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White Paper

## 5 Questions to Ask

Before you implement a dispatch solution with DMR

Interoperability Gateways

Radio Dispatch Systems

Location Services

Radio over IP

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## 5 Questions to Ask Before you Implement a Dispatch Solution with DMR

The DMR radio standard is proving a force to be reckoned with in the digital Professional Mobile Radio (PMR) market. It has become the technology of choice across a number of market verticals and across the globe.

A primary goal of DMR is to specify affordable digital systems with low complexity, complete with voice, data and other supplementary services. To gain maximum value from a DMR system, you need to complement your network with a modern and full featured dispatch console.

Before finalizing your network design, it is important to consider your dispatch console system and how best to integrate this as part of the overall solution. There are five key questions that should be asked to ensure you get the most out of your network and maximize the return on your investment.



### Question 1:

## What Console Features Will Help You Get the Most from Your Investment?

The DMR Association has approved a protocol for use by dispatch consoles in either Tier II (conventional) or Tier III (trunking) systems. This protocol is known as "AIS" and provides a common and well-defined way for a console to interface with a DMR-compatible radio. A console system that supports AIS will ensure that your organization can access the most beneficial features of DMR. Almost all console systems that are designed for use with digital radio use PC based dispatch workstations.

Therefore, before choosing a console system, you should assess what dispatch features would add value to your operations – now and in the future – and check that the console can support these features.

**Location Services through GPS:** Digital radios can periodically transmit GPS coordinates so you always know where your assets are – whether they are people or vehicles. Your assets can be displayed on a map. You can choose from basic Real-Time tracking to advanced asset management complete with Geofencing, speed control, logging and trace routing.

**Emergency Management:** The ability to generate Emergency and Blast Tones across the network to alert users to a dangerous situation.

**Text Messaging:** This is very useful for communicating non-urgent information or for use in noisy environments.

**Remote Monitor:** Dispatchers have the ability to remotely activate the microphone of a radio user and have that user's audio discreetly monitored. This is an important feature when you are concerned about a user's wellbeing and safety.

**Stun Kill:** The dispatcher can temporarily or permanently disable a radio in the field. This is useful if the radio is lost, stolen or generating faulty transmissions.

**Rapid Recall:** A dispatcher can immediately playback conversations, in whole or in parts, during and after received calls. Radio users do not need to repeat key information and dispatchers can re-check facts themselves.

**Integrated Contacts:** Users on a DMR network can have their own ID and belong to one or more talk groups. An integrated contacts function will ensure that people can be contacted easily and identified quickly.

**Call Logging:** By keeping a history of recent and missed calls, dispatchers may never miss important requests and notifications.

**Linking or Patching:** The ability to create links with radio users on one channel or talk group with those on another. Linking can also be used to interconnect DMR and other technologies (such as legacy analog).

**Phone Connectivity:** The ability to integrate telephones into a system can be useful for both dispatchers and radio users. For a dispatcher, the ability to communicate with the phone system and the DMR network, using the same headset equipment, can be very useful.

#### ***Ease of Use***

In order to get the most out of your dispatch solution, it should be simple for operators to use. A few options you may want to look for in a dispatch console to achieve this include:

- Options for Configuring the Screen Layout how you like, including multi-screen
- The ability to turn features on and off
- User access control, roles and security
- Touch Screen Operation with advanced, intuitive controls such as press-and-hold
- Minimal clicks/touches for priority tasks

## Question 2:

### How Will You Connect to the DMR Infrastructure?

Although the DMR Association have recommended a protocol for dispatch communications over IP, not all radio manufacturers will support this interface. Some will provide alternative interfaces (which may or may not include IP) and sometimes the IP method itself will not be suitable.

#### ***IP/Wireline***

One of the advantages of the AIS protocol for DMR is that it enables dispatch consoles to connect to an Ethernet port on Base Stations or Repeaters and communicate using IP. This method greatly simplifies installation and provides significant cost savings. In addition, an IP connection enables the console to be physically separated from the DMR system but connected using standard IT equipment.

If the radio supports both DMR channels then the console should be able to access those channels simultaneously and both voice and data are carried over IP. When choosing IP as the method of connectivity, the IT professionals at your organization should be consulted. There may be certain restrictions on how you can connect using this method, such as what addressing methods you can use. Additionally, you will need to ensure that there will be sufficient bandwidth to transmit voice and data. Is voice able to be given priority to ensure that critical communications are not lost?

#### ***Donor Radio***

An alternative to using a direct IP/Wireline interface to the Base or Repeater is to use a donor radio. This method is useful in a couple of scenarios:

The base is in an inaccessible area such as in a mountainous region and it's not feasible to connect it to an IP network;  
The base is owned by a 3rd Party such as a service provider.

Donor radio interfaces usually involve two separate connections: a USB connection for data and call control, and an analog connection for voice.

The use of donor radios can become a problem if an organisation requires many channels. This is due to the increased cost of installing antennas and other ancillary equipment, which can quickly outweigh the cost savings of using a mobile radio rather than a Base.

Whilst most DMR radio equipment, with IP, will allow the console to access both DMR channels, a donor radio can only ever access one channel at any one time. Therefore, two donor radios are required in order to provide the same dispatcher coverage as an IP equipped Base or Repeater.

## Question 3:

### How Will You Manage Migration?

The migration from Analog to Digital can be quite a complex process and many organizations cannot tolerate having any down time to accommodate this. Furthermore, the cost of replacing all of your equipment at one time can be daunting. Many organizations prefer to spread the cost across multiple budget periods.

The key to migration is to ensure that your dispatch console system employs Radio over IP Gateways. RoIP Gateways connect the dispatch system through to the other radio resources and there are differing gateways for different radio systems. They enable the dispatch system to handle different protocols from different radio vendors, allowing dispatch operators to communicate over different radio networks in a transparent way.

This is how you can connect to both analog and digital radios, and migrate from analog to digital or from one technology to DMR. An example of a process could be:

1. Connect all of your existing Analog radios onto an IP network using Radio over IP (RoIP) Gateways;
2. Upgrade and configure your Dispatch Software to connect to both the legacy and DMR network simultaneously. Depending on the choice of Dispatch Solution, you may also be able to create links between the technologies so that you can better integrate the technologies;
3. Upgrade one site, region or functional area at a time by adding gateways to suit the type of radio.

## Question 4:

### What Type of Dispatch Solution Should You Use?

The type of dispatch solution, and the architecture employed, can have an impact on performance, administration, maintenance and reliability. It's important to understand the pros and cons of various architectures and to be aware of potential issues.

#### ***Direct IP Console or Server-Based System***

Direct IP based consoles that operate on a PC are also known as "soft consoles". Whilst there are many PC-based soft consoles on the market that claim to be purely IP based, in reality, most still require a server or gateway to act as an interface between the console and the radio network. Nevertheless, the benefit of this type of solution is the ability to quickly and easily add dispatch positions anywhere that IP is available and with minimal configuration at each station.

However, standalone IP consoles have limitations and suffer from issues that are overcome by using a central server. In a server-based architecture, the dispatcher workstations (PC's) actually connect to a central server (or switch) that interfaces to various communications systems including radio networks and PBX's; the connections are still made using IP. The server provides a high level of coordination and optimizes communications through the whole network.

	Direct IP Console	Server-Based System
<b>Setup Time</b>	Low	High
<b>Configuration</b>	Done at the PC	Done at the Server
<b>Redundancy</b>	Achieved by adding Consoles in Multiple Locations	Achieved by adding redundant Servers
<b>Databases</b>	Stored Locally	Stored Centrally and shareable

For more information about dispatch solutions see the Omnitronics white paper entitled: *“Which Dispatch Solution?”*.

### **Local or Remote Dispatch**

Another consideration should be whether or not you want to base your dispatch operations locally or remotely. You may want to choose from one or more of the below options:

- All dispatch operations are local, on site
- All dispatch operations are at a remote site such as headquarters in another town
- Dispatchers are located at multiple locations based on differing regional or operational activities
- Dispatch Operations are at one (local or remote) site with a second backup site available for disaster recovery purposes

One of the key things here is to ensure that your console system is capable of working reliably across IP networks, whether they are VPN, microwave or even public Internet. Factors such as the type of IP and VoIP protocols that are used, and whether multi-cast is used, can affect your ability to locate your dispatch operators just where you need them.

## Question 5:

### What Costs Do You Need to be Aware of?

At some stage in the design process "price" is going to come into the equation. Price may include more than just the cost of the equipment. Like buying an airline ticket, you need to dig deep to understand exactly what you will be getting.

Here are some key considerations that can help you work out if you are getting the best value for your purchase:

- **Support:** Is this optional or mandatory? If it's mandatory, what is the total cost over the lifetime of the system?
- **Installation and Commissioning:** Do you have the expertise to do this? Are you tied into the manufacturer or can you use an approved Dealer? Can you split this, do the commissioning yourself but have some other approved partner perform the final commissioning?
- **Training:** Does the vendor offer customized training to suit your needs and your budget?
- **Licensing of Software:** This can be a mine field of hidden costs. If you're using GPS maps, you will probably need to pay an annual license fee. Be sure to understand how your license costs increase as you expand your system or add new functionality. The simpler the pricing structure, the better!

## BONUS WORKSHEET!

Complete the below questions to help the decision-making process and to send to your preferred DMR supplier to start the conversation.

### INFRASTRUCTURE

How many Radios do you want on your new network? \_\_\_\_\_

Where are they located? \_\_\_\_\_

What is your expected bandwidth usage?  
\_\_\_\_\_

### RADIO FEATURES REQUIRED

- |   |                                      |  |   |
|---|--------------------------------------|--|---|
| <input type="checkbox"/> Individual Calls | <input type="checkbox"/> Group Calls | <input type="checkbox"/> Individual Text Msg | <input type="checkbox"/> Group Text Msg |
| <input type="checkbox"/> Status Msg       | <input type="checkbox"/> Lone Worker | <input type="checkbox"/> Remote Monitor      | <input type="checkbox"/> Stun Kill      |
| <input type="checkbox"/> Packet Data      | <input type="checkbox"/> GPS         | <input type="checkbox"/> Other: _____        |   |

PREFERRED RADIO/S \_\_\_\_\_

### MIGRATION STRATEGY

Legacy Radio/s: \_\_\_\_\_

- Method/s:
- |  |  |
|--|--|
| <input type="checkbox"/> Overnight Switch-Over | <input type="checkbox"/> Phased: Over What Period? _____ |
| <input type="checkbox"/> Parallel Networks     | <input type="checkbox"/> Dual Mode Radios                |
| <input type="checkbox"/> Gateways              | <input type="checkbox"/> Other: _____                    |

What existing equipment/software would you like to continue to use? (e.g. recorders, antenna's)  
\_\_\_\_\_

### CONNECTIVITY METHOD

Are any of the radios remotely located? \_\_\_\_\_ If so, is IP connectivity available at each site? \_\_\_\_\_  
Does IT have any requirements as to how you can connect?  
\_\_\_\_\_  
\_\_\_\_\_

Method/s:  IP/Wireline  Donor Radios  Gateways

### DISPATCH

How many Console Positions are required? \_\_\_\_\_ How many channels/talk groups on each? \_\_\_\_\_

Would you prefer Direct IP or a Server Based Dispatch Network?  
\_\_\_\_\_

Where will Dispatch Operations be located? (tick all that apply)

- On-Site     Remotely     Combination     Backup Locations

Extra Functionality Required:

- Linking     GPS Basic     GPS Adv.     Rapid Recall     Integrated Contacts  
 Emergency Mgmt     Call Logging     SIP Telephony     Other: \_\_\_\_\_

## A Final Thought

DMR is a technology that can provide you with affordable digital communications of low complexity, complete with voice, data and other supplementary services. To maximize the value of your DMR system, you may choose to add a full featured dispatch console. However, the dispatch console should not be considered an afterthought. This paper has presented five questions that should be asked before committing to a particular vendor. These range from the features that you need through to the actual costs that are involved. By addressing these five questions, you will be in a better position to make your purchase and ensure that you get the best return on your investment.

## About Us

Omnitronics was established in 1981 by a small team of experienced Engineers all with one common focus: to improve the design and efficiency of two-way radio peripherals.

Today, Omnitronics has evolved into a leading provider of radio dispatch, interoperability and communications management products designed to meet specific organizations needs through understanding customer requirements and providing flexibility.

In addition, Omnitronics uses this expertise to develop products specific to customer requirements. This has resulted in the company designing then manufacturing equipment for a long list of clients, over many years.



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