

The Joint Council on Transit Wireless Communications

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INTRODUCTION

The Joint Council on Transit Wireless Communications (referred to herein as “The Joint Council”) is a newly formed alliance of professionals and transportation organizations created to represent North American surface land passenger transportation service operators on matters of wireless voice and data communications. The Council membership is drawn from public agencies, private providers and industry serving road, water, and rail transit. The council seeks to educate and inform public and private transportation agencies and providers on issues relating to their use of wireless communications.

Vision

To be the collective voice committed to addressing transit industry wireless communications needs.

Mission

To assure that the transit industry wireless communications needs are continuously met through information sharing.

Origin & Background

The Joint Council was established in 2009 as a result of the National Academies, Transportation Research Board (TRB), Transportation Research Cooperative Program (TCRP) Project, C-18 Strategic Plan for Meeting Transit Industry Wireless Communications Needs. Under this project, a strategic plan for transit industry wireless communications was developed through a collaborative effort with the American Public Transportation Association (APTA), the Community Transportation Association of America (CTAA), and other industry representatives. One of the transit industry goals identified in the strategic plan is the creation of a joint council to implement the strategic plan.

The establishment of a non-membership transit organization (i.e., the Joint Council) is viewed as

necessary to capture all aspects of the transit industry including the membership of APTA and CTAA, and other transport providers not represented by these two organizations. Further, it is recognized that the wireless communications needs of the more traditional “transit” industry substantially overlap with the needs of other passenger transportation service providers, including but not limited to non-emergency medical and senior citizen transport providers, taxicabs, limousines, and school buses. In addition to bringing together the broad spectrum of transportation providers with similar wireless communications needs, the Joint Council has been established to engage crucial partner organizations such as those indicated in Figure 1. To meet the wireless communications goals of the transit industry, it will be important to maintain an on-going exchange with these partner organizations.

Organization Structure

The Joint Council is structured to include officers, committees and task forces per the following Figure. The following are the current Officers of the Joint Council:

- **Chair:** Barry Einsig 
beinsig@harris.com (Harris Corp) 
- **Vice Chair:** Karl Witbeck
karl.witbeck@stantec.com (Stantec)
- **Secretary:** Delma Bratvold
delma.j.bratvold@saic.com (SAIC) 
- **Industry Committee Chair:** Raj Wagley 
Raj.Wagley@dot.gov (FTA)
- **Coordination Committee Chair:** Karl Witbeck
- **Outreach Committee Chair:** Mark McGregor 
mark@vatransit.org (Virginia Regional Transit)
- **Narrowbanding and 800 MHz Re-banding Task Forces Chair:** Alan Tilles  

atilles@shulmanrogers.com (Shulman, Rogers, Gandal, Pordy & Ecker, P.A.)

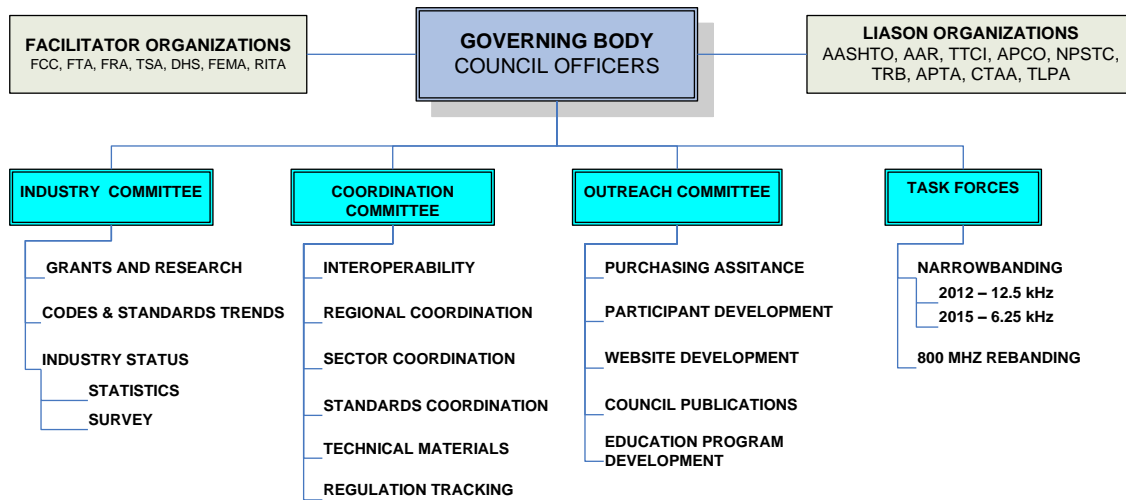


Figure 1. The Joint Council Organization Chart

Committees

The Joint Council is comprised of three standing committees and two task forces (see figure 1). They are as follows:

The Industry Committee

The Industry Committee was formed to provide the following principle functions:

- Track and report to the Joint Council the status of the industry through surveys and the development of statistics.
- Support and encourage information sharing between Facilitator Organizations.
- Track and report to the Joint Council trends and updates of pertinent industry codes and standards.
- Track and report to the Joint Council relevant information regarding applicable grants and research.

The Coordination Committee

The coordination committee was formed to provide the following principle functions:

- Support transport providers participation in State Interoperability Executive Committees (SIEC)
- Support transport providers participation in Public Safety Regional Planning Committees (RPC)
- Support the arrangement of Interoperable communications between transport providers and public safety or other entities.
- Support the development of vendor neutral and open published wireless communications

standards for use by transport providers and for interoperable emergency communications.

- Develop common transport provider requirements for radio communications to encourage and promote the development and availability of suitable product by original equipment manufacturers.
- Develop position papers and filings on matters pertaining to frequency coordination and FCC regulations, rule makings and other related items of importance to the transit industry.
- Track and report to the Joint Council FCC and other pertinent regulatory activity.
- Develop technical materials on subjects relevant to the functions of this committee defined herein, and/or as requested by the Joint Council.

The Outreach Committee

The outreach committee was formed to provide the following principle functions:

- Develop outreach programs to expand awareness of the Joint Council and share transit wireless information.
- Develop and maintain public website format and pertinent content to meet transport providers wireless communications needs.
- Develop relevant materials for publication and distribution. Provide editorial review, formatting, packaging and content definition.
- Develop educational programming and related materials on subjects relevant to the wireless communications needs of transport providers.

- Support sharing of radio system purchasing information and related data.

Task Forces

The following task forces have been created to address ongoing and near term regulatory issues.

Narrowbanding

This task force seeks to inform our industry of the requirements to be in compliance with this Report and Order by the FCC to reduce the bandwidth emissions from 25kHz to 12.5 kHz of licenses below 512 MHz with the intent to create more available frequencies to all. The key date is Jan, 01 2013 at which time all licenses must be in compliance. The approach is to use of web sites, prepare educational materials and disseminate this information via seminars, conferences and other training programs.

The following web sites are available for reference:

- <http://wireless.fcc.gov/>
- <http://www.npstc.org/narrowbanding.jsp>
- <http://www.ojp.usdoj.gov/nij/topics/technology/communication/fcc-narrowbanding.htm#key>
- <http://www.narrowbandinglaw.com/>

800 MHz Rebanding

This task force seeks to inform our industry of the requirements to be in compliance with this Report and Order by the FCC to move public safety licenses in the 800 MHz band to reduce interference with Sprint's cellular systems. The approach is to use web sites, prepare educational materials and disseminate this information via seminars, conferences and other training programs.

The following web sites are available for reference:

- <http://www.800ta.org/>
- <http://www.800mhzrebanding.com>

The original completion date was scheduled for June of 2008, however various issues have delayed the completion date to 2011 or 2012.

Funding and Resources

The National Academies TRB has provided funding for the initial establishment of the Joint Council, from 2009 through 2011. These TRB funds are provided through both the TCRP and the National Cooperative Highway Research Program (NCHRP). The TRB funding originates from the FTA. The primary purpose of these funds is to reimburse transportation providers for their participation in Joint Council activities. SAIC has been contracted through TRB to disperse these reimbursements, and to assist with meeting logistics.

The Joint Council leaders are working to identify subsequent funding for 2012 and beyond. The FTA is actively participating in Joint Council activities – the participation of transit agencies on the Joint Council will help encourage continued FTA support.

The Joint Council webpage is provided by the National Public Safety Telecommunications Council (NPSTC), with funding from the DHS. NPSTC provides this service to facilitate effective inclusion of transportation providers in emergency activities. Refer to: <http://www.npstc.org/transitCommunity.jsp> for details.

All Joint Council officers and participants are volunteers.

2010 ACCOMPLISHMENTS & PLANS

The following items have been completed or are in progress as of the writing of this paper.

- Four meetings of the Joint Council are scheduled or have been completed for 2010.
 - February 22 at APTA TransiTech, Ft. Lauderdale, FL – Completed
 - May 27 at CTAA EXPO in Long Beach, CA
 - August at the APCO conference in Houston, TX
 - October at the AASHTO Annual meeting in Biloxi, MS
- Committees and tasks forces have been formed and Chairman identified.
- FCC comments have been filed by the Coordination Committee for the Following items.
 - Nov 23, 2009 Filing on NPSTC petition to stay interim narrowbanding dates
 - Nov. 24, 2009 Filing on EWA petition for Narrowbanding the 800 MHz band
 - Dec. 21, 2009 Filing on National Broadband Plan
 - Feb. 5, 2010 Filing on Signal Boosters
- Funding has been allocated for travel expenses and discussions are underway to obtain sustaining funding.
- Draft Joint Council Charter posted for comment.

HISTORICAL BACKGROUND

Regulatory Perspective

Land mobile radio transport provider users are licensed primarily under two sections of Part 90 of the

FCC rules, 47 C.F.R. § 90.20(a) (Public Safety Pool) and 47 C.F.R. § 90.35(a) (Industrial/Business Pool) since 1997. Other sections of Part 90 rules may also apply in some circumstances. The 1997 consolidation by the FCC combined 20 radio services spread across 6 categories into these two service pools. Prior to 1997 there were many service pools, which further fragmented user groups and complicated planning and coordination efforts.

Since 1997, planning efforts have improved somewhat, however transport providers remain fragmented or spread across multiple frequency bands in both pools for the following reasons, including (but certainly not limited to):

- Public transit properties that are owned and operated as a government or municipal entity are eligible to apply for public safety pool frequencies. However, public safety pool frequencies may not be available in the service area needed, (typically in dense urban areas) and therefore are forced to apply for industrial/business pool frequencies or a combination of frequencies in both frequency pools as may (or may not) be available depending on the number of frequencies needed dictated by the application and service to be implemented.
- Transport providers that are owned and operated as a commercial enterprise are not eligible for public safety frequencies and are only eligible for industrial/business pool frequencies.
- Frequencies are acquired and licensed through a frequency planning and coordination process specified by the FCC. This process varies somewhat for each pool and radio service, but for public safety frequencies for example, applicants for 700 MHz and 800 MHz NPSPAC channels must first obtain concurrence from the appropriate Regional Planning Committee (RPC) in each state for their frequency request and then have the application coordinated by an FCC authorized frequency coordinator who files the license application on their behalf. The applicant can choose from several frequency coordinators with access to the appropriate pool. The coordinator then selects available frequencies within their allocated pool on a first come, first served basis (except for 700 MHz and 800 MHz NPSPAC frequencies, which are allocated based upon regional plans).
- Each transport provider makes independent, project specific spectrum requests as each have separate funding and planning cycles and different needs.

Because of this, public transport operators licenses are fragmented and spread across multiple frequency bands and service pools. As a consequence over many years, there has not been consideration given by policy and rule makers to consider transport operators, which provide a public service, to allocate or prioritize spectrum for use by non-freight transport operators as an aggregate block of users. They have been left to fend for themselves and get in line with everyone else that may need spectrum. This is a common problem throughout the wireless industry as spectrum is not in adequate supply.

There are two main issues limiting the ability of transport providers to use (for operational purposes) and offer advanced wireless services to their patrons:

- Lack of funding (it is beyond the scope of this paper to address funding issues), and
- Lack of suitable spectrum in the service area needed.

To the best of our knowledge, the transport provider sector has never been represented in the United States as an aggregated user community; that is until now!

Accordingly it has been identified that this industry would benefit from an aggregated voice regarding spectrum needs.

STRATEGIC PLANNING

Introduction

TCRP Project C-18 was initiated to accomplish three main goals.

- Develop a strategic plan and general goals
- Conduct an Industry Roundtable
- Develop a Draft Implementation Plan

The round table was held in March of 2009 and produced a strategic plan in June of 2009 as follows:

Strategic Plan

This strategic plan was prepared for the wireless communications needs of the transit industry. It describes the vision, mission, and strategic goals for the next five years to effectively support the communication needs of the transit industry.

The rapid evolution of communications technologies is evident in the increasing variety of wireless services, and accompanying greater usage of the radio spectrum. To maintain its critical push-to-talk and real time communications capabilities, and to take advantage of the growing opportunities offered by the wireless communication system (e.g., enhanced passenger services, real-time video and vehicle operation data, voice

and data transfer among varied technologies, etc.), the transit industry must monitor, respond, and adapt to:

- Changes in FCC regulations affecting licensed and unlicensed spectrum used by transit agencies.
- Changes in commercial services that affect expectations for communications and change the needs for communications.

The transit industry must build partnerships with other radio spectrum user-groups and emergency response organizations to the benefit of public transportation communications. The future of public transportation communications depends on our collective voice, our commitment to action, and our adaptability to shifts in the environment impacting our industry. The following vision and mission of this industry-wide strategic plan support this commitment.

Vision

To be the collective voice committed to addressing transit industry wireless communications needs.

Mission

To assure that the transit industry wireless communications needs are continuously met through information sharing.

The following strategic goals were developed as a result of the roundtable and represented a first step in translating the vision and mission into action. The transit industry will use this plan to develop an implementation plan that will guide our actions, establish priorities, and align our resources. For each strategic goal listed below, the implementation plan will include specific objectives that are measurable, actionable, relevant, and time-based.

Strategic Goal 1: PRIVATE RADIO SYSTEMS

To promote and implement standards and regulations affecting the private communication systems in a manner that assures uninterrupted communications, and optimizes spectrum usage.

Specific regulation-based goals to be addressed within this heading include:

1. UHF/VHF Spectrum – Assure uninterrupted communications as private radio licensees operating in this spectrum implement mandated, phased-in efficiency standards by January 1, 2013.
2. 800 MHz Band – Optimize band use recognizing that some channels in this band have recently been designated for Public Safety use, and further recognizing that if these bands are not used, they will later be re-assigned for broader use.
3. 700 MHz Band -- Optimize use of this band recognizing that a portion of this spectrum vacated by

analog television on June 12, 2009 will become a primary interoperability band between various emergency responders, including transit.

4. Spectrum for private broadband application – Optimize use.

Activities to meet these goals include, but are not limited to:

- Expand Knowledge -- Facilitate industry-wide knowledge of spectrum availability and licensing changes, equipment needs, funding and purchasing timeline needs, and recognition of soon-to-be obsolete equipment (both in-use, and on the market).
- Pool Resources -- Facilitate mechanisms for obtaining large-group purchase prices, with emphasis on small transit agencies.
- Liaison Functions – Provide responses to FCC requests for information and notices of proposed rulemaking.

Strategic Goal 2: COMMERCIAL SERVICES

Recognizing that about 70% of the transit industry purchases commercial communication services (e.g., cell phone), the second strategic goal was to facilitate transit industry knowledge of relevant commercial communications advances to promote more informed decision-making for new equipment, system, and service purchases. Activities to meet this goal include, but are not limited to:

- Tracking of commercial voice and data services including prioritization capabilities, and means of interoperability with other communication technologies.
- Periodic summarization of the potential applicability of various commercial services to the transit industry, including advantages and disadvantages.
- Identification and development of means for obtaining reduced rates for commercial services (e.g., pooled purchasing groups).
- Improve Interoperability

Strategic Goal 3: INDUSTRY REPRESENTATION

The third strategic goal is to represent transit industry needs in communications standards development and rulemaking to assure considerations of public transportation needs. Activities to meet this goal include, but are no limited to:

- Tracking and responding to congressional legislation, FCC notices, requests for information, and rulemaking

- Tracking transit industry wireless communications
- Solicitation of funding for industry wireless communication needs
- Participation in standards development for wireless technologies.

Strategic Goal 4: JOINT COUNCIL

The fourth strategic goal was to establish a joint council to implement the Transit Wireless Communications Strategic Plan. Activities to meet this goal include, but are not limited to:

- Identification of transit organizations interested in participating on the Joint Council
- Identification of other transit communication stakeholders that are interested in participating on the Joint Council (e.g., government agencies and other spectrum user groups)
- Development of the Joint Council structure and charter.

TCRP TRANSIT INDUSTRY SURVEY

A survey of the transit industry was conducted in 2007 by TCRP J-06, Task 67. The results of this survey are summarized below.

This survey provides a baseline snapshot in time of this industry and only represents the data from those that participated. However, this provided a useful representation of the status of the industry and helped to guide the goals for the development of the strategic plan completed in 2009.

Survey Objective

“To develop a profile of current radio-frequency and wireless-data usage for the transit industry and to assess future needs.”

Survey Approach

- Web-based survey of the transit industry
- Survey invitations sent to all APTA and CTAA transit members
- Invitations were sent to APTA and CTAA members in February, 2007, and re-sent to non-responding Northeast agencies in August, 2007 to achieve comparable representation among regions.
 - Agencies Sent Invitations: 765
 - Completed Submissions: 272 (36% of deliveries)

Responses by Fleet Size Category

Fleet Size Categories are indicated in the Table below.

Size Category	Number of Vehicles and/or Rail Cars
Large	>500
Med-Large	100 to 499
Medium	50 to 99
Med-Small	20 to 49
Small	<20

Table 1. Fleet Size Categories (Based on number of vehicles/vessels/cars).

The number of agencies who responded are indicated in Figure below by fleet size.

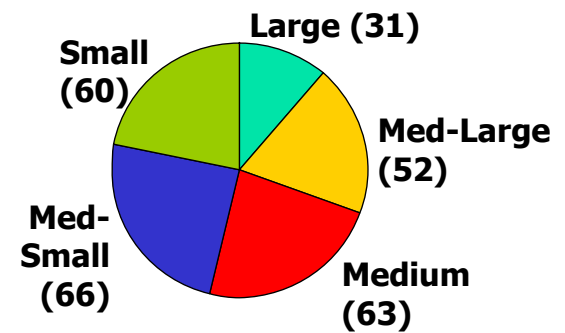


Figure 2. Agency distribution by Fleet Size Categories

The number of agencies who responded by median fleet size is indicated in the following Figure.

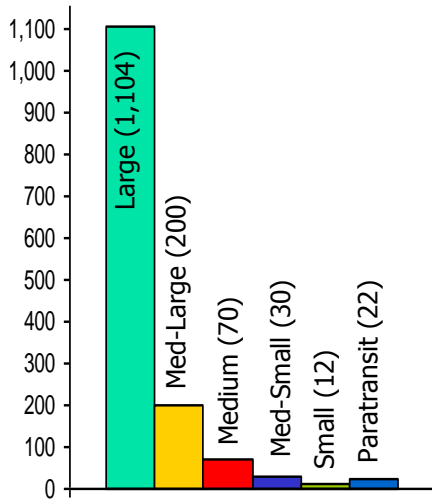


Figure 3. Median Fleet Size Categories

2 Way Radio Use

It was reported that 89% of those surveyed used private 2-way land mobile radio systems of some type. See figures below.

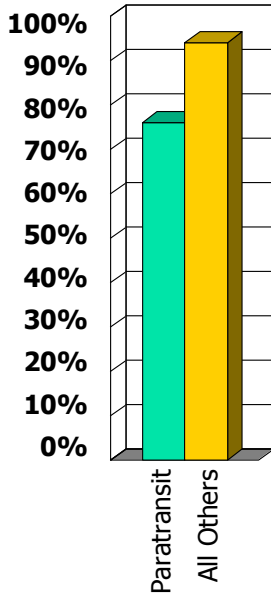


Figure 4. 2 Way Radio use by Median Fleet Size Categories

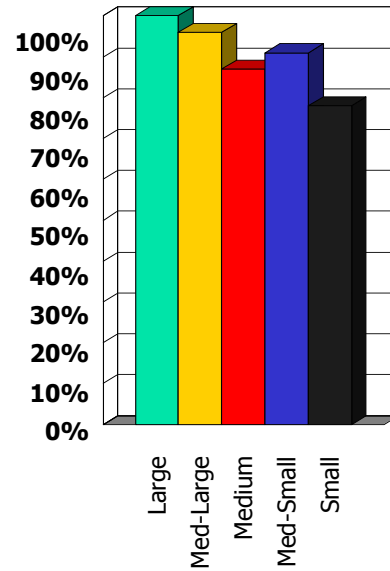


Figure 5. 2 Way Radio use by Mode

Frequency Band Use

The figure below indicates the 2 way radio usage categorized by frequency band.

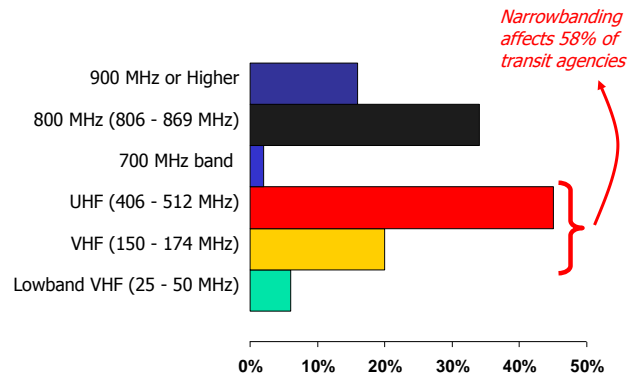


Figure 6. 2 Way Radio use by frequency band

The following figure indicates the 2 way radio frequency band usage by fleet size.

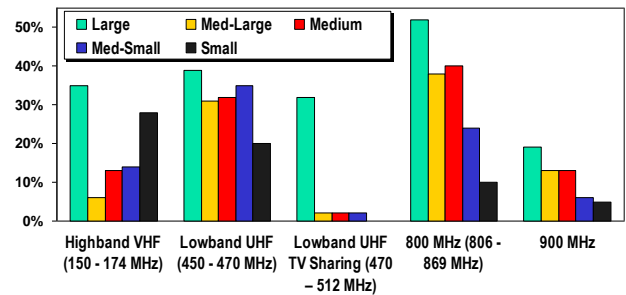


Figure 7. Frequency Band % use by fleet size

Use of other radio technologies

Non-private land mobile radio use

The following figure summarizes the use of non-private land mobile radio systems by fleet size. It is noted that a high percentage of the industry uses commercial cellular service for non-vital, administrative and routine communications. While none of the large agencies used commercial services for mission critical push-to-talk operations, as indicated in Figure 5, above, roughly 20% of small agencies do not have private 2-way radios, and presumably rely entirely on commercial services.

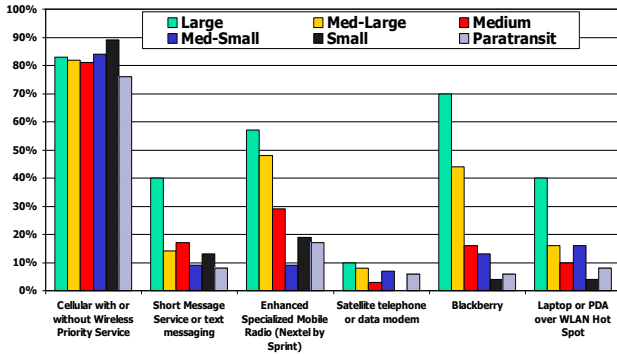


Figure 8. Other 2 Way Radio use by Fleet size

Use of wireless communications for sensor applications

The following figure indicates the use of various sensors and devices such as GPS, telemetry and video on their fleets. The most common use is some form of GPS technology for vehicle tracking.

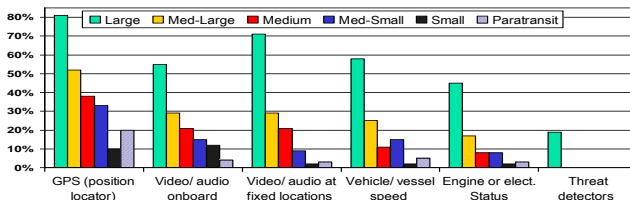


Figure 9. Use of sensor technology by Fleet size

Use of wireless alert technologies

The following figure indicates the use of various alert technologies or non-private radio technologies for the purposes of sending instant alerts typically to a central dispatch location. The most common was cellular phone calls or text messaging (not by operators!).

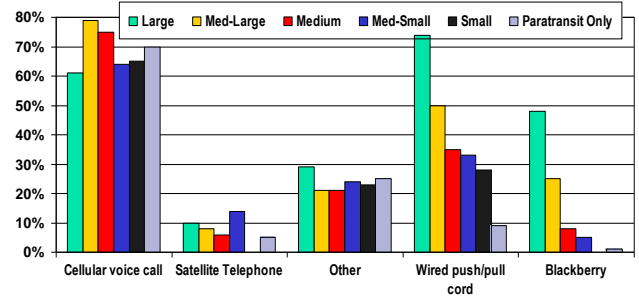


Figure 10. Use of alerting technologies by Fleet size

Operators providing wireless services for passengers

The following chart indicates the percentage of operators currently providing wireless services to their patrons sorted by fleet size. It was noted that overall a small percentage of operators provide this service.

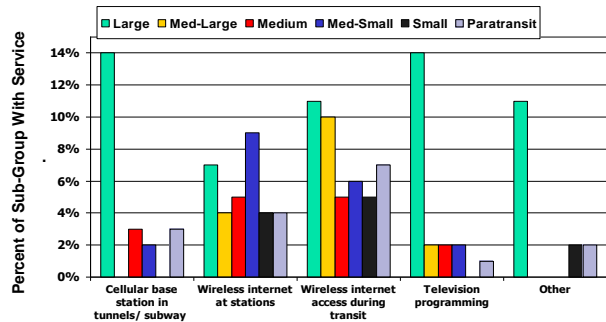


Figure 11. Current provision of passenger wireless technologies by Fleet size

The following chart indicates the percentage of operators planning on providing wireless services to their patrons. It is noted that WiFi type internet access at stations is the most prevalent service to be offered.

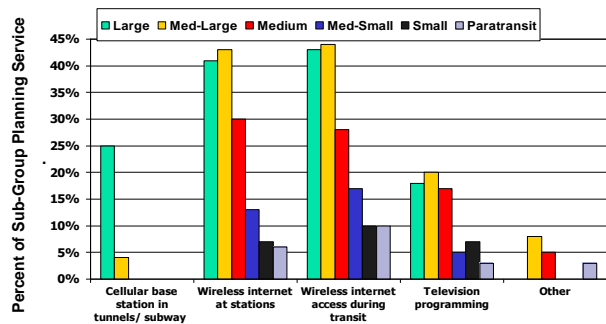


Figure 12. Operators planning on providing passenger wireless technologies by Fleet size

Emergency Response Experience

The following chart indicates by fleet size the involvement in emergency events or exercises in the

preceding five year period. As indicated, 100% of large fleet operators had some type of role in emergency response and planning.

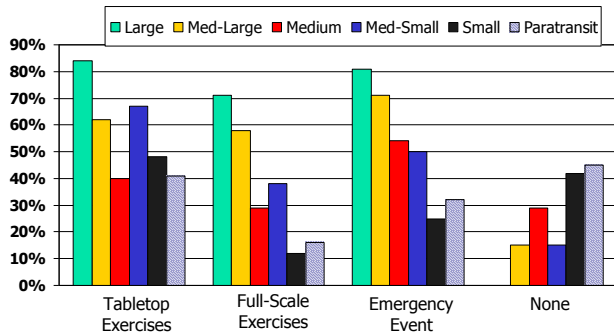


Figure 13. Emergency response by Fleet size

The following chart indicates who within an operator’s organization can talk on the radio generally and who can talk directly to first responders or emergency management. This includes both technological capability and procedural allowance of direct communications. The most common scenario is for Dispatch to be the main user of the radio system, particularly in emergencies. It was interesting to note though that the smaller the fleet size, the more likely it was that vehicle drivers would be able and allowed to speak directly with other agencies and the larger the fleet size the less likely that would be needed or may happen by necessity.

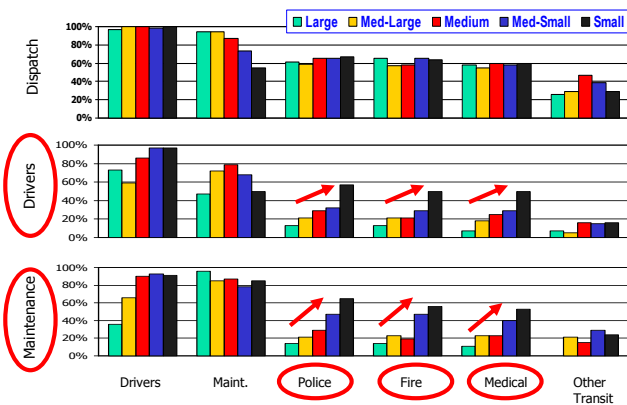


Figure 14. Radio system use by Fleet size

Reason for System Change

The following charts indicate the most common reasons used to justify and initiate radio system upgrades or replacements in the past and for the future. It is noted that Narrowbanding or 800 MHz rebanding (or Frequency Changes) was the most common reason for future projects being planned. Generally though, obsolescence is the most common reason.

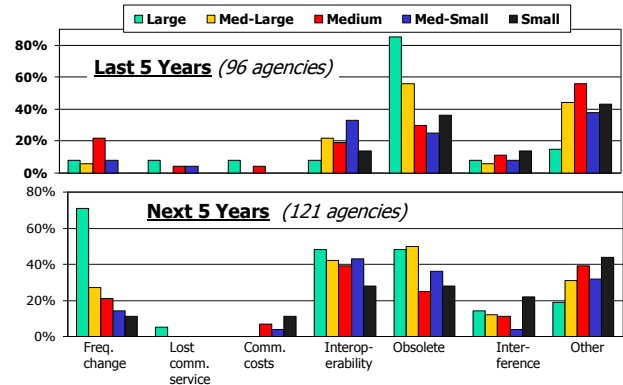


Figure 15. Reasons for Radio system upgrades/changes by Fleet size

Industry Concerns

The following graph rates various issues/concerns identified by degree of concern. It is noted that the biggest issue for all operators regardless of fleet size was funding followed by Emergency communications policy and interoperability.

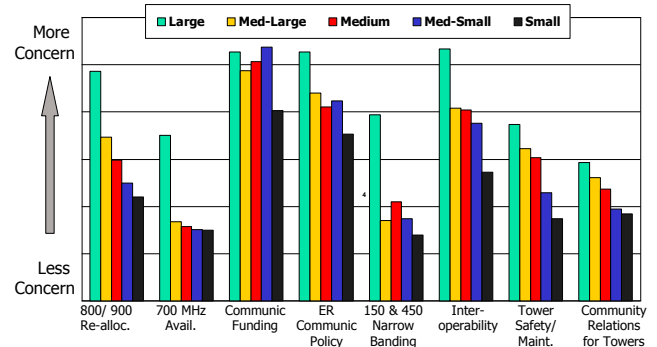


Figure 16. Radio system industry concerns by Fleet size

Industry Knowledge

The following graph indicates the percentage of respondents who answered “Don’t Know” when asked about the topics indicated sorted by fleet size. It was noted that a fairly high percentage indicated they were not aware of the FCC changes coming.

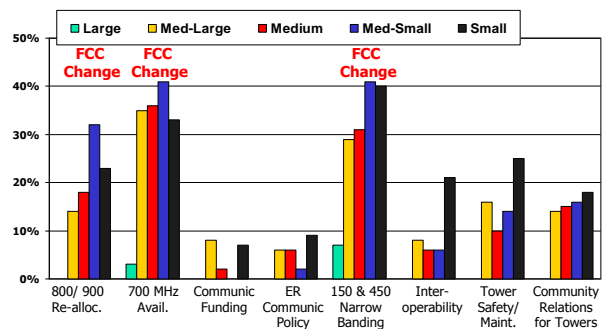


Figure 17. Survey of industry knowledge by Fleet size

CONCLUSION

By the expression of interest received by the industry, the results of the survey and the goals of the strategic plan, it is apparent a clear need has been identified and the Joint Council is well on it's way to becoming an effective organization to meet these needs and accomplishing key goals within the first year of our existence.

We are please with this progress and look forward to increased involvement by the industry who own the issues summarized in this paper, and deal with them every day.

For additional information on the Joint Council, please visit <http://www.npstc.org/transitCommunity.jsp> or contact any of the aforementioned Joint Council officers.