TACTICAL REPEATER & RETRANSMITTER SYSTEMS
and
REMOTE BASE OPERATIONS

Special Presentation to the
2019 ASRC Winter Retreat

Gene Harrison
ASRC – NCRC – CAP - MARS

12 Jan 2019
Revision 3.1
FUNDAMENTAL RULES

COMMUNICATIONS IS YOUR LIFELINE!!

* IN FIRST!  OUT LAST!
* ALWAYS ON & LISTENING!
* COVERAGE EVERYWHERE!
* ALWAYS ABLE TO SUPPORT & COORDINATE!
* EVERYBODY IN FIELD OR AT RISK NEEDS COMMS!
* ALWAYS HAVE BACKUPS!
COMMS QUESTIONS

WHAT ARE RELAYS, REPEATERS & RETRANSMITTERS?

But must understand::

What are the actual operational mission needs for sar, cave & other tactical operations?

Why are our tactical & deployed operations & needs so different, and so hard to accomplish?

Why do we need “good” communications?

What are good (essential!) Communications?

What do we mean by reliability, availability, suitability, viability, security, range, coverage, propagation, capacity, contention, *interoperability*… (insert many other buzzwords!!)

(lots more questions, issues, concerns…!)
CONTENTS

Star & multipoint networks
Isolated nets
Manual voice relay
Automatic repeaters
Automatic retransmitters
Local & remote base systems
Retransmitter design & costs
STAR NETWORK
(SIMPLEX)
MULTIPOINT NETWORK (SIMPLEX)
MULTIPOINT NETWORK
(SIMPLEX)
ISOLATED NETS! (BAD NEWS!)

Simple Simplex Signals
MANUAL VOICE RELAY
(TIME DELAY SIMPLEX)

Simple Simplex Signals
Manual Relays
Awkward & Unreliable

Rev 3.1 12 Jan 2019 © G.Harrison
MANUAL VOICE RELAY
(2-STEP BASE to FIELD)

Simple Simplex Signals
Manual Relays
Awkward & Unreliable
MANUAL VOICE RELAY
(2-STEP FIELD to BASE)

Simple Simplex Signals
Manual Relays
Awkward & Unreliable

Rev 3.1 12 Jan 2019 © G.Harrison
AUTOMATIC REPEATER
(1-WAY DUPLEX RELAY)

BOTH Repeater & ReTrans
AUTOMATIC REPEATER
(1-WAY DUPLEX RELAY)

BOTH Repeater & ReTrans
AUTOMATIC REPEATER
(BASE to FIELD)

BOTH Repeater & ReTrans

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AUTOMATIC REPEATER (FIELD to BASE)

F2 → F1

BOTH Repeater & ReTrans
AUTOMATIC REPEATER
(FIELD to FIELD)

BOTH Repeater & ReTrans
AUTOMATIC REPEATER
(“TALKAROUND” CHANNEL)

BOTH Repeater & ReTrans
RETRANSMITTER
(2-WAY DUPLEX RELAY)

ONLY ReTransmitter!
RETRANSMITTER
(2-WAY DUPLEX RELAY)

ONLY ReTransmitter!
RETRANSMITTER
(FREQ REUSE & MONITOR)

ONLY ReTransmitter!
REMOTE BASE
(BASE to FIELD)

ONLY ReTransmitter!
REMOTE BASE
(FIELD to BASE)

ONLY ReTransmitter!
RETRANSMITTER
(FIELD to FIELD)

ONLY ReTransmitter!
AUTOMATIC REPEATER (Using RETRANSMITTER)

BOTH Repeater & ReTrans
LOCAL & REMOTE BASES
TYPICAL FIELD USE

ONLY ReTransmitter!
LOCAL & 2 REMOTE BASES
TYPICAL FIELD USE

ONLY ReTransmitter!
RETRANSMITTER
DEPLOYMENT

Antenna

Mast

Handy High Hilltop...

BOTH Repeater & ReTrans
RETRANSMITTER
BLOCK DIAGRAM

ReTrans Changes
[ 2 Transceivers vs RX & TX ]

Antenna

Cavity Filter

RF Amp 25W

Receives Audio

Receives COR

Transmits Audio

Transmits PTT

T/R F1 1-5W

Battery & Power Supply

12 VDC

External Power Inputs

12 VDC

12 VDC

Remote Controls

Receive Audio

Receive COR

Transmit Audio

Transmit PTT

Control
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**NOTES:**
- INPUT VARIABLES
- INFORMATION
- OUTPUTS

**NOTES:** Preliminary Prices 2016 – Needs Update!
SUMMARY

• RELAYS, INCLUDING REPEATERS & RETRANSMITTERS
  – PROVIDE LONGER RANGES & WIDER COVERAGE AREAS
  – CONNECT FORMERLY REMOTE OR ISOLATED USERS & NETS
  – ENHANCE INTEROPERABILITY
  – SEEM SIMILAR, AND ALL ARE NEEDED

• AUTOMATIC SYSTEMS ARE SUPERIOR TO MANUAL RELAYS
QUESTIONS??

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