AFC Documentation Review

AFC Fall 2015 – Montreal

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Scope

- Review the AFC documentation over 2015/2016
  - Coordinated with AFC meetings
    - Outside work will be required
  - AFC manual approval targeted for Q1 2016
  - Other documentation will then be updated during 2016
- Review is intended to update and rationalize
  - Reflect how we would want to do it in a practical manner
- Presentation of ASRI proposals to AFC
  - Concepts not agreed until AFC review and vote
  - Requires approval from ASRI BoD to finalize

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AFC Manual Rev C

- Administrative/procedural
- VDLM2 channel plan
- Justification process for additional VDLM2 channels
- Co-channel separation criteria
- Voice channel justification formula
- Radio emission profiles
- De-icing frequency policy

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Administrative/procedural

- Review period
- Clean up language
- Clarify membership categories
  - Voting and approval
  - Primary and alternate members
- Definition updates

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Proposed VDLM2 Channel Plan

Frequency (MHz)	Allocation	Notes
136.975	Common Signaling Channel	Already assigned nationally to VDLM2
136.950	Guard Channel	
136.925	Guard Channel	
136.900	Guard Channel	
136.875	Guard Channel	
136.850	Guard Channel	
136.825	Guard Channel	
136.800	VDLM2 on-site SITA	Primarily ground traffic - Planned for national US deployment
136.775	Guard Channel	
136.750	VDLM2 off-site SITA	Primarily enroute traffic - Planned for national US deployment
136.725	Guard Channel	
136.700	Guard Channel	
136.675	Guard Channel	
136.650	VDLM2 on-site RC	Primarily ground traffic - Planned for national US deployment
136.625	Guard Channel	
136.600	VDLM2 off-site RC	Primarily enroute traffic - Planned for national US deployment
136.575	Guard Channel	
136.550	Guard Channel	
136.525	ASRI voice users	Select US areas only
136.500	ASRI voice users	Select US areas only

Frequency (MHz)	Allocation	Notes
136.475	FAA voice users	National
136.450	FAA voice users	National
136.425	Guard Channel	
136.400	Guard Channel	
136.375	Guard Channel	
136.350	VDLM2 off-site SITA	Primarily enroute traffic - Planned for national US deployment
136.325	Guard Channel	
136.300	VDLM2 on-site SITA	Primarily ground traffic - Planned for national US deployment
136.275	Guard Channel	
136.250	Guard Channel	
136.225	Guard Channel	
136.200	Guard Channel	
136.175	Guard Channel	
136.150	VDLM2 off-site RC	Primarily enroute traffic - Planned for national US deployment
136.125	Guard Channel	
136.100	VDLM2 on-site RC	Primarily ground traffic - Planned for national US deployment
136.075	Guard Channel	
136.050	Guard Channel	
136.025	Guard Channel	
136.000	Guard Channel	

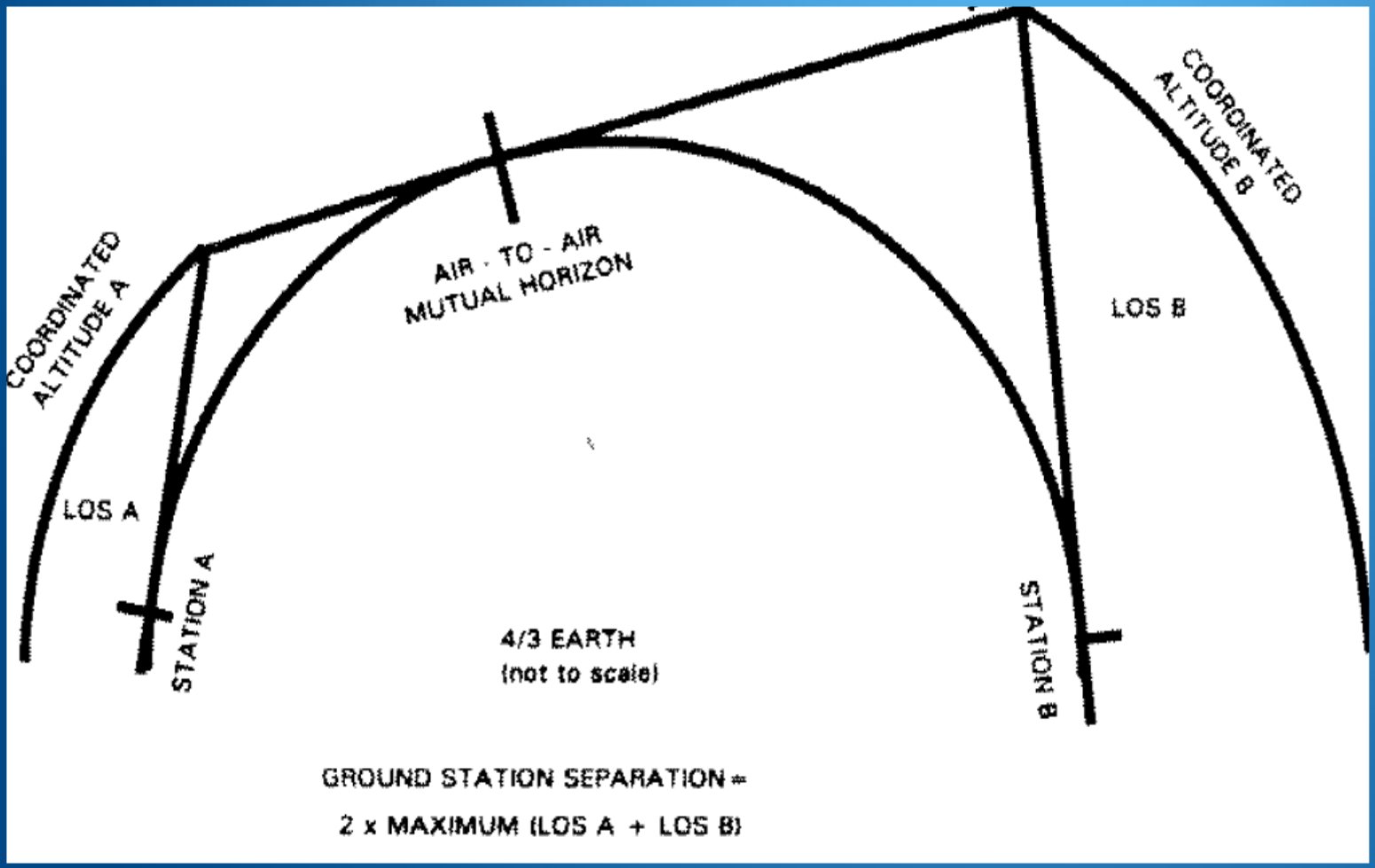
VDLM2 Channel Justification Process

- Draft recommendation from the VDLM2 spectral group
  - Reviewed by ASRI, CSPs, Harris and the FAA
- Primarily to manage additional channels beyond upper 136 MHz

Co-channel Separation Criteria

- Reviewing current co-channel separation criteria to seek greater efficiencies
  - Verify how current station classes are used

AFC Voice Co-channel Separation



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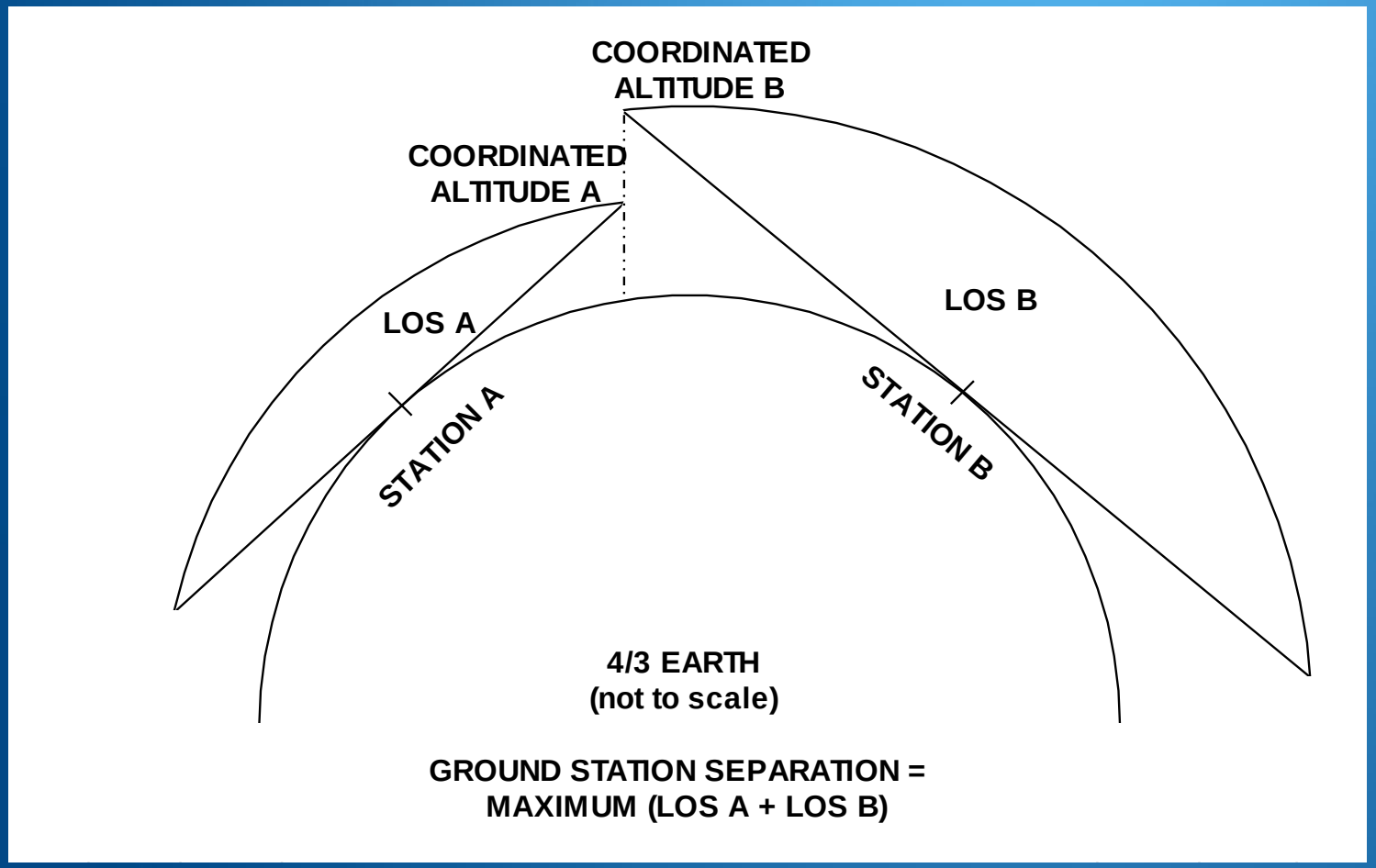
AFC Voice Co-channel Separation



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AFC Voice Co-channel Separation

- 20 dB model (ideal separation)

		RT	HO	LL	ML	HL	SHL
	Height (ft.)	50	2000	15000	24000	45000	70000
SHL	70000	670	760	950	1030	1175	1300
HL	45000	540	630	825	905	1045	1175
ML	24000	400	490	680	760	905	1030
LL	15000	320	410	605	680	825	950
HO	2000	125	220	410	490	630	760
RT	50	35	125	320	400	540	670

- 14 dB model (reduced separation)

		RT	HO	LL	ML	HL	SHL
	Height (ft.)	50	2000	15000	24000	45000	70000
SHL	70000	335	380	475	515	585	650
HL	45000	270	315	410	450	520	585
ML	24000	200	245	340	380	450	515
LL	15000	160	205	300	340	410	475
HO	2000	65	110	205	245	315	380
RT	50	15	65	160	200	270	335

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VHF Frequency Justification (Current)

Number of channels justified relies on current formula (section 2.6.1):

$$N = \frac{A}{14}$$

14 = The number of flights that can be accommodated within a channel assignment sector within a peak hour for voice.

Where:

$$A = \sum_{i=1}^{i=4} \left(T_i + L_i + \frac{0.25 P_i}{S} \right)$$

Note: The operating entity shall select the four 15 minute periods, which need not be consecutive, but the same four 15 minute periods shall be used for all the factors, Ti, Li and Pi.

Note: Where application of the formula results in a fractional number greater than 0.3, the next larger whole number will apply.

VHF Frequency Assignment/Justification (cont)

- Congested vs. non-congested (2.6.2)
  - Additional requirements when in congested airspace

  'approximately 80% of the available frequencies are in use located within low level air-to-air interference range of the congested area (605 nmi radius), or when it becomes necessary to assign cosite adjacent channels'*
- CONUS is now considered 'congested' by the above definition
  - Must be justified by actual loading in addition to formula
  - Subject to validation by physical measurement of channel occupancy on all channels used by the applicant
  - Measuring carrier on power over a peak 5 min period
  - Below interval - new users can be assigned to existing channel
  - Above interval - new channel provided
    - Single user - 35-45%
    - Multiple users - 30-40%
  - Rules intended to ensure even loading across all channels

VHF Frequency Justification (Proposed)

- Simplify to only landings and takeoffs

Number of channels

$$N = \frac{A}{14}$$

Where:

$$A = \sum_{i=1}^{i=4}(T_i + L_i)$$

T_i = Number of scheduled take offs

L_i = Number of scheduled landings

Calculated over the four busiest 15 minute periods at the site, which need not be consecutive, but the same four 15 minute periods shall be used for both Ti & Li.

N shall be rounded up to nearest integer if the fractional number is ≥ 0.3

Radio Emission Profiles

DSB-AM 25K Voice GS (6K00A3E)									
Adjacent Channel #	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Tx Signal (dBm/25kHz)	44	-16	-36	-46	-51	-52	-53	-54	-56
Ratio to Tx power (dBC)	0	-60	-80	-90	-95	-96	-97	-98	-100
Rx Adjacent Channel Rejection (dB)	0	60	75	85	90	90	95	95	100
Rx sensitivity (dBm/25kHz)	-107								
Required SNR (dB)	15								

VDLM2 (14K0G1D)									
Adjacent Channel #	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Tx Signal (dBm/25kHz)	44	2	-28	-33	-38	-39	-40	-41	-43
Ratio to Tx power (dBC)	0	-42	-72	-77	-82	-83	-84	-85	-87
Rx Adjacent Channel Rejection (dB)	0	40	45	50	60	60	65	65	70
Rx sensitivity (dBm/25kHz)	-107								
Required SNR (dB)	20								

Radio Emission Profiles

ACARS (13K0A2D)									
Adjacent Channel #	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Tx Signal (dBm/25kHz)	44	-16	-30	-40	-45	-46	-47	-48	-50
Ratio to Tx power (dBC)	0	-60	-74	-84	-89	-90	-91	-92	-94
Rx Adjacent Channel Rejection (dB)	0	60	70	80	85	85	90	90	95
Rx sensitivity (dBm/25kHz)	-107								
Required SNR (dB)	20								

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Questions?

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