

# High Frequency Radio Equipment



# What we are covering

HF (high frequency) radio wave and its characteristics

HF Base Stations

The PoISAR HF radio

Channels

Aerial configurations

Basic Fault finding

A practical exercise

# HF Radio Wave Characteristics

High Frequency radio waves are between 3 and 30MHz

2 types are generated : a ground wave and a sky wave or 'skip'

The sky wave can be 'long range' or 'short range' depending on aerial configuration

Non Line-of-Sight means mountains aren't an obstacle.

Characteristics of frequencies mean certain ranges work better than others.

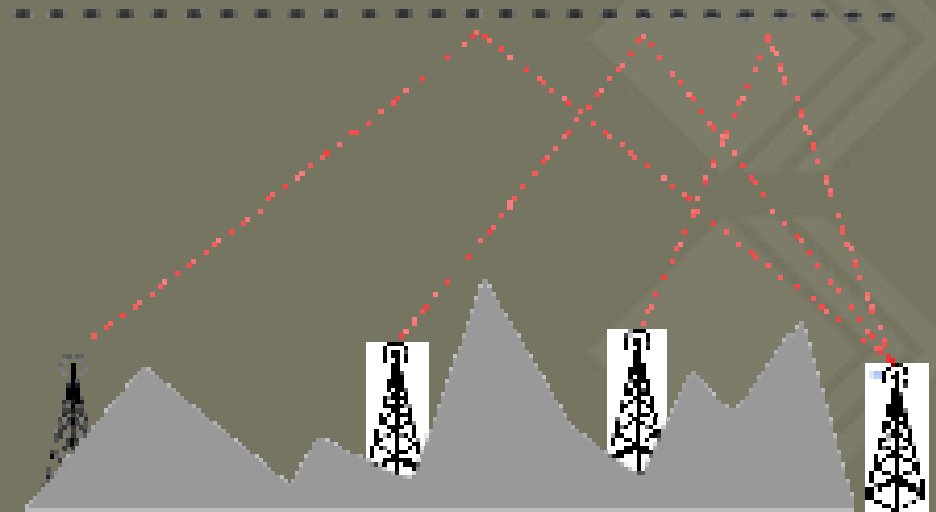
# HF Radio Wave Characteristics

## Types Generated

Ground wave

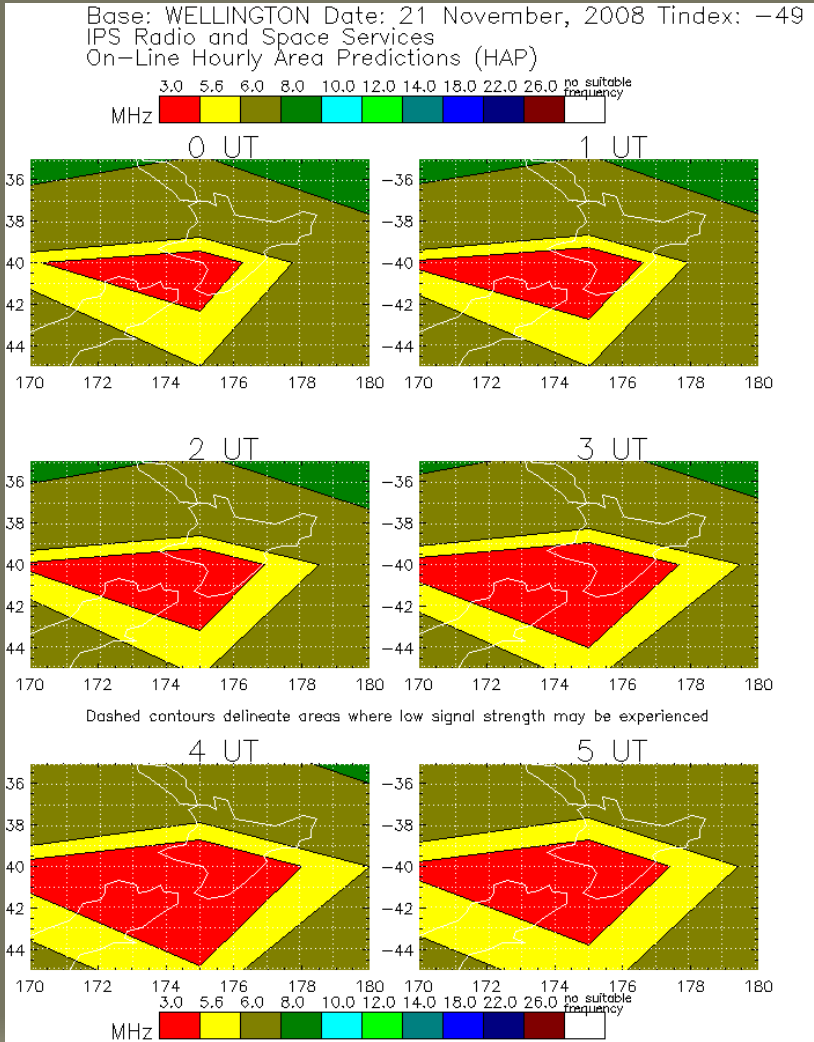
Near Vertical Incident Sky wave –  
short range sky wave

‘Normal’ range sky wave –  
longer range sky wave  
or ‘skip’



# HF Radio Wave Characteristics

## Skip Zones



# HF Radio Characteristics Communication Plan

## Communications Plan

Form SAR 41  
Ver Dec 2010



<b>Operation Name:</b>	Erua	<b>Time:</b>	2230hrs
<b>Prepared By:</b>	J. Osborne	<b>Date:</b>	11/5

### 1. Operational Period for this Plan (Date and Time)

<b>From:</b>	0530hrs 12/5	<b>To:</b>	1800hrs 12/5
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### 2. Key Contact Details

	Land Line	Cell Phone	Email/Fax/Other
Incident Controller	04 4357861	024 763290	
Information/Liaison/Media	04 4357861	024 763290	
Operations Section	04 4357861		
Planning & Intel Section	04 4357861		
Logistics Section	04 4357861		
Staging Area		021 547890	
Comms Unit Leader		021 896575	

### 3. VHF Comms

	Chan Name	Chan ID	Bank/Ch #	Comments
Command & Control	ESB 58			Direct channel for command/control
Operations	ESB 57			Duplex for all parts of search area
Team Simplex	ESX 07			Team to team. Could use for relaying messages to Ops if needed
Air Ops Channel	MSX 27			Ground to air

### 4. HF Comms

Chan Name	HF Schedule Time	Comments
1	as needed	Night time frequency. Use as backup for VHF. Listening watch will be maintained by Ops
2	as needed	Day time frequency. Use as backup for VHF. Listening watch will be maintained by Ops

### 5. Notes on VHF Comms

Call Signs  
ICP : Erua Base  
Team 1 : Erua 1  
Team 2 : Erua 2

Schedule time : Hourly on the hour


Alternate Channel: In event you cannot raise Ops on above channels use DOC 20. This may not be accessible in some parts of search area due to terrain


<b>Approved:</b>	J.OSBORNE	<b>Date/Time:</b>	11/5 2245HRS
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# HF Base Station

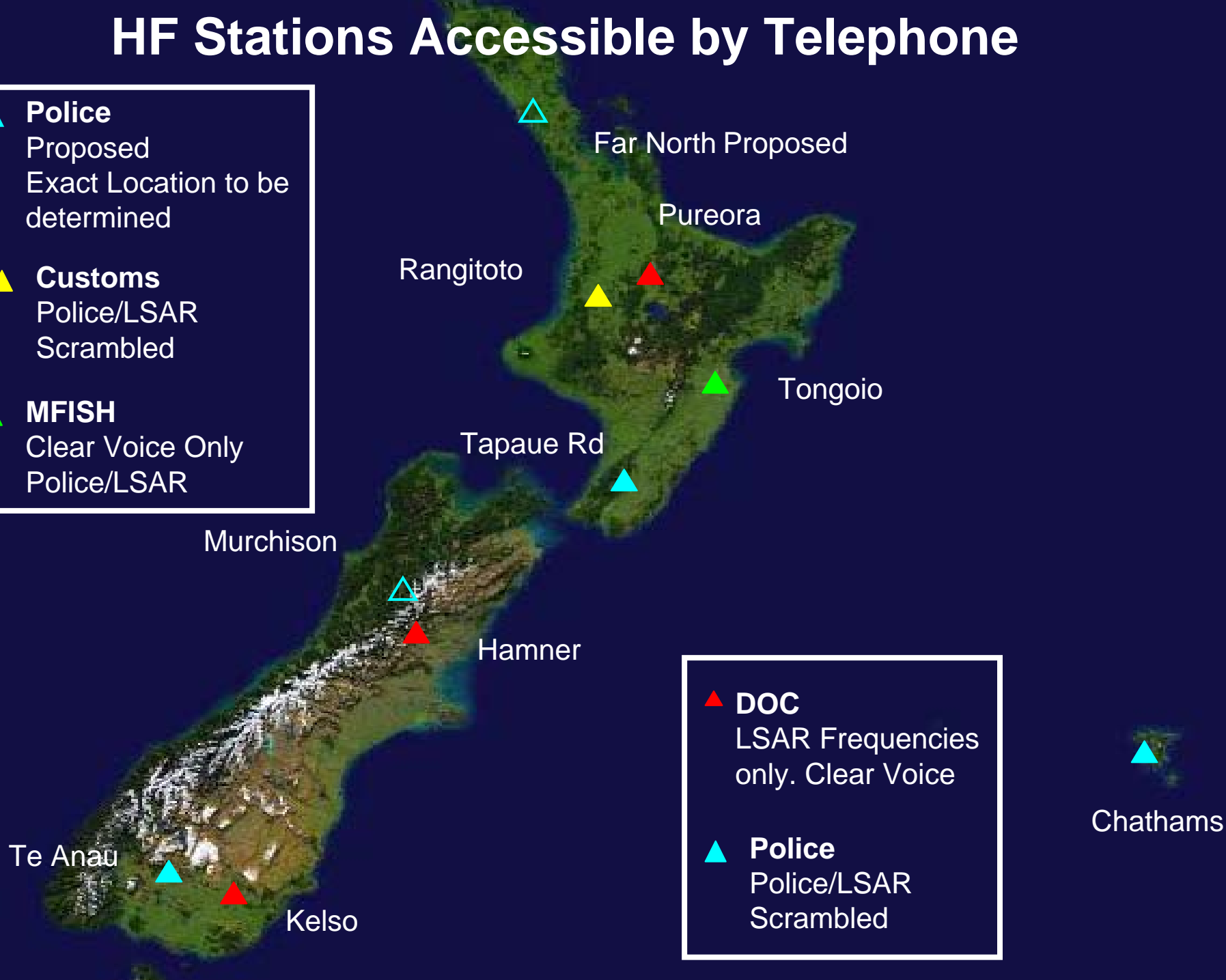



# HF Stations Accessible by Telephone


 **Police**  
Proposed  
Exact Location to be determined

 **Customs**  
Police/LSAR  
Scrambled

 **MFISH**  
Clear Voice Only  
Police/LSAR



 **DOC**  
LSAR Frequencies only. Clear Voice

 **Police**  
Police/LSAR  
Scrambled



# SR3 / POLSAR Portable HF Radio



Battery Light

TX Light

# SR3 / POLSAR Channels and Use

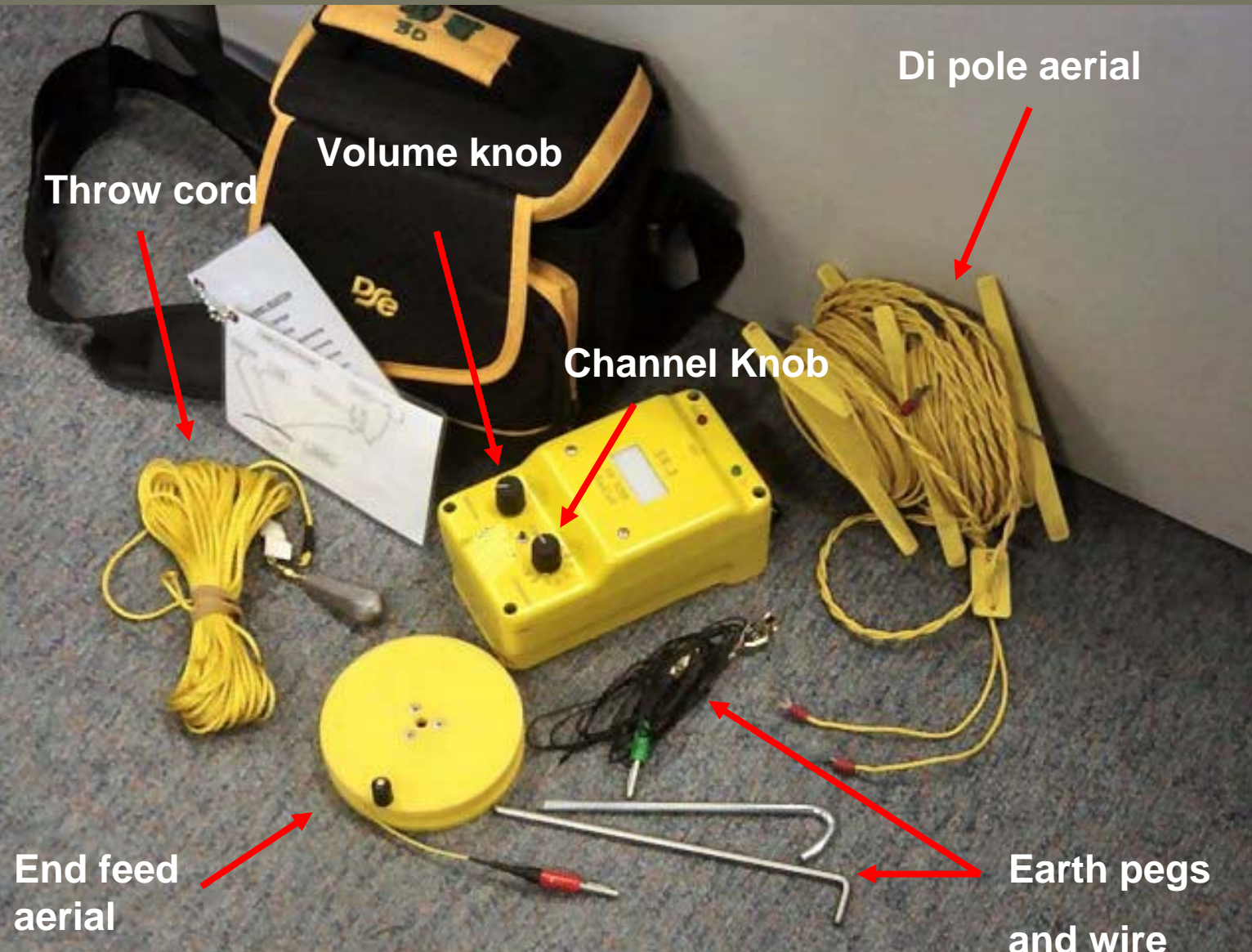
Volume knob

Microphone

PTT button

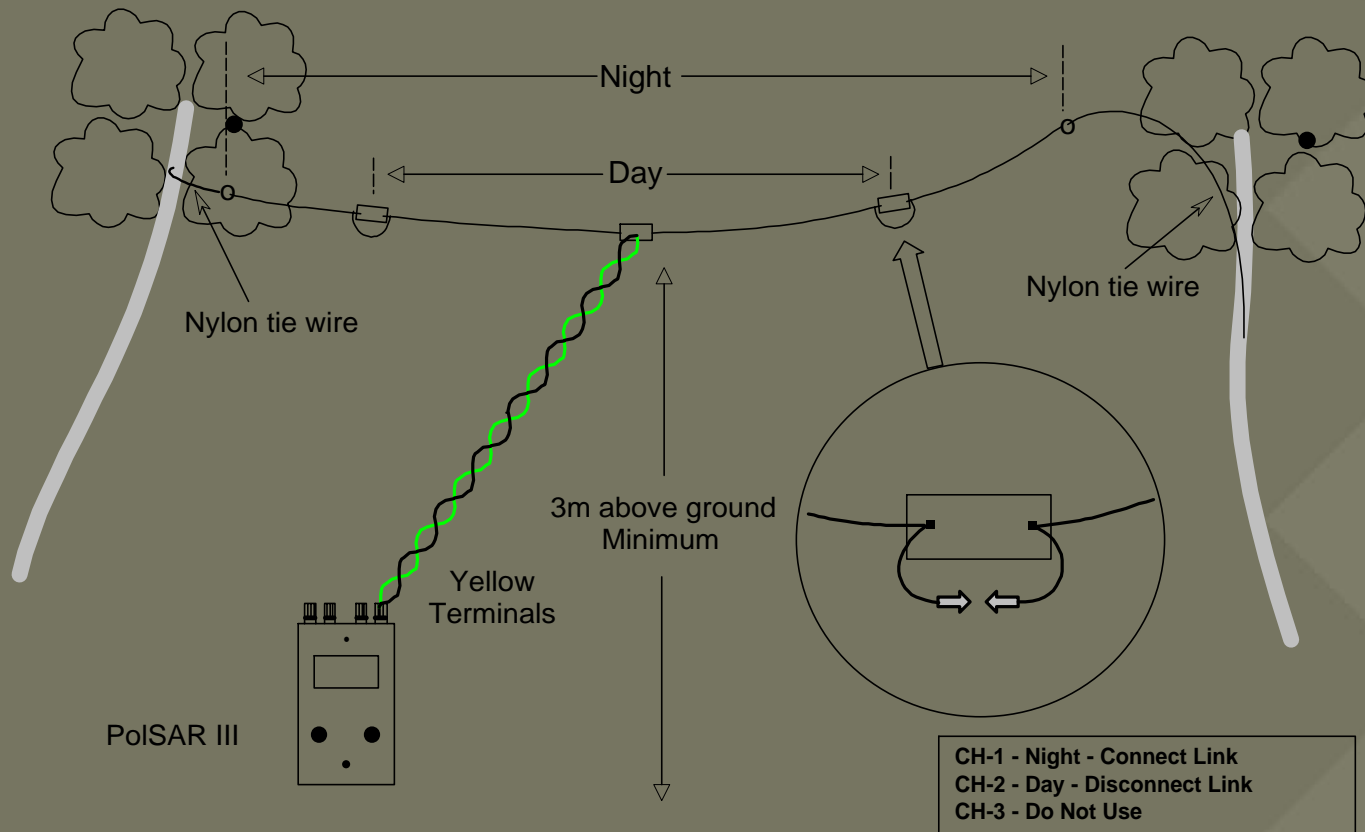
Channel Knob

# SR3 / POLSAR Aerials



# SR3/POLSAR Antenna - Dipole

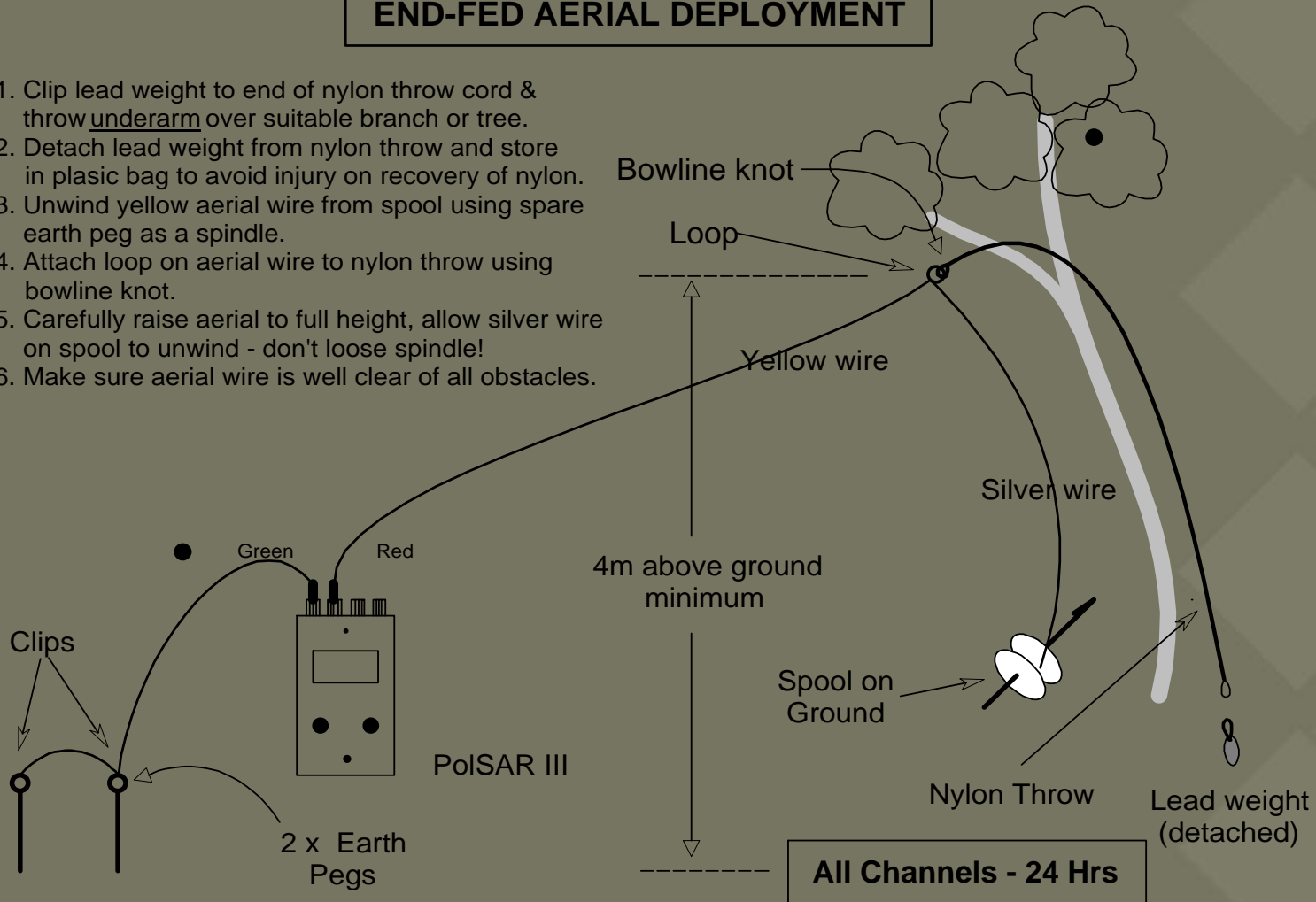
## DIPOLE AERIAL DEPLOYMENT



# SR3/POLSAR Antenna - End-Fed

## END-FED AERIAL DEPLOYMENT

1. Clip lead weight to end of nylon throw cord & throw underarm over suitable branch or tree.
2. Detach lead weight from nylon throw and store in plastic bag to avoid injury on recovery of nylon.
3. Unwind yellow aerial wire from spool using spare earth peg as a spindle.
4. Attach loop on aerial wire to nylon throw using bowline knot.
5. Carefully raise aerial to full height, allow silver wire on spool to unwind - don't lose spindle!
6. Make sure aerial wire is well clear of all obstacles.



**Search Area**

**Team Location**

**ICP**

**CHRISTCHURCH**



# SR3 / POLSAR – Common Faults

Often associated with:

- Power
- Antennae



# Practical A - using ground waves and NVIS

## Phase 1:

- Divide into teams of 2 or 3
- All teams to set up a radio and aerial , debrief to the group then dismantle as advised

## Phase 2:

- All teams will be advised of a location to which to travel, call signs and message content
- On arriving at the predetermined position teams to set up the radio and call the control point
- The control point will transmit a message to each team
- Each team will transmit a message to each other. If necessary teams to use a relay
- Return for debrief.



# Practical B- Using sky wave

- Divide in to 3 or more teams
- 1 team will deploy the radio using the Dipole Antenna using the Day Frequency
- 1 team will deploy the radio using the Dipole Antenna using the Night Frequency
- Other teams will deploy the radio using the End Fed antenna. Each team will be on a different frequency. The facilitator will advise you the frequency
- The facilitator will use a HF telephone connection to talk to each of the teams on the channel they have set their radio to. To illustrate 'skip zones' use will be made of different remote HF telephone connections.

# High Frequency Radio Equipment

## REFERENCES

- NZ LandSAR Field Guide
- NZ LandSAR Aid Memoir
- N.Z. LandSAR Radio Communication Competencies

## ACKNOWLEDGEMENTS

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