PTV GROUP

the mind of movement

PTV VISUM SAFETY

SMART SAFETY AND TRAFFIC CONTROL FOR SMART CITIES

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PTV OPTIMA
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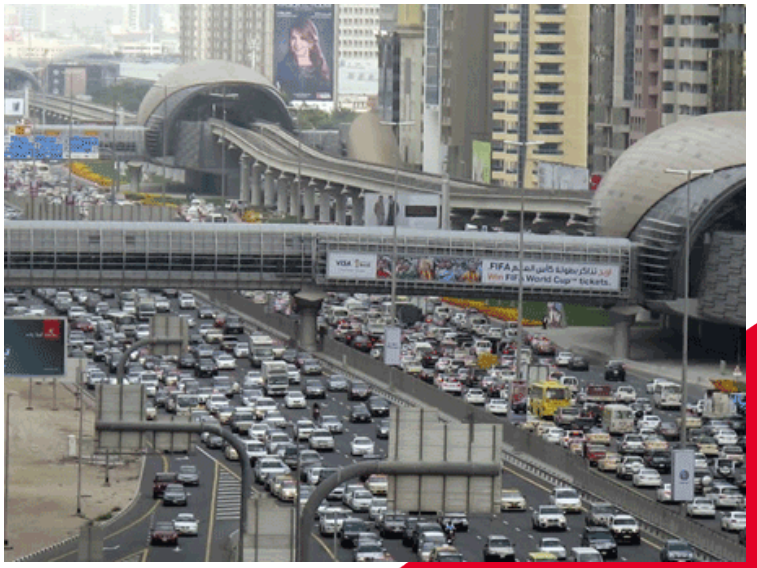
THE TWO PROBLEMS

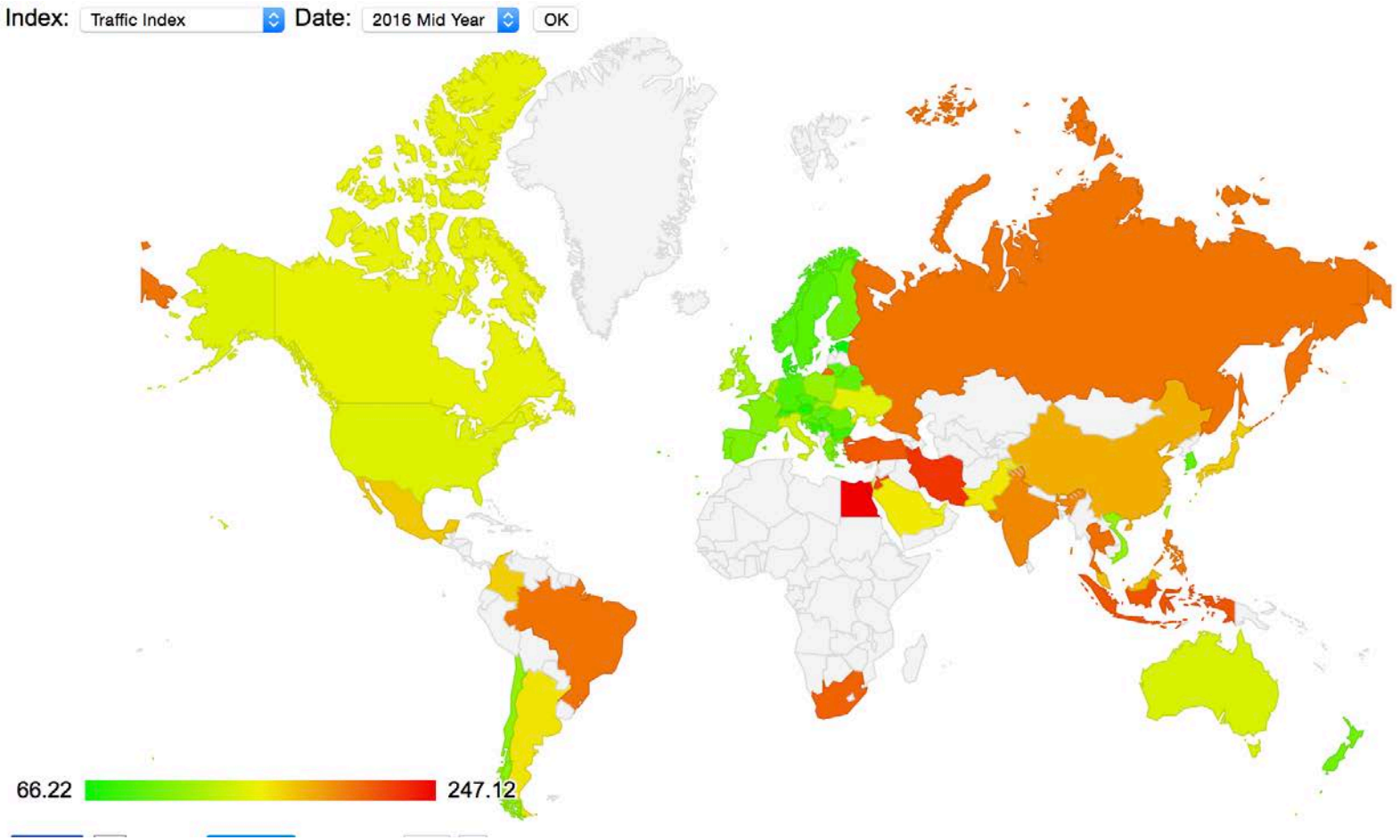
1. TRAFFIC CONGESTION



2. ROAD ACCIDENTS

KEY FACTS

Traffic Index 2016 Mid year by NUMBEO



KEY FACTS

India has the 2nd highest road accident and fatality rate in the world

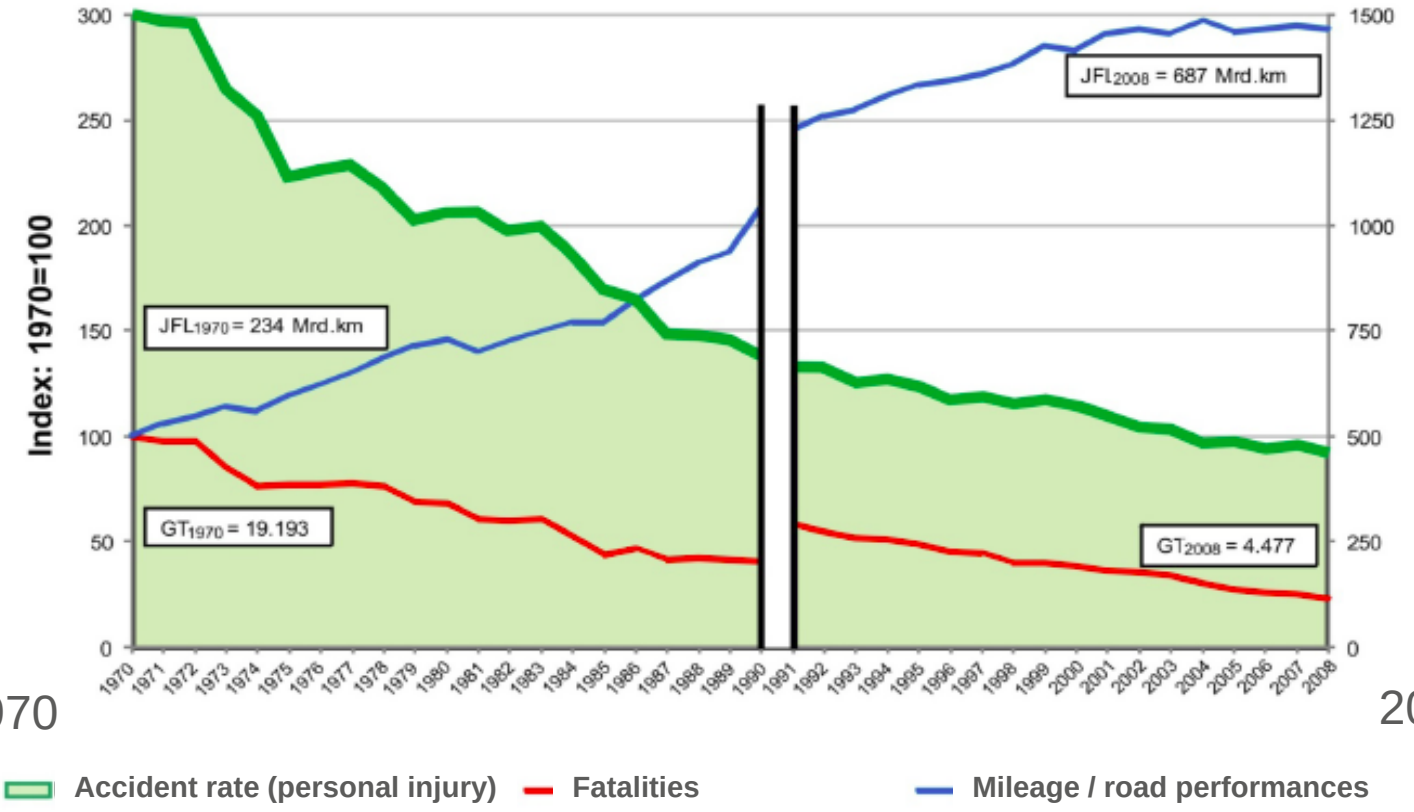
TABLE 1A(A)
Incidence and Share of Deaths due to Traffic Accidents during 2010 - 2014

Sl. No.	Year	Number of Accidental Deaths					Percentage Share of 'Traffic Accident Deaths' in Un-natural Accidental Deaths
		Road Accidents	Railway Accidents	Railway Crossing Accidents	Total Traffic Accidents	Total Un-natural Accidents	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	2010	1,33,938	24,451	3,347	1,61,736	3,59,583	45.0
2	2011	1,36,834	25,872	2,366	1,65,072	3,67,194	45.0
3	2012	1,39,091	27,402	1,808	1,68,301	3,72,022	45.2
4	2013	1,37,423	27,765	1,318	1,66,506	3,77,758	44.1
5	2014	1,41,526	25,006	2,575	1,69,107	4,31,556	39.2

Accidental Deaths
&
Suicides in India
2014

DISASTER AND ACCIDENT MANAGEMENT SYSTEM FOR INDIA

HOW TO IMPROVE ROAD SAFETY?
ACCIDENT HISTORY AND MILEAGE IN GERMANY



Mileage
3 times more

Accidents with ijuries per 1 billion vehicle km

1/3 accidents with injuries

Source: 2009 ADAC Fachveranstaltung, Sichere Straßen retten Leben

Road safety in Germany - a success story over the last 40 years!

ACCIDENT DATA ANALYSIS OF POLICE IN GERMANY – A SOLID NATIONAL BASE

PTV EUSKA accident database

in use (state wide)
other or no system

- Police authorities of **11 federal states** generates accurate accident data
- Cover **70%** of all police recorded accidents in Germany
- About **1000 users**
- more than **10 years** experience with applications at police authorities

11 FEDERAL STATES IN GERMANY USE PTV EUSKA

- Baden-Wuerttemberg
- Brandenburg
- Bremen
- Hamburg
- Hesse
- Lower Saxony
- Mecklenburg-Western Pomerania
- North Rhine-Westphalia
- Saxony
- Saxony-Anhalt
- Thuringia

National Police meeting at PTV - April 2012

Accident report – registration of statistically accident data

STAATSBETRIEB SÄCHSISCHE INFORMATIK DIENSTE | Freistaat SACHSEN

Traffic Police Saxony, Germany

Data content for the accident investigation:

- classification
- data regarding the site
- description of the accident
- personal data, vehicle data

ACCIDENT RECORD IN GERMANY (FEDERAL STANDARD)

AF22-07.JPG

Kind of collision

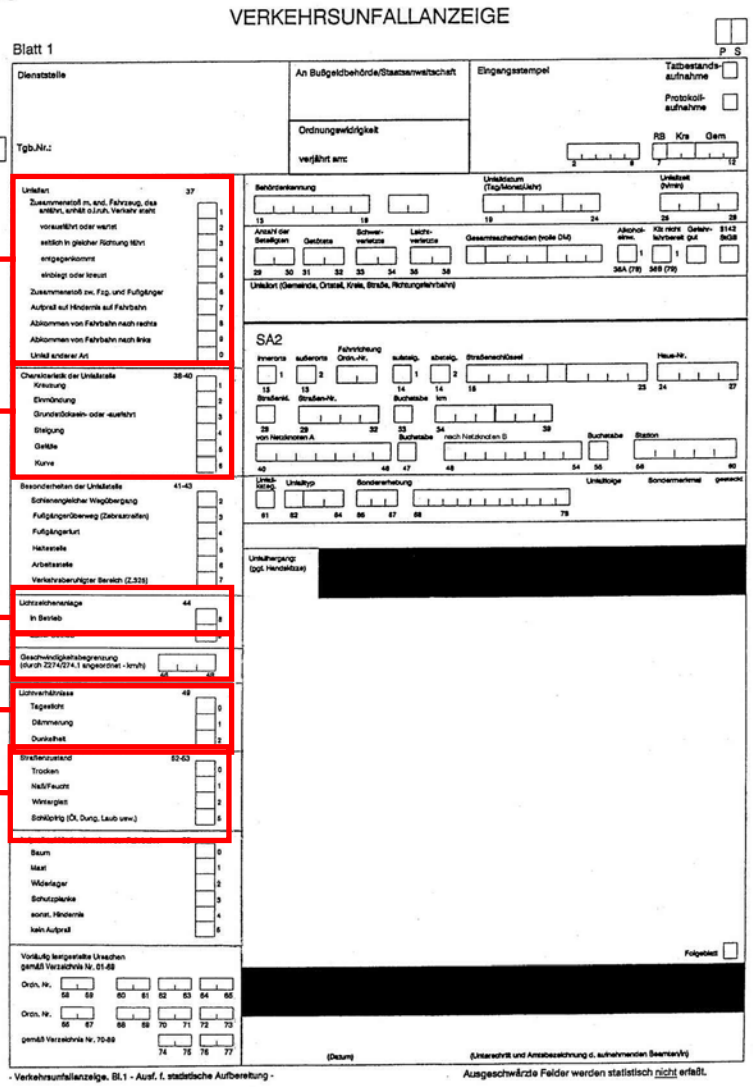
Kind of location (junction, gradient,etc.)

Traffic light

Speed limit

Daylight?

Road surface



and a lot of others...
Defined by statistic law in Germany

The guideline provides also plausibilty checks for data entry.

SOURCE: Germany DeStatis Statistisches Bundesamt, Wiesbaden 2007:

SYSTEM ARCHITECTURE

Sunovatech India - PTV
Road Accident Mobile Data Collection Application
Data Flow

General Public

Emergency Response Protocol

Police / Authorities

Emergency Response Protocol
Accident Details/Statics
Vehicle Details
Casualty Details

Data Transfer
Via 3G/4G and WiFi

Central Accident Data Server
Located at Authority Infrastructure
Or on Cloud Server

WAN
ISP

Data Administrator
Data Validation and Sync Central

WAN
ISP

Scientific Analysis Units

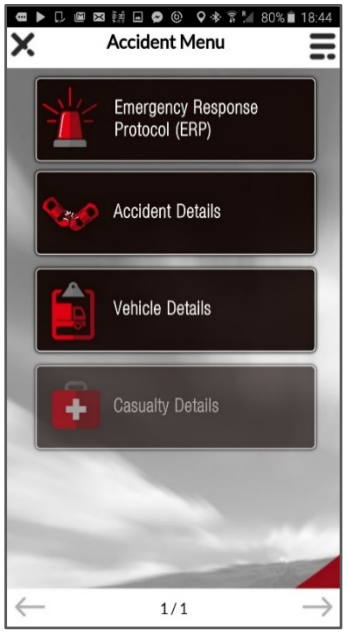
Scientific Analysis Units

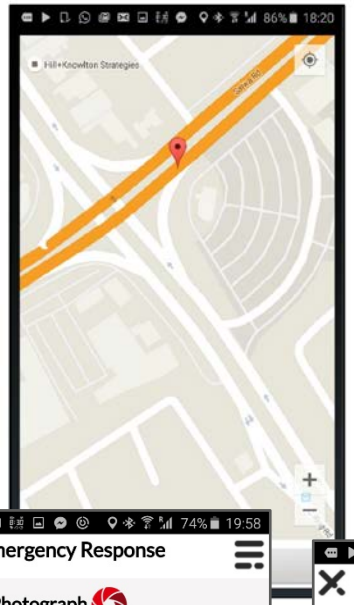
Scientific Analysis Units

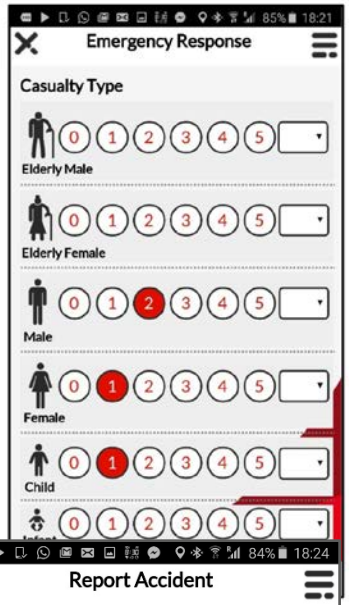
Scientific Analysis Units

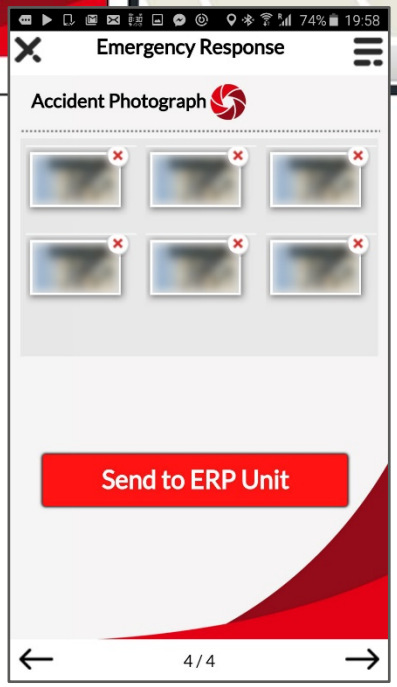
Desktop Application VISTAD
Hospitals and Police Stations

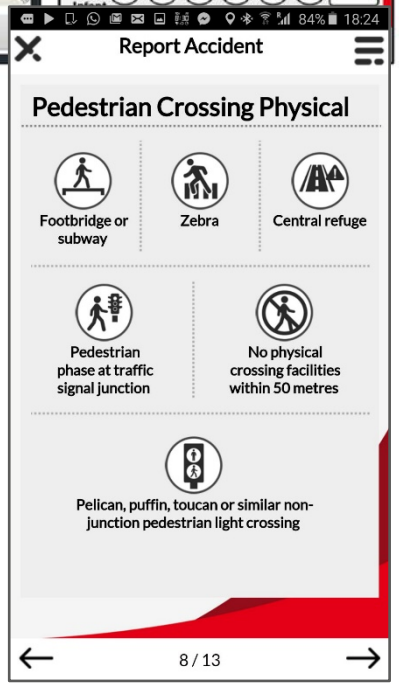
Clash Data Collection Mobile Application for IOS and Android for Crowd and Police











ANDROID

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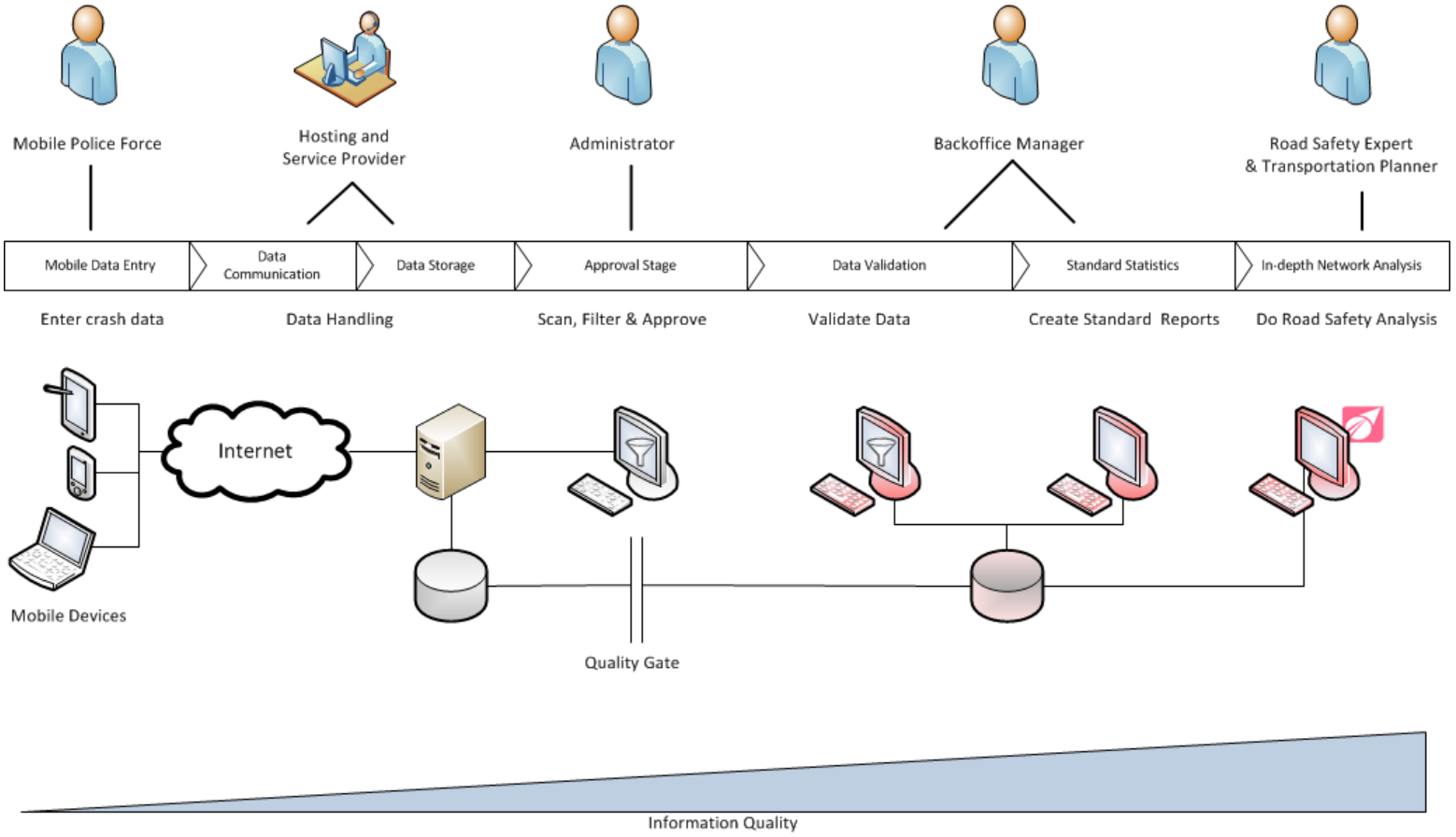
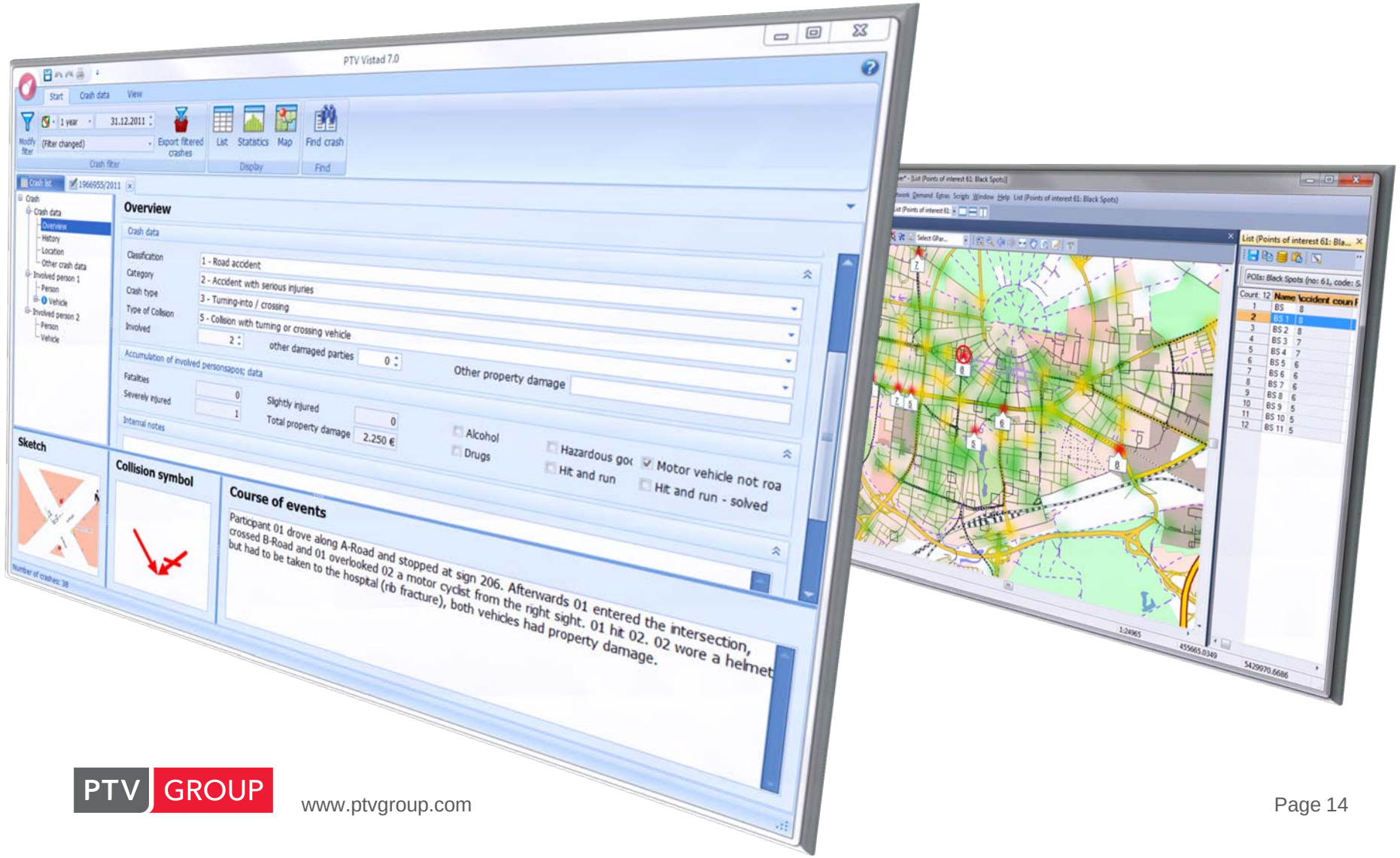
SUN INFRASTRUCTURE WLL
سن انفراستراكجر ذ م م


Mobile Police Force
Hosting and Service Provider
Administrator
Backoffice Manager
Road Safety Expert & Transportation Planner
Mobile Data Entry
Data Communication
Data Storage
Approval Stage
Data Validation
Standard Statistics
In-depth Network Analysis
Enter crash data
Data Handling
Scan, Filter & Approve
Validate Data
Create Standard Reports
Do Road Safety Analysis
Internet
Mobile Devices
Quality Gate
Information Quality

ROAD SAFETY MANAGEMENT WITH PTV SOLUTIONS

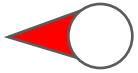


Collision Types

1 Driving accident

2 Turning accident

3 Entering / crossing accident

4  Crossing over accident (Pedestrian)

5 Accident caused by stopping / parking

6 Accident in longitudinal traffic

7 Other accident

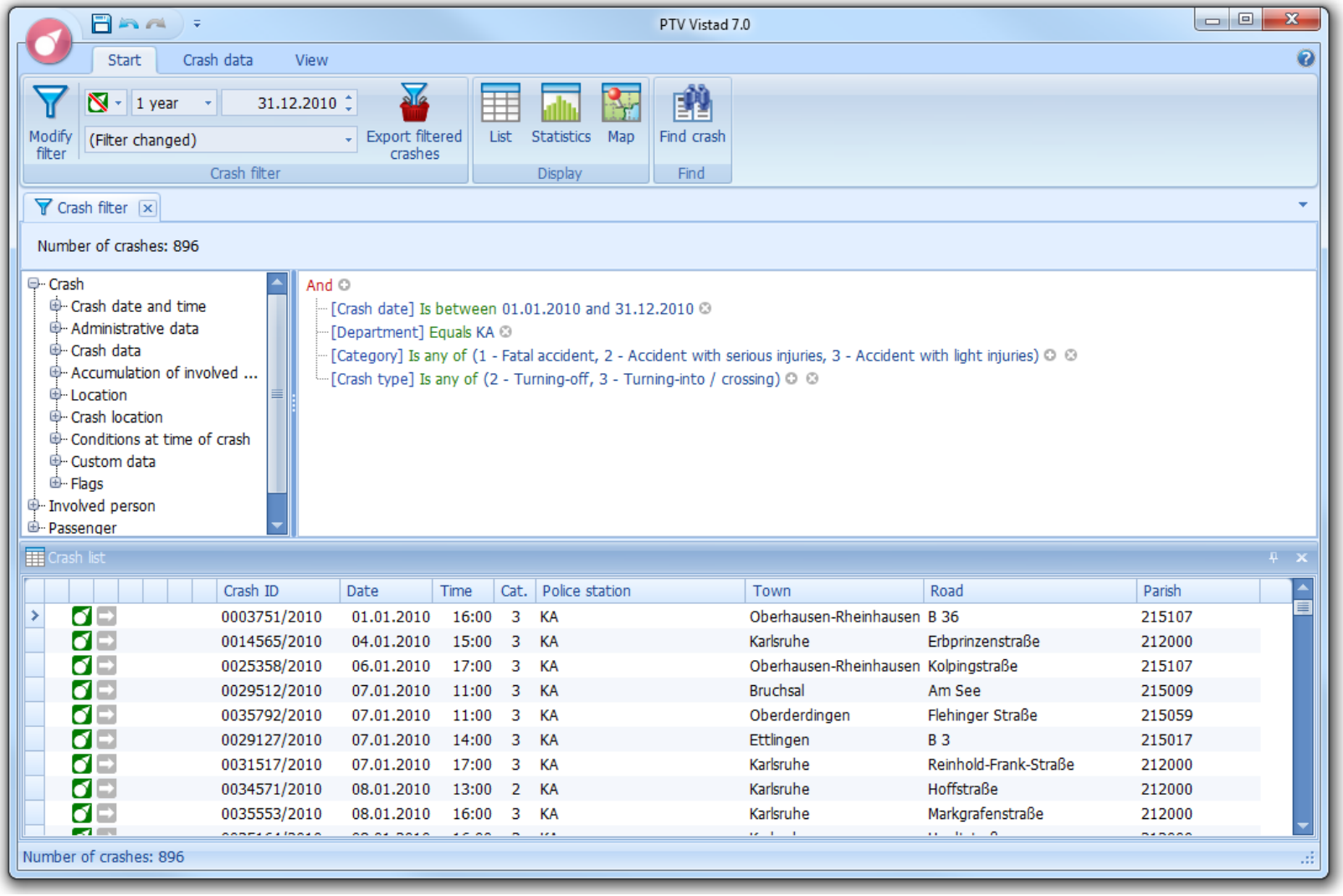
SEVERITY OF ACCIDENTS

Fatality / killed persons
(8 mm circle and 10 mm square)

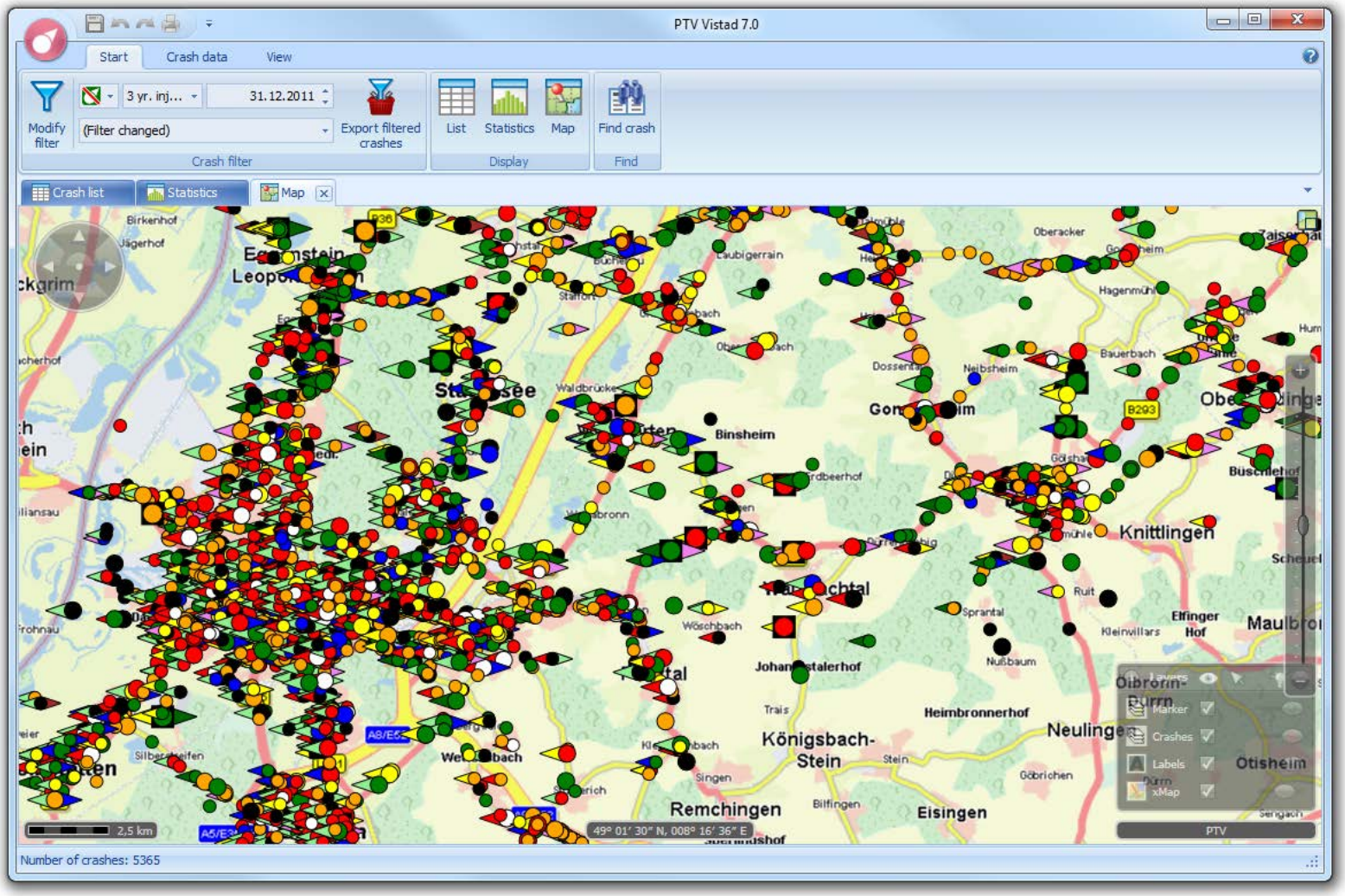
Serious injury accident
(8 mm circle)

Slight injury accident
(4 mm circle)

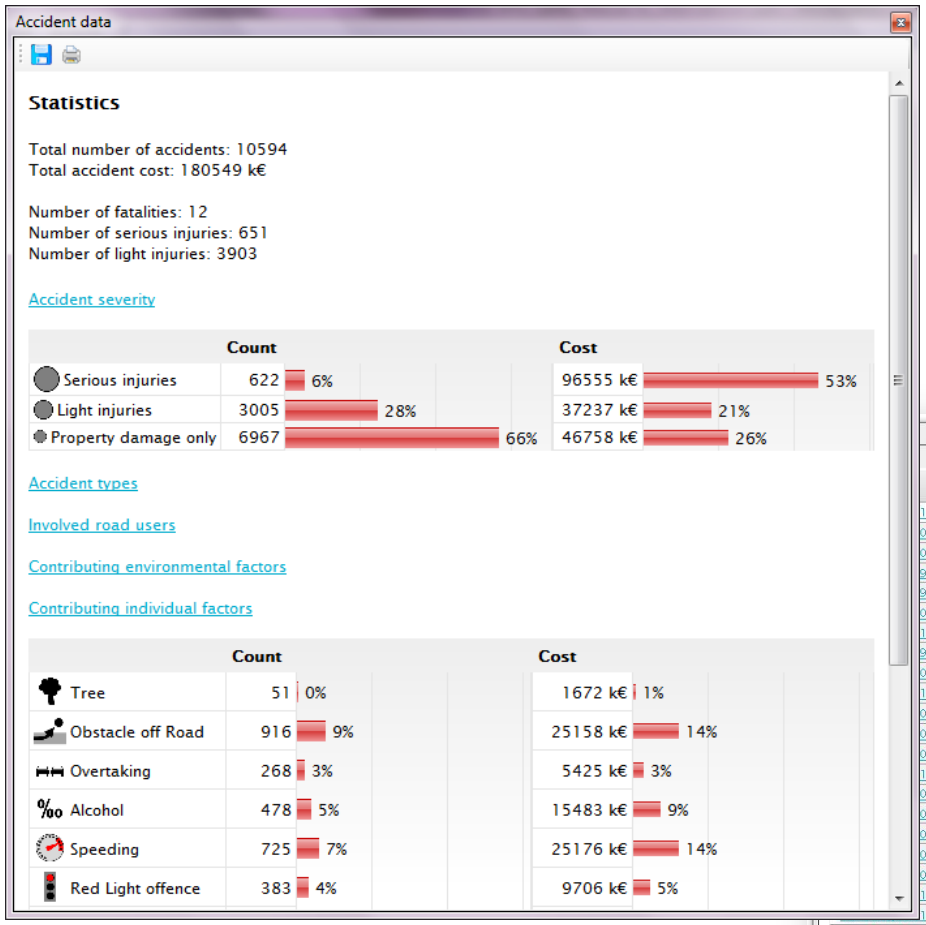
PTV VISTAD DATA FILTERING

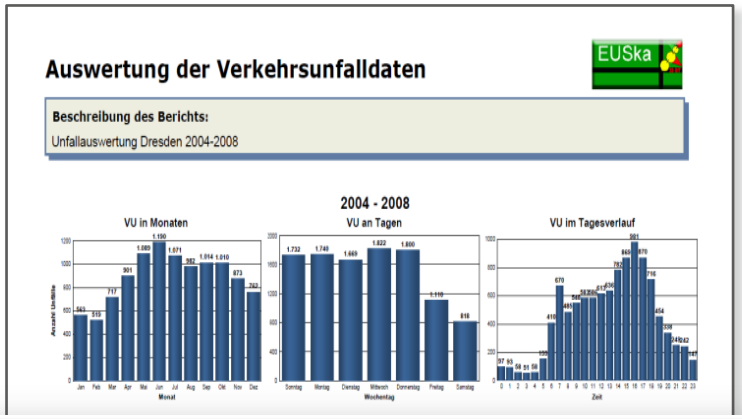


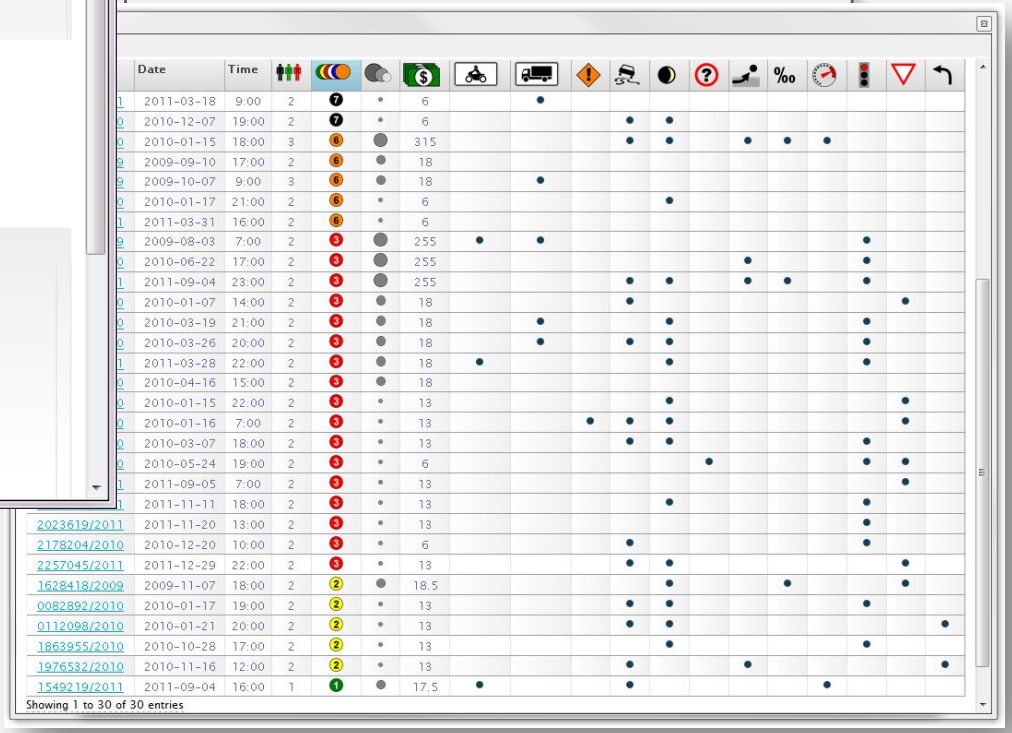
ACCIDENT MAPPING AND FILTERING



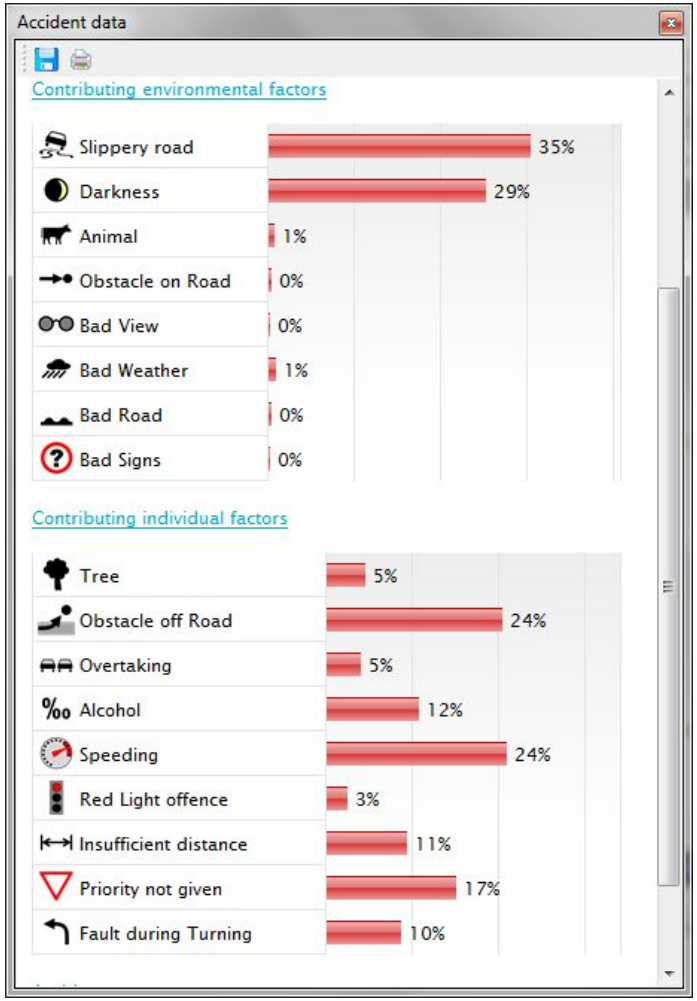
VARIOUS STATISTICS AND REPORTING CAPABILITIES







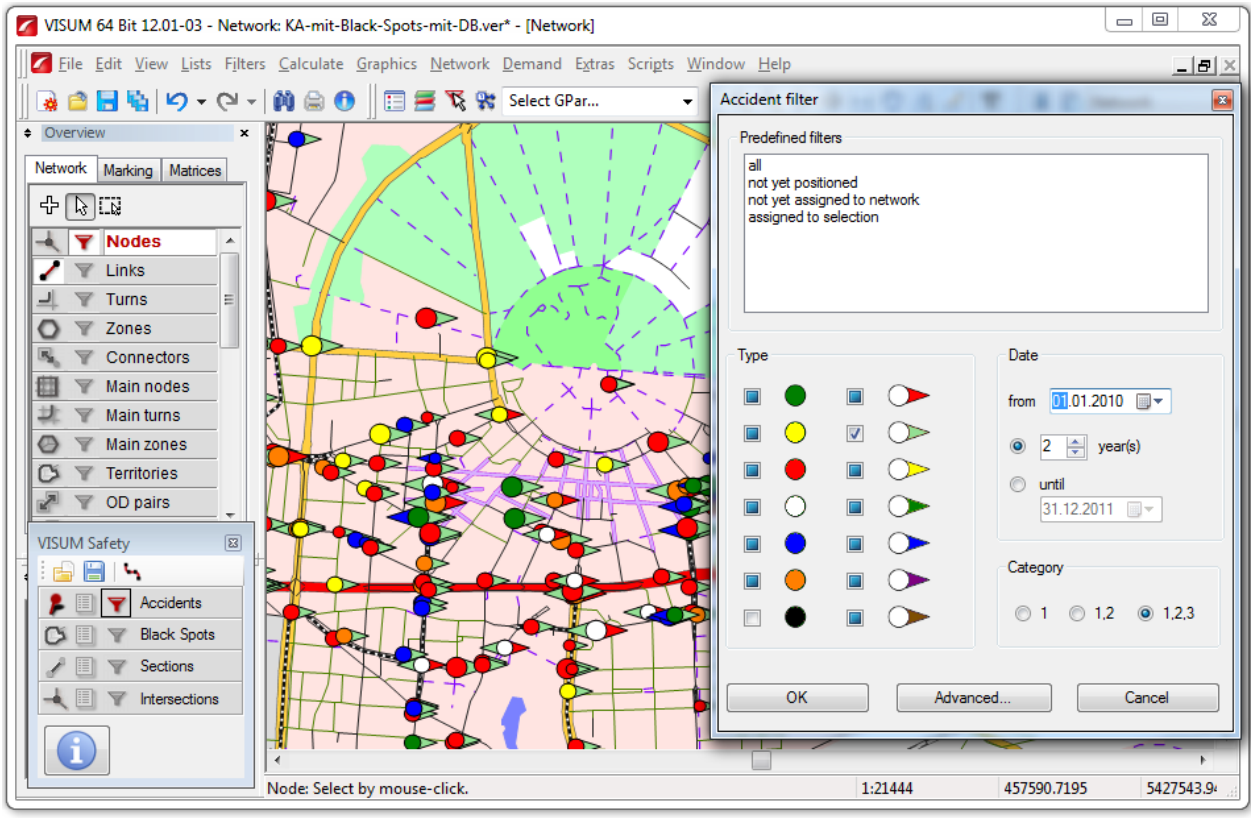
BLACK SPOT MANAGEMENT ON MICRO LEVEL –
Some statistics on accident data with PTV Visum Safety



PTV Visum Safety supported some statistics based on accident attributes to give first indicators about road safety for instance:
Slippery roads 35% (30%)
Darkness 29% (30%)
(Expected values in Germany cities)

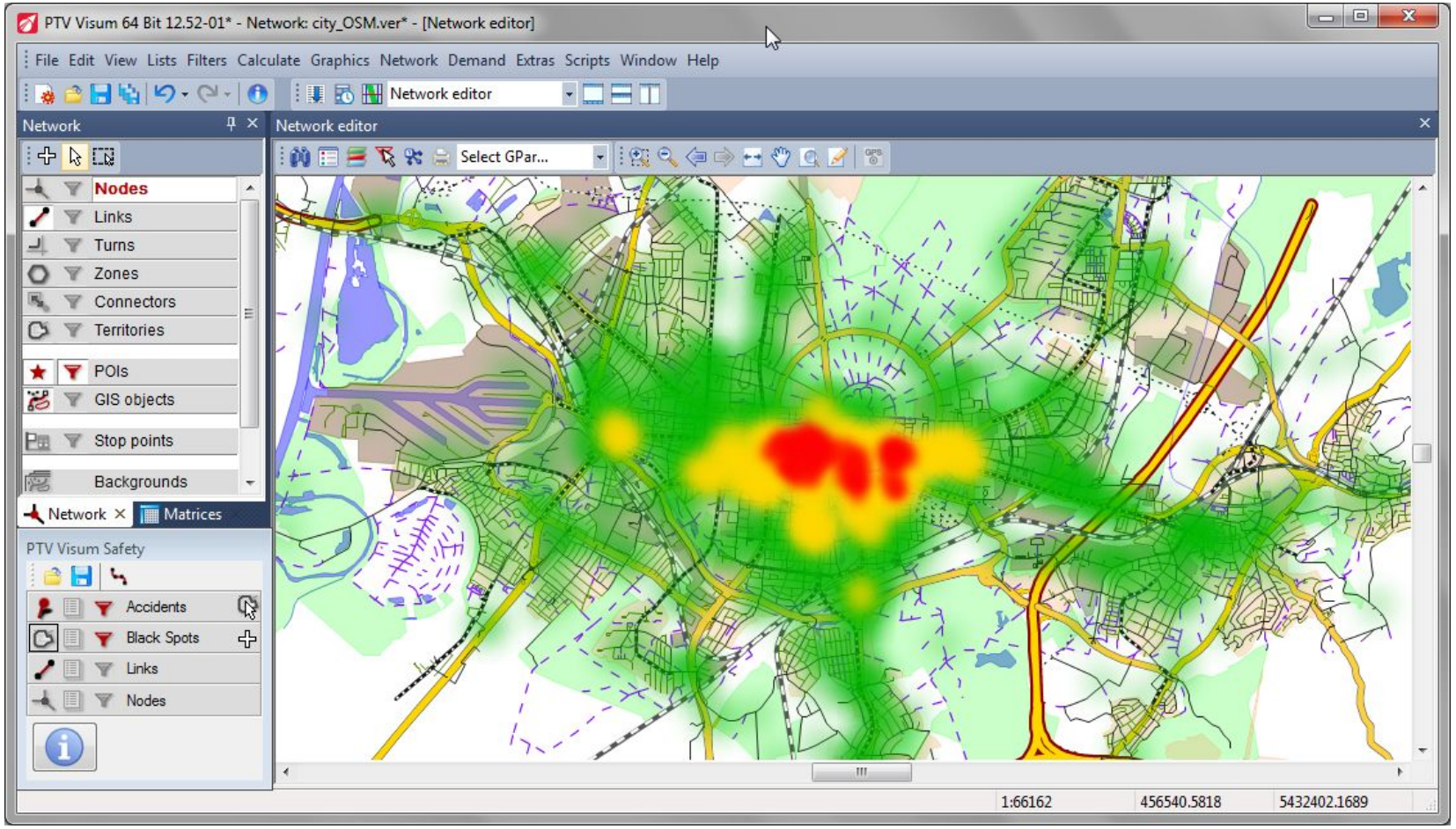
Ausprägung der Unfallumstände (Durchschnittswerte Deutschland)*				
	innerorts	Landstraße	BAB	
Winter	30%	35%	35%	Dez - März
Wochenende	25%	30%	30%	Sa / So
Spitzenzeiten	45%	45%	45%	6 - 9 / 16 - 19
Nacht	30%	35%	40%	dä / du
Nässe / Glätte	30%	40%	45%	na / wgl

EASY FILTERING ACCIDENT DATA – ACCIDENTS WITH CYCLISTS



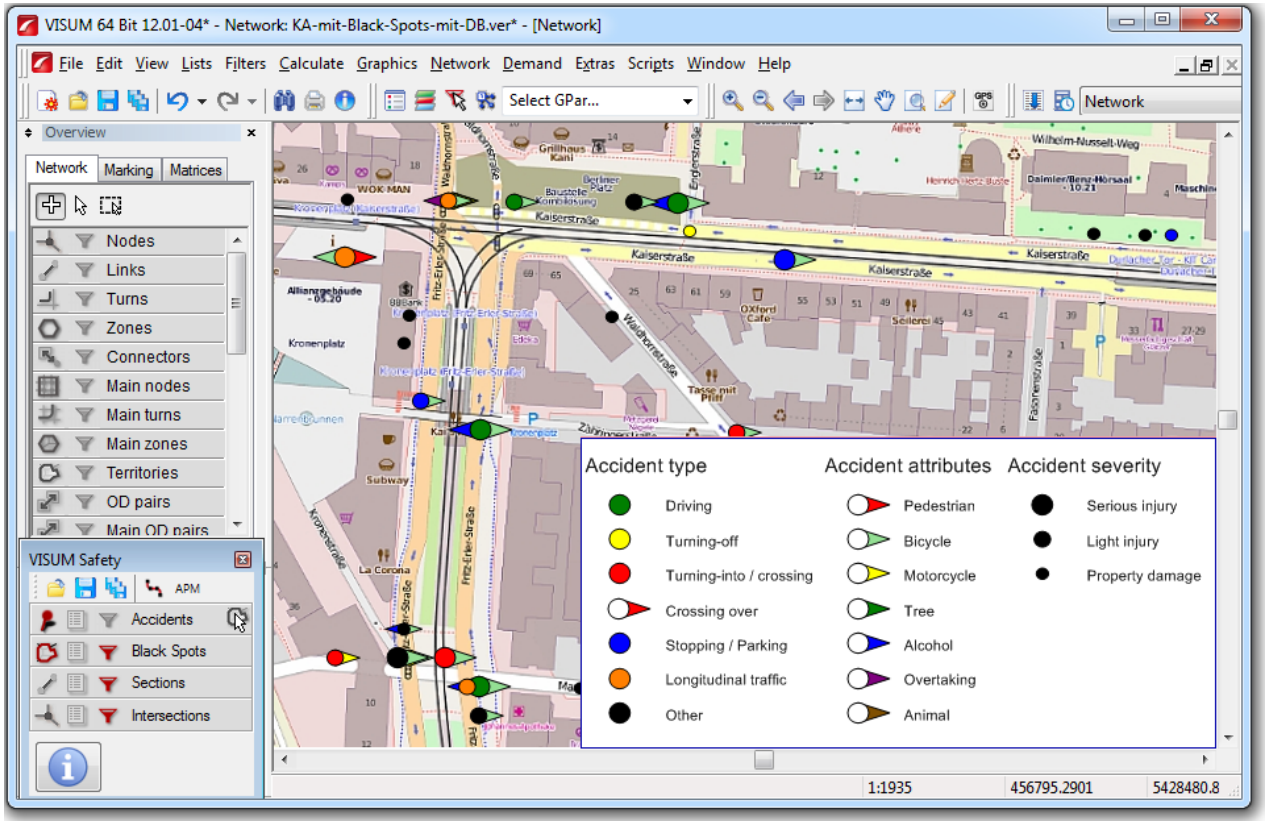
The accident data can be filtered depending on the accident main attributes. Easy filtering of accidents with cyclists.

HEAT MAP OF THE CITY AREA



PTV Visum Safety generates a heat map based on user accident data to focus road safety action programs on the significant areas e.g. cyclists.

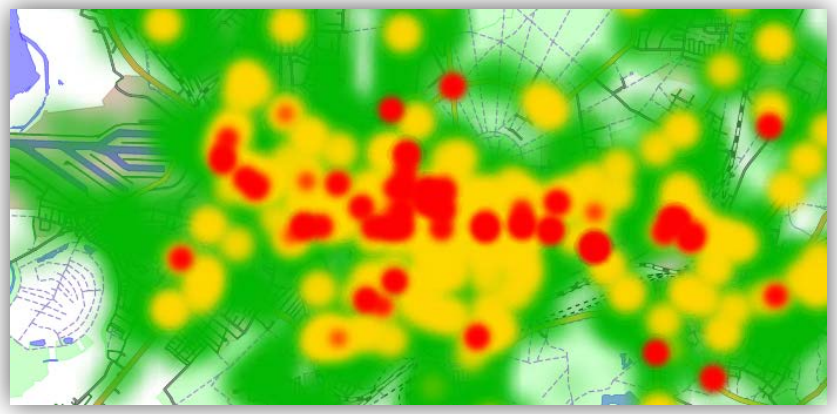
ACCIDENT MAPPING IN DETAIL



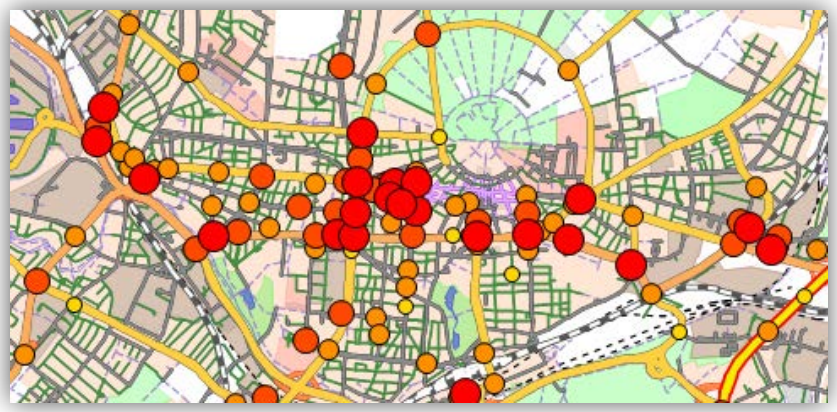
The accident data are systematically displayed in a pragmatic and intuitive format based on more than 30 years experience with police officers in Germany.
PTV Visum Safety displays accidents types (conflict situation).

ACCIDENT DATA ANALYSIS

Heat map



Find black spots



View accident attributes

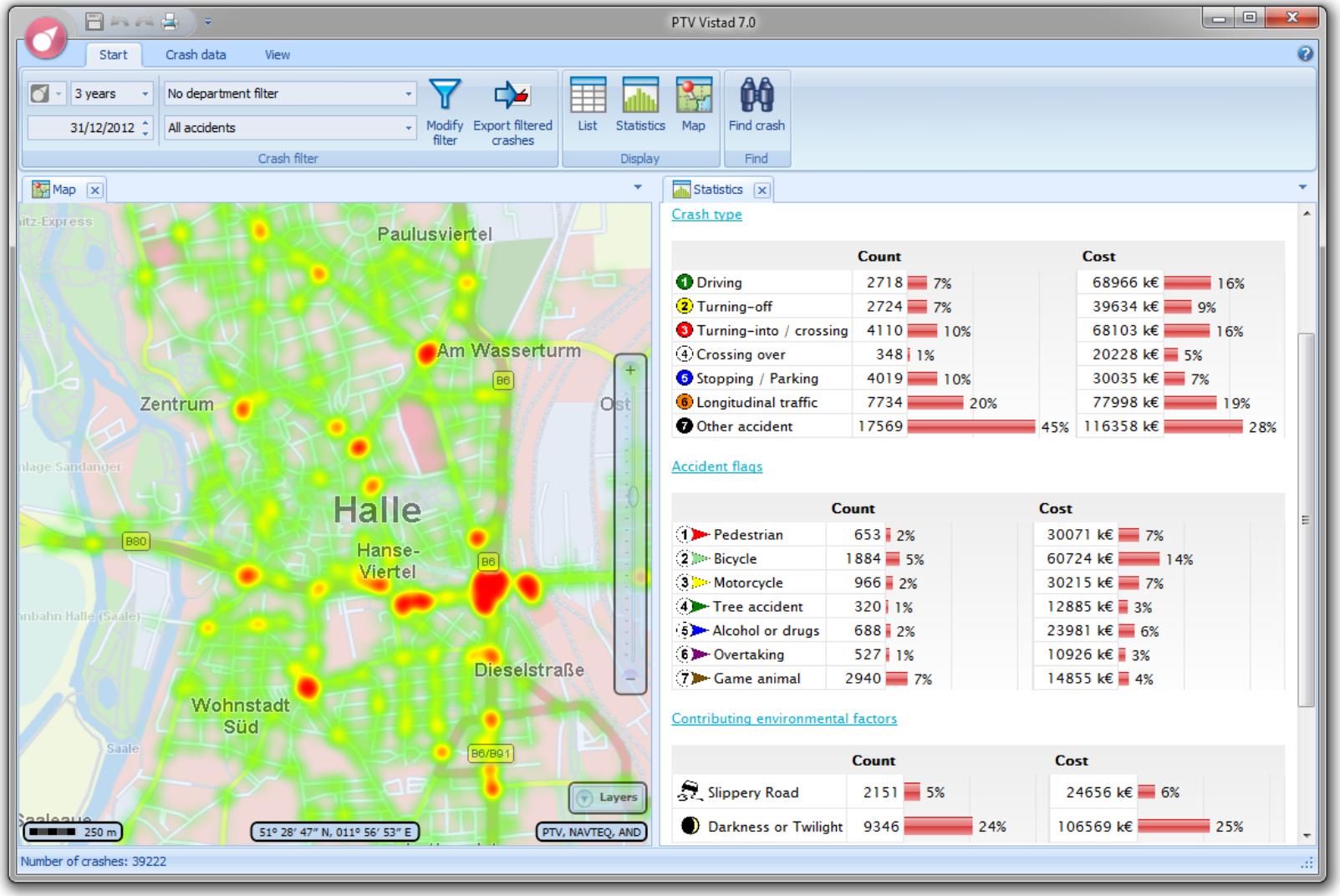
			9	4	6	2	6	8
		$				‰		
4		385	•	•				
3		255						•
3		255	•	•		•		•
3		255			•			•
3		18	•					•
3		18						•
1		17.5	•		•		•	
1		17.5	•		•		•	
6		18					•	
1		17.5	•				•	

Attribute distribution

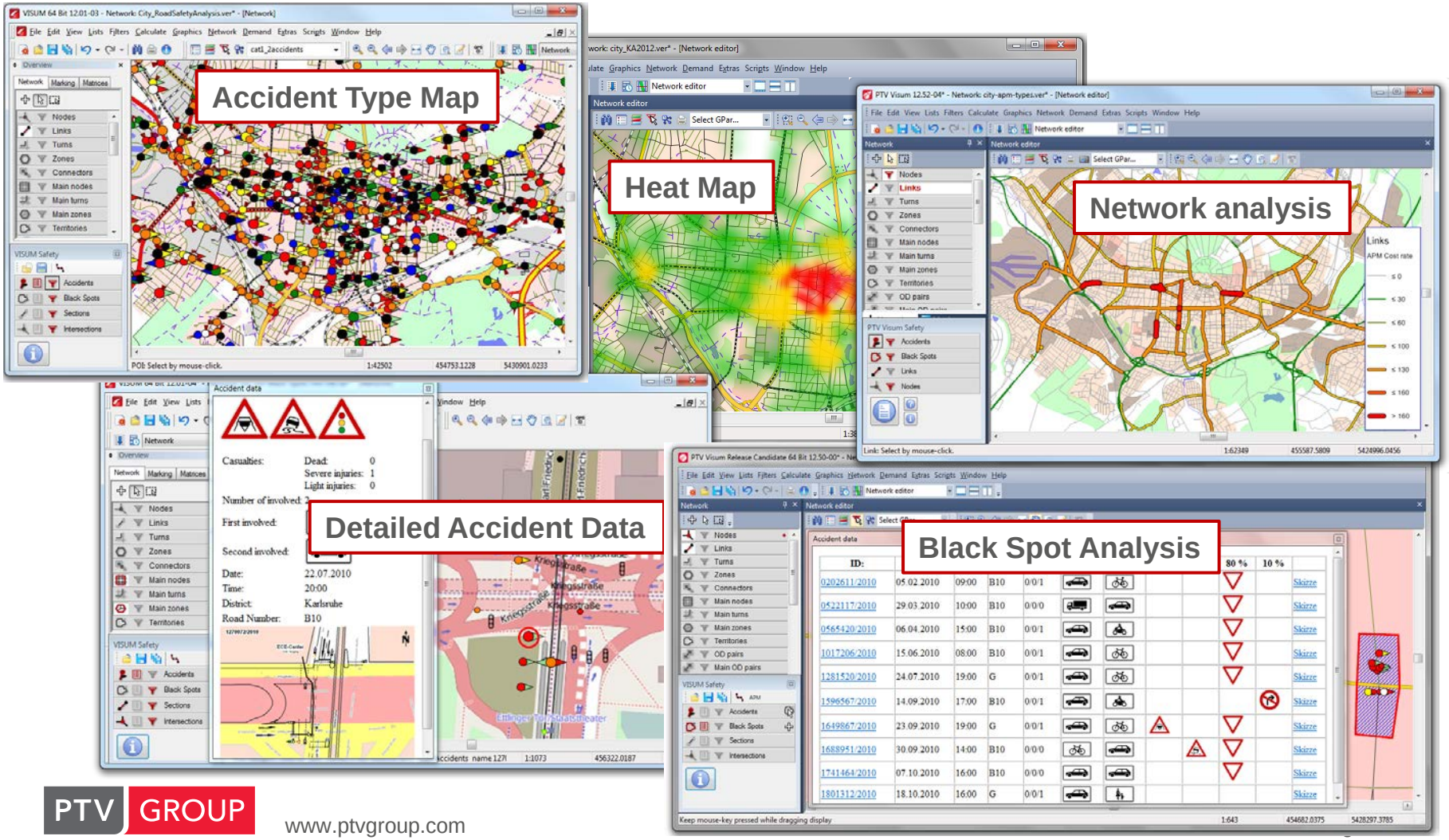
Accident types

	Count	
1 Driving	289	13%
2 Turning-off	441	20%
3 Turning-into / crossing	676	30%
4 Crossing over	250	11%
6 Longitudinal traffic	590	26%

EXAMPLE OF AN CRASH DATABASE APPLICAITON



BLACK SPOT MANAGEMENT BASED ON PTV VISUM SAFETY



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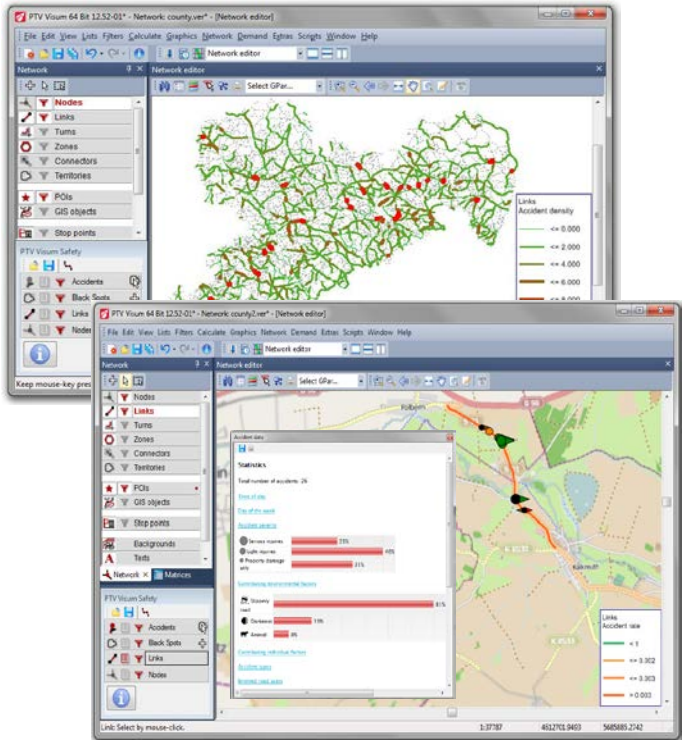
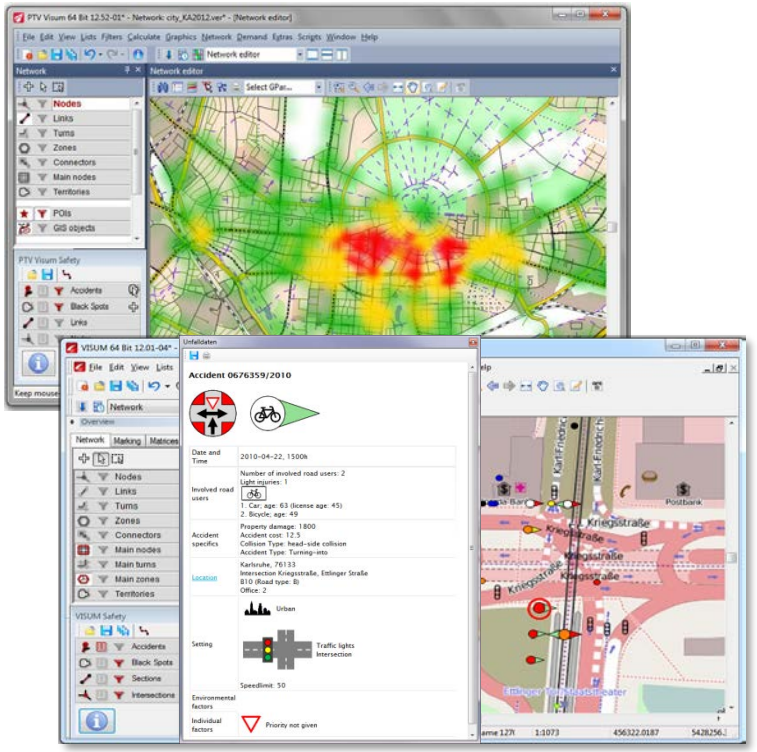
ROAD ONE SAFETY APPLICATION COVERS ALL LEVELS

RURAL | **URBAN**

MACROSCOPIC

MICROSCOPIC

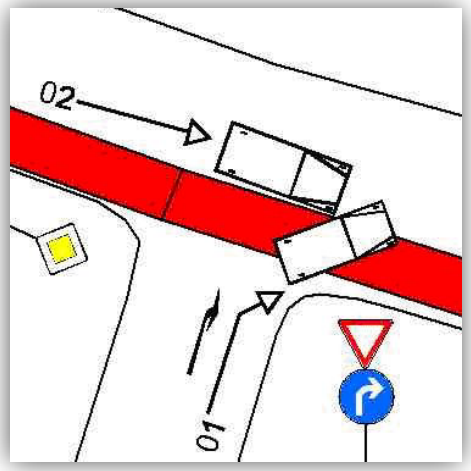




NSM

BSM

MITIGATE MEASURE TO ELEMINATE BLACK SPOTS

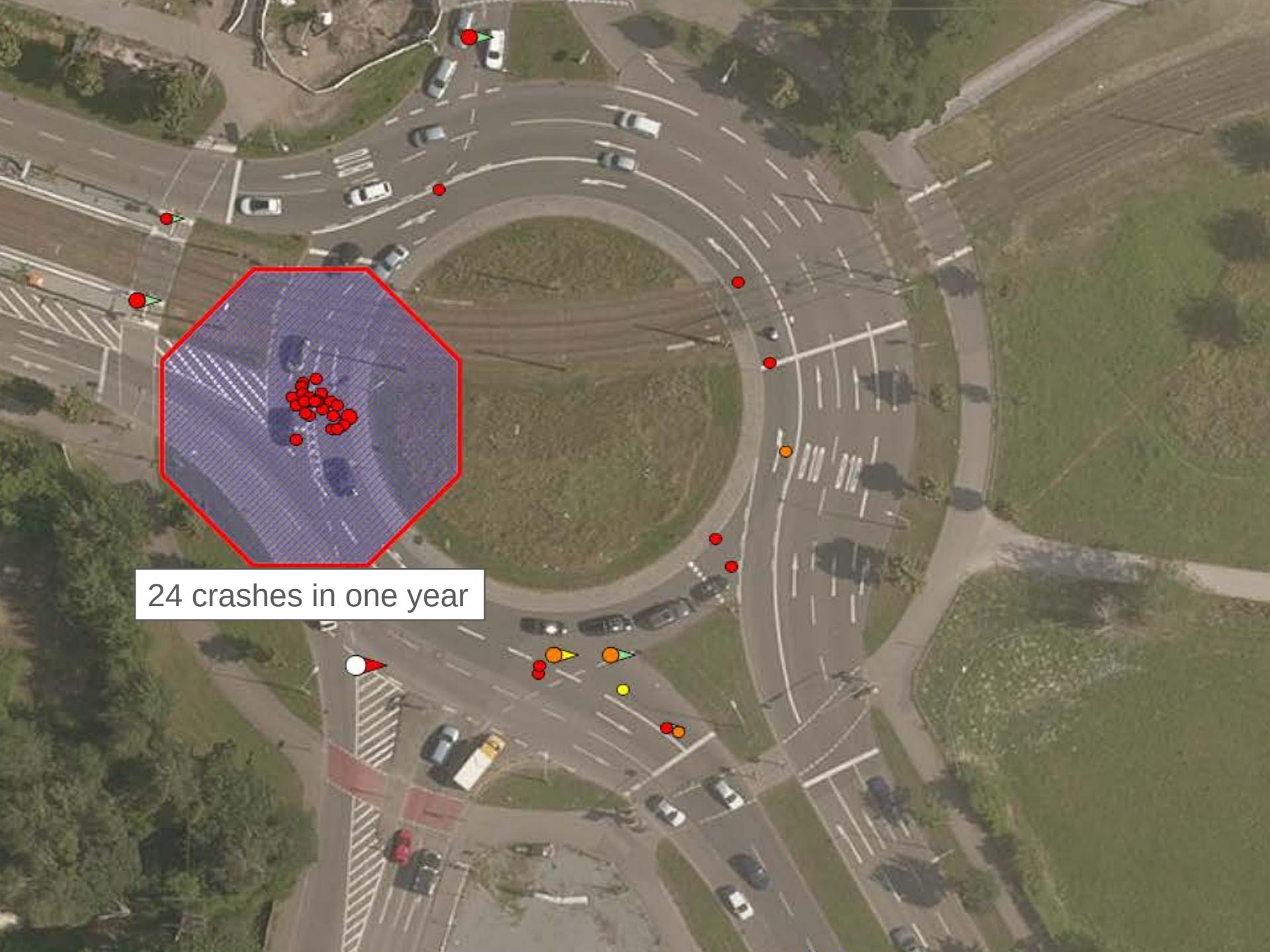


Crash data application ovrview

- Crash data management
- Black spot analysis
- Find mitigate measure to eliminate black spots

SAFE OR UNSAFE INTERSECTION?

SAFE OR UNSAFE
INTERSECITON DESIGN?


24 crashes in one year

Data table

Search:

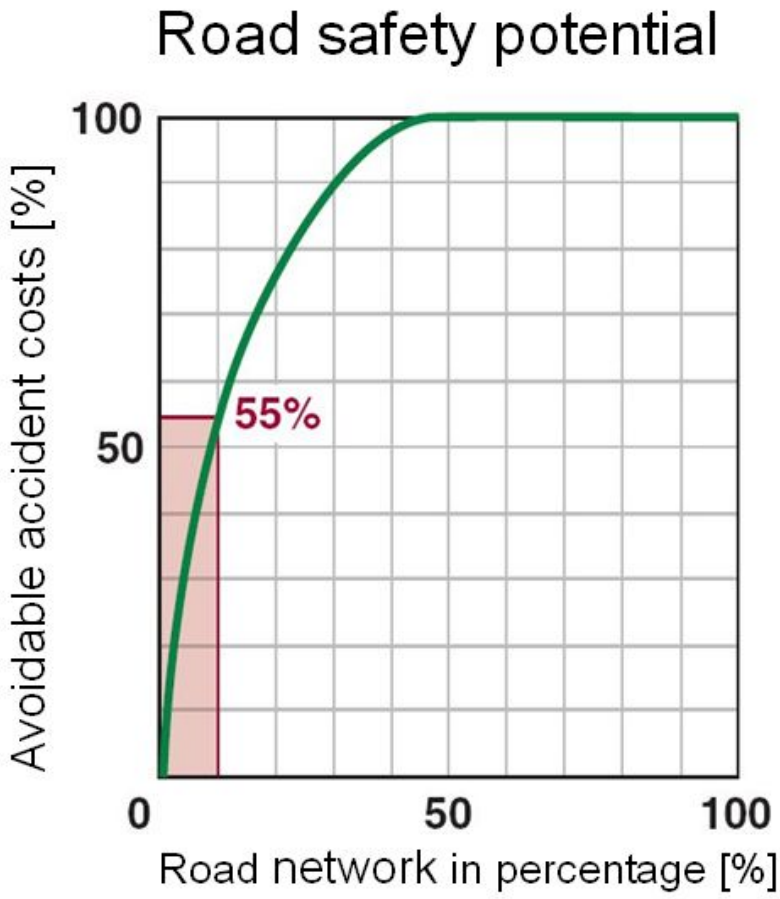
Accident ID	Date	Time					3	6	3	2	2	2	4
0936938/2011	2011-05-30	17:00	2	3		135		•					•
0356524/2013	2013-03-03	17:00	2	6		41.5		•					
1015647/2011	2011-06-11	13:00	2	6		13		•					
1098016/2011	2011-06-25	15:00	2	6		13		•					
1348401/2012	2012-08-03	14:00	2	6		41.5		•					
1869372/2011	2011-10-26	6:00	2	3		12.5		•	•				•
1462421/2012	2012-08-22	22:00	2	3		41.5	•		•	•	•	•	
0548669/2011	2011-04-01	19:00	2	6		13							
0731434/2012	2012-05-01	15:00	2	3		41.5							•
1332051/2013	2013-08-02	17:00	2	6		41.5	•						
1564782/2011	2011-09-06	18:00	2	3		12.5	•			•		•	
2244247/2011	2011-12-27	17:00	2	3		12.5			•		•		•

Showing 1 to 12 of 12 entries

12 crashes with injuries in 3 years
3 severity injuried
9 slightly injuried

NETWORK SAFETY MANAGEMENT:

WHAT DOES SAFETY POTENTIAL TELL ME ABOUT MY ROAD NETWORK?



More than

50 % of avoidable accident costs

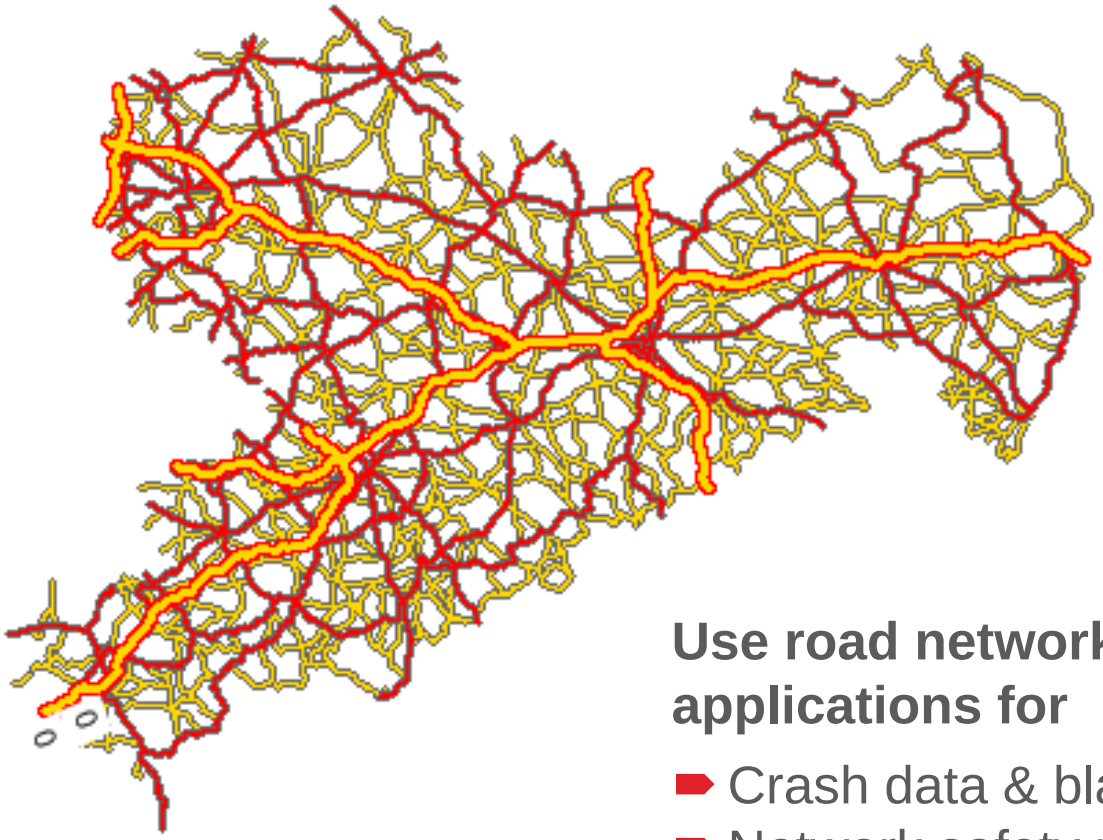
occur on only

10% of the road network!

Source: Kerstin Lemke BASt, Germany, 2006

Source: GDV, Germany

ROAD SAFETY ANALYSIS COMBINED WITH ROAD NETWORK

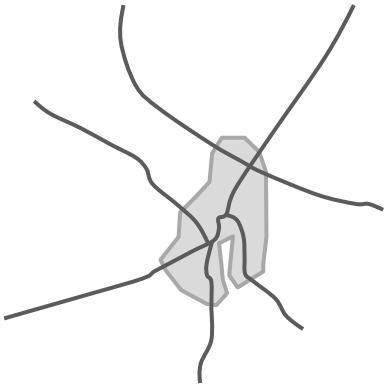


Use road network linkage on applications for

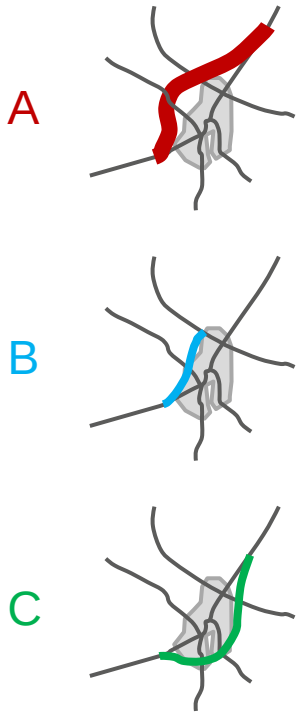
- Crash data & black spot analysis
- Network safety management
- Crash prediction models

ROAD SAFETY IMPACT ASSESSMENT

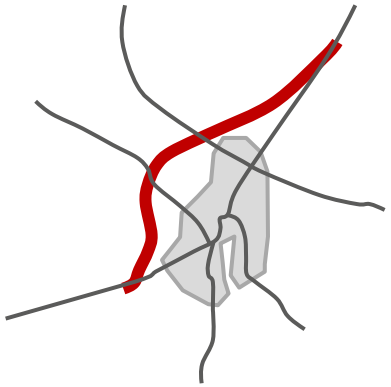
Current status



Layouts



Safest Layout

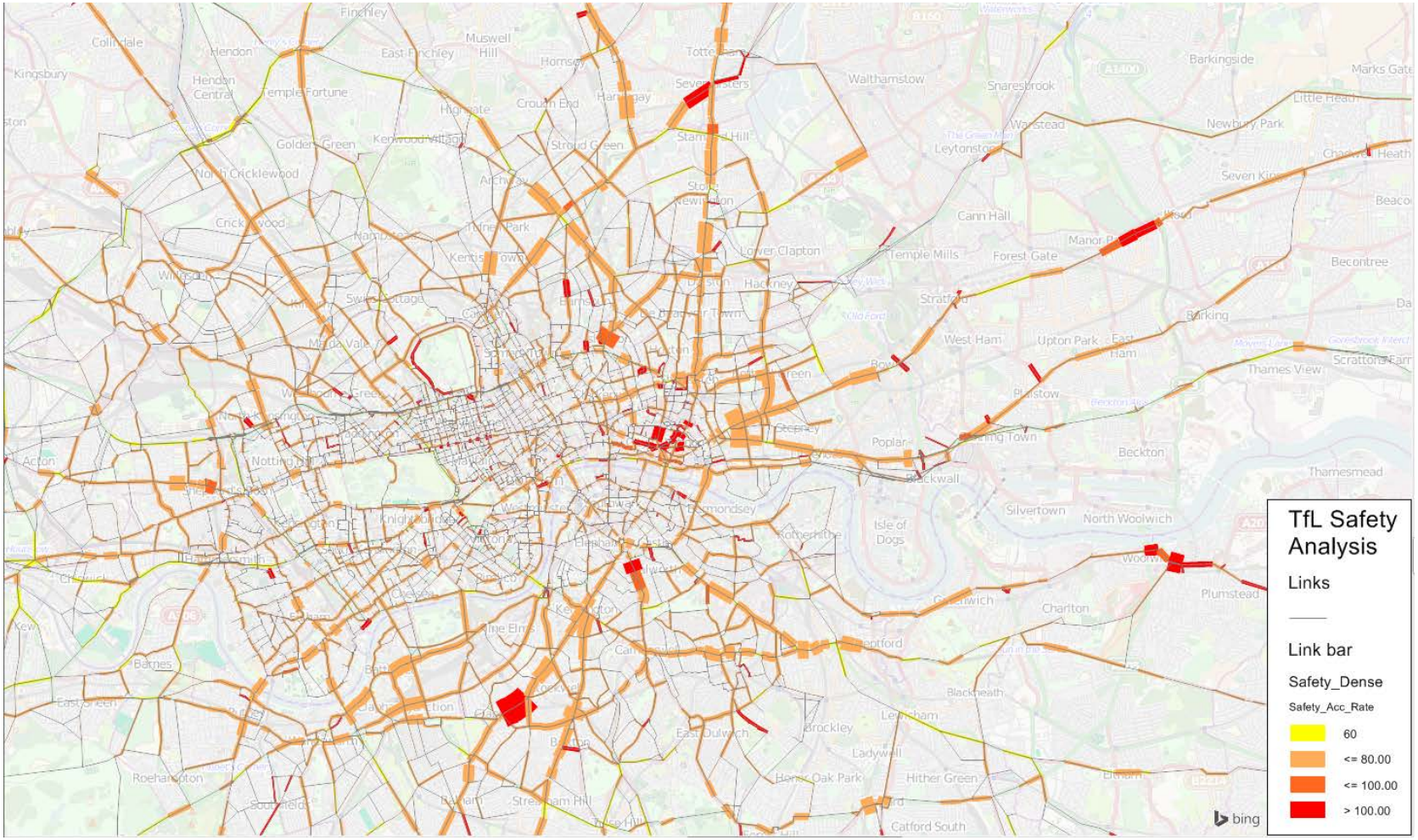


USE CASE ROAD IMPACT ASSESMENT BASED ON CRASH PREDICITON MODELLING

Road types | Accident rate | Accident density

- Calculate accident cost rates based on network attributes
- Use traffic model to calculate **expected accident cost**
- Compare different scenarios

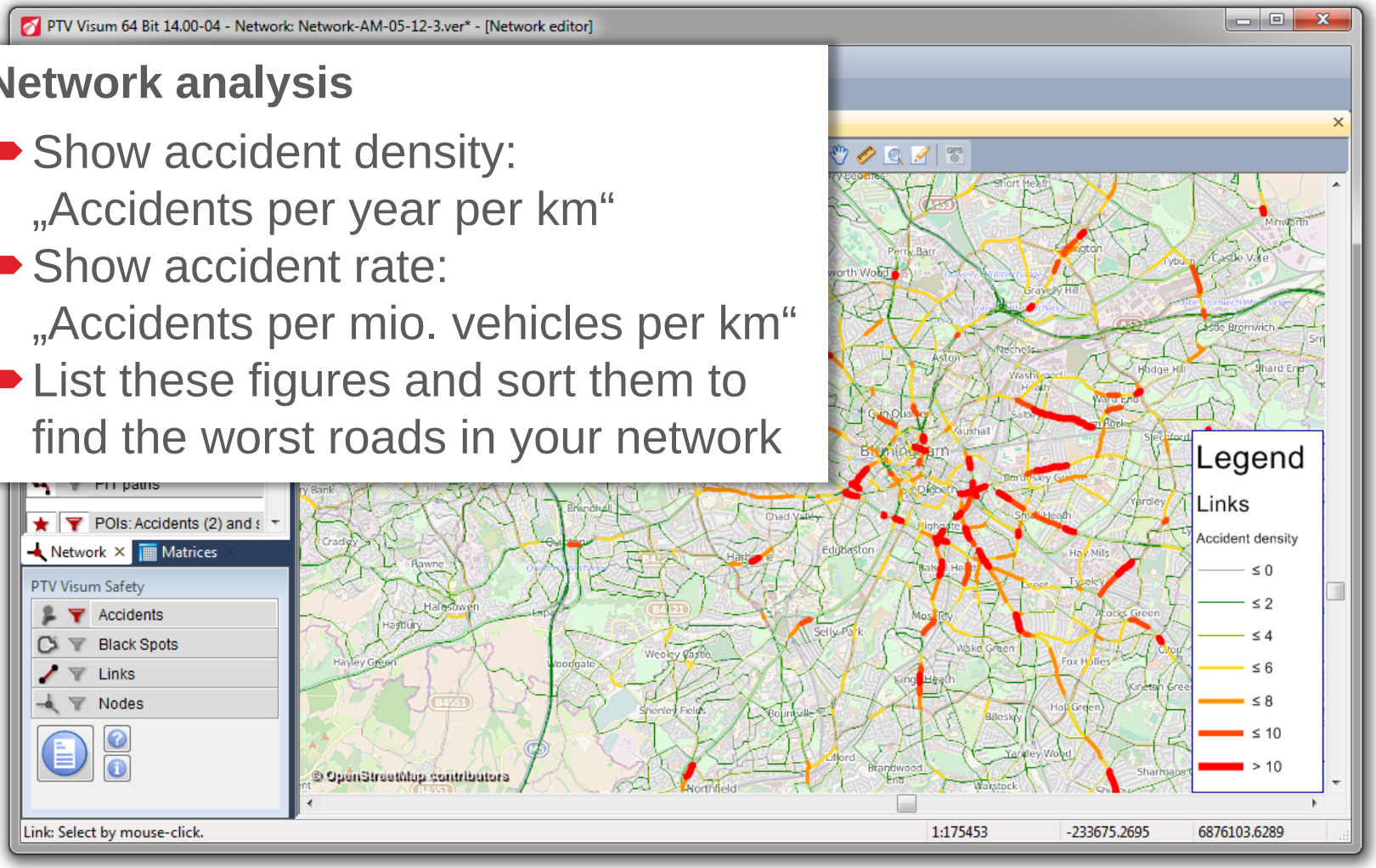
EXAMPLE LONDON: ACCIDENT RATES & DENSITY ON LINKS



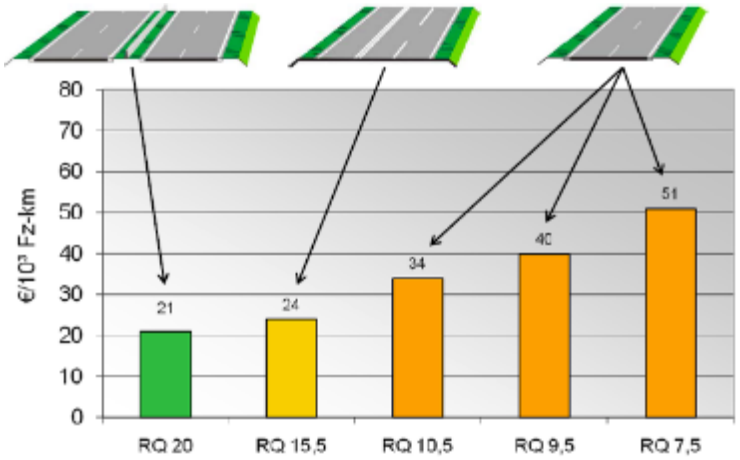
NETWORK SAFETY MANAGEMENT

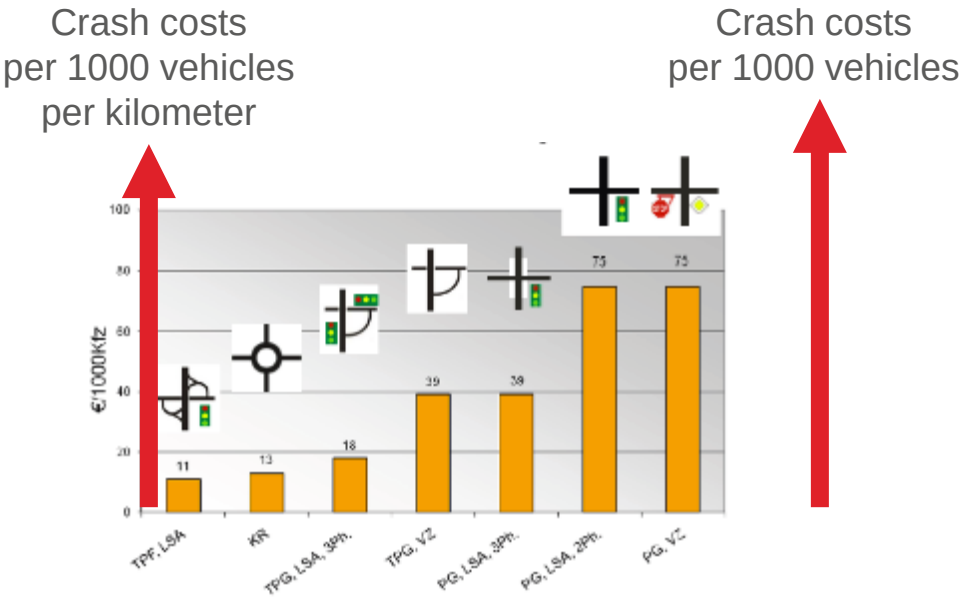
Network analysis

- Show accident density:
  „Accidents per year per km“
- Show accident rate:
  „Accidents per mio. vehicles per km“
- List these figures and sort them to find the worst roads in your network



ROAD SAFETY IMPACT ASSESSMENT



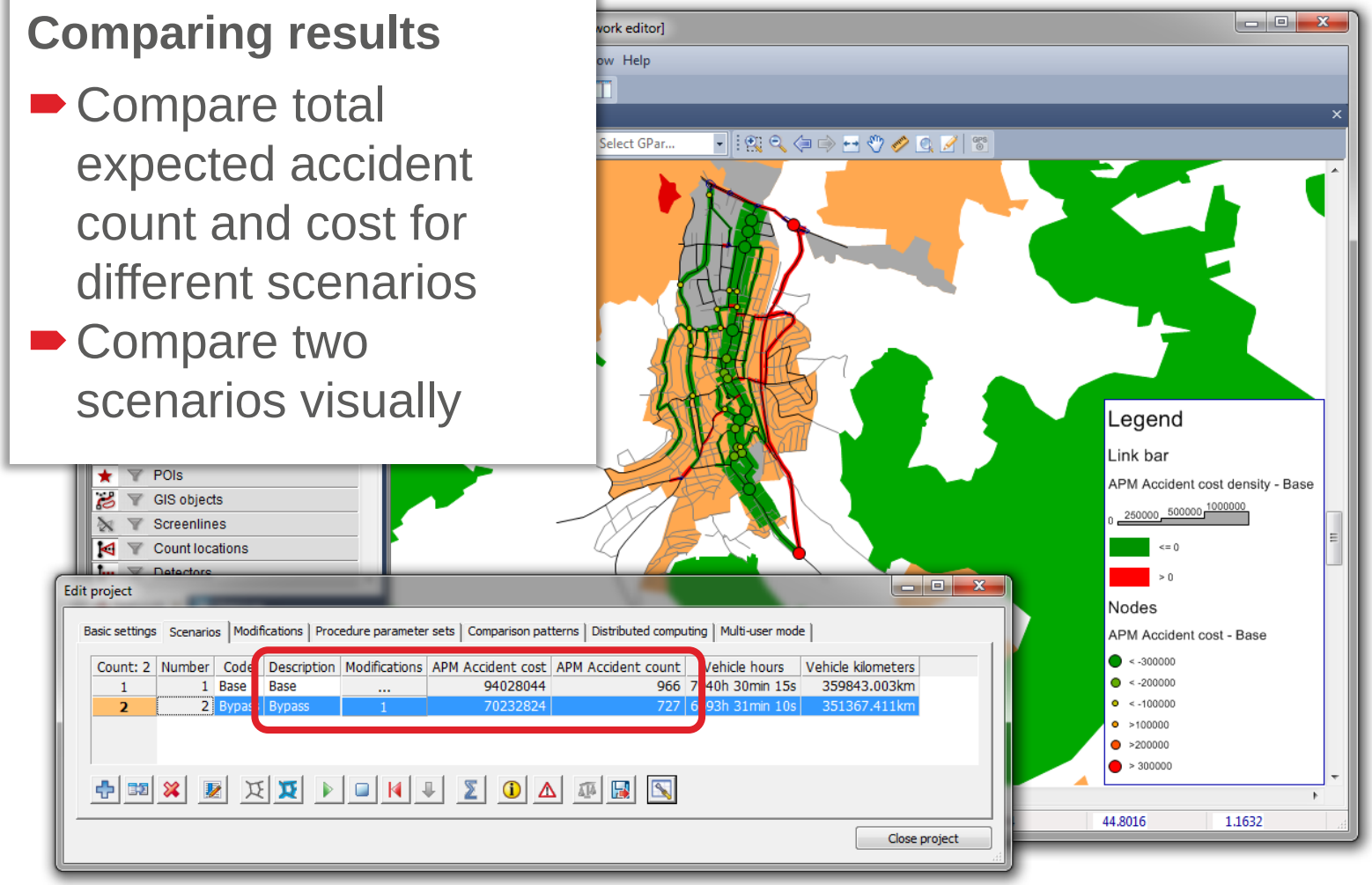


- Standardized valuation method for comparing newly planned alternative schemes
- Estimations of e.g. crash cost rates for different types of infrastructure (nodes and links)
- Cost-benefit-analysis of new construction or reconstruction

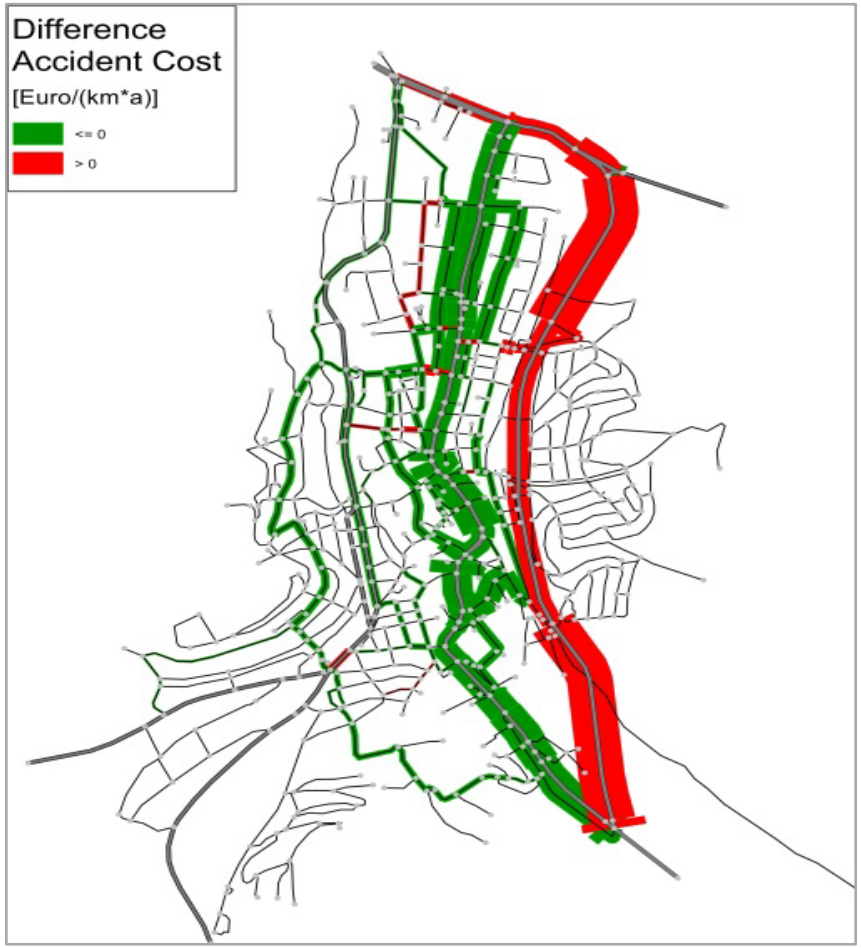
EVALUATION OF RESULTS

Comparing results

- Compare total expected accident count and cost for different scenarios
- Compare two scenarios visually



ROAD SAFETY IMPACT ASSESSMENT (RIA)



Estimation of the effects that changes in the amount and the distribution of traffic volumes have on the road network.

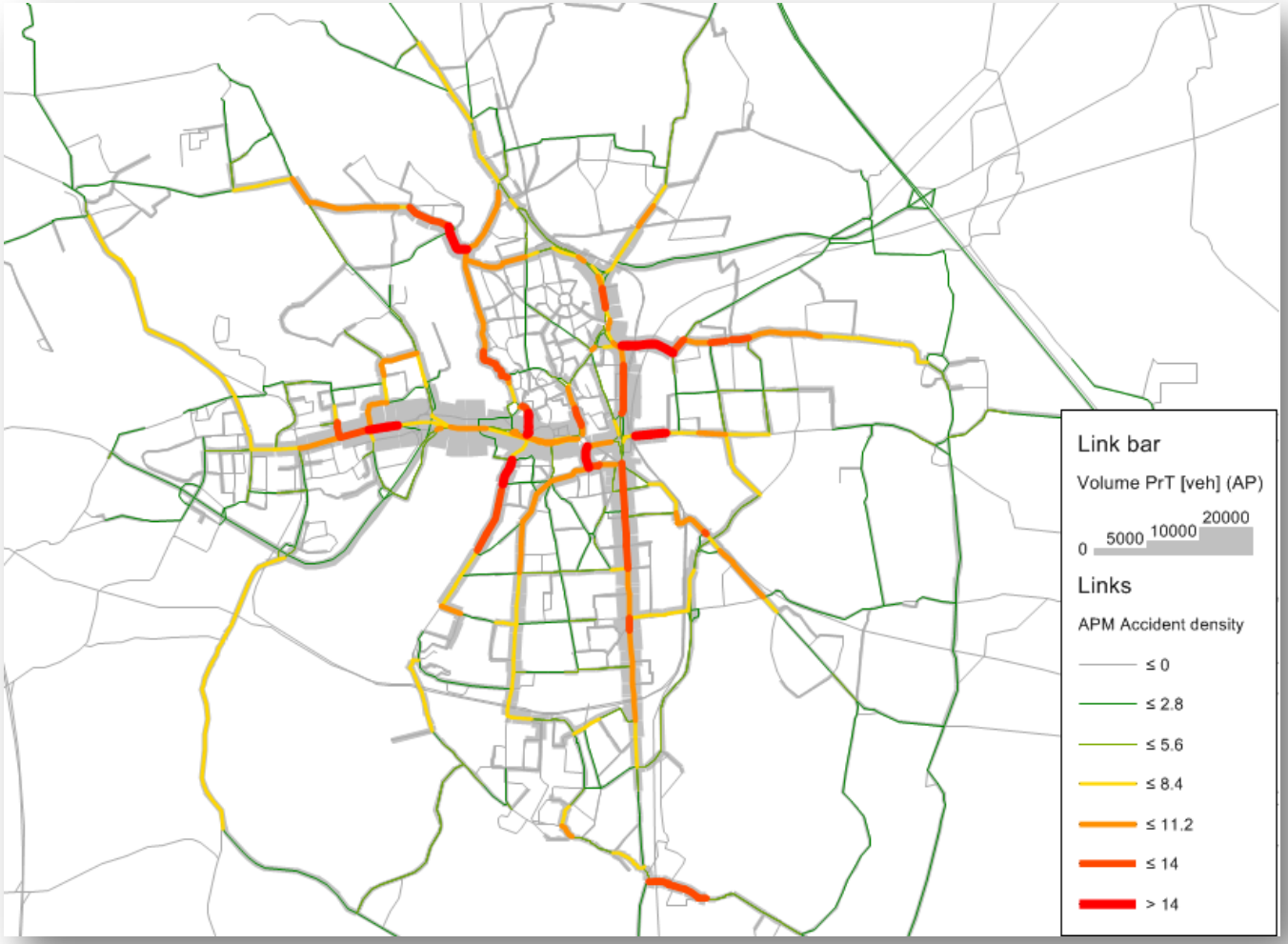
Example of new bypass and the impact on safety:

increase

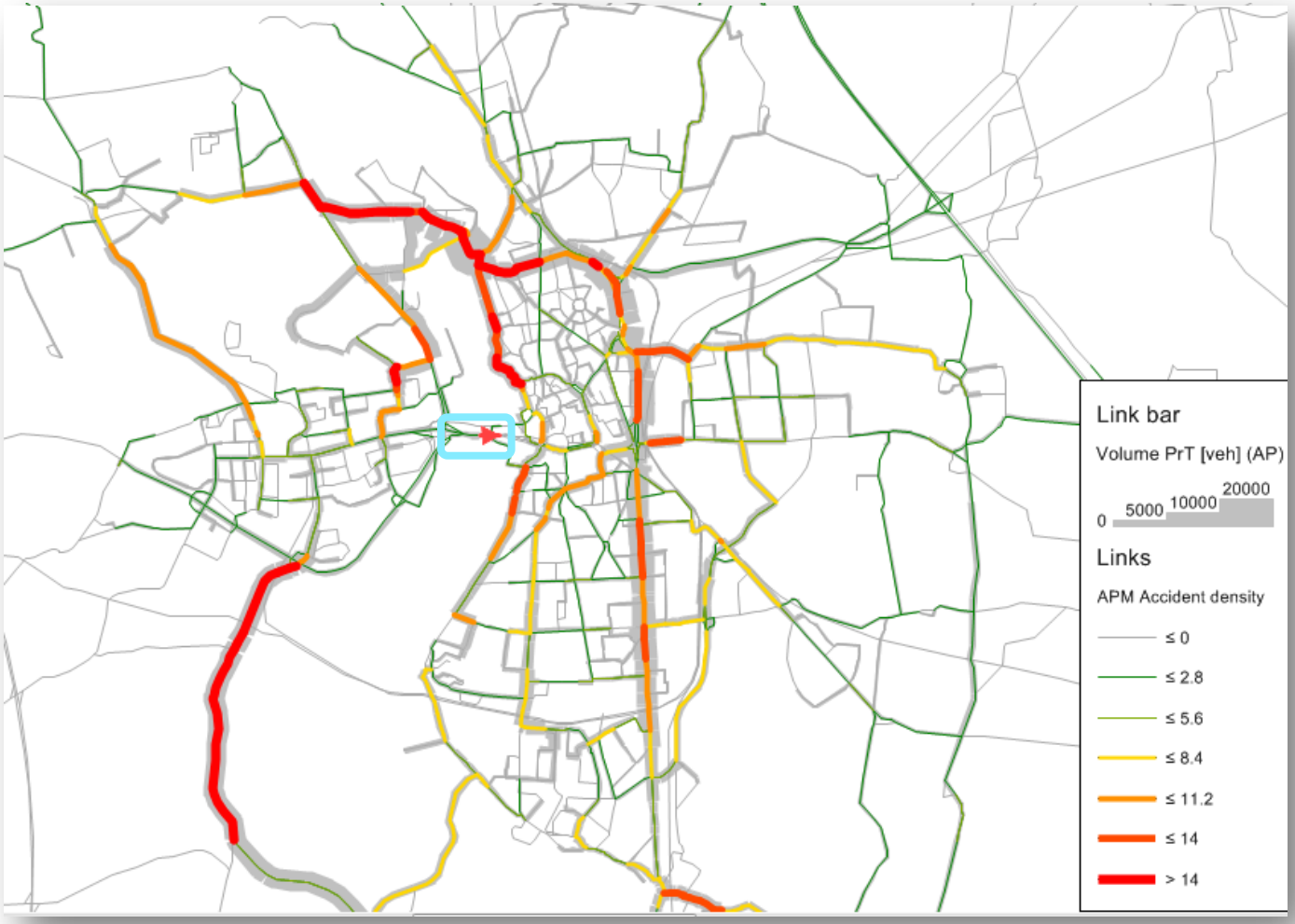
decrease

of accident costs

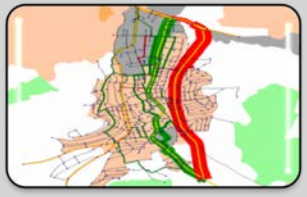
USE CASE TRAFFIC MANAGEMENT:
REGULAR TRAFFIC VOLUME AND ACCIDENT DENSITY



BRIDGE CLOSED:
DIFFERENT TRAFFIC VOLUME AND ACCIDENT DENSITY

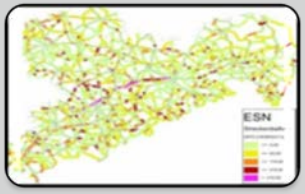


SCOPE OF APPLICATIONS FOR ROAD SAFTEY



Road Impact Assessment (RIA)

Forecast of safety levels



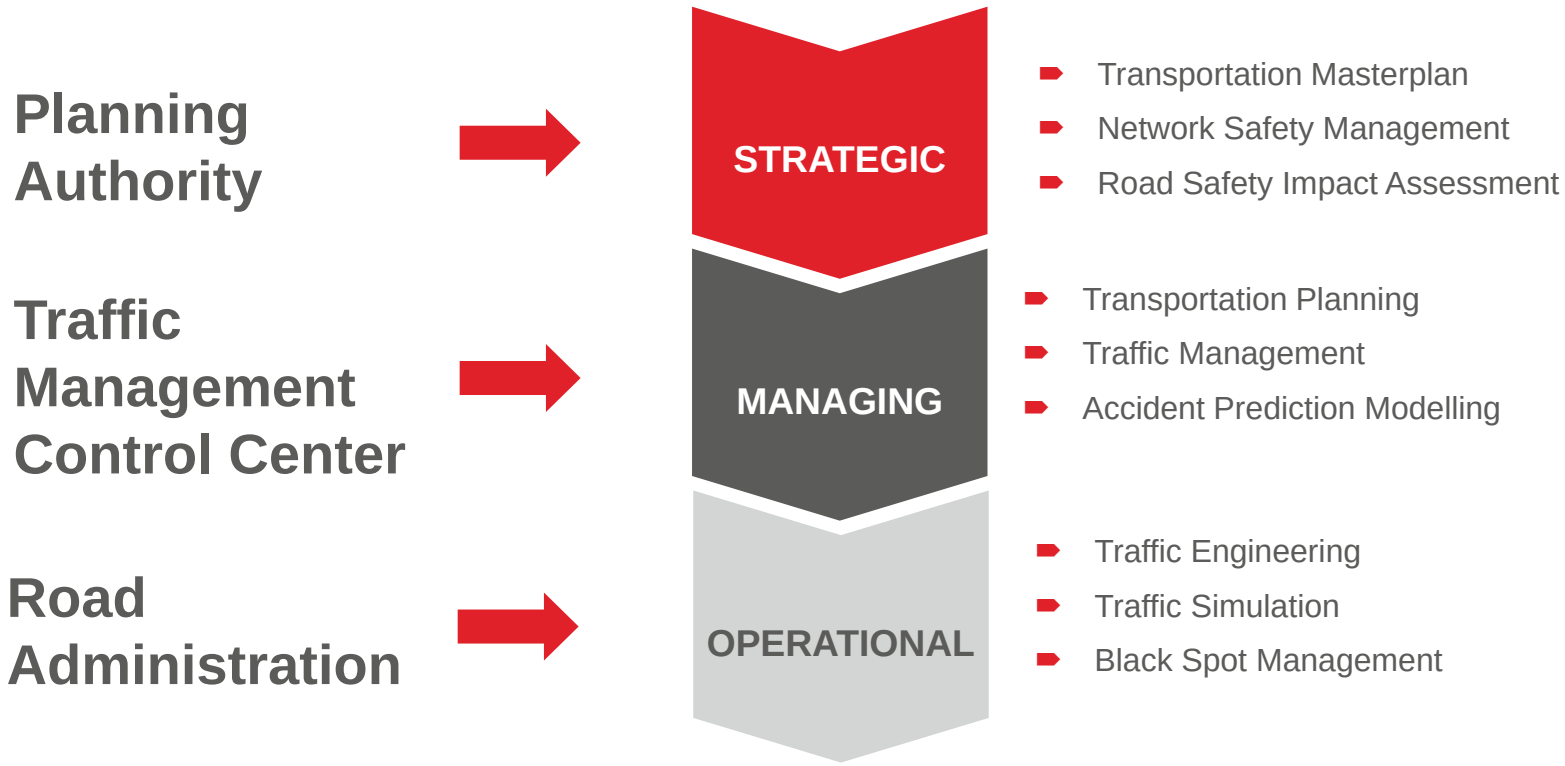
Network Safety Management (NSM)

Aggregation of safety data

Black Spot Management (BSM)

Detailed analysis of historical accident data

ADMINISTRATIONAL LEVELS OF SAFETY MANAGEMENT



Safe and sustainable road networks

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