Digital Map Technology Has Arrived
Harnessing its Power
Eliot Dam, NAVTEQ Director Product Management Latin America
Agenda

• What is a Digital Map?

• How to Optimize Technology and Opportunities

• What are the Market Opportunities?
What is a Navigable Map?
A Brief History of the Practical Map

Mercator’s maps were renowned for their precision and accuracy. But, they were large (think bed sheet large) and therefore not terribly useful.

Ortelius was a contemporary of Mercator. He was commissioned to take the very large maps, and turn them into something more practical: a map small enough to be portable. And thus was born the first map for practical applications.
A Navigable Map Requires More

Map making has evolved significantly in the last few centuries. It takes many attributes and a robust build process to deliver a navigable map.
The Map Starts with Geometry

- A digital map is a vector based database with the following standard components
  - Link: the standard a unit of measure representing roadway geometry between two intersections
  - Node: the junction of 2 links (e.g. an intersection)
  - Shapepoint: a point along a link used to adjust the curvature of its geometry
Add Broad Road Geometry Classification

Extending routing options of navigation applications.

Functional Class Based on Navigation Importance

- **Functional Class = 1** high speed and volume controlled access roads
- **Functional Class = 2** quick travel between and through cities
- **Functional Class = 3** moderate speed travel within cities
- **Functional Class = 4** moderate speed travel between neighborhoods
- **Functional Class = 5** lower speed travel within neighborhoods
Once you have the basics, you need the features of the roadway.
How is a Navigable Map Built?
Database Specification is Key to Quality

Making Sure the Map is Relevant and Current
Sourcing is a Start, But isn’t Good Enough

• Sourcing has limitations
  – Sources are notoriously variable in quality / accuracy
  – Sourcing cannot capture navigable attributes

• That is why you need a field staff
  – Local presence to interpret local nuances
  – Relationships with local sources
  – Sophisticated collection technology
  – Standard global tool kit
Strategic Field Collection Improves Efficiency

• Confirms source quality
• Collects non-source road attribute
• Can include driving all types of roads in the coverage areas
  – arteries
  – residential roads
  – named alleys
  – interior polygon roads
  – POI access roads
• Plus “non-drive” collection
  – addressed walkways
  – “pedestrian only” streets
  – ferry routes
In-the-Field Validation Aids in Eliminating Errors

identify and resolve exceptions

in the field....when data changes are entered
Investment in Maintenance Keeps the Map Fresh

Effective change management includes both prior knowledge of change and knowledge of change after it has occurred.

Sources of Prior Insight
- Local Field Office
- Government Sources
- Video Data
- Sign Manufacturers
- Address Guides

Post Change Management Awareness
Fleet Customers & User Community

Prior Insight to Upcoming Road Network Change
Where is a Navigable Map Used?
Technology In Place to Support Breakout Success

Key Factors Enabling Demand for Navigation and LBS Applications

- Faster, bigger, higher resolution color screens
- Greater internal memory and onboard processing power
- Quality Digital Map and Content
Industry Showing Signs of Readiness

Mobile Penetration %

- 2002: 0%
- 2007: 90%
- 2012: 270%

Navigation Unit Sales

- 2002: 0
- 2008: 80
- 2012: 240

Graph showing the increase in mobile penetration and navigation unit sales from 2002 to 2012.
Map Enables Highly Functional Navigation Features

1. Destination Selection
   Creating powerful new options to find the places you want.

2. Route Guidance
   Improving driver context and clarity along the way.

3. Destination Arrival
   Ensuring drivers arrive at their destination.
Deliver Multiple Search Options to End-Users

Key Use Cases

1. Reduced manual entry of destination information provides a more user-friendly search experience
2. Reduced requirement for users to specify a city for search, e.g., Buenos Aires vs. La Boca
3. Advanced search criteria, profiles and preferences
4. Advanced display of search results

Digital Map Content

- Greater City Zones
- Brand Icons
- Points of Interest
- City Models
Points of Interest (POI) Search by Category

- POI search is one of the more popular features among end-users

Examples of POI Categories
Greater City Zones: Intuitive Selection

- Users can search in Buenos Aires and still find a destination that is actually located in Belgrano.
- Valuable in metropolitan areas that can encompass multiple municipalities.

Keywords:
Urbanico Suites

Location:
Buenos Aires

Search
Advanced Search Options

- More content translates to more options in application design of search functions.
- Connected devices will be able to offer real-time information about a destination such as gas prices.
Enhancing the Driving Experience

Route Guidance
Improving driver context and clarity along the way.

Destination Selection
Creating powerful new options to find the places you want.
Clarity and Context on the Road

Key Use Cases

1. Improved driver orientation and minimized distraction
2. Reduced risk of last minute maneuvers
3. Increased choices in route preferences
4. Improved accuracy of drive time calculations
5. Driver warnings about upcoming changes in road conditions

Map Content

Extended Lanes
Camera Alert
Junction View Images
Junction View Objects
Speed Limits
Knowing What’s Around the Corner

- Notification of upcoming changes in speed limit
- Alert appropriate speed for approaching curve
Moving Toward A Virtual World

- Junction View Objects
- More automation
- Direct linking of 3D object to the real world situation and map data
- More flexibility in look and feel
- Customization to the device (screen size)
Enhancing the Driving Experience

1. **Destination Selection**
   Creating powerful new options to find the places you want.

2. **Route Guidance**
   Improving driver context and clarity along the way.

3. **Destination Arrival**
   Ensuring drivers arrive at their destination.
You Have Arrived

Key Use Cases

- More precise arrival guidance
- Easily recognizable landmark reference points
- A virtual city experience
- Information about your destination

NAVTEQ Products

3D Landmarks
3D City Model
Address Ranges
Extended Navigation
Parking
How will the Market Evolve?
Develop Market via Differentiation

Examples of Product Bundles

Sport

Tourism

Business
Brief Overview of the Value Chain

Digital Map Partners
- Licensed customer / reseller of maps OR strategic partner driving the industry
  - Carriers
  - Large Retail Chains
  - Wireless OEM's
  - Consumer Electronics OEM's

Developer Community
- Third parties that create location-enabled solutions with integrated maps
  - ISVs – VARs – Integration Service Houses
  - In-House Corp. Development
  - Enterprise App Service Providers
  - Entertainment App Service Providers
  - Hobbyists
Building Out The Ecosystem

• A healthy ecosystem will fuel navigation and location-based service innovation & drive market growth

• Role of the navigable map provider
  - Ease development burdens with resources that accelerate creation
  - Aggregate information, companies, solutions to drive commercialization
Taking Advantage of the Opportunity

- End-user interest and technology are converging
- High quality navigable map expands the opportunity
- Nurturing the eco-system provides value chain advantages