Communication warfare (ECM and ECCM)

A game of Frequencies

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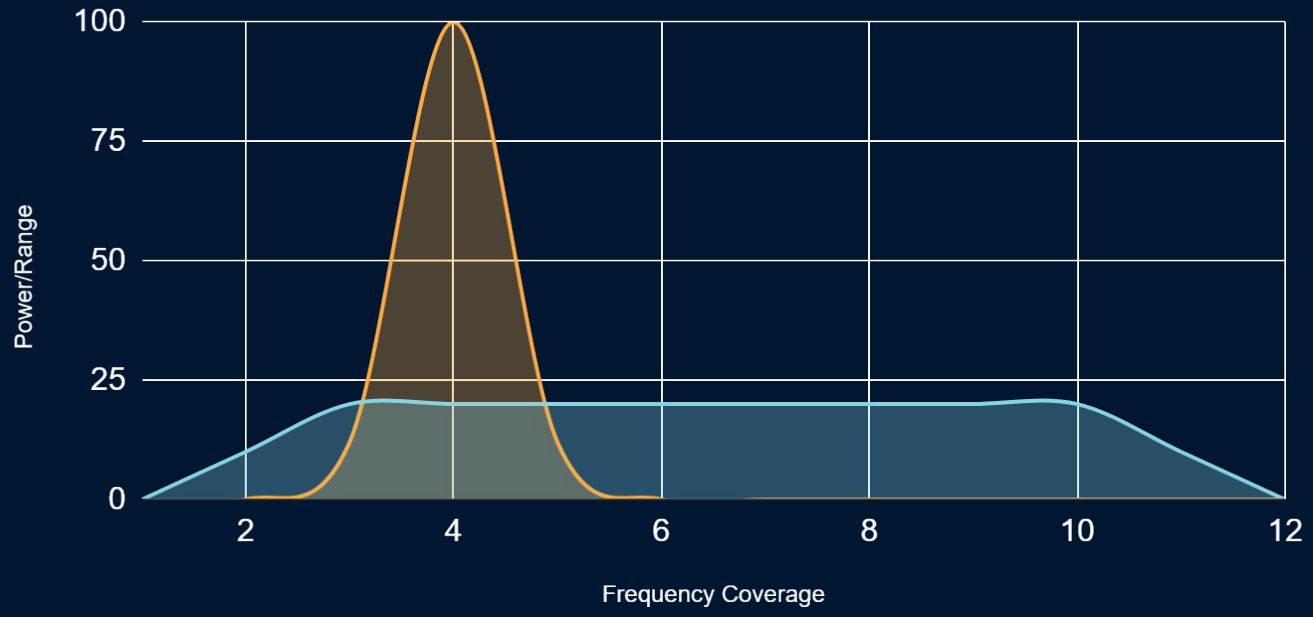
Basic Jamming methods

Spot vs Barrage Jamming

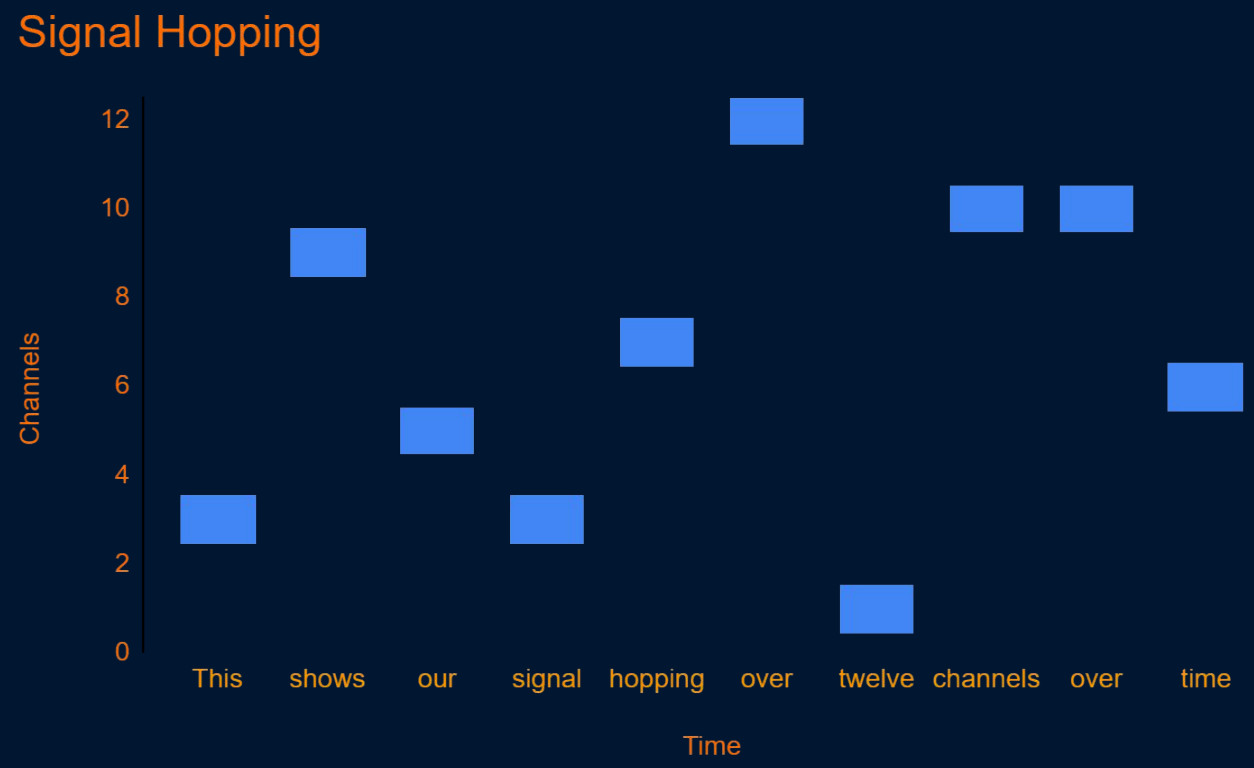


- Spot Jammer
- Barrage Jammer

How do we maximize jamming?

How do we minimize its impact?

Frequency Hopping



Both jammers and transceivers are capable of signal hopping

This results in a “zero sum” game in which 100% of one side’s success is another’s failure

Perfect for game theory and probabilities

MinMaxing the game

Linear Programming

Optimal Transceiver Strategy

Maximize v

subject to $A^T x \geq v$
$||x||_1 = 1$
$x \geq 0$

$$v = x^T A y$$

v - Transceiver Throughput (value of the game)

x - Transceiver Strategy (Probability Dist.)

y - Jammer Strategy (Probability Dist)

Optimal Jammer Strategy

Minimize v

subject to $Ay \leq v$
$||y||_1 = 1$
$y \geq 0$