RAIDER

Realising Advanced Incident Detection on European Roads

ENR Mobility - PEB meeting
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Toon Beeks, Bart Netten

SEVENTH FRAMEWORK PROGRAMME

Overview

- Project Objectives & Focus
- WorkPlan & Status
- Planned Results:
  - Assessment of future technologies
  - Generic Specifications

Project Objectives

Improve quality of incident detection

- Functionality & performance
  - improve detection accuracy, reliability
  - reduce false alarm rate, detection delay

System concepts for new technologies

- Generic specifications
  - Cost estimates, benefits and feasibility
  - Quality requirements on main components:

    sensors, data fusion & detection algorithms

Project Focus

Innovative Technologies - near future (2015-2020)

- Road side systems (video, radar, laser, BT, …)
- In-vehicle systems (G5, 3G)
- Nomadic devices (3G)

From 1st Stakeholder consultations and WS:

1. Focus on (3) types of incidents

   Accidents, Broken down vehicles, Extraordinary congestion

2. Typical Use Cases of NRAs

   Road type, Traffic volume / state, Existing detection systems

3. NRAs Decision process

   as a basis for developing generic specifications

Workplan & Status

Milestones, Deliverable & Work Packages		Project Month															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MS1	Consolidated Requirements				▼												
MS2	Specifications														▼		
WS1	Stakeholder Workshop 1 on Requirements				◇												
WS2	Stakeholder workshop 2 on Specifications														◇		
D2.1	User Needs & Reqs				◆												
D4.1	Specifications														◆		
D5.1	Final summary																◆
WP1	Project management																
WP2	Stakeholder consultations																
WP3	Requirements analysis																
WP4	Specification of innovative technologies																
WP5	Final results and recommendations																

Planned Results

Generic Specifications support the decision process of a NRA

1. Typical Use Cases of NRA

   Existing system -> Desired situation (what needs to be improved)

   Selection of 3 typical Use Cases

2. Analyse Innovative Technologies

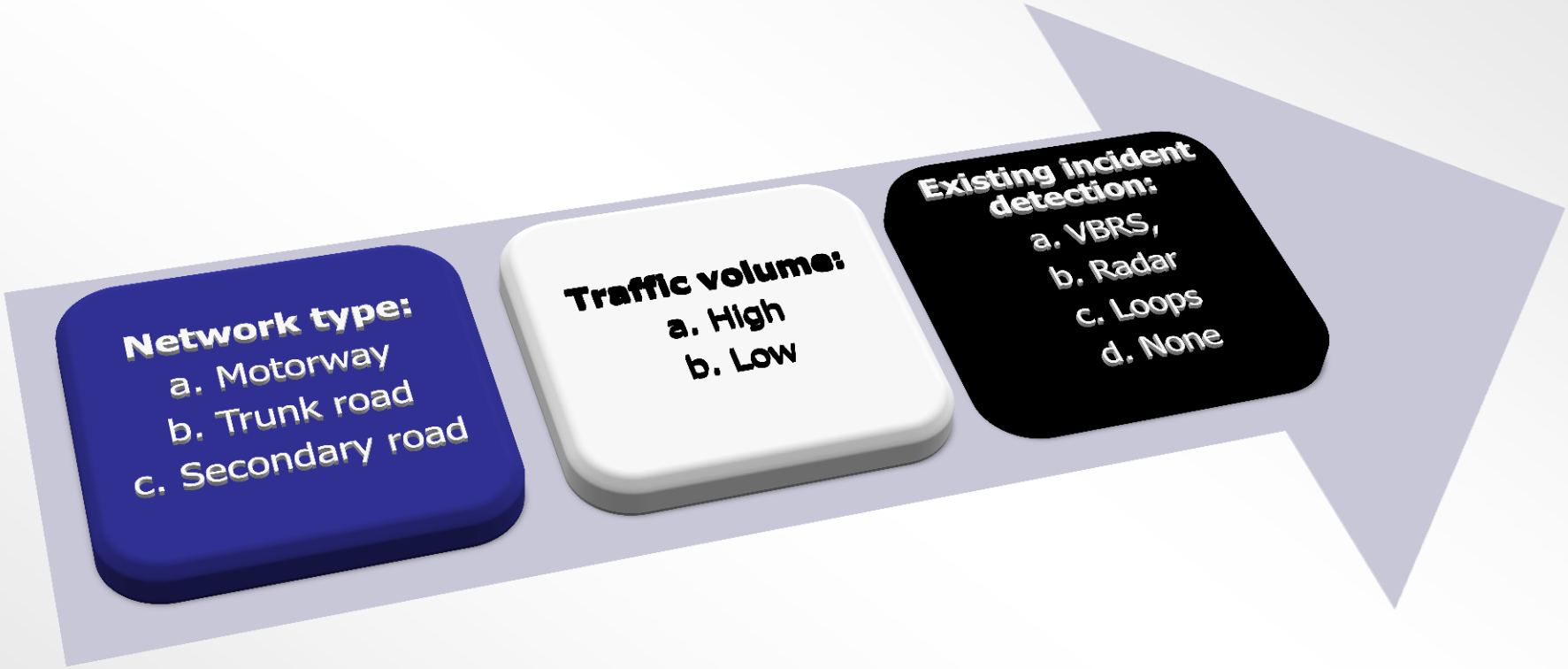
   Library of Technology Sheets

3. Selection of technologies for Use Cases and Incident Types

   How to integrate innovative technology into existing systems

4. Benefits in performance & costs

Use Cases: Existing Situation



Future technologies

Assessment of future technologies for the user needs and requirements

Nomadic & In-Vehicle Systems

- eCall
- Nomadic devices (3G)
- Cooperative Systems (3G)
- Cooperative Systems (G5)

Road Side Systems

- Tracking Video
- Scanning Radar
- Tolling Systems
- Bluetooth scanner
- Advanced Inductive Loops
- ANPR
- Magnetometers
- Acoustics
- Fibre optics
- Thermography
- WIM
- …

Technology Library

- Fact sheet per technology
  - Detailed descriptions of
    - Performance considerations
    - Cost considerations
  - Technology sheet with overview table

    example for Cooperative Systems (G5)

    on next 2 slides

Technology sheet (1)

Performance Considerations			
	Incident Type		
	Accidents	Breakdowns	Congestion
Detector Accuracy	Very High (accel., ABS, ESP,..)	Very high (CAN)	Very high (Speed, accelerations, CAN)
Detection Delay	Seconds Equipped vehicle is in direct communication contact with road side units, connecting to the infrastructure of the road operator		Seconds Equipped vehicle is in direct communication contact with road side units, connecting to the infrastructure of the road operator
Detection Rate	Low depending on penetration rate		Very high for speed based congestion detection. With lower penetration rates not applicable for flow and density detection
False Alarm Rate	low		low
Suitability	Good (with low penetration rate, detection rate similar to loops?)		Excelent

Technology Sheet (2)

Cost Considerations			
	Installation Type		
	New System	Retrofit	Upgrade
Set Up Costs	High requires road side units with G5 communication units every 500-1000m	Low add G5 communication units to existing road side units and reuse network	NA
Maint.	Medium communication units will require updates and have a limited life time	Medium communication units will require updates and have a limited life time	NA
Operation	Additional equipment may be required to verify incidents	Low if existing infrastructure already provides systems for incident verification	NA

3. Selection of Technologies

Selection of technologies for (Use Cases * Incident Types)

1. Existing situation
   - Motorway with / without hard shoulder / Arterial
   - High / Low traffic volume
   - No incident detection system / loops / radar/ video / tolling
2. Desired situation
   - Improve performance for incident type
   - Reduce costs for setup, maintenance, or operation
3. Options
   - Propose most effective/efficient technologies

Vehicle Breakdowns

Option	System 2020	Detector Accuracy	Detection Delay	Detection Rate	False Alarm Rate	Cost		
						Set up	Maint .	Oper.
Ref.	***No detection***	*N.A.*	*N.A.*	*N.A.*	*N.A.*	*0*	*0*	*+++*
1	**V2I - G5** 20% penetration	Excellent * 20%	Excellent (1 sec)	Excellent * 20%	Excellent	++	++	-- /+++
2	**V2I - 3G** 30% penetration	Excellent * 30%	Excellent (10 sec)	Excellent * 30%	Excellent	+	+	-- /+++
3	**Tracking Video** @ 500m up & downstream	Good	Excellent	Excellent	Good	+++	++	--
4	**Scanning Radar** @ 1km	Good	Excellent	Good	Good	++	++	-
5	**Nomadic Devices** 70% active, 30% has App	Manual	>1 min	manual	Average	+	+	--
6	**V2I eCall** 40% penetration	N.A.						

Questions to the PEB

- Extend project end to from 01 March to 31 July 2013
  - D4.1 in April 2013 – Specifications
  - D5.1 in June 2013 – Final Summary report (20 p)
  - extra Progress report in April 2013

- Selection of (3) typical Use Cases
  - Feedback on our proposal in December 2012

- 2nd Stakeholder WS
  - Objective:
    - Dissemination of final results
    - Discussion with experts from PEB / NRAs
  - Form of WS
    - Individual consultation of experts
    - WS during an event
    - Separate RAIDER WS (Brussels)

Thank you for your attention

Bart Netten (Technical Lead)
Toon Beeks (Project Manager)
Toon.Beeks@tno.nl
Tel: +31 888 66 8007