NAVTEQ Maps for Advanced Routing
NAVTEQ Transport Agenda

Speaker:

- Sangeeta Walsh, Product Manager, NAVTEQ

Agenda:

- Who is NAVTEQ
- The NAVTEQ Map
  - Quality
  - Global coverage highlights
- NAVTEQ Transport
  - Restriction types
- Questions
Who is NAVTEQ?

NAVTEQ is the leading global provider of digital map, traffic and location data that enables navigation and location-based platforms around the world.
A Global Presence

Corporate Headquarters
Chicago, USA

EMEA Headquarters
Veldhoven, Netherlands

APAC Headquarters
Gateway East, Singapore
NAVTEQ is the leading provider of the digital map, traffic and location data that powers many of the world’s most innovative navigation applications.
THE FOUNDATION: THE NAVTEQ MAP
A Comprehensive Quality Approach

At NAVTEQ, we build our map step by step. At every stage, we focus on creating accurate, precise data to be used in a wide range of applications.

- NAVTEQ’s global map build process includes:
  - Quality Testing over 80,000 Data Sources
  - Collection and Verification by Local Experts
  - Database Validation and Compilation
  - Publication of Data
  - Continuous Testing for Quality Improvement

NAVTEQ is not only focused on building an accurate database, but on keeping it fresh so that it reflects the real world.
The NAVTEQ Difference: Its People and Technology

Leveraging the right balance of people and technology allows for NAVTEQ’s competitive advantage in providing the highest quality map

- **NAVTEQ’s ~ 1,000 Geographic Analysts:**
  - Local knowledge: 203 offices in 45 countries
  - Field teams “own” their piece of the map

- **NAVTEQ’s Global Toolkit:**
  - A single global specification—One World, One Database
  - Tools and technology are mobile and scalable to adjust to unique scenarios

- **NAVTEQ’s Continuous Innovation:**
  - New ways to leverage existing tools
  - Powerful tools open the door to new content and boost collection capabilities

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Local Knowledge: A Key Value Add

This in-depth “human factor” delivers data consistent with real world conditions and results in a multi-faceted and comprehensive product.

- Local field teams “own” their piece of the map
  - Collecting and verifying up to 260 attributes
  - Regular updating of changing/growing areas
  - Identifying new unique local sources
  - Adapting collection methods based on local constraints
  - Responding to customer update requests
  - Defining phonetic translation localization
  - Adding local content coding directly into the map
  - Monitoring quality at every step of collection and production
Identical software, tools and processes used by our approximately 1,000 geographic analysts are the foundation of NAVTEQ’s unique build process.

Examples of software, tools and processes include:

- Multi-view cameras which enable a complete view of the road to optimize data quality and collection efficiency.
- Geo-referenced audio files allow for “virtual re-drives” and provide context for field coding during production.
- Inertial Measurement Units (IMU) aid in collection where GPS signals are unreliable and provide the precision needed for advanced data collection.
- Automated feature extraction and real-time validation tools help ensure equal emphasis on efficiency and quality.
Most Accurate and Comprehensive Global Footprint

NAVTEQ Map
Entry Map

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Coverage Highlights: Europe, Middle East, Africa

- Western Europe: 100% Prime Coverage with continued enhancements to address range coverage

- Eastern Europe: Full Coverage of 10 countries, Prime Coverage in most capital cities and expanded coverage in Bulgaria, Romania, Russia, Turkey and Ukraine

- Middle East: 100% of the population covered in 6 countries; Saudi Arabia includes 73% Prime and Lebanon includes 65% Prime Coverage

- Africa: Full Coverage of La Reunion, Namibia and South Africa and expanded coverage in neighboring countries: Botswana, Lesotho and Swaziland. First footprint in Northern Africa with the launch of Morocco
Coverage Highlights: Americas

- United States and Canada: Full Coverage of the Continental US. Expanding Prime Coverage across US and Canada

- Caribbean: Comprehensive coverage of Bahamas, Cayman Islands, Guadalupe, Martinique, Puerto Rico, St. Barthélemy and the US Virgin Islands

- Mexico: Includes Prime Coverage of 34 cities including Mexico City, Monterrey and Guadalajara, in addition to 54 cities with Complete Coverage

- Brazil: Comprehensive coverage with significant increases to the Verified road network

- South America: Comprehensive coverage of Argentina, Chile, Colombia French Guyana and Venezuela
Coverage Highlights: Asia Pacific

- **Australia/New Zealand:** 100% population covered. Full Coverage across Australia.* New Zealand includes 100% of the highway network and extensive Prime and City-to-City Coverage

- **India:** Prime Coverage for 86 cities and 81 cities with Base Coverage, with the entire highway road network covered

- **Southeast Asia:** Comprehensive coverage including 100% Prime Coverage of Singapore; 100% population coverage of Thailand and Malaysia; and 81% of the population covered in Indonesia with expanding Prime, Complete and City-to-City Coverage

- **South Korea:** 100% Prime Coverage

- **Taiwan:** 15% Prime Coverage

- **China:** Full Coverage of China built from a joint venture, NAV2, with over 1,842 cities including Hong Kong and Macau

*Some roads in Complete coverage were verified by local sources and will undergo additional NAVTEQ verification procedures as part of planned update activities

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NAVTEQ TRANSPORT™
NAVTEQ Transport™ is a set of navigable attributes specifically designed for navigation for trucks and large vehicles.

- Dataset enhanced and maintained by NAVTEQ field
- Included in the Core NAVTEQ Map (Q2/09)
- Global specification
- Enhanced with additional navigation and Rich POI content

Available features in 2010:

- Physical Restrictions: Available
- Legal Restrictions: Available
- Warnings: Available
- Truck POIs: Available
Why NAVTEQ Transport?

- **Reduce Costs:**
  - Reduce fuel consumption
  - More efficient routes
  - Fewer unscheduled stops and reroutes
  - Avoid damages
  - Increase dispatching flexibility

- **Improve Customer Service:**
  - More timely deliveries
  - Improved delivery time estimates
  - Improved fleet efficiency
Data – details: Physical restrictions (1/4)

<table>
<thead>
<tr>
<th>Physical Restrictions</th>
<th>EU</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height Restriction</td>
<td>3.8m</td>
<td><img src="image" alt="Low Clearance Sign" /></td>
</tr>
<tr>
<td>Weight Restriction</td>
<td>5.5t</td>
<td><img src="image" alt="Weight Limit Sign" /></td>
</tr>
<tr>
<td>Weight per Axle</td>
<td>8t</td>
<td><img src="image" alt="Axle Weight Limit Sign" /></td>
</tr>
<tr>
<td>Width Restriction</td>
<td>2m</td>
<td><img src="image" alt="Check Mark" /></td>
</tr>
<tr>
<td>Length Restriction</td>
<td><img src="image" alt="Check Mark" /></td>
<td></td>
</tr>
</tbody>
</table>

- Exact locations of a restriction to be captured to make sure that restricted road segment is entered from the correct side
- Detailed information about the type of restriction (e.g. tunnel, bridge, arch-bridge) are available
### Data – details: Legal (2/4)

<table>
<thead>
<tr>
<th>Legal Restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trucks not allowed</td>
</tr>
<tr>
<td>No left turn for trucks</td>
</tr>
<tr>
<td>No right turn for trucks</td>
</tr>
<tr>
<td>No U-turn for trucks</td>
</tr>
<tr>
<td>Trailer forbidden</td>
</tr>
<tr>
<td>Truck specific speed limits</td>
</tr>
<tr>
<td>No overtaking</td>
</tr>
</tbody>
</table>

- Includes date and time related restrictions
- Exceptions for residents, deliveries and public transport are also captured

**Recommended truck routes**

- STAA Routes
- TD Routes
### Data – details: Warning (3/4)

<table>
<thead>
<tr>
<th><strong>Warning Information</strong></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Steep hill downwards ahead</td>
<td><img src="image1.png" alt="Warning Icon" /></td>
<td><img src="image2.png" alt="Warning Icon" /></td>
</tr>
<tr>
<td>Steep hill upwards ahead</td>
<td><img src="image3.png" alt="Warning Icon" /></td>
<td><img src="image4.png" alt="Warning Icon" /></td>
</tr>
<tr>
<td>Sharp curve(s)</td>
<td><img src="image5.png" alt="Warning Icon" /></td>
<td><img src="image6.png" alt="Warning Icon" /></td>
</tr>
<tr>
<td>Lateral wind</td>
<td><img src="image7.png" alt="Warning Icon" /></td>
<td><img src="image8.png" alt="Warning Icon" /></td>
</tr>
<tr>
<td>Risk of grounding</td>
<td><img src="image9.png" alt="Warning Icon" /></td>
<td><img src="image10.png" alt="Warning Icon" /></td>
</tr>
<tr>
<td>Tree overhang</td>
<td><img src="image11.png" alt="Warning Icon" /></td>
<td><img src="image12.png" alt="Warning Icon" /></td>
</tr>
<tr>
<td>Road narrows</td>
<td><img src="image13.png" alt="Warning Icon" /></td>
<td><img src="image14.png" alt="Warning Icon" /></td>
</tr>
</tbody>
</table>
**HAZMAT Restrictions**

- Restrictions for trucks with specific hazardous materials
- All trucks with explosive and inflammmable goods forbidden
- All trucks with natural goods that can be harmful for the water forbidden

**Preferred HAZMAT Routes:**

- All NRHM HAZMATs
- Class 1 HAZMATs
- Poisonous Inhalation Hazard
- Medical Waste HAZMATs
- Radioactive HAZMATs

**HAZMAT Restrictions**

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Explosives</td>
</tr>
<tr>
<td>2</td>
<td>Gas</td>
</tr>
<tr>
<td>3</td>
<td>Flammable</td>
</tr>
<tr>
<td>4</td>
<td>Flammable S/C</td>
</tr>
<tr>
<td>5</td>
<td>Organic</td>
</tr>
<tr>
<td>6</td>
<td>Poisons</td>
</tr>
<tr>
<td>7</td>
<td>Radio Active</td>
</tr>
<tr>
<td>8</td>
<td>Corrosive</td>
</tr>
<tr>
<td>9</td>
<td>Other e.g. PIH</td>
</tr>
</tbody>
</table>
Truck POI* – US & Canada

Value added POI for the Transport industry

**DESCRIPTION**
- NAVTEQ Truck Guide provides value added points of interest (POI) specific to the transport industry.
- Primary target is the Enterprise (Mobile Resource Management) market, but will also be relevant to consumer and in-vehicle device.
- The product can be used for many applications like routing, optimization, resource management and truck navigation.

**DATA FEATURES**
- NAVTEQ Truck Guide Rich Content complements the NAVTEQ Core database, adding POI that fulfills the unique needs of the Transport industry.
- Transport specific POI flags (e.g. Truck Stop flags include idle reductions system availability, Wi-Fi access, showers, # of showers, truck scales, truck wash, and truck service center).

**COVERAGE**
- U.S.
- Canada

**FORMAT**
- POI-XML

*Included with the NAVTEQ Enterprise license*
# Truck POI Delivery Details

## North America Categories

<table>
<thead>
<tr>
<th></th>
<th>Truck Stops</th>
<th>Weigh Stations</th>
<th>Truck Parking</th>
<th>Truck Dealerships</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Core</strong></td>
<td>Location Information,</td>
<td>Location information &amp;</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>POI name, phone number,</td>
<td>POI name</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chain ID</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>XML file</strong></td>
<td>Same attributes as Core and:</td>
<td>Same attributes as Core</td>
<td>*Potential attributes</td>
<td>*Potential attributes for</td>
</tr>
<tr>
<td></td>
<td>-Idle Reduction System</td>
<td>and:</td>
<td>for parking:</td>
<td>dealerships:</td>
</tr>
<tr>
<td></td>
<td>-WiFi Access</td>
<td>-Weight in Motion (WIM)</td>
<td>-24 hour Parking</td>
<td>-Location Information</td>
</tr>
<tr>
<td></td>
<td>-Showers</td>
<td></td>
<td>-Secure Parking</td>
<td>-POI name</td>
</tr>
<tr>
<td></td>
<td>-Truck Wash</td>
<td></td>
<td></td>
<td>-Phone number</td>
</tr>
<tr>
<td></td>
<td>-Truck Scales</td>
<td></td>
<td></td>
<td>-Chain ID</td>
</tr>
<tr>
<td></td>
<td>-Truck Service Center</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Q1 2010 will be migration into Core Map of Truck stops and Weigh stations

*Truck Parking and Truck Dealership attributes may change, for a 2H 2010 product. Final source for these 2 POI's are still under investigation
Meet growing trucking industry demand for ‘green functionality’ and achieve cost savings through price discounts and implementation synergies

Enable drivers to select the most fuel efficient route before driving and/or get driver cues and feedback that can lead to changes in driving behavior and improved fuel efficiency

Enable fleets to let the truck work for them, reducing fuel consumption, transmission wear and environmental impact
Enabling More Advanced Use Cases

**Absolute Height & Slope**
- Eco Driving
- Predictive Cruise Control and Smart Transmission
- Eco Routing

**Curvature**
- Eco Driving
- Predictive Cruise Control and Smart Transmission
- Eco Routing

**Speed Limits (FC1-4)**
- Eco Driving
- Predictive Cruise Control and Smart Transmission
- Eco Routing

**Traffic Signals & Stop Signs**
- Eco Driving
- Predictive Cruise Control and Smart Transmission
- Eco Routing

**NAVTEQ Traffic Patterns**
- Eco Driving
- Predictive Cruise Control and Smart Transmission
- Eco Routing

**NAVTEQ Traffic**
- Eco Driving
- Predictive Cruise Control and Smart Transmission
- Eco Routing

**Enabling More Advanced Use Cases**

- **Eco Routing**: Enable drivers the ability to select and follow the most fuel efficient route based on pertinent map-based parameters and traffic conditions that lead to smoother driving and reduced vehicle workload.

- **Eco Driving**: Enable the application to provide driver cues which can lead to smoother acceleration and braking behavior as well as optimal gear selection to help reduce fuel consumption.

- **Predictive Cruise Control and Smart Transmission**: Enable the vehicle to anticipate upcoming changes in road conditions to automatically reduce the powertrain workload and help the transmission optimize gear selection and gear change timing.
Eco Routing

Enable routing algorithms to generate the most fuel-efficient route based on map data and traffic conditions that lead to smoother driving and reduced vehicle workload.

- Applications can minimize start/stop by avoidance of traffic signals, stop signs and traffic congestion.
- Applications can also maximize smooth driving at most fuel efficient speeds taking into account historical speed, road curvature, height and slope.
- In addition, applications can display a summary of estimated fuel and CO2 reduction achieved through the use of green routes—both individually and cumulatively over time.
QUESTIONS