



**XXIVth WORLD
ROAD CONGRESS**
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Dynamic Navigation: Car manufacturers and traffic management working hand in hand

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Mobility challenges in Megacities

The world becomes
urbanized



Today already more people live in urban areas than in rural areas.

In 2030 it will be more than 60% of the world population.



The car is part of a large Network BMW ConnectedDrive



Navigation 1996.
Things were simple at that time.

NAVTECH



carin[®]
NAVIGATION SYSTEM



PHILIPS



ITS Telematics Today. Is it all about being connected?



Navigation in large metropolitan areas. State of the Art.

- High and still increasing penetration of navigation devices
- Many devices provide dynamic content but static routing
- Traffic information mostly on major roads and highways
- Dynamic Route Guidance leads through „White Spots“



Navigation in large metropolitan areas. Effects of individual traffic guidance.

- Contradicting information between road signage and navigation
- Uncertainty if alternative routing is really better
- Increasing traffic volumes on low class arterials
- Negative customer experience



Navigation in large metropolitan areas. Goals and Objectives.

- Take local traffic management strategies into account
- Concentrate traffic onto high capacity arterials
- Proactively react to local incidents
- Establish a Win-Win proposition for drivers and local traffic management





Local alternative routing strategies

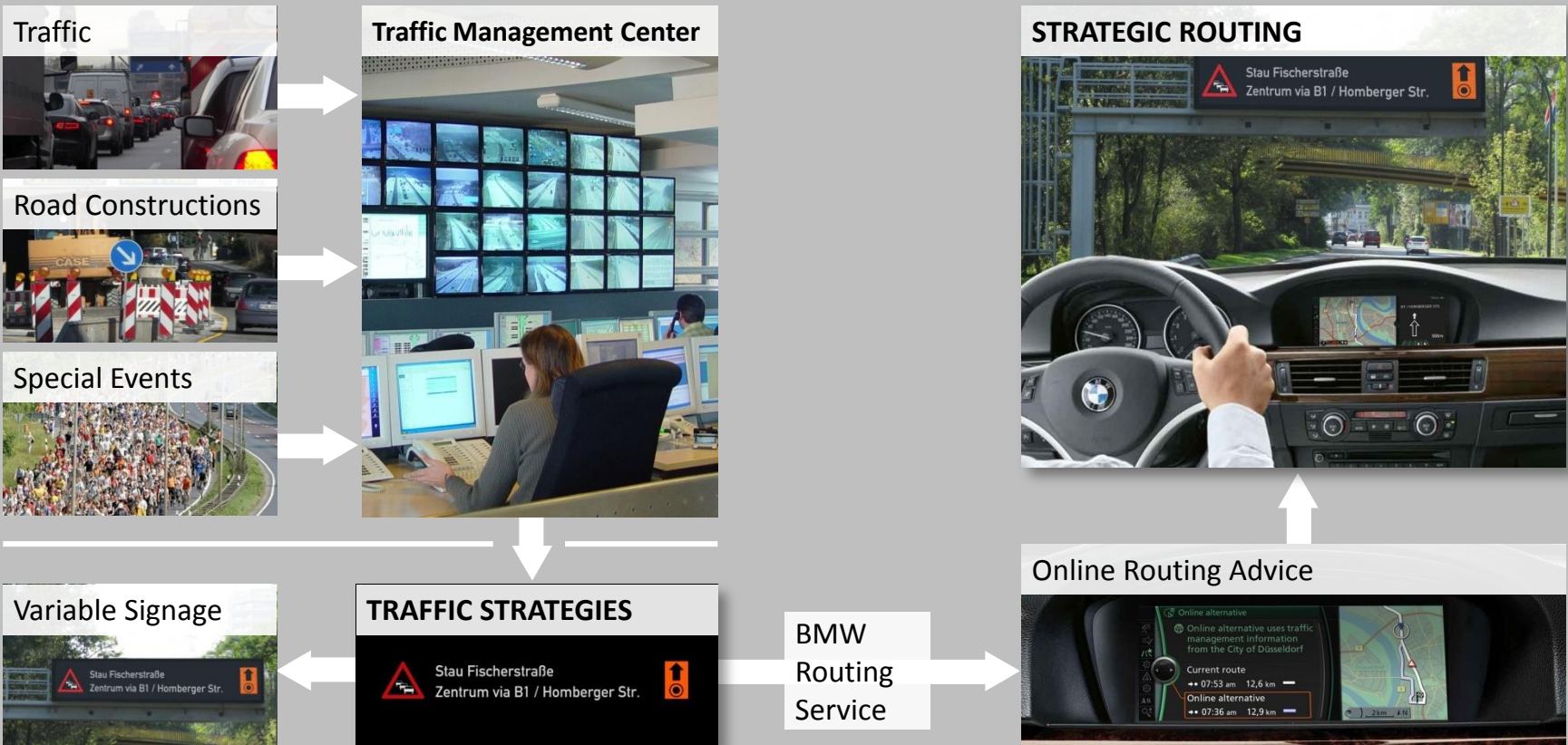
Traffic Management vs Individual Navigation ?!

Effects of individual navigation in competition with traffic management

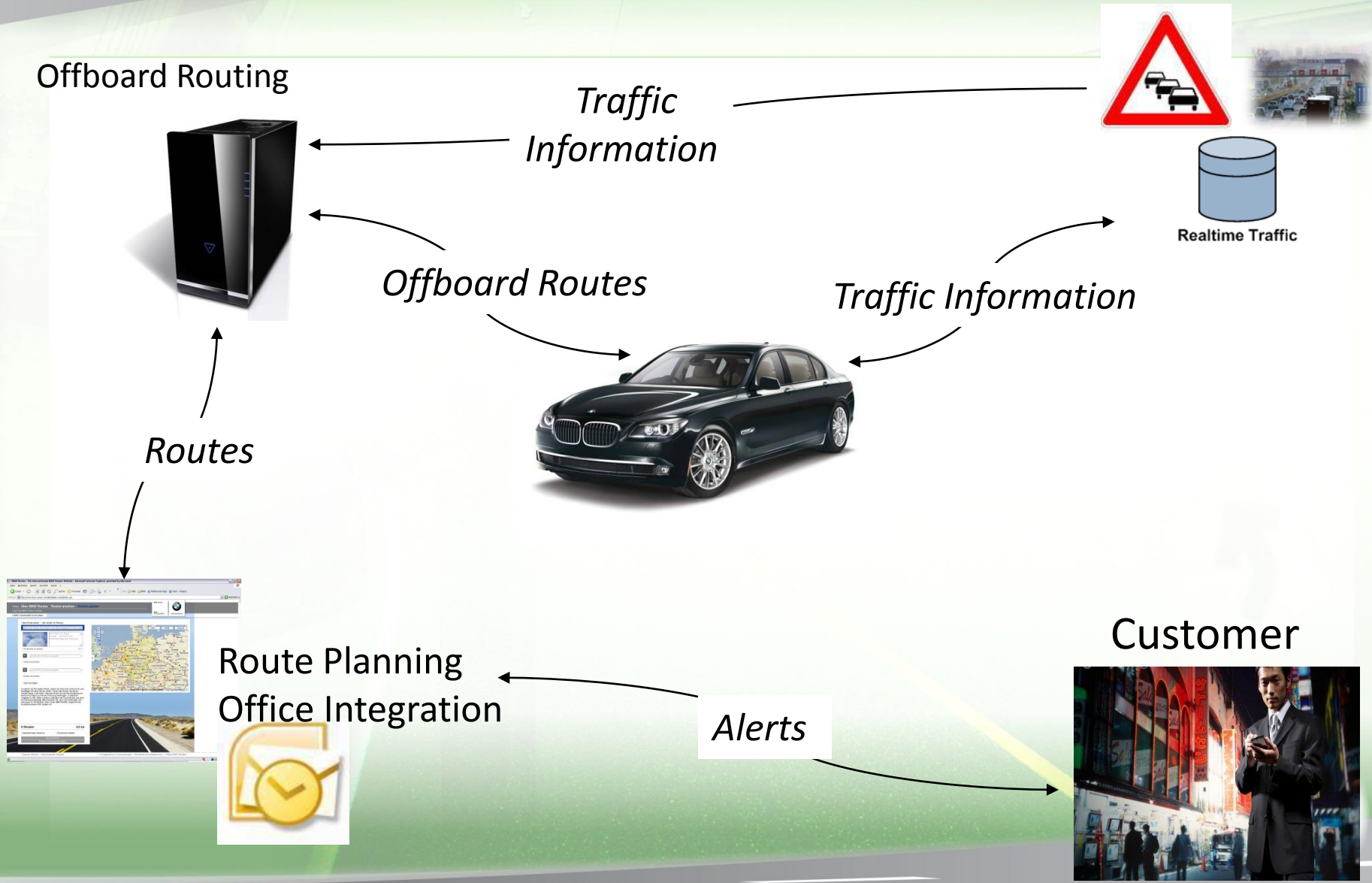
Route Guidance on roads that:

- are of low capacity (secondary / congested)
 - are effected by incidents (Accidents, Road Works),
 - run through sensitive areas (residential areas)
 - are unsuitable (clearance, maximum weight restrictions)
 - are not permitted for through traffic
-
- Contradicting Route Suggestions
static road signs, variable road signs, Radio Broadcasts, Navigation Device
-
- Less that 20% of motorists follow local signs

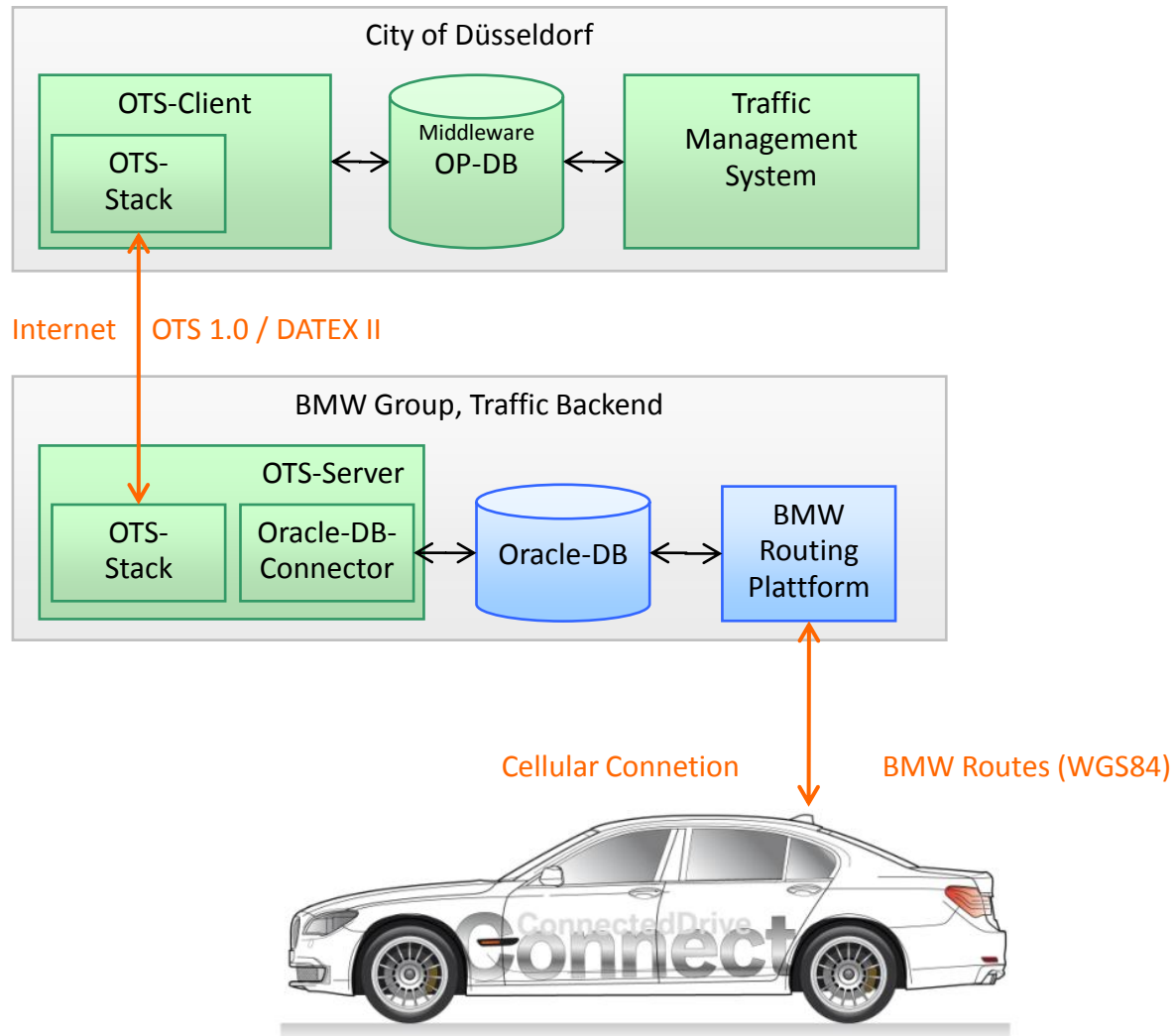
Public Private Cooperation Traffic Management and Navigation working hand in hand



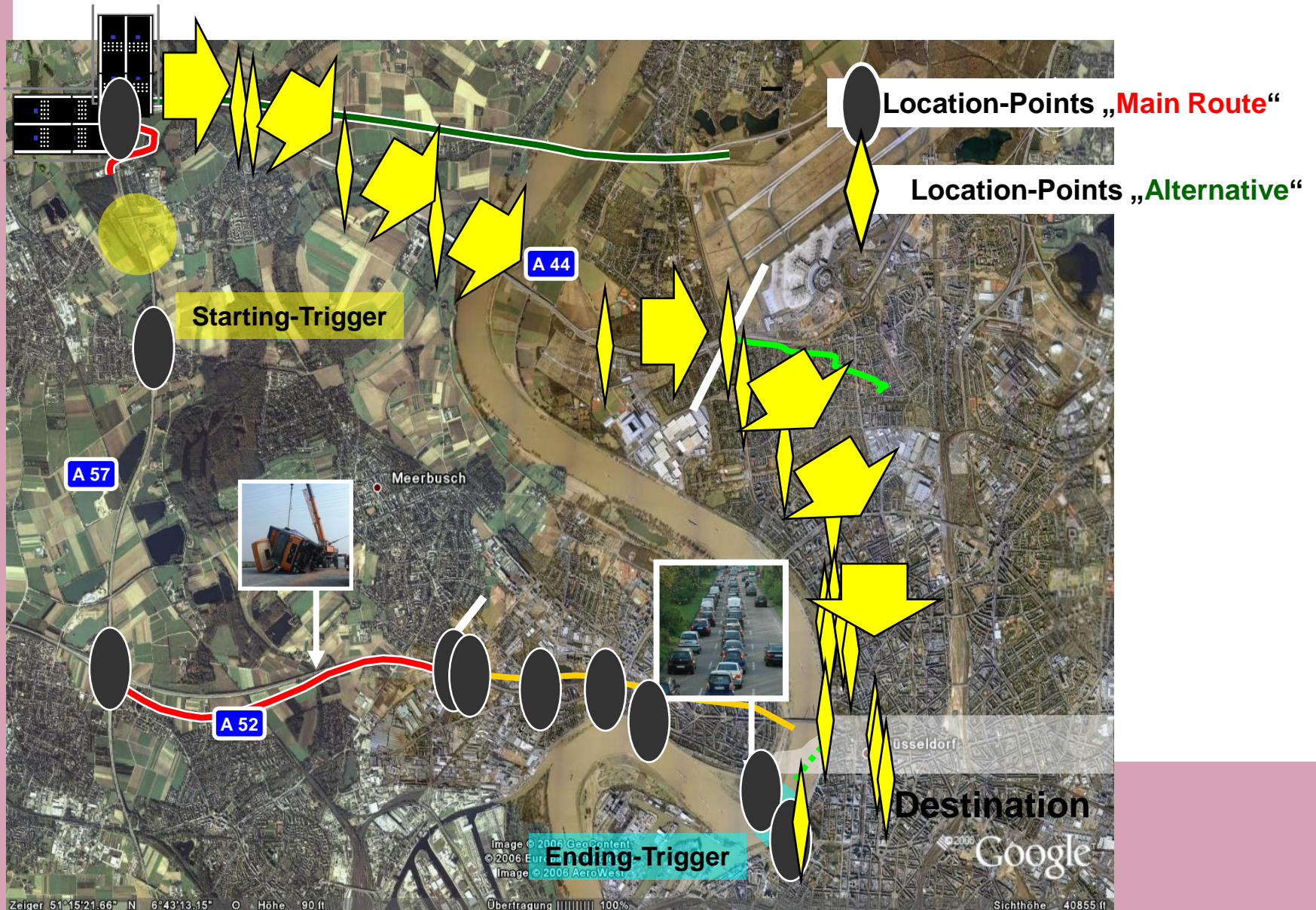
Navigation in large metropolitan areas. Off-Board and Hybrid Routing.



Public Private Cooperation Research Project: Düsseldorf in Motion



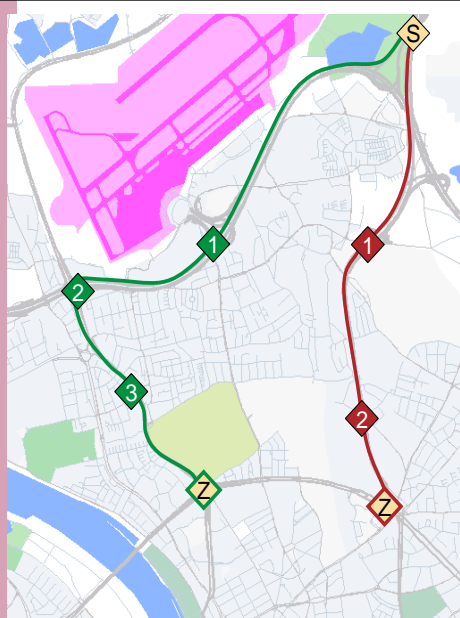
Local alternative routing strategies



Local alternative routing strategies



OTS Interface Implementation



Start: AK Düsseldorf-Nord	
AS Rath	A44 Flughafen (Tunnelzufahrt)
LSA „Vogelsanger Weg“	AS Stockum
LSA „ARAG-Tower“	Danziger Str. (Brücke „Am Hain“)
	KP Nordfriedhof

```
<?xml version="1.0" encoding="UTF-8" ?>
<!-- Beispiel für eine Routenempfehlung im DATEX II-Datenmodell, die per OTS 2 gesendet wird -->
<!-- GEVAS software, TGS, 25.03.2010 -->
- <OTS2:OTSTestRootTransport xsi:schemaLocation="http://opentrafficsystems.org/OTS2 OTS_Implementation.xsd" xmlns:OTS2="http://opentrafficsystems.org/OTS2"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:D2="http://datex2.eu/schema/2_0RC2/2_0">
- <OTS2:tSend>
- <OTS2:transportId>
  <OTS2:clientPart>1246</OTS2:clientPart>
  <OTS2:serverPart>1307</OTS2:serverPart>
</OTS2:transportId>
- <OTS2:data xsi:type="OTS2:sMsgType">
- <OTS2:msg xsi:type="OTS2:aSnippetsType">
  <OTS2:subscrId>25601</OTS2:subscrId>
- <OTS2:data xsi:type="OTS2:acDataSituationType">
- <OTS2:base>
  <OTS2:initState>1</OTS2:initState>
</OTS2:base>
- <OTS2:sPublication lang="de">
<!-- Ab hier beginnt die Modellierung im DATEX II Datenmodell -->
  <D2:publicationTime>2009-11-11T16:06:26+01:00</D2:publicationTime>
- <D2:publicationCreator>
  <D2:country>de</D2:country>
  <D2:nationalIdentifier />
  <D2:publicationCreator />
- <D2:situation id="ID_17" version="1">
- <D2:headerInformation>
  <D2:confidentiality>noRestriction</D2:confidentiality>
  <D2:informationStatus>real</D2:informationStatus>
</D2:headerInformation>
<!-- Gestörte Route, die mit der Alternativroute umfahren werden soll. Trigger sind erster und letzter Punkt der Route -->
- <D2:situationRecord xsi:type="D2:AbnormalTraffic" id="ID_23" version="1">
  <D2:situationRecordCreationTime>2009-11-11T16:06:26+01:00</D2:situationRecordCreationTime>
  <D2:situationRecordVersionTime>2009-11-11T16:06:26+01:00</D2:situationRecordVersionTime>
  <D2:probabilityOfOccurrence>certain</D2:probabilityOfOccurrence>
- <D2:validity>
  <D2:validityStatus>active</D2:validityStatus>
- <D2:validityTimeSpecification>
  <D2:overallStartTime>2009-11-11T16:06:26+01:00</D2:overallStartTime>
</D2:validityTimeSpecification>
</D2:validity>
<!-- Ereignistext zur Routenempfehlung -->
- <D2:cause xsi:type="D2:NonManagedCause">
- <D2:causeDescription>
  <D2:values>
  <D2:value>Stau im Bereich Fischerstraße, Umleitung des Ziels Düsseldorf-Zentrum via Homberger
    Straße/Cecilienallee</D2:value>
  </D2:values>
</D2:causeDescription>
</D2:cause>
</D2:situationRecord>
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</OTS2:data>
</OTS2:tSend>
</OTS2:OTSTestRootTransport>
```

Local alternative routing strategies

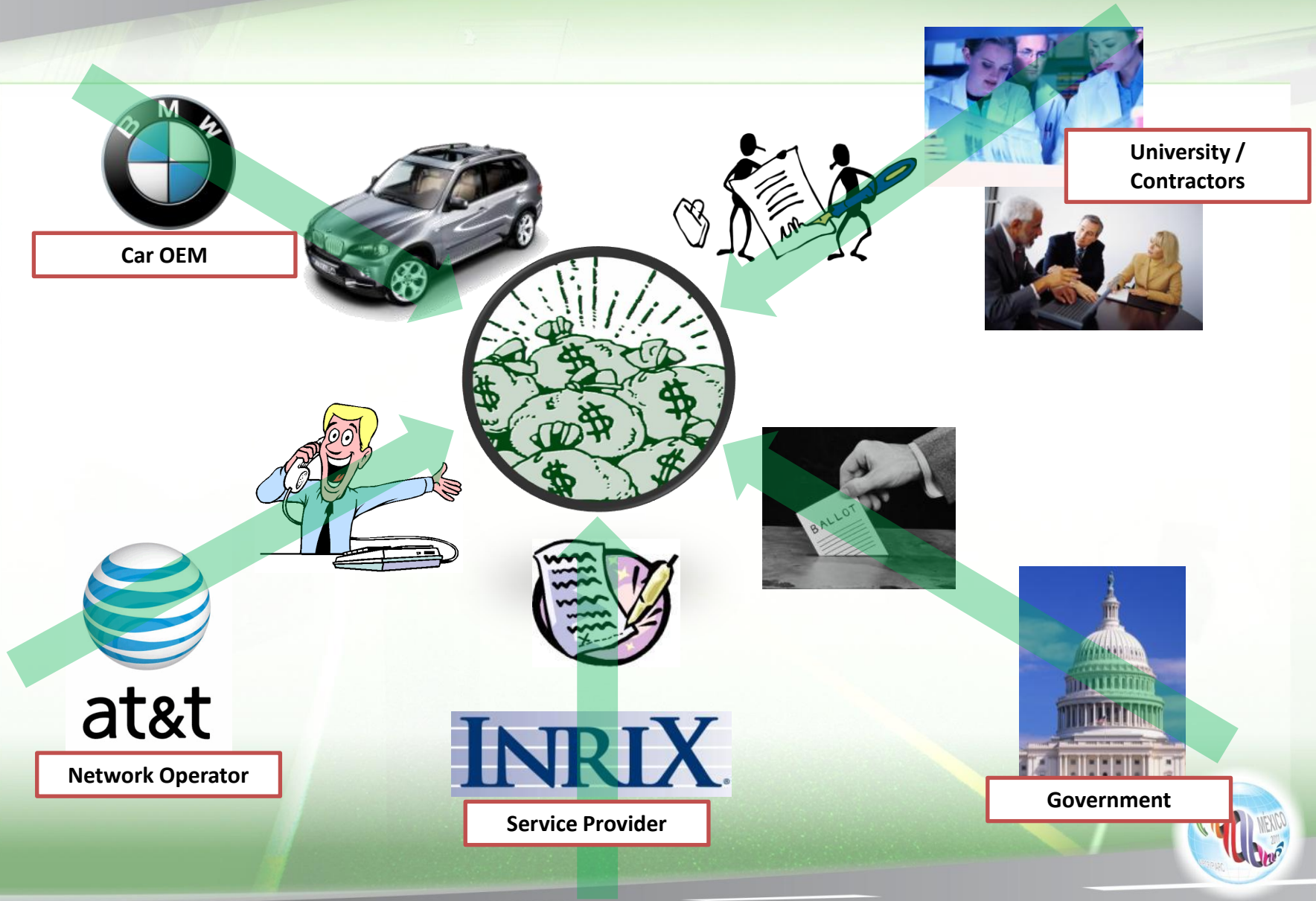
Traffic Management vs Individual Navigation ?!

Results of strategie conforming routing

- No contradictions between collective and individual systems
- Increase in effectiveness of traffic management measures as a result of integration in navigation systems



Advanced ITS Traffic and Mobility Services. Finding a Win-Win scenario for everyone involved.



Thank you for your attention

