

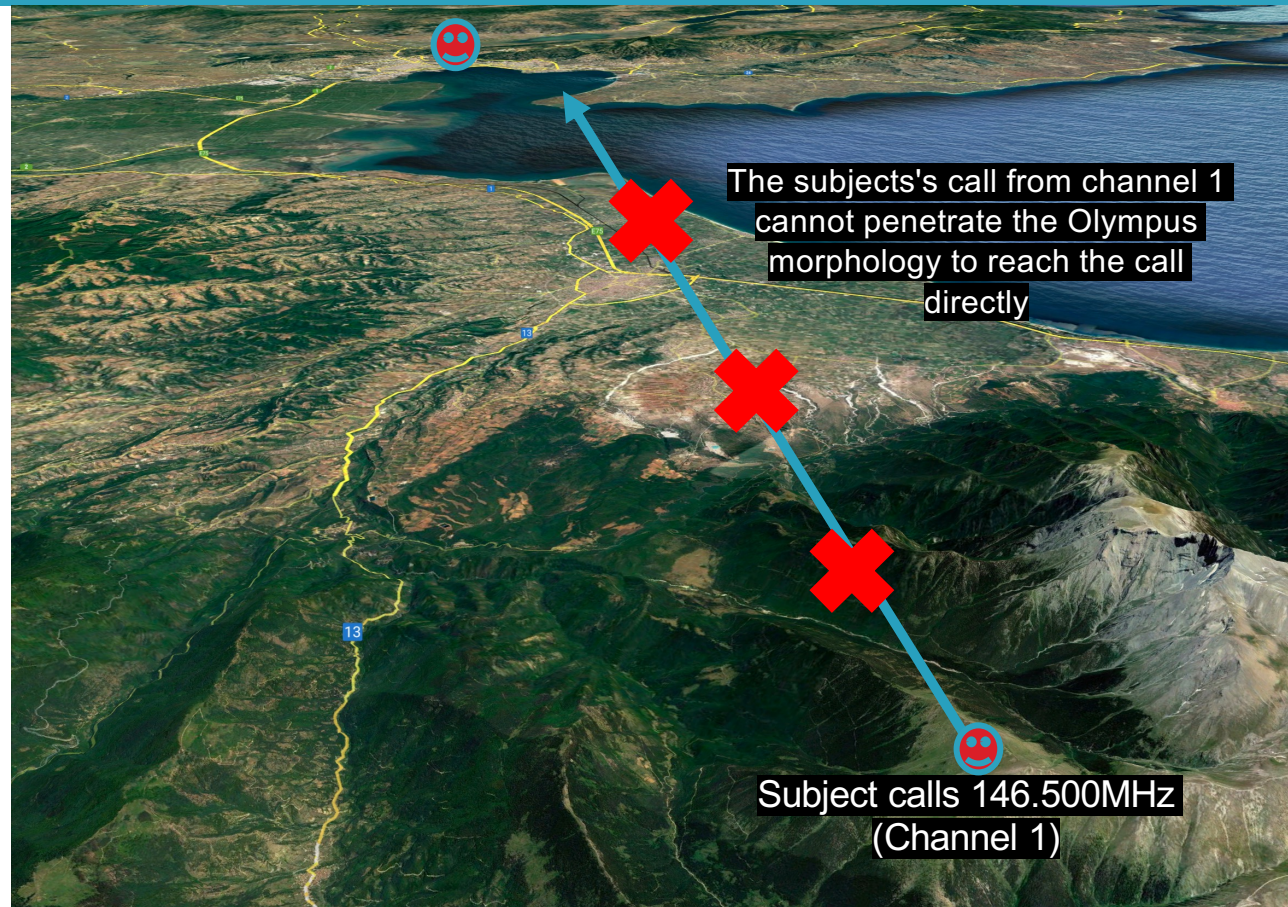


THE IMPORTANCE OF A ROBUST RADIO TELECOMMUNICATION SYSTEM IN MOUNTAIN SAR OPERATIONS

Hellenic Rescue Team

Dimitris Stoupis, Telecommunication Department (HRT)

Distress Call in 2021 (true story)



The Beginning



December 1976

What we will see



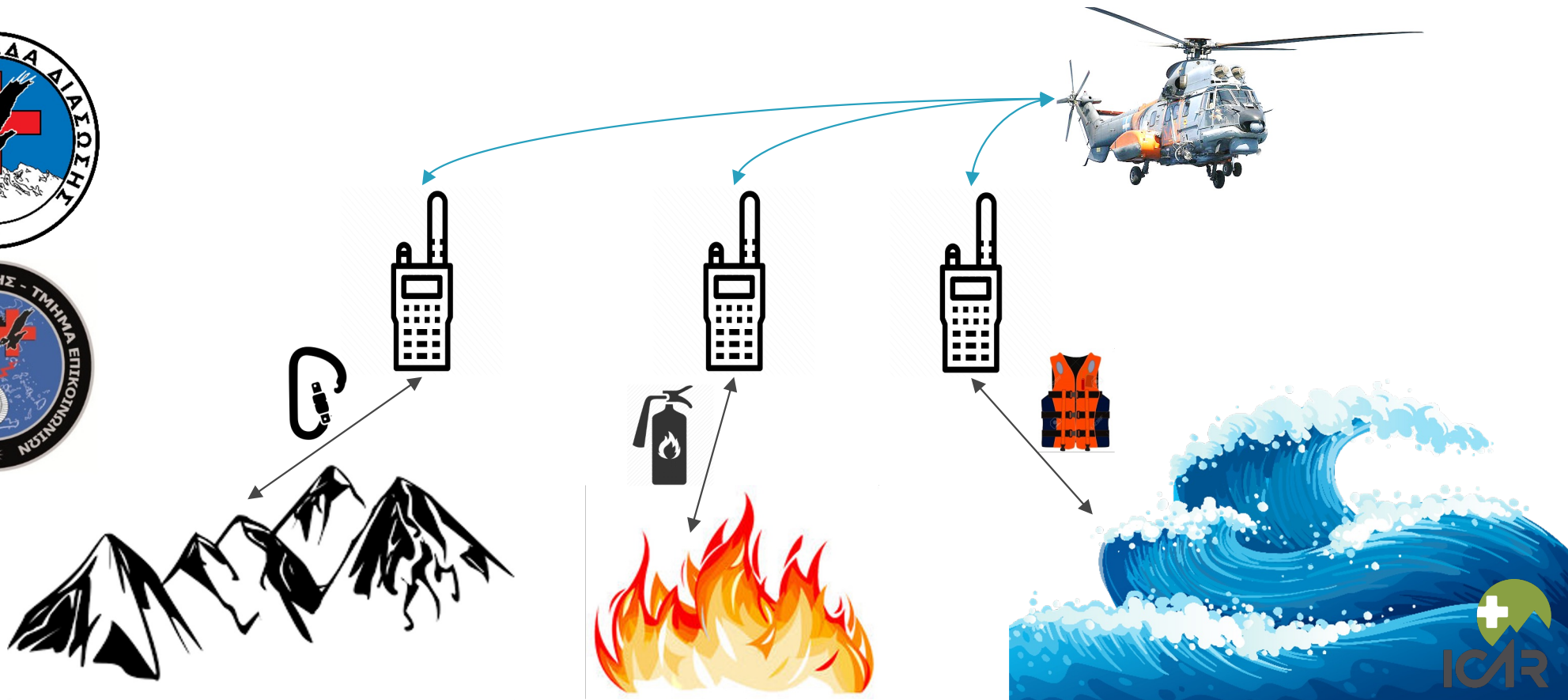
- ❑ HRT nationwide network
- ❑ Using RF wave properties on our side
- ❑ Real incident & communication importance

What - Radio Communications



- ❑ Information **relay** through **radio waves**
- ❑ Long or short distance **data exchange**
- ❑ **Transmitter** and **receiver** operation

Importance - Radio Communications



Importance - Radio Communications



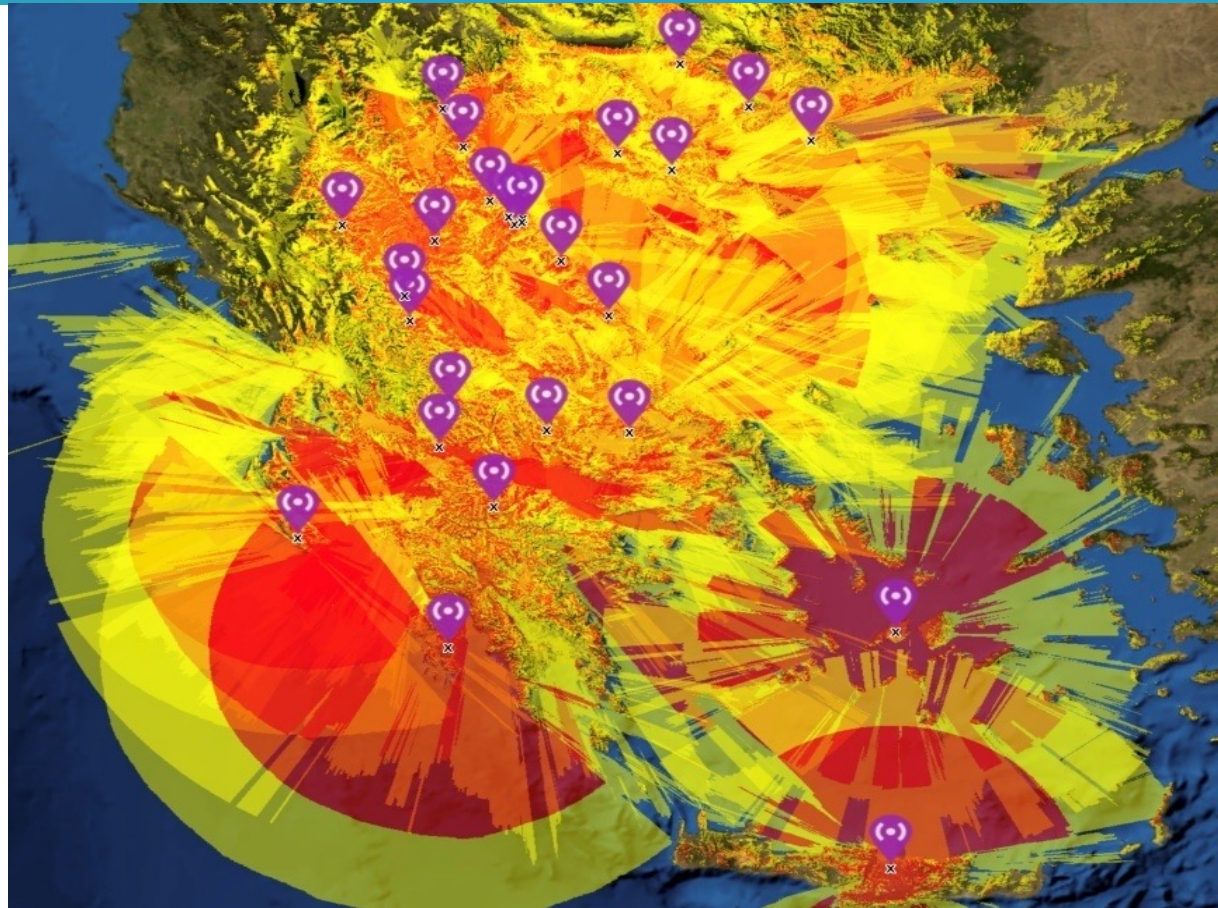
March 1999



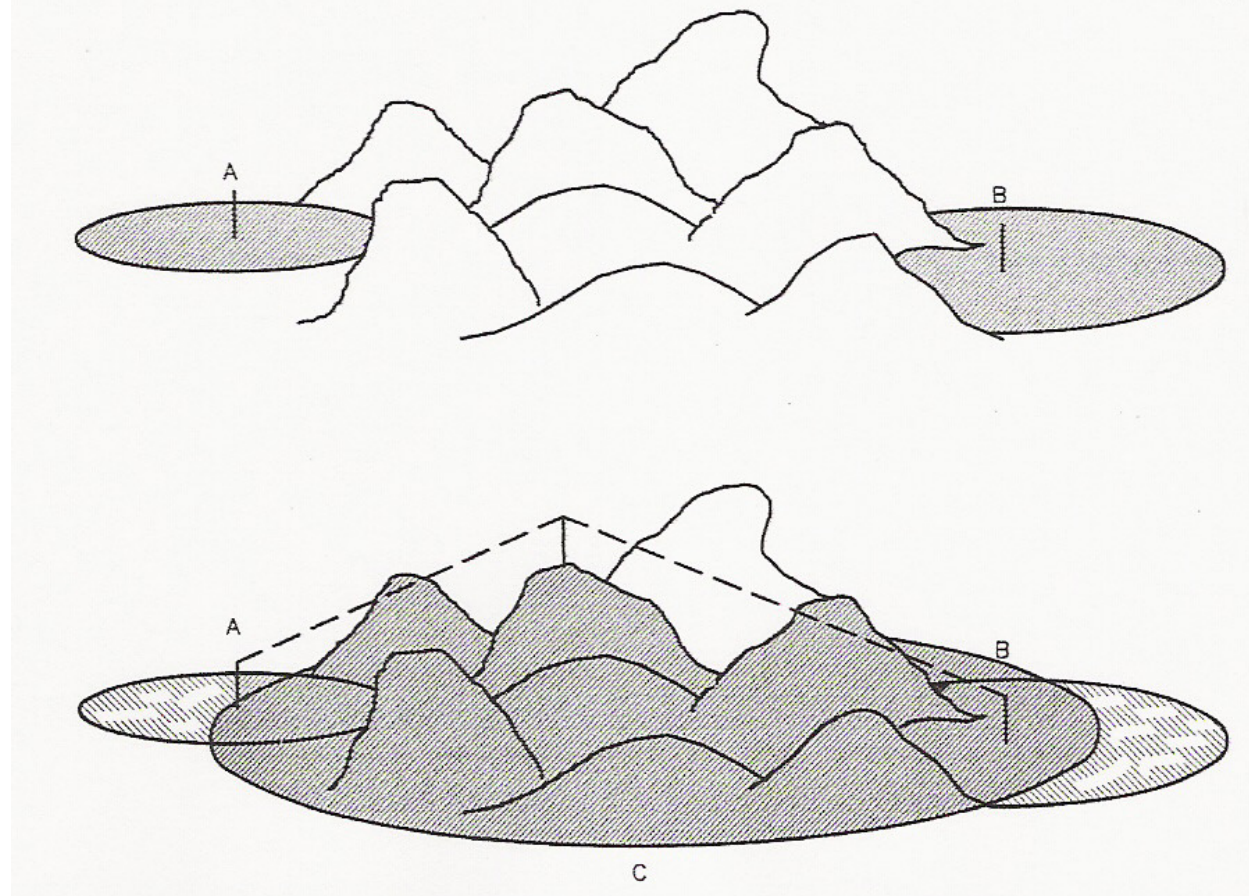
Coverage - HRT Radio Network



Coverage - HRT Radio Network



Repeaters - Connecting places



Advantages of Repeaters

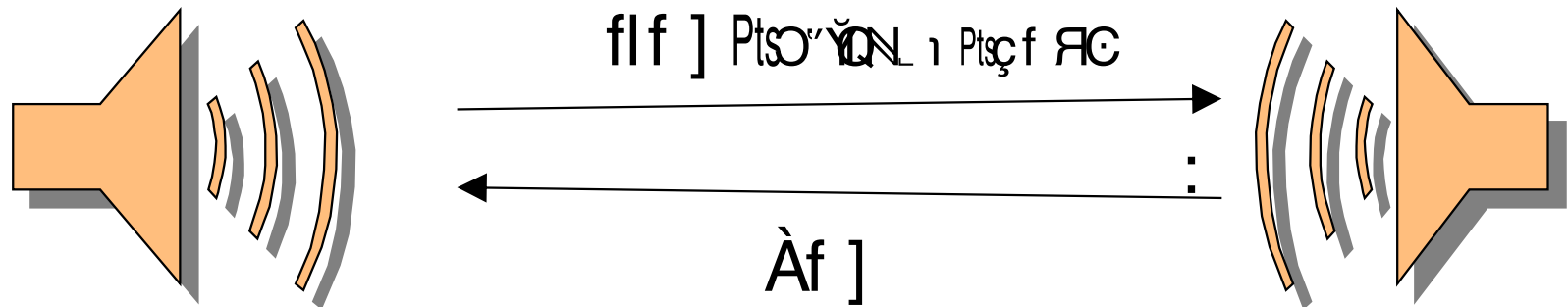


- ❑ Long range
- ❑ Battery saving
- ❑ Reliable communication link

HRT Repeaters



- ❑ A is always at 146.500 MHz (Channel 1)
- ❑ B always different and unique



Why - HRT Radio Network



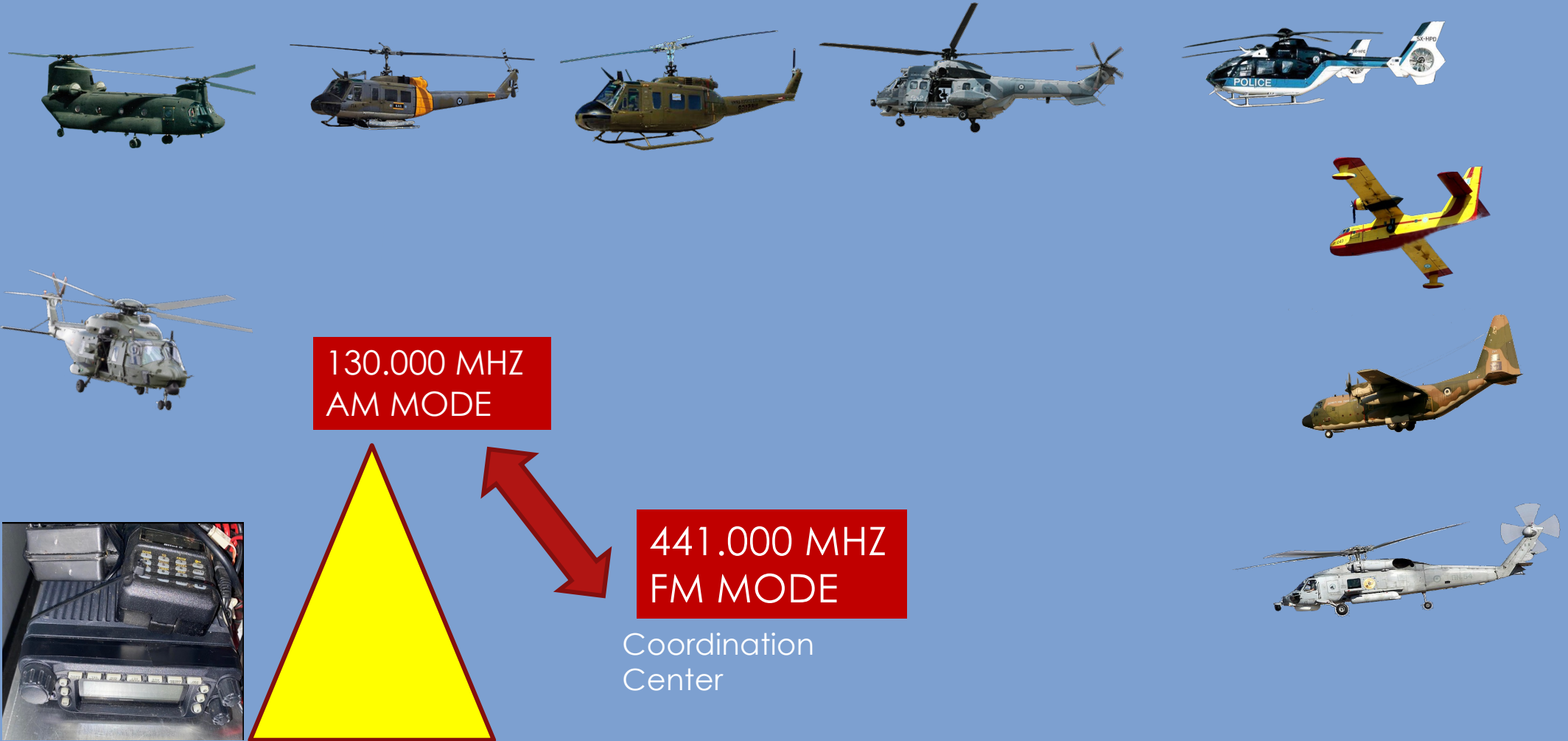
- ❑ Receiving emergency calls nationwide
- ❑ Communication for hikers and huts
- ❑ Search and rescue operations
- ❑ RF experimentation

Compatibility - HRT Radio Network



- ❑ Any civilian with a radio
- ❑ Fire Service
- ❑ Air Force & SAR Helicopters
- ❑ Any agency with VHF/UHF capability

Cross-sectoral compatibility and communication support





400-470 MHz FM
MODE

Base
Station



HRT Mobile Emergency Operations Center

ADSB.
Aircraft location

VHF AIR
BAND

Military
30-75 MHz

V/UHF

Marine
152-165 MHz

HF

Direction Finder

HF

Spectrum
Analyzer

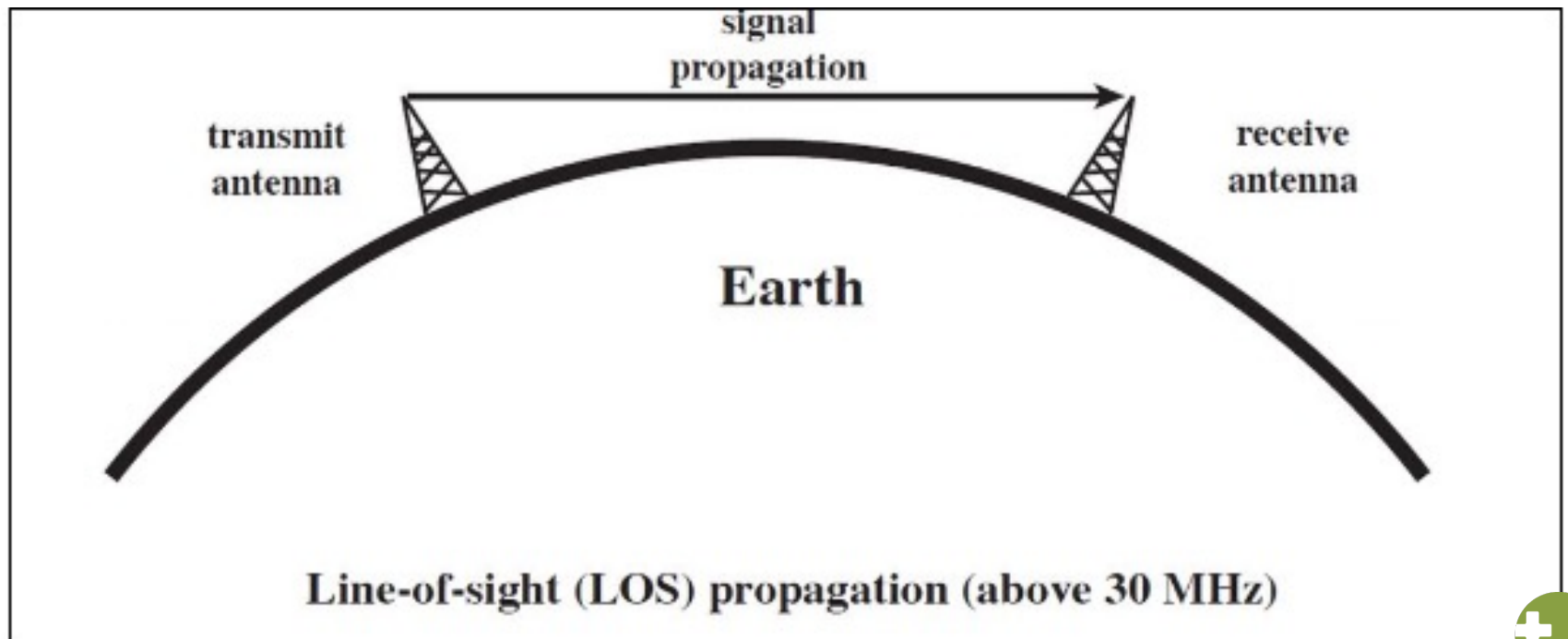
Naval
Radar

ADF Antenna

Starlink
Comms



Propagation - Electromagnetic Waves

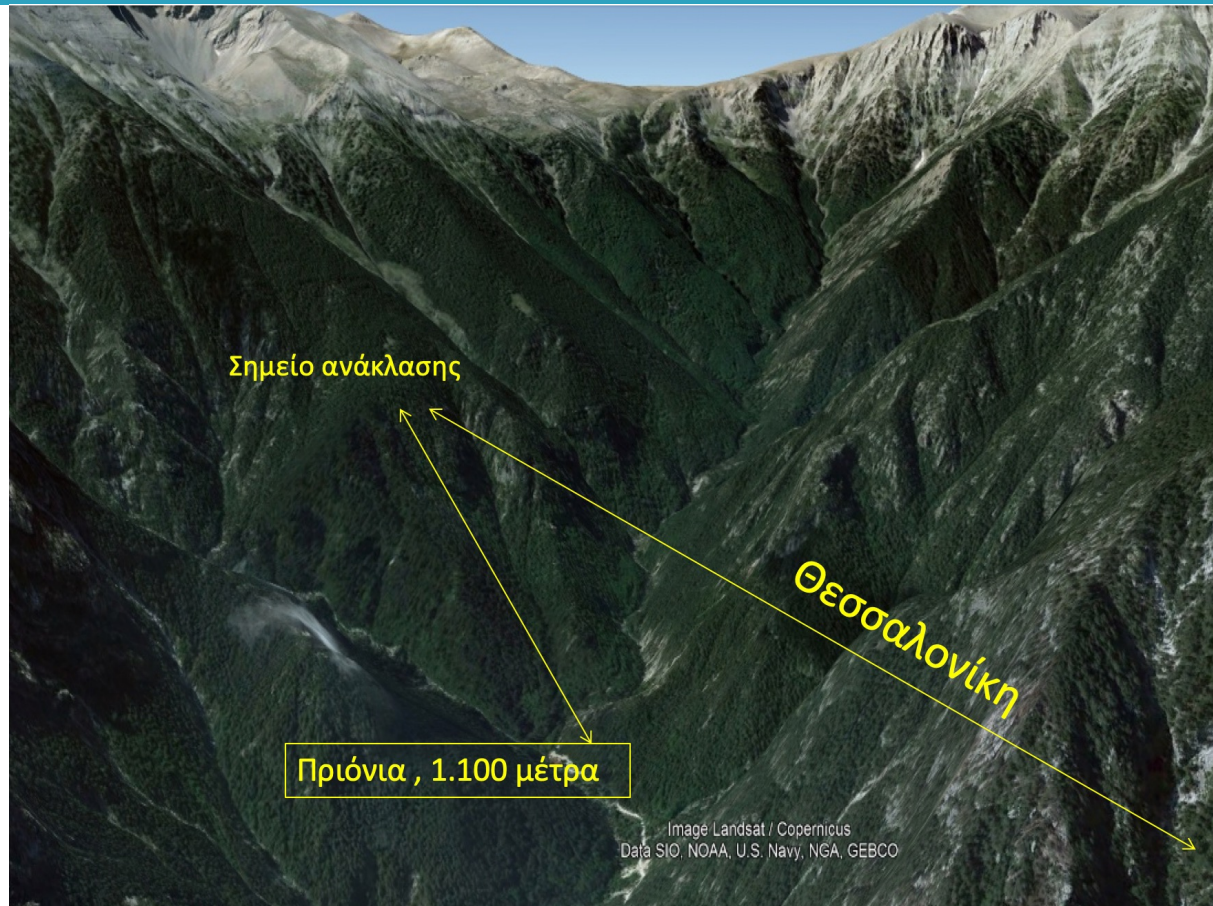


Properties - Electromagnetic Waves

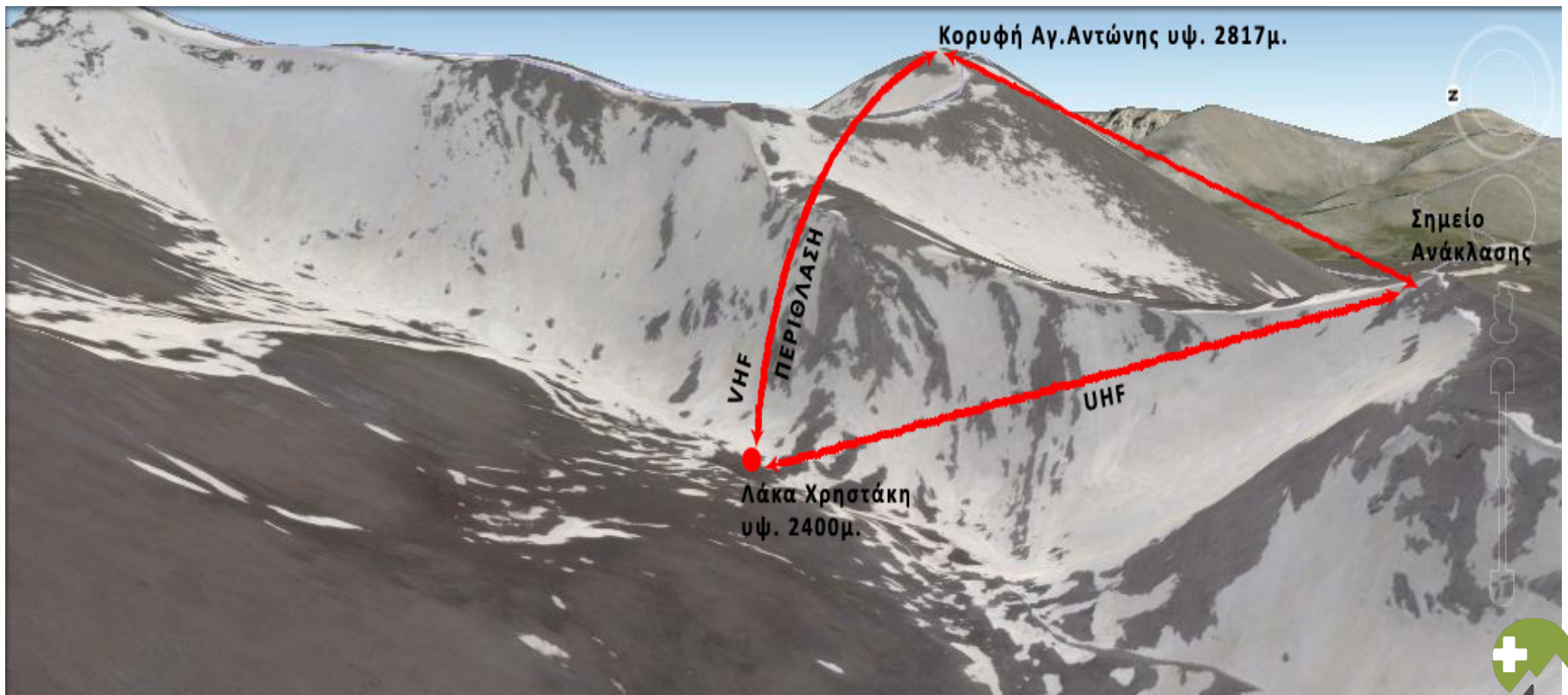


- ❑ Reflection
- ❑ Diffraction
- ❑ Absorption (Scattering)

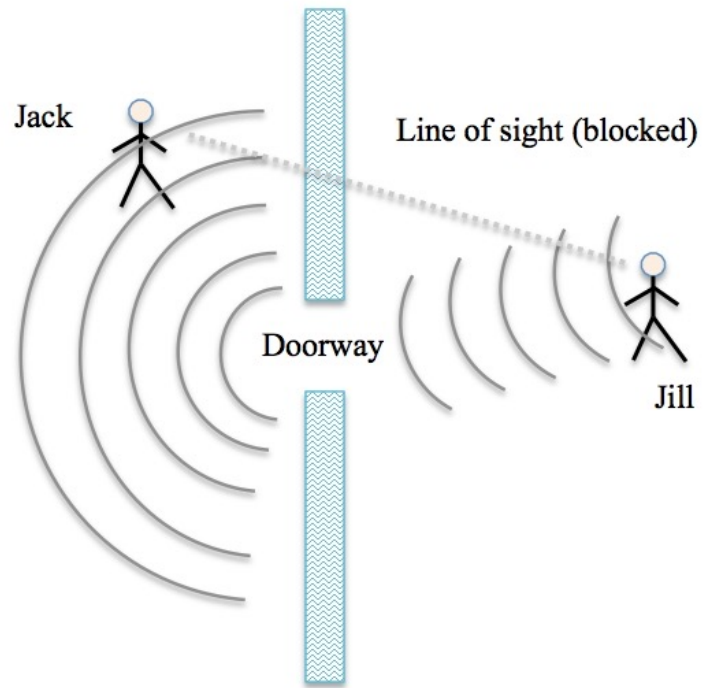
Reflection



Diffraction



Diffraction

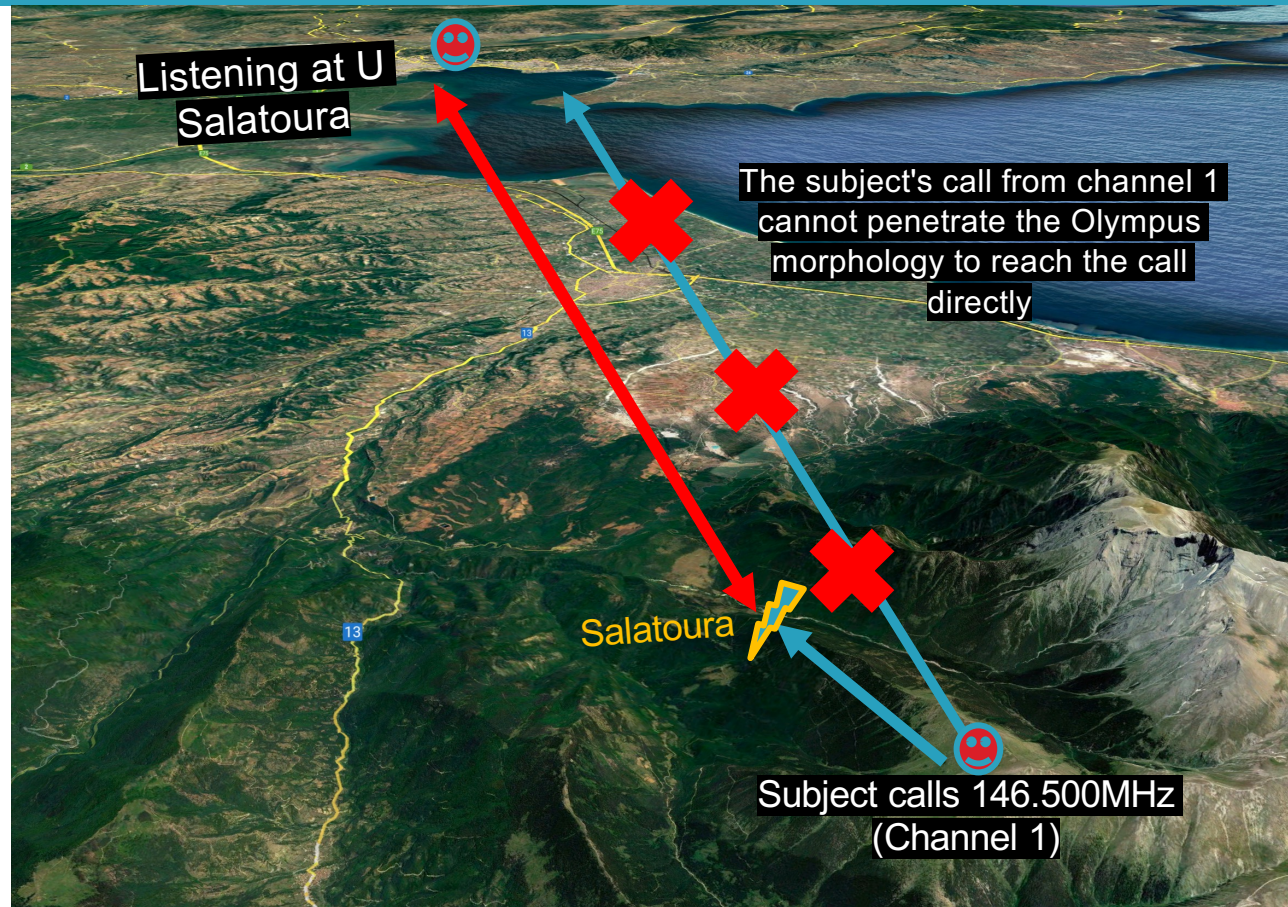


Properties of Electromagnetic Waves



- ❑ **Challenging** line of sight communication
- ❑ **Reflection** and **Diffraction** for beyond LOS
 - ❑ **UHF** radio waves reflect more than VHF
 - ❑ **VHF** diffract more than UHF

Distress Call (true story)



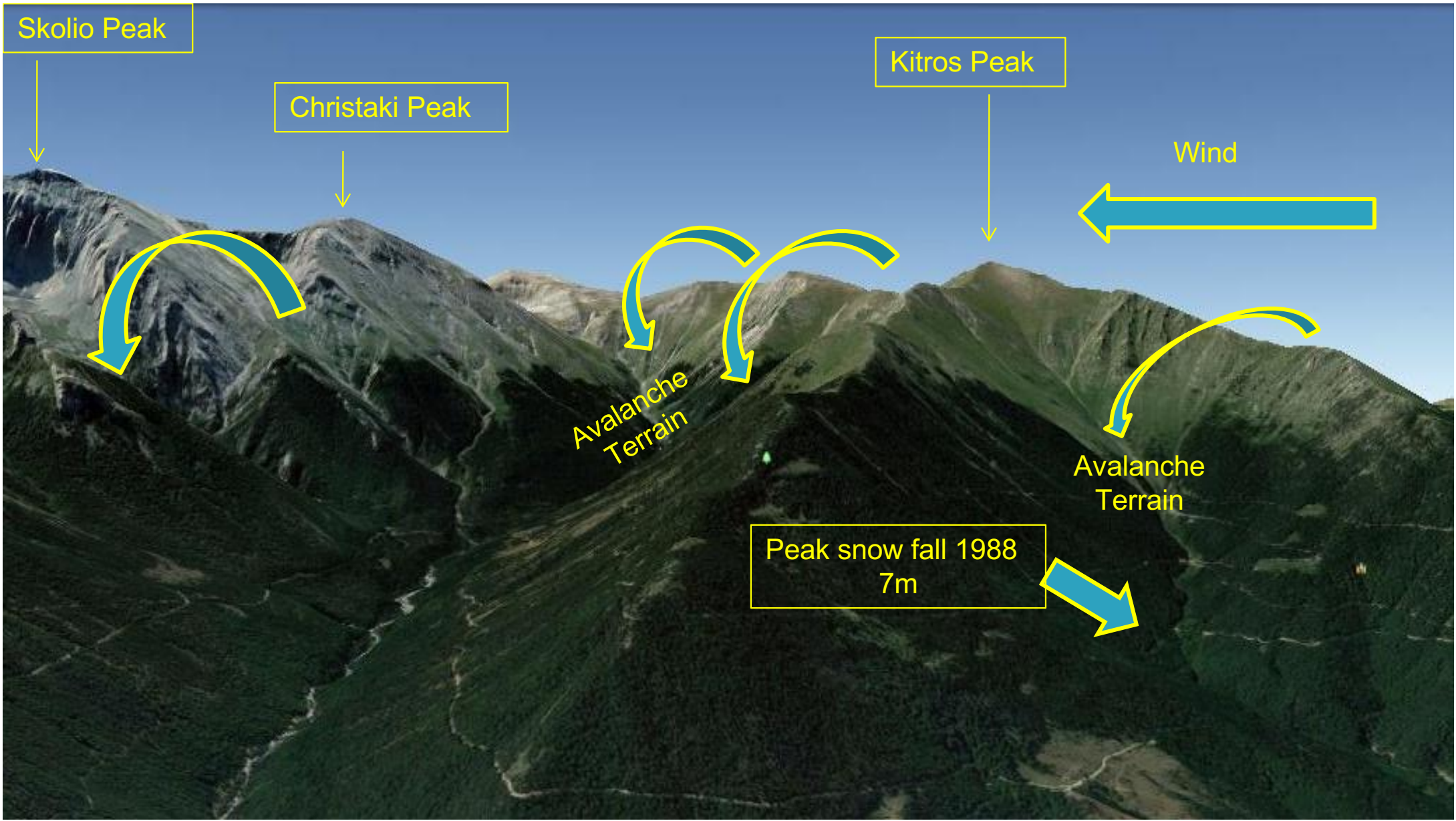
Jan. 2021



Distress Call (true story)



Jan. 2021



Skolio Peak

Christaki Peak

Kitros Peak

Wind

Avalanche
Terrain

Avalanche
Terrain

Peak snow fall 1988
7m

Take-home Messages



- ❑ Infeasible SAR without proper communication
- ❑ Be confident with an “accent”
- ❑ Plan for the worst to execute the best



Hellenic Rescue Team

THANK YOU!!



Discussion

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Hellenic Rescue Team

Questions?