



VEHICLE NAVIGATION SYSTEM

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VEHICLE NAVIGATION SYSTEM

- Vehicle Navigation System (VNS) is a typically satellite navigation system designed for use in automobiles. It uses a GPS navigation device to acquire position data to locate the user on the road on the unit's map database.
- Turn by Turn Guidance
- VNS coupled with ITS will enhance the navigation capability of the system.

HISTORY

- One of the First Vehicle Navigation Systems were based on Dead Reckoning.
- It was built by a company called Etak in the mid eighties which had a rudimentary computer, 256 MB RAM and ROM plus some tape drives, 4.5-inch TV screen, inertial sensors, a compass, which contained maps of the San Francisco.



History

- The Electro Gyrocomator was also claimed to be the first commercial available automotive navigation system. It was based on a gas gyroscope that could detect both rotation and movement.
- Maps were placed inside the unit and it would scroll them past a CRT illumination as the car travelled.



HISTORY

- Then there were other companies like Honda, Mitsubishi Electric, Magellean and Pioneer who claimed to make the first GPS based VNS, but still in those days the GPS signal was dithered and it was not until year 2000 a more accurate GPS signal was available for civilian use.

GPS

- Constellation of 32 satellites launched by Department of Defense US Govt.
- SA removed by the US in May 2000.
- Active GPS and Aided GPS available today.
- Aided GPS provides ability to fix position faster and as well as where active GPS fails such as indoors.



The Technology

- GPS Coupled with GIS it can be used for numerous applications
 - Real Time Tracking (AVTS)
 - Vehicle Navigation Systems (turn by turn Guidance)
 - Location Verification for assets and Transactions



VEHICLE NAVIGATION SYSTEM

- Vehicle Navigation System requires a
 - GPS module
 - Communication and receiving device
 - a display panel
 - enriched geocoded mapbase
- A no. of vendors across the Globe provide reliable technical solutions. Some of them are Garmin, Navman, HP etc
- The fourth component has to be procured locally



GPS

- Both External and Internal
- Accuracy about 10m active GPS



Display devices

- Touch screen
- Voice enabled
- Color LCD



Communication Devices

- Integrated GPS GSM chip set available.
- Two way Communication possible between the device and control tower.
- Benefits:
 - Establishing points of interest, parking information and transmitting them.
 - Real-time traffic information is one of the most important applications for the driver and an essential feature of vehicle navigation system .
 - Disaster Management possible online



Mapdatabase

- Maps needed in large scale format with proper road directions.
- For inter city travel a scale of 1:50000 will be good whereas in case of intracity travel maps should be highly detailed of at least 1:5000
- Every system provider provides maps in its own propriety format. (no standards and inter – operability)
- Voice Guidance



MapDatabase Components

- Topological correct road network fabric
- Road type, name, number Road type, name, number, road direction and exits
- Street address ranges, Address Book
- Highways, Expressways
- Travel Time
- Travel Speed
- Municipal Boundaries
- Turn restrictions table
- Major Hydrographic features
- Hotels, restaurants and places of tourist attractions
- Petrol Pumps, Vehicle service garages etc (POI)
- Major landmarks
- Way points

Woman runs for her life after satnav leads her into path of a train

by LUKE SALKELD

Last updated at 00:14 11 May 2007

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Paula Ceely with the device: The train 'missed her by inches'

A Motorist leapt clear of her car with moments to spare after a satellite-navigation system led her into the path of a speeding train.

Paula Ceely watched in horror as the locomotive ploughed into her Renault Clio at over 60mph, then shunted the car half a mile down the track.

Status in India

- Commonly used basemaps for car navigation are on the scale of 1:5000 and 1:50000 for intercity and intracity travel respectively. Some intracity maps have prepared by Eicher , Map my India and some other agencies. Still larger basemaps with accurate road centreline directions will enhance the routing capability of the Navigation device.
- Survey of India prepares topographical maps (on scale 1:25000 and above). The large scale maps are created by SOI and nine other authorized agencies. Any value addition to these maps will require additional clearance from MOD.
- There is a new map policy which is yet to be approved by GOI that recommends two kinds of topographical maps, one for Defence based on the Everest ellipsoid and the other Open Series map based on WGS 84 for general public.



Limitations

- No standards for large scale base map in the country.
- Most of the towns have no large scale maps.
- There is a need to enrich these maps for use in vehicle navigation systems to include points of interest.

Industry Concerns

- High duty structure limits the applications and encourages grey market and lack of standards
- MOD Clearances for map base required.



The Road Ahead

- Need to speed up the approval of new map policy, which will allow access to topographical maps
- There is an urgent need to establish an agency to coordinate the development of large scale maps and their standards in the country
- Need to make 1:5,000 and 1:50,000 map data available with SOI public, so that it can be put in the Navigation systems.
- Allow the private vendors to add map, related data to make the final data useful for commercial use.
- There is a need to establish a map validation mechanism for the third party data to be authenticated if so required



Benefits of Vehicle Navigation System

- Reduce unnecessary mileage and fuel costs.
- Improve on time performance as drivers unlikely to get lost
- More effective handling exceptions to a route
- GPS navigation allows enterprises to reduce stops or activities which can enable more stops per driver per day.
- Movement of vehicles can be monitored

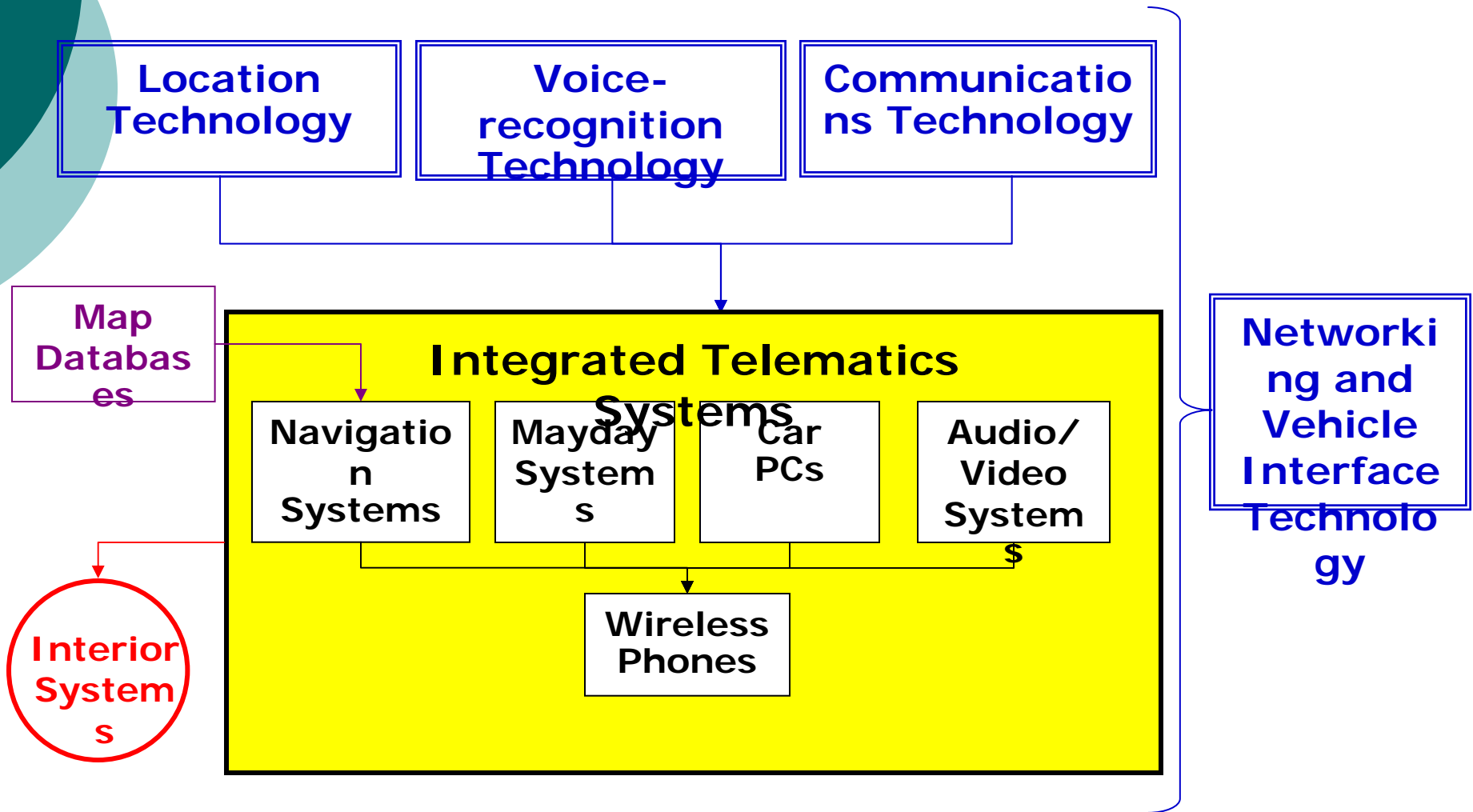


The Future

- Vehicle Telematics

- the convergence of wireless communications, location technology, and in-vehicle electronics which is being used to integrate the automobile into the information age

Telematics Building Blocks: Technologies



Applications and Services

Services available using telematics devices:

Emergency call or mayday services

Device-to-device communications

Interactive on-board entertainment

Navigation and route guidance services

Remote vehicle access and diagnostics

Person-to-person communications

E-commerce applications

Interactive value-added services

Commercial fleet management

Remote vehicle theft tracking

The Future

- Autonomous Navigation systems
(Unmanned Vehicles)
 - Autonomous navigation means that a vehicle is able to plan its path and execute its plan by itself.
 - It has a mind of its own
 - No human interaction
 - Uses LIDAR as its eyes



THANK YOU

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