MOCoPo

Measuring and mOdelling traffic COngestion and POllution

MOCoPo:
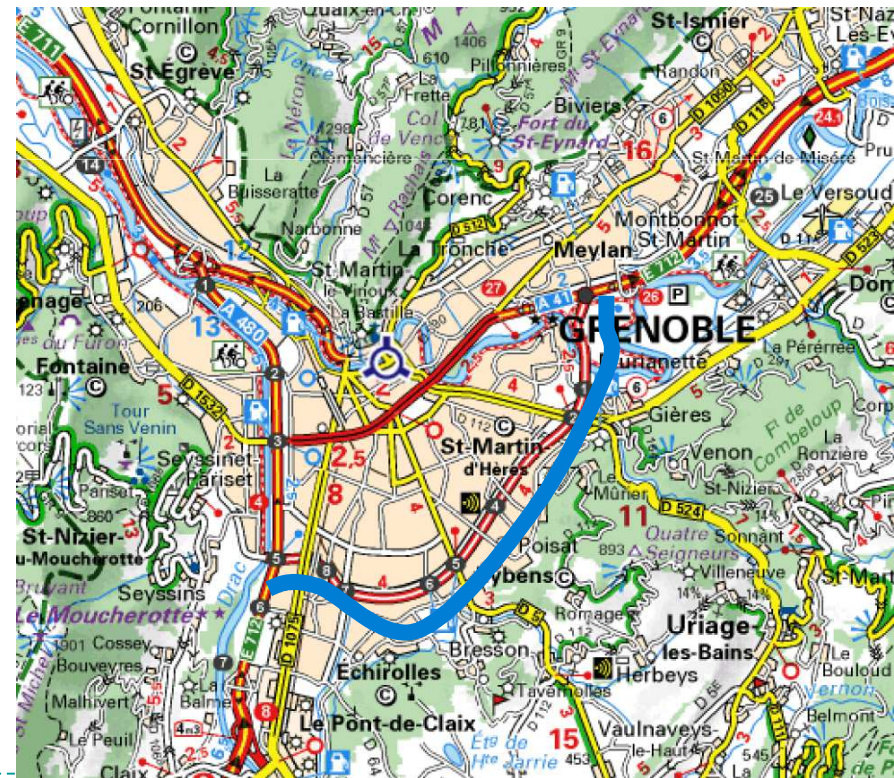## status of data collection tasks in January 2012

January 2012
MOCoPo team

MOCoPo: Some facts

- A project funded by the French Ministry of Transportation (350 k€)
- Dates:
  - Beginning: January 2011   End: December 2013
  - First year: Measurements   Second and third years: Modeling enhancements
- 6 partners
  - IFSTTAR (Lyon, Paris, Nantes),
  - INRIA (Grenoble),
  - French Ministry of Transportation (Grenoble, Lyon, Angers)
  - Association of Pollution Measurement ASCOPARG (Grenoble),
  - CEREA (Paris)
  - ENTPE

  and more than 30 individuals
- A join data collection project: PM-Drive devoted only to high precision pollution measurements leaded by Aurélie Charron (LTE-IFSTTAR) with the involvement of additional partners: LGGE (Grenoble), LCP (Marseille), LCM (Chambery)
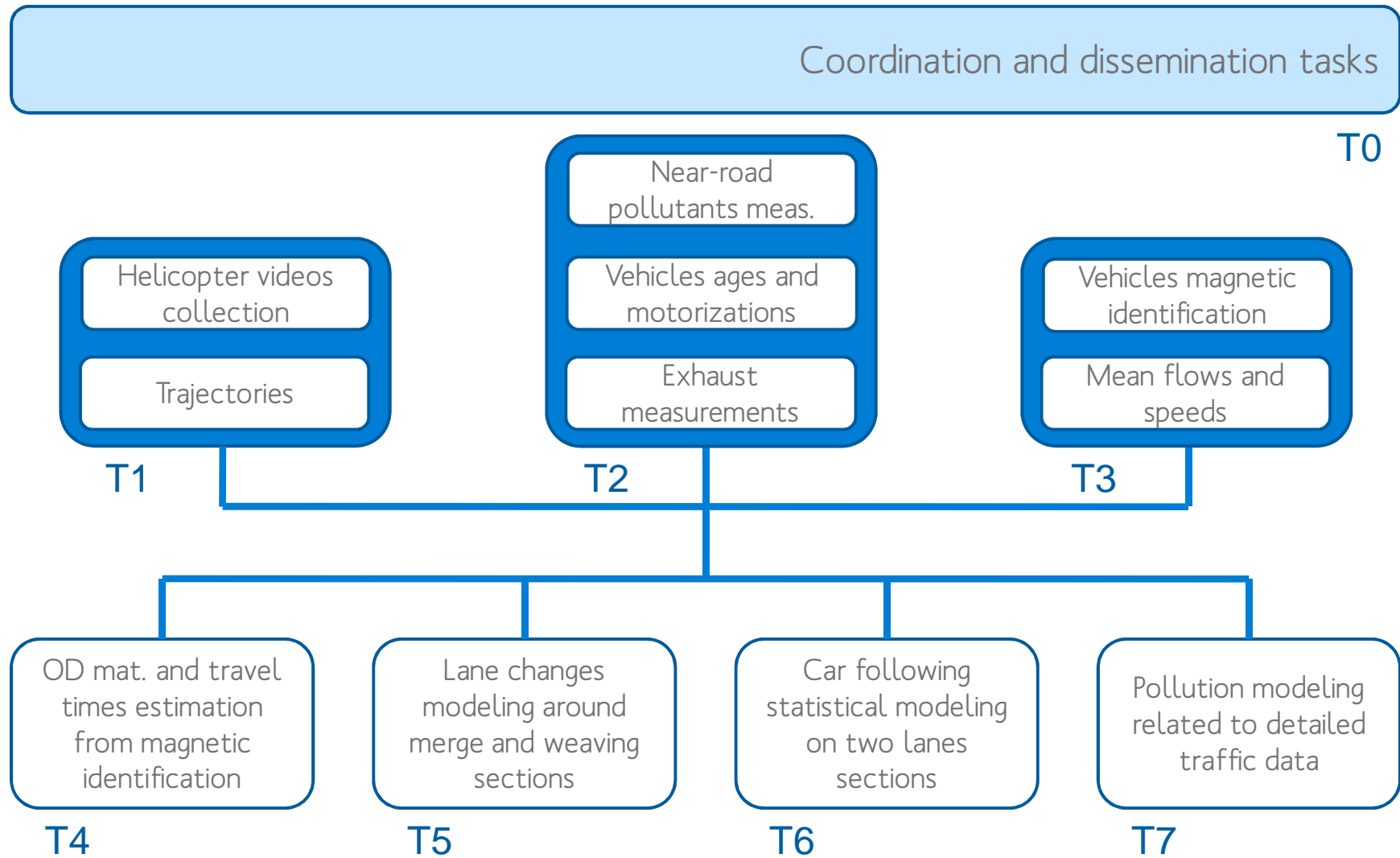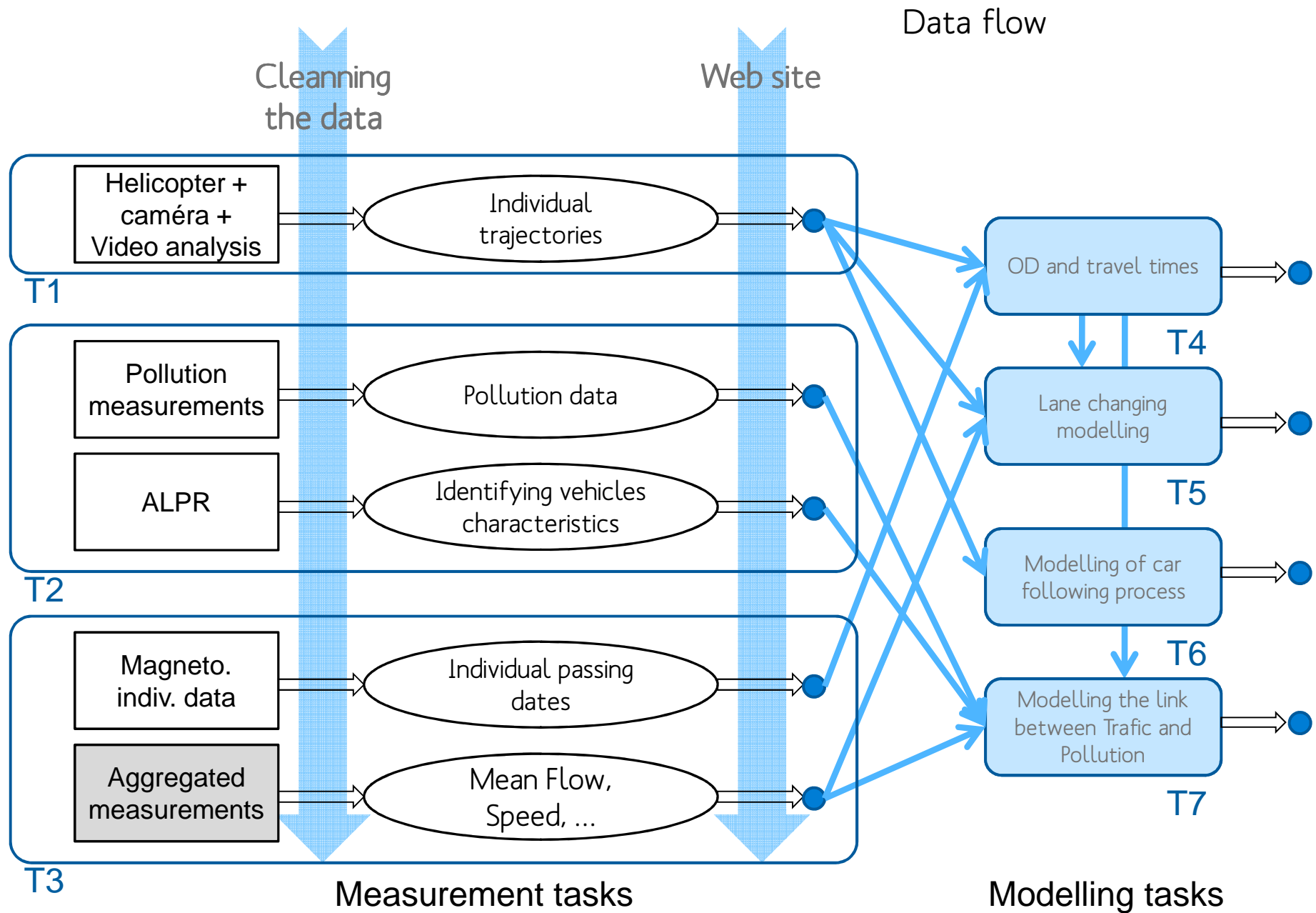
MOCoPo: global objectives

- Collect data on a simple and congested highway
  - The RN87 in South of Grenoble about 10 km long;
  - A 2x2 lanes highway
  - Simultaneously collect
    - Trajectories
    - Pollutants
    - On-road traffic data
  - Thus, allowing better modeling

Global organization

Coordination and dissemination tasks

T0

T1
- Helicopter videos collection
- Trajectories

T2
- Near-road pollutants meas.
- Vehicles ages and motorizations
- Exhaust measurements

T3
- Vehicles magnetic identification
- Mean flows and speeds

T4
OD mat. and travel times estimation from magnetic identification

T5
Lane changes modeling around merge and weaving sections

T6
Car following statistical modeling on two lanes sections

T7
Pollution modeling related to detailed traffic data

Data flow

Cleanning the data

Web site

Helicopter + caméra + Video analysis

Individual trajectories

T1

Pollution measurements

Pollution data

ALPR

Identifying vehicles characteristics

T2

Magneto. indiv. data

Individual passing dates

Aggregated measurements

Mean Flow, Speed, …

T3

Measurement tasks

OD and travel times

T4

Lane changing modelling

T5

Modelling of car following process

T6

Modelling the link between Trafic and Pollution

T7

Modelling tasks

Task 1: trajectories data collection

5 days and 3 zones of helicopter fights

Zone 1: Meylan merge (from left to right)

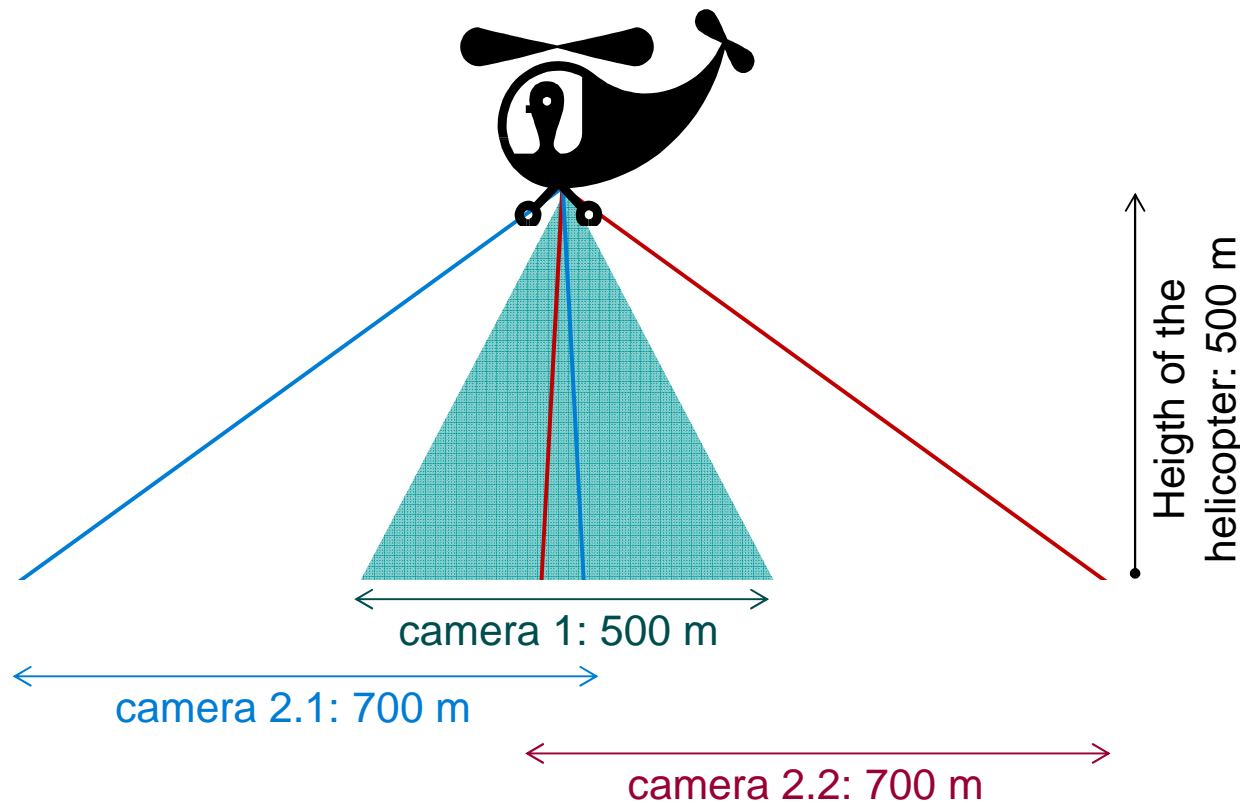Zone 2: Eybens

Zone 3: Le Rondeau

Three cameras for a complete measurement

Heigth of the helicopter: 500 m

camera 1: 500 m

camera 2.1: 700 m

camera 2.2: 700 m

▶ Camera 1
  ▸ 2500*1000 pixels
  ▶ More than 20 images/second
▶ Cameras 2.1 and 2.2
  ▸ To determine upstream and downstream flows

Summary: 7 h 10 of potentially perfect data and 8 h 40 of analyzable data

	Zone 1 - merge 1h50 (2h40)		Zone 2 - standard section 1h30 (2h10)		Zone 3 - weaving section 3h50 (3h50)	
	duration	Remark/period	duration	Remark/period	duration	Remark/period
Mon. 12	15'	8:16 - 8:32			50'	16:12 - 17:02
Tues. 13	51'	No image of camera 2.1 downstream 7:29 - 8:21	40'	No image of camera 2.1 downstream 8:40 - 9:20		
Wed. 14	45'	Many clouds and rain; helicopter at 450 m	15'	9:26 – 9:41	60'	16:21 – 17:21
Thurs. 15	35'	7:32 – 8:06	50'	8:54 – 9:44	60'	16:17 – 17:17
Fri. 16	60'	7:58 – 8:58	25'	9:04 – 9:28	60'	16:07-17:07

In global, more than 20,000 vehicles will be precisely observed along 500 m

Video analysis

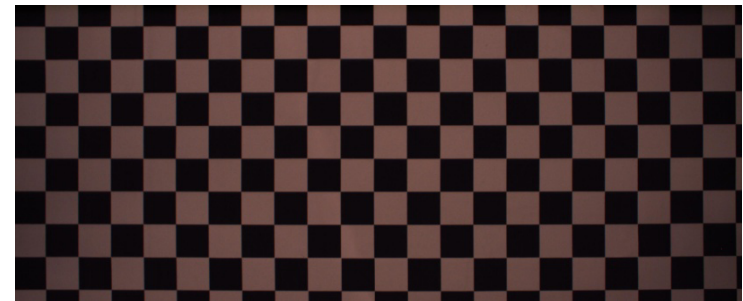Digitalization made with the help of a software developped by TU Delft

3 steps

▸ Stabilization

▸ Determination of the objects moving from one image to another

▸ Building up the vehicles trajectories from one image to another

First step: stabilization

▸ Image distorsion correction
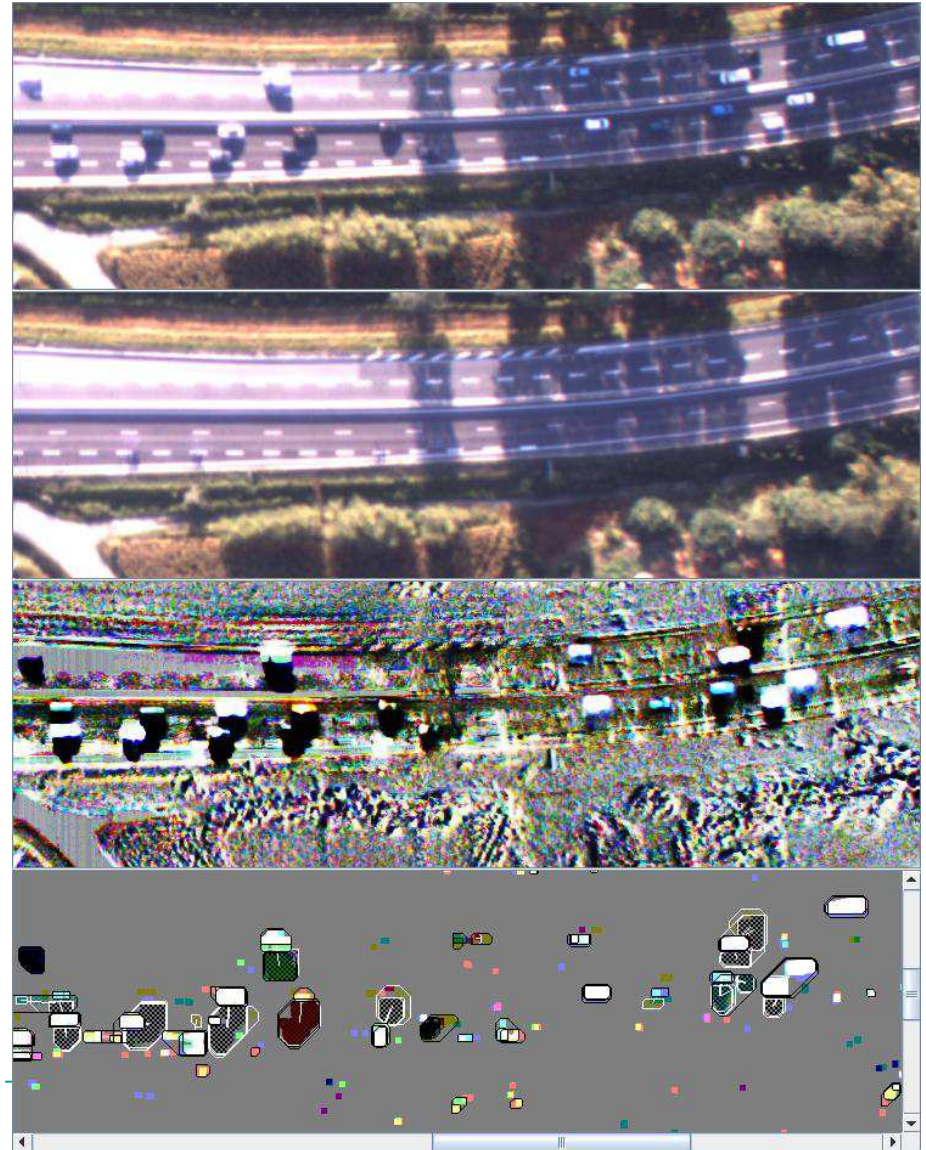▸ Choose a reference image
▸ Define the region of interest

Step 2: identify what moves
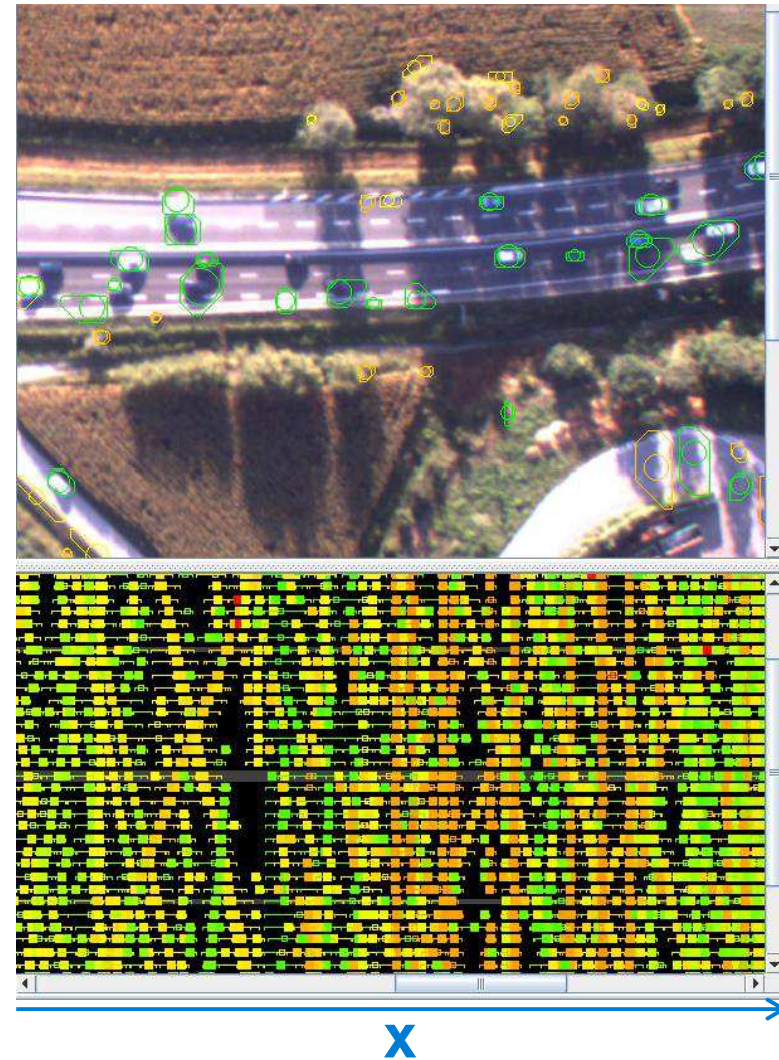
Image from step 1

"Nude" image

Difference

Moving spots

Step 3: building trajectories

▸ Connexion of the spots between two sucessive images

Task 2: Pollutants measurements

Three sub-tasks

- Complete and detailed data set was collected
  - 4 periods (winter, spring, summer, fall) of two weeks each;
  - 4 measurement locations
    - 3 near-road measurements
    - 1 urban background measurement
  - NO/ NO2/ PM10/ PM2.5/ CO/ SO/ O3
  - Weather data: wind speed, temperature
- Observation of the types (motorization, truck/car/...) and age of the vehicles for the period of spring
- Exhaust pipe measurements on three circuits made by a diesel light duty vehicle (NOx, CO2, CO and THC).

The data of the first sub task are available

▸ Also loop detector data for those periods

Trajectories data should be soon available

We hope you will use them!

http://mocopo.ifsttar.fr