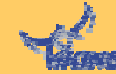


Road Monitoring

ITS and road monitoring

Results and perspectives from the Euro-regional Monitoring Workshop

Ing. Massimo LIPPI – Autostrada dei Fiori SpA
Dr. Pietro CONTEGNO – Autostrada dei Fiori SpA



Results from the ER monitoring WS

Monitoring as a base of ITS

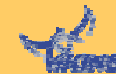
Monitoring based on mobile vehicles

Extended monitoring

Guidelines in the EU dimension

Monitoring in the field

Results and perspectives



The Euroregional Monitoring Workshop

- ✓ When: September 2002
- ✓ Where: Imperia, Italy
- ✓ Who: more than 60 delegates from all ER project, road operators, national authorities, industries...



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Workshop

Base of ITS

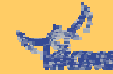
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Extended

Guidelines

The field

Conclusions



Monitoring as a base of ITS

- ✓ Need for accurate, fast and reliable monitoring techniques in critical areas
- ✓ Need for cross-border cooperation in deploying monitoring infrastructures
- ✓ Need for definition of high quality targets for monitoring, supporting EU policy
 - ✓ Proven benefits realized from improvements in safety, network efficiency and environment;
 - ✓ Basis for supporting statistical analysis and providing service to users;
 - ✓ Perhaps the question is not: “is it needed?” but “how it might be best provided in the future?”

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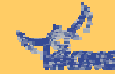
Mobile

Extended

Guidelines

The field

Conclusions



Monitoring as a base of ITS

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Workshop

Base of ITS

Mobile

Extended

Guidelines

The field

Conclusions

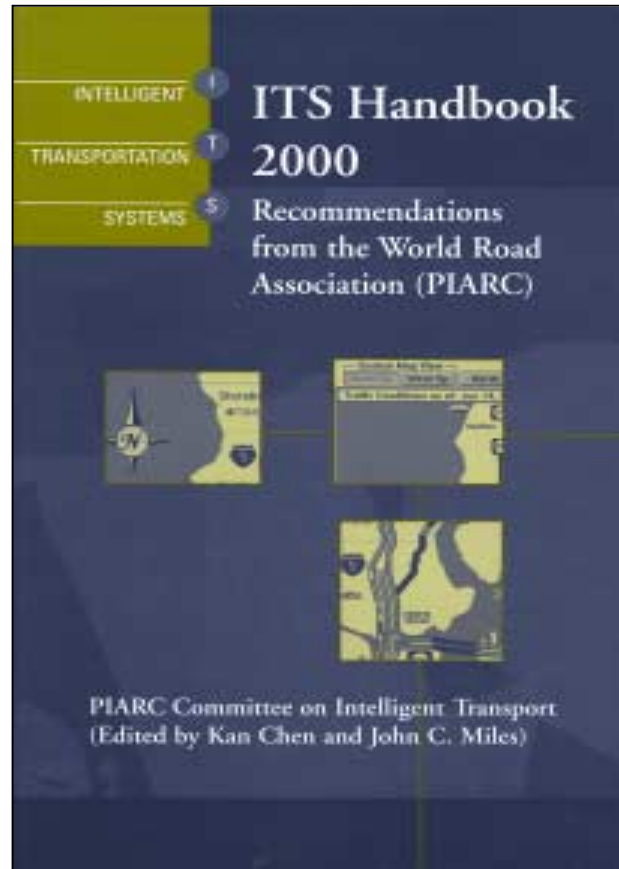
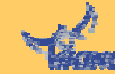


Table 2.8
U.K. Review of Potential ITS Benefits/Cost Ratios

	Standalone Applications	With Common Infrastructure in Place	Comments—Main Benefits
Benefits/Cost Ratios	A	B	
Interurban			
1. Incident detection	1.7	5.2	accident reduction
2. Speed control	2.9	8.5	accident reduction
3. Lane control	2.7	5.5	reduction in congestion and accidents
4. Ramp control	3.6	7.1	travel time savings
Urban			
5. Incident detection	3.8	3.8	reduction in congestion and accident severity
6. Intersection control	34.0	34.0	travel time savings
7. Area traffic control	2.8	7.5	travel time savings
8. Parking management	1.7	2.1	reduction in congestion
9. Emergency vehicles priority	4.8	4.8	reduction in accident severity
Monitoring and enforcement			
10. Speeding detection	4.1	N/A	reduction in accidents and severity
11. Weigh-in-motion	1.8	1.8	reduction in road maintenance and accidents
Freight and fleet			
12. Dynamic route guidance for fleet vehicles	N/A	N/A	fleet managers increase the efficiency savings
Automated highways			
13. Automatic speed control	1.8	5.9	reduction in accidents
14. Integrated automatic driving	1.1	1.1	increase in network capacity



Monitoring based on mobile vehicles

High potential of new sensors,
applications and services for:

- ✓ Travel time estimation;
- ✓ Critical area monitoring;
- ✓ Special vehicles localization;

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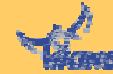
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Extended

Guidelines

The field

Conclusions



Monitoring based on mobile vehicles

✓ Benefits:

- ✓ Less investments in expensive “classic” detectors;
- ✓ High penetration of detecting probes (mobile phones);
- ✓ Robustness with regard to weather conditions as well as slow moving traffic;
- ✓ Future potential for new developments and improvement of accuracy

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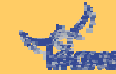
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Guidelines

The field

Conclusions



Monitoring based on mobile vehicles

✓ Drawbacks:

- ✓ Uncertain (or to be better evaluated) reliability of some kind of data and observation;
- ✓ No guarantee of data availability or sufficient number of data;
- ✓ Driver's safety and privacy law issues;
- ✓ Need for development of filters, algorithms to be ever improved

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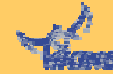
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Extended

Guidelines

The field

Conclusions



Monitoring based on mobile vehicles

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Mobile

Extended

Guidelines

The field

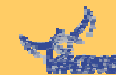
Conclusions



WebTrafic - temps de parcours

POISSY	➔ CH			
CHAUFOR	➔ POISSY	0h20	0h22	0h02
MANTES SUD	➔ POISSY	0h13	0h14	0h01
POISSY	➔ MANTES SUD	0h13	0h14	0h01
MANTES SUD	➔ CHAUFOR	0h07	0h08	0h01
CHAUFOR	➔ MANTES SUD	0h07	0h09	0h02

[Quitter](#)



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Mobile

Extended

Guidelines

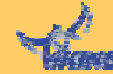
The field

Conclusions



Extended Monitoring

- ✓ Need for an integrated view of monitoring applications;
- ✓ Need for a wider vision of the monitoring approach, especially in critical areas.
 - ✓ e.g. High traffic level critical beltways or junctions (Mestre – Venice in Italy)
- ✓ Multiple technology detectors and spread of information around critical areas
- ✓ Agreement between regional authorities to develop wide area monitoring (e.g. Scotland, Wales, Northern Ireland and EIRE)
- ✓ Euro-regional cooperation, comparison of results, best practice examples



Extended Monitoring

ER
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workshop

Workshop

Base of ITS

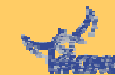
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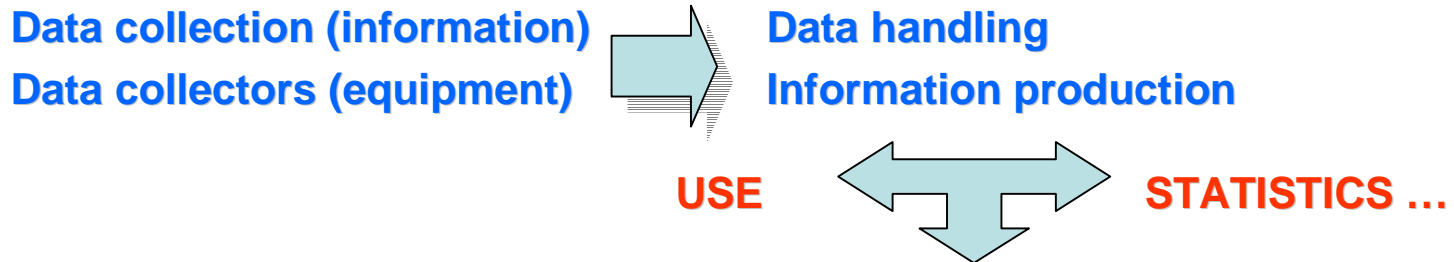
The field

Conclusions



Guidelines in the EU dimension

Monitoring as a multi threaded process:



Need for precise guidelines:

- ✓ Face priorities (cross-section information, incident detection...)
- ✓ Harmonization of monitoring situations according to application to be pursued at national and EU level
- ✓ Quality requirements

Good examples:

TELTEN2, VIKING framework, FINNRA quality requirements...

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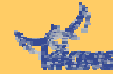
Mobile

Extended

Guidelines

The field

Conclusions



Monitoring in the field

- ✓ Accurate monitoring of road traffic and conditions is fundamental in assisting network managers to meet their goals. Many examples covered in IWOROMO:
 - ✓ Monitoring and maintenance of detectors;
 - ✓ Share of information and technology between road operators and police authorities;
 - ✓ Artificial intelligence technologies and automatic detection systems;
 - ✓ Cost/effectiveness balance when considering monitoring needs;
 - ✓ Accuracy requirement needs and cost/accuracy trade off: attention to emerging low cost systems (e.g. mobile, as seen before)

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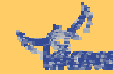
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Extended

Guidelines

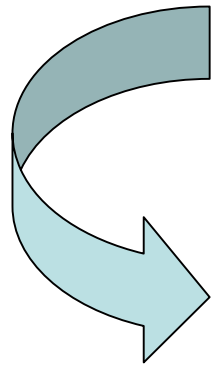
The field

Conclusions



Monitoring in the field

Anyway collection of data is of crucial importance.
The fusion of the entire data demonstrates that,
in this case, the sum of all parts becomes
greater than the whole



Increased credibility and
reliability of data

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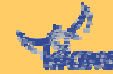
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Guidelines

The field

Conclusions



Monitoring in the field

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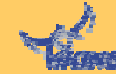
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Guidelines

The field

Conclusions



Conclusions and perspectives

- ✓ Monitoring improvement efforts:
 - ✓ Clear definition of priorities;
 - ✓ Quality targets and QoS levels, validation;
 - ✓ New technologies and techniques;
 - ✓ Efficiency and response time improvement;
 - ✓ Cooperation: all efforts done by one entity give power results when done by more.

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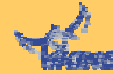
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Extended

Guidelines

The field

Conclusions



Conclusions and perspectives

- ✓ Back to the question stated at the beginning:
It is not: “is it needed?” but “how it might be best provided in the future?”

The answer: as a matter of fact, it is possible:

- ✓ Technology is available,
- ✓ Guidelines have been traced,
- ✓ Many examples are on the way.

All E-R project yield results that clearly say that this direction is pursued:

let's go on.

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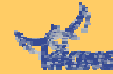
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Guidelines

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Conclusions



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The End



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