Collecting Data:
Technologies and Partnerships

California 511
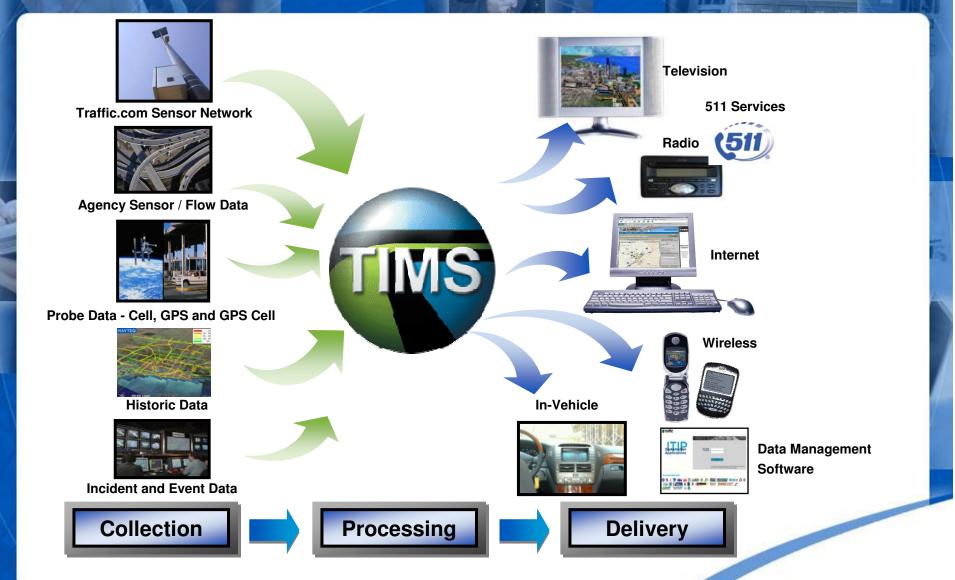
October 28, 2008

Collecting Data: Overview

- Technologies
  - Gather from different sources
  - Process and improve data quality
- Partnerships
  - Connected Traveler (CCIT/Caltrans)
  - Los Angeles/Inland Empire (District 8)
  - Sacramento (District 3)
  - San Diego (SANDAG/ District 11)
  - San Jose (District 4)
  - San Francisco (District 4)
- Delivery of Data Services
  - Real time
  - Archived

NAVTEQ

Technology Leadership: End-to-End Solution

Traffic.com Sensor Network

Agency Sensor / Flow Data

Probe Data - Cell, GPS and GPS Cell

Historic Data

Incident and Event Data

TIMS

Television

511 Services

Radio

Internet

Wireless

In-Vehicle

Data Management Software

Collection → **Processing** → **Delivery**

NAVTEQ

Collection - Sources

Comprehensive Traffic Flow Data Solution

- NAVTEQ's Sensor Network
  - Owns and operates over 2,500 center lane miles of sensors providing volume, speed, classification and density

- Agency Data
  - Agency data is processed through the TIMS engine to clean the data.

- Probes (Cell and GPS)
  - Extends the sensor network with coverage and accuracy. Tens of millions of GPS data points/day.

- NAVTEQ Operations Centers- Three in California

- Historic Data
  - Augments real-time traffic data with a nationwide historic traffic model covering 900,000 miles

Traffic.com sensor

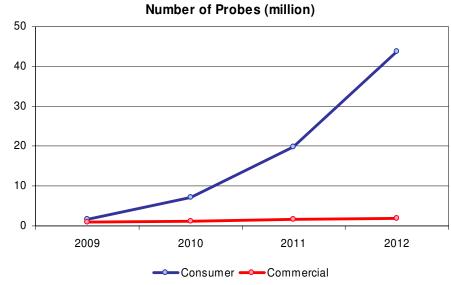**NAVTEQ**

Collection

NAVTEQ Sensors

- Lane-by-lane data
- Data collected every 60 seconds
- Lane by lane average speed, volume, lane occupancy, & vehicle classification
- Up to four vehicle classifications
  - Non-commercial
  - Single-unit commercial
  - Single-trailer commercial
  - Multi-trailer commercial
- Technology
  - Solar Powered
  - Wireless Communications
  - Modular Components
  - Non-Intrusive
  - Covers All Lanes
  - High Reliability

NAVTEQ Sensor

NAVTEQ

Number of Probes (million)

Consumer   Commercial

Points per Day (billion)

Consumer   Commercial
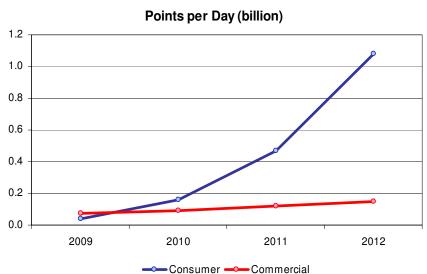
NAVTEQ is uniquely positioned to source consumer probe data

– Supplier to wireless carriers, and car and device manufacturers

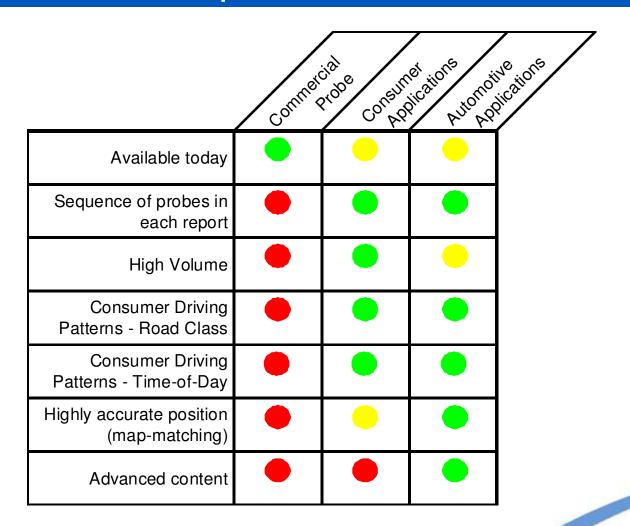– Nokia relationship

– Map and traffic products

NAVTEQ

- **Two coordinated programs**
  - **Contract with US Department of Transportation, Caltrans, and Univ. of California**
    - **Advanced technology development**
    - **Special focus on ensuring privacy**
  - **Commercial deployment**
    - **Alpha and beta tests in Q4 2008**
    - **Commercial launch in Q1 2009**

Not all probes are created equal

	Commercial Probe	Consumer Applications	Automotive Applications
Available today	🟢	🟡	🟡
Sequence of probes in each report	🔴	🟢	🟢
High Volume	🔴	🟢	🟡
Consumer Driving Patterns - Road Class	🔴	🟢	🟢
Consumer Driving Patterns - Time-of-Day	🔴	🟢	🟢
Highly accurate position (map-matching)	🔴	🟡	🟢
Advanced content	🔴	🔴	🟢

NAVTEQ

San Diego Area Traffic Map

NAVTEQ

Los Angeles Area Traffic Map

NAVTEQ

San Francisco Area Traffic Map

NAVTEQ

Sacramento Area Traffic Map

Copyright 2008 Traffic.com, Inc.

NAVTEQ

Processing: HTTM (Hierarchical Travel Time Model)

- Incorporate all data sources
  - Fixed Sensors
  - Probe (fleet and GPS cell)
  - Probe Sequences (previous probe combined with current probe)
  - Incident Data
  - Historical Data
- Optimizes calculation cycles
  - Data feed synchronization
- Weighs data sources on a continuous basis
  - Distance decay
  - Time decay
- Confidence calculation

NAVTEQ

Operations and Traffic Management

Stakeholder access to real-time, digital sensor data

- Region-wide Map

- Individual Sensor Access

- Lane-by-lane Data

- Speed, Volume and
  Lane Occupancy

Station CA015006[15196]. I-15 - 0.81 Mile North of Market Street - Milepost 2.7

Live Update | Update Data Now | Go To Info Page (close this window) | Close this window

Time	Int	Ln #	Direction ▲	Lane Pos	Lane Type	Speed	Volume	Occupancy	Class1	Class2	Class3	Class4	Sensor	Device	Stat
1:31:30 PM	60	1	North	RIGHT	THRU	61	16	2.4%	16	0	0	0	64929	1	A
1:31:30 PM	60	1	North	CENTER	THRU	65	22	5.2%	21	1	0	0	64929	2	A
1:31:30 PM	60	1	North	LEFT	THRU	67	14	2.4%	14	0	0	0	64929	3	A
1:31:30 PM	60	1	South	RIGHT	THRU	60	8	1.6%	8	0	0	0	64929	4	A
1:31:30 PM	60	1	South	CENTER	THRU	55	11	2.0%	11	0	0	0	64929	5	A
1:31:30 PM	60	1	South	LEFT	THRU	65	4	0.6%	4	0	0	0	64929	6	A

NAVTEQ

Delivery

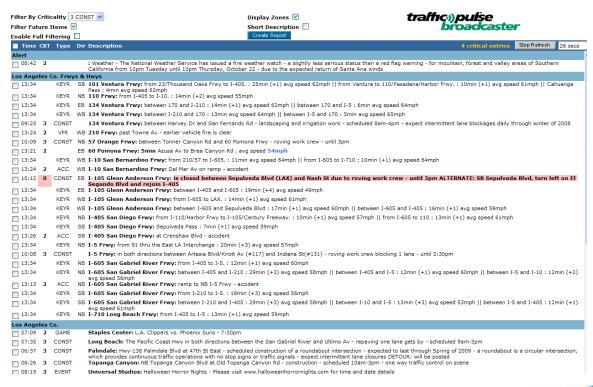## Operations and Traffic Management

Stakeholder/Broadcasters access to incidents and events

- Web-based tool

- Incidents and events

- Archived

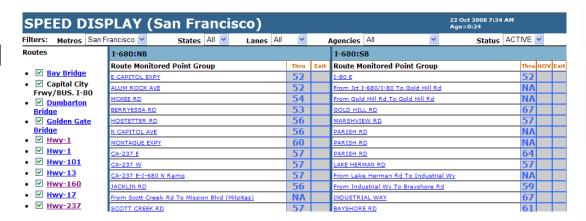NAVTEQ

Operations and Traffic Management

Agency access to real-time speed data by roadway and direction

- Speed data

- Aggregated by direction and lane type

- View of individual lanes

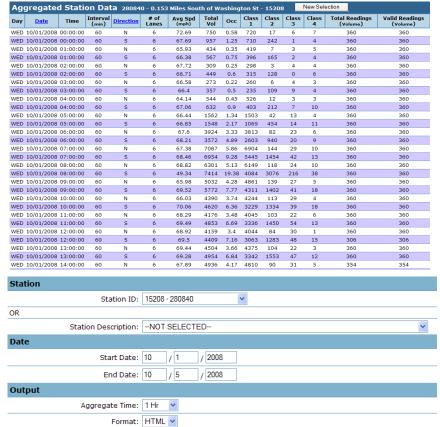- Ability to see speeds below user selected threshold

Planning and Operations

Agency access to archived sensor and incident traffic data

- Raw Data
  - 1 min. data by lane
- Historical data
- Incidents & events
- Reports
- Select Station
- Date Range
  - Start Date
  - End Date
- Aggregate Time
  - 24 hour
  - 1 hour
  - 15 minute
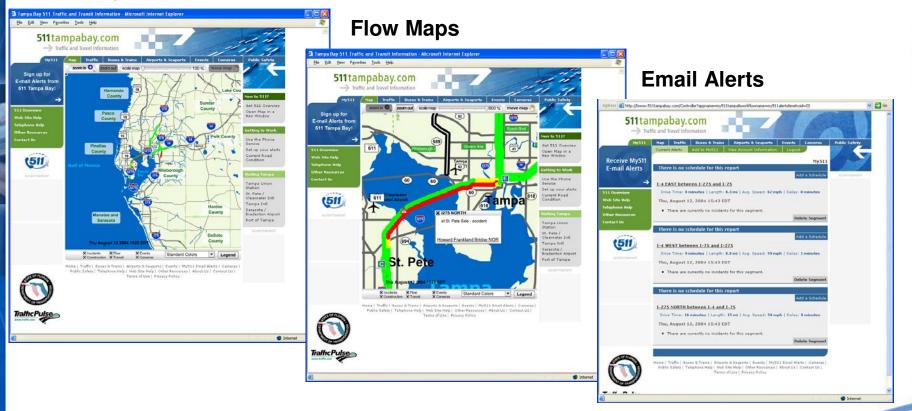 - 5 minute
- Format
  - HTML
  - Excel

Aggregated Station Data 280840 - 0.153 Miles South of Washington St - 15208 · New Selection

Day	Date	Time	Interval (min)	Direction	# of Lanes	Avg Spd (mph)	Total Vol	Occ	Class 1	Class 2	Class 3	Class 4	Total Readings (Volume)	Valid Readings (Volume)
WED	10/01/2008	00:00:00	60	N	6	72.69	750	0.58	720	17	6	7	360	360
WED	10/01/2008	00:00:00	60	S	6	67.69	957	1.25	710	242	1	4	360	360
WED	10/01/2008	01:00:00	60	N	6	65.93	434	0.35	419	7	3	5	360	360
WED	10/01/2008	01:00:00	60	S	6	66.38	567	0.75	396	165	2	4	360	360
WED	10/01/2008	02:00:00	60	N	6	67.72	309	0.25	298	3	4	4	360	360
WED	10/01/2008	02:00:00	60	S	6	66.71	449	0.6	315	128	0	6	360	360
WED	10/01/2008	03:00:00	60	N	6	66.58	273	0.22	260	6	4	3	360	360
WED	10/01/2008	03:00:00	60	S	6	66.4	357	0.5	235	109	9	4	360	360
WED	10/01/2008	04:00:00	60	N	6	64.14	544	0.45	526	12	3	3	360	360
WED	10/01/2008	04:00:00	60	S	6	67.06	632	0.9	403	212	7	10	360	360
WED	10/01/2008	05:00:00	60	N	6	66.44	1562	1.34	1503	42	13	4	360	360
WED	10/01/2008	05:00:00	60	S	6	66.85	1548	2.17	1069	454	14	11	360	360
WED	10/01/2008	06:00:00	60	N	6	67.6	3924	3.33	3813	82	23	6	360	360
WED	10/01/2008	06:00:00	60	S	6	68.21	3572	4.89	2603	940	20	9	360	360
WED	10/01/2008	07:00:00	60	N	6	67.38	7087	5.86	6904	144	29	10	360	360
WED	10/01/2008	07:00:00	60	S	6	68.46	6954	9.28	5445	1454	42	13	360	360
WED	10/01/2008	08:00:00	60	N	6	68.82	6301	5.13	6149	118	24	10	360	360
WED	10/01/2008	08:00:00	60	S	6	49.34	7414	19.38	4084	3076	216	38	360	360
WED	10/01/2008	09:00:00	60	N	6	65.98	5032	4.28	4861	139	27	5	360	360
WED	10/01/2008	09:00:00	60	S	6	69.52	5772	7.77	4311	1402	41	18	360	360
WED	10/01/2008	10:00:00	60	N	6	66.03	4390	3.74	4244	113	29	4	360	360
WED	10/01/2008	10:00:00	60	S	6	70.06	4620	6.36	3229	1334	39	18	360	360
WED	10/01/2008	11:00:00	60	N	6	68.29	4176	3.48	4045	103	22	6	360	360
WED	10/01/2008	11:00:00	60	S	6	69.49	4853	6.69	3336	1450	54	13	360	360
WED	10/01/2008	12:00:00	60	N	6	68.92	4159	3.4	4044	84	30	1	360	360
WED	10/01/2008	12:00:00	60	S	6	69.5	4409	7.16	3063	1283	48	15	306	306
WED	10/01/2008	13:00:00	60	N	6	69.44	4504	3.66	4375	104	22	3	360	360
WED	10/01/2008	13:00:00	60	S	6	69.28	4954	6.84	3342	1553	47	12	360	360
WED	10/01/2008	14:00:00	60	N	6	67.89	4936	4.17	4810	90	31	5	354	354

Station

Station ID: 15208 - 280840

OR

Station Description: --NOT SELECTED--

Date

Start Date: 10 / 1 / 2008

End Date: 10 / 5 / 2008

Output

Aggregate Time: 1 Hr

Format: HTML

Get Aggregated Data

NAVTEQ

Delivery

- Daily Agency and NAVTEQ Sensor Data Reports

  – 5-minute reports by lane

  – 15-minute reports aggregated by direction

  – 1-hour reports aggregated by direction

  – Data quality reports

- Monthly Agency and NAVTEQ Sensor Data Reports

  – Traffic Monitoring Reports (HPMS Format)

  – Performance Measure Reports

- Station Reports

  – Agency and NAVTEQ Station information in a single file

NAVTEQ

Home Page

Flow Maps

Email Alerts

How NAVTEQ Can Help

- **511 Services: Free or Customized**
  - Interactive voice system
  - Web Site
  - Personalized routes and alerts
- **Traffic Data Services**
  - Expand Sensor coverage
  - Expand Agency data and/or fill gaps
  - Operate and maintain system

- **Data Management Systems**
  - Real-time monitoring systems
  - Archive database
  - Data quality tools
- **License Incident and Probe Data**
  - Support operations
  - Traveler information
  - 511 Services

NAVTEQ

NAVTEQ Fast Facts

- NAVTEQ creates digital maps and map content that power navigation and location-based services solutions around the world.

- Traffic.com is owned by NAVTEQ, which gives us access to worldwide resources.

- NAVTEQ/Traffic.com is the <u>only</u> provider of one stop, end-to-end traffic solutions to customers and commuters.

- NAVTEQ is the largest provider of in-vehicle mapping/traffic to automotive manufacturers.

- NAVTEQ was founded in 1985 and has approximately 3,400 employees located in 144 offices and in 28 countries.

- Nokia's acquisition of NAVTEQ/Traffic.com gives us the ability to leverage cell phone technology for traffic information.

- Nokia is the world's largest cell phone manufacturer.

A NAVTEQ/NOKIA Company
Successful Public Data Services

www.traffic.com