CTA COMMUNICATIONS, INC

CTA COMMUNICATIONS, Inc.
CONSULTANTS

FINAL

Dispatch Service and Record Keeping Consolidation Study

Bi-State Regional Commission

Bi-State Regional Commission

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EXECUTIVE SUMMARY

There are currently three primary and one secondary Public Safety Answering Points (PSAPs) in Scott County, Iowa. The four PSAPs perform similar functions for the entities they serve. In 2005, a "Blue Ribbon Committee" was formed and CTA Communications of Lynchburg, Virginia was selected to conduct a study of the feasibility of consolidating two or more of the dispatch centers in the County.

The feasibility study was designed to answer the following questions:

- How would a consolidation take place and provide improved service?
- How should it be organized and staffed?
- What services should it perform?
- How should policies be made and changed?
- How should it be funded?
- With consolidation, what communications changes or improvements should be made in order to support the operations better than provided today?

CTA Communications conducted approximately forty interviews. The four existing dispatch centers were surveyed and detailed information was gathered on the systems and facilities currently in use.

This report contains:

- An operational design for a consolidated center. This includes the number of operational police radio consoles, Fire/EMS consoles, and call answering positions.
- Equipment needs of the consolidated center and associated costs with installation.
- Equipment transition plan from the existing operations to the new consolidated center including preparation for cutover.
- Employee transition plan, including providing costs estimates of accrued leave time liability.
- Facility improvement needs, and costs including the fiber system.
- An implementation plan, time line and start-up costs for the operation of a consolidated center.
- An operational budget for the consolidated center.
- Identification of future expansion capabilities for the consolidated center and potential assimilation of the new center into new service areas regarding emergency call handling.

CTA is now providing this final report and providing a formal presentation.

Problem Assessment Summary

We note that there are substantial differences in the volume of calls received at the three primary 9-1-1 centers as well as the number of 911 calls received per full-time employee. The agencies current dispatch centers vary significantly in terms of size and room for expansion. In addition, with the new Davenport Police Station under construction without allocated space for dispatch operations, a sense of urgency is added to the process.

Currently three different Computer Aided Dispatch (CAD) systems are in use between the four dispatch centers. There is not agreement among the agencies about the suitability of any of the existing platforms for use by all of the agencies.

Disparate radio systems are also in use. These systems use three different frequency bands and two different technologies. This makes interoperability, which is defined as the ability of personnel from different agencies to communicate with each other, more challenging.

The impact of technology on the 9-1-1 system and the 9-1-1 center is significant. It becomes more significant each and every day. Technology has affected every aspect of doing business. Technology has changed the way public safety agencies, including 9-1-1 centers function. The technological revolutions in other areas have both a direct and an indirect effect on public safety and 9-1-1. It has created challenges and opportunities that were not envisioned a short time ago. Modern 911 systems are computer based as are the radio consoles. Computer Aided Dispatch systems are essential to conducting operations. The technological innovations when properly implemented, have improved our ability to be more accurate and reliable. By implementing enhanced 9-1-1, the time it takes for an incident to be reported has been reduced significantly. Studies show that the time from the detection of an incident until it is reported has decreased by more than a minute. In a true emergency, one minute is significant. Fires can double in size in a minute. According to the American Heart Association, for every seven seconds a heart stops beating, there is a one percent decrease in the chance of survival. Some studies have shown that a one minute reduction in police response to an emergency call can have a significant difference in the outcome of the call. The systems used in the PSAP can contribute to reducing the time it takes to get the needed help to the people that need the help. The challenges that the influence of technology brings require carefully planning to both minimize the failures and, more importantly, to maximize the benefits of the technology.

The life expectancy of modern system components is significantly less than before. Previously with hardware-based systems, a ten to twelve year life expectancy was not unreasonable. Now the capacity of computer memory chips doubles every eighteen months. While it is not necessary to rush out and buy the latest and greatest every six months, a three to five year replacement cycle is more reasonable. In that time frame, sufficient advances have been made that upgrades are justified. In addition, support and repair becomes more difficult after that period of time. The software industry is characterized by a high degree of turnover. Not only do employees change employers frequently, software companies have tended to have rather short life spans. The result is that after three to five years, it is difficult to find anyone on the staff of the software company who has worked on the older versions of the software. It becomes equally difficult to find compatible hardware.

The cost of providing dispatch services is a significant item in the budget of each of the four participating entities. Combined the four spend over $3,600,000 each year on dispatch. Most of that is for salaries and benefits for staff. With the increased dependence on technology, funds must be allocated to update and replace obsolete equipment and systems.

Alternative Solutions

CTA Communications identified five possible solutions for a consolidation effort. This included:

1. Davenport Only
2. Davenport and Scott County
3. Governmental Agencies (Davenport, Bettendorf, and Scott County)
4. Davenport, Scott County, and MED-COM
5. Total Consolidation

The organizational aspects, staffing requirements, technology needs, and space requirements for each were reviewed.

1. No Consolidation: The first option would continue operations unchanged without any consolidation. Five additional personnel for the Davenport Police Department would be needed to bring the staffing levels up to meet the demands currently being placed on the system. A new CAD system, radio consoles, and 9-1-1 system will be required for the City of Davenport. Scott County will need a new CAD system in the near future. Both Bettendorf and MEDIC EMS systems will need updates in the next three to five years.

A total of sixty-three and one half personnel would be required to adequately staff the four centers. Approximately three thousand square feet of space would be needed for the Davenport Police Department's dispatch operation in order to accommodate the recommended five position dispatch center.

2. Davenport and Scott County: This option would consolidate the Davenport Police Department and the Scott County Sheriff's Office dispatch operations. A new CAD system, radio consoles, and 9-1-1 system would be required. As noted above, both Bettendorf and MEDIC-EMS will need to update their systems over the next three to five years. A total of fifty-nine personnel would be needed under this option. Since there is not sufficient space in either existing facility, a new center of approximately six thousand square feet will be required to accommodate the recommended twelve position center.

3. Davenport, Bettendorf, and Scott County: This option would consolidate the three governmental dispatch centers. A new CAD system, radio consoles, and 911 system would be required. MEDIC-EMS would need to plan on updates to their systems every three to five years. A total of fifty-six personnel would be needed to staff the two centers. Space would be needed for a thirteen position dispatch center. Approximately six thousand square feet of space would be required.

4. Davenport, Scott County and MEDIC-EMS: This option would have Bettendorf not joining the combined system. A new CAD system, radio consoles, and 911 system would be required. Bettendorf would need to plan on updates to their systems every three to five years. A total of fifty-three personnel would be required to staff the two centers. Approximately six thousand square feet of space would be required to for a thirteen position center.

5. Full Consolidation: This option consolidates the operations of all four existing dispatch centers into one combined center. A new CAD system, radio consoles, and 911 system would be required. A total of forty eight personnel would be required to staff the dispatch functions of the new center. Approximately six thousand square feet of space would be required to for a thirteen position center.

Opinion of Probable Costs

Currently the four entities spend $3,695,568 for their dispatch operations. If there is no consolidation (Option 1 above), the operating costs will increase to $4,190,653 and $2,250,000 will be required in capital outlay.

If Davenport and Scott County are the only two agencies to consolidate (Option 2), the total operating costs for the three centers will be $3,863,835. Another $4,174,180 will be required for capital outlay. If the three governmental dispatch centers consolidate (Option 3), the estimated operating costs for the first year for the consolidated center and MED-COM will be $3,544,244. Capital Outlay is estimated to be $4,428,198. If Davenport, Scott County and MEDIC-EMS consolidate (Option 4) the operating costs will be $3,635,599 and capital expenditures of $4,174,180 will be required. Full consolidation of all four PSAPs will result in estimated first year operating costs of $3,290,932 and capital expenditures of $4,428,198.

CTA Communications estimates that full consolidation will result total savings in the cost of dispatch of $4,651,320 over the twenty year estimated life of the project compared to the current expenditures.

Recommendations

CTA Communications recommends that a shared public safety Emergency Communications Center be created. Participants in the shared center should include:

- The City of Davenport
- The City of Bettendorf
- The Scott County Sheriff's Office
- MEDIC-EMS

A shared communications center, with proper implementation, offers significant service improvements to all of the participants. By establishing high standards of performance and then consistently assuring that those standards of service are achieved and the center is properly organized, adequately staffed, responsive to the public safety providers and citizens, and well managed, the service level provided to all of the citizens of Scott County will be equal to or better than the highest levels provided now. The goal must be the creation of an efficient, customer-friendly organization.

Because of the differences between all four entities, CTA Communications recommends that initially the Cities of Davenport and Bettendorf along with Scott County consolidate their public safety dispatch operations as soon as a suitable facility is ready and equipped. We further recommend that initially, MED-COM be co-located with the consolidated PSAP and then, as soon as feasible, MED-COM's operations be consolidated with the governmental PSAP. It is anticipated that the full consolidation would occur in eighteen to twenty-four months after the initial consolidation.

We recommend that an independent authority focused on the provision of public safety communications services through a joint powers agreement under Chapter 28E of the Iowa Code be created. It would be governed by a Board of Directors. The Board of Directors for the dispatch entity should be composed of seven members. The following elected officials should serve as members of the Board of Directors: Mayor and one alderman from the City of Davenport; Mayor, City of Bettendorf; Chairman, Scott County Board of Supervisors; One Mayor representing the other communities in Scott County; one member of the MEDIC-EMS Board of Directors, and one citizen representative appointed jointly by Davenport, Bettendorf, and Scott County. The MEDIC-EMS representative should be a member of the MEDIC board who does not represent a public agency. The Davenport City Administrator, the Bettendorf City Administrator, the Scott County Administrator and the Executive Director of MEDIC-EMS should be the ex-officio members of Board of Directors.

There should also be a User Advisory Committee to provide guidance and input to the Board of Directors and the ECC Manager. CTA Communications recommends that the User Advisory Committee include the following:

- Davenport Police Chief
- Davenport Fire Chief
- Bettendorf Police Chief
- Bettendorf Fire Chief
- Scott County Sheriff
- MEDIC-EMS Representative
- Outlying police agency representative
- Volunteer fire department representative

The Board should appoint the Director of Communications. The Director should be responsible for many of the above duties initially established for the Board. For purposes of efficiency and consistency in management, many of the duties outlined to the Board should be delegated to the Director. However, the Board should reserve the right of appellant review and oversight.

The rules governing the ECC should be laid out in a set of Standard Operating Procedures (SOP). The ECC Director and the User Advisory Committee should develop the SOP jointly. The SOP should be subordinate to any contradictory local ordinance, Scott County Codes, Iowa Statutes, the Board bylaws or any current labor agreement or one subsequently adopted.

The ECC Director should have an administrative staff to help manage the centers. The administrative staff should consist of an Operations Manager, a Training and Quality Assurance Manager, a Technical Support Coordinator, and an Administrative Assistant.

There should be five shift supervisors and thirty-eight telecommunicators. The Davenport and Bettendorf City councils, the Scott County Board of Supervisors and the MEDIC-EMS Board has repeatedly issued assurances that all dispatch employees at the time of the consolidation will be offered employment at the new center. This will be true even if the consolidation with MED-COM occurs later than the consolidation of the governmental PSAPs. Each of the legislative bodies has made this commitment to officer employment in writing.

Currently, the three government entities fund their respective public safety dispatch operations through their law enforcement agencies budget. The funds come from the agencies general fund. CTA Communications recommends that the initial costs for constructing and equipping the new ECC be funded by bonds issues by the City of Davenport. The bonds would be paid off through the operating budget of the new ECC. We recommend that the operating budget be financed through the "Local Emergency Management Fund".

As noted previously, the construction of the new Davenport Police Station with an estimated completion in the second quarter 2007 as well as the continued scarcity of financial resources adds a degree of urgency to the implementation of these recommendations. CTA is pleased to present the following recommended action plan for the implementation of the consolidation.

- Commitment to Consolidate

  As expeditiously as possible, each of the involved governmental bodies as well as the MEDIC-EMS Board of Directors should adopt resolutions committing them to the consolidation. This needs to be completed no later than July 1, 2006. The initial consolidation should include all three governmental PSAPs with MED-COM co-locating in the center. Med-COM's operations should consolidate fully in 18-24 months after the initial start-up of operations of the consolidated center.

- Draft Intergovernmental Agreement

  As soon as the involved entities have committed to the consolidation project, legal counsel for the entities should prepare the intergovernmental agreement and present it for adoption. All involved entities should adopt the agreement no later than October 1, 2006.

- Recruit and hire an Emergency Communications Center Director

  Effective leadership will be extremely critical in the establishment of the consolidated center. There will be much work to be done to prepare for the start-up of operations.

It is critical that the director be brought on board as early as possible. In any case, the director needs to be in place no later than January 1, 2007.

- Facility Development

  Typically, the construction of a new public safety communications center takes a minimum of eighteen months from the start of the design phase until the completion of construction. Installation and burn-in of the new equipment adds another forty-five to sixty days on to the substantial completion of construction. With the completion of the new Davenport Police Station scheduled for mid-2007, it is essential that the selection of an architect/consultant be accomplished as quickly as possible. The design of the facility should begin as soon as the commitment to participate is received from the entities involved. It should begin no later than July 1, 2006. As noted above, the design of public safety communications centers and emergency operations centers is a specialized field. It is important to the success of this that a firm with the appropriate experience be selected. Even with an expedited schedule, it is unrealistic to assume that the consolidated center could become operational before the first or second quarter 2008.

- Complete a detailed needs assessment of the land mobile radio system for all public safety agencies in Scott County. As noted previously, the public safety agencies communicate on three different frequency bands and use multiple incompatible technologies. This study did not look at the radio systems in detail. In order to make an informed decision, we urge the community to undertake a detailed study. This study should be completed by December 31, 2006. Should the study result in a decision to implement a new radio system, it would be beneficial to make the procurement decisions on the system in conjunction with the purchase of the new radio console system for the consolidated center. If the console system is purchased and then a new radio system that uses incompatible technology is chosen, the $663,510 console system might become useless before its time to be replaced.

- Begin the procurement process for new 911 CPE, a new CAD system, radio consoles, and specialty furniture in a timely manner to allow the installation as soon as the new dispatch facility is substantially completed. Detailed functional specifications, based on the specific needs of the user agencies, will need to be developed, requests for proposals issued, proposals received and reviewed, negotiations conducted with the successful respondents, and the system implemented in close coordination with the building schedule. In order to achieve the coordination, the procurement process for this specialized equipment should begin shortly after the building contractor is selected.

- Develop appropriate information and materials for the City of Davenport to include the capital costs in its 2007 bond package. The date that this needs to be completed by needs to be supplied by the City of Davenport.

- Develop ballot proposal for the wireline surcharge to relieve some of the need to collect the full amount of the Local Emergency Management Fund. As noted above, the surcharge could generate over $2,000,000 for the first two years and then $1,000,000 per year after that based on the number of access lines currently in use.

1.0 INTRODUCTION

There are currently three primary and one secondary Public Safety Answering Points (PSAPs) in Scott County, Iowa. The four PSAPs perform similar functions for the entities they serve. Previously, the communities attempted to consolidate dispatch service without success. In 2005, a new approach was tried. A "Blue Ribbon Committee" was formed and CTA Communications was hired to conduct a study of the feasibility of consolidating two or more of the dispatch centers in the County.

The feasibility study was designed to answer the following questions:

- How would a consolidation take place and provide improved service?
- How should it be organized and staffed?
- What services should it perform?
- How should policies be made and changed?
- How should it be funded?
- With consolidation, what communications changes or improvements should be made in order to support the operations better than provided today?

During the first two weeks of October 2005, a team of personnel from CTA Communications conducted interviews and dispatch center surveys in the Quad City area. Approximately forty interviews were conducted. The four existing dispatch centers were surveyed and detailed information was gathered on the systems and facilities currently in use.

CTA Communications was also tasked with the following:

- Develop Operational Modes for a Consolidated Center
- Develop a Governing Structure for a Consolidated Center
- Identify Funding Options and Develop an Operating Budget for a Consolidated Center
- Public and Stakeholder Study Involvement

This report also addresses those tasks.

SECTION 2 of this report covers the Current Communications Environment. SECTION 3 describes the functional attributes that a consolidated public safety communications system should have. SECTION 4 discusses the current communications problems and concerns. SECTION 5 analyzes alternative designs. SECTION 6 presents CTA's cost estimates. Our conclusions and recommendations are in SECTION 7.

2.0 CURRENT COMMUNICATIONS ENVIRONMENT

This section defines the current dispatch operations and communications environment as they exist in each of the four entities participating in the study. A brief description of the overall community environment and the projected changes in population is reviewed. Descriptions of the current operations for each of the four entities involved in this study (Davenport, Bettendorf, Scott County and MEDIC-EMS) are given and the duties performed by the staff of the centers are reviewed.

2.1 Current Community Environment

Scott County Iowa is the largest of the four counties in the Quad Cities Metropolitan Statistical Area (MSA). The City of Davenport is the largest of the incorporated cities in the Quad City Metropolitan Area. Scott County is also the single county of the four counties in the Metropolitan Statistical Area to record a population growth over the past thirty years. The area experienced a significant decline in population during the mid-1980's, but has been experiencing sustained growth recently. While the population in the region and in Scott County has not recovered to peak levels, the decade between 1990 and 2000 did show solid growth. Projections estimate that this trend will continue over the next twenty years. Scott County is expected to show the largest growth, about 13.7% in the region during this period. Much of that growth will occur in northern Davenport, northeastern Bettendorf, and northern Scott County. TABLE 2-1 shows the population since 1990 and the anticipated population in 2025.

TABLE 2-1 POPULATION GROWTH

Area	1990 Census	2000 Census	% Change 1990-2005	2005 Estimate	2010 Estimate	2015 Estimate	2020 Estimate	2025 Estimate	% Change 2000-2025
Scott County	150,979	158,668	15.4%	161,040	165,285	169,989	175,002	180,370	13.7%
Bettendorf	28,139	31,275	11.1%	31,721	32,557	33,884	34,471	35,529	13.7%
Davenport	95,333	98,359	3.2%	99,816	102,447	105,363	108,470	111,797	+13.7%
Quad-Cites MSA	350,861	359,062	2.3%	359,201	362,823	367,501		378,915	5.5%

2.2 City of Davenport

As noted above, Davenport is the largest community in Scott County and in the Quad-Cities MSA. It is the third largest city in Iowa and the largest city on the Mississippi River between St. Louis and the Twin Cities. In the mid 1980's, the City as well as the rest of the Quad-Cities MSA, experienced a significant downturn as many of the goods producing jobs, especially those in the farm equipment manufacturing sector, were eliminated. Between 1980 and 1990, the population of the City shrunk by almost 8,000. Since 1990, the City has experienced a gradual recovery. While not back to 1980's peak level, the population is expected to continue to grow at a modest rate for the next twenty years.

As the largest city in the Quad Cities MSA, both in terms of population and size, Davenport has many of the challenges typical of core cities These factors tend to result in a higher demand for public safety services than in either of the other communities.

2.2.1 Davenport Police Department

The Davenport Police Department has an authorized strength of 206 employees for 2006. The department is organized into four divisions (Administrative, Patrol, Criminal Investigation, and Support Services). The department's budget for FY 2006 is $19,044,423. The FY 2006 budget adds five staff members to the department.

The Patrol Division has eight officers and two evidence technicians on duty during the day shift (7 am – 3 pm); eleven officers and two evidence technicians during the afternoon shift; and nine officers during the night shift. On Fridays and Saturdays, there is an additional officer on duty during the night shift. In addition, a Lieutenant and three Sergeants are assigned to supervise each shift.

The current Davenport police headquarters building is in a building that was originally constructed as a Railway Express Freight Station. It later became an automotive dealership. In 1978, the police department moved from City Hall on a temporary basis. They were supposed to use that building for ten years. Ground was broken on December 21, 2005 for a new headquarters facility for the police department. The department anticipates occupying the new facility in Mid-2007.

The police department uses three repeated conventional UHF band channels and several simplex channels. Two of the repeaters are located at Fire Station Six. The third repeater is located at Fire Station 4. There are two satellite receivers on each channel.

Most of the patrol units are equipped with mobile data computers (MDC). The MDCs use a separate 800 MHz trunked radio on the RACOM Network. Officers can see CAD calls, run local, IOWA, and NCIC inquiries from their vehicles.

2.2.2 Davenport Fire Department

The Davenport Fire Department has seven stations. There are three Assistant Chiefs. One Assistant Chief is in charge of Operations; one is in charge of training, and the third is the Fire Marshall and in charge of the Fire Prevention Bureau.

The Operations Division is divided into three platoons with each platoon working 24 hours on and having 48 hours off. Each shift consists of one District Chief, eleven company officers, eleven engineers, fire apparatus operators and twenty-one fire fighters. These personnel man eight engine companies, three truck companies and two command vehicles. There are minimum staffing requirements of three personnel per apparatus with the exception of the command vehicles. This requires a minimum of 34 persons on duty with a maximum of 43 persons per day. The Davenport Fire Department responds to medical emergencies. It is a non-transporting EMS agency. Each engine company is staffed with at least one advanced life support trained firefighter.

The Davenport Fire Department's Hazardous Materials team was established in 1991. As well as providing emergency response to the citizens of Davenport, response coverage includes half of Scott County, the eastern half of Cedar County, Clinton County and Jackson County (1900 square miles).

The Insurance Services Office (ISO) recently completed a classification survey of the Davenport Fire Department. The Department was classified as a class 3 in hydrant areas and class 9 in non-hydrant areas. Ten percent of the rating is for Receiving and Handling Fire Alarms. The Davenport Fire Department only received 6.45 points of the ten available.

The Davenport Fire Department is dispatched by the Davenport Police Department. The police department assumed this duty from the fire department in 1982. The department answered over 12,000 calls in 2004.

The department uses two repeated UHF conventional radio channels as well as simplex tactical channels. One repeater is located at Fire Station Six, and the other is at Fire Station Four. There are two satellite receivers on each channel.

2.2.3 Davenport Dispatch Center

The Davenport Police Department serves as the primary Public Safety Answering Point (PSAP) for 9-1-1 and provides dispatch service for the Davenport Police Department and the Davenport Fire Department.

The Davenport Police Department Dispatch Center is located on the main floor of the police department. It is staffed by twenty-two communications clerks. In addition to the dispatch center, the communications clerks also staff the front desk of the police department. Typical staffing is two communications clerks in the dispatch center and one or two communications clerks at the front desk. The communications function is part of the patrol division of the police department. A police officer functions as the 911/technical support coordinator. The Davenport Police Department uses a three shift arrangement (7am to 3 pm, 3pm to 11 pm, and 11 pm to 7 am.). The communications clerks are supervised by the junior field sergeant on each shift. The clerks are represented by the Union of Professional Police. They are in the same bargaining unit as the police officers and included in the same collective bargaining agreement. The following activities and functions are performed by the Davenport Police Department Dispatchers:

- Answer incoming 911 calls (wireline and wireless)
- Answer seven digit emergency lines
- Staff police department front desk
- Answer police department administrative lines
- Respond to walk-up requests for assistance
- Take walk-in and telephone police reports
- Dispatch police calls via radio
- Dispatch fire and medical calls via radio

- Transfer medical calls to MEDIC-EMS
- Coordinate with other agencies (public works, other police and fire agencies, etc.)
- Perform after-hours notifications as required.
- Monitor NCIC/IOWA activity for police department
- Enter, clear, and modify articles in NCIC/IOWA systems for police department
- Maintain records in reference to NCIC/IOWA activity
- Perform after hours hit confirmations for NCIC/IOWA entries
- Maintain other police and fire records
- Prepare court related paperwork
- Prepare daily hot sheet
- Distribute report copies (after hours)
- Prepare trespass notices
- Erase video tapes for patrol units
- Activate Warning Sirens

There are three Motorola Centra-Com II radio consoles in the dispatch center. Typically, only two of the consoles are staffed. The two communications clerks in the dispatch center answer incoming 911 calls, dispatch the police and fire department, as well as handle IOWA/NCIC terminal traffic.

A Positron Lifeline 100 Enhanced 911 system has been installed. There are four wireline and six wireless trunks installed. Davenport Police Department is currently Wireless Enhanced 911 Phase I capable. This means the PSAP is capable of receiving the wireless callers' call-back information and the location of the wireless tower being used for the call. At the time of this report, mapping had not been installed. This restricts the ability of the PSAP to deploy Wireless Enhanced 911 Phase II that permits the display of the wireless callers' location.

The Davenport Police Department's Computer Aided Dispatch CAD) and Records Management System (RMS) was purchased from Infocell in 1986. In 1990, the company ceased providing support for the system. The City obtained the source code and the City's Information Technology Department has been supporting the system ever since. TABLE 2-2 displays the available metrics for the Davenport Police dispatch center.

TABLE 2-2 DAVENPORT POLICE DISPATCH CENTER METRICS

Activity	2003	2004	2005
Wireline 911 Calls Received	**74,168**	**73,000**	**72,665**
Wireless 911 Calls Received	**34,599**	**38,410**	**45,165**
Total 911 Calls Received	**108,767**	**111,410**	**117,830**
Wireless Call %	**32%**	**35%**	**38%**
Average 911 Answer Time			
Other Emergency Calls Received			
Administrative/Non-Emergency Calls			**90,504**
Total Incoming Calls			**208,334**
Police Calls Dispatched	**138,123**	**139,641**	**147,425**
Police Officer Initiated		**61,380**	**70,243**
Fire Events Dispatched	**11,477**	**11,578**	**12,118**
Emergency Medical Incidents	**8,667**	**8,753**	**9,366**
Medical Pre-Arrival Instructions Given			
Number of 911 Transfers			
CJIS (SCIC/NCIC) Inquiries			**96,411**
CJIS File Maintenance (Entries, Mods, Cancels, etc.			**29,558**
Administrative Messages			**3,862**
Total Iowa/NCIC Transactions	**102,274**	**106,891**	**129,831**

2.3 City of Bettendorf

Bettendorf is the smallest and fastest growing of the Quad Cities. It is projected it will continue to be the fastest growing of the four communities. It is also one of the fastest growing communities in Iowa. Based on US Census data, Bettendorf has a higher than average percentage of residents employed in managerial, professional and technical sectors.

2.3.1 Bettendorf Police Department

The Bettendorf Police Department has an authorized strength of forty-four sworn officers and thirteen civilian employees. The department is organized into two divisions (Support Services and Field Services). Field Services includes the patrol, communications, traffic, training, community service officer, and crossing guard functions. Support Services includes the records, identification, investigations, data entry, evidence, school liaison, chaplains, metropolitan enforcement group functions as well as the department's social worker. Bettendorf is the first department in Iowa to have a full-time social worker on staff.

The nineteen officers assigned to the patrol division work overlapping ten hour shifts. As a result at certain times, there are between four and nine units on duty. In addition to the Patrol Division, the Detective Bureau and the Traffic Bureau have officers in the field. This can raise the number of units on duty to between twelve and seventeen. The department's offices are located in the Municipal Center which also includes the City's administrative offices.

The Bettendorf Police Department uses the RACOM Network. The RACOM Network is an Enhanced Specialized Mobile Radio (ESMR) system owned by RACOM. RACOM installs the infrastructure and operates the system. Users buy the mobiles, portables and control stations then pay a monthly fee to access the system. The RACOM Network uses the EDACS digital trunking system from Ericsson/M/A-Com. Bettendorf began using the RACOM Network in 1999.

Bettendorf is currently using the RACOM EDACS network using 800 MHz. They are implementing a new high-speed, multi-site; city owned and operated 900 MHz data system. They will be using this network for all police mobile data needs, including field reporting, AVL and messaging. They had been using a joint mobile data system run by the City of Davenport until 2003. They were able to save enough money by switching from this system to pay for their own Packet Cluster system. They use separate radios for voice and data currently.

2.3.2 Bettendorf Fire Department

The Bettendorf Fire Department is a combination department consisting of 18 paid fire fighters, one captain, one chief, and 20 volunteer firefighters. Their coverage area includes Bettendorf, the City of Panorama Park, and one-third of Fire District #1. The department has four stations. Two of the stations are staffed twenty-four hours a day, State Street and Spruce Hills stations. The Surry Heights station has six apartments attached to it. Volunteer resident fire fighters live in the apartments. In return for the apartment, two are required to be on duty from 7 pm until 7 am every day. Bettendorf Fire Department received an ISO rating of 3. The department provides non-transport medical emergency response. The department does have personnel certified to the Advanced Life Support level (paramedic).

The Bettendorf Fire Department is the only Iowa department that is a member of the Mutual Aid Box Alarm System (MABAS). MABAS allows a fire department to plan for situations when resources from outside departments are needed. MABAS currently consists of over 700 fire departments, organized into forty-six divisions.

The Bettendorf Fire Department is dispatched by the Bettendorf Police Department. In 2004, the fire department responded to 2,182 calls. Of the calls, 1,488 were medical or rescue calls. In 2005 the department responded to 2,369 calls of which 1,318 were medical emergencies.

The Bettendorf Fire Department also uses the RACOM Network. They have good in-building coverage. The system is linked to a VHF channel that is used for paging of volunteer and off-duty personnel. They also have the ability to link to other radio channels for mutual aid purposes.

2.3.3 Bettendorf Dispatch Center

The Bettendorf Police Department serves as the primary Public Safety Answering Point (PSAP) for 9-1-1 and provides dispatch service for the Bettendorf Police Department and the Bettendorf Fire Department.

The dispatch center is located in the police department area of the City of Bettendorf's Municipal Center. The center is staffed by eight full-time and one part-time Communications and Computer Specialists. In addition there is a Lead Dispatcher or Operations Manager who supervises the day-to-day operation of the dispatch center. The center is staffed with a minimum of two specialists. They work overlapping ten hour shifts. Shift preference and days off are selected on a seniority basis. The Communications/Computer Specialists are represented by the Bettendorf Peace Officers Association. The following activities and functions are performed by the Bettendorf Police Department Dispatchers:

- Answer incoming 911 calls (wireline and wireless)
- Answer seven digit emergency lines
- Answer police department administrative lines
- Answer City Hall Switchboard (after-hours)
- Respond to walk-up requests for assistance (after-hours)
- Dispatch police calls via radio
- Dispatch fire and medical calls via radio
- Transfer medical calls to MEDIC-EMS
- Coordinate with other agencies (public works, other police and fire agencies, etc.)
- Perform after-hours notifications as required
- Monitor NCIC/IOWA activity for police department
- Enter, clear, and modify articles in NCIC/IOWA systems for police department
- Maintain records in reference to NCIC/IOWA activity
- Perform hit confirmations for NCIC/IOWA entries
- Maintain other police and fire records
- Prepare and update vacation watch /Quad City Net/Extra Patrol lists
- Distribute report copies (after hours)
- Prepare trespass notices
- Erase video tapes for patrol units
- Activate/test warning sirens
- Monitor intersection/bridge cameras
- Perform "matron" services for police department
- Provide officer assistance/research
- Enter citations and other information into computer systems

The communications center was updated in 1999 when Bettendorf switched to the RACOM Network. Three Zetron Series 4000 computer - based consoles were installed. The consoles are connected to radio control stations in order to access the RACOM Network as well as conventional channels.

A Positron Lifeline 100 Enhanced 911 system has been installed. There are three wireline 911 trunks and 5 wireless 911 trunks. Bettendorf has recently completed the deployment of Wireless Enhanced 911 Phase II with all carriers serving the area. This means that the PSAP has the ability to display the location of the wireless 911 caller.

In 2003 a new computer aided dispatch system and records management system from Cody Systems was installed. The system is interfaced with the 911 system, the IOWA/NCIC system, and the mobile data system. TABLE 2-3 displays the available metrics for the Bettendorf Police Department dispatch center.

TABLE 2-3 BETTENDORF POLICE DEPARTMENT DISPATCH CENTER METRICS

Activity	2003	2004	2005
Wireline 911 Calls Received			**6,000**
Wireless 911 Calls Received			**8,268**
Total 911 Calls Received			**14,268**
Wireless Call %			**58%**
Average 911 Answer Time			
Other Emergency Calls Received			
Administrative/Non-Emergency Calls			**36,000**
Total Incoming Calls			**50,268**
Police Calls Dispatched		**18,379**	**19,046**
Police Officer Initiated		**18,347**	**17,097**
Fire Events Dispatched		**2,199**	**2,369**
Emergency Medical Incidents		**1,318**	**1,497**
Medical Pre-Arrival Instructions Given			

Activity	2003	2004	2005
Number of 911 Transfers			
CJIS (SCIC/NCIC) Inquiries			
CJIS File Maintenance (Entries, Mods, Cancels, etc.			
Administrative Messages			
Total Iowa/NCIC Transactions			**97,999**

2.4 Scott County

Scott County is part of the Quad Cities Metropolitan Statistical Area. It represents a blend of the urban and rural. While the area around Davenport and Bettendorf is highly urbanized, a high percentage of the 465 square mile land area of Scott County is farmland. Scott County is the most populous county in the Quad City MSA and the third most populous county in Iowa.

In addition to Davenport and Bettendorf, there are a number of smaller communities scattered throughout the county. Eldridge and LeClaire are the largest of these communities.

2.4.1 Scott County Sheriff's Department

The Scott County Sheriff's Office provides law enforcement services to all of Scott County. The department has an authorized strength of 166.15 employees for 2006. The department is organized into four divisions (patrol, corrections, criminal investigation, and support services.) The department's budget for FY 2006 is $12,521,482. The FY 2006 budget adds six corrections staff to the department.

The Patrol Division provides uniformed law enforcement services, primarily in the unincorporated areas of the county. The division is staffed by a Captain, three Lieutenants, four Sergeants, and nineteen Deputies. There are typically four to five patrol units on duty.

The Criminal Investigations Division is responsible for follow-up investigation of crimes in and for the processing of civil documents. In addition, the division is responsible for the processing of crime scenes and evidence. It is staffed by a Captain, two Sergeants, and eleven deputies.

The Corrections Division is responsible for the operation of the county jail. A major expansion of the jail is currently under construction. The facility has an authorized staff of 101.66 persons.

The Scott County Sheriff's Office uses the RACOM Network. The RACOM Network is an Enhanced Specialized Mobile Radio (ESMR) system owned by RACOM. RACOM installs the infrastructure and operates the system. Users buy the mobiles, portables and control stations then pay a monthly fee to access the system. The RACOM Network uses the EDACS digital trunking system from Ericsson/M/A-Com. Scott County began using the RACOM Network in 1999. In addition to voice communications, the RACOM Network is used for mobile data communications.

2.4.2 Scott County Fire/ EMS Departments

In addition to the Davenport and Bettendorf Fire Departments, there are fourteen volunteer fire departments in Scott County. All fourteen volunteer departments are dispatched by the Scott County Sheriff's Department. These departments include: the Blue Grass Volunteer Fire Department; the Buffalo Fire Department; the Dixon Volunteer Fire Department; the Donahue Volunteer Fire Department; the Durant Volunteer Fire Department; the Eldridge Volunteer Fire Department; the LeClaire Fire, Rescue, and EMS Department; the Long Grove Volunteer Fire Department; the Maysville Fire Department; the McCausland Fire Department; the New Liberty Fire Department; the Princeton Fire Department; the Riverdale Fire Department, and the Walcott Fire Department.

In addition to responding to fire calls, the volunteer fire departments also provide medical first response. EMS transport is provided by five agencies. Medic-EMS is discussed in SECTION 2.5 below.

The other four providers include: the Bennett Ambulance Service; the Buffalo Volunteer Ambulance Service; the Durant Ambulance Service, and the Wheatland Ambulance Service. Each of these four services is a volunteer or primarily volunteer service. Three of the four volunteer services are actually located outside of the county boundaries, but respond into the outlying portions of the county.

The volunteer fire departments and ambulance services use a repeated VHF High-band radio channel that is permanently linked to a talk-group on the RACOM Network. There are four different sites used for fire transmitters. The departments are dispatched by the Scott County Sheriff's Office.

2.4.3 Scott County Dispatch Center

The Scott County Dispatch Center is part of the Support Services Division of the Scott County Sheriff's Department. It serves as the primary PSAP for those areas of Scott County that are outside of the corporate limits of the City of Davenport and the City of Bettendorf. The center also provides dispatch service for the Scott County Sheriff's Office, eight local police departments, fourteen volunteer fire departments, four volunteer ambulance services, and several other agencies.

The dispatch center is located in the basement of the Scott County Courthouse. The center is staffed by nine full-time Public Safety Dispatchers, one part-time Public Safety Dispatcher and three Lead Public Safety Dispatchers. The Chief Telecommunications Operator is responsible for the day-to-day operations of the PSAP. The division commander, a Sheriff's Lieutenant, coordinates the technical support. The center is staffed by a minimum of two persons. They work eight hour shifts.

When fully staffed, there are three Public Safety Dispatchers and one Lead Dispatcher assigned to each shift. That allows for the center to be staffed with two Public Safety Dispatchers and one Lead Dispatcher on each shift, except for vacations. The following activities and functions are performed by the Scott County Sheriff's Office Dispatchers:

- Answer incoming 911 calls (wireline and wireless)
- Answer seven digit emergency lines

- Answer Sheriff's Office administrative lines (after-hours)
- After-hours telephone answering for some outlying departments
- Dispatch police calls via radio
- Dispatch fire and medical calls via radio
- Provide emergency medical pre-arrival instructions, as appropriate
- Coordinate with other agencies (public works, other police and fire agencies, etc.)
- Perform after-hours notifications as required.
- Monitor NCIC/IOWA activity for Sheriff's Office and outlying police departments
- Enter, clear, and modify articles in NCIC/IOWA systems for Sheriff's Office and outlying police department
- Maintain records in reference to NCIC/IOWA activity
- Perform hit confirmations for NCIC/IOWA entries
- Maintain other police and fire records
- Prepare hot sheet
- Maintain Stolen Vehicle Log
- Maintain Detain and Injunction Files/Records
- Activate State Highway Signs.

Scott County has implemented the National Academy of Emergency Medical Dispatch (EMD) and provides pre-arrival instructions to callers in need of medical assistance. In addition to the dispatch center workload, the PSAP is responsible for warrant entry and related file maintenance. The workload from the warrants is a significant portion of the center's workload. As shown below, over 1,500 warrants are entered by the PSAP each year and approximately the same number of validations of existing warrants is handled. Validation involves reviewing the warrant and associated paperwork to assure that the warrant is still active.

The communications center was updated in 1999 when Scott County switched to the RACOM Network. Three Zetron 4800 computer - based consoles were installed along with new workstation furniture. The consoles are connected to control stations in order to access the RACOM network as well as conventional channels.

A Positron Life Line 100 Enhanced 911 system has been installed. There are three wireline and four wireless 911 trunks as well as sixteen other trunks. The Scott County PSAP has deployed Wireless Enhanced 911 Phase I and is in the process of adding computerized mapping so that Phase II can be deployed.

The Scott County Sheriff's Office uses a computer aided dispatch system and records management system from CODY systems. TABLE 2-4 displays the available dispatch metrics for the Scott County Sheriff's Office.

TABLE 2-4 SCOTT COUNTY SHERIFF'S OFFICE DISPATCH CENTER METRICS

Activity	2003	2004	2005
Wireline 911 Calls Received			**5,167**
Wireless 911 Calls Received			**6,600**
Total 911 Calls Received	**11,830**	**12,088**	**11,767**
Wireless Call %			**56%**
Average 911 Answer Time			
Other Emergency Calls Received			
Administrative/Non-Emergency Calls			**103,253**
Total Incoming Calls	**117,729**	**123,647**	**115,020**
Police Calls Dispatched		**23,207**	**26,813**
Police Officer Initiated			**23,612**
Fire Events Dispatched			**1,794**
Emergency Medical Incidents			**1,323**
Medical Pre-Arrival Instructions Given	**819**	**946**	**1046**
Number of 911 Transfers			
CJIS (SCIC/NCIC) Inquiries			
CJIS File Maintenance (Entries, Mods, Cancels, etc.			
Administrative Messages			

Activity	2003	2004	2005
Total Iowa/NCIC Transactions			**113,972**
Warrants Entered	**1450**	**1866**	**1754**

2.5 MEDIC EMS

MEDIC EMS provides Advanced Life Support transport service for most of Scott County including the Cities of Davenport and Bettendorf. MEDIC's service area is approximately 456 square miles and has a population of 160,000. There are three volunteer ambulance services in outlying communities along the western border of Scott County that provide service in those areas.

The Davenport Hospital Ambulance Corporation, doing business as MEDIC EMS, was incorporated in 1982, as a Non-Profit Corporation under SECTION 501 c 3 of the Internal Revenue Service Code. MEDIC is governed by a 15 member Board of Directors. Eight of the board members are appointed by Genesis Medical Center; two are appointed by Trinity Health Systems and five members are appointed from the public sector. At the present time, two of the public sector members are from the City of Davenport; one is from the City of Bettendorf, and two are from Scott County.

MEDIC has eight different stations or posts. Seven of those stations are located in Scott County. Five of the seven are staffed by full-time MEDIC-EMS employees. Those stations are located in Davenport and Bettendorf. The stations in Eldridge and LeClaire are staffed using the Alternative Delivery Method (ADM). This model uses a full-time paramedic paired with a volunteer. MEDIC-EMS also staffs a unit in Clinton Iowa. This unit responds to requests of service from Mercy Medical Center, various nursing homes in the area and tier requests in the greater Clinton Iowa/Illinois region.

MEDIC EMS's revenue comes primarily from user fees. If MEDIC-EMS's expenses exceed revenues, the loss is subsidized by Scott County (2/3) and Genesis Medical and Trinity at Terrace Park (1/3). From 1988-2001, MEDIC-EMS was subsidy free and expects to be subsidy free this fiscal year. The need for subsidization in recent years is primarily due to the decision to expand coverage in the rural areas of Scott County. The coverage was needed based on response times, but the call volume was not sufficient to cover expenses.

MEDIC also operates a courier service as a separate division. The courier service provides an inter-campus shuttle for Genesis Medical Center as well as package delivery and courier service to the John Deere Davenport Works facility and the various Genesis campuses. They operate on a UHF radio system and handle 2,000 -3,000 transports per year.

2.5.1 MED-COM

MEDIC established MED-COM as a dispatch center in 1991. Prior to that time, the ambulances were not dispatched. The fire departments would send a page and a supervisor would assign the units. MED-COM became a 24 hour a day dispatch center in 1995. Emergency Medical Dispatch was implemented in 1997. MEDIC was accredited by the Commission on Accreditation of Ambulance Services (CAAS) in 1996. They have been reaccredited twice. MED-COM provides dispatch service for MEDIC-EMS, the MEDIC Courier, Illini Ambulance (Silvis, IL) and MED-FORCE Air transport. Illini Ambulance covers East Moline, Silvis, Upper Rock Island County, Colona, Rapids City, Hillsdale, and part of Henry County.

MED-COM has 4 fully equipped positions and 1 partial position. Weekday 09:00 to 17:00 staffing is three. On weekends and nights, staffing is normally 2 controllers. MED-COM's System Status Controllers complete the Iowa Basic Telecommunicator Training Course (40 hours). In addition, they complete the Medical Priority Dispatch Emergency Medical Dispatch training. Most of MED-COM's workload is not related to 9-1-1 calls. During the day an estimated 30% of the workload is related to 9-1-1 calls. Nights and evenings, the "Non-9-1-1" workload is approximately 80% of the effort. The following activities and functions are performed by the Med-Com Controllers:

- Answer incoming 911 transfer calls (wireline and wireless)
- Answer seven digit emergency lines
- Answer MEDIC-EMS administrative lines (after-hours)
- Answer Illini Ambulance Business Calls
- Dispatch ambulance calls via radio
- Dispatch MED-FORCE calls
- Flight follow MED-Force on all helicopter calls
- Provide emergency medical pre-arrival instructions, as appropriate

- Coordinate with other agencies (public works, other police and fire agencies, etc.)
- Perform notifications as required.
- Enter billing information for MEDIC, Illini, and courier division
- Print and distribute daily reports
- Manage portable battery rotation and track equipment
- Track vehicle information for fleet management
- Perform system status management movements as required
- Mail privacy practice communications and audit privacy practice
- Provide chart management support to field crews
- Answer and schedule transfers and courier calls

MED-COM has installed a Positron Lifeline 911 switch. This allows MED-COM to function as a secondary PSAP receiving 911 transfer calls from the primary PSAPs. Enhanced 9-1-1 data (ANI & ALI) is not received on calls from Illinois PSAPs. MED-COM has ring-down circuits (dedicated telephone lines) to the Iowa PSAPS (Davenport, Bettendorf and Scott County) and single button speed calls to the Illinois PSAPs.

MED-COM uses a CAD system from Zoll Data Systems. It is not interfaced with the primary PSAP's 911 system nor is it interfaced with any of the other agencies CAD systems. MEDIC does have an AVL system. It is the same system (Location Technologies) that is being used by Scott County and Bettendorf. MEDIC but does not have mobile data computers. It does computerized reporting.

MEDIC uses the RACOM network as its primary communications system. MEDIC has twenty talk groups on the system. MEDIC also has a UHF system which is used to communicate with units in areas not covered by the RACOM Network, as well as the courier division. TABLE 2-5 displays the available dispatch metrics for MEDIC-EMS and MED-COM.

TABLE 2-5 MEDIC-EMS AND MED-COM DISPATCH METRICS

Activity	2003	2004	2005
Wireline 911 Calls Received	Unavailable	Unavailable	21,291
Wireless 911 Calls Received	Unable to	differentiate between	Wired and Wireless
Total 911 Calls Received	Unavailable	Unavailable	21291
Wireless Call %	N/A	N/A	N/A
Average 911 Answer Time	Unavailable	Unavailable	Unavailable
Other Emergency Calls Received	Included in Wireline #	Included in Wireline #	Included in Wireline #
Administrative/Non-Emergency Calls			85,157
Total Incoming Calls			106,448
911 Calls Dispatched (MEDIC)	N/A	11,855	12,258
Transfers Dispatched (MEDIC)	N/A	8,658	9,405
Total Dispatches (MEDIC)	20,123	20,513	21,663
Total Transports (MEDIC)	16,426	15,983	16,121
Medical Pre-Arrival Instructions Given	5,950	7413	9,580
Illini Ambulance Dispatches	N/A	5,133	5,040
MED_FORCE Dispatches	N/A	869	1,278
MEDIC Courier Calls	N/A	2,392	1,945

3.0 REQUIREMENTS OF A CONSOLIDATED DISPATCH CENTER

The 911/dispatch consolidation project that the participating government and non-government entities are considering will have wide reaching effects on their operations. This would not just be an improvement in dispatch operations but a profound realignment of how the entities and communications operations relate to one another.

As background information, this section will describe some of the complex issues involved. Then, recommendations can be made and applied to the participating municipalities. Here we will also discuss some effective means of managing the communications operations that have worked in other places.

3.1 911 Systems

A 911 system is comprised of at least two separate functions: Operations and Technology. 911 operations involve dispatch protocols, very intensive personnel scheduling and management issues, and statistical and records release maintenance. 911 technology involves the management of the 911 telephone technology, computer assisted dispatch systems, recording systems, and other ancillary support systems.

3.1.1 911 Operations

911 operations personnel typically receive little recognition and are asked to function in one of the most complex and stress filled work environments in existence. Included in 911 operations management are dispatch functions for all of the agencies involved in the center. This normally means that center personnel must be proficient in police, fire and emergency medical protocols. The differing disciplines have their own characteristics that create scheduling and staffing challenges.

- Police - An extremely high volume of calls typically characterizes police dispatch. Most traffic involves small numbers of units sent to a large number of incidents.

Most police agencies do not have sufficient units; therefore many times police calls for service are held and prioritized. The officers in the field, rather than the dispatcher, originate a large percentage of the dispatch activity. The dispatch work is largely reactive to field operations. This creates a constant, unrelenting requirement for dispatch attention.

- Fire - Fire dispatch normally has less call volume than police, however the calls that are dispatched are much more complex and time consuming. Fire radio traffic has a smaller number of calls involved with a larger number of units sent to each incident. Workload for the dispatcher is generally driven by complaints received over the telephone rather than from the field. By definition, fire calls are considered emergency calls unless otherwise specified.

- EMS - Medical dispatch also has a lesser number of calls for service than police. These incidents also normally involve multiple agencies. With the advent of medical pre-arrival protocols, medical incidents have become the most time consuming of all for dispatchers. Again, workload is driven by complaints received over the telephone rather than from the field. Transfers from one medical facility to another are another important component of medical dispatch.

The results are that while police will have the preponderance of calls statistically, the actual workload for fire and medical can easily equal that of police. In essence, the dispatchers in the various dispatch disciplines are restricted in how they can assist each other. 911 management must balance the conflicting needs of these disciplines while attempting to meet differing dispatch procedures for each agency.

The quality of service provided through consolidation depends upon numerous factors; accuracy and reliability are two of the key factors. Other factors include personnel selection, training, shift personnel, supervisory and operational procedures, and telecommunicator workload. Much more than E9-1-1 dispatching must be considered.

Dispatchers may have non-emergency dispatch related duties to perform for their agency, including record keeping, administrative telephone duties and dispatch for agencies outside of public safety. Staffing for such collateral duties must be considered when operations are moved to a centralized dispatch center. Once resolved, efforts must then focus on improving dispatch service quality.

The National Fire Protection Association's Standard for the Installation, Maintenance, and Use of Emergency Communications Systems (NFPA 1221) establishes that:

- *Ninety-five percent of alarms shall be answered within 15 seconds and 99 percent of alarms shall be answered within 40 seconds.*

- *Ninety-five percent of emergency dispatching shall be completed within 60 seconds.*

In a clarification from previous editions, the 2002 edition of the standard indicates that the sixty second time period begins when the call is answered at the dispatch center and ends with the completion of the dispatch.

Personnel scheduling and management are full-time vocations in themselves. With a national average of 20% per year turnover in staff, training becomes a serious concern. Often times, it is necessary that training is ongoing. This requires staffing and management attention as well.

A centralized communications center by its nature also becomes the point where the preponderance of public safety statistics are created and compiled. Basic statistics are the numbers of calls for service and response times. Also, because of the recording systems, the center receives many requests for news releases and investigatory tapes. In a combined agency center, the various procedures and authorizations to release such information create a supporting specialty of records management.

3.1.2 911 Technology

A complex and multifaceted technology supports any centralized communications center. One of the primary subsystems is the Enhanced 911 telephone technology. Each 911 Center or PSAP (public safety answering point) is normally equipped with its own 911 switch. Also known as an ANI/ALI controller, this is the equipment that provides the Automatic Number Identification (ANI) and Automatic Location Information (ALI) to the dispatchers. There is an extensive database, the Master Street Address Guide (MSAG) maintained to ensure that this ANI & ALI information is correct. It includes a listing of all valid address ranges within the jurisdiction.

In the past few years, 911 Customer Premises Equipment (CPE) has featured the integration of the telephone and computer. Modern 9-1-1 customer premise equipment is computer based and integrates several different applications. Most suppliers of the integrated workstation include "instant recall recorders" and integrated TDD for communications with hearing and speech impaired callers as standardized options. Depending on the option and the vendor, some of the options are included at no additional charge, and some are relatively low cost. By using the replay recorder and TDD included with the telephone, the 9-1-1 center can avoid having to purchase separate, expensive pieces of equipment. In addition to the integration of the functions, operation is significantly easier. The US Department of Justice has interpreted the Americans with Disabilities Act (ADA) legislation to mean that each 9-1-1 position must be equipped with a device capable of communicating with the hearing and speech impaired 9-1-1 caller.

Depending upon the age and manufacturer of this equipment, the existing system in any municipality may have very limited expansion and adaptation capacity. For example, first generation 911 switches generally do not provide abandoned call notifications. In this current litigious environment abandoned call notification is a necessity. An abandoned call occurs when the caller has disconnected prior to the dispatcher answering. The caller's number and location are known to a center via ANI and ALI. But, if a center does not attempt to reconnect the caller or recognize a need to do so, then the center could face extreme liability and bad publicity.

In first generation 911 equipment, the operators could only discern an abandoned call by realizing that the ANI and ALI printers were activated. The abandoned call notification system presents an alarm to dispatchers and supervisors.

The Master Street Address Guide (MSAG) is a critical element in any Enhanced 911 system. The primary purpose of the MSAG is to assist in routing 911 calls to the proper PSAP. Telephone exchange boundaries and political boundaries are often different. The MSAG is used to direct calls originating in a jurisdiction to the PSAP that answers calls for that jurisdiction. There is a fair amount of work required to keep the MSAG current, especially in areas where there is new development. The MSAG can also be used to indicate which agency has jurisdiction for a particular location.

Beginning in the late 1990's, wireless enhanced 911 began to be deployed throughout the country. Because wireless callers are by definition not in a fixed location, a different technology was needed to provide the location of wireless callers in an emergency. This has placed additional demands on the PSAPS. Wireless 911 calls require that the 911 equipment be capable of receiving two ten digit telephone numbers as well as location information expressed as latitude and longitude. Many older 911 systems are not capable of fulfilling that requirement. In addition, the PSAP needs some form of computer-based mapping system to be able to rapidly convert the location information to a dispatchable address. In addition, the 911 equipment must allow the telecommunicator to refresh or rebid the ALI information in order to obtain the wireless callers location.

Voice over the Internet (VoIP) telephony is another new technology that is creating additional requirements for the 911 system. Callers using VoIP technology make telephone calls over the internet. VOIP calls interface with the conventional telephone network at the VOIP service provider's points of presence, which may or may not be in the local community. There are significant issues that must be resolved in order to assure that a 911 call is routed to the correct PSAP. Some VoIP telecommunications service provider networks, however, are not compatible with the existing E9-1-1 infrastructure. The Federal Communications Commission has ordered that VoIP service providers provide 911 service.

Because this is a new and rapidly evolving technology, many of the details have yet to be resolved. As with wireless 911, several different phases have been identified for VoIP 911 service. Some VoIP providers are able to provide a level of service similar to enhanced 911. Others are not able to provide the enhanced features at this time.

The telephone hardware must also be sized to accommodate a centralized center's workload. Often this limitation will require an expansion of the 911 switch subsystem or replacement of the entire 911-switch subsystem.

3.1.3 Computer Aided Dispatch (CAD)

A computer aided dispatch subsystem would certainly be a necessity in a centralized communications center with the volume of activity anticipated in a consolidated center. This computer keeps track of all field units and calls for service. The CAD assigns case and run numbers for tracking purposes. Through a geographic database the CAD is able to make recommendations to the dispatcher concerning which units to assign to calls. Through call class tables the CAD recommends the correct number and type of units to respond.

For example a call class might be "Signal 41-I," meaning traffic accident with injuries; "House" meaning a house fire; or "Heart" meaning a cardiac incident. The dispatcher enters only this call class identification into the CAD system. The CAD then generates the appropriate police, fire, and medical incidents from the single entry.

The geographic database (GEOFILE) can become quite complex as well, due to the differing service disciplines (police, fire, and medical) often with differing jurisdictional boundaries. This results in multiple agencies of similar type within one system. This will sometimes require the CAD to generate different case and run numbers for the same incident. The CAD GEOFILE typically recommends specific units to respond to a given location whereas the MSAG only indicates the jurisdiction. The CAD must also interface with all computer and records systems that reside downstream from it. Agency records systems should receive direct input from the CAD system for basic elements, such as incident numbers, date and time, location, and investigating officer.

As it is a part of the system, the mobile data system must also interface with the CAD in order to package and transfer information over the air. There is also NCIC, IOWA, and local criminal justice databases, as well as the 911 switch itself with which the CAD must communicate.

As noted above, location information for wireless 911 callers is expressed in latitude/longitude coordinates. The CAD must, therefore, be adaptable to latitude/longitude points and translating that to a location in the CAD system.

Generally, a computer aided dispatch system should allow for easy entry of incident information, recommend the resources to be dispatched to the call, track the status of the units both in relation to the incident and otherwise, maintain records of those calls and time related to it, and provide assorted records and reports for analysis and documentation.

A number of the systems being marketed as CAD systems are more focused on the records management and incident reporting aspects rather than on the dispatch aspects. While they may be suitable for use in smaller agencies, these systems may not be suitable for use in busier centers.

Agencies looking to implement or upgrade their CAD system should focus on the functionality as it pertains to dispatch operations. Common CAD functions include:

- Event Entry
- Event Prioritization
- Unit Recommendation for Assignment to Calls
- Time-stamping
- Address Verification
- Unit Status Monitoring/Recording
- Alert Timers
- Call History
- 911 Interface
- Paging Interface
- Radio System Interface
- Mobile Data Interface
- Mapping System Interface

These are just a few of the more common features and functions of a modern CAD system. It is important during the procurement to define what functions and features are required. As prospective systems are reviewed, there needs to be appropriate assurances that the system will have adequate capacity to handle the anticipated workload. This should not be just the normal workload, but must focus on estimated peak workloads. What happens when a major event adds extra units to the system? What happens when an unusual occurrence results in a call volume several times large than the normal call volume? Does the system have sufficient capacity to handle the demand?

3.1.4 Support Systems

Within any 911 center, there are ancillary subsystems that also require technical management. For example, the logging recorder subsystem must be sized to the needs of the 911 center and also to the recording needs of the agencies that require their radio traffic recorded. Other examples of ancillary systems include: generators, uninterruptible power supplies, ADA tone detectors, and internal security subsystems.

3.1.5 System Integration

Intelligent Workstation is the term that has been applied to computer based 9-1-1 answering position equipment that includes computer telephony integration. These workstations help resolve many of the issues facing PSAP's. There are several integration levels available. Basic integration allows the use of the same keyboard to access multiple computers. A manual switch is used to switch between the computers. A second level of integration allows the use of one computer, serving as a workstation to switch between multiple applications running on multiple host computers. The third and highest level of integration allows for a more complete interface between the various applications. An example of this is an interface between the 9-1-1 system and a CAD system. Through the use of a programmed interface, caller information is transferred from the 9-1-1 system and reformatted so that it is displayed in the appropriate fields in the calls for service screen in the CAD screen.

While the use of intelligent workstations solves a number of issues, there are also a number of potential concerns with their implementation that must be dealt with. First is the possibility that the applications are incompatible. Even when applications use the same operating systems, problems can occur when similar commands between applications cause undesired results. Often what is called multi-tasking actually refers to the ability to do multiple tasks in rapid succession.

This may create problems when applications compete for priority. Even when the operating system of the workstation does permit true multi-tasking, problems may occur when two or more applications try to use the same portion of a computer's memory at the same time. Another potential problem involves human factors. A telecommunicator may need to view multiple applications at the same time. For example, a call-taker may need to see the 9-1-1 display screen, the CAD call-taking screen, and a digitized map. It may become difficult to view all three applications at the same time on one screen. Multiple monitors may be needed. Integration of multiple applications is not only possible; in many cases it is desirable. Because of the potential problems involved, any integration effort must be done with a great deal of care and caution.

3.1.6 Additional Considerations

In addition to the number of computer monitors, cabling requirements have changed dramatically. Previously, with the older analog technology, several multiple-pair cables were needed between each position and the connection point. New digital communications techniques have dramatically changed that. The new trend is to use computer networking techniques to interconnect the various terminals with the "back-room ". This has greatly reduced the amount of cabling that must be run. However, as more applications become networked, the capacity of the network must expand. To that end, TIA/ANSI/NEMA Category 6 or 7 cabling is recommended for all new installations. These new categories of cabling permit data transfer speeds of up 600 Mb.

3.2 911 Consolidation

A change in the 911, or dispatch system, will not affect the number of calls for service, but it will impact how they are handled.

Even major leaps in technology can only reduce processing time by minimal amounts, and certainly not enough to produce a reduction in staff. The most dramatic cost savings in personnel will be in areas where personnel were used for activities other than dispatch. Most public safety dispatchers perform a multitude of administrative tasks in support of their employer. While consolidation in a centralized center may remove these non-911 functions from the dispatchers, the functions must be satisfied in some other fashion. Estimating how these tasks impact workload and staffing levels can be very difficult, especially because these duties are largely non-quantifiable.

3.2.1 Consolidation

A consolidated center requires diverse centers to be brought together under one management with common operating platforms. A consolidated center offers many advantages. The consolidated center can take advantage of common electrical, HVAC, and emergency power subsystems. The employees can be cross-trained and the schedules can be combined for added personnel efficiency. A consolidated center would create an arrangement that is more flexible, and amplifies the commonalties in fire and medical dispatch. The technical issues here become the 911 equipment, administrative telephones, computer-aided dispatch, and recording equipment. The 911 equipment must be sized for the consolidated dispatch operation. The telephone sets themselves must also accommodate the new larger number of non-911 lines. One operating platform for the consolidated 911 operation would be a necessity. Any new CAD could feed multiple records management systems. This single CAD must be able to upload into the various records management systems. A consolidated Center would require a single recording system.

3.2.2 Co-Location

If various 911 centers are co-located, then they will remain separate operations in the same building. This presents an entirely different set of issues. In this scenario, there would be different management of the multiple operations and equipment could be different as well. In a co-located operation there would be multiple 911 switches. Because of the equipment that routes the 911 calls from the provider to the center, the calls cannot be divided any other way. The CAD and recorder systems in this scenario could remain separate.

The most challenging issues involve personnel, resulting from two complete staffs with their own schedules and supervision. This would be the least efficient use of personnel.

3.2.3 911 Center Design

Because of the critical functions performed at public safety communications centers, considerable care is required in the location, design and construction of a center. The location should be chosen carefully and be as far from known hazards as feasible. For example, the lowest floor in a communications center should be above the 100 year flood elevation. Facilities that use hazardous chemicals should not be close to the center Careful consideration is needed when considering a location near a rail line or major highway that is used to transport hazardous chemicals The Federal Emergency Management Agency recommends that a ten-mile radius around a critical facility be thoroughly investigated. A significant leak of an Extremely Hazardous Substance (EHS), such as chlorine, could necessitate the need for protective actions including evacuation as far as ten miles from the incident. Possible terrorist actions could expand that emergency action zone. A hazard analysis should result in a threat rating – how likely is the facility to face the particular threat(s).

The design of critical communications facilities is a complex field. Public safety communications systems and public safety communications facilities should function under all conditions. The facility should be designed to withstand the anticipated hazards. Any effort to enhance the security and survivability of critical communications facilities should consider all of the hazards that the facility may face. The impact of technology on emergency communication systems and facilities is becoming increasingly significant. Technological advances have affected the way public safety agencies and corresponding centers operate daily. Technology affects every aspect of doing business – directly and indirectly. In order to meet future needs over the next 15 to 20 years, a critical communications center should be designed with the following considerations in mind:

- Avoiding fixed objects (walls, furniture, etc.) when practical

- Selecting equipment and peripherals such as displays, keyboards, and computers that can change and move as much as possible
- The infrastructure (data and power cables, etc.) needs to be moveable and reconfigurable
- The space should be as open as possible, and raised flooring and high ceilings should be used
- Adequate equipment room space must be provided
- Extra attention must be focused on electrical grounding

The PSAP must also comply with other requirements of the ADA concerning requirements that facilities and equipment be readily accessible and useable by persons with disabilities.

As the equipment in critical communications centers become more integrated and computer-based, there is a definite trend towards equipping them with more ergonomic furniture. A number of manufacturers offer adjustable furniture so personnel can raise or lower a chair or work surface to a comfortable position. Many new models allow adjustments from sitting to standing. This amenity is especially helpful when dispatchers and call takers are expected to spend prolonged periods at a workstation.

The consolidation/co-location issue has profound effects on the room design. It will directly impact the number of console positions in the center. In the equipment room, this will dictate the size and quantity of CAD processors, 911 switching equipment, and recorder processors. These requirements, in turn, will be carried out to determine the floor space, electrical, and HVAC needs.

3.2.4 911 Position Descriptions

Dispatcher - A dispatch position will normally contain radio controls, a 911 telephone with associated screens, and two CAD screens (one call taking and one unit status). A fourth screen is often used to display the computerized map.

Call Taker - A call taker only requires a 911 telephone with associated screens, a map display, and a call taking CAD screen.

At least one call taker should also be equipped with the commercial alarm terminations. In a co-located center, call takers would have to be replicated for the differing CADs and 911 equipment. This would require twice as many call takers.

Supervisor – A typical supervisor's position would have at least one more computer display. The position would have additional controls for internal alarms, system controls, and console override access.

In all but the largest centers, all of the positions, except for the supervisor's position, are typically set up as dispatch positions so that all positions can do all of the functions. This permits the maximum flexibility as staffing and workload changes.

3.2.5 911 Space Characteristics

The dispatch area should be characterized by these features:

- ADA compliant.
- Raised flooring.
- Bookshelves, or other storage, for ready access to manual reference materials.
- Lighting should have a wide range of adjustments. Individual lighting at each position is most preferred.
- Lockers – dispatcher should have available personal storage space for coats, headsets, reference texts, and other materials.
- Adequate restrooms for male and female employees.
- Equipment room for electrical, HVAC, generator, and UPS.
- Storage.
- Break/common area nearby.
- Training and administrative office space.
- Adequate automobile parking

3.2.6 Dispatch protocols

Consolidation of dispatch operations also requires consolidation of dispatch protocols. Much discussion is required before operations commence to resolve service level issues. Some centers have chosen to have all agencies follow the same protocol, while others have chosen to permit differences between the agencies. Advances in computer aided dispatch systems have facilitated allowing different protocols. There is still a need to establish common call classes and recommendation tables in the CAD.

This may require participating agencies adopting the same set of signals and codes. They would have to agree on the number of units assigned to a particular call class and the priority level. Consolidation, therefore, involves a great deal of cooperation between all agencies.

4.0 PROBLEMS AND CONCERNS

Each of the three governmental entities participating in this study as well as MEDIC-EMS has operated as self-sufficient entities for a long time. As noted in SECTION 2, MED-COM has been in operation since 1995. It is the newest of the dispatch agencies. This has been necessary to serve the complete spectrum of needs of the citizens of their respective communities. Each of the communities is unique. As a result, the public safety agencies have followed diverse paths as they try to meet the needs of their respective communities. This diversity presents some challenges in consolidating services. This section will explore the major issues and concerns we have identified in moving towards a consolidated 911 operation.

4.1 Customer Service

As shown in TABLE 4-1, there is a significant difference in the volume of 911 calls at each of the three governmental PSAPs. Along with the difference in the number of calls received, there is an equally significant difference in the number of calls received per full time employee. As a result, telecommunicators at the Davenport Police Department must handle each call quickly, extracting the needed information in the shortest amount of time. The Bettendorf Police Department and the Scott County Sheriff's Office, because their volume of incoming calls is lower, are able to spend more time when necessary to obtain more information. TABLE 4-1 below shows the 911 calls received by each primary PSAP, the number of calls received at that PSAP per full time employee and the number of 911 calls per resident. The 911 calls per employee figure for the Davenport Police Department also includes the staff for the front desk and only answer overflow 911 calls when working the desk. If only the staff working in the dispatch center were included, the number would be significantly higher.

TABLE 4-1 911 CALLS

Agency	911 Calls Received	911 Calls per FTE	Calls per person
Davenport	117,830	5356	1.12
Bettendorf	14,268	1,389	.42
Scott County	11,767	905	.37
NENA Study	34,310	1,811	.62

The Davenport Police Department responds to a high volume of calls for service. Because the resources available to respond to the calls has not increased as the volume of calls has increased, primarily due to budgetary constraints, the Davenport Police Department has chosen to not respond to certain types of service calls and to implement differential response for other types of calls. This means that many minor offense reports are taken by telephone instead of dispatching a police officer to take the report. Both the Bettendorf Police Department and the agencies dispatched by the Scott County Sheriff's Office respond to many of the types of service calls and minor incident reports that Davenport Police Department handles by differential response, as a matter of departmental policy.

The differences in call volumes and incidents responded to have created a high level of concern amongst the participants in this study. In interviews with Davenport, the concern was expressed in terms of the personnel from the other agencies having the ability to handle the higher call volume and dispatch traffic. Personnel from the other entities expressed their concerns in terms of the Davenport personnel handling calls very rapidly. In 2003 the National Emergency Number Association funded a PSAP Staffing Survey and Analysis Study. The results of that study provide a basis for comparison to the call volumes experienced in Scott County.

4.2 Community Size

With the City of Davenport having more than one half of the total population of Scott County, there is a concern about the City dominating any consolidated operation. While the percentage of the Scott County population living in the City of Davenport has decreased from a high of more than seventy-five percent in 1960 to just under sixty-two percent in 2000, Davenport will continue to be the largest city in Scott County for the foreseeable future. TABLE 4-2 below shows the population percentage of the three governmental entities since 1950.

TABLE 4-2 POPULATION PERCENTAGE OF GOVERNMENTAL ENTITIES

Area	1950	1960	1970	1980	1990	2000	2005	2015
Davenport	74%	75%	69%	65%	63%	62%	62%	65%
Bettendorf	5%	9%	16%	17%	19%	20%	20%	20%
Scott County	21%	16%	15%	18%	18%	18%	18%	15%

The population figures for 1950 through 2000 are from the US Census Bureau. The population projections are from information provided by the Bi-State Planning Commission.

4.3 Existing Dispatch Facilities and Equipment

With the construction of the new Davenport Police Station underway, the issue of the existing facilities and equipment takes on a different complexion and urgency. The new police headquarters has no space allocated for a dispatch center. The facility is scheduled to be completed mid-2007. The existing facility will be demolished and replaced with a parking deck. The equipment in the existing facility is obsolete, particularly the radio consoles and CAD system, and no longer supported by the manufacturer. While the new police facility is slightly farther away, both facilities are very close to railroad tracks that routinely carry cars of extremely hazardous substances. The Harrison Street underpass under the railroad tracks has a very low clearance. Even though there are signs and flashing lights, trucks frequently fail to heed the warnings and strike the overpass. The potential for a hazardous materials incident is high.

The Scott County PSAP was renovated and upgraded in 1999. There is no room for future expansion and there is inadequate space currently available for the equipment rooms needed for radio, telephone and computer equipment. Storage space is needed for supplies and consumables used in normal day-to-day operations as well as space for records and spare equipment. The space in the dispatch center portion is further constrained by the warrant files. While located two blocks from the overpass, the Scott County PSAP is still located near the same railroad tracks that pass by the Davenport Police Department. The potential for the same hazardous materials incident that affects the Davenport Police Department to also impact the Scott County Dispatch is equally high.

The Bettendorf Police Department PSAP in City Hall was also renovated and upgraded. The space available in the dispatch center is adequate for current and projected needs for the City of Bettendorf. However, the equipment rooms needed for radio, telephone, and computer equipment are currently crowded. There is limited space for future expansion. The Bettendorf Police Department is also located a little more than one hundred yards from railroad tracks, albeit different tracks than the line that is near the Davenport Police Department and the Scott County Sheriff's Office.

The MED-COM dispatch center is also extremely space limited. Not only is there no room for expansion, the equipment rooms needed for radio, telephone and computer equipment are inadequate for current needs.

4.4 CAD System Issues

Currently the four agencies use three different, incompatible Computer Aided Dispatch systems (CAD). The Davenport Police Department Computer Aided Dispatch (CAD) and Records Management System (RMS) were purchased from Infocell in 1986. In 1990, the company ceased providing support for the system. The City's Information Technology Department has been supporting the system ever since. In 2003, both Scott County and Bettendorf implemented a Computer Aided Dispatch system and records management system from Cody Systems. MEDIC-EMS and MED-COM use a Zoll Data CAD system. There are considerable differences in opinion as to suitability of the Cody system for use in a consolidated dispatch center. The CODY system uses one integrated data base for all transactions. There are both positive and negative aspects of the single data base. On the positive side, transactions only have to be entered once into the system, whether a name, an address, an article and so forth. The entry is then available to all modules.

The concerns with a single data base center on system performance in a high volume dispatch environment. NFPA 1221 and other standards recommend that the system response time not exceed two seconds under all conditions from the time a telecommunicator completes a keyboard entry until the full display of the system response where required. When there is a single data base, the concern is that the system response may be slowed by other activity on the system as well as the size of the data base. The system must be highly reliable and available. NFPA 1221 recommends the system be available and fully functional 99.95 percent of the time and be capable of automatically recovering from a power-failure.

The Zoll Data System, used by MED-COM, also uses an integrated data base. The system is designed for EMS and ambulance operations and is not suitable for use by police and fire departments. One feature of the system that MEDIC uses is the billing module since they are a fee-for-service operation. The Zoll system also transfers information to the MEDIC-EMS records management system.

4.5 Radio Issues

Although the scope of this study does not include a detailed analysis of two-way radio issues, there are considerable obstacles in any 911 consolidation. The two-way radio situation is a serious problem that the participating public safety agencies are facing and deserves attention by the governing bodies involved. The radio issue centers on the lack of interoperability between all of the agencies in Scott County due to incompatible frequency bands and incompatible technologies being used.

The City of Davenport Police and Fire Department, as well as other City departments use a legacy system in the Ultra High Frequency Band (UHF). The system uses the conventional analog mode for communications. In a conventional architecture, a separate frequency is used for each channel of communication. To hear transmissions destined for your operational group, you need to be tuned to that specific frequency. In most situations multiple operational groups will share a frequency, meaning that it is necessary to listen to the frequency to make sure no-one else is speaking before making your transmission. The term “Conventional” only became necessary in order to differentiate from “Trunking”. Conventional systems were the only ones available prior to the advent of trunking. Conventional radio equipment is relatively simple and inexpensive, and in many cases vendor-neutral.

In an effort to accommodate the increasing need for radio spectrum, the FCC began in 1992 a proceeding to increase spectrum efficiency in the Private LMR (PLMR) bands below 512 MHz. The refarming proceeding, as it became known, introduced major changes to these bands are explained below. In the UHF bands, where existing 25-kHz channels were spaced 25 kHz apart, new channels were created at 12.5 kHz and 6.25 kHz from existing channels. The channels 12.5 kHz from existing channels are available for licensing at 12.5-kHz or less bandwidths and those 6.25 kHz from existing channels are available for licensing at 6.25-kHz or less bandwidths. The refarming proceeding instituted new type acceptance rules, requiring new equipment to meet more efficient standards. The rules required all new equipment to be capable of one voice channel per 12.5 kHz of bandwidth by 1997. Recently, the FCC set deadlines for migration to greater spectral efficiency. As a result, the FCC decided to prohibit manufacture and importation of equipment capable of operating one voice channel per 25 kHz of bandwidth after January 1, 2011.

The FCC also updated the rules to set a fixed deadline for transition to 12.5 kHz operation. The deadline for conversion to 12.5 kHz efficiency is January 1, 2013 for all licensees. The narrowbanding requirement impacts the City of Davenport, the Scott County Fire Dispatch System, and MEDIC-EMS's UHF channels. Bettendorf, Scott County and MEDIC all use the RACOM Network as their primary communications system. The RACOM Network is an Enhanced Specialized Mobile Radio (ESMR) system owned by RACOM. The RACOM Network uses the EDACS digital trunking system from Ericsson/M/A-Com. In a Trunked Radio System, a small number of radio channels are shared among a large number of users. A computer directs groups of users (talk-groups) to available channels as needed, packing them into the available physical channels in a highly efficient way. Users only hear units in the same "talk group". This process permits substantially more users to be served (a factor of three to four times as many as in a conventional situation) by the same number of physical channels since most users do not need their channel 100% of the time.

While the primary purpose of trunking technology is spectrum efficiency, the commercial manifestation of this technology has used the technology to provide many additional features. Trunked systems can track users over wide areas, automatically applying multiple site resources to dispersed talk groups, while limiting the number of sites involved when a talk group is contained in a local area. Trunked systems are scalable, so that as the communications needs increase it is a simple matter of adding a channel to increase capacity. Trunked systems can prioritize talk groups, so that when an emergency arises that is communications intensive, the critical groups responding to the emergency are guaranteed access.

Trunking systems are inherently expensive. The fixed infrastructure requires not only the radio repeaters of a conventional system, but also the computers, inter-site communications, system management, and alarms necessary for their operation. Currently once a vendor is selected for the fixed infrastructure, additional fixed equipment can only be purchased from that vendor. The subscriber equipment is complex, generally specific only to the protocols for the particular fixed system, and therefore also expensive. With the RACOM Network, the system users do not have to bear the burden of the upfront cost of the infrastructure. RACOM installs the infrastructure and operates the system. Users buy the mobiles, portables and control stations then pay a monthly fee to access the system. The users pay $25.00 per radio per month. That fee covers the system cost and ongoing maintenance.

While the agencies in Scott County that currently use the RACOM network has not experienced any significant issues with the system, there are concerns over the fact the system is shared with non-governmental users, particularly utility companies; whose usage of the system during storms could affect the ability of public safety users to access the system. The Scott County Fire Dispatch System uses the VHF band. MEDIC-EMS uses a UHF system to communicate with units in areas not covered by the RACOM Network, as well as the courier division.

The use of disparate technology and three different frequency bands cause significant problems when units from agencies operating on different systems attempt to communicate with each other. For example, Davenport Police units can not seamlessly communicate with units from the Scott County Sheriff's Office or the Bettendorf Police Department. MEDIC ambulance crews loose the ability to communicate directly with Davenport Fire personnel on the scene of an emergency when they leave their vehicles because they only have 800 MHZ portables. While some patches or links between the various systems have been established, the links are not as effective as they need to be. Interoperability is a significant issue.

4.5.1 Dispatch Impact

"The first rule of dispatch" is that a dispatcher can only process one audio source at a time. This must be kept in mind when considering consolidated dispatch design. The existing two-way radio situation has a direct relationship to this truism. While a typical, efficient, well-equipped dispatcher can handle up to twenty police officers; this is not possible when the officers are operating on four or five radio channels. The dispatcher would be required to listen to several radio channels and discern the local traffic. Inevitably, at some point in time simultaneous radio traffic will occur on two or more of the channels, resulting in the dispatcher missing critical radio traffic. This situation will force the participating municipalities into inefficient use of dispatch personnel. However, CTA must recommend that a single dispatcher be assigned for every individual radio channel in use in the center.

With fire departments, the complications of consolidation are not so severe because there is less radio traffic. Nevertheless, the two-way radio environment presents real obstacles to efficient personnel use in a consolidated center. This issue will be discussed more specifically in SECTION 5.0 – Alternate Solutions.

4.6 Mobile Data System

All three of the law enforcement agencies have installed a mobile data system. Originally, the same system was shared between all three agencies and run by the City of Davenport. However in 2003, the City of Bettendorf established its own system. Part of the reason for this was the operating costs for the joint system. The City of Davenport instituted a charge per transaction as a way to fund system support. Bettendorf was able to save enough money by not paying the transaction fees to fund its own system. For both the Davenport Police Department and the Scott County Sheriff's Department, the transaction charge, three to five cents per transaction, inhibits the use of the system. This in turn places an additional burden on the dispatch system since the officers have the telecommunicators at dispatch run the transaction instead of incurring the charge.

In addition to the transaction charge, other issues have prevented the mobile data system from achieving the promise intended. The system concept was that the officers would not only use the system for their warrant and license checks, but also complete their incident reports in the field and submit them through the system instead of coming to headquarters to write their reports. Unfortunately, the interface between the mobile data system, and the CAD and RMS system was never fully perfected. The original implementation of the system was funded in large part by a U.S. Department of Justice Community Oriented Policing Making Officer Redeployment Effective (COPS MORE) grant. While the system is functioning sufficiently to allow the COPS MORE grant to be closed out, it did not achieve all of the results envisioned at the onset. The COPS MORE program funded a number of efforts to implement mobile field reporting. Many of these projects suffered from the same issues as this program did.

4.7 Emergency Medical Dispatch

Emergency Medical Dispatch (EMD) is the structured method by which dispatchers provide to persons at the scene of a medical emergency pre-arrival instructions to assist the injured party prior to the arrival of response personnel. EMD provides assistance to the injured party during the precious first moments before response units arrive at the scene. This service saves many lives and improves the delivery of emergency medical service. EMD calls present challenges because the dispatcher must remain on the telephone with the complainant until responders arrive on the scene. An EMD call requires the full attention of the dispatcher, who cannot be asked to perform any other duties for the duration of the call.

Of the primary PSAPs, only Scott County provides EMD instructions. Davenport and Bettendorf rely on MED-COM to provide EMD. This presents issues when callers reporting medical emergencies are not connected to MED-COM. In addition, sometimes callers are not connected to MED-COM for various reasons and thereby not afforded the opportunity to receive pre-arrival instructions.

4.8 NCIC/IOWA

Criminal justice computer databases at the national (NCIC) and state (IOWA) levels permit authorized criminal justice agencies to check for warrants, stolen items, and articles. Integration with other databases also allows for verification of a driver's license status and vehicle registration information. In any consolidation environment, access to this information is critical in performing law enforcement operations.

4.8.1 Legal Responsibility

Information from these systems is used to detain and arrest wanted persons and/or persons in possession of stolen property. The agency that comes into contact with such a person and makes an arrest is depending on the originating agency to have provided accurate information. The liability for false arrest, or improper confiscation of items, rests solely with the agency inputting the data. This information must be accurate and completely up-to-date at all times. Failure to do so may result in an agency being denied access to the system.

4.8.2 Ten – Minute Responses

One of the checks and balances in the system that most directly affects a dispatch operation is the "10-minute response". This can best be described by an example: An officer in Florida stops a vehicle and enters the registration into the system. This particular vehicle has been put into the system as stolen by a police department in Scott County. The computer system will immediately notify the officer in Florida that the vehicle has been reported as stolen by an out-of-state police department. The computer system also notifies the local department immediately that one of its vehicles is being detained in Florida. The local department has 10 minutes to confirm or disaffirm that the vehicle is, in fact, stolen.

This example requires constant attention to the NCIC/IOWA system and immediate access to accurate records. The gravity of this situation is evidenced by the fact that mistakes will cause innocent persons to be arrested. In a consolidated environment, if a dispatcher is unavailable to perform these tasks, then other personnel must be available to perform them. Wide area records computer systems might allow dispatchers to perform this service remotely, but the database information still must be impeccably maintained.

4.8.3 Article Entry and Clearing

Items in the system must be entered in specific formats. This applies to persons, warrants, vehicles, guns, and articles. In each department there is a NCIC/IOWA operator that enters, clears, and modifies these items. Personnel who perform this function must be certified by the NCIC and the State of IOWA. These entry functions should best be done on a 24-hour basis. To the extent that consolidation displaces dispatchers at each PSAP, some other personnel must be assigned.

4.8.4 Non-Law Enforcement Agencies

There are provisions in the NCIC organization for non-law enforcement agencies to have access to the system. These agencies are normally non-enforcing criminal justice agencies (NCIC 'N' designator) and/or public safety dispatch agencies (NCIC 'P' designator). These agencies may make inquiries only and not entries or confirmations in the system. They also cannot obtain criminal history record information (CHRI). A consolidated dispatch center should gain access to the system as a public safety dispatch agency.

4.9 Warrants

Because of recent policy changes in response to mandates by the Federal Bureau of Investigation, which operations the National Crime Information Center (NCIC), the location of the original copies of arrest warrants has become an increasing problem. Previously, the original copies of the warrants were kept at the Scott County Clerk's Office.

However, the IOWA (Iowa On-line Warrants and Articles System) as required by the NCIC Rules and Regulations requires that "an agency receiving a hit confirmation request should consult the original warrant and/or case file in order to provide the most accurate response." In addition, the Courts are insistent on having the original warrant in their presence at the time a person is brought before a judge when first arrested. This has resulted in a considerable amount of time being spent by officers in Davenport and Bettendorf transporting warrants to court during the day. There is concern that, should a consolidated dispatch center be located outside of the vicinity of the Courthouse, the problem will be exacerbated.

In addition to the location of the warrants, the workload that results from them in the dispatch centers is significant, especially for the Scott County Sheriff's Office. IOWA Rules and Regulations require that new warrants be entered into the system within three days of issuance. It is not unusual for large batches of warrants to be brought to dispatch, especially after the weekends. In 2005, the Scott County Sheriff's Office entered over 1,700 new warrants. Before the warrants can be entered, some research is needed to obtain all of the available information on the person named in the warrant. In addition, all entries must periodically be validated. Validation (vehicles, plates, fugitives, missing person entries) requires the entering agency to confirm the record is complete, accurate, and still outstanding or active. This too can be a time consuming process. Last year, Scott County validated over 1,800 warrants alone.

4.10 Collateral Duties

To a varying degree, all of the dispatchers surveyed in this study have work responsibilities beyond those that would be defined as dispatch related. These responsibilities have expanded over time to where, at present, the dispatchers in the participating municipalities are integral positions for police, fire, and other municipal services. In any consolidation scenario, the future performance of these functions presents issues to be addressed at each municipality.

4.10.1 Administrative Telephone Lines

Administrative telephone call service has typically been a function performed by 911 dispatchers and MED-COM controllers. They are trained in telephone techniques and already have this skill. This is especially important because many emergency and administrative calls are related.

In a consolidated environment, these calls still require proper handling, even if the 911 operation is physically located somewhere else. But present day technology could allow a municipality's administrative telephone operation to be located outside its boundaries. However there would be some deficiencies in this type of situation.

4.10.2 Records Management

Dispatchers are directly involved in the operation of their respective departments. Also, they are typically located at the center of the departmental facilities. This has resulted in their becoming involved in the record keeping functions of the departments. Many are involved in other agency records management functions.

4.10.3 Point of Contact

Many participants interviewed in this study placed a strong emphasis on retaining a sense of contact and service to their constituents. The dispatchers have been providing this point of contact for the community via walk-up windows or other means on a 24-hour basis. The same service can be provided after normal business hours by installing a "ring-down" line at the entrance of the police departments that is answered at the consolidated dispatch. The dispatch center then contacts department personnel either in the police station or by radio and has them respond.

4.11 Operational Differences

There are significant differences between the operation of the three governmental PSAPs and MED-COM. Davenport, Bettendorf, and Scott County each dispatch police and fire departments. The police units are typically on patrol and moving around in their assigned area. The fire departments are station based. That is to say that the apparatus responds from an assigned station and returns to that station when the call is completed. The ambulance services that Scott County dispatches are also station based. MEDIC-EMS, on the other hand, uses *System Status Management*. System status management (SSM) predicts when and where ambulance units are going to be needed most on a day-by-day, hour-by-hour basis, using analysis of past call and volume history.

The MED-COM Controllers make decisions regarding the dynamic positioning of ambulance units throughout a service area based on pre-determined criteria. This dynamic positioning involves moving units periodically to respond to variations in call volume within the service area,

As noted in SECTION 2 of this report, a significant portion of MED-COM's workload is not related to calls received through the 911 system in Scott County. MED-COM provides dispatch service for Illini Ambulance which serves portions of Rock Island and Henry Counties in Illinois. MEDIC-EMS also has a unit stationed in Clinton, outside of Scott County. MED-COM also dispatches MED-Force. While MED-Force does do some transport from incident scenes, their primary activity is hospital to hospital transfers by helicopter. Much of MEDIC-EMS's activity involves inter-facility transfers. Finally, MEDIC-EMS also operates a courier division which provides approximately 2,000 transports of personnel and materials each year.

4.12 Summary of Interviewee Concerns

During the first two weeks of October 2005, a team of personnel from CTA Communications conducted interviews and dispatch center surveys in the Quad City area. Approximately forty interviews were conducted. Following is a summary of the concerns expressed by those interviewed.

There is a significant difference in the level of service provided between the various dispatch centers. This is true for both the service to internal and external customers. This diversity between the centers is a source of concern at all levels. A number of the public safety personnel involved are intensely skeptical about any potential public safety benefits. In fact, they strongly believe that consolidation will cause them to compromise public safety services. This concern is present in many proposed public safety dispatch consolidations. The concerns are legitimate and are successfully addressed by adhering to standards and developing and adhering to good policy and procedures. These concerns are addressed in CTA's recommendations in SECTION 7.

Another concern deals with arrest warrants. IOWA System Rules and Regulations require that all warrants be entered/confirmed using the original warrant. At the time of our interviews, Scott County had over 2300 active warrants and Davenport had over 800. Handling of warrants is a significant portion of the workload of the Scott County dispatch center.

There is also concern that if a consolidated dispatch center is located away from the jail, the amount of time involved serving warrants will significantly increase since the courts also demand the original warrant. Another concern is the timeliness of warrant entries. The IOWA system requires that new warrants be entered within three days of receipt.

The change in the working relationships between the dispatchers and field personnel is a further concern that was mentioned by a number of parties. There are a number of close working relationships in the existing centers. There are potential positives and negatives to these close relationships. Officers and dispatchers, who work in the same facility, get to know each other personally and have a personal investment and involvement with each other.

Day-to-day performance feedback and complaint resolution are easier when all the employees work in the same place. Law enforcement personnel can provide dispatchers with quick information by walking over to the dispatch area. With personal knowledge of the backgrounds and subject-area strengths of different officers, dispatch staff can make better decisions in dispatching specific officers to respond to specific incidents. The Bettendorf Police Department noted that their dispatch staff does significant research for officers in the field that assists the officers in resolving issues.

Interoperability was another issue that was raised during our interviews. Bettendorf, Scott County, MEDIC, and a number of Illinois agencies in the Quad City area all use the RACOM Network, which is an 800 MHz, trunked radio system using the EDACS platform. Davenport uses a number of conventional, UHF channels for police and fire communications. While some links between the two systems have been established, interoperability is less than seamless.

A number of issues were raised about the RACOM Network, primarily by those not using it. The issues center on cost, access, robustness, reliability, and security.

MEDIC-EMS and the other ambulance services in the County are non-governmental, non-profit corporations. All of the other entities involved are governmental entities.

In any potential consolidation, the question of how to integrate non-governmental organizations is one that will have to be addressed.

There are differences in compensation and benefits between the various centers. Personnel at two of the agencies are represented by unions; two are not.

There are significant differences of opinion on the adequacy of the Cody CAD/RMS system for a consolidated operation.

Finances are another issue that will be a significant part of the feasibility study. Interviewees also described the delivery of 24-hour service as vital and expected by the public. This service must be maintained. Consequently, there are concerns about the personnel costs of any consolidated center in addition to the costs of personnel to handle the non-telephone and non-radio duties that the dispatchers currently perform. In addition, concern was expressed about the costs incurred to build and maintain a centralized communications center.

The governance of a consolidated center is a concern. As was noted, there was a previous attempt at consolidation that failed. The disparity in size between Davenport and the other entities exacerbates the issues.

5.0 ALTERNATIVE SOLUTIONS

This section of the study presents five possible solutions for a consolidation effort that satisfy the study.

1. Davenport Only
2. Davenport and Scott County
3. Governmental Agencies (Davenport, Bettendorf, and Scott County)
4. Davenport, Scott County, and MED-COM
5. Total Consolidation

Previous sections of this report addressed the current situation, the requirements for a consolidated center, and the issues and problems currently encountered.

5.1 Technological Assumptions

5.1.1 Interoperability/Interagency Coordination

Currently, the ability for the Davenport Police and Fire Departments to communicate with surrounding departments is constrained by the fact that the Davenport departments operate in a different frequency band and use different technology from the other agencies. While not an absolute requirement, the migration of all of the public safety agencies, including MEDIC-EMS to appropriately designed compatible systems could result in significant improvement in the communications and coordination between the various agencies.

5.1.2 Computer Aided Dispatch System (CAD)

Computer-Aided Dispatch (CAD) systems allow public safety operations and communications to be augmented, assisted, or partially controlled by an automated system. It can include, among other capabilities, computer controlled emergency vehicle dispatching, vehicle status, incident reporting, and management information.

Most importantly the CAD will track the status of public safety units and recommend which units to assign to a call. All aspects of a CAD system must be optimized for rapid response time and system reliability. Since time is of the essence, the CAD system must accurately provide a data and time stamp for every activity. Call processing time is reduced. Case and assignment numbers are created and tracked automatically. CAD systems collect the initial information for an incident and then provide the information to one or more RMS systems. The CAD system also supports other activities that assist in the effective use of public safety resources, including shift change roll call, "Be on the lookout" (BOLO) files, and the ability to schedule a call in the future. Currently there are four separate CAD systems in use among the four agencies.

5.1.3 Records Management Systems

Records Management System (RMS) is an agency-wide system that provides for the storage, retrieval, retention, manipulation, archiving, and viewing of information, records, documents, or files pertaining to law enforcement operations. The RMS covers the entire life span of records development, from initial generation until the process to which it is complete. An effective RMS allows single entry of data while supporting multiple reporting mechanisms. Frequently the RMS is interfaced with the CAD so that when calls are closed in CAD, the call record is transferred to the RMS to facilitate the capture of all relevant information without having to re-key the data into the RMS. Currently there are four separate RMS systems in use in the four agencies. There is little interchange of information between the systems. A regional records management system, especially involving the law enforcement agencies in Scott County could provide significant enhancements in the ability of the law enforcement agencies to exchange information.

5.1.4 9-1-1 System

Currently the 911 system nationally is in a state of flux. Over the last decade, wireless 911 has become a reality. All three of the primary PSAPs have deployed at least Phase I wireless enhanced 911 and either have or are in the process of deploying Phase II. Phase I service provides the call-back number of the caller and the location of the cell tower being used for the call.

Phase II can provide the callers actual location if the callers handset provides the information. Internet Telephony is the next technological challenge facing the system. Currently, all four of the PSAPs use the same 911 Customer Premise Equipment. While the ANI/ALI controller is the current model being sold and supported by the vendor, the instruments at the dispatch positions are at the end of their lifecycle. Although these units are still being supported by the manufacturer, they lack many of the features found in more modern models. In addition, as the state of the technology continues its rapid evolution, the units may quickly become obsolete.

5.1.5 Space

Scott County has offered the existing space at the Sheriff's Annex on Tremont Avenue for use as a shared communications center. The available space is in a pre-engineered metal building that is currently used by the County for storage. There are significant steps that would have to be taken to mitigate risks associated with using that type of structure. These are described in SECTION 7 of this report.

The other alternative being considered would be constructing a "hardened" facility adjacent to the Tremont site or at another suitable location such as the Davenport Department of Public Works campus also on Tremont. CTA's recommendations are contained in SECTION 7 of this report.

5.2 Option 1 – No Consolidation

This option would continue the status-quo with each of the four centers continuing to operate independently.

5.2.1 Organization

Since each center would continue to operate independently, no organizational changes would occur.

5.2.2 Staffing Requirements

There is a need for increased staff for the City of Davenport. In order to meet the current and anticipated workload, we recommend that the City of Davenport have a five position dispatch center with at least three of these positions staffed around the clock. This is in addition to the personnel assigned to the front desk. One of the three people on duty in the communications center should be a shift supervisor in order to facilitate the smooth running of the operations. TABLE 5-1 displays the current staffing.

TABLE 5-1 OPTION 1 CURRENT STAFFING

	Davenport		Bettendorf		Scott County		MED-COM		Total Staff	
	On-Duty	Total	On-Duty	Total	On-Duty	Total	On-Duty	Total	On-Duty	Total
Manager										
Operations Manager				1		1		1		3
Training Manager										
Tech Support Coordinator		0.5				0.5		0.5		1.5
Admin Assistant										
Sub-Total		0.5		1		0.5		1.5		3.5
										0
Shift Supervisors					1	3			1	3
Telecommunicators	2-3	22	2-3	8	2	9	2-3	8	8-11	47
Front Desk	1-2								1-2	
Part-Time (Counted as .5 FTE)				1		1		6		8
Sub-Total (FTE)	3-5	22	2-3	8.5	3	9.5	2-3	11	10-13	54
Total	**3-5**	**22.5**	**2-3**	**9.5**	**3**	**14**	**2-3**	**12.5**	**9-12**	**58.5**

Note: The total staff number does include the personnel assigned to the front desk but does not include the police officers and command personnel back-filling the front desk at the Davenport Police Department. For MED-COM, each part-time staff member was computed equaling fifty percent of a full-time employee.

5.2.3 Technology

Not consolidating will limit the benefits that will be realized. The City of Davenport will have to bear the burden of updating its CAD and RMS systems, as well as obtaining new 911 CPE and radio consoles on its own. Each of the other agencies will have to shoulder the cost of updates to their existing equipment and systems. Interchange of information will continue to be less efficient than it could be.

5.2.4 Space

Since the new Davenport Police Department facility does not have any space allocated for a dispatch center, space will be needed for one either in an existing building or in new construction. A five position dispatch center would require approximately 2,700 square feet of space along with raised flooring, redundant routing for 911 and emergency telephone circuits, and back-up power supplies and HVAC systems. The space would be allocated as follows:

Dispatch Center (5 positions) - 2,071 square feet
Equipment Room - 565 square feet

If the facility were not located in an existing building, additional space will be needed for staff support (locker rooms, break room, etc.) and for building services and systems (HVAC, etc.) This would bring the total space required to approximately 3,000 square feet.

5.3 Option 2 Consolidate Davenport and Scott County

This scenario consolidates the City of Davenport Dispatch Center and the Scott County Sheriff's Office.

5.3.1 Organization

The two organizations would be combined into one joint operation. The recommended structure would involve the development of a twelve position dispatch center. Ten positions would be needed immediately during peak activity times with space for two additional positions set aside for future growth. All of the positions would be fully capable of performing all of the functions.

In addition to the dispatch positions, there will be a need for four full-time and one part-time management staff. The management staff includes a center manager, an operations manager, a training manager and a technical support coordinator, as well as a part-time administrative assistant.

5.3.2 Staffing Requirements

As shown in APPENDIX B, there should be five to eight people on duty in the combined center One of the people on duty in the communications center should be a shift supervisor in order to facilitate the smooth running of the operations. TABLE 5-2 displays the estimated staffing. The four management positions are included.

TABLE 5-2 OPTION 2 ESTIMATED STAFFING

	Bettendorf		MED-COM		Davenport-Scott County		Total Staff	
	On-Duty	Total	On-Duty	Total	On-Duty	Total	On-Duty	Total
Manager						1		1
Operations Manager		1		1		1		3
Training Manager						1		1
Tech Support Coordinator				0.5		1		1.5
Admin Assistant								
Sub-Total						4		6.5

	Bettendorf		MED-COM		Davenport-Scott County		Total Staff	
	On-Duty	Total	On-Duty	Total	On-Duty	Total	On-Duty	Total
Shift Supervisors					1	5	1	5
Telecommunicators	2-3	8	2-3	8	5-7	26	9-14	44
Part-Time (Counted as .5 FTE)		1		6				7
Sub-Total (FTE)		8.5		11	6-8	31	10-14	52.5
Total	**2-3**	**9**	**2-3**	**13**	**6-8**	**35**	**11-13**	**59**

Note: For MED-COM, each part-time staff member was computed equaling fifty percent of a full-time employee.

5.3.3 Technology

Consolidation, even if just two agencies, will enable an easier transition to future dispatch improvements and requirements.

- CAD

  A new CAD is recommended for this center. Davenport's CAD/RMS system is obsolete and needs replacement. The Cody System used by Scott County may be suitable for use, but significant enhancements would be required in order to meet the increased demands. Functional specifications need to be developed to define the capability and capacity needed.

- 911 Equipment

  As noted above, while the ANI/ALI controller is the current model being sold and supported by the vendor, the instruments at the dispatch positions are at the end of their lifecycle. Consolidation would provide the opportunity to install an upgraded 911 system with the most current technology.

The 911 equipment would need to be sized for the center and made adaptable to manage not only wireline and wireless 911 calls, but also VoIP 911 calls.

- Consoles

A new console system would be needed assuming that the existing Scott County Dispatch Center is left intact to serve as a back-up to the consolidated center. Modern communications consoles system use centralized electronics, usually located in the equipment room and computer-based workstations at each operating position. The centralized electronics provide flexibility to reconfigure and adapt to changing needs with minimal disruption of on-going operations.

5.3.4 Space

A center this size would require more space than is available at any of the study participants' current facilities. Ten positions would be required immediately, with space allocated for the addition of two additional workstations in the future. A twelve position dispatch center would require approximately 4,900 square feet of space along with raised flooring, redundant routing for 911 and emergency telephone circuits, and back-up power supplies and HVAC systems. The space would be allocated as follows:

Dispatch Center (12 positions)	3,300 square feet
Equipment Room	600 square feet
Administrative Space	1,000 square feet

If the facility is not located in an existing building, additional space will be needed for staff support (locker rooms, break room, etc.) and for building services and systems (HVAC, etc.). The total estimated space required for a stand-alone facility would be approximately 6,000 square feet.

There has also been discussion of co-locating the Emergency Operating Center with the Emergency Communications Center. This would involve the provision of a large room, which could also be used for training and meetings.

The requirements for the Emergency Operating Center and other potential co-located functions are discussed in SECTION 5.6 below

5.4 Option 3 Consolidate Davenport, Bettendorf, and Scott County

This scenario consolidates the City of Davenport Dispatch Center, the City of Bettendorf Dispatch Center and the Scott County Sheriff's Office.

5.4.1 Organization

The organizations would be combined into one joint operation. The recommended structure would involve the development of a thirteen position dispatch center. Eleven positions would be needed immediately with space for two additional positions set aside for future growth. All of the positions would be fully capable of performing all of the functions.

In addition to the dispatch positions, there will be a need for five full-time management staff. The management staff includes a center manager, an administrative assistant, an operations manager, a training manager and a technical support coordinator.

5.4.2 Staffing Requirements

As shown in APPENDIX B, the staffing complement is as follows:

- Day Shift 6
- Afternoon Shift 9
- Night Shift 5

One of the people on duty in the communications center should be a shift supervisor in order to facilitate the smooth running of the operations. TABLE 5-3 displays the estimated staffing. The four administrative positions are included.

TABLE 5-3 OPTION 3 ESTIMATED STAFFING

	MED-COM		Consolidated		Total Staff	
	On-Duty	Total	On-Duty	Total	On-Duty	Total
Manager				1		1
Operations Manager		1		1		2
Training Manager				1		1
Tech Support Coordinator		0.5		1		1.5
Admin Assistant				1		1
Sub-Total		1.5		5		6.5
Shift Supervisors			1	5	1	5
Telecommunicators	2-3	8	6-9	34	8-11	42
Part-Time (Counted as .5 FTE)		6				6
Sub-Total (FTE)		11	6-8	39	9-12	50
Total	**2-3**	**12.5**	**7-9**	**44**	**9-12**	**56.5**

Note: For MED-COM, each part-time staff member was computed equaling fifty percent of a full-time employee.

5.4.3 Technology

Consolidation will enable an easier transition to future dispatch improvements and requirements.

- CAD

  A new CAD is recommended for this center. Davenport's CAD/RMS system is obsolete and needs replacement. The Cody System used by Scott County and Bettendorf may be suitable for use, but significant enhancements would be required in order to meet the increased demands. Functional specifications need to be developed to define the capability and capacity needed.

- 911 Equipment

  As noted above, while the ANI/ALI controller is the current model being sold and supported by the vendor, the instruments at the dispatch positions are at the end of their lifecycle. Consolidation would provide the opportunity to install a new 911 system with the most current technology. The 911 equipment would need to be sized for the center and made adaptable to manage not only wireline and wireless 911 calls, but also VoIP 911 calls.

- Consoles

  A new console system would be needed assuming that the existing Scott County Dispatch Center is left intact to serve as a back-up to the consolidated center. Modern communications console systems use centralized electronics, usually located in the equipment room and computer-based workstations at each operating position. The centralized electronics provide flexibility to reconfigure and adapt to changing needs with minimal disruption of on-going operations.

5.4.4 Space

A center this size would require more space than is available at any of the study participants' current facility. As noted above eleven positions would be required immediately, with space allocated for the addition of two additional workstations in the future. A thirteen position dispatch center would require approximately 5,000 square feet of space along with raised flooring, redundant routing for 911 and emergency telephone circuits, and back-up power supplies and HVAC systems. The space would be allocated as follows:

Dispatch Center (13 positions)	3,400 square feet
Equipment Room	600 square feet
Administrative Space	1,000 square feet

If the facility is not located in an existing building, additional space will be needed for staff support (locker rooms, break room, etc.) and for building services and systems (HVAC, etc.). The total space required for a stand-alone facility would be approximately 7,200 square feet.

There has also been discussion of co-locating the Emergency Operating Center with the Emergency Communications Center. This would involve the provision of a large room, which could also be used for training and meetings. The requirements for the Emergency Operating Center and other potential co-located functions are discussed in SECTION 5.6 below.

5.5 Option 4 Consolidate Davenport, Scott County and MED-COM

There is a high degree of concern expressed by user agency personnel in the City of Bettendorf about the feasibility of their joining a consolidated dispatch center. This option consolidates the other three PSAPS (Davenport, Scott County and MED-COM).

5.5.1 Organization

The organization would be combined into one joint operation. The recommended structure would involve the development of a twelve position dispatch center. Ten positions would be needed immediately with space for two additional positions set aside for future growth. For planning purposes, the project is assumed to have a twenty year life. All of the positions would be fully capable of performing all of the functions.

In addition to the dispatch positions, there will be a need for four full-time and one part-time management staff. The management staff includes a center manager, an operations manager, a training manager and a technical support coordinator in addition to a part-time administrative assistant.

5.5.2 Staffing Requirements

The staffing needed each day including these positions then becomes:

- Day Shift 6
- Afternoon Shift 8
- Night Shift 5

In order to staff the twenty shifts every day, a total of thirty-four full-time telecommunicators and supervisors will be needed.

One of the people on duty in the communications center should be a shift supervisor in order to facilitate the smooth running of the operations. TABLE 5-4 displays the estimated staffing. The four and one-half administrative positions are included.

TABLE 5-4 OPTION 4 ESTIMATED STAFFING

	Bettendorf		Consolidated		Total Staff	
	On-Duty	Total	On-Duty	Total	On-Duty	Total
Manager				1		1
Operations Manager		1		1		2
Training Manager				1		1
Tech Support Coordinator				1		1
Admin Assistant				0.5		0.5
Sub-Total				4.5		5.5
Shift Supervisors			1	5	1	5
Telecommunicators	2-3	8	5-8	34	8-10	42
Part-Time (Counted as .5 FTE)		1				1
Sub-Total (FTE)		8.5		39		49.5
Total	**2-3**	**9.5**		**43.5**	**9-10**	**54**

5.5.3 Technology

Consolidation will enable an easier transition to future dispatch improvements and requirements.

- CAD

  A new CAD is recommended for this center. Davenport's CAD/RMS system is obsolete and needs replacement. The Cody System used by Scott County may be suitable for use, but significant enhancements would be required in order to meet the increased demands. MED-COM's CAD is designed for EMS use. An interface between the new CAD and MED-COM's system would be provided to facilitate the additional functions that MED-Com provides, specifically billing. Functional specifications need to be developed to define the capability and capacity needed.

- 911 Equipment

  As noted above, while the ANI/ALI controller is the current model being sold and supported by the vendor, the instruments at the dispatch positions are at the end of their lifecycle. Consolidation would provide the opportunity to install a new 911 system with the most current technology. The 911 equipment would need to be sized for the center and made adaptable to manage not only wireline and wireless 911 calls, but also VOIP 911 calls.

- Consoles

  A new console system would be needed assuming that the existing Scott County Dispatch Center is left intact to serve as a back-up to the consolidated center. Modern communications console systems use centralized electronics, usually located in the equipment room and computer-based workstations at each operating position. The centralized electronics provide flexibility to reconfigure and adapt to changing needs with minimal disruption of on-going operations.

5.5.4 Space

A center this size would require more space than is available at any of the study participants' current facility. As noted above eleven positions would be required immediately, with space allocated for the addition of two additional workstations in the future. A thirteen position dispatch center would require approximately 5,300 square feet of space along with raised flooring, redundant routing for 911 and emergency telephone circuits, and back-up power supplies and HVAC systems. The space would be allocated as follows:

Dispatch Center (13 positions)	3,700 square feet
Equipment Room	600 square feet
Administrative Space	1,000 square feet

If the facility were not located in an existing building, additional space will be needed for staff support (locker rooms, break room, etc.) and for building services and systems (HVAC, etc.). CTA estimates that approximately 7,800 square feet of space would be required for a stand-alone facility.

There has also been discussion of co-locating the Emergency Operating Center with the Emergency Communications Center. This would involve the provision of a large room, which could also be used for training and meetings. The requirements for the Emergency Operating Center and other potential co-located functions are discussed in SECTION 5.6 below.

5.6 Option 5 Total Consolidation

This option would consolidate the operations of the four existing PSAPs into one combined center.

5.6.1 Organization

The organization would be combined into one joint operation. The recommended structure would involve the development of a thirteen position dispatch center.

Eleven positions would be needed immediately with space for two additional positions set aside for future growth. All of the positions would be fully capable of performing all of the functions.

In addition to the dispatch positions, there will be a need for five full-time administrative staff. The management staff includes a center manager, an operations manager, a training manager, an administrative assistant, and a technical support coordinator.

5.6.2 Staffing Requirements

The staffing needed each day including these positions then becomes:

- Day Shift 7
- Afternoon Shift 9
- Night Shift 6

In order to staff the twenty-two shifts every day, a total of thirty-eight full-time telecommunicators and supervisors will be needed. One of the nine people on duty in the communications center should be a shift supervisor in order to facilitate the smooth running of the operations. TABLE 5-4 displays the estimated staffing. The five administrative positions are included.

TABLE 5-5 OPTION 5 ESTIMATED STAFFING

	Full Consolidation		Total Staff	
	On-Duty	Total	On-Duty	Total
Manager		1		1
Operations Manager		1		1
Training Manager		1		1
Tech Support Coordinator		1		1
Admin Assistant		1		1
Sub-Total		5		5

	Full Consolidation		Total Staff	
	On-Duty	Total	On-Duty	Total
Shift Supervisors	1	5	1	5
Telecommunicators	6-8	38	6-8	38
Sub-Total (FTE)	7-11	43	7-11	43
Total	**7-11**	**48**	**7-11**	**48**

5.6.3 Technology

Consolidation will enable an easier transition to future dispatch improvements and requirements.

- CAD

  A new CAD is recommended for this center. Davenport's CAD/RMS system is obsolete and needs replacement. The Cody System used by Scott County and Bettendorf may be suitable for use, but significant enhancements would be required in order to meet the increased demands. New servers would be needed to meet the increased demand and software licenses will be required for the center in addition to the ones currently in use. MED-COM's CAD is designed for EMS use. An interface between the new CAD and MED-COM's system would be provided to facilitate the additional functions that MED-Com provides, specifically billing. An interface should also be provided to the existing RMS systems at Bettendorf and Scott County. Functional specifications need to be developed to define the capability and capacity needed.

- 911 Equipment

  As noted above, while the ANI/ALI controller is the current model being sold and supported by the vendor, the instruments at the dispatch positions are at the end of their lifecycle. Consolidation would provide the opportunity to install a new 911 system with the most current technology.

The 911 equipment would need to be sized for the center and made adaptable to manage not only wireline and wireless 911 calls, but also VOIP 911 calls.

- Consoles

A new console system would be needed assuming that the existing Scott County Dispatch Center is left intact to serve as a back-up to the consolidated center. Modern communications console systems use centralized electronics, usually located in the equipment room and computer-based workstations at each operating position.
The centralized electronics provide flexibility to reconfigure and adapt to changing needs with minimal disruption of on-going operations.

5.6.4 Space

A center this size would require more space than is available at any of the study participants' current facility. As noted above eleven positions would be required immediately, with space allocated for the addition of two additional workstations in the future. A thirteen position dispatch center would require approximately 5,300 square feet of space along with raised flooring, redundant routing for 911 and emergency telephone circuits, and back-up power supplies and HVAC systems. The space would be allocated as follows:

Dispatch Center (13 positions)	3,700 square feet
Equipment Room	600 square feet
Administrative Space	1,000 square feet

If the facility were not located in an existing building, additional space will be needed for staff support (locker rooms, break room, etc.) and for building services and systems (HVAC, etc.). CTA estimates that a approximately 7,800 square feet of space would be required for a stand-alone facility.

There has also been discussion of co-locating the Emergency Operating Center with the Emergency Communications Center. This would involve the provision of a large room, which could also be used for training and meetings.

The requirements for the Emergency Operating Center and other potential co-located functions are discussed in SECTION 5.6 below.

5.7 Emergency Operating Center and Warrants

The current Scott County Emergency Operating Center (EOC) is located in the Sheriff's Office adjacent to the dispatch center. There is limited space available. The space designated for the operations room is a shared conference room that does not provide adequate space for the personnel needed during an emergency. There has been discussion about co-locating the EOC with the combined ECC. Both functions require space that provides sustainability, security, and survivability in case of emergency. For the most part, the space requirements for the EOC would be multi-purpose space. The operations center would be useable as a training room when the EOC was not activated. Conference rooms would serve both agencies. The staff support facilities (restrooms, kitchen, etc.) needed for the ECC would generally be adequate for use by the EOC staff when the EOC is activated. The exclusive space needs for the Emergency Management Agency would be office space for the Coordinator and a communications room for use by the amateur radio operators used to support emergency operations. CTA recommends that the amateur radio equipment be separated from the ECC so that communications in a difficult period of time is not compromised. The co-location of the EOC with a consolidated EOC will result in improved coordination of emergency response efforts while minimizing the costs. CTA estimates that approximately 1,500 to 2,000 square feet of space would be required for the EOC functions in addition to the space provided for the consolidated ECC.

As noted in SECTION 2 of this report, the handling of warrants has become a significant issue among the law enforcement agencies in Scott County. Based on a February 17, 2006 conference call, space should be provided in a consolidated center for a central warrants squad. This squad would consist of existing officers from each law enforcement agency and clerical support staff. There would be three to four officers and two-three clerical staff. Significant file space would be required. It is estimated that sixteen lateral files would be needed. Approximately 750 to 800 square feet would be needed to add a centralized warrants function to the facility.

6.0 OPINION OF PROBABLE COSTS

Estimates were developed for the major categories of equipment as they apply to the general design for the four consolidation scenarios that are described in this study. The cost information is obtained from historical CTA cost files and vendor pricing of comparable projects. The various costs are compared and weighted in order to derive an average type of estimate. Estimates reflect expected pricing. The prices are recommended for planning and budgetary purposes. Although CTA cannot guarantee price levels, successful competitive bidding typically results in savings on the list price costs.

As we collected data for this study, it became readily apparent that there were differences in budgetary format between each of the governmental entities and MEDIC-EMS. For example, the Davenport Police Department budget did not specifically separate the dispatch costs from the rest of the budget while the Scott County Sheriff's budget combines the communications and records functions. MEDIC-EMS distributes utility costs to the various cost centers including MED-COM; none of the other agencies do that. With the cooperation of the staffs of the participating governmental entities, we have attempted to establish comparable expenditures for each entity in order to delineate the current cost of the dispatch function for comparison purposes. CTA Communications expresses its appreciation for the efforts of all involved in arriving at these common expenditures.

6.1 Current Expenditures

The current authorized budgets for all four entities for the 2005-2006 Fiscal Year total $3,695,568.00. The expenditures are categorized as follows:

Personnel Services	$3,388,631	92%
Maintenance & Operations	$ 306,937	9%
Capital Expenditure	$ 0	
Total	$3,695,568	

6.2 Option 1 – No Consolidation

6.2.1 Staffing

As noted in SECTION 5 of this report, there is a critical need for additional staff in the Davenport. CTA Communications recommends that, if consolidation does not occur, a shift supervisor/lead dispatcher position be created and that a minimum of three persons be on duty in the dispatch center at all times. One of those three should be a shift supervisor. In order to cover days off, vacations and other paid time off, a total of five people are needed to fill one position twenty-four hours a day, seven days a week. Adding the five shift supervisors would add an estimated $495,085 to the current expenditures. The estimated staffing costs will be $3,883,716.

6.2.2 Maintenance and Operations

The expenditure category includes office supplies, training and travel, equipment repair, telephone, and similar non-capital expenditures. For planning purposes, we estimate the cost if no consolidation occurs to be the same as shown above $306,937.

6.2.3 CAD/RMS

Should consolidation not occur, Bettendorf, Scott County and MEDIC-EMS could continue to use their existing computer systems. A new CAD/RMS system would be required for the City of Davenport. The estimated cost of a system to serve Davenport only is $700,000.

6.2.4 911 Equipment

New 911 Customer Premises Equipment (CPE) would be required for the City of Davenport. Scott County and Bettendorf would continue to use their existing CPE. The estimated cost of new 911 CPE for the City of Davenport only is $300,000.

6.2.5 Consoles and Furniture

New consoles and workstation furniture will be needed for the City of Davenport. The estimated cost of the new console system for the City of Davenport is $200,000.

6.2.6 Space

As noted in SECTION 5 of this report, a five position dispatch center would require approximately 3,500 square feet of space if the center is not located in an existing facility. The estimated cost of constructing a suitable building should be estimated at $1,050,000. This does not include any costs for obtaining the land or any zoning or other permit requirements.

6.2.7 Total

This brings the estimate of probable costs for the first year of operation to $6,440,653 if no consolidation takes place.

6.3 Option 2 Consolidate Davenport and Scott County

6.3.1 Staffing

The estimated yearly personnel costs will be $3,556.898 for the consolidated center.

6.3.2 Maintenance and Operations

Estimated maintenance and operations costs for the combined center will be $306,937.

6.3.3 CAD/RMS

A CAD/RMS product suitable for this sized organization is estimated to cost $1,002,250.

6.3.4 911 Equipment

A new 911 switch and answering position units should be estimated at $383,830.

6.3.5 Consoles and Furniture

Full-featured dispatch workstation furniture will cost approximately $97,100 and the new console system will cost $531,000.

6.3.6 Space

The estimated cost of constructing and furnishing a suitable building for a center of this size is $2,160,000. This does not include any costs for obtaining the land or any zoning or other permit requirements.

6.3.7 Total

The estimate of probable costs for the consolidated center is $6,776,755 for the first year of operation. In addition to the consolidated dispatch costs, Bettendorf and MEDIC would also spend a total of $1,218,914. This would bring the total cost of dispatch operations to $8,038,015.

6.4 Option 3 Consolidate Davenport, Bettendorf, and Scott County

6.4.1 Staffing

The estimated yearly personnel expenses will be $3,237,307.

6.4.2 Maintenance and Operations

Estimated maintenance and operations costs for the combined center will be $306,937.

6.4.3 CAD/RMS

A CAD/RMS product suitable for this sized organization is estimated to cost $1,027,475.

6.4.4 911 Equipment

A new 911 switch and answering position units should be estimated at $397,213.

6.4.5 Consoles and Furniture

Full-featured dispatch workstation furniture will cost approximately $109,310 and the new console system will cost $554,200.

6.4.6 Space

The estimated cost of constructing and furnishing a suitable building for a center of this size is $2,160,000. This does not include any costs for obtaining the land or any zoning or other permit requirements.

6.4.7 Total

The estimate of probable costs for the consolidated center is $7,387,145 for the first year of operation. In addition to the consolidated dispatch costs, MEDIC would also spend a total of $585,297. This would bring the total cost of dispatch operations to $7,972,442.

6.5 Option 4 Consolidate Davenport, Scott County, and MEDIC

6.5.1 Staffing

The estimated yearly personnel expenses will be $3,287,701.

6.5.2 Maintenance and Operations

Estimated maintenance and operations costs for the combined center will be $347,898.00.

6.5.3 CAD/RMS

A CAD/RMS product suitable for this sized organization is estimated to cost $1,002,250.

6.5.4 911 Equipment

A new 911 switch and answering position units should be estimated at $383,830.

6.5.5 Consoles and Furniture

Full-featured dispatch workstation furniture will cost approximately $97,100and the new console system will cost $531,000.

6.5.6 Space

The estimated cost of constructing and furnishing a suitable building for a center of this size is $2,160,000. This does not include any costs for obtaining the land or any zoning or other permit requirements.

6.5.7 Total

The estimate of probable costs for the consolidated center is $7,133,816 for the first year of operation. In addition to the consolidated dispatch costs, Bettendorf would also spend a total of $675,963. This would bring the total cost of dispatch operations to $7,809,779.

6.6 Option 5 Full Consolidation

6.6.1 Staffing

The estimated yearly personnel expenses will be $2,943,034.

6.6.2 Maintenance and Operations

Estimated maintenance and operations costs for the combined center will be $347,898.

6.6.3 CAD/RMS

A CAD/RMS product suitable for this sized organization is estimated to cost $1,027,475.

6.6.4 911 Equipment

A new 911 switch and answering position units should be estimated at $397,213.

6.6.5 Consoles and Furniture

Full-featured dispatch workstation furniture will cost approximately $109,310 and the new console system will cost $554,200.

6.6.6 Space

The estimated cost of constructing and furnishing a suitable building for a center of this size is $2,340,000. This does not include any costs for obtaining the land or any zoning or other permit requirements. Both the City of Davenport and Scott County have indicated that there is suitable City or County owned land available for a consolidated dispatch center to be constructed on.

6.6.7 Total

The estimate of probable costs for the consolidated center is $7,719,130 for the first year of operation.

TABLE 6-1
COST COMPARISON

	Current	No Consolidation	Davenport-Scott County	Davenport-Scott County-Bettendorf	Davenport-Scott County-MEDIC	Full Consolidation
Salaries & Wages	$ 2,299,547	$ 2,638,609	$ 2,374,034	$ 2,168,467	$ 2,170,027	$ 1,947,284
Overtime	$ 168,821	$ 168,821	$ 164,346	$ 142,346	$ 122,000	$ 100,000
Employee Benefits	$ 920,263	$ 1,076,286	$ 1,018,517	$ 926,495	$ 995,674	$ 895,750
Total Personnel Costs	$ 3,388,631	$ 3,883,716	$ 3,556,898	$ 3,237,307	$ 3,287,701	$ 2,943,034
Operational Expenses	$ 306,937	$ 306,937	$ 306,937	$ 306,937	$ 347,898	$ 347,898
Operating Budget	$ 3,695,568	$ 4,190,653	$ 3,863,835	$ 3,544,244	$ 3,635,599	$ 3,290,932
Capital Outlay		$ 2,250,000	$ 4,174,180	$ 4,428,198	$ 4,174,180	$ 4,428,198
Total Costs	$ 3,695,568	$ 6,440,653	$ 8,038,015	$ 7,972,442	$ 7,809,779	$ 7,719,130
# Full Time Dispatch Employees	53	58	55	53	52	48
#Part Time Dispatch Employees	8	8	8	7	2	0
On duty staff	10	10	11-13	9-12	9-10	7-11

7.0 CONCLUSIONS AND RECOMMENDATIONS

As has been described in the preceding sections, the participants in this study are facing complex decisions as to how to proceed with their public safety dispatching operations. During the course of this study, we examined several different alternatives. This section of the report is designed to answer the following questions:

- How would a consolidation take place and provide improved service?
- How should it be organized and staffed?
- What services should it perform?
- How should policies be made and changed?
- How should it be funded?
- With consolidation, what communications changes or improvements should be made in order to support the operations better than provided today?
- Develop Operational Modes for a Consolidated Center.
- Develop a Governing Structure for a Consolidated Center.
- Identify Funding Options and Develop Operating Budget for a Consolidated Center.

7.1 Creating a Shared Emergency Communications Center

A public safety Emergency Communications Center (ECC) functions both as the interface between the public and the public safety agencies of the community, and provides coordination and support to those public safety agencies. An important part of the coordination and support that an ECC provides to a given public safety agency is coordination with other agencies and responders. Any situation requiring more than one public safety responder requires coordination. That is true whether the responders are from the same or different agencies. More responders require more coordination. Coordination cannot occur without communication. Bringing the four existing communications centers into the same room will result in significant enhancements to the interagency coordination that is required when more than one agency is responding to an emergency.

A shared communications center, with proper implementation, also offers significant service improvements to all of the participants.

By establishing high standards of performance and then consistently assuring that those standards of service are achieved and the center is properly organized, adequately staffed, responsive to the public safety providers and citizens, and well managed, the service level provided to all of the citizens of Scott County will be equal to or better than the highest levels provided now. The goal must be the creation of an efficient, customer-friendly organization.

The improved level of service can be achieved at a significant cost savings, especially in personnel costs. In addition, new financing methods, available to the shared center will significantly reduce the financial burden of providing the current operations on the general funds of the participating entities.

Improved efficiency and effectiveness will be two additional benefits of a shared communications center. With limited exception, any emergency incident involving a medical response currently requires the involvement of at least two communications centers. Because of the lack of interoperability between the existing computer aided dispatch systems, the 9-1-1 caller must repeat the information multiple times or information must be relayed verbally from one dispatch center to another. Not only does that increase the time it takes to get help to the scene, the accuracy and reliability of the information suffers every time it must be repeated. A shared ECC will allow for more efficient use of staff as well as improved technology.

A shared ECC will also allow improved, specialized support. Currently, support of the various systems used in the four centers is provided by a number of individuals in each of the entities. The dispatch support duties are only part of each of their duties. The same is true for training and quality assurance. Staffing of the shared ECC will allow for the provision of full-time systems support as well as full-time training and quality assurance management.

CTA Communications recommends that a shared emergency communications center be created. Participants in the shared center should include:

- The City of Davenport
- The City of Bettendorf
- The Scott County Sheriff's Office
- MEDIC-EMS

7.2 Consolidation or Co-location

No two public safety agencies are identical. This is true not just in the Quad Cities, but nationwide and worldwide. While there are many similarities, each agency has evolved based on its own local situation. There are many factors that have contributed to the current state of each agency. The creation of a shared emergency communications center will result in significant changes in the operations of each of the participating public safety agencies. It is critically important that the process of creating the shared center be focused on making positive improvements to all aspects of the delivery of public safety services to all of the citizens and visitors of Scott County, Davenport, and Bettendorf.

One of the first issues that must be resolved is the structure of the shared center. There are two underlying structures for a shared center. The first is a consolidated center, where a single agency provides the dispatch services for all of the participating agencies. The second involves co-location of dispatch centers. Each co-located center operates independently of the other co-located centers. Facilities are shared, but operations are separate. There are advantages and disadvantages to each form.

A consolidated center offers the following advantages and disadvantages:

Advantages	Disadvantages
Single Agency	Major Organizational Restructuring
Reduced management costs	Loss of Agency Identity
Reduced employment competition	Loss of Agency Control
More flexible use of staff	Multi-agency management
More efficient use of technology	Loss of non-dispatch functions

A co-located center offers the following advantages and disadvantages:

Advantages	Disadvantages
Maintain agency control	Differences in policies/procedures
Improved Operational Awareness	Competition for employees
Least disruptive	Greater facility requirements
Maintain agency identity	No service delivery improvement
	Greater management overhead

Three of the dispatch centers in Scott County are part of a government agency. The fourth is a non-profit entity. While that in and of itself does not present insurmountable obstacles to consolidation, there are other factors that should be considered. The three governmental PSAPs provide service to law enforcement and fire agencies. While there are variations in how the services are provided, there is a great deal of commonality in the services provided between the three governmental PSAPs. MED-COM only serves emergency medical agencies. In addition, MED-COM provides service outside the boundaries of Scott County.

While there currently are significant differences in the volume of activity handled and the level of service provided between the three governmental PSAPs, there is sufficient commonality so that consolidation is feasible. There is also sufficient commonality of function between MED-COM and the governmental entities that consolidation is also feasible eventually.

Because of the differences between all four entities, CTA Communications recommends that initially the Cities of Davenport and Bettendorf along with Scott County consolidate their public safety dispatch operations as soon as a suitable facility is ready and equipped. We further recommend that initially, MED-COM be co-located with the consolidated PSAP and then, as soon as feasible, MED-COM's operations be consolidated with the governmental PSAP. It is anticipated that the full consolidation would occur in eighteen to twenty-four months after the initial consolidation. Our reason for recommending the phased approach with MED-COM is based not only on the differences in operations, but also because of the difference in training between the other PSAPs and MED-COM.

We feel that the phased approach will more adequately allow for the dispatch personnel to absorb the new training and procedures. Our concern is that if all four PSAPs are consolidated at one time, it will be extremely stressful and challenging for those involved. A more incremental approach will be easier to manage. Since MED-COM and Scott County are the only two agencies that provide emergency medical dispatch with pre-arrival instructions, all of the employees transferring from the other two centers will need to be trained. MED-COM employees are not trained in dispatching police and fire, nor are they trained and certified in IOWA/NCIC operations. Phasing in the consolidation will allow for a smoother transition. However, we do feel it is critically important that MED-COM's operations be co-located at the PSAP from the day the doors open.

7.3 Governance

There are a number of models for the governance of a consolidated center. One possibility is for one of the existing agencies to absorb the dispatch operations of the other participants. Another model would be for three of the agencies to contract with the fourth agency. We do not believe either of these models is appropriate for use in Scott County at this time. The model that makes the most sense is to create an independent authority focused on the provision of public safety communications services through a joint powers agreement under Chapter 28E of the Iowa Code. The separate entity has been the model of choice in most successful consolidations that we have studied.

CTA Communications recommends a two tiered governance structure be established.

7.4 Board of Directors

The Board of Directors for the dispatch entity should be composed of seven members. The following elected officials should serve as members of the Board of Directors: Mayor and one alderman from the City of Davenport; Mayor, City of Bettendorf; Chairman, Scott County Board of Supervisors; One Mayor representing the other communities in Scott County; one member of the MEDIC-EMS Board of Directors, and one citizen representative appointed jointly by Davenport, Bettendorf, and Scott County. The MEDIC_EMS representative should be a member of the MEDIC board who does not represent a public agency. The Davenport City Administrator, the Bettendorf City Administrator, the Scott County Administrator and the Executive Director of MEDIC-EMS should be ex-officio members of the Board of Directors. This board should be the general policy making authority for the dispatch operations. Its functions should include:

- Entering into contracts
- Acquiring, holding, or disposing of property
- Approval of dispatch annual budget and expenditures
- Hiring, employing and terminating dispatch management staff
- Adopt and revise bylaws for its operation as well as the operation of the user advisory committee

7.4.1 User Advisory Committee

The second board that should be created is the User Advisory Committee. The User Advisory Committee should consist of representatives of the agencies served. CTA Communications recommends that the User Advisory Committee include the following:

- Davenport Police Chief
- Davenport Fire Chief
- Bettendorf Police Chief
- Bettendorf Fire Chief
- Scott County Sheriff
- MEDIC-EMS Representative
- Outlying police agency representative
- Volunteer fire department representative

The function of the User Advisory Committee is to provide guidance and input to the Board of Directors and the Emergency Communications Center Director on operational and other appropriate issues. It is envisioned that the User Advisory Committee would work with the Emergency Communications Center Director to develop appropriate standards and procedures concerning ECC performance, personnel selection and training, and other technical and operational issues as directed by the ECC Board of Directors.

7.4.2 Emergency Communications Center Director

The Board should appoint the Director of Communications. The Director should be responsible for many of the above duties initially established for the Board. For purposes of efficiency and consistency in management, many of the duties outlined to the Board should be delegated to the Director. However, the Board should reserve the right of appellant review and oversight.

The Director should be subject to the following standards:

- The Director should be responsible for managing the day-to-day operations of the center. The bylaws written by the Board should outline the powers bestowed upon the Director.

- Those powers should include, but not be limited to, the rights to hire, terminate, discipline, and manage personnel. However, the Board should reserve the right of review to overrule a decision by the Director for serious personnel actions.

- The bylaws should specify when the Director may be involuntarily dismissed.

7.4.3 Standard Operating Procedures

The rules governing the ECC should be laid out in a set of Standard Operating Procedures (SOP). The ECC Director and the User Advisory Committee should develop the SOP jointly. The SOP should be subordinate to any contradictory local ordinance, Scott County Codes, Iowa Statutes, the Board bylaws or any current labor agreement or one subsequently adopted. The Commission on Accreditation of Law Enforcement Agencies (CALEA) in conjunction with the Association of Public Safety Communications Officials (APCO) has developed an accreditation program for communications centers. Two hundred sixteen standards have been developed as a part of the program. These standards are organized into six topic areas:

- Organization
- Direction and Authority
- Human Resources
- Recruitment and Selection
- Training
- Operations

The standards represent the best professional requirements and practices and describe what the agency should be doing, not how they should be doing it. While we recommend that the ECC pursue CALEA Communications Center Accreditation, the standards are a useful guide to the establishment of policies and procedures regardless of whether accreditation is sought or not.

7.5 Staffing Requirements and Personnel Issues

7.5.1 Administrative Staff

The ECC Director should have an administrative staff to help manage the centers. The administrative staff should consist of an Operations Manager, a Training and Quality Assurance Manager, a Technical Support Coordinator, and an Administrative Assistant.

7.5.2 Operations Staff

As discussed in SECTION 5 of this report, CTA Communications recommends that there be a Shift Supervisor/Lead Dispatcher on duty in the ECC twenty-four hours a day. The shift supervisors would be experienced staff who would be available to provide assistance and support to the staff in the event of questions as well as assure the smooth running of the ECC on an around-the clock basis.

The Director should develop standard operating procedures that ensure sufficient answering of incoming emergency calls. During peak periods of the day, staff at the communication centers should strive to answer at least 95% of incoming emergency calls within two or three rings (fifteen seconds) and 95% of emergency dispatching within sixty seconds.

The average number of 911 calls per month is 12,000 for the three primary PSAPS. The centers currently handle an additional 26,000 other 7-digit telephone calls each month.

Adequate staffing, as determined by the board and Director, should be provided to ensure that those calls are answered in a timely fashion. We recommend a total of thirty-eight full-time dispatchers and five shift supervisors be hired in order to adequately staff the center.

In addition to the dispatch staff, CTA Communications recommends that three warrant clerks be hired to staff the warrant section as discussed in SECTION 7.9.

7.5.3 Personnel Issues

Displacement Concerns

In response to concerns expressed by current dispatchers about their future employment, it can be presumed that many of them will have the opportunity to transfer to the new organization. In addition, there will be a need for some positions at the employees' current departments. The Davenport and Bettendorf City councils, the Scott County Board of Supervisors and the MEDIC-EMS Board has repeatedly issued assurances that all dispatch employees at the time of the consolidation will be offered employment at the new center. This will be true even if the consolidation with MED-COM occurs later than the consolidation of the governmental PSAPs. Each of the legislative bodies has made this commitment to officer employment in writing.

Rehiring & Seniority

The ECC Director should be responsible for hiring the staff. The Director should give preference to dispatchers currently working in the region. The standards for hiring new personnel will be set out in the directives that govern the communication centers. The board should decide compensation for the staff.

Tenure and seniority for dispatchers who have been displaced by the reorganization of a central communications center should remain (e.g., a dispatcher with 10 years of service at a particular department, should maintain his or her 10 years of service at a new center).

Existing dispatch employees of the involved agencies at the time of consolidation will also have the opportunity to apply for a position within their existing entity depending on their qualifications. The salary and benefits will be determined by the position the individual applies for.

Compensation & Benefits

There should be one compensation and benefits package. The package should be equal to the Scott County Non-Union plan. The compensation package should include health and retirement benefits. During the transition, it is anticipated that no employees would be forced to take a pay cut. Those employees whose pay rate is above the adopted pay plan would remain at their existing rate until such time as the new pay plan rate equaled the employee's existing rate. Based on our review in October 2005, there was not a great deal of variance between the three governmental agencies pay rates for dispatchers, particularly at the upper end of the pay scale.

7.6 Finance

Currently, the three government entities fund their respective public safety dispatch operations through their law enforcement agencies budget. The funds come from the agencies general fund. Most of the general fund revenue comes from property taxes. The Iowa Legislature severely impacted the ability of cities, such as Davenport, to raise revenue through taxes. It set a cap of $8.10 per $1,000 of assessed valuation and rolled back the assessed value to be a greatly reduced percentage of the actual value of residence. Davenport is the most severely impacted of the entities involved in this study.

Scott County is the only county in Iowa that does not levy a wireline 911 surcharge. There is some interest in implementing such a charge.

However, the number of wireline phone lines is decreasing. Iowa law prescribes that the surcharge must be approved by a referendum. There is a $1.00 per access line cap on the surcharge. By referendum, the surcharge could be raised to $2.50 per line per month for a period of time not to exceed twenty-four months. 911 funds may not be used to fund personnel costs, except for the personnel directly involved in 911 database management and addressing. 911 funds may be used for the purchase of some radio and other communications equipment. At the time of this study, there were 86,815 access lines in Scott County. If the $2.50 per month surcharge were approved, the surcharge would provide $2,604,450 per year for the first two years. The $1.00 per month surcharge would result in revenues of $1,041,780.

Under Chapter 29C of the *Code of Iowa*, the County Board of Supervisors has the ability to create a "Local Emergency Management Fund" and fund it through a special levy. That levy is not subject to any of the caps on taxes. The local emergency management fund could be used to fund the costs of the consolidated dispatch if the dispatch were part of the Emergency Management Agency.

The City of Davenport is classified as a "Charter City" and has the ability to finance capital improvements through the sale of bonds authorized by the City Council.

MED-COM receives approximately $120,000 in fees from Illini Ambulance and MED-Force. The remaining costs of operating MED-COM come from MEDIC-EMS. We would anticipate that the arrangement would continue as is during the time that MED-COM is co-located with the new ECC. For planning purposes, we anticipate that the provision of services to Illini Ambulance and MED-FORCE would continue after MED-COM consolidates with the new ECC.

CTA Communications recommends that the initial costs for constructing and equipping the new ECC be funded by bonds issues by the City of Davenport. The bonds would be paid off through the operating budget of the new ECC. We recommend that the operating budget be financed through the "Local Emergency Management Fund". A suggested operating budget is attached in APPENDIX A of this report. The budget shows anticipated expenditures for the next twenty years. Over the twenty year time frame, we estimate that a total savings of $4,651,320 can be realized.

We also recommend that at the appropriate time, the voters be given the alternative of implementing the 911 surcharge in return for a corresponding reduction in the levy for the Local Emergency Management Fund.

7.6.1 Facility

As part of our efforts on this project, CTA reviewed the suitability of the Scott County Sheriff's Annex for use for the new consolidated emergency communications center. The City of Davenport has also indicated that City owned property at 46th and Tremont could be used as an alternative to the Sheriff's Annex. This property is immediately adjacent to the Sheriff's Annex. We do have several concerns about the location of either site. These include the proximity of the railroad tracks and the Air Product's facility as well as the relationship of the Tremont location to the runways at the Davenport Municipal Airport. Each of those factors provides a risk.

We do feel that steps can be taken to mitigate those risks. We have more serious concerns about the proposed hardening of the existing Sheriff's Annex building.

It was suggested that the existing pre-engineered metal building could be "hardened" and used to house the new ECC. The adapted reuse of an existing pre-engineered metal building for use as Emergency Communication Center and Emergency Operations Center is not recommended because the mitigation steps necessary to "harden" the existing space would not be cost-effective.

The controlling factor in this decision is the ability for the structure to resist wind loads. Most pre-engineered metal buildings are designed close to the minimum code requirements for uses such as warehouses or manufacturing.

At a minimum, the building would need to meet the building code requirements for "Essential Facilities" which requires the building resist higher loads from wind, snow, and earthquakes. Snow loads are 20 percent greater, seismic loads are 50 percent greater, and wind loads are 15 percent greater or winds of about 104 miles per hour. The building's framing and siding may be able to be modified to meet the snow and wind loads. The effect of the increased seismic load is very site specific and could require a new foundation system. To determine if the building could be modified to meet these requirements an in depth structural analysis would have to be performed.

The building must remain operational so it is recommended that it be designed to resist tornados. FEMA 361, Design and Construction Guidance for Community Shelters, recommends that a building in Scott County be designed to resist 250 mph winds. To resist these winds a large foundation or pile system would be required to keep the building on the ground. The walls would have to be concrete or fully reinforced masonry. The roof deck would need to be constructed of concrete. All of the doors and windows would have to be designed to pass wind pressures and debris impact tests for tornados. If the building is used, a two hour CMU fire wall would have to be constructed to separate the ECC and EOC from the adjacent uses and provide a security barrier. All of the doors would have to be fire rated.

We do feel that there is enough space available on the site to locate a properly constructed ECC behind the existing building or on the City DPW property.

This may provide the ability to tie into some of the existing building support systems, but still provide the needed resiliency. Extra site security measures, such as fencing, would have to be taken to protect the staff and the infrastructure such as generators and chillers from the adjacent inmate population.

In our interview and survey process, interest was expressed in co-locating the County's Emergency Operations Center with the new facility. There are significant advantages to co-locating the facilities. Both functions require the same type of flexible space that can meet a variety of needs. Both require sustainability and survivability- the ability to both sustain the effectives of a potential disaster and continue operations for an extended period of time without interruption and potentially isolated from commercial utility sources. The shared use of the space will allow both functions to have improved facilities and reduced costs. The operations area can function as a training room for the ECC. Conference rooms can serve both agencies. The support facilities (restrooms, break rooms, etc.) can be used by both, and so forth. CTA Communications recommends that the ECC and EOC be co-located.

The design of Emergency Communications Centers and Emergency Operating Centers is a specialized field. Most architectural and engineering firms are not familiar with the unique requirements for a fully functioning ECC. We recommend that Scott County engage the services of an Architectural and Engineering firm specializing in ECC/EOC design early in the design process.

7.7 Equipment

The five major equipment systems in a modern emergency communications center include the 911 system, the Computer Aided Dispatch (CAD)/Records Management System (RMS), the radio consoles, the logging recorder, and the workstation furniture. The following contains CTA's recommendations for each of these key items:

7.7.1 911 Customer Premises Equipment

Consolidation would provide the opportunity to install a new 911 system with the most current technology. The 911 equipment would need to be sized for the center and made adaptable to manage not only wireline and wireless 911 calls, but also VoIP 911 calls. Integrating the 911 system with computer based telephony provides significant benefits to the system. These benefits include:

- Increased flexibility – features and functions can be added or changed as needed much more easily than with the traditional key system phones. This is critical as the system changes over time.
- Improved efficiency – Computer based telephones provided more information in a better organized display making the staff more efficient.
- Improved Space Utilization – Generally, computer based systems use less desk space than the large key system units. With the use of LCD based display screens for 911, CAD, and radio consoles located on modern dispatch workstation furniture, the telecommunicators can operate much more effectively.
- Easier Integration – Most of the systems used in a modern emergency communications center are computer based. The ability to transfer data from one system to another, while still challenging, is much easier when all of the systems are computer based.

7.7.2 Computer Aided Dispatch/Records Management

A new CAD is recommended for this center. Functional specifications need to be developed to define the capability and capacity needed.

Since significant history exists in the systems currently in use, provisions must be included to either convert that data to run on the new system or to provide interfaces to the current systems so that history is not lost. CTA recommends that specifications be developed for the new CAD system. These specifications should focus on the functionality as it pertains to dispatch operations. As noted in SECTION 3 of this report, common CAD functions include:

- Event Entry
- Event Prioritization
- Unit Recommendation for Assignment to Calls
- Time-stamping
- Address Verification
- Unit Status Monitoring/Recording
- Alert Timers
- Call History
- 911 Interface
- Paging Interface
- Radio System Interface
- Mobile Data Interface
- Mapping System Interface

These are just a few of the more common features and functions of a modern CAD system. It is important during the procurement to define what functions and features are required. As prospective systems are reviewed, there needs to be appropriate assurances that the system will have adequate capacity to handle the anticipated workload. This should not be just the normal workload, but must focus on estimated peak workloads. What happens when a major event adds extra units to the system? What happens when an unusual occurrence results in a call volume several times large than the normal call volume? Does the system have sufficient capacity to handle the demand?

7.7.3 Radio Consoles

The radio console serves as the interface between the telecommunicator or dispatcher and the radio system. As with the other systems in the ECC, radio consoles are increasingly computer-based. The use of computer based radio consoles provides the same benefits as noted under the 911 systems.

With the use of trunked radio systems, care must be taken to assure that the radio consoles will work with the radio systems in use. With the current arrangement used by the RACOM Network, this is not as significant an issue as it would be if the consoles were directly connected to the system controller instead of using control stations. We recommend that new, compatible consoles be purchased and installed in the new ECC.

7.7.4 Logging Recorder

In recent years the technology used in recording the telephone and radio traffic in dispatch centers has also changed significantly. Digital Voice Recorders, using computer based system are the standard in the industry.

A new digital voice recording system with sufficient capacity to record and store the appropriate radio and telephone messages will be needed. There are a number of vendors who offer suitable equipment. We recommend that specifications be developed to obtain a new recording system.

7.7.5 Dispatch Workstation Furniture

As with the evolution of the various systems used in the Emergency Communications Centers, significant changes have occurred in the furniture used in the dispatch center. Gone is the traditional desk with radios sitting on top. Gone too are the massive metal cabinets replete with switches and buttons. Now the typical dispatch position is equipped with multiple large monitors, multiple keyboards, and multiple computer mice. Each workstation typically has three or more personal computers. Cable management is a significant issue. Electrical requirements are extensive. Heat dissipation has significant impact on the heating ventilating, and cooling systems. These changes have lead to a redefinition of the workstation.

The change in the way work is done, has also led to increased attention to ergonomics or human factors engineering. Most dispatch workstation furniture is user adjustable to accommodate the differences in sizes of the personnel using it. In addition, the workstations must be capable of withstanding the around the clock usage by a variety of users. Experience has shown that even top-of-the-line office furniture can not withstand the around-the-clock usage.

CTA Communications recommends that specifications be developed for the purchase of the specialized dispatch workstations.

7.8 Radio System

As described in SECTION 2, there are several different radio systems in use by public safety agencies in Scott County. These systems use three separate frequency bands (VHF, UHF, and 800 MHz) and two different technologies (conventional and trunked). As a result the ability for people from one agency to communicate with people from another agency is frequently challenging. Ideally, all of the agencies would use compatible systems and equipment. There are a number of issues concerning the various radio systems that need a more in depth review than this study permits.

CTA Communications recommends that a Radio System Study of current users of the various systems be undertaken to determine the best course for the future. In the interim, the new ECC must accommodate all of the systems currently used in the four centers.

7.9 Warrants

As noted in SECTION 2 of this report, the handling of warrants has become a significant issue among the law enforcement agencies in Scott County. On February 17, 2006 a conference call was held with the Clerk of the Court, Scott County law enforcement agencies, the Bi-State Regional Commission, and CTA Communications. During the conference call, the Clerk of the Court advised that the Court would accept faxes of the return of service of the warrant initially. In addition, it was agreed that the original warrant would be housed at the combined dispatch center. When a person was arrested on a warrant, a copy of the warrant would be faxed to jail for service on the subject. The original would then be sent via courier during one of the regular trips from Tremont to the Court House and delivered to the clerk. Space should be provided in the new facility for a joint warrant squad, consisting of three or four officers, and up to five clerical staff. Not all clerical positions would be filled immediately. The officers would be existing officers assigned by their respective departments to warrant duty and would not be in addition to current staff. CTA Communications recommends that three warrant clerks be hired initially to provide coverage seven days a week, sixteen hours a day. The clerical duties would include warrant entry, validation, and confirmation and so forth. During the hours the clerk position was not staffed, the dispatch staff would handle any warrant confirmations and related efforts.

7.10 Summary and Timetable

As noted previously, the construction of the new Davenport Police Station with an estimated completion in the second quarter 2007 as well as the continued scarcity of financial resources adds a degree of urgency to the implementation of these recommendations. CTA is pleased to present the following recommended action plan for the implementation of the consolidation.

- Commitment to Consolidate

  As expeditiously as possible, each of the involved governmental bodies as well as the MEDIC-EMS Board of Directors should adopt resolutions committing them to the consolidation. This needs to be completed no later than July 1, 2006. The initial consolidation should include all three governmental PSAPs with MED-COM co-locating in the center. Med-COM's operations should consolidate fully in 18-24 months after the initial start-up of operations of the consolidated center.

- Draft Intergovernmental Agreement

  As soon as the involved entities have committed to the consolidation project, legal counsel for the entities should prepare the intergovernmental agreement and present it for adoption. All involved entities should adopt the agreement no later than October 1, 2006.

- Recruit and hire an Emergency Communications Center Director

  Effective leadership will be extremely critical in the establishment of the consolidated center. There will be much work to be done to prepare for the start-up of operations. It is critical that the director be brought on board as early as possible. In any case, the director needs to be in place no later than January 1, 2007.

- Facility Development

  Typically, the construction of a new public safety communications center takes a minimum of eighteen months from the start of the design phase until the completion of construction. Installation and burn-in of the new equipment adds another forty-five to sixty days on to the substantial completion of construction.

With the completion of the new Davenport Police Station scheduled for mid-2007, it is essential that the selection of an architect/consultant be accomplished as quickly as possible. The design of the facility should begin as soon as the commitment to participate is received from the entities involved. It should begin no later than July 1, 2006. As noted above, the design of public safety communications centers and emergency operations centers is a specialized field. It is important to the success of this that a firm with the appropriate experience be selected. Even with an expedited schedule, it is unrealistic to assume that the consolidated center could become operational before the first or second quarter 2008.

- Complete a detailed needs assessment of the land mobile radio system for all public safety agencies in Scott County. As noted previously, the public safety agencies communicate on three different frequency bands and use multiple incompatible technologies. This study did not look at the radio systems in detail. In order to make an informed decision, we urge the community to undertake a detailed study.

  This study should be completed by December 31, 2006. Should the study result in a decision to implement a new radio system, it would be beneficial to make the procurement decisions on the system in conjunction with the purchase of the new radio console system for the consolidated center. If the console system is purchased and then a new radio system that uses incompatible technology is chosen, the $663,510 console system might become useless before its time to be replaced.

- Begin the procurement process for new 911 CPE, a new CAD system, radio consoles, and specialty furniture in a timely manner to allow the installation as soon as the new dispatch facility is substantially completed. Detailed functional specifications, based on the specific needs of the user agencies, will need to be developed, requests for proposals issued, proposals received and reviewed, negotiations conducted with the successful respondents, and the system implemented in close coordination with the building schedule. In order to achieve the coordination, the procurement process for this specialized equipment should begin shortly after the building contractor is selected.

- Develop ballot proposal for the wireline surcharge to relieve some of the need to collect the full amount of the Local Emergency Management Fund. As noted above, the surcharge could generate over $2,000,000 for the first two years and then $1,000,000 per year after that based on the number of access lines currently in use.

APPENDIX A BUDGETING

APPENDIX A - BUDGET

	Current	2008	2009	2010	2011	2012	2013	2014
Salaries & Wages	$ 2,299,547	$2,103,067	$2,187,189	$2,274,677	$2,365,664	$2,460,291	$2,558,702	$2,661,050
Overtime	$ 168,821	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000
Employee Benefits	$ 920,263	$940,538	$978,159	$1,017,285	$1,057,977	$1,100,296	$1,144,308	$1,190,080
Total Personnel Costs	$ 3,346,285	$3,145,612	$3,267,357	$3,393,972	$3,525,652	$3,662,598	$3,805,023	$3,953,144
Operational Expenses	$ 306,937	$347,898	$354,856	$361,953	$369,192	$376,576	$384,108	$391,790
Debt Service		$360,000	$360,000	$360,000	$360,000	$360,000	$360,000	$360,000
Operating Budget	$ 3,653,222	$3,853,510	$3,982,213	$4,115,925	$4,254,844	$4,399,174	$4,549,130	$4,704,934
Capital Outlay		$4,428,198		$295,213	$295,213	$295,213	$295,213	$295,213
Total Costs	$ 3,653,222	$8,281,708	$3,982,213	$4,411,139	$4,550,057	$4,694,388	$4,844,344	$5,000,147
# Full Time Dispatch Employees	53							
#Part Time Dispatch Employees	8							
On duty staff	10							

APPENDIX A - BUDGET

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Salaries & Wages	$2,767,492	$2,878,192	$2,993,320	$3,113,052	$3,237,575	$3,367,078	$3,501,761	$3,641,831	$3,787,504
Overtime	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000
Employee Benefits	$1,237,683	$1,287,191	$1,338,678	$1,392,225	$1,447,914	$1,505,831	$1,566,064	$1,628,707	$1,693,855
Total Personnel Costs	$4,107,191	$4,267,399	$4,434,015	$4,607,296	$4,787,508	$4,974,928	$5,169,846	$5,372,560	$5,583,382
Operational Expenses	$399,625	$407,618	$415,770	$424,086	$432,567	$441,219	$450,043	$459,044	$468,225
Debt Service	$360,000	$360,000	$360,000	$360,000	$360,000	$360,000	$360,000	$360,000	$360,000
Operating Budget	$4,866,816	$5,035,016	$5,209,785	$5,391,381	$5,580,075	$5,776,147	$5,979,889	$6,191,604	$6,411,607
Capital Outlay	$295,213	$295,213	$295,213	$295,213	$295,213	$295,213	$295,213	$295,213	$295,213
Total Costs	$5,162,029	$5,330,230	$5,504,998	$5,686,595	$5,875,288	$6,071,360	$6,275,102	$6,486,817	$6,706,820
# Full Time Dispatch Employees									
#Part Time Dispatch Employees									
On duty staff									

APPENDIX A - BUDGET

	2024	2025	2026	2027	2028
Salaries & Wages	$3,939,005	$4,096,565	$4,260,427	$4,430,844	$4,608,078
Overtime	$100,000	$100,000	$100,000	$100,000	$100,000
Employee Benefits	$1,761,609	$1,832,073	$1,905,356	$1,981,571	$2,060,833
Total Personnel Costs	$5,802,638	$6,030,663	$6,267,810	$6,514,442	$6,770,940
Operational Expenses	$477,589	$487,141	$496,884	$506,822	$516,958
Debt Service	$360,000	$360,000	$360,000	$360,000	$360,000
Operating Budget	$6,640,227	$6,877,804	$7,124,694	$7,381,264	$7,647,898
Capital Outlay	$295,213	$295,213	$295,213	$295,213	$295,213
Total Costs	$6,935,440	$7,173,018	$7,419,907	$7,676,477	$7,943,111
# Full Time Dispatch Employees					
#Part Time Dispatch Employees					
On duty staff					

APPENDIX B STAFFING

B.1 Introduction

The staffing of public safety communications centers is a complex issue. Having the correct compliment of staff on duty when needed is a significant challenge to public safety communications managers in many locations. There are a number of aspects to staffing that need to be addressed. These not only include personnel issues such as the number of authorized positions, the actual staffing complement, employee turnover, training, amount of overtime, paid leave amounts, sick leave amounts and so forth, but also include things such as the technology employed and the nature of the duties of the personnel. The appendix provides a brief overview of the various issues involved and then presents CTA Communications recommendations for staffing for each of the consolidation models. The recommendations are based on common formulas used to determine staffing as modified by the available data from the agencies participating in this study.

While each public safety dispatch center is unique, staffing is a common issue present at every center. Insufficient staffing of a dispatch operation promotes excessive stress and employee burnout which in turn leads to higher turnover. A recent study by the University of Denver Research Institute for the Association of Public Safety Communications Officials, International Project RETAINS[i] identified five factors that predicted higher retention rates, in order of influence:

- Employees perception that the center was fully staffed;
- Average overtime hours per month;
- Job complexity;
- Hourly base pay rate;
- Employee satisfaction with working conditions

The study also identified eight factors that predicted higher employee satisfaction, in order of importance:

- Center performance;
- Preparation and ongoing training;
- Feeling appreciated by management;
- Satisfaction with the shift selection process;

- Satisfaction with the process for mentoring new trainees;
- Feeling appreciated by their immediate supervisor;
- The perception that there was a thorough and extensive application and selection process;
- Feeling appreciated by the media.

Just as understaffing a dispatch center creates problems, overstaffing creates its own set of problems:

- Internal morale is affected by boredom during periods of little work
- Low activity does not allow for a feeling of accomplishment or achievement
- Personnel may become more interested in entertainment than operations during periods of low activity.

Finding the right staffing complement is an ever changing challenge. At best, they are only estimates based on assumptions and available data. There are several approaches to determining the number of people needed on duty at any time. Most staffing formulas use queuing theories to estimate the number of call takers needed. Most calculations are based on either First In First Out (FIFO) or Last In First Out (LIFO) disciplines. As Church and Church note,[ii] in public safety communications, the discipline is almost never either FIFO or LIFO. One of the reasons for this is that no visible line forms. In addition, the varying priority of messages affects the order in which the messages are handled. CTA Communications uses a method that analysis the various elements of the center's workload and estimates the staff needed to handle that workload within the established performance estimates. The specific tasks that are performed in the center must be identified first. Some of the tasks, such as answering incoming 911 lines, are easily quantifiable based on available statistics. Others, such as handling traffic on the IOWA system, and various supervisory tasks are not easily measured in terms of the time commitment involved. Each of the tasks takes a certain amount of time. While individual occurrences of the same task may take more or less time, an acceptable average time can be established.

Once the tasks have been identified and the average time requirements determined, there are two basic approaches to determining call volume and staff requirements. One involves a detailed data collection and analysis. The second approach uses an approximation approach. Since each of the four centers involved in this study collect and measure data differently, we have used a modified approximation approach to estimate the workload for the center.

We have used the available data from the four centers to modify the calculations. For example, one model suggests that two 911 calls per day per 1,000 population can be expected. Using the 2005 population estimate for Scott County (161,040), the PSAPs would have been expected to receive an average of 322 incoming 911 calls per day. In 2005, the three PSAPs together averaged 394 calls per day. A large part of the difference can be attributed to the advent of wireless telephones and the proximity to the Illinois border. As this project moves forward, more detailed data can be collected and used to refine the estimates. Once a shared dispatch operation has been established, this type of analysis needs to be done on a routine basis to make sure the staffing is appropriate. The sampling period needs to be long enough to identify the differences caused by the hour of the day, day of the week, season and other factors such as a significant event. As a historical record is developed, changes in patterns, both on a seasonal and longer term basis, can be detected and adjustments made.

B.2 Emergency Communications Center Functions

The four communications centers involved in this study exist to support the public safety agencies in Scott County Iowa. As such the centers receive and classify calls for assistance from the public, select the appropriate response and alert the appropriate responders of the incident. Each of the centers tracks the status of responders they have responsibility for, provides access to various local, state, and national data bases, and provides coordination between various responders and agencies. In addition to answering the incoming emergency lines, each center also answers a number of non-emergency telephone phone calls. The three governmental centers are responsible for the entry of IOWA/NCIC messages and updates. Particularly in the case of Scott County, warrant related tasks consume a significant amount of time. In addition, the three centers receive requests from the field to run inquiries into the various systems when the field units aren't able to use their mobile terminals. They also call for tow trucks and make other calls in support of the officers in the field. They provide similar services for the fire departments. In addition, both the Scott County dispatch center and MED-COM provide Emergency Medical Dispatch (EMD). This involves providing pre-arrival instructions to callers. In some cases, the dispatcher stays on the line with the caller until help arrives at the scene. While both agencies have provided information on the number of EMD incidents, we do not have sufficient data to estimate the time allocated to pre-arrival instructions. While MED-COM does not access the law enforcement computer systems, they do dispatch medical transports, as well as provide dispatch service for MED-FORCE helicopters. This involves flight following the aircraft. Again, we do not have sufficient information to be able to quantify the time commitment for these activities.

B.3 Task Analysis

Using studies done in other public safety communications centers, it is possible to develop reasonable estimates of the time used to support dispatch operations. Each of the agencies involved maintains some form of operational statistics. The agencies have provided the information to CTA for our use in conducting this study. Because there are differences in the definitions and the level of detail available, limited data sets are available for computing the workload in the consolidated center. The following table contains the common statistics available from the four centers.

2005	Davenport	Bettendorf	Scott County	MEDIC	Total
Wireline 911 Calls	72,665	6,000	5,167		83,832
Cellular 9111 Calls	45,165	8,268	6,600		60,033
Total 911 Calls Received	117,830	14,268	11,767	21,291*	143,865
Administrative Calls	90,504	36,000	103,253	85,157	314,914
Total Phone Calls	208,334	50,268	115,020	85,157	458,779
Police Dispatches	147,425	19,046	26,813		193,284
Police Officer Initiated	70,243	17,097			87,340
Fire Events	12,118	2,369	804		15,291
Medical Dispatches	9,366	1,318	1,046	12,258	23,988
Transfers Dispatched (MEDIC)				9,405	9,405
Illini Ambulance Dispatches				5,040	5,040
MED-Force Dispatch				1,278	1,278
MEDIC Courier Calls				1,945	

2005	Davenport	Bettendorf	Scott County	MEDIC	Total
					1,945
Total Dispatches	239,152	39,830	28,663	29,926	337,571
					-
IOWA/NCIC Transactions	129,831	97,999	113,972	-	341,802
Total Calls per FTE	9,470	5,291	8,848		
*MEDIC 911 calls are transfers from other PSAPS. This figure is not included in the total.					

This activity data will be used to determine the workload generated and the staffing needed for the various combinations of centers discussed in the report.

The initial task in all three centers is the report of an incident. The majority of incident reports typically stem from 9-1-1 calls. The critical information needed includes:

- Location of the Incident
- Nature of the Incident
- Time Incident Occurred (In progress?)
- Other Hazards

Other information, which is not essential to initiate the dispatch, includes the following:

- Name of Person Reporting the Incident
- Names of Witnesses
- Name and Description of Parties Involved
- Other Descriptive Information

On calls reporting medical emergencies, additional information is gathered. This includes:

- Chief Complaint or Symptom
- Patient's Age
- State of Consciousness
- Breathing Activity

The location verification process is essential to a timely and appropriate response to any emergency. The implementation of enhanced 911 for wireline telephone service provides some time-saving assistance. However studies have indicated that as many of forty percent of all incident reports made by wireline telephone do not originate from the address of the incident occurrence. In addition, wireless 911 calls do not initially provide location information. The dispatcher must request the location information after they have answered the call. Generally, this request must be at least thirty seconds after the call has been initially answered. Many wireless callers are unable to provide accurate information on the location of the incident. Studies have show that typical call processing time for wireless 911 calls is approximately fifty percent greater than for wireline calls. A typical wireline 911 call is handled in sixty seconds. The average processing time for wireless calls is ninety seconds.

Once the location of the incident is verified, it is entered into the Computer Aided Dispatch (CAD) system along with the nature of the incident and other appropriate information. Typically the information is entered as the dispatcher is taking the information. The call is also classified as to its severity. On some in-progress calls, the dispatch may be initiated while additional information is being obtained. This is usually done by one dispatcher remaining on the telephone while another dispatcher initiates the response.

In many cases, more than one telephone call is received reporting the same incident. These subsequent calls usually do not receive the full treatment once it is determined that the caller is reporting the same incident and does not have additional information that is needed.

Once the incident has been entered into the CAD system, the appropriate resources must be dispatched. This involves the selection of the proper resource based on the location and nature of the incident. The dispatcher must have an awareness of the availability of the resources under his or her control.

The CAD system provides a recommendation based on the resource. Police response is normally dependent on the availability of units to respond. When all units are busy, incidents are queued or stacked by severity and age. Frequently for incidents that are not high priority, the incident is stacked until the unit assigned to the area of the call is available.

A certain amount of time delay in response to non-emergency incidents is not considered unacceptable Fire and EMS incidents are almost always treated as emergencies requiring immediate response. Some prioritizing of calls is done through emergency medical dispatch. Most typically, the prioritizing of EMS calls involves determining if first responders should also be dispatched and if the responding units should respond using emergency lights and sirens.

The dispatcher must confirm the recommendations of the CAD system based on information that may not be in the system. This includes other events occurring, specific abilities needed for the incident response, upcoming shift changes, and so forth. In other words the dispatcher must independently develop a recommendation and then accept or modify any recommendation from the CAD system. While many of the police units are equipped with mobile computer terminals, most police and all fire and EMS calls are dispatched by voice since not all units are equipped with mobile computers and other units need to be aware of what the other units are doing.

For police calls, the dispatcher must first alert the unit or units to prepare to receive a message, be notified by the unit of its availability, broadcast the assignment and receive acknowledgement from the unit. Fire/EMS dispatch usually does not involve the availability reply. If the unit does not acknowledge the dispatch, the dispatcher must confirm receipt of the message, reinitiate the contact, or in the case of critical incidents, select other resources to respond.

Once the units have been dispatched, there will be radio messages from the unit to provide status changes (arrival, clear, etc.), to request additional information or resources and to provide information. The dispatcher may initiate additional messages as well to check the well-being to the responders, to provide or request additional information, and so forth.

In addition to the task related workload, typical operations involve three breaks away from the dispatch positions. Two of the breaks are typically ten minute breaks.

The impact on the workload analysis needs to be taken into account when calculating the number of personnel needed on duty.

B.4 Dispatch Configuration

Receiving and dispatching of calls for assistance are the two primary tasks of each of the public safety communications centers in this study. Each of the agencies has equipped all of its primary positions to handle both functions simultaneously. All of the dispatch centers operate as *single-stage operations*. In other words, all of the dispatchers have the ability to efficiently control all units. This is typically the most efficient method of dispatching. Some larger dispatch centers use a *two-stage operation*. In a two-stage operation, the call is taken by one person and the information is transferred to a second person who then dispatches the call. The two-stage operation becomes the model of choice when the number of incoming calls requires multiple call-takers and the number of units being controlled requires multiple channels and dispatcher. A third model, *three-stage operations*, is used in a few communities. Under this model, the 9-1-1 operator determines the location and nature of the call and transfers the call to the appropriate call-taker. The call taker then enters the information into the system and transfers the information to the dispatcher. The dispatcher then transfers the call. This model is not widely used.

CTA recommends that the consolidated center use a modified single-stage operation. For most of the day, the single-stage model would be used. During peak times, however, supplemental personnel would be used in a call-taking capacity.

B.5 Workload Analysis Assumptions

The workload analysis uses the activity data and task descriptions to estimate the time used support public safety operations. Based on available data, the typical 911 call for law enforcement services occupies the call taker for approximately sixty seconds. The typical fire call occupies the call taker for forty-five seconds, and the typical emergency medical call occupies the call taker for one hundred ten seconds in centers where emergency medical dispatch protocols are used.[iii] Radio traffic adds to the center's workload. For the average law enforcement incident, there will be a minimum of three radio messages. These consist of the dispatch and the unit's arrival and clear status changes. EMS incidents involve those same messages as well as additional status changes for the unit calling enroute to the scene and to the hospital, arriving at the hospital and returning to quarters. Fire incidents also add additional messages.

Since many fire incidents involve multiple unit responses, the status change messages for calling enroute, arriving, clearing and returning to quarters are multiplied by the number of units arriving. In addition, incident command procedures commonly used by fire departments include additional messages concerning the status of the incident such as initial size-up report, fire loss stopped, and so forth. The messages are transmitted so that the times can be documented in the incident record.

The workload at a dispatch center is not evenly distributed. Studies have show that the busy day call volume is approximately forty percent higher than the average call volume.[iv] Based on available data from the PSAPs involved in the study, forty-seven percent of the activity occurs between the hours of 3 PM and 11 PM; twenty-nine percent occurs between 7 AM and 3 PM, and twenty-five percent occurs between 11 PM and 7 AM. The percentages add up to more than 100 due to rounding. Yung and Dayharsh also noted that approximately ten percent of the days total call volume occurs during the busiest hour on the busiest shift; eight percent occurs during the busiest hour of the second busiest shift, and six percent of the daily call volume occurs during the busiest hour of the least busy shift. A review of the data furnished by the PSAPs in Scott County indicates that this estimate is reasonably accurate. We have taken the available data and computed the daily average, the average for the busiest day of the week and the average activity for the busiest hour of the busiest day. Those figures are shown below.

	Daily Avg	Busy Day	Avg Busy Hour
Total 911 Calls Received	394	552	61
Administrative/Non-Emergency Calls	863	1208	121
Total Incoming Calls	1315	1841	184
Police Calls Dispatched	530	741	74
Police Officer Initiated	304	426	43
Fire Events Dispatched	45	62	6
Emergency Medical Incidents	33	47	5
Medical Pre-Arrival Instructions Given	29	41	4
911 Calls Dispatched (MEDIC)	34	47	5

	Daily Avg	Busy Day	Avg Busy Hour
Transfers Dispatched (MEDIC)	26	36	4
Total Dispatches (MEDIC)	59	83	8
Total Transports (MEDIC)	44	62	6
			0
Illini Ambulance Dispatches	14	19	2
MED_FORCE Dispatches	4	5	0
MEDIC Courier Calls	5	7	1
Total Iowa/NCIC Transactions	936	1311	131

Using the estimated busy day figures, we can begin to estimate the workload and, as a result, the staffing is required to meet the performance goals. Using the busy day statistics, the following is the estimated workload in seconds for the center:

	Daily Avg	Busy Dav	Busy Day Activity (Seconds)
Total 911 Calls Received	394	552	33109
Administrative/Non-Emergency Calls	863	1208	90592
Total Incoming Calls	1315	1841	123700
Police Calls Dispatched	530	741	66723
Police Officer Initiated	304	426	25534
Fire Events Dispatched	45	62	5308
Emergency Medical Incidents	33	47	3506
Medical Pre-Arrival Instructions Given	29	41	

	Daily Avg	Busy Dav	Busy Day Activity (Seconds)
Number of 911 Transfers		0	
		0	
911 Calls Dispatched (MEDIC)	34	47	2821
Transfers Dispatched (MEDIC)	26	36	1623
Total Dispatches (MEDIC)	59	83	
Total Transports (MEDIC)	44	62	
Medical Pre-Arrival Instructions Given	26	37	
Illini Ambulance Dispatches	14	19	1160
MED_FORCE Dispatches	4	5	882
MEDIC Courier Calls	5	7	52
Total Iowa/NCIC Transactions	936	1311	39331
Total Time Required (Seconds)			270641

It is then possible to divide the total seconds required by the seconds that one dispatch position is available to work per shift and determine the number of staff needed each day.[v] There are three thousand six hundred seconds in each hour. If each dispatcher is assumed to be sixty-seven percent efficient, that is they work measured activities forty minutes in each hour, one position is available to handled the above activities three hundred twenty-one minutes in an eight hour shift. In order to handle the activity above (4,511 minutes), a total of fifteen people are needed on duty each day[vi].

Using the activity distribution described above, we recommended the following minimum on-duty staff for each of the three shifts:

- Day Shift 5
- Afternoon Shift 7
- Night Shift 4

Because of the specific breakdown of activity by shift, we recommend adding an additional position to the Afternoon Shift to insure adequate staffing.

In addition to the personnel needed to handle those volume-influence positions, two additional positions will be needed on each shift to cover the other activities. One of those positions should be a shift supervisor. The staffing needed each day including these positions then becomes:

- Day Shift 7
- Afternoon Shift 9
- Night Shift 6

In order to staff the twenty-two shifts every day, a total of thirty-eight full-time telecommunicators and supervisors will be needed. This is based on each full-time employee's work year being based on 2,088 hours in a year. All of the time that the employee is unavailable to work (vacation, sick, and other leave as well as training time, breaks, and so forth) are subtracted from the 2,088 hours to provide the net available working hours per employee. For this project we estimated a total average of 411 unavailable hours leaving a net available work hour's figure of 1,677 hours per full-time employee. This number was then used to divide the total number of hours needing to be covered. The result is shown above.

Should the consolidation only involve Davenport and Scott County, the staffing complement is as follows:

- Day Shift 3
- Afternoon Shift 6
- Night Shift 3

In addition to the personnel needed to handle those volume-influence positions, two additional positions will be need on each shift to cover the other activities. One of those positions should be a shift supervisor.

The staffing needed each day including these positions then becomes:

- Day Shift 5
- Afternoon Shift 8
- Night Shift 5

In order to staff the eighteen shifts every day, a total of thirty-one full-time telecommunicators and supervisors will be needed.

Should the consolidation involve Davenport, Bettendorf, and Scott County, the staffing complement is as follows:

- Day Shift 4
- Afternoon Shift 7
- Night Shift 3

In addition to the personnel needed to handle those volume-influence positions, two additional positions will be need on each shift to cover the other activities. One of those positions should be a shift supervisor. The staffing needed each day including these positions then becomes:

- Day Shift 6
- Afternoon Shift 9
- Night Shift 5

In order to staff the twenty shifts every day, a total of thirty-five full-time telecommunicators and supervisors will be needed.

Finally, should the consolidation include Davenport, Scott County and MEDIC EMS, the staffing complement is as follows:

- Day Shift 4
- Afternoon Shift 6
- Night Shift 3

In addition to the personnel needed to handle those volume-influence positions, two additional positions will be need on each shift to cover the other activities. One of those positions should be a shift supervisor. The staffing needed each day including these positions then becomes:

- Day Shift 6
- Afternoon Shift 8
- Night Shift 5

In order to staff the twenty shifts every day, a total of thirty-four full-time telecommunicators and supervisors will be needed.

We can not emphasize enough that these are estimates. We highly recommend that detail data be collected between now and the actual consolidation. Among the data that should be collected are detailed 911 call and dispatch data. Ideally, the information should be collected for each hour of each day for a year in order to facilitate a more complete analysis. Unfortunately some of the current systems in place do not provide this information in an automated manner. With the fact that all of the current dispatch employees have been guaranteed a position with the consolidated center, there will be more staff than our studies indicate is necessary. This will allow more detailed study and revision of the staffing levels as time progresses.

[i] APCO Project RETAINS Research Report. University of Denver Research Institute, Denver, Colorado, August 2005.
[ii] Church, Thomas and Church, Janis. *Public Safety Communications, An Introduction to the Theory of Waiting Times*. Association of Public-Safety Communications Officers, Inc. 1973.
[iii] Yung, T.J and Dayharsh,, T.I. *The Design and Costing of 911 Systems*. Bureau of Justice Statistics, US Department of Justice. Washington, DC. 1980 (no longer in print). Updated by additional studies.
[iv] Yung, T.J and Dayharsh,, T.I. *The Design and Costing of 911 Systems*. Bureau of Justice Statistics, US Department of Justice. Washington, DC. 1980 (no longer in print). Updated by additional studies
[v] McClure, N.D, *Muskegon Central Dispatch Workload Analysis*. Unpublished paper.
[vi] Richard S. Tucker, Communications Center Workload Analysis, paper presented at 1990 APCO Conference, Boston, MA.