



Aeronautical Spectrum and Frequency Management in Europe



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Aeronautical Spectrum Management

Introduction:

- Aircraft operation would neither be safe nor be capable of meeting the global demand for rapid and cost-effective transport without aeronautical radio services.
- Radio spectrum is a scarce natural resource with finite capacity limits and constantly increasing demands.
- Radio frequency spectrum congestion imposes the need for an efficient and effective spectrum and frequency management system.
- Spectrum management is the combination of administrative and technical procedures necessary to ensure the interference-free and efficient operation of radio services (e.g. Radionavigation).
- Frequency management deals with the assignment of frequencies to transmitting and/or receiving stations (e.g. airborne radio station).



Aeronautical Spectrum Management

Main activities:

- Development of aviation position for ITU WRC's
- Preparation and participation at different ITU and CEPT meetings
- General electromagnetic compatibility analysis between aeronautical and non-aeronautical radio services for identification of sharing possibilities (e.g. Radar vs IMT/2000 - UMTS)
- Development of frequency planning criteria between aeronautical and non-aeronautical radio services (e.g. FM broadcast vs. GBAS)



Aeronautical Spectrum Management

NOTE:

The aeronautical spectrum management activities recognises fully the fact that **only National administrations** can make proposals to, and vote in, ITU Conferences. International co-ordination actions are supplementary and supportive to these National processes.



Aeronautical Spectrum Management

High level objectives for the development of aviation position for ITU WRC's:

- harmonisation of the European aviation position and a close liaison with ICAO
- continual and effective monitoring of European proposals for meetings of ITU, CEPT and ETSI with co-ordination on agreed positions and attendance
- rapid circulation of all relevant material
- regular meetings of a specialised group to track events, discuss and agree joint policies and tactics and to organise attendance's and presentations



Aeronautical Spectrum Management

Relevant Aeronautical Working Groups:

- ICAO AMCP Working Group F
- ICAO Frequency Management Group FMG
- Eurocontrol Spectrum Protection Group



Aeronautical Spectrum Management

More information can be found:

- ICAO AMCP WG/F - www.icao.int/anb/panels/amcp/
- Eurocontrol Spectrum Protection Group - www.eurocontrol.be/projects/spg



Aeronautical Spectrum Management

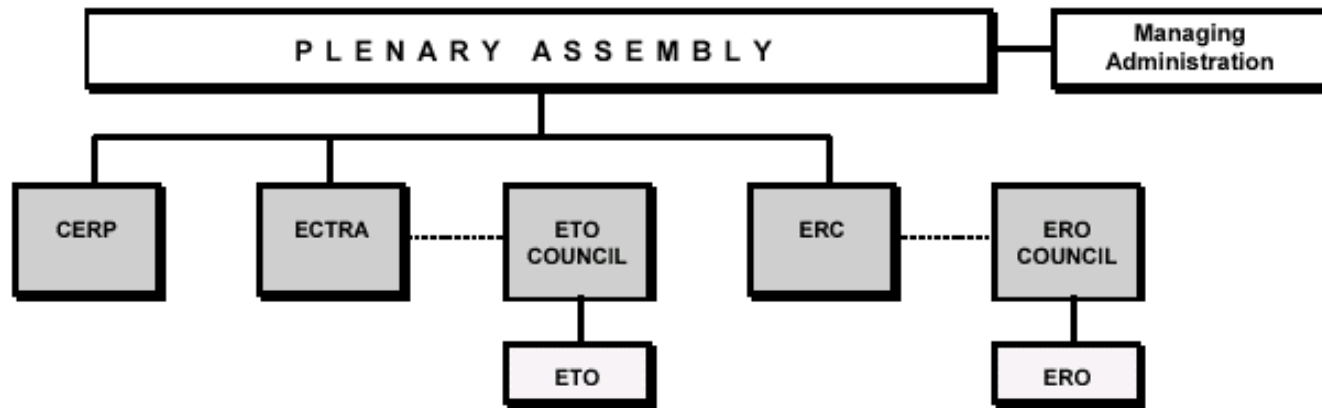
Outlook:

- ECAC Ministers of Transport recognised that radio frequency spectrum is a scarce natural resource with finite capacity .
- Radio spectrum should not become a limiting factor for the future growth of air transport.
- An ad hoc Working Group with participants from States, ICAO, Eurocontrol, IATA and European Commission is developing proposals for a more efficient and effective aeronautical spectrum and frequency management process.
- The introduction of the revised process should start by end of 2001.



European preparation for ITU WRC's

European Conference of Postal and Telecommunications Administrations - CEPT



CEPT deals exclusively with sovereign/regulatory matters and has established the committee on postal matters and two committees on telecommunications issues

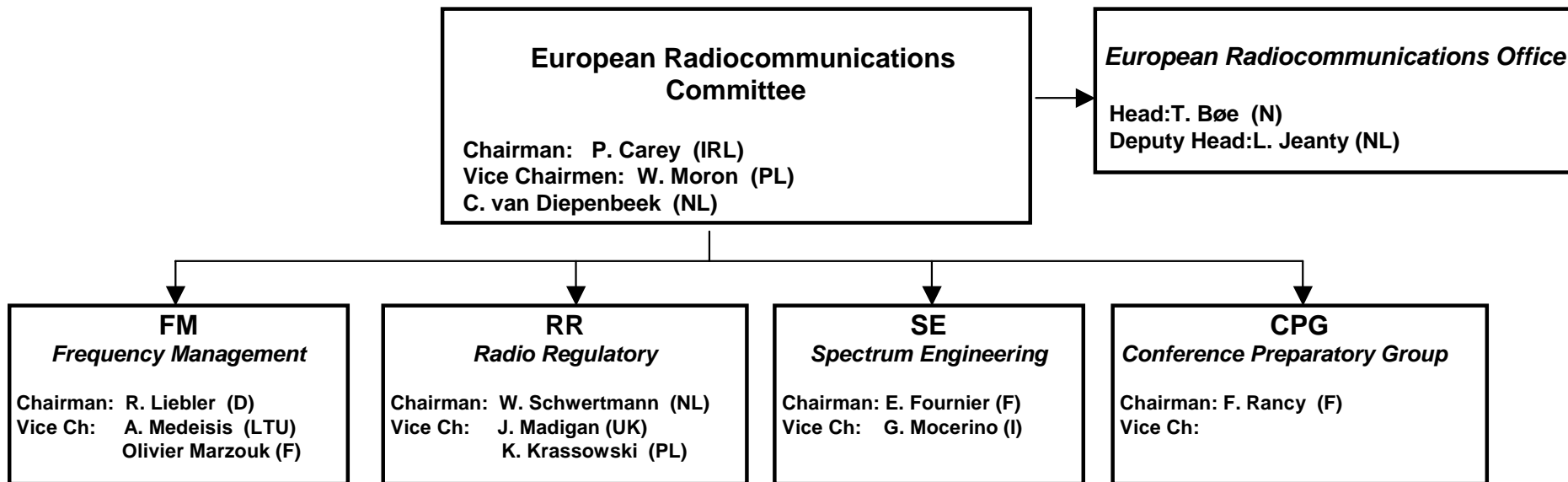
CERP (Comité européen des régulateurs postaux)

ERC (European Radiocommunication Committee) and

ECTRA (European Committee for Regulatory Telecommunications Affairs)



European preparation for ITU WRC's



European preparation for ITU WRC's

CPG established four Project Teams for preparation of
WRC-2003:

- CPG/PT1 - regulatory/procedural issues – Anders Frederich, S
- CPG/PT2 - radionavigation, radionavigation-satellite, radiolocation, mobile, mobile-satellite and space science services – Vincent Meens, F
- CPG/PT3 - fixed, fixed-satellite and broadcasting-satellite services – Terry Jeacock, UK
- CPG/PT4 - HF and MF bands Pekka Länsman, FIN



European preparation for ITU WRC's

More information can be found:

- CEPT - www.cept.org
- ERO (CPG, WGFM, WGSE, WGRR) - www.ero.dk
- ITU - www.itu.int



Frequency Management

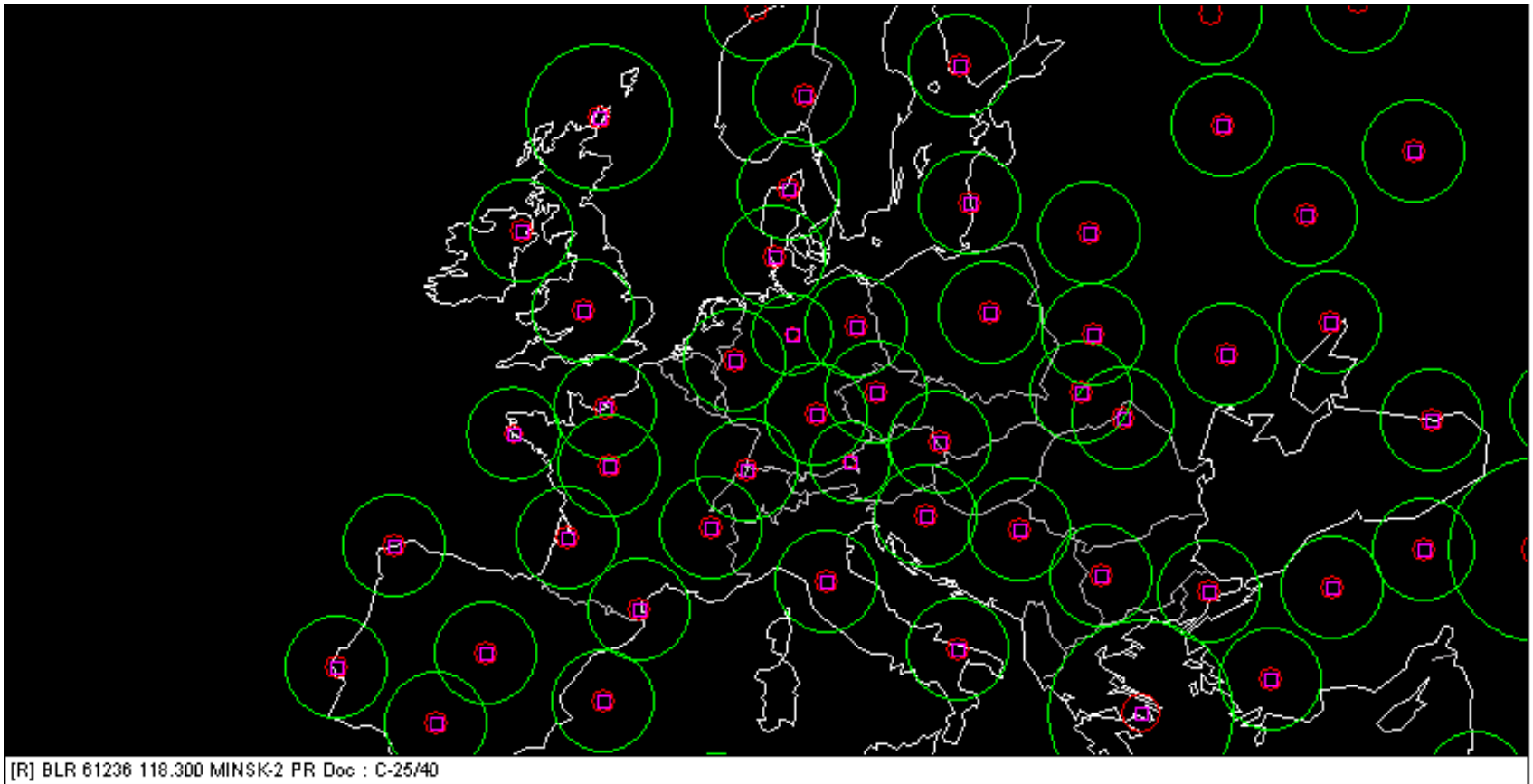
Main activities:

- Assignment of frequencies/channels for aeronautical communication and navigation facilities:
 - Day-to-day co-ordination
 - Frequency Planning Meetings
- Development of frequency co-ordination criteria for new aeronautical radio services (e.g. 8.33 kHz, VDL, GBAS)
- Development of software tools for frequency assignment planning and international co-ordination



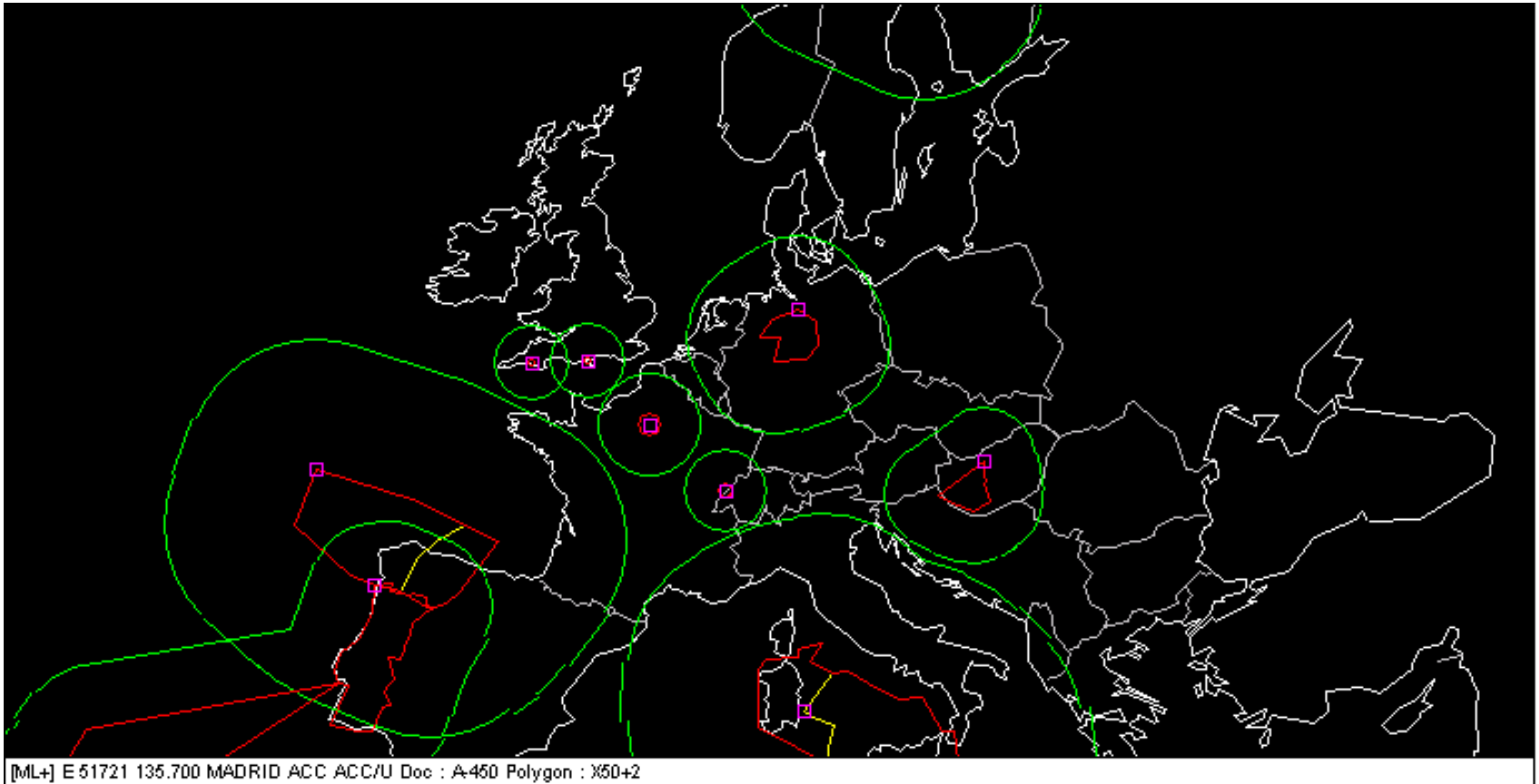
Frequency Management

Today's situation in Europe:



Frequency Management

Today's situation in Europe:



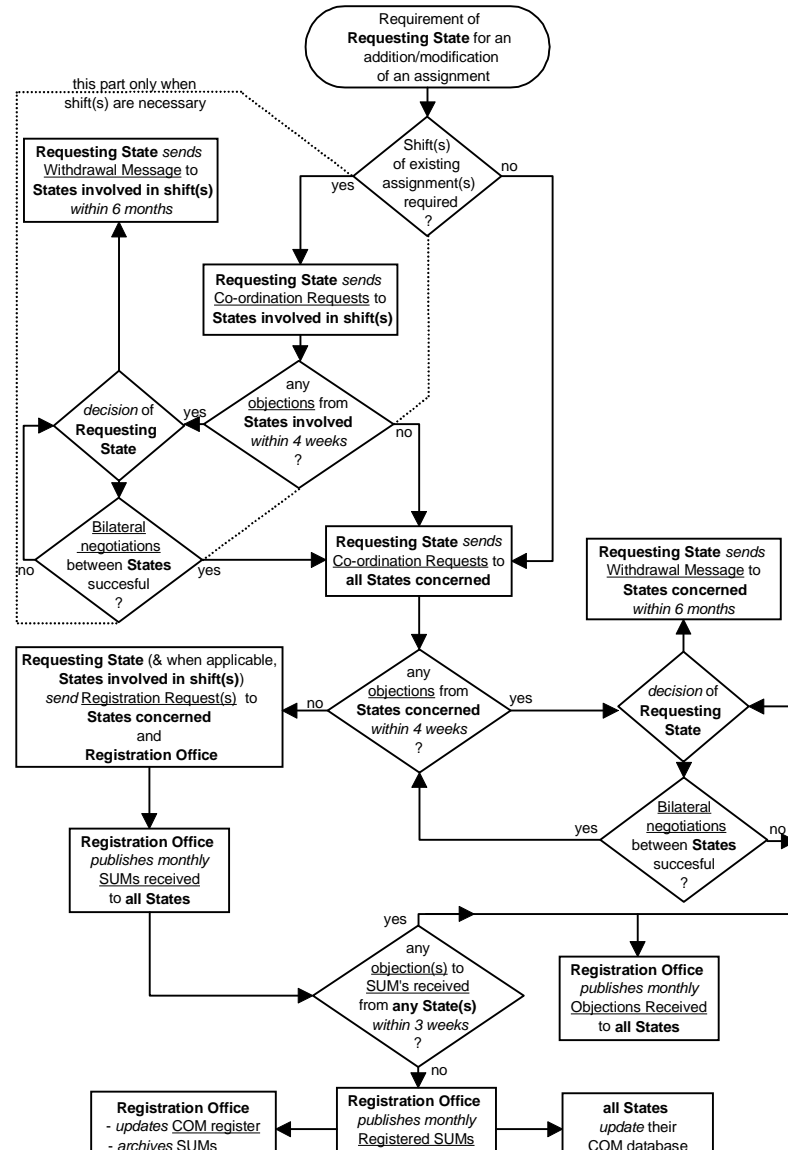
Frequency Management

Parties involved:

Co-ordination between States

Supporting function by ICAO and Eurocontrol

COORDINATION/REGISTRATION PROCEDURES



Frequency Assignment Planning

General principles for VHF voice communication:

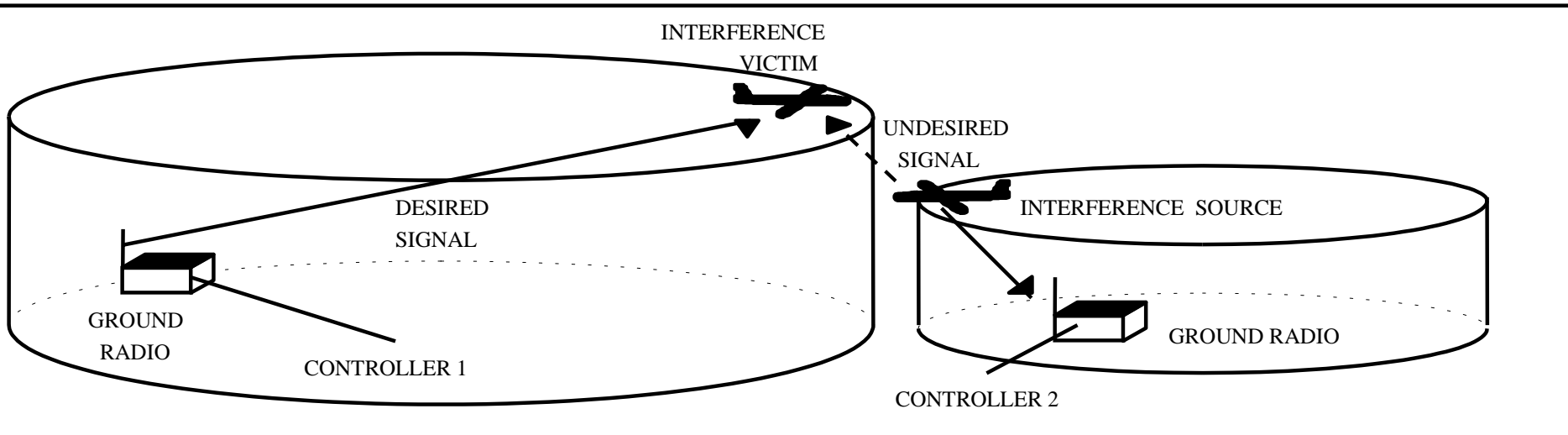
1. *To protect a service with a circular operational coverage (circular service), the distances from the edge of the service to another airborne or ground transmitter must be 5 times the range of that circular service; if the other transmitter is below the radio horizon from that service edge and the radio horizon distance is also less than 5 times circular service range then radio horizon distance is to be used;*
2. *To protect a service with a non-circular operational coverage area the ground or airborne transmitter of the other service must be below the radio horizon;*
3. *the protection criteria for both the requested service and the existing assignment must be met for a valid assignment.*



Frequency Assignment Planning

Co-channel protection requirement for VHF voice communication:

- minimum desired/undesired signal strength ratio of 14 dB (5 : 1 ratio) between circular services
- minimum desired/undesired signal strength ratio of 20 dB between area services



Frequency Assignment Planning

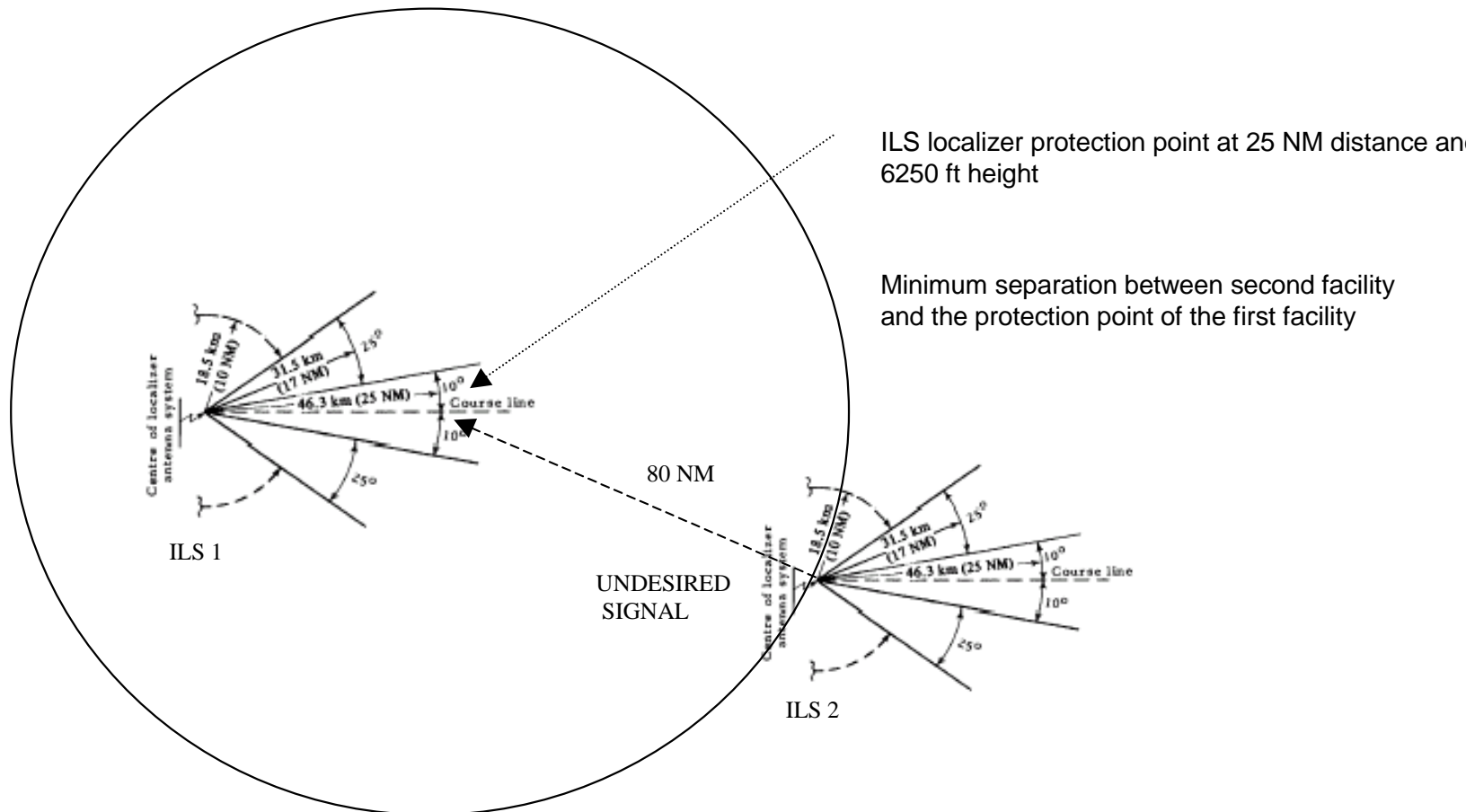
	AFIS TWR 16/FL30	TWR 25/FL40	APP 25/FL100	APP 40/FL150	ATIS 60/FL200	APP 50/FL250	VOLMET 261/FL450	ACC FL150	ACC FL245	ACC FL350	ACC FL450
AFIS/TWR (16/FL30)	80	125	125	200	241*	250	328*	218*	260*	298*	328*
TWR 25/FL40	125	125	125	200	252*	250	339*	228*	270*	308*	339*
APP 25/FL100	125	125	125	200	297*	250	384*	274*	316*	353*	384*
APP 40/FL150	200	200	200	200	300	250	412*	301*	343*	381*	412*
ATIS 60/FL200	241*	252*	297*	300	114*	300	201*	300	300	300	300
APP 50/FL250	250	250	250	250	300	250	455*	345*	387*	425*	455*
VOLMET 261/450	328*	339	384*	412*	201*	455*	0*	412*	454*	491*	522*
ACC FL150	218*	228*	274*	301*	300	345*	412*	301*	343*	381*	412*
ACC FL245	260*	270*	316*	343*	300	387*	454*	343*	385*	423*	454*
ACC FL350	298*	308*	353*	381*	300	425*	491*	381*	423*	460*	491*
ACC FL450	328*	339*	384*	412*	300	455*	522*	412*	454*	491*	522*



Frequency Assignment Planning

Co-channel protection requirement for ILS:

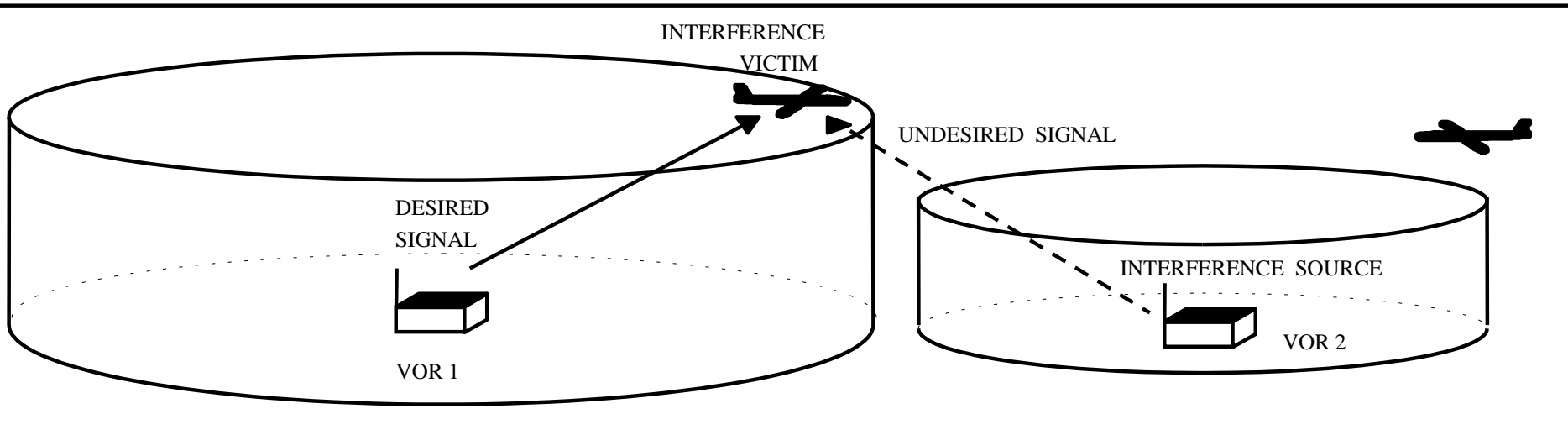
- Minimum separation between second facility and the Protection Point of the first facility of 80 NM



Frequency Assignment Planning

Co-channel protection requirement for VOR:

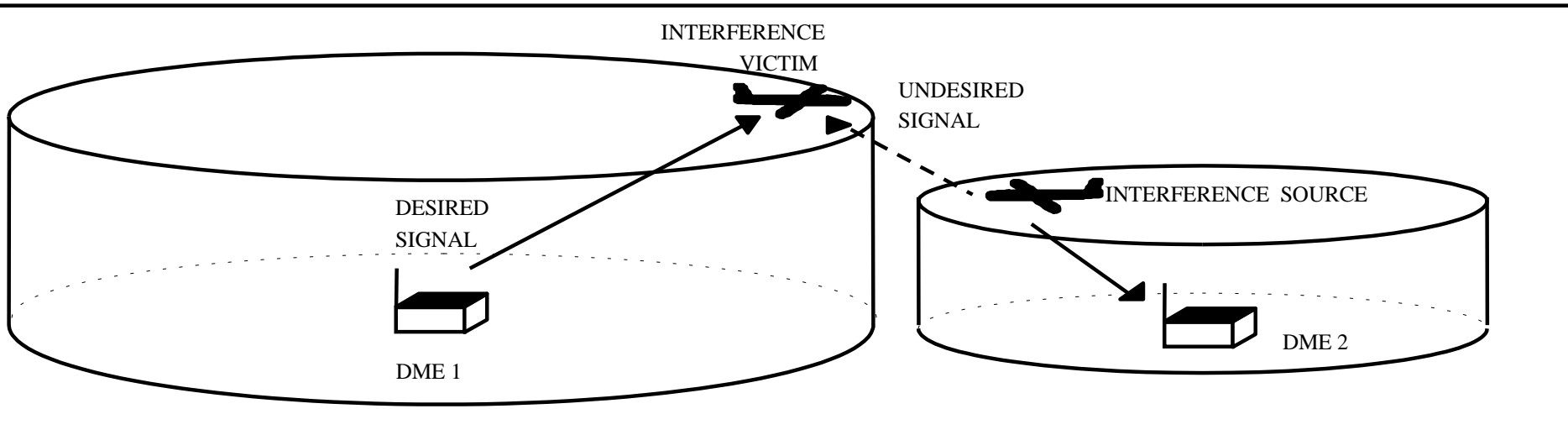
- Minimum desired/undesired signal strength ratio of 20 dB within the protected coverage of VOR facilities



Frequency Assignment Planning

Co-channel protection requirement for DME:

- Minimum desired/undesired signal strength ratio of 8 dB for same frequency, same pulse code
- Minimum desired/undesired signal strength ratio of 0 dB for same frequency, different pulse code



Frequency Planning Tool

Frequency management COM2

Asg Maps Compat Frq search Poly Bands Correl Export Free Return

Asg : Consult assignments

Frequency 132.4 Free

R POR 3503 LISBOA ACC 862

25 ACCAU 133.900

(9864) A-450

STAT	CTY	ASGNBR	LOCATION	FREQ	SERVICE	DOC	POLYGON	COORD	CAT	OP	REMARKS
R	RUS	5393	ST-PETERBURG ACC	133.800	ACCAU	A-450	1205	5948N03016E	I	OP	[CN]
R	S	3780	STORUMAN	133.800	APPL	C-25/100		6458N01742E	N	OP	[CN] ALSO TV
R	S	3830	LJUNGBYHED	133.800	APPA	C-40/150		5605N01313E	N	OP	[CN]
R	UKR	10336	DNIPROPETROVSK ACC	133.800	ACCAI	A-350	1485+1486	4821N03506E	I	OP	[CN]
R	F	9165	PARIS/REIMS ACC	133.825	ACCAU	A-450	405+406+407	4843N00223E	I	OP	[CN]
R	UKR	4522	KHARKIV ACC	133.825	ACCAU	A-450	1025	5000N03605E	N		[CN]
R	D	6697	HANNOVER ACC	133.850	ACCAU	A-450	1462	5228N00941E	I	OP	[CN] MAASTR
R	E	1145	MADRID ACC	133.850	ACCAU	A-450	307	4028N00334W	I	OP	[CN] CASTEJC
R	G	7436	BRISTOL/LULSGATE	133.850	TWR	C-25/40		5123N00243W	I	OP	[CN]
R	F	8809	MARSEILLE ACC	133.875	ACCAU	A-450	385+386	4326N00513E	I	OP	[CN]
R	G	7735	LONDON ACC	133.875	ACCAU	A-450	514+515	5128N00027W	N	OP	[CN] N OF 533
R	G	8100	SCOTTISH ACC	133.875	ACCAL	A-250	1526	5530N00435W	I	OP	[CN]
R	GRC	1589	ATHINAI ACC	133.875	ACCAU	A-450	556	3754N02344E	N	OP	[CN] N.E.(RAD
MP+	UKR	4512	KHARKIV ACC	133.900	ACCAU	A-450	1022+1023	4956N03617E	I	OP	[PM:11513] C
R	G	7678	LONDON ACC	133.900	ACCAL	A-250	460+461	5128N00027W	I	OP	[CN]
R	POR	3503	LISBOA ACC	133.900	ACCAU	A-450	862	3910N00903W	I	OP	[CN]



Frequency Assignment Planning

Outlook:

- Introduction of advanced frequency assignment planning tools for new aeronautical radio services (VDL, GBAS etc.)
- Electronic co-ordination and data exchange tools

