



U.S. Department
of Transportation

Federal Transit
Administration

The Administrator

400 Seventh St., S.W.
Washington, D.C. 20590

RECEIVED

ORIGINAL
FILE

APR 22 1992

April 21, 1992

FCC MAIL BRANCH

Federal Communications Commission
1919 M Street, NW
Room 222
Washington, DC 20554

RECEIVED

APR 23 1992

RE: NRPM ET Docket 92-9;
FCC 92-20

Gentlemen:

Federal Communications Commission
Office of the Secretary

This letter refers to the FCC Notice of Proposed Rule-making to allocate certain radio frequencies for emerging technologies. The Federal Transit Administration (FTA) supports consideration for emerging technologies strongly. We encourage the FCC to consider the full needs of transportation in its decision making.

One emerging technology for surface transportation is Intelligent Vehicle Highway Systems (IVHS). IVHS technologies will permit the exchange of data between vehicles and a central computer. Transportation decisions can be made with real-time information, thus improving both travel decisions and traveler options.

One important component of the IVHS program is FTA's Advanced Public Transportation Systems Program (APTS). Under this program, a wide range of innovative services are envisioned, as shown in Attachment A. Attachment B comprises six (6) tables which touch upon the Customer, Operational and Communications Requirements for IVHS.

As transportation systems continue to evolve, FTA foresees a mix of public and private vehicles providing mobility to travelers. These vehicles will be equipped with IVHS systems to operate within the ground transportation network. Radio spectrum must be available to provide for these systems. Enhanced safety and mobility improvements supportive of such important policy mandates as clean air and energy conservation will result.

IVHS is an important emerging technology that will need future consideration in the allocation of spectrum. FTA will work with the FCC in all possible ways to help ensure the development of these promising technologies.

Sincerely,

Brian W. Clymer

ATTACHMENT A

Listing of Advanced Public transportation Systems Technologies (as identified to date)

Information Access

- HOV/Ride Sharing Aids
- Dynamic Carpool Matching
- Handheld Information Devices
- Fixed Information Devices

Fare Collection

- Magnetic Fare Data Storage
- Solid State Fare Data Storage
- RF Induction-Coupled Fare Cards
- Infrared-Coupled Fare Cards

Automatic Vehicle Identification/Location

- Transponder Tags
- Bar Code Tags
- Inertial Navigation
- Dead Reckoning
- Electronic Signpost and Beacon Systems
- Radio Direction Finding Systems
- Satellite-Based Navigation Systems
- Combination / Composite Systems

Operator Interface

- Heads-Up Display
- Variable Display Terminals
- Liquid Crystal Displays
- Electroluminesce Displays
- Light Emitting Diode Displays
- Tough Screen Interactive Displays
- Synthesized Voice-Text
- Stored Message

Automatic Vehicle Monitoring

- On-Board Recording
- Telemetered Data Collection

High Occupancy Vehicle (HOV) Verification and Control

- HOV Lane Access and Entry Control Tags
- Random Statistical Checking
- Video Occupant Counting

Traffic Signal Pre-emption

- Communications Systems

Fleet Management

- Computer Aided Dispatch
- Revenue Collection
- Maintenance
- Safety / Security

Management Information Systems
Historical and Financial
Operations
Diagnostics
Voice Log
Maintenance

Voice / Data Communication Systems
Optical Communications
Ultrasonic communications
Cellular Communication
Radio Frequency Communications
Satellite Communications
Meteor Scatter
Low Orbit Satellite
Audio Signals

Note: A partial listing of the requirements for these technologies are contained in Attachment B.

ATTACHMENT B

The following tables contain Advanced Public Transportation Systems (APTS) requirements and applicable technologies.

Non-Standard Communication Bands and Applicable Technology:	Frequency Range:
Mobile Data	~ 900 MHz
Spread Spectrum	All useable freq.
Beacons	1.2 - 1.3 GHz
Tags	2.2 - 2.4 GHz
Repeaters	All useable freq.
Cellular	850 - 900 MHz
Microwave Systems	300 MHz - 60 GHz
Satellite (high orbit)	1.6 - 2.5 GHz 14.5 - 14.8 GHz
Satellite (LEOS)	137 - 138 MHz 148 - 149.9 MHz
Meteor Scatter Satellite	140 -150 MHz
Digital Audio	1.5 - 2.3 GHz (FCC) 2310 - 2390 MHz (NTIA)
RF Systems	10 kHz - 2 GHz
Ultrasonic	10 kHz - 130 kHz
Infrared	0.003 - 4.3 X 10 ¹⁴ Hz

Table 1: Transit technologies to communications frequencies.

April 9, 1992

APTS Areas:	APTS Requirements:	Applicable Technologies:	Smart Bus:	Ext. Supp:	Fleet Mgt.:
Information Access	HOV/Ride Sharing Aids	Mobile Data Cellular Infrared Ultrasonic Tags	No	No	Yes
	Dynamic Carpool Matching	Mobile Data Cellular	No	No	Yes
	Videotext	Mobile Data RF	Yes	Yes	Yes
	Handheld Infor. Devices	Mobile Data Cellular RF	Yes	Yes	Yes
	Fixed Infor. Devices	Mobile Data	Yes	Yes	Yes

Table 2: Customer requirements for FCC proposed spectrum allocation for Advanced Public Transportation Systems (APTS)

April 9, 1992

APTS Areas:	APTS Requirements:	Applicable Technology:	Smart Bus:	Ext. Supp:	Fleet Mgt.:
Fare Collection	Magnetic Fare Data Storage	N/A	Yes	No	No
	Solid-State Fare Data Storage	N/A	Yes	No	No
	RF Induction-Coupled Fare Cards	RF Ultrasonic	Yes	No	No
	Infrared-Coupled Fare Cards	Infrared	Yes	No	No
AVI/L	Transponder Tags	Microwave RF Infrared Tags	Yes	Yes	Yes
	Bar Code Tags	N/A	Yes	Yes	Yes
	Inertial Navigation	Microwave	Yes	Yes	Yes
	Dead Reckoning	N/A	Yes	Yes	Yes
	Electronic Signpost and Beacon System	Tags Microwave Infrared Ultrasonic	Yes	Yes	Yes
	Radio Direction Finding Systems	RF	Yes	Yes	Yes
	Satellite-Based	Satellite	Yes	Yes	Yes
	Combination / Composite Systems	All	Yes	Yes	Yes

Table 3a: Operational requirements for FCC proposed spectrum allocation for Advanced Public Transportation Systems (Continued in Table 3b)

April 9, 1992

APTS Areas:	APTS Requirements:	Applicable Technology:	Smart Bus:	Ext. Supp:	Fleet Mgt.:
Operator Interface	Heads-Up Display	N/A	Yes	No	No
	VDTs	N/A	Yes	No	No
	Liquid Crystal Display	N/A	Yes	No	No
	Electroluminescent	N/A	Yes	No	No
	Light-Emitting Diode	N/A	Yes	No	No
	Touch-Screen Interactive	N/A	Yes	No	No
	Synthesized Voice-Text	N/A	Yes	No	No
	Stored-Message	N/A	Yes	No	No
AVM	On-board Recording	N/A	Yes	Yes	Yes
	Telemetered Data Collection	RF Microwave Mobile Data	Yes	Yes	Yes
HOV Verification and Control	HOV Lane Access and Entry Control Tags	Tags Microwave Ultrasonic Infrared	Yes	Yes	No
	Random Statistical Checking	N/A	Yes	Yes	No
	Video Occupant Counting	N/A	Yes	Yes	No

Table 3b: Operational requirements for FCC proposed spectrum allocation for Advanced Public Transportation Systems (Continued from Table 3a and continued in Table 3c)

April 9, 1992

APTS Areas:	APTS Requirements:	Applicable Technology:	Smart Bus:	Ext. Supp:	Fleet Mgt.:
Traffic Signal Pre-emption	Communications Systems	Tags Infrared Microwave Ultrasonic RF	Yes	Yes	No
Fleet Management	Computer Aided Dispatch	Mobile Data Cellular RF Beacons	No	No	Yes
	Revenue Collection	Mobile Data Cellular RF	No	No	Yes
	Maintenance	Mobile Data Cellular RF	No	No	Yes
	Safety	Mobile Data Cellular RF	No	No	Yes
	Security	Mobile Data Cellular RF	No	No	Yes
Management Information System	Historical & Financial	N/A	No	No	Yes
	Operations	N/A	No	No	Yes
	Diagnostics	N/A	No	No	Yes
	Voice Log	N/A	No	No	Yes
	Maintenance	N/A	No	No	Yes

Table 3c: Operational requirements for FCC proposed spectrum allocation for Advanced Public Transportation Systems (Continued from Table 3b)

April 9, 1992

APTS Areas:	APTS Requirements:	Applicable Technology:	Smart Bus:	Ext. Supp:	Fleet Mgt.:
Voice/Data Communication Systems	Optical Comm.	N/A	Yes	Yes	Yes
	Ultrasonic Comm.	Ultrasonic	Yes	Yes	Yes
	Cellular	Cellular	Yes	Yes	Yes
	RF	RF	Yes	Yes	Yes
	Satellite	Satellite	Yes	Yes	Yes
	Meteor Scatter	Meteor Scatter	Yes	Yes	Yes
	Low Orbit Satellite (LEOS)	Satellite	Yes	Yes	Yes
	Audio Signals	N/A	Yes	Yes	Yes

Table 4: Communications requirements for FCC proposed spectrum allocation for Advanced Public Transportation Systems