



# MPSCS NEWSLETTER

## Inside this issue:

Rebanding Update	2
IMPORTANT BDA Information	2
Engineering Overview	2
Grade of Service	3
Funding Option: Used Radio Trade-In	3
MPSCS Contacts	4
Usage Stats	4

## UPCOMING EVENTS

### Training

Contact: Gloria Cline  
(517) 336-6126

- September 14-17 (Saginaw)
- October 19-22 (Gaylord)
- November (NO TRAINING SESSION)

## QUICK STATS

- TOTAL RADIOS:  
**50,402**
- AMOUNT ADDED IN PAST TWO MONTHS:  
**1,465**

## FUN FACT

- September is *National Preparedness Month*. Find out more information at: <http://www.ready.gov>

## The Casual Listener Problem

*What all MPSCS users need to know about talkgroups and base stations*

In May, dozens of areas around the state experienced excessive radio busies. This happened at the same time that hundreds of Michigan's public safety officials traveled to Grand Rapids for the Homeland Security Training Conference and Expo. Many of them brought along their MPSCS radios . . . which were powered on and tuned in to their local P911 talkgroups.

Theoretically, there should not have been a problem. There was. These talkgroups are capable of operating statewide, but are not intended for continued use outside of their primary operating area.

The MPSCS towers in Kent County, as is true with every MPSCS tower across the state, are equipped with a set number of base stations (between 4 and 15 depending on voice traffic density). Base stations transmit talkgroup communications, and each talkgroup needs an available base station to function. Once all of the base station resources at any given site are in use, busies occur.

The officials attending the conference were not necessarily transmitting on their radios. Nevertheless, the radios were accessing Kent county tower sites by being turned on, and affiliated with every other radio tuned to that talkgroup. Far too many talkgroups attempted to utilize a small amount of resources, and the busies started piling up.

Critical public safety talkgroups in the Grand Rapids area were bonked, as well as P911 talkgroups around the state. The NCC was flooded with calls for help.

This problem could have been prevented with training on how talkgroups function



When listeners access local talkgroups outside of their home areas, system busies can pile up like cars in a traffic jam.

within digital, multi-site trunked radio systems like the MPSCS.

The MPSCS operates in ALLSTART mode, meaning that if even one radio can't obtain a channel when listen or transmitting to a talkgroup, the entire talkgroup will experience a busy. This ensures that every individual tuned to that particular talkgroup will hear all transmissions.

A few methods are in place to reduce the number of potential system busies. MPSCS officials configure all towers with an appropriate ratio of base stations to talkgroups.

Most of the 4,762 talkgroups operating on the MPSCS are local talkgroups, and have access to the sites in their local area. This limits the talkgroup's transmissions to a certain geographic area near their "home" tower site(s). This

method effectively prevents most users from tying up resources outside of their normal operating area.

Some talkgroups have all site access, allowing them to transmit on any tower in any geographic area of the state. This permits statewide interoperability, and can effectively limit the number of necessary system resources when utilized correctly.

Finally, each talkgroup is given a "priority assignment" when it is created on the MPSCS. All public safety agencies (law, fire, ambulance, etc.) have a higher priority than non-public safety agencies (parks & recreation, road commission, etc.). A police radio that arrives in queue will "jump" over all other radios with a lower priority.

MPSCS users can help assist with this issue. When leaving your home operating area, switch to one of the STATE talkgroups (beginning with STATW). Numerous people can communicate across the state while using only one base station per site, compared to several when each individual maintains ties with a P911 talkgroup. This will alleviate issues like what happened in Grand Rapids.

If you do receive a busy signal/tone, do not continue to push the PTT button. Once you receive a busy, you are placed in line to receive the "go ahead and transmit" tone. By continuing to push the PTT button, you are lengthening the time that

*(continued on page 4)*

## Rebanding Update: Coverage plan almost complete

The Rebanding project is moving ahead smoothly, and the implementation plan continues on schedule.

- A plan for installing Back-to-Back Repeater Antennas on all Mutual Aid network tower antennas is nearing completion. A separate funding application to Sprint is being developed for this. If approved, the antenna installation will occur before the radio Rebanding phase, ensuring that Mutual Aid Channels (on both the existing and newly Rebanded frequencies) will be available throughout the project. Therefore, there will be no coverage gaps for users.
- RCC completed an analysis of all new frequencies. Motorola is now analyzing these new frequencies to make certain there will be no Inter-modulation disturbances after installation on the antenna towers.
- Discussions continue regarding the complex radio Rebanding process. This includes counting all radios, troubleshooting the methods of receiving radios at the Rebanding sites, testing and reflashing the radios to install the most up-to-date operating program, installing the new frequencies, retesting to ensure the radios meet MPSCS operating standards, and measuring all processes to ensure that strict quality control standards are met.
- Communications continue with EF Johnson and Kenwood representatives. Efforts are underway to develop the Rebanding process for these radios.
- The issues of Interoperability between MPSCS and partner agencies are still under discussion, but remain unresolved at this time.

Once these stages are complete, project managers will finalize the budgets, and include them in the implementation plan. A target date for submission of the Rebanding Frequency Agreement Proposal to Sprint/Nextel and the FCC's Transition Authority is set for mid to late November 2009.

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*Updates will appear in each future issue of this Newsletter. However, detailed project information, upcoming events, and up-to-date progress reports can be found at the Rebanding Project's website: <http://www.rccpm.com/MJ800MHz/default.aspx>*

## Bi-Directional Amplifier? The MPSCS Needs Information

Bi-Directional Amplifiers (BDA's) are installed in buildings and structures to enable radio signals to be transmitted into the interior beyond where they can be transmitted from an outside source. It is critical that these BDA's are installed for MPSCS operation and are Rebanded to the new frequencies at the same time as other MPSCS system components and radios.

"It is critical that these BDA's are installed for MPSCS operation and are Rebanded to the new frequencies ..."

**The problem:** MPSCS has installed some of these BDA's, and knows where those are. However, local agencies and companies have also installed BDA's without notifying MPSCS or local radio shops. The MPSCS Rebanding team needs to learn where every BDA is located, regardless of who installed it, so it can be entered in the project's inventory. Once Rebanding is underway, the BDA's will be scheduled for Rebanding at no cost to the local agency.

If a BDA is not Rebanded, it will

not be able to function with the MPSCS once the Rebanding migration is complete, a potential critical point of failure for public safety personnel and services.

**The Solution:** Please review your infrastructure to identify any BDA installations for the improvement of MPSCS coverage. Prepare a list of the BDA's, their location address as well as a location within the structure, and contact information for the person that can provide additional or clarifying information. The information can be e-mailed to: [dar-curi@rcc.com](mailto:dar-curi@rcc.com) with BDA in the Subject line. Dominick Arcuri, PE is the Sr. VP of RCC Consultants assigned to this project.

Your assistance and response to this request is important to the success of the project.

Please contact Richard Baker, Project Manager if you have questions at 517-333-4133 or [Bakerr4@michigan.gov](mailto:Bakerr4@michigan.gov).

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## The MPSCS' Engineering Team

When asked what the goal of the MPSCS' Engineering team is, Mark Sandberg, MPSCS Radio System Engineer, says, "It's to provide optimal technical services to the end user. Everything we do needs to be for them."

The group is directly involved in almost every MPSCS project, at least during the initial stages. Sandberg noted the group functions with a "system-level view," and therefore every decision's impact is assessed against how it will affect the existing infrastructure. "The end user's needs are the most important," Sandberg said. "We must make sure to maintain and improve the current system."

If equipment and technology aren't properly integrated, the system is adversely affected; the engineering team strives to ensure that everything is designed and executed correctly.

The six-person group meets once a week to go over all current projects, and to troubleshoot any issues the MPSCS currently faces. Large tasks benefit from these cooperative brainstorming sessions, as this is when the engineering team completes the best work, Sandberg said.

Working with locals is also a key part of the team's work. Often, the engineers seek the help of end users to better understand issues within the system, such as coverage and accessibility problems.

For example, the MPSCS engineers are currently working with project managers from Kalamazoo to reevaluate their infrastructure design, with hopes of improving coverage in that area.

The engineers occasionally participate in ride-alongs with local users. This gives them a clear view of how the radios are being used and under which conditions. When creating systems and modifying existing infrastructure, the engineers use this information to design more effectively.

Balancing standards, procedures, and policies with creative thinking and innovative design techniques has helped the small staff develop and maintain a state-of-the-art communication system. Without the engineering team, the MPSCS would not remain one of the nation's leaders in 800 MHz digital communication systems.

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## Grade of Service:

*As system usage increases, MPSCS users experience less busies*

In 2005, the MPSCS created a method for tracking the system's Grade of Service (GOS), which identifies accessibility problems and helps the MPSCS engineers prioritize sites for channel additions. The engineers monitor and assess the GOS each week to ensure the system can handle the growing number of users.

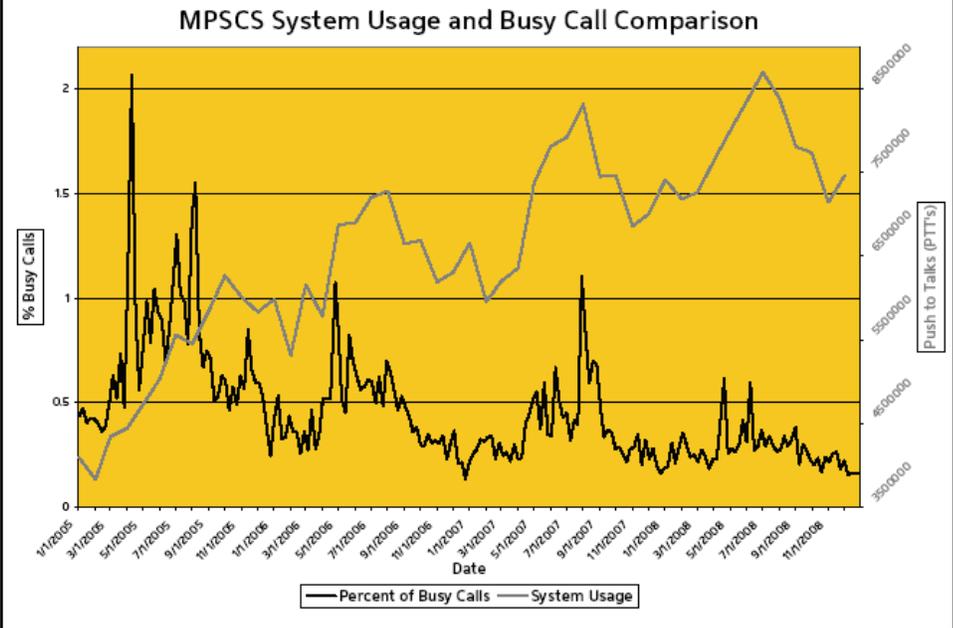
Grade of Service (GOS) is "a measurement used to help quantify system loading," as defined by MPSCS policy 4.1.2, *Grade of Service* (available on the MPSCS' website). "It helps describe a subscriber's ability to access the system considering existing or predicted radio traffic volume."

When establishing the GOS, MPSCS adhered to the industry standard 5% criterion. This means that at the busiest time of day, there should be no more than a 5% chance of one's call, or PTT, being queued. However, the MPSCS tries to keep the average GOS between 2% and 3%.

Each week, usage statistics are pulled from the system, including real time traffic data on a site-by-site basis. Those stats are then plugged into a custom-built tool that uses the Erlang C formula. The resulting figure is a percentage probability that a user will receive a busy signal.

A system-wide chart arranges this data, organized per site and week. Different colors respond to different GOS levels, performing as an easy-to-use, visual representation of system usage. The engineers then use this chart to determine if any sites are approaching the GOS limit.

If an area is near or above the 5% criterion, it is evaluated immediately. If the area lies in the 2-4% range, the engineers monitor it closely over the next several weeks, identifying if the conges-



Despite the MPSCS' increasing system usage, the percent of system busies has declined since the Grade of Service tracking tool was created in 2005. MPSCS engineers monitor system congestion, and implement additional channels to help prevent busies.

tion is a one-time occurrence, or a long-term problem.

The engineers create a prioritized site list, designating which sites are to receive additional channels. Because of the lengthy licensing process and the installation of hardware, activating a frequency for use requires roughly two months. An ongoing channel addition cycle is always taking place.

In times when a location's GOS needs immediate improvement, the MPSCS engineers can acquire an emergency STA, or temporary license. This is only done in public safety operations when lives are at risk.

With the system constantly expanding, there is a consistent need for additional channels at tower sites. When large subsystems and agencies join the MPSCS, it is sometimes required for them to add channels not only to their primary tower sites but also to the surrounding sites to facilitate this extra use.

Since the tool's creation in 2005, the system's GOS has improved dramatically. Despite the increasing usage and the shrinking State budget, the MPSCS engineers have built upon the system's assets and maintained a proactive approach to alleviate accessibility problems.

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## Used Radio Trade-In : A potential funding source for communication equipment

### Funding Option:

Sunny Communications provides credit for old, outdated, or unwanted communication equipment. They act as a third party between the agency and the local dealer, purchasing VHF/UHF radios, 800 MHz analog and digital radios, some 900 MHz radios, and backbone infrastructure. Then, the local dealer provides the agency with an earmarked credit to use in future equipment purchases. Sunny Communications then sells this equipment overseas.

For more information about this company and its services, contact Sunny Communication's North American Sales Manager, John Sapuppo, at 519-551-5386, or by email at [john@sunnycommunications.com](mailto:john@sunnycommunications.com)



The MPSCS Newsletter strives to provide users with information to help better utilize the system through understanding and instruction, to help find funding sources for communication programs, and to inform of news and events in the communication technology world, and in Michigan's public safety sector.



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Comments or suggestions are appreciated!  
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[www.michigan.gov/mpscs](http://www.michigan.gov/mpscs)

### Usage Statistics

2009	Total Calls	PTTs	PTT Change From 2008
July	4,825,551	8,737,460	+35,561
Aug	4,806,191	8,652,044	+257,857

(continued from page 1)

everyone else must wait to transmit, as the system believes there are more people waiting.

Lastly, if a large incident occurs outside of your normal operating area, do not listen in simply out of curiosity. Tying up base stations like this can be detrimental to the safety of others.

This occurred in Minnesota during the 2007 I-35 bridge collapse. Many individuals listened in on the response talkgroups, causing sites to overload and halting vital public safety communications.

Proper user training prevents the majority of "casual listener" problems. Large digital trunked radio systems like the MPSCS are sensitive to user interactions, and everyone must be mindful of their usage decisions.

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### Want additional information?

Email: [mpscs@michigan.gov](mailto:mpscs@michigan.gov)

For topics of interest related to articles in this volume contact:

**Base Stations and Talkgroups**

NCC Technician  
 Steve Leaming  
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**Rebanding Updates:**

800 MHz Rebanding Project Manager  
 Dick Baker  
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**BDA Notice:**

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**Used Radio Trade-In:**

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## Keep Your Eyes Open for UPCOMING ISSUES of the MPSCS Newsletter.

- Simulcasting
- New Data Security Technology
- MPSCS Performance Standards
- Project 25 Phase 2 Standards
- Point-To-Point Technology
- Communication Technology
- MPSCS Staff Bio
- System/User ID Updates
- Rebanding Updates
- ...and more!