selection and installation of the VMS

- Priority of the VMS implantation, based on:

- The size of the incidents
- The development projects planned
- The available detection components

Not yet VMS of
this type in
Brussels

For each VMS selected, simulation of implantation:



Conclusion

- A specific study is first necessary to know the mobility problems, their causes and their consequences
- Such a study is complex due to the great number of incidents
- The dynamic technologies in real time needs real-time information sources which are sometimes scarce or unavailable
- Consultation between specialists of management systems and field people (police, municipalities, mobility managers) is very important

Selection and installation of the VMS

Thank you for your attention

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