

## **Additional Applications for E-ZPass**

- **TRANSCOM - Transmit**
  - **Traffic Management**
  - **Incident Detection**
- **Commercial Vehicle Operations**
- **Border Crossing**
- **Parking**

**E-ZPass**

## **What are requirements of technology at 5.9 GHz?**

- ▶ **Multiple Agencies migrating at once?**
- ▶ **Uninterrupted Service to (5+?) millions of customers**
- ▶ **Exchanging 5+ million tags**
- ▶ **Maintaining Interoperable Reciprocal Systems**
- ▶ **Use of technology for related applications**

**E-ZPass**

## **Expectations of Technology at 5.9 GHz**

- **Performance Reliability**
- **Non-Interfering & Compatible with existing equipment**
- **Non-Proprietary**
- **Interoperability with related technologies**

**ETPass**

**Challenge is to develop technology that, at a minimum, performs as well as our current technology, at a reasonable cost**

**AND**

**provides a method for migration *without* interrupting current service to millions of customers**

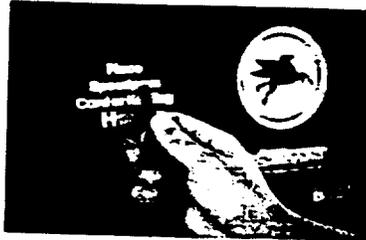
**ETPass**

**E-Z Pass**

**E-Z Pass**

5.9GHz Stakeholders Workshop  
December 16, 1999

**TIRIS** Technology by  
Texas Instruments



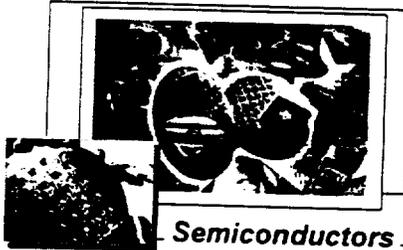
**TIRIS** Technology by  
Texas Instruments™

Jim Bucklar - Texas Instruments  
December 16, 1999

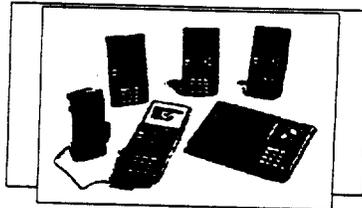
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**TIRIS** Technology by  
Texas Instruments™

**Businesses of Texas Instruments**



**Semiconductors**



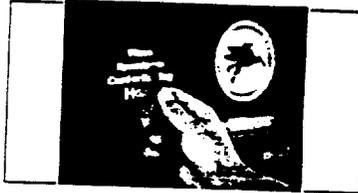
**Calculators**

**Digital Light Processing**

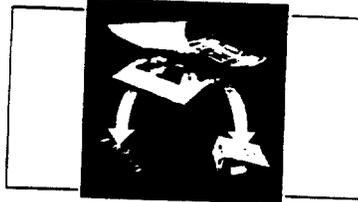


**Materials & Controls**

TIRIS Radio Frequency Identification Market Segments



**Automatic Recognition  
of Consumers**



**Tag-it™ Smart Labels**



**Automotive Security**



**General Applications**

TIRIS 2000

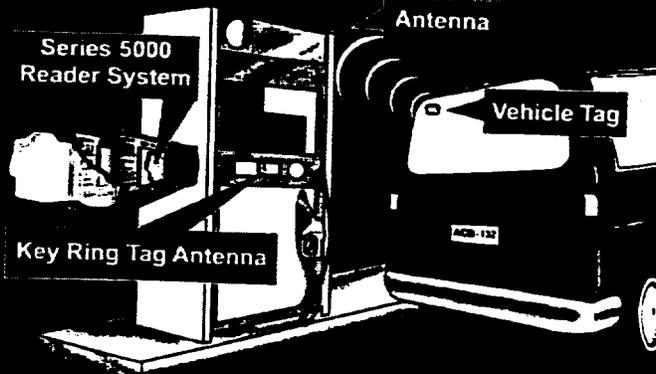
Automatic Recognition of Customers with RFID

- ARC = Use of RFID transponder by a consumer for Loyalty or Payment
- ARC Provides:
  - Speed
  - Convenience
  - Flexibility
  - Peace of Mind
  - Hi-Tech Buying
- ARC Programs:
  - Loyalty/ID Only
  - Credit Payment (via host)



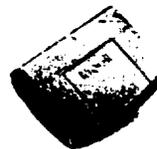
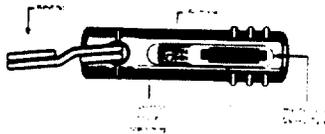
4

## Automatic Retail Fueling System



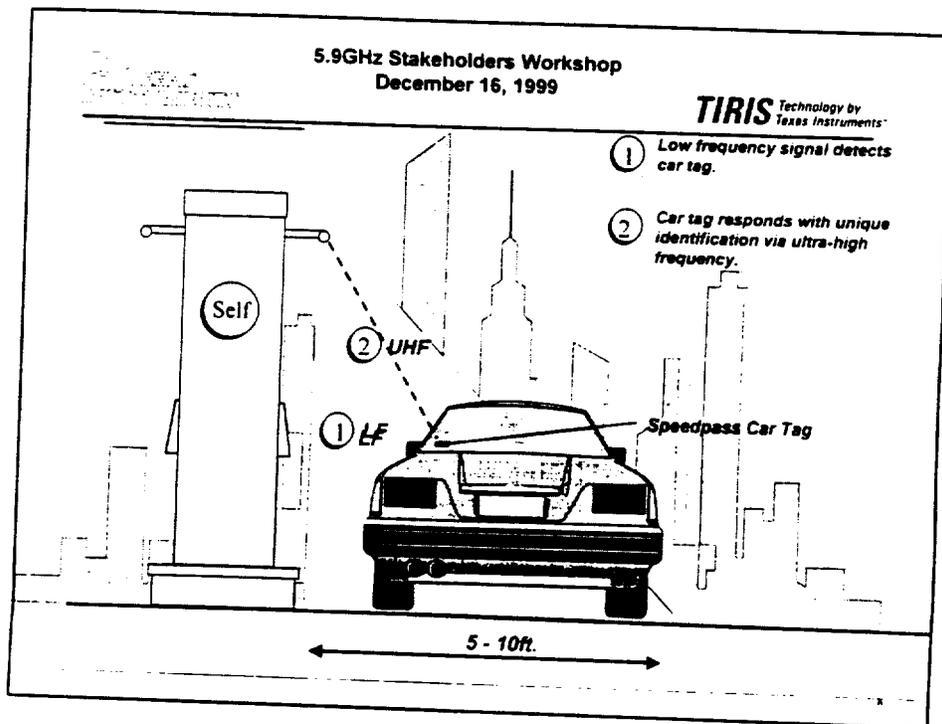
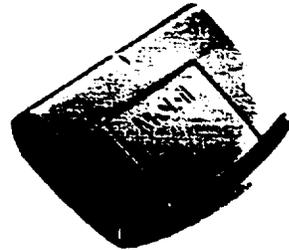
### Keyfob/Vehicle Tag Summary

- Keyfob Transponders Deployed = 4M+.
- 134.2kHz Proven Technology (70M+ tags deployed).
- 134.2kHz Passive RFID Frequency Approved Over the Entire World.
- DST Solution with Challenge Response Security Feature.
- Vehicle Transponders Deployed = 850K+.
- Current Production Field Performance has been Excellent.
- Developed Frequency Agility and Frequency Hop Features. ETSI Compliant (support 4Q98 international rollout).
- DST Solution with Challenge Response Security Feature.

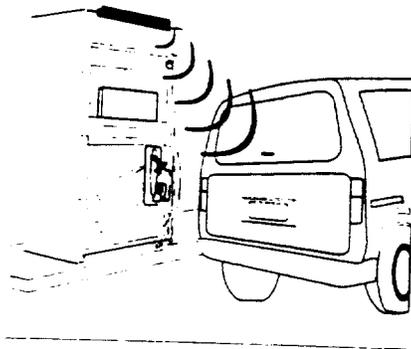


Vehicle Tag – LUHF

- Read range: 5'x 5' in front of dispenser.
- Light on and off within 1/2 second of driving by the dispenser.
- Authentication process.
- Light remains on during fueling.
- Receipt printed, if preferred.

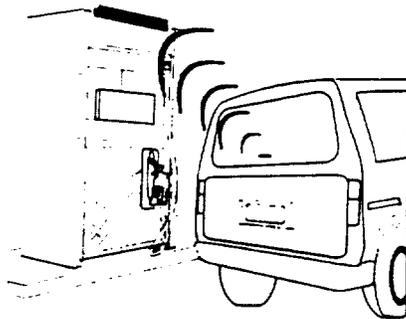


**Down Link  
Dispenser to Transponder**



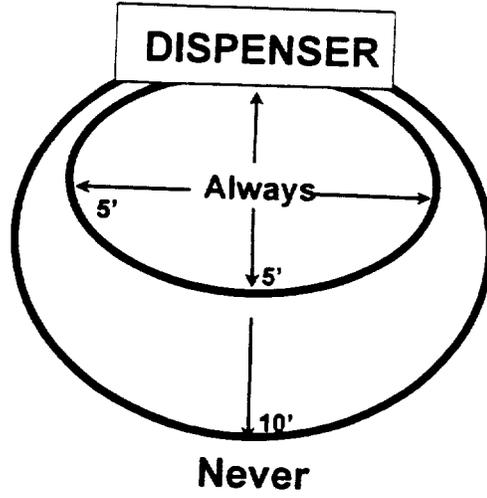
- 134.2 kHz
- Range: up to 7-10 feet
- Tag Type Inquiry
- Station ID
- Dispenser ID
- DST Challenge
- Request for Data
  - Customer Specific
  - Future Applications

**Up Link  
Transponder to Dispenser**



- 903 MHz
- Range: Guaranteed 7 ft
- Oil Company ID
- Tag Location Data
- Tag ID
- Customer Specific Data
- Response to Challenge
- Future Application Data

LUHF Vehicle Tag - localization



**Introduction  
to  
ITS Info-communications  
Forum  
Japan**

**5.9GHz Stakeholders Workshop**

**December 16, 1999**

**ITS America**

**Sam Oyama**

**Japan**

**ITS Info-communications Forum, Japan**

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**• Objectives**

- R&D on ITS Info-communications systems as well as studies into the possibility of turning these systems into standards**
- Gathering, exchange and provision of information on ITS info-communications systems**
- Close contact with relevant organizations in promoting development of ITS info-communications systems**
- Public awareness campaigns on ITS info-communications systems**

## **ITS Info-communications Forum, Japan**

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- **History**
  - February 1999, TTC's List of DSRC Applications
  - July 1999, Forum Establishment
- **Membership**
  - Private sector(Manufacturers, Telecommunications Carriers, Broadcasting companies, ...)
  - MPT, NPA, MITI, MOT and MOC
- **Board of directors**
  - Chairman: Shoichiro Toyoda(TOYOTA Motor)
  - Vice-chairman: Mitsutoshi Hatori(Professor, National Center for Science Information Systems)

## **ITS Info-communications Forum, Japan**

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- **Organization(More than 200)**
  - General Assembly**
    - **R&D Committee**
      - ITS Info-communications Platform EG
      - Roadside Communications System EG
      - Inter-vehicle Communications EG
      - ITS Mobil Communications System EG
      - ITS Broadcasting System EG
    - **Survey Committee**
      - Planning and Survey EG
      - Public Relations EG

## **ITS Info-communications Forum, Japan**

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- **DSRC related working group**
  - **Roadside Communications System Expert Group**
    - **Deployment(Realization) WG**
    - **Wireless Communications System WG**
    - **Protocol WG**
    - **Roadside Network WG**
    - *Security Ad-hoc G.*
    - *Cruise-Assistance System Ad-hoc G.*

## **ITS Info-communications Forum, Japan**

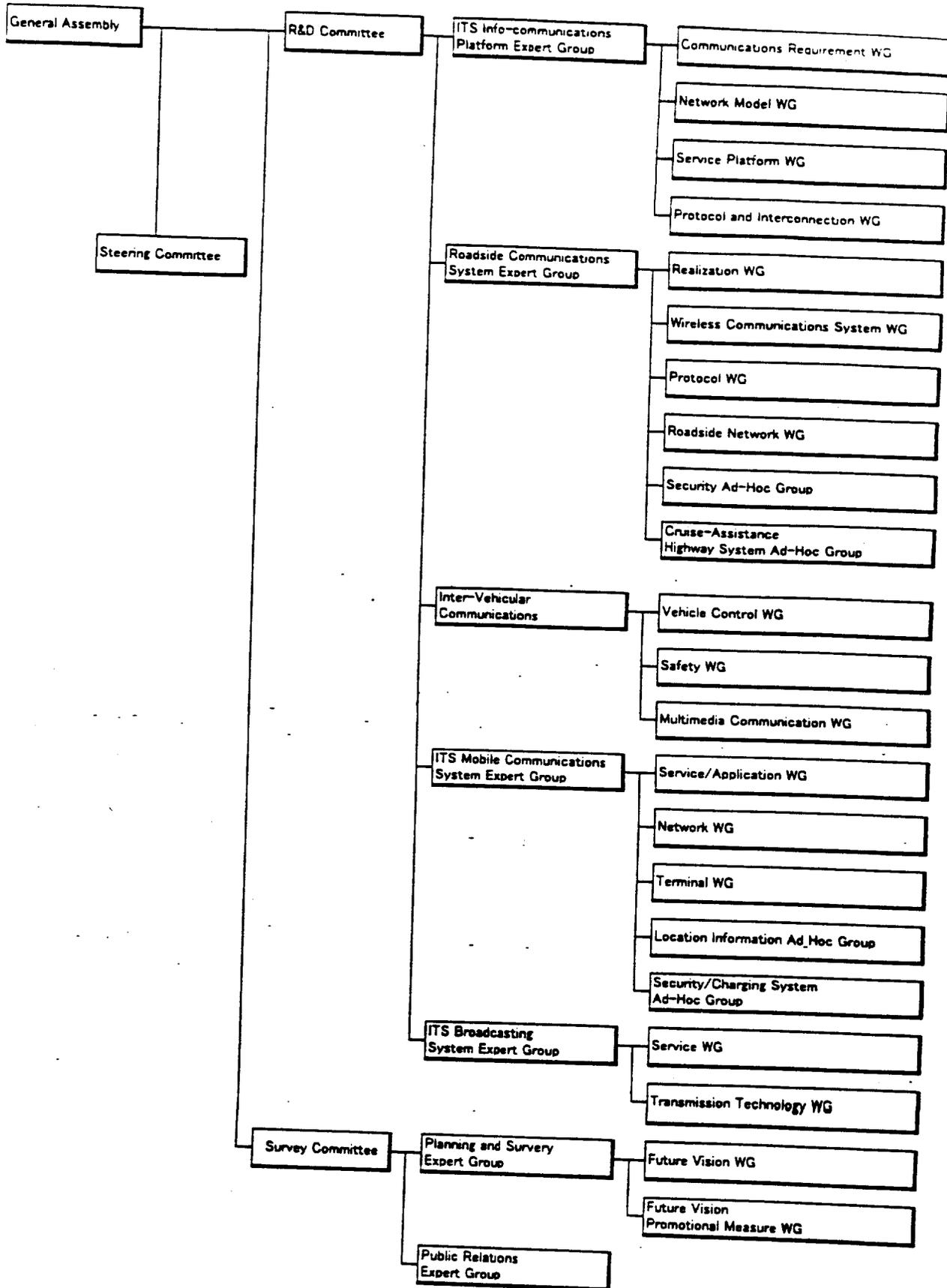
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- **How to join for the Forum?**
  - **Contact to the Secretariat:**

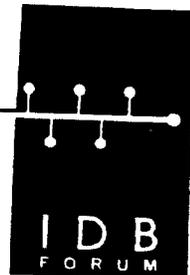
**Kazumasa Nakamura**  
**ARIB(Association of Radio Industries and Businesses)**  
**Nittochi Bldg., 14Floor**  
**1-4-1 Kasumigaseki, Chiyoda-ku**  
**Tokyo 100-0013**  
**Japan**

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FAX: +81-3-3592-1103  
E-mail: [nakamura@arib.or.jp](mailto:nakamura@arib.or.jp)

# Organization of the ITS Info-communications Forum



# ITS Data Bus



Tomorrow's Electronics in Today's Automobiles.

## Open Architecture - DSRC Vehicle Opportunities

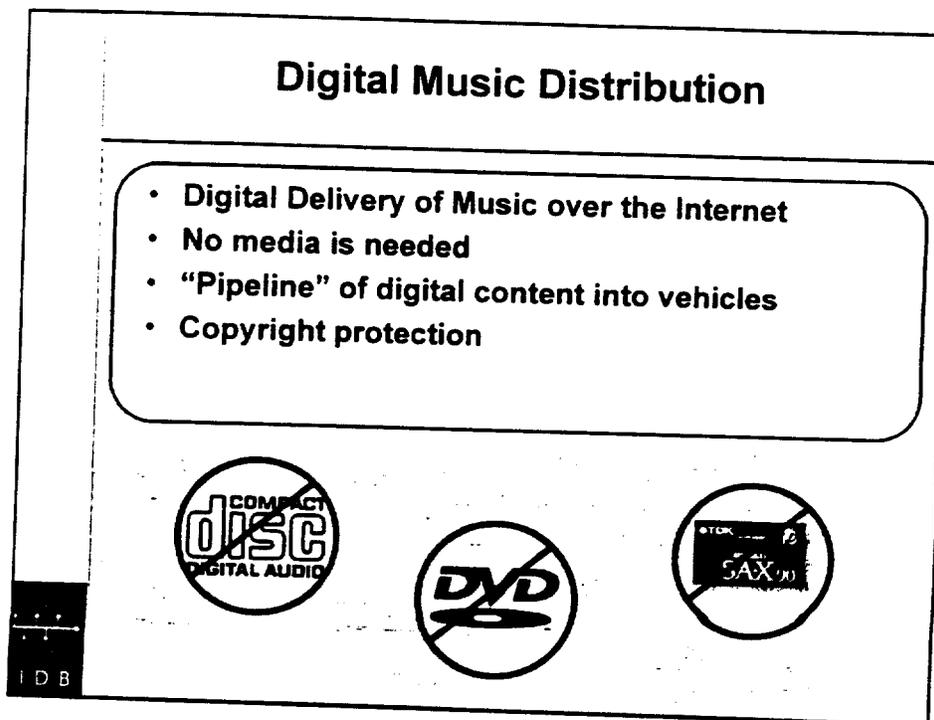
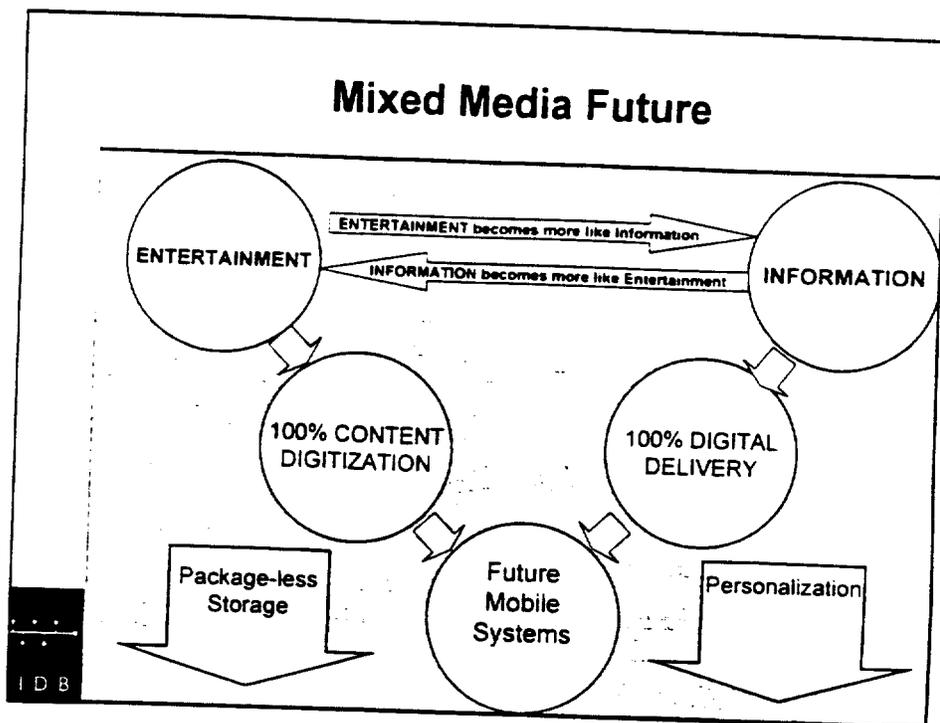
5.9GHz Stakeholders Workshop - 16 December 99  
Holiday Inn Capitol, Washington DC

Arlan Stehney  
Executive Director  
IDB Forum

IDB

The vehicle will be  
transformed into a  
"Pathway" for digital media,  
control and communications.

IDB



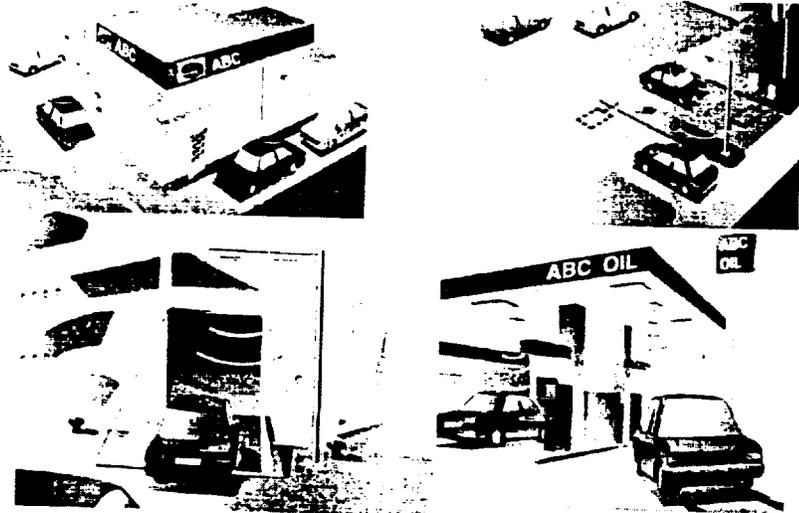
## Portable Devices

### •Key Drivers

- Large Consumer Market
  - Wireless Phones 63 million
  - Handheld PC's 3.9 million worldwide in 1998
- High consumer product demand
- Shorter product life cycle
- Promotes *faster* Technology Enhancements and Merging of Technologies

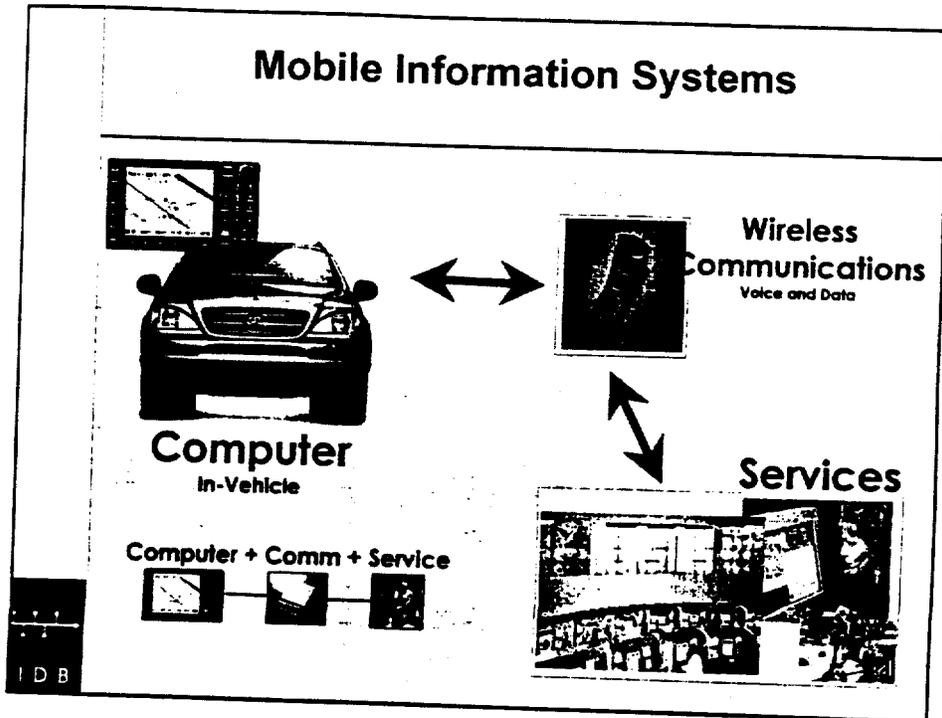
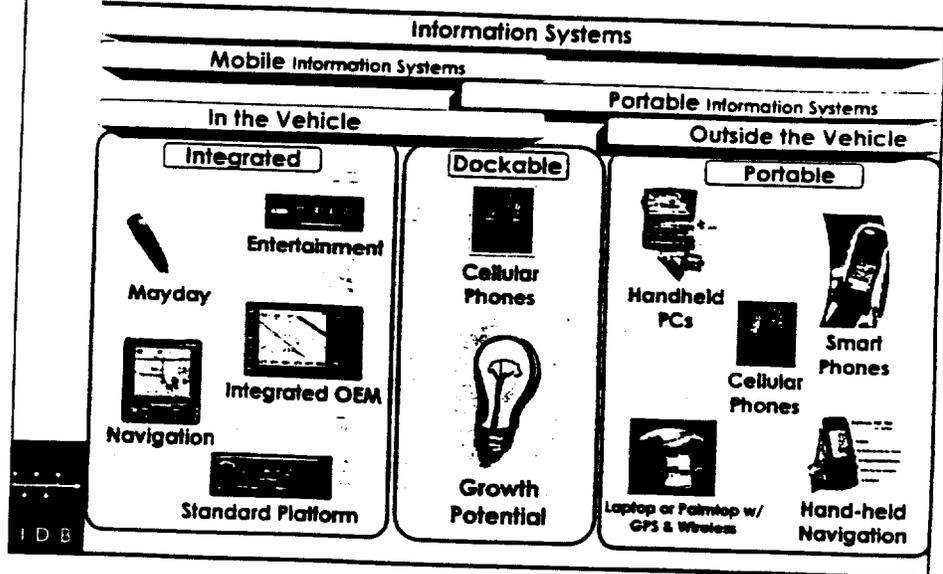
IDB

## Dedicated Short Range Communication



IDB

# Mobile and Portable



## Applications

### Applications

#### Navigation

Route Guidance,  
Points of Interest

#### E911/Roadside

Automatic Emergency Contact,  
Roadside Assistance

#### Traffic Information

Real-time, Detailed,  
Dynamic Route Guidance

#### Theft Recovery

Vehicle Tracking

#### Person to Person

#### Communications

Cellular, Paging, E-mail

#### Remote Vehicle Access

Remote Diagnostics,  
Remote Door Unlock

#### General Information

News, Sports, Stocks, Weather,  
Web Browsing

#### E-Commerce

Tolls, parking, gas

### Driver Benefits

#### Convenience

Information and services at the  
fingertips

#### Safety

Safety net for unplanned events

#### Business

Increase productivity

#### Entertainment

The next step beyond radio

### Delivery Methods

#### Internet

Cellular, Satellite

#### Intranet

Cellular, Satellite

#### Direct Connect

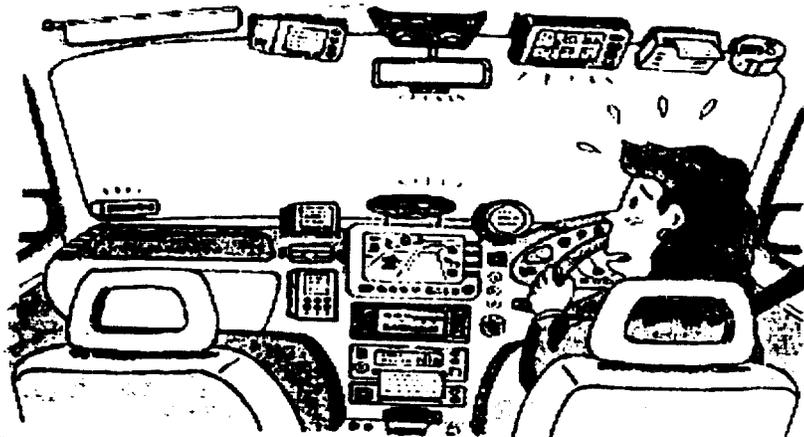
Cellular, Paging, DSRC

#### Broadcast

Radio, TV, RBDS, Subcarrier,  
Dedicated, SDAR, Paging

IDB

The need is obvious...



IDB

## **(Postscript) State DOT Concerns**

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- Caltrans unable to participate here directly...
- State DOTs are major stakeholders here, with heavy investments in legacy systems:
  - need substantial research and testing to justify changes from current legacy systems
  - need migration plan with enough time for state decision making and procurement processes
  - need direct involvement in the process to obtain "buy in"

PATH

## **(Postscript) State DOT Concerns**

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- Great breadth of state interests in DSRC:
  - Caltrans wireless Ethernet network (traffic operations, maintenance, construction)
  - Statewide ATIS and traveler information center
  - Electronic toll collection
  - HOV enforcement
  - remote traffic monitoring stations
  - remote weather information systems
  - Freeway Service Patrols
  - automated work zone warning systems
  - operations and maintenance fleet management
  - AHS

PATH

# RF Priority Control

A 3M Perspective

Mike Duoos

## Market Opportunity

- 250,000 signalized intersections
- \_\_\_\_\_ emergency vehicles
- \_\_\_\_\_ transit vehicles

## Priority Control Customers

- Priority vehicle operators are users
- Traffic engineers are implementers

## Priority Control Goals

- Safe, smooth, efficient route for emergency vehicles
- Better service for transit customers
- Minimum disruption to normal traffic
- Minimum disruption to traffic control

## RF Priority Control Requirements

- Continuous communication
- Large communication zones (1000 meters)
- Vehicle position and speed
- High security
- High reliability

## 3M's Position

- 3M is developing RF Priority Control now
- If Priority Control is accommodated at 5.9 GHz, 3M will develop 5.9 GHz solution

# Truck OE Perspective

## 5.9 GHz Stakeholders Workshop

Dec. 16, 1999  
Washington, DC

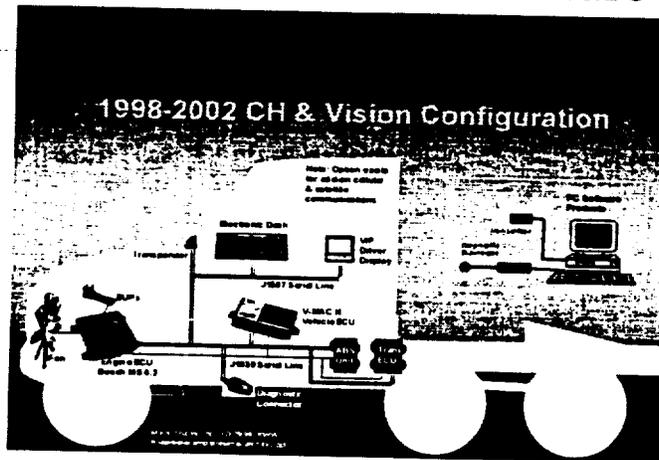
Guy T Rini  
Mack Trucks, Inc

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# V-MAC III Architecture

1998-2002 CH & Vision Configuration



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## Guiding Principles

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- ✓ One Standard
- ✓ Support Open and Proprietary Data
- ✓ On Board Gateway to Networks

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## 1. One Standard for All

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- ✓ Light Duty
- ✓ Medium Duty
- ✓ Heavy Duty

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## 2. Support Open and Proprietary Data

- ✓ Logistics
- ✓ Driver Management
- ✓ Fleet Management
- ✓ Service and Inspection
- ✓ Internet Access
- ✓ Future Bus

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## 3. On Board Gateway to Networks

- ✓ Powertrain
- ✓ Vehicle Electronics
- ✓ IDB/ AMIC
- ✓ PLC-4TRUCKS
- ✓ Next Generation

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## Emerging Wireless Technologies

- ✓ IRDA
- ✓ Bluetooth
- ✓ IDB
- ✓ PLC-4TRUCKS
- ✓ DSRC?

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## Concerns

- ✓ Antenna design / installation
- ✓ Open Field Vs. Fixed Lane
- ✓ Standard body works slowly?
  - history
  - meetings too far apart
  - right to continue to disagree

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