Thinking About EMCOMM CERT Communications Planning

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A One Hour Primer In Emergency Communications Planning

Planning

Failure to Plan is Planning to Fail

Communications Discipline
Getting the Message Through

Clearly Assigned Responsibility

Established Routes

Interference Plan

Redundancy/Robustness

Established Protocols

CERT Communications Responsibilities

Team Member

    Understand Radio Use

    Use Radio Protocols

    Control Own Radio

        Frequency/Tones

        Power

CERT Communications Responsibilities

Team Communicator

Team Member +

Know Relevant Nets

Set Up Out of Team Comms

Know Comms Protocols

Copy Record Traffic

CERT Communications Responsibilities

Team Leader

    Team Member +

    Know Up Line Nets

    Know Same Level Nets

    Control Team Comms

    Know Comms Protocols

Leadership

The First Job of a Leader is to LEAD!

The Leader and the Communicator are Normally Different People

CERT Communications Requirements

Portable

Cheap (Acquire and Operate)

Simple

Rugged/Reliable

Short Range (< 10 Miles)
   Typically < 1 Mile

EMCOMM Communications Layers

Level 1 - State OES Regional EOC to Operational Area (County) EOC

Level 2 - Op Area EOC to Juristictions and Emergency Alert System

Level 3 - Op Area EOC to Mobile Units

-------------------------- CERT? --------------------------

Level 4 - Jurisdiction OEC to Internal Units

Level 5 - Jurisdiction Internal Unit Intra Unit Communications

Primary CERT Communications Needs

Report Status

Request Resources

Receive Direction

Receive Information

Primary CERT Communications Nets

Team to OpCen (Level 4)

Inter Team (Level 5)

Intra Team (Level 5)

CERT Communications Characteristics

Team to OpCen

- Structured/Formal
- Directed Net Likely
- Brief
- Extended Range
- Fixed Channel

CERT Communications Characteristics

Inter Team

     Informal/Conversational

     Informal Net Likely

     Brief

     Shorter Range

     Flexible Channel

CERT Communications Characteristics

Intra Team

 Informal/Conversational

 Team Leader Moderated

 Continuous Chatter

 Line of Sight

 Fixed Channel

CERT Communications Environment

Spectrum (Bandwidth) Limited

Heavy Official Need/Use

Heavy "Idiot" Use

Lots of Interference

CERT Communications Doctrine Response

Use Spectrum (Bandwidth) Wisely

Use Privacy Tones Wisely

Do Not Interfere With Others

Frequency Selection

Lowest Useful Power

Avoiding Interference

Separation By:
    Frequency
    Time
    Space
    Tones (PT or CTCSS)

CERT Communications Tools

FRS Radio

GMRS Radio

HAM Radio

VHF (2 Meter)

UHF (70 Centimeter)

FRS Radio/GMRS Radio

The "New" Citizen's Bands

~465 Mhz FM Voice

22 Channels

7 FRS

8 GMRS

7 Shared

FRS Features

Unlicensed
Very Low Power
Poor Antennas (By Law)
Low Range (Typ < 1 Mile)
Channels 8 – 14 Exclusive

GMRS Features

Licensed
Low Power
Better Antennas Allowed
Low Range (Typ < 2 Miles)
Channels 15 – 22 Exclusive

FRS Radio/GMRS Radio

Privacy Tones (PT or CTCSS) on FRS/GMRS Radios are NOT Standardized by Number,

Only by Frequency.

If used: ALWAYS TEST!

HAM Radio Features

Licensed

Variable Power

Better Antennas

Variable Range (HT < 2 Miles

Mobile > 10 Miles

Repeater - 10's of Miles

Many Frequencies

Standardized CTCSS Tones

Avoiding Interference

Separation By:
Frequency
Time
Space
Tones (PT or CTCSS)

Primary CERT Communications Nets

Team to OpCen (HAM, GMRS)
Inter Team (HAM, GMRS, FRS)
Intra Team (FRS)

Frequency Assignment

Static

    Establishing Contact

    High Use

    Special Application

Dynamic

    Temporary Use

    Shared Use

Special Static Frequencies

Calling Frequencies

Used to Establish Contact

FRS/GMRS Channel 1

HAM 2 Meter 146.52 Mhz

HAM 70 cm 446.0 Mhz

Repeater Pairs

Protected Nets

Calling Frequencies

FRS/GMRS Recommendations

Calling

    Channel 1

Team Assignments

    FRS 8 – 14

    Shared 2 – 7 (Work Down)

OpArea Assignments

    GMRS 15 – 22 (Work Down)

Avoiding Interference

Separation By:
   Frequency
   Time
   Space
   Tones (PT or CTCSS)

Time Assignment

Fixed Slots by Function
    WX Channel "Local on the 8's"
Fixed Rotation
    Formal Order of "Turns"
Service Request (By Priority?)
First to Fill the Vacancy

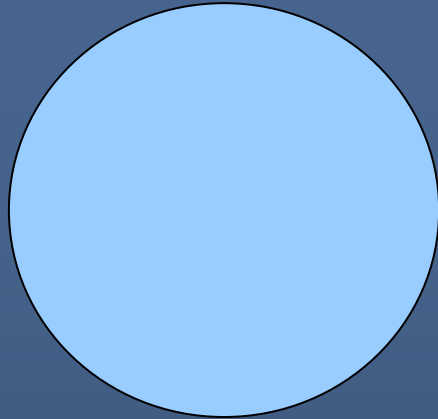# Avoiding Interference
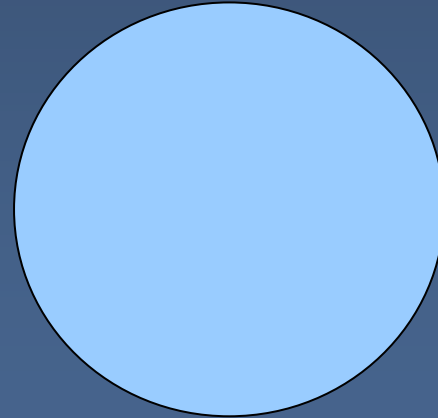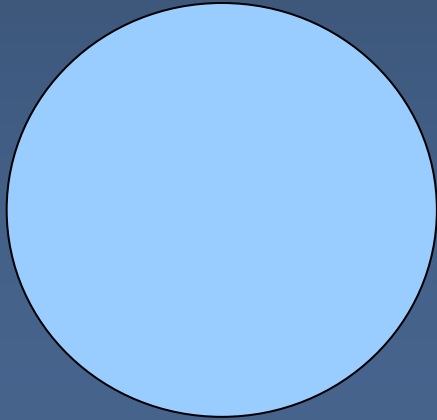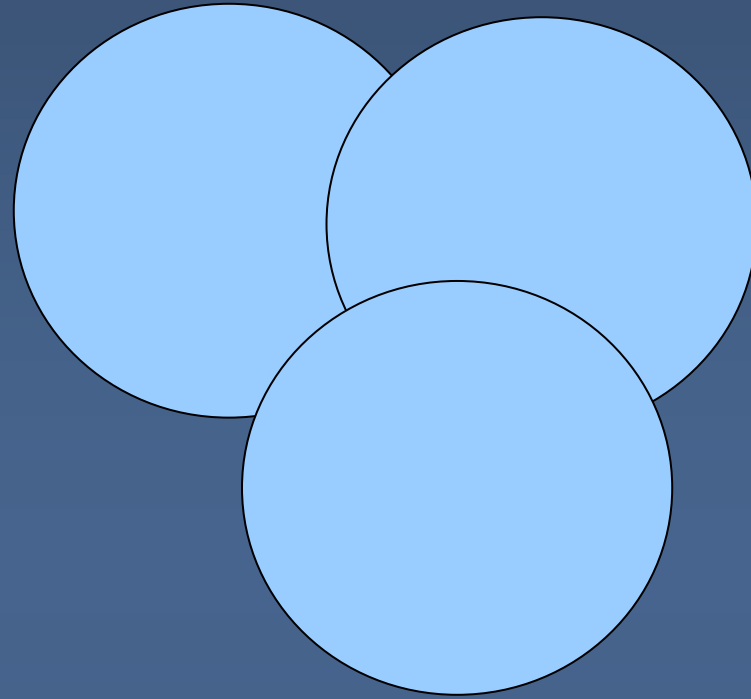
Separation By:
    Frequency
    Time
    Space
    Tones (PT or CTCSS)

Separation by Space
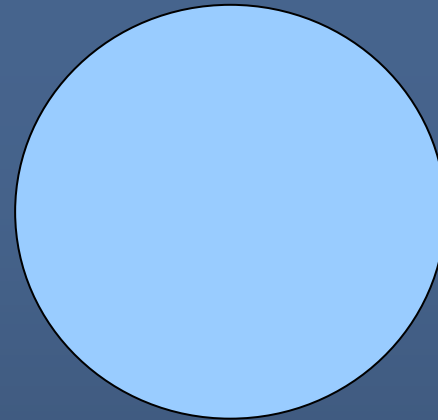
**Needs Separation by:
Frequency or Tone**

Avoiding Interference

Separation By:
- Frequency
- Time
- Space
- Tones (PT or CTCSS)

Privacy Tones
PT or CTCSS

"Subaudio" Tone (~100hz)

Suppress Audio Amplifier if Tone is Absent.

Privacy Tones
PT or CTCSS

Advantages

    Masks Non-member Transmissions

    Creates Illusion of Non-interence
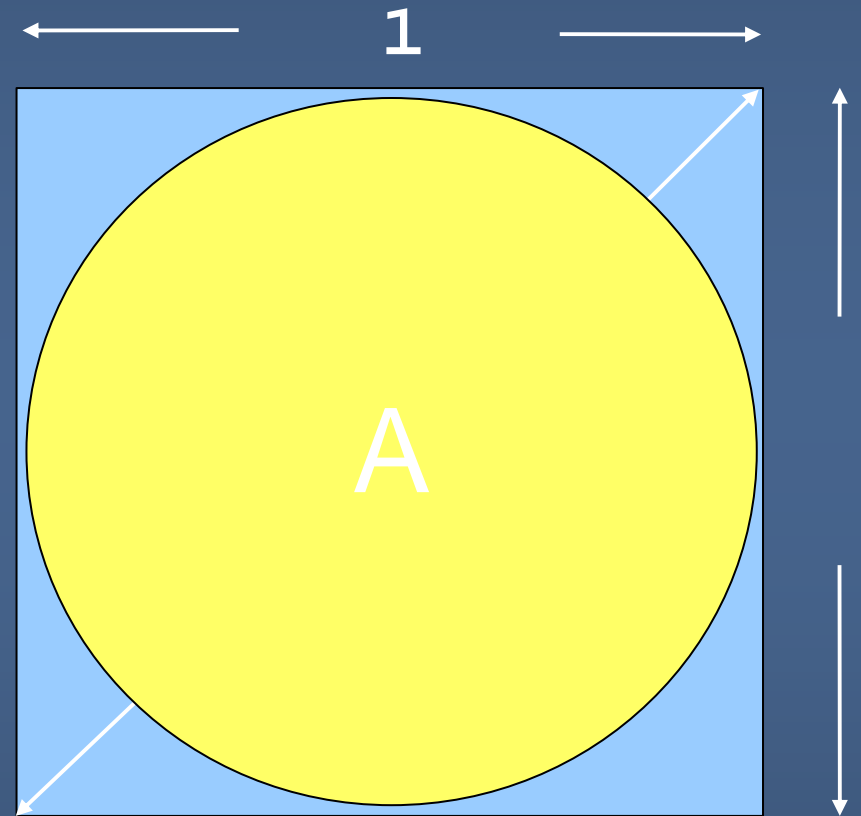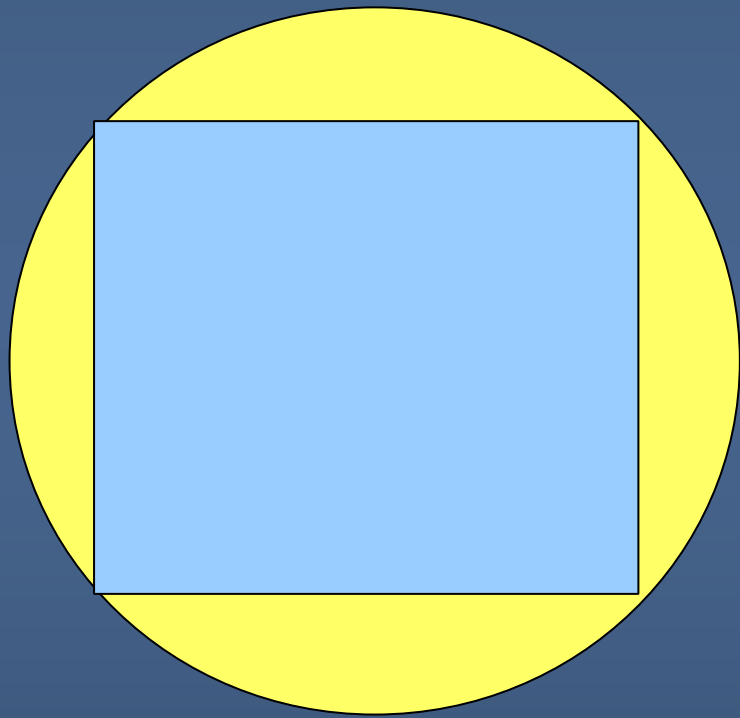
Disadvantages

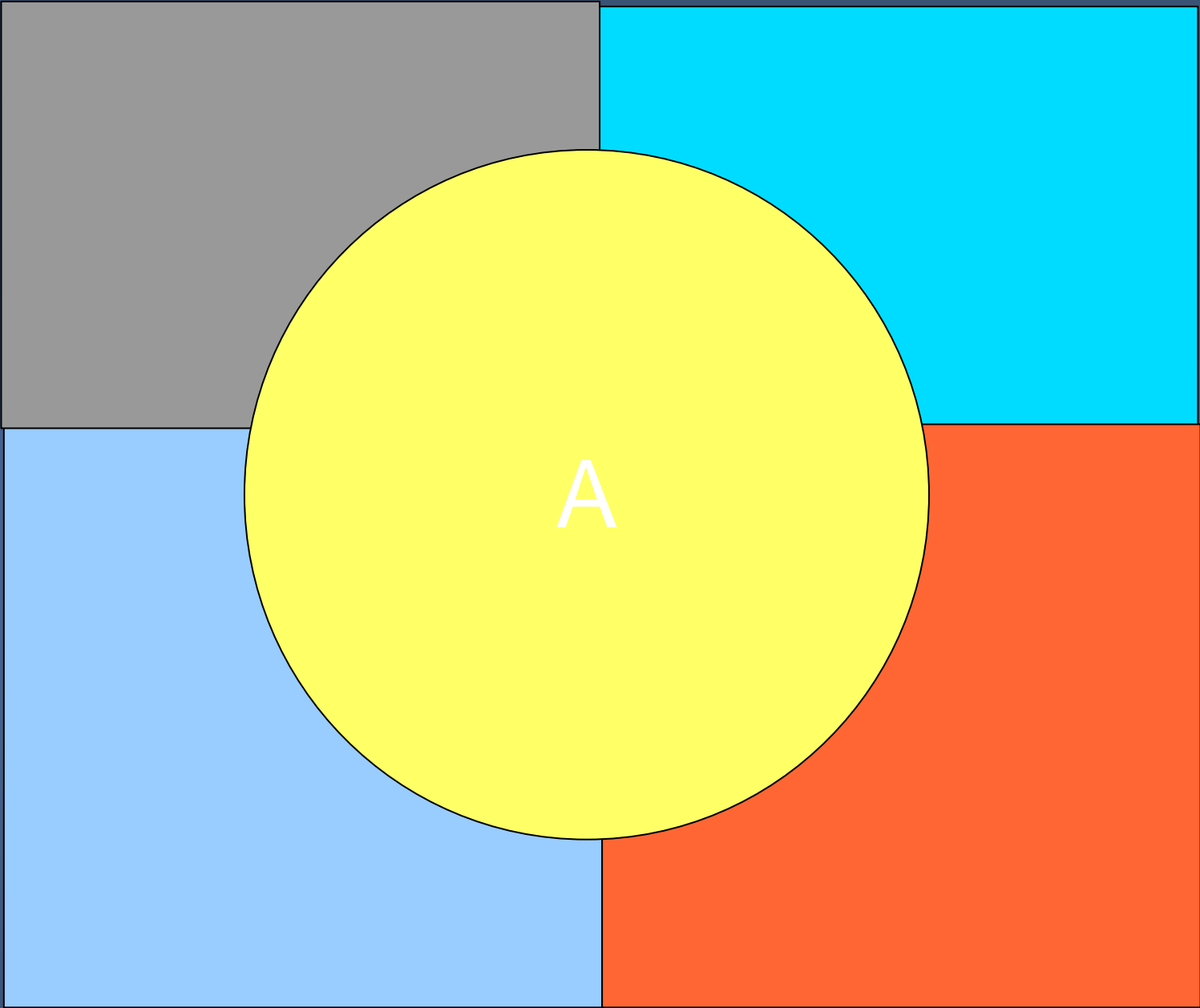   Not Possible to Hear if Frequency

    Really Open and Free

Sectorizing High Density Communications

A Space Based Method for Maintaining Minimum Interference When There are Many Mobile Teams.
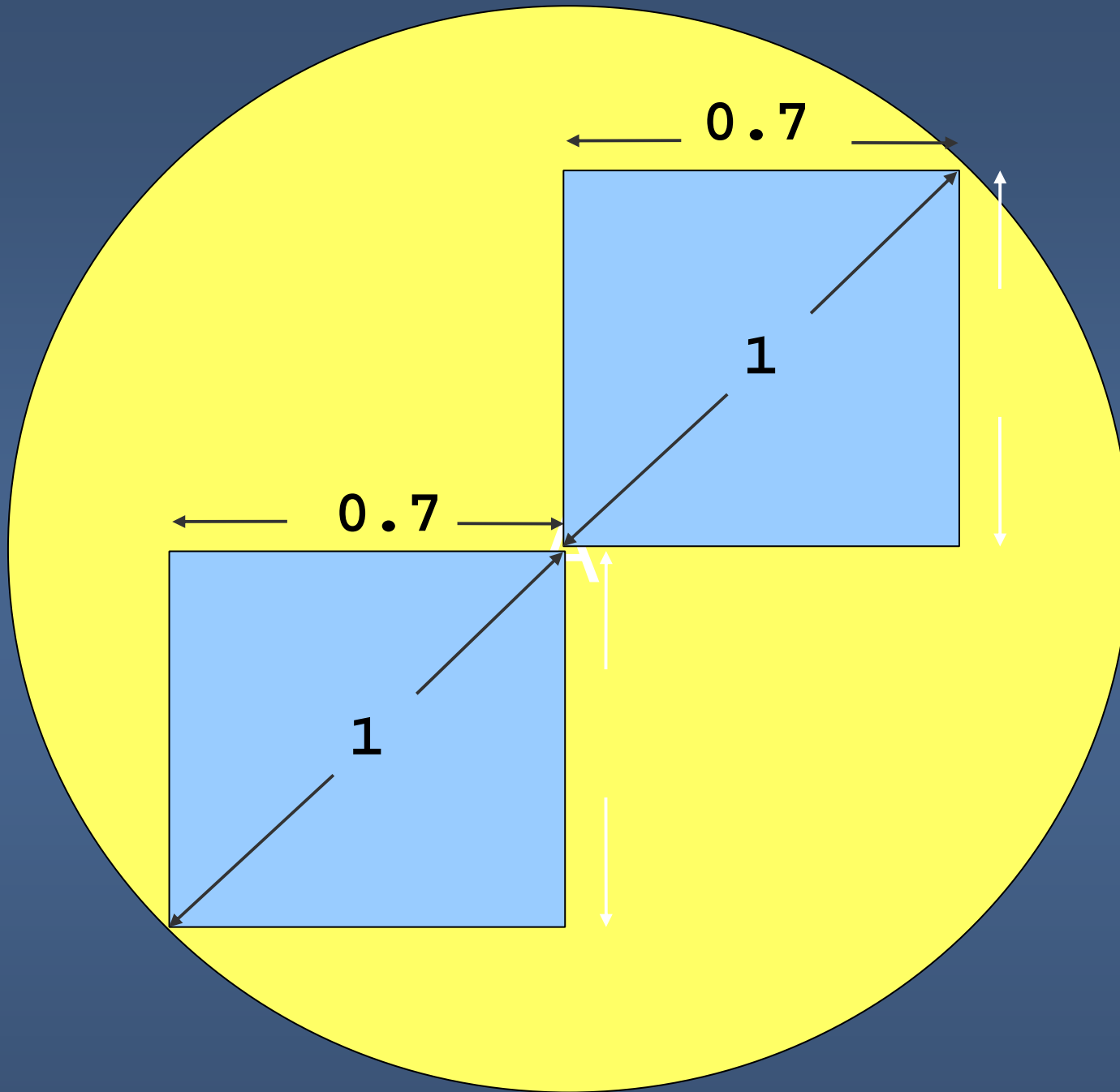
Many = > Available Frequencies

Communications Radius Vs Grid

A

1

Rectangular Pattern, Four Sector

A B C D A B C D A B C D A B C D

C D A B C D A B C D A B C D A B

A B C D A B C D A B C D A B C D

C D A B C D A B C D A B C D A B

Hexagonal Grid, Seven Sectors

```
1212121212121212
1212121212121212
1212121212121212
1212121212121212
1212121212121212
1212121212121212
1212121212121212
```

A   B   C   D   E   F   G

F   G   A   B   C   D

C   D   E   F   G   A   B

A   B   C   D   E   F

E   F   G   A   B   C   D

C   D   E   F   G   A

G   A   B   C   D   E   F

E   F   G   A   B   C

B   C   D   E   F   G   A

G   A   B   C   D   E

D   E   F   G   A   B   C

B   C   D   E   F   G

F   G   A   B   C   D   E

Rectangular Pattern, Eight Sector

```
A B C D E F G H A B C D E F G H
D E F G H A B C D E F G H A B C
G H A B C D E F G H A B C D E F
B C D E F G H A B C D E F G H A
E F G H A B C D E F G H A B C D
H A B C D E F G H A B C D E F G
C D E F G H A B C D E F G H A B
F G H A B C D E F G H A B C D E
```

Rectangular Pattern, Nine Sectors

A B C D E F G H I A B C D E F G H I
D E F G H I A B C D E F G H I A B C
G H I A B C D E F G H I A B C D E F
A B C D E F G H I A B C D E F G H I
D E F G H I A B C D E F G H I A B C
G H I A B C D E F G H I A B C D E F

Establishing YOUR CERT Plan

Keep

It

Simple

Stupid

Communications Complexity Progression

Chat

Informal Control

Formal Net(s)

Assigned Frequencies

    By Team or Function

    By Area

    By Area and Team and Function

Key Questions:

How Many Units (Teams) in OpArea?

How Many Frequencies Available?

How Frequent is the Traffic?

How Time Critical is the Traffic?

What is the Range of the Radio?

How Big is the OpArea?

Communications Discipline
Getting the Message Through

Clearly Assigned Responsibility

Established Routes

Interference Plan

Redundancy/Robustness

Established Protocols

Typical Intra Team Implications

One FRS Radio Channel (8 – 14)

If Inadequate Range, Go GMRS

Informal Net or Chat Mode

No Privacy Tones

Every Team Member Has a Radio

Every Team Member Hears All

Typical Inter Team Implications

Assigned or Requested Channel (GMRS 15 – 22 or HAM)

May Need "Calling Frequency"

Shared Channel 1 or HAM

Informal Net or Chat Mode

Only Team Communicator Has Radio

Only Leader + Communicator Hears

Typical Team/OES Implications

Assigned Channels

(GMRS 15 – 22 and/or HAM)

May Use "Calling Frequency"

Shared Channel 1 or HAM

Formal (Directed) Net

Only Team Communicator Has Radio

Only Leader + Communicator Hears

OpCen Comms Team

Monitors Calling Freq(s)

Serves as Net Control

Maintains Record of Traffic

Copies/Sends Formal Traffic

Relays Traffic

May Assign Sub Nets/Frequencies

Controls System Transitions

Team Communicator

Monitors Calling Freq(s)

Maintains Record of Traffic

Copies/Sends Formal Traffic

Relays Traffic

Negotiates/Establishes Comms Links

Disestablishes Comm Links

Stays Near Team Leader

FRS/GMRS Recommendations

Calling

    Channel 1

Team Assignments

    FRS 8 – 14

    Shared 2 – 7 (Work Down)

OpArea Assignments

    GMRS 15 – 22 (Work Down)