



Association of Professional Wireless Production Technologies

29th Tonmeistertagung, in Cologne, 17th - 20th November, 2016
expert meeting for audio professionals, producers, artists,
vendors, suppliers, developers, and producers.

**Roundtable - Use of wireless Microphones & Co with focus
on Radio Spectrum Operation, Technology and Methodology**

Description of PMSE an it's changing Situation

20.11.2016, Matthias Fehr / Norbert Hilbich, APWPT e.V.



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Introduction

Welcome to the roundtable



Our information event has these focuses:

- Introduction: changing frequency usage of PMSE (Matthias Fehr and Norbert Hilbich, APWPT)
- IRT Forecasting Tool FREQSCAN and its supporting features (Susanne Rath, Institut für Rundfunktechnik GmbH - IRT)
- PMSE-DB.CH - an online frequency coordination tool (Gerd Rehm, Schweizerische Radio- und Fernsehgesellschaft - SRG SSR)
- Concluding discussion talk



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The changing frequency usage of PMSE

Who uses PMSE?



- Live sound, images, and effects usually need to be observed at appropriate locations and at a short distance to achieve the desired effect.
- If this prerequisite can not be fulfilled or if events are to be recorded at a different location for later playback, you must use appropriate tools.
- This concerns, among other things, Education, art, culture and creative industries, event and concert productions, as well as the production of news and content.

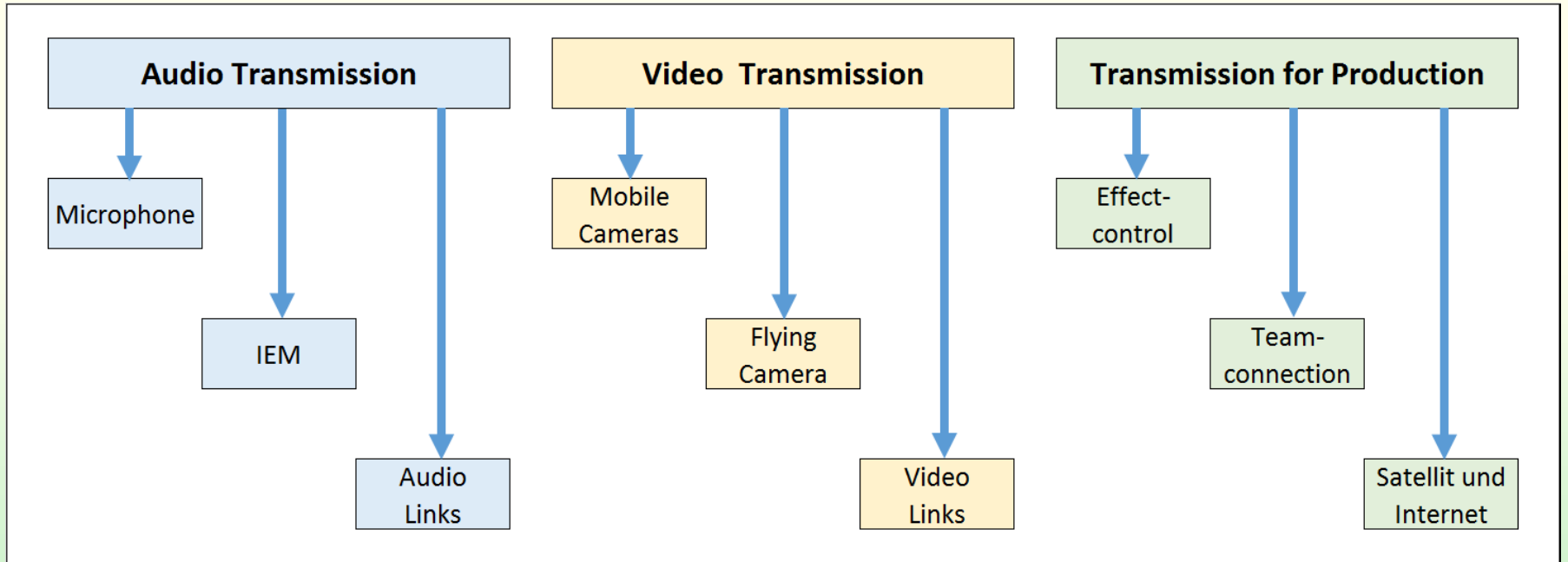
What are PMSE?



Wireless tools in typical applications:

- Audio PMSE, wireless microphones and IEM
- Video PMSE, wireless cameras, and video links
- In addition, there are many tools that are mainly used "behind the stage".
- Different PMSE often use neighboring frequencies with a tendency to disturbances. Changes in frequency allocation can increase this trend.

Typical PMSE operation



Further information: [ERC Report 204](#) or [APWPT-Info](#)



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**How to get access to
PMSE frequencies?**

Different assignment types

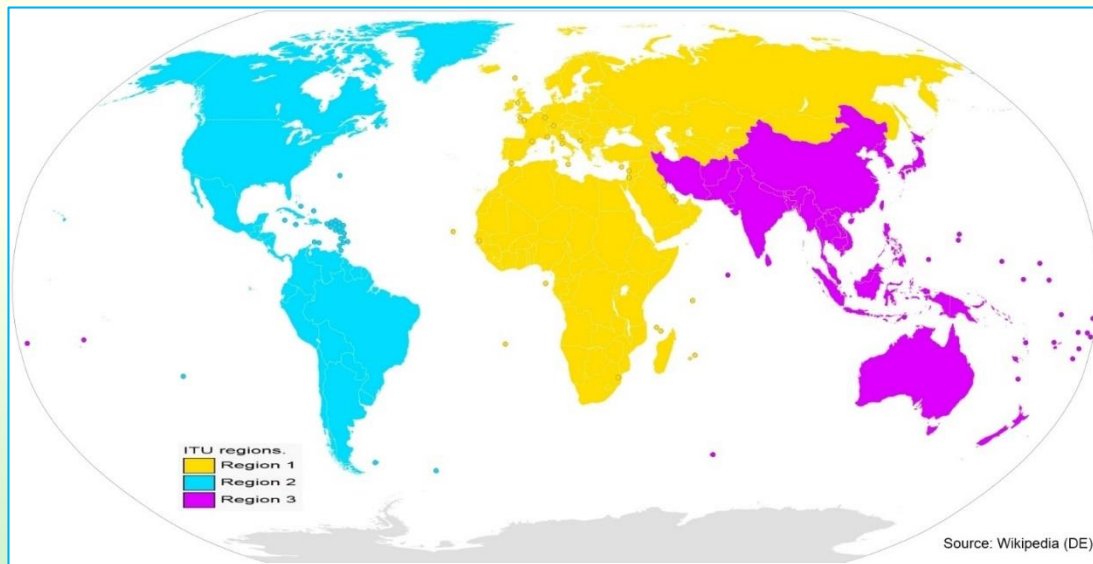


- „Free access" via special frequency allocations, e.g.
 - National regulation, each country decides flexibly
 - Regional regulation, e.g.
 - European harmonization
 - Regional allocation by ITU-R
- Individual assignment of frequencies or frequency ranges
=> As above, each country decides flexibly
- Special assignments for large events?
=> Costly preparation for long periods

Worldwide regulation of ITU

The International Telecommunications Union is a special organisation of the United Nations, which deals officially and worldwide with the technical aspects of telecommunications.

The Radio Regulations (RR) regulate internationally the radio services and their use of radio frequencies within the framework of international law.



Regional regulation in the CEPT

- A good example of the work done in regions -



- In the ECC/CEPT*, the European regulatory authorities are working (48 States) on the technical aspects of telecommunications. This also applies to PMSE frequency use.
- Since September 2009, APWPT has been a LoC partner of ECC/CEPT and represents the interests of PMSE users in many working groups.
- After several years of work, a common frequency table for PMSE operation was adopted, the [ECC REC 25-10](#). This is the basis for further decisions in the coming years – the national and regional implementation of PMSE frequencies.

How is it going now?



Once essential studies have been completed and the results are accepted, APWPT is committed to the necessary PMSE planning security through:

- National implementation in as many countries as possible
- The consideration by the European Commission in the context of the [Opinion on a long-term Strategy for PMSE](#)
(+) The work has already begun, under Austrian chairmanship
- The consideration of the CEPT work within the framework of the work of the ITU-R; according to [ITU-R Resolution 59-1](#)
(+) ITU-R Study groups have begun to work



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What changes?

The UHF TV area is the current focus for Audio PMSE



This graphic outlines the reduced usability of the UHF TV range for audio PMSE. We can see that up to 193 MHz are lost for PMSE.



The current developments drive the conclusion that "alternative frequencies, outside" the UHF TV frequency bands, must also be used in the future.

Alternatives of a frequency usage of audio PMSE (1)



- **Duplex gaps 823 to 832 and 1785 to 1805 MHz**
 - (+) Positive experiences because of European harmonization
 - (+) 1785-1805 MHz is well imaginable for use in many countries
 - (+) Support from PMSE manufacturers is growing
 - (-) Limited usability, with strong local IMT operation
- **1350 to 1400 MHz**
 - (+) about 25 MHz in use by a passive service (no transmitters)
 - (+) Remaining use mostly outside conurbations
 - (+) Implementation in very many countries
 - (-) unfortunately a first country wants to auction this frequencies

Alternatives of a frequency usage of audio PMSE (2)



- **1452 to 1492 MHz**
 - (+) Studies CEPT completed
 - (-) WRC-15 has assigned this frequency range for IMT
 - ➔ We do not expect any investments, except for special events

- **1492 to 1518 MHz**
 - (+) In some countries already open for PMSE
 - (+) [WGMF #86](#) has confirmed the results of studies
 - ➔ A rapid implementation in many countries is now conceivable

Alternatives of a frequency usage of audio PMSE (3)



- **1518 to 1525 MHz**
 - (+) In some countries already in use for the event production
 - (+) So far no operation of MSS is visible
 - (+) [WGMF #86](#) has confirmed the results of studies
 - ➔ A rapid implementation in many countries is now conceivable
- **1525 to 1559 MHz**
 - (+) Currently in discussion

2.3 - 2.4 GHz is the current focus for Video PMSE



- In this frequency range Video PMSE is currently operated in many countries. However, an IMT usage for 2.3 to 2.4 GHz is in discussion for the future.
- 2.7 to 2.9 GHz as an alternative was studied for video PMSE and the study results were accepted by [WGFM # 86](#).
 - (+) Now an European harmonization seems to be possible
 - (-) Germany has many airfield radars in these frequencies

Further frequencies for video PMSE



- The current revision of the ERC [REC 25-10](#) presents further frequencies which can be used differently in countries:
2010 to 2500 MHz, 2010 to 2025 MHz, 2025 to 2110 MHz, 2200 to 2300 MHz, 2400 to 2500MHz, 7.0 to 8.5 GHz and 10.0 to 10.68 GHz.
- A proposal that is currently being discussed within ITU-R is 42 GHz for the HDTV and UHD TV production with channel bandwidths of up to 125 MHz per Video Camera Link.

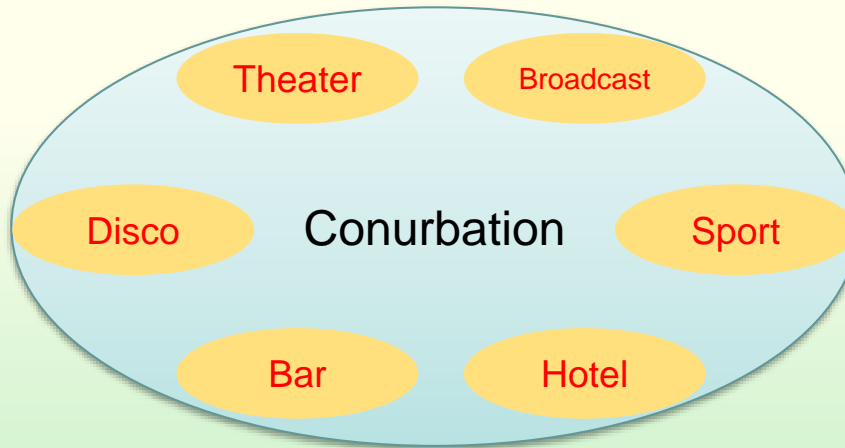


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The Challenge

What are the foreseeable challenges?

Well known frequency ranges have an increasing useful density.
Often more than you can handle; even with professional experience!



- Adapted PMSE technology must support this process

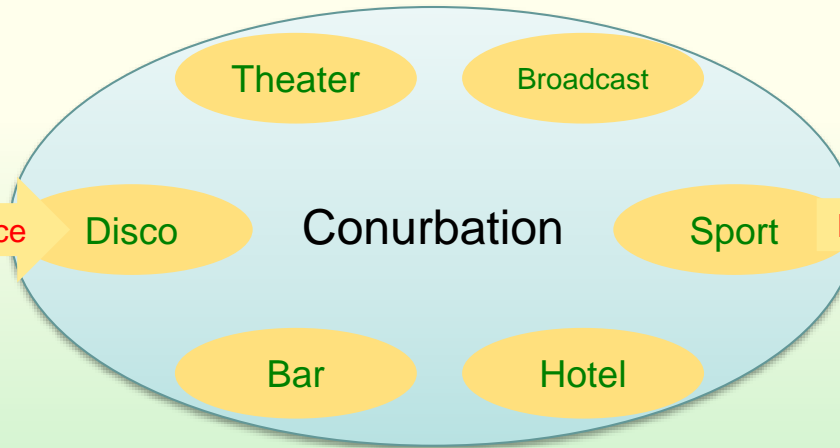
Share alternative frequencies with previously unknown partners

- New interference scenarios must be considered!
- Primary Radio Services need to be protected - but how?



Aerodrome Surveillance Radar

Interference



Interference



Radio Astronomy

Quelle: Wikipedia

➤ We inevitably need new tools and methods



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New tools and methods

Transition to solutions



- In the next two presentations, we will show some tried-and-tested tools and methods that are constantly being developed further.
- These have the potential to support the PMSE users, in order to cope with the emerging challenges.
- Please see and afterwards let us advise.

The Forecasting Tool FREQSCAN of IRT



Frau Susanne Rath, Institut für Rundfunktechnik, IRT

- Improved production planning through forecasting and coordination of free frequency resources during the production of events.
- The Forecasting Tool „FREQSCAN“ and its possibilities.

The Swiss PMSE database, an online frequency coordination tool



Herr Gerd Rehm, Schweizer Fernsehen, SRG SSR

- SRG SSR has developed a web-based management tool and communications for the frequency use of wireless microphones and cameras that supports frequency planning for events.
- It shows the PMSE interference situation with DVB-T stations in Switzerland as well as in the border region.



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APWPT

APWPT



APWPT is an international non-profit organisation, which is representing the needs of all users of the Programme Making & Special Event (“PMSE”) sector.

PMSE is crucial on a daily basis for the production of content that has received world-wide acclaim and continues to attract a global audience. A vast array of organisations are reliant on radio spectrum for the production of content for Performing Arts, Broadcasting, News Gathering, Independent Film and TV Production, Corporate Events, Concerts, Night Venues, Sports Events, Churches, etc. In addition, other sectors that utilise the current UHF spectrum include the Health Service, Education, Local Government, Political Programming and Conferencing.

Events in 2016 (excerpt)



- Prolight + Sound 2016 together with Messe-Frankfurt
→ Info: [APWPT-Veranstaltungen zur Prolight + Sound 2016](#)
- 3rd PMSE Workshop at EuMW2016, London
→ Info: [Output of PMSE Workshop at European Microwave Week](#)
- 20th November, [PMSE Roundtable](#),
during [29. Tonmeistertagung](#) (this event)

PMSE events in preparation for 2017



- Probably again a PMSE contribution/event at [Prolight + Sound 2017](#) (4th to 7th April 2017)
- 4th PMSE-Workshop at [EuMW2017](#)
Probably on October 9th in Nuremberg
- Further events in preparation

Further Information



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