SCHEDULE 7

TELECOMMUNICATIONS

1.0 INTRODUCTION

As set out in s. 4.5.3 of the Manitoba Emergency Plan (MEP):

> **In an emergency, effective telecommunications is critical to**
>
> - **the efficient exchange of information**
> - **coordination,**
> - **command and control, and**
> - **responder safety.**

Historically public safety communications in a land mobile environment was assigned a specific frequency or a number of frequencies that were unique to a specific department or agency. Occasionally other agencies from the same discipline, e.g. police or fire might share a common frequency but rarely would agencies from different disciplines communicate directly with one another.

In addition to telecommunications established between responders at the site, telecommunications communications must be established between the site or incident commander, the Municipal Emergency Operations Centre (EOC) and the Manitoba Emergency Coordination Centre (MECC). See Appendix A attached.

1.1 INTEROPERABILITY

Since 9/11, greater emphasis has been placed on first responder cooperation and coordination.

Whereas effective telecommunication within a public safety agency is referred to as operability, interoperability has been defined as the ability of public safety agencies to talk across disciplines and jurisdictions via voice communications systems, exchanging information with one another on demand, in real time, when needed, and as authorized.

For those departments and agencies that use the FleetNet system, there is an opportunity to use features in that system to overcome some of the technical barriers to interoperability. Some features can be accessed at the consol level by trained dispatchers, while others may be accessed by individual users, including use of specific talkgroups.

The following “province-wide” FleetNet talkgroups are designated for inter-agency communications

- Government (GOV) Command and Control
- Interagency (INTERAGENCY) Calling and Response Coordination
- Operations 1 (OPS1) Operations
- Operations 2 (OPS2) Operations
- Operations 3 (OPS3) Operations

- EMO Simplex (SIMPLEX) is a short range, unrepeated frequency that can be installed in FleetNet radios to retain limited local functionality if FleetNet service is unavailable, or if only short range is required.

A department that is not on FleetNet cannot access these features directly. Technologies are available which will allow bridging or cross-band repeating between different systems. Although not ideal, sometimes the simplest approach is to exchange radios between departments. This is not particularly effective in a major emergency or disaster.

Notes:

1. MTS will automatically install these talkgroups in radios operated by approved agencies, such as RCMP, EMS, Manitoba EMO and Office of the Fire Commissioner (OFC).

2. Other departments, agencies, and other organizations seeking to install these talkgroups will be required to provide authorization from the Executive Director before MTS will install them. Application should be made to the Executive Director in writing.

3. The Executive Director will not authorize installation of the OPS1, OPS2 and OPS3 talkgroups until installation is approved by the Interoperability Coordinating Committee.

1.2 SERVICE INTERRUPTION

A variety of technologies can be used to provide telecommunications on site, between the site and agencies' EOCs, and between EOCs, including

- two-way radio,
- facsimile,
- email and other intra or internet-based services
- telephone (cellular and landline), and
- satellite communication systems.

Radio technologies usually require complex infrastructure to operate beyond the "line of sight" restriction. The modern telecommunications infrastructure used in Manitoba is extremely reliable in day to day use, and is often taken for granted. Nevertheless, this infrastructure can be damaged or otherwise interrupted.

Shared services, such as cellular telephone networks, have a limited number of frequencies and are sometimes incapable of handling the extreme volume of telecommunications traffic that is generated in a major emergency or disaster.

Even though we may think of cellular telephone, landline, facsimile, email, internet, two-way radio as different technologies, they often share common "pipes." These "pipes" can be a mixture of radio, microwave, and landline/optical fibre. The destruction or failure of such a "pipe" can disrupt messages that travel through the "pipe" regardless of what technology was used to generate the message.

All of these technologies require some form of electrical power.

As soon as practicable after impact, a quick survey should be made to determine which technologies are still available, and a tactical telecommunications plan should be prepared around the use of the surviving technologies.

Facsimile, email and other so-called "transmit and forget" technologies can be problematic if no one is continuously monitoring the receipt of information and acknowledging receipt. In 911 a number of firefighter deaths were attributed to warnings being left unread among many thousands of messages in the dispatchers' computerized cue.

1.2.1 Basic Replacement Considerations

(a) Short Range Telecommunications

Where short-range "line of sight" telecommunications are required, such as within the confines of a typical site, in addition to messengers or "runners" various temporary alternatives are usually available, including

- other service providers, e.g. Rogers cellular instead of MTS or MTS instead of Rogers (note that other cellular providers may share Rogers or MTS infrastructure)
- other radio systems that still work,
- radio systems used in their simplex (non-repeated) mode,
- General Mobile Radio Service (GMRS) or
- Family Radio Service (FRS).

Note: Radio signals at the frequencies commonly used in public safety applications are "blocked" by the curvature of the earth and by terrain such as mountains, hills and valley walls. Hand held satellite devices generally don't work well from inside buildings. Satellite signals (up and down) can also be blocked by significant precipitation. The signal emanating from the transmitter's antenna must be able to be "seen" by the receiver's antenna. This is the so-called "line of sight." In most circumstances, the higher the antenna of transmitter or receiver compared to the surrounding topography, the greater the "line of sight" and therefore the greater the range that can be achieved.

Range generally can be increased by

- raising the antenna height, or
- using a more efficient antenna.

Sometimes climbing to the top of a hill, or moving higher in a building is all that is

required. Independent of height, antennas on hand-held radios, particularly the "rubber duck" type are much less efficient than the antenna mounted on the roof of a car. These in turn are usually less efficient than a base antenna mounted on a tower or on the roof of a building.

Note: Increasing power output can improve the signal quality within the line of sight, but the power output settings of most commercial and public safety transmitters cannot be adjusted by the operator.

(b) Beyond "line of sight"

It is more difficult to set up a system that will work beyond the "line of sight." This generally requires a "repeater."

Note: A repeater is a radio which receives a signal from a transmitter within its "line of sight" and rebroadcasts it on a different frequency to receivers which are within its "line of sight," but which may be beyond the "line of sight" of the first transmitter. Even communications satellites are a form of repeater.

To achieve even greater distances

- a repeater antenna can be mounted on a very high building or tower (communications satellites take this to the extreme), or
- repeaters can be linked together using radio, microwave, cable or optical fibre. This is an overly simple description of a trunked radio (e.g. FleetNet) or cellular system.

In a widespread event where sites require telecommunications beyond the "line of sight," EMO may arrange for

- distribution of FleetNet radios, satellite telephones, or other suitable technology, and/or
- operators and equipment from the Amateur Radio Emergency Service.

(c) Amateur Radio Emergency Service (ARES)

ARES can provide temporary telecommunications services, using federally licensed operators and high-power radios that are capable of operating on frequencies that use ground waves or "bounce" off of layers in the earth's ionosphere to broadcast over long distances without complex central infrastructure.

Some of this equipment has been pre-installed in a number of federal, provincial and municipal facilities, including EMO, Manitoba Health Office of Disaster Management, Public Safety Canada, Department of National Defense, Environment Canada's Severe Weather Office, and the City of Winnipeg EOC.

ARES can be activated through the **EMO Duty Officer at 204-945-5555**.