Nokia True

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Nokia Maps: Customers and Services

Websites, Navigation Systems, In-Car Navigation, Mobile Phones, and a number of other products.

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Our Database

Hundreds of navigation attributes

Pillars of Field Collection

- **Global Field Operations**
  - Strategically distributed network of geographic analysts
- **Local Knowledge and Contacts**
  - Applied to single, worldwide database specification
- **State of the Art Tools & Technology**
  - Proprietary software tools
  - Over 400 patents related to field collection and processing

Sources of Data

Creating and maintaining our data

Local field driving and research

News and construction

GIS and DOT

Data Collection Methodology

Nokia focuses on quality every step of the way.

Collecting
thousands of sources including field driving

Validating
and verifying hundreds of attributes

Testing
database and real world functionality

More Attributes + More Products = More Changes

Nokia processes an average of

2.4 million changes per day

Nokia (NAVTEQ) TRUE™

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What is Nokia True?

The most comprehensive data collection platform on Earth

- Implement automated feature recognition
- Improve operational efficiency through broad TRUE deployment
- Innovate on top of platform: 3D and beyond

True Collection System

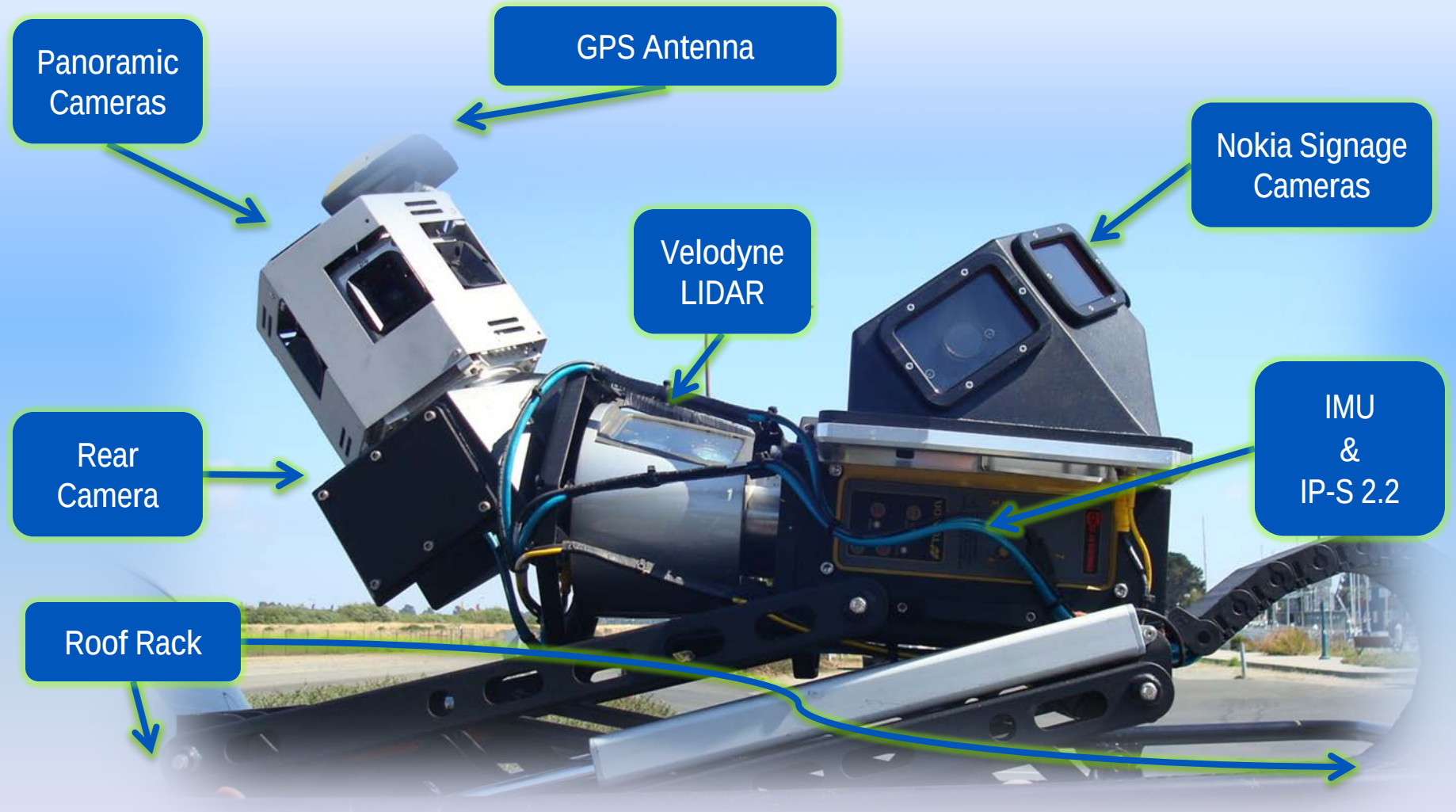
Every component has a unique role.

360° LIDAR generates a 3D model of the world, taking automation to a whole new level

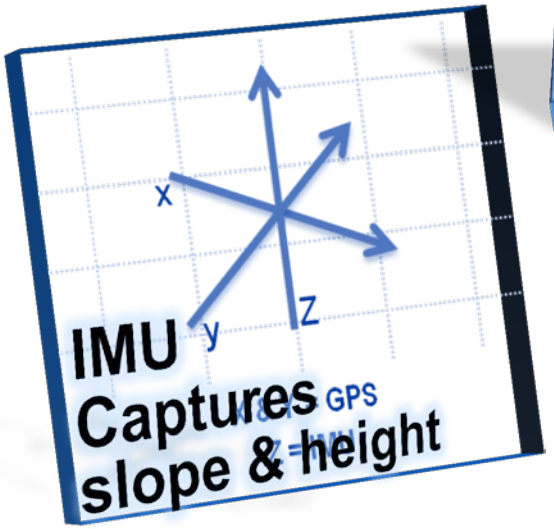
Hi Res and Panoramic Cameras sophisticated synchronization extends types of content that can be collected

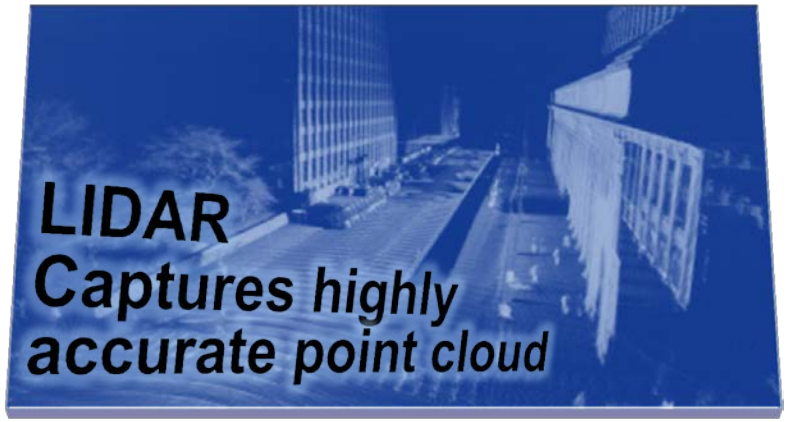
Positioning Sensors incredible precision ensures every individual 3D point is accurately geo-referenced

Nokia True: A Look Above the Roof


Panoramic Cameras
GPS Antenna
Nokia Signage Cameras
Velodyne LIDAR
IMU & IP-S 2.2
Rear Camera
Roof Rack

Sensors to Enable The Precision and Accuracy of Collection





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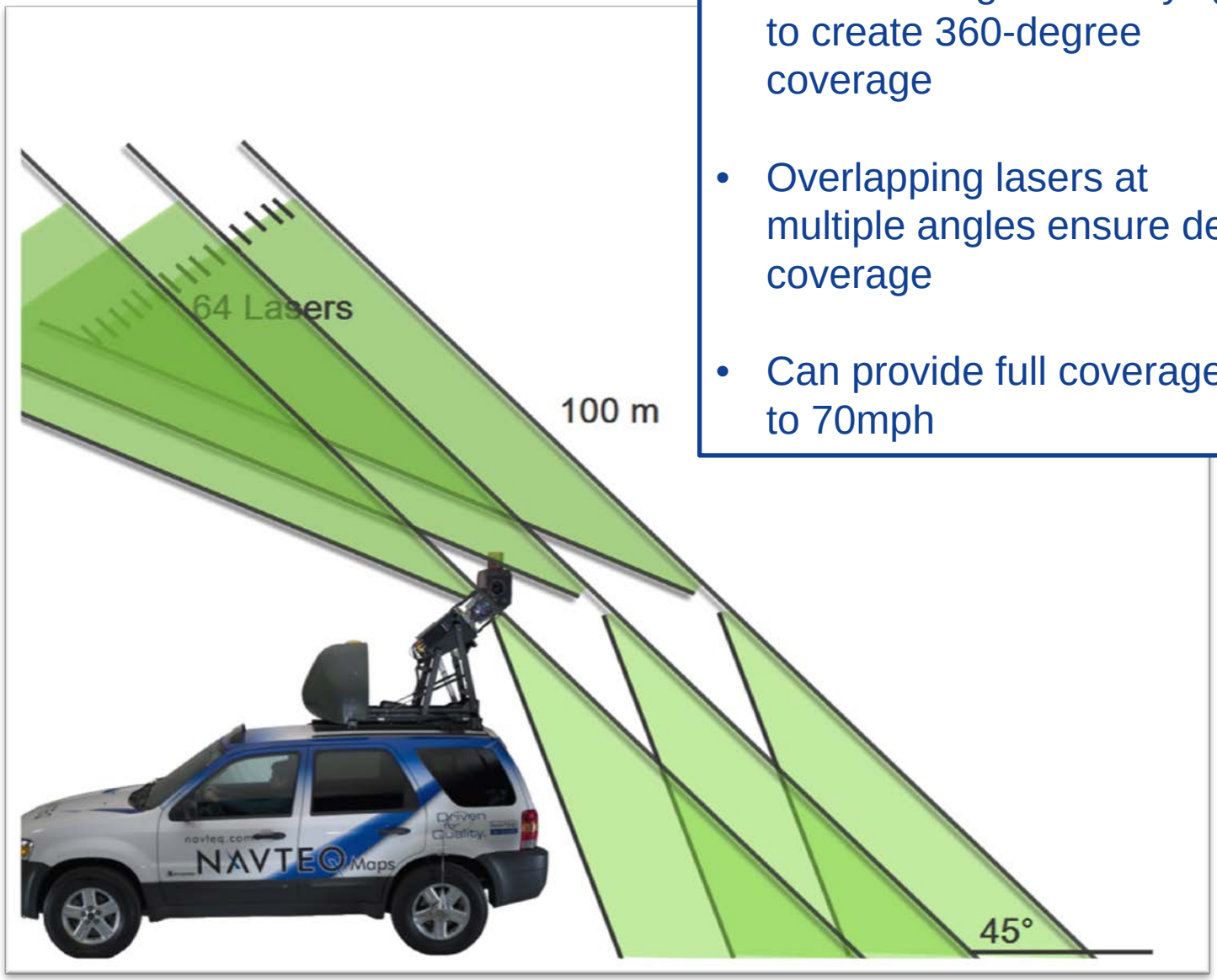
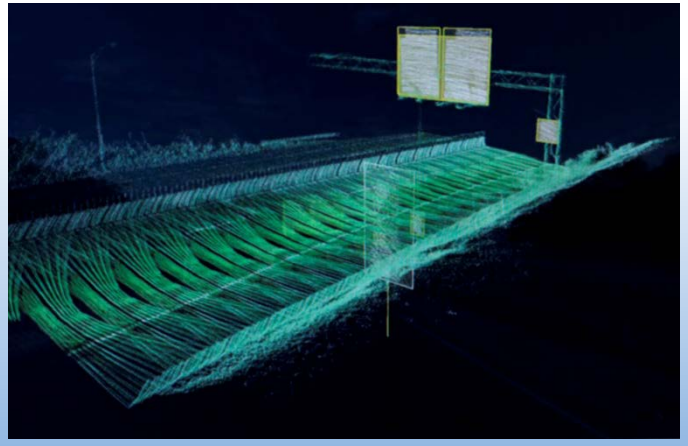
What is LIDAR?



- Pulses of high-intensity light to create 360-degree coverage
- Overlapping lasers at multiple angles ensure dense coverage
- Can provide full coverage up to 70mph

LIDAR: Capturing a 3D Perspective

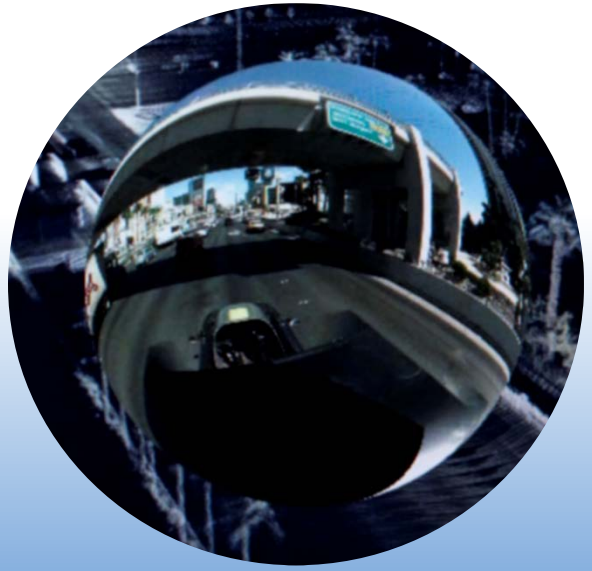


- 3D collection from multiple angles of access
- 360 degree maximizes size of point cloud
- 100 meter range

64 Lasers Creating a 3D Representation

Density and Detail

High-res and Panoramic Cameras



- **High-resolution cameras**
- **Panoramic cameras**

Multiple Cameras Support Depth and Breadth o Product Development

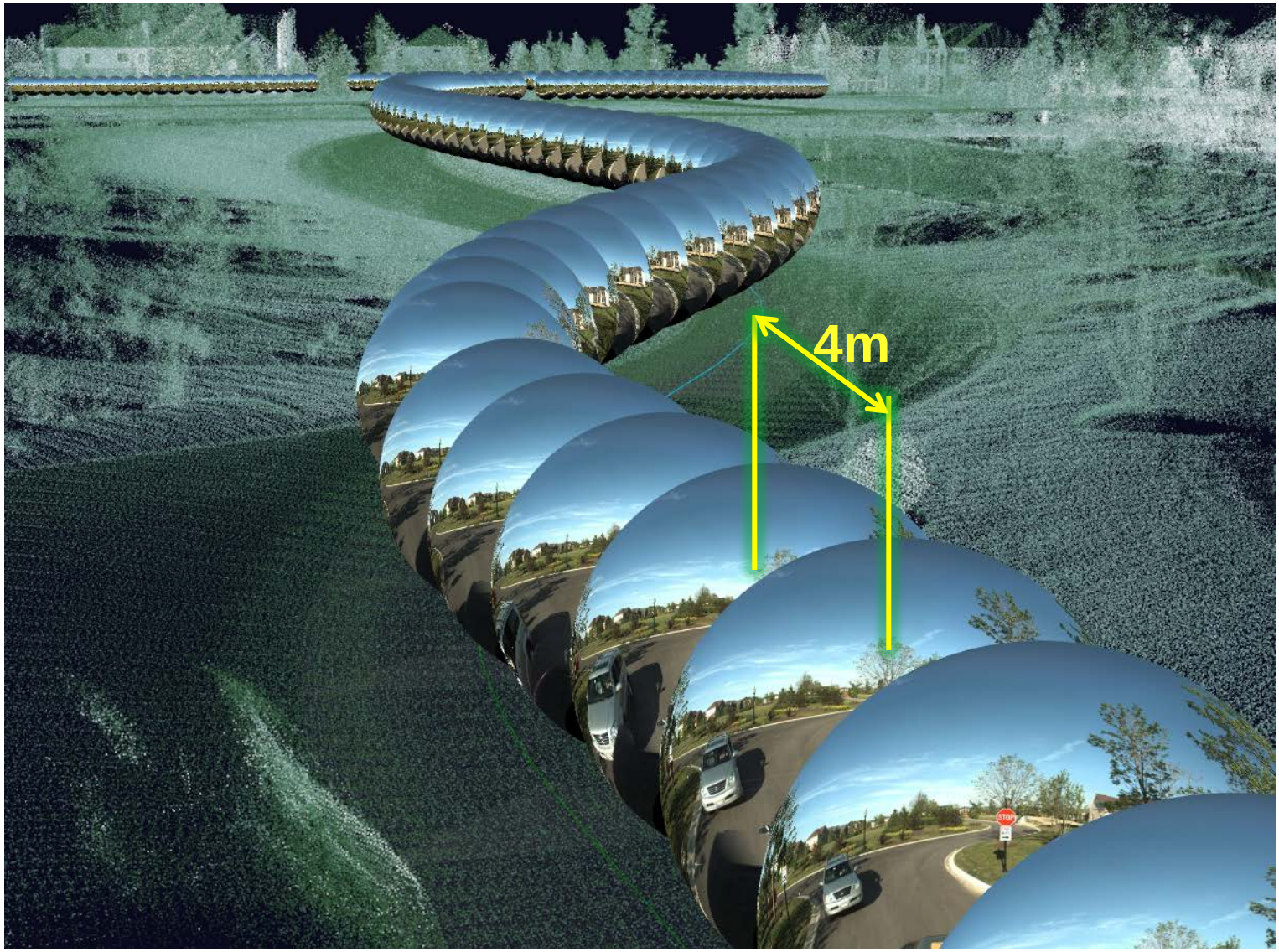
- Each camera has a specific value in enabling advanced location-based use cases

- **Microsoft Panoramic cameras**: 6 looking horizontal in a 360° field 2 looking vertical
- **Signage Cameras:** 270° field of view enable collection of signage including storefront signage
- **Rear camera** can be mounted for left or right hand side driving countries for a different perspective

Panoramic Imagery

- Provides Context and Navigation
- Instantaneous Snapshot: Temporal Comparison
- Introduces Orientation Dependency

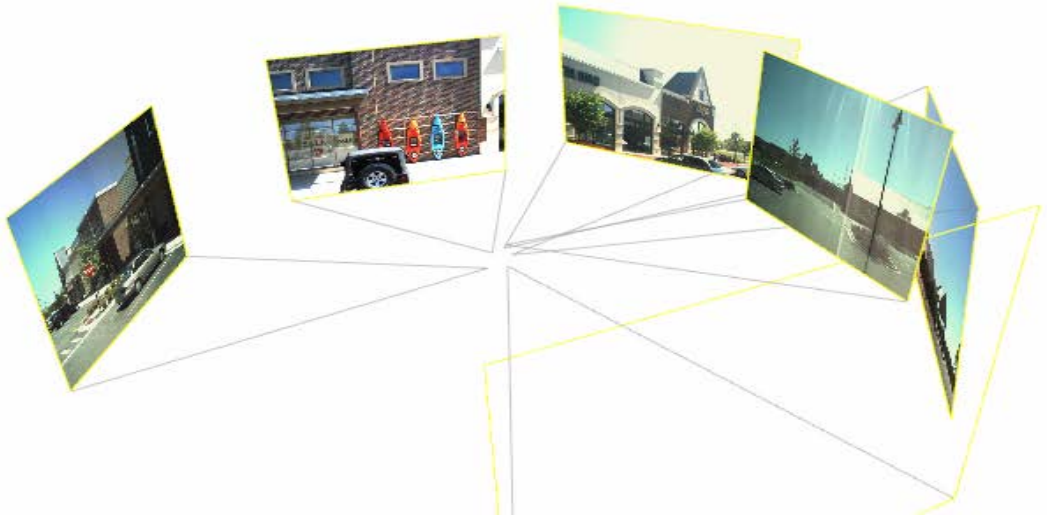
Image Every Four Meters



Microsoft Cameras - Full Perspective

High-Resolution Targeted Cameras

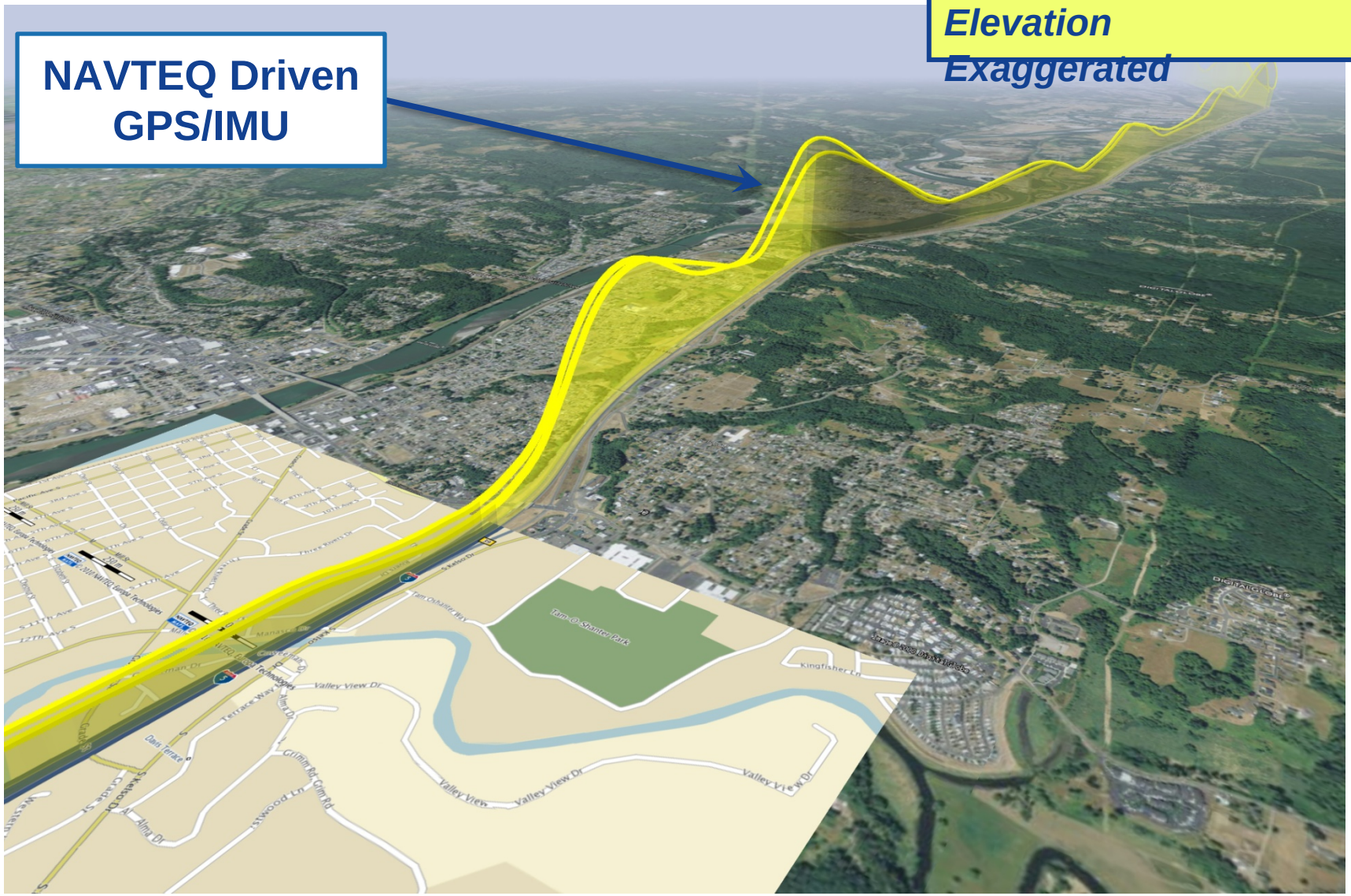
- Narrow Field of View
- Increased Detail Resolution
- Sign and Text Recognition



Targeted Sign Cameras – Narrow FOV

Grounding it in Location and Positioning

Positioning – High Accuracy IMU/GPS



Nokia True Increases Efficiency

- Faster with fewer people
- More efficient coding
- Platform for the future

Video Presentation
Illinois
K68 2098
Land of Lincoln
NAVTEQ True

Thank you.

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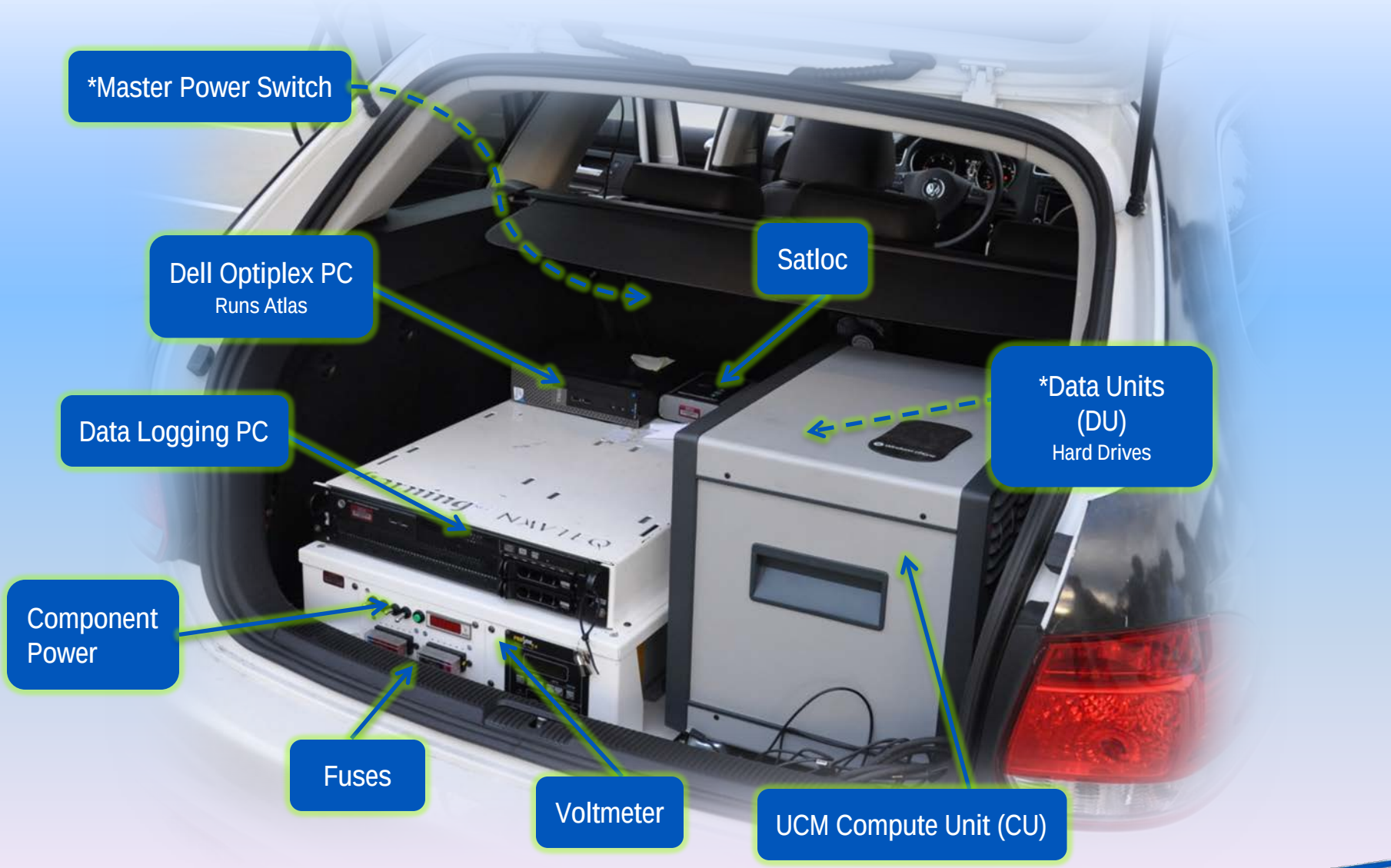
Nokia True: A Look in the Trunk


*Master Power Switch
Dell Optiplex PC
Runs Atlas
Satloc
*Data Units
(DU)
Hard Drives
Data Logging PC
Component
Power
Fuses
Voltmeter
UCM Compute Unit (CU)

Team of Processors Enables Powerful Collection and Display

UCM

Compute Unit Vs

Data Unit

One Unit

Logging Computer

Dell R5400

Dell Optiplex Computer

Runs Atlas

In-Car Display

10 inch/ 25 cm