

De-conflicting Use

- De-conflict use between tiers
- De-conflict use within each tier
- Protect Incumbents and Priority Access users
- SAS should authorize the use of a specific frequency at a particular location and time, similar to the dynamic frequency assignment of a “trunked” radio system
- SAS should **not** configure or re-configure other radio parameters (other than frequency)

SAS Frequency Assignment

- Knowing BS/AP location, terrain, EIRP and antenna characteristics, calculate both a coverage zone and a larger, surrounding buffer zone to protect neighboring BS/APs from interference
- Use the buffer zone(s) to determine where and when to re-use each frequency

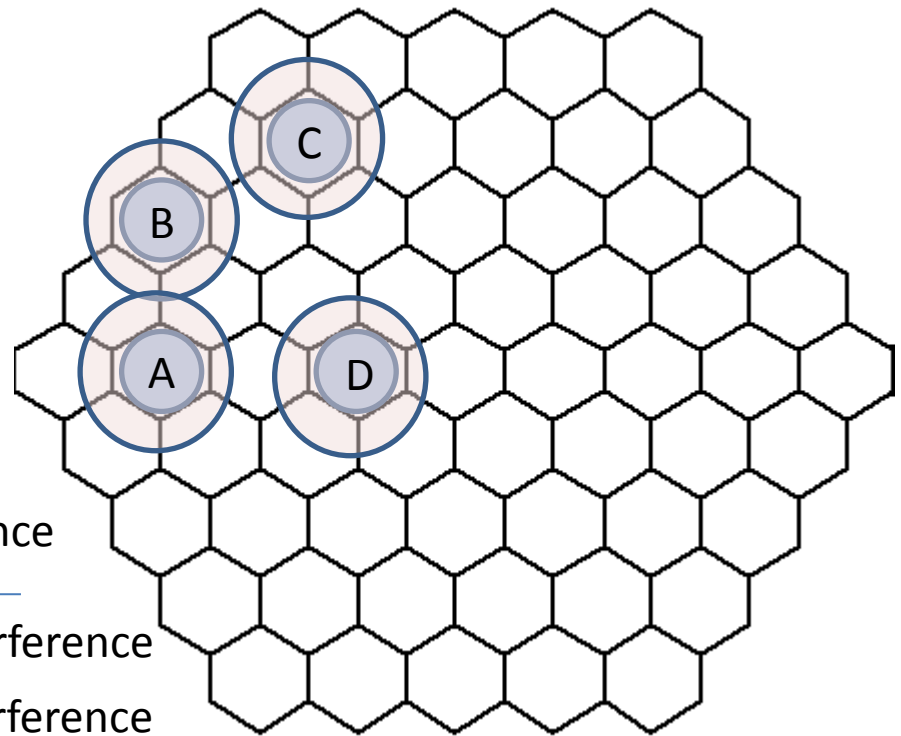
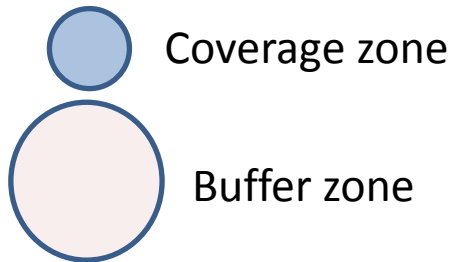
Mitigating Mutual Interference

- All nodes collect statistics on “error rate”, which can be
 - Re-transmitted frame rate, or
 - Errored packet rate, or
 - Error rate, or
 - Some other indicator of the percentage of failed packets
- No matter the label, the meaning is the same: the error rate for frames or packets that fail to be acknowledged from the distant end.
- An increasing error rate can be due to an equipment failure *or* to interference; however, ***mutually*** rising error rates between nearby same-frequency nodes typically indicates mutual interference. The SAS can mitigate this interference with a frequency change.

Interference Mitigation

KEY

ER means “Error Rate”
+ means “Is Increasing”
= means “Is Stable”



IF $ER(x) +$ *and* $ER(y) +$ **THEN** x/y Interference

IF $ER(A) +$ *and* $ER(B) =$ **THEN** NO A/B Interference

IF $ER(A) +$ *and* $ER(C) =$ **THEN** NO A/C Interference

IF $ER(A) +$ *and* $ER(D) +$ **THEN** A/D Interference

Census Tracts

Detecting Frequency Usage

- Agree to real-world usage thresholds
- SAS pulls and logs information from each BS/AP administration or management database
 - Number of client connections
 - Total packets transmitted and received
- SAS determines that a node is in real-world use serving clients
 - If node **is not in use** then the frequency is made available to other BS/APs
 - If node **is in use** then no frequency change