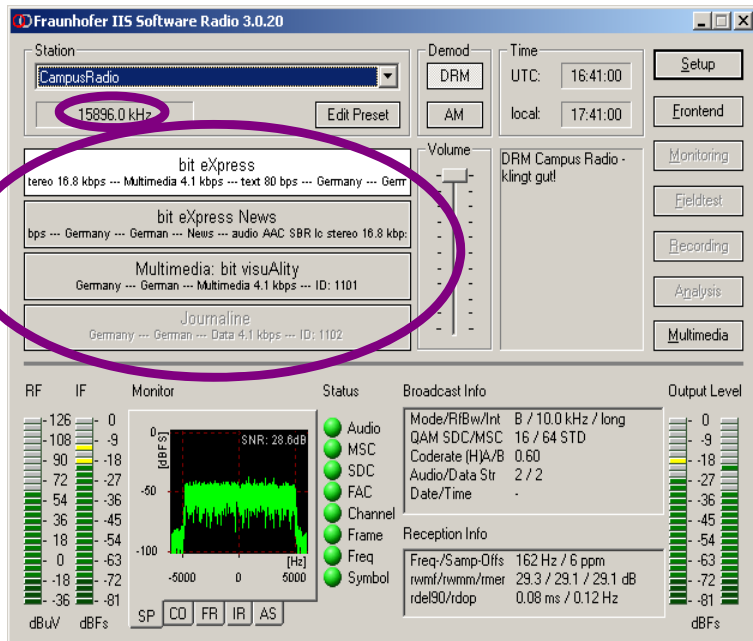


# **Advanced Functionality & Commercial Aspects of DRM**

**Dipl.-Ing. Alexander Zink, MBA**

Vice Chairman DRM Technical Committee,  
DRM Treasurer, Vice President DRM Association

# Services & Structure



- Up to 4 Services on 1 Frequency
- With worldwide unique **Service ID**  
→ scanning, bookmarking, AFS
- **Flexible Service layout:**
  - Audio-only Services
  - Audio + PAD  
(Programme Associated Data)
  - Multimedia/Data Services

# AFS – Alternative Frequency Signalling



- AFS per DRM Multiplex and per Service
  - **Multiplex-AFS:**  
synchronous/non-synchronous
  - **Service-AFS:**  
links to DRM/DRM+, AM, AM/AMSS, FM, FM-RDS, DAB/DAB+/DMB, etc.  
by Service-ID
  - Including **schedules and regions**
- **Automatic frequency switching**  
when leaving coverage area
- **Seamless Switching**  
throughout broadcast networks possible
- Single tuner background AFS scanning

# Warning / Alert Feature



- Immediately alerts the population  
e.g. in case of **environmental disasters**  
(tsunami, earthquake, tornado warnings, ...)
- **Automatically re-tunes DRM receivers**  
to a specified radio program / frequency
- Tunes to a DRM Services  
or any alternative broadcast system (e.g. AM)
- **Textual information services**  
provide background information  
and instructions for listeners  
(various languages, detailed information,  
all information immediately accessible)

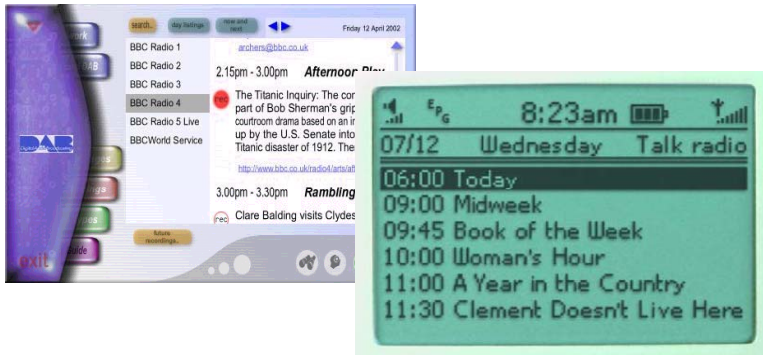
# DRM Data Services

- DRM supports various general types of data services (signalling and transport):
  - DRM standardized services
  - DAB standardized services (!)
  - Any proprietary data transport
- - Shared data applications beneficial for **Broadcasters** and **Multi-standard receivers**
- Data service categories:
  - Visible to user
  - Invisible to user (machine-to-machine)





# Multimedia Applications



- **DRM TextMessages**  
programme accompanying labels (Unicode)

- **EPG – Electronic Program Guide**  
What's up now & next;  
Search for programs and  
schedule recording



- **Journaline**  
text based information service (Unicode),  
supporting all classes of receivers
- **MOT Slideshow**  
programme accompanying images+animation
- **TPEG / TMC Traffic Information**
- → **Great commercial potential !**



# Multimedia Applications – Journaline



*Optimized for  
Efficiency & Simplicity  
all along the  
broadcast chain.*

- Hierarchically categorized text information  
→ “Teletext for Digital Radio”
- Push & store service  
for any digital radio platform  
→ Immediately available for **interactive use**
- Specifically designed for digital radio services:  
**low bitrate requirement**
- Re-use of **existing data sources** for broadcasters  
(RSS, XML),  
Internationally applicable (Unicode/UTF-8)
- Optimized for  
**inexpensive consumer receivers**  
(low decoder and user interface requirements)
- Extensible information for advanced receivers:  
**back channel + interactivity,**  
**geo-tagging, speech hinting,** etc.

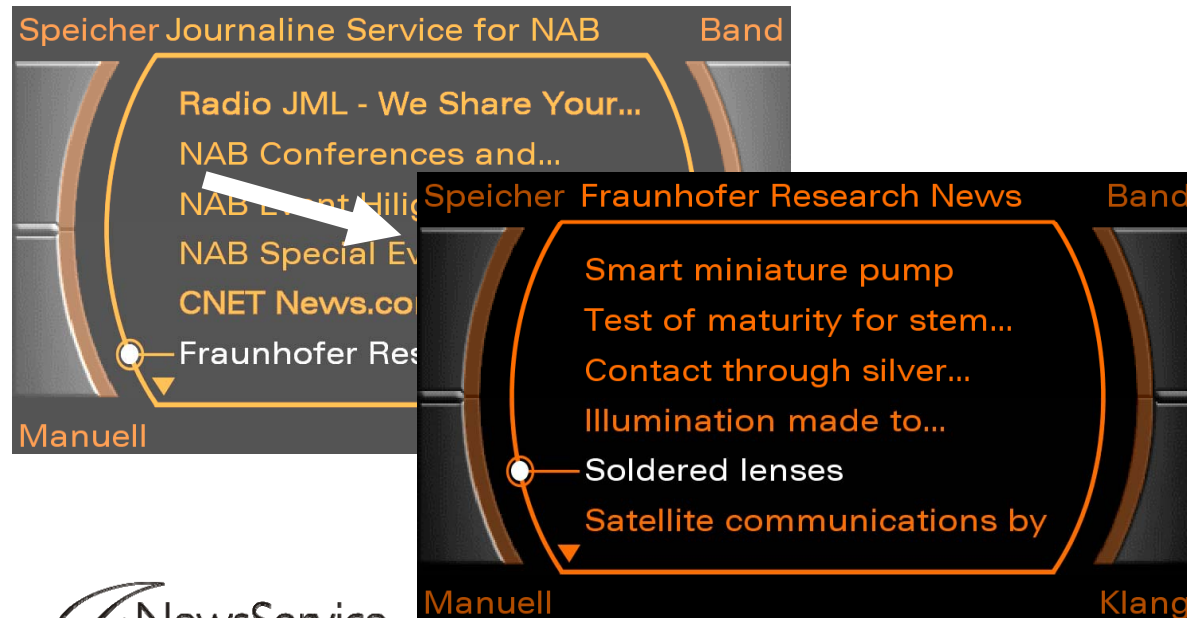
# Multimedia Applications – Journaline



Source: Fraunhofer IIS (Audi MMI)



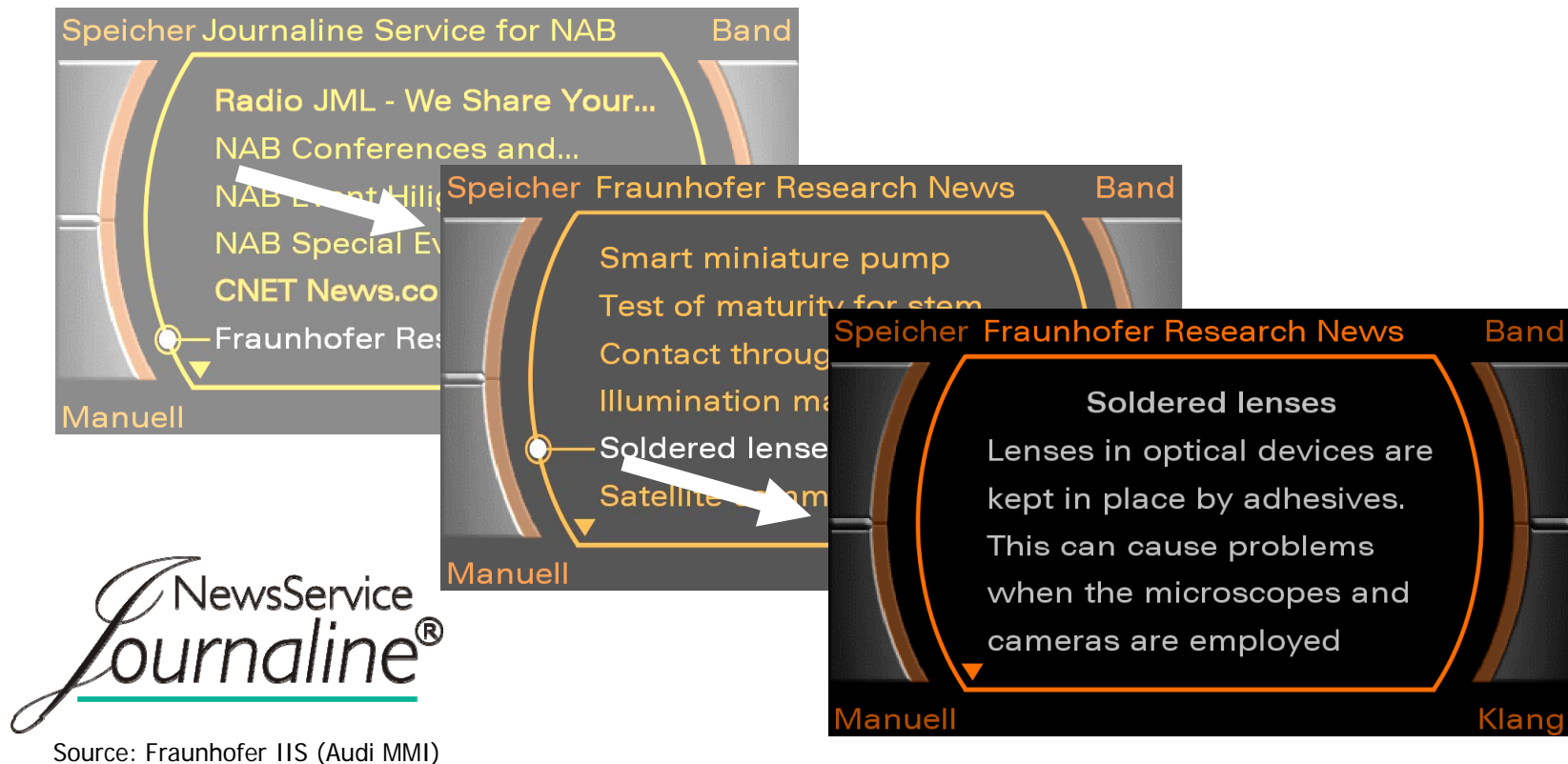
# Multimedia Applications – Journaline



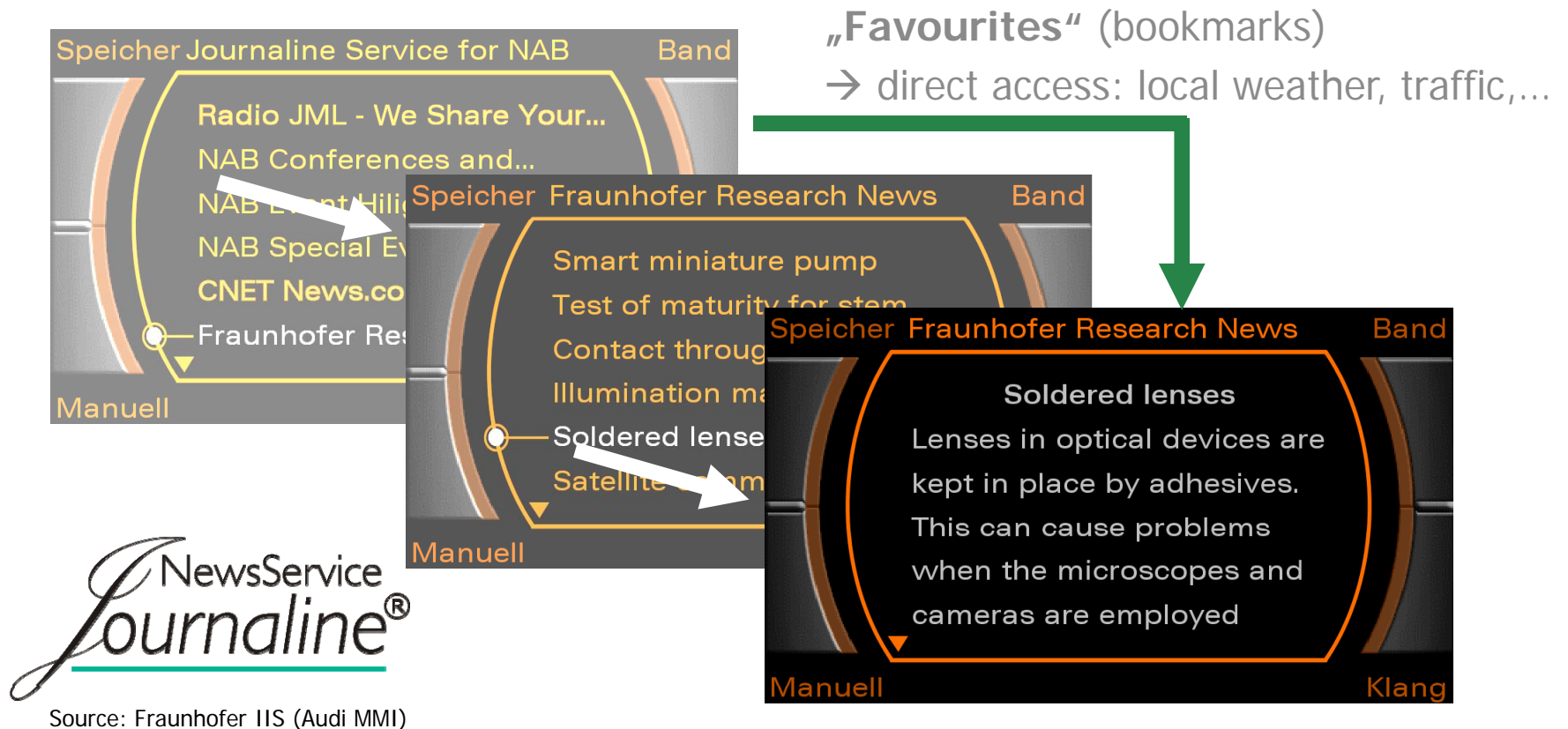
NewsService  
*Journaline*®

Source: Fraunhofer IIS (Audi MMI)

# Multimedia Applications – Journaline



# Multimedia Applications – Journaline



# Multimedia Applications – Journaline



- Content examples –  
**General information:**
- News
- Sports events and results  
(incl. result tables with real-time updates)
- Financial information / Stock market values
- Airport departure / arrival times
- Advertisement  
(with interactivity / Hot Button)
- Games / Lottery
- ...

# Multimedia Applications – Journaline



- Content examples –  
**Program related information:**
- Station contact information for listener feedback
- Show background information (e.g. optionally with link to online-platform)
- Direct phone link to participate in chat show
- Captions (Mobile-TV subtitles / Radio for the impaired)
- ...
- ➔ **Journaline can flexibly deliver all kinds of textual content**



# Multimedia Applications – Journaline

NewsService  
*Journaline*®



[www.journaline.info](http://www.journaline.info)



Journaline live-broadcast during the Beijing Olympics 2008

# DRM Surround Sound – Benefits

- A new Dimension for Radio:  
**Revolutionary radio listening experience**
  - Classical music, Pop concerts
  - Radio plays
  - Advertisements, Station jingles
  - Sports presentations
- **Listeners already appreciate Surround Sound!**
  - Digital Movie Theaters
  - DVD, Blu-ray, Home Theater
  - High-level Cars



# DRM Surround Sound – Benefits

- A **Quality Promise**  
to promote benefits of Digital Radio

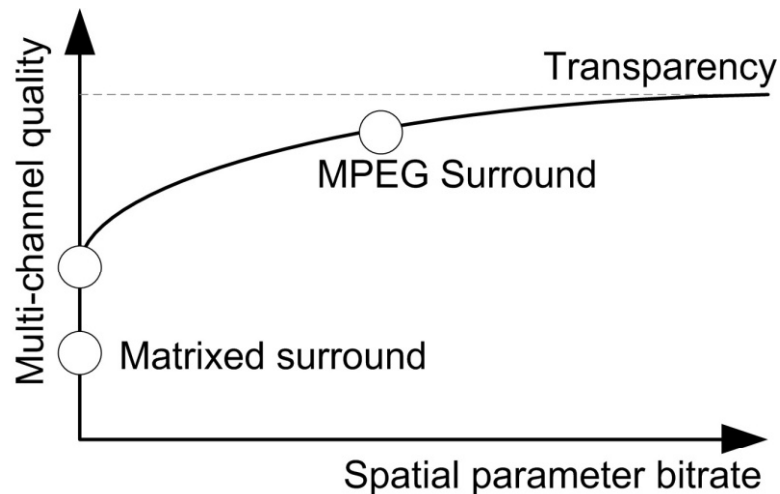
- The next Evolutional Step:

- |             |   |               |   |                     |
|-------------|---|---------------|---|---------------------|
| <b>Mono</b> | → | <b>Stereo</b> | → | <b>5.1 Surround</b> |
| past        |   | present       |   | future!             |

- Could you imagine  
a modern pop station  
broadcasting in mono quality ?



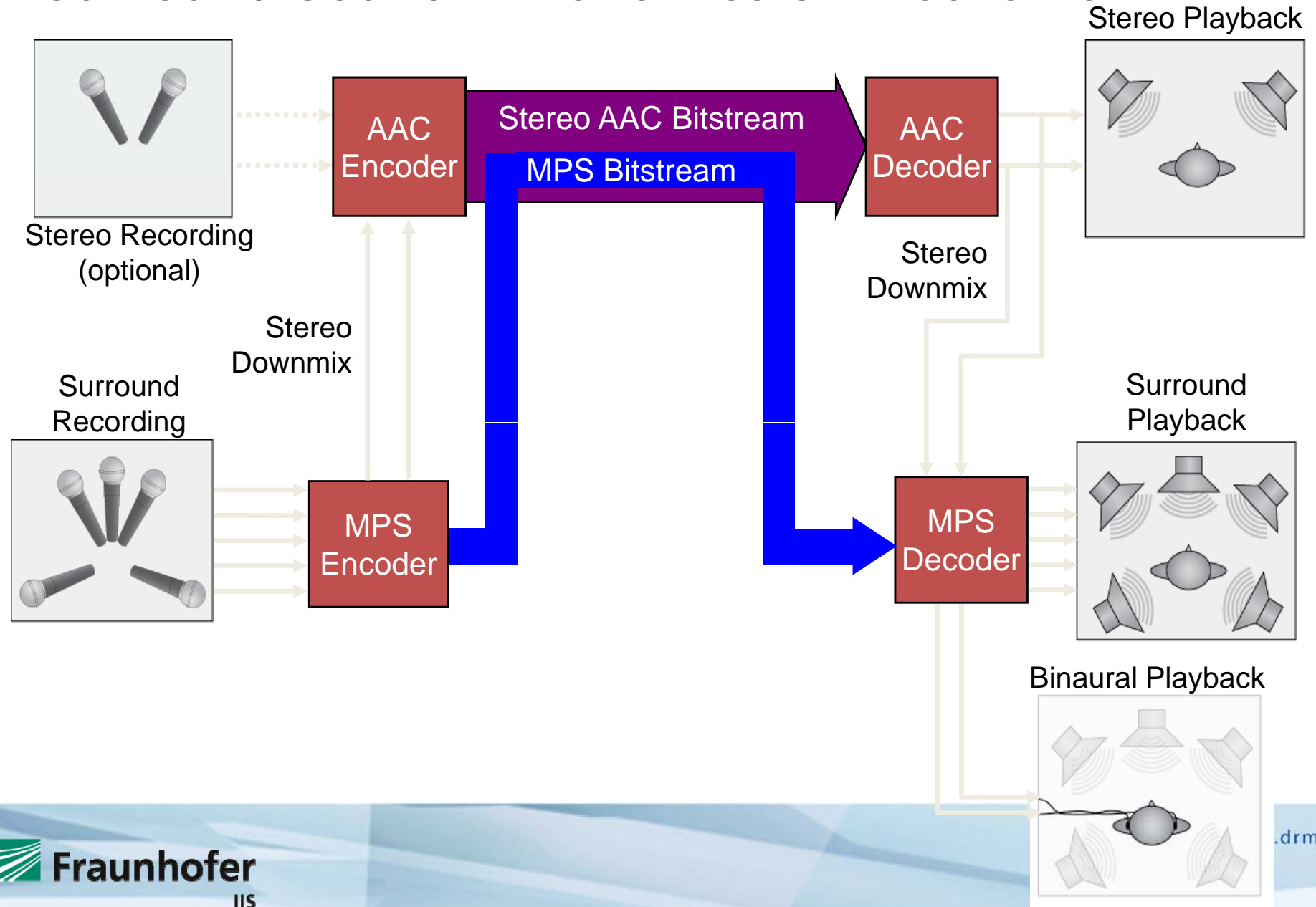
# DRM Surround Sound – Delivery



## +MPEG Surround:

- **Fully backward compatible**  
with existing stereo/mono decoders
- **Original stereo- and mono quality**  
for legacy decoders
- **Very high multichannel quality**  
(channel separation)
- **Very low bandwidth:**  
side information of e.g. 4-10 kbps  
**transparently carried in the audio stream**
- ➔ **No simulcasting required**
- **Open MPEG Standard**

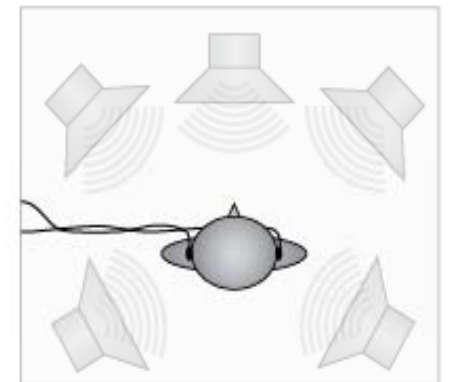
# DRM Surround Sound – Transmission Mechanism



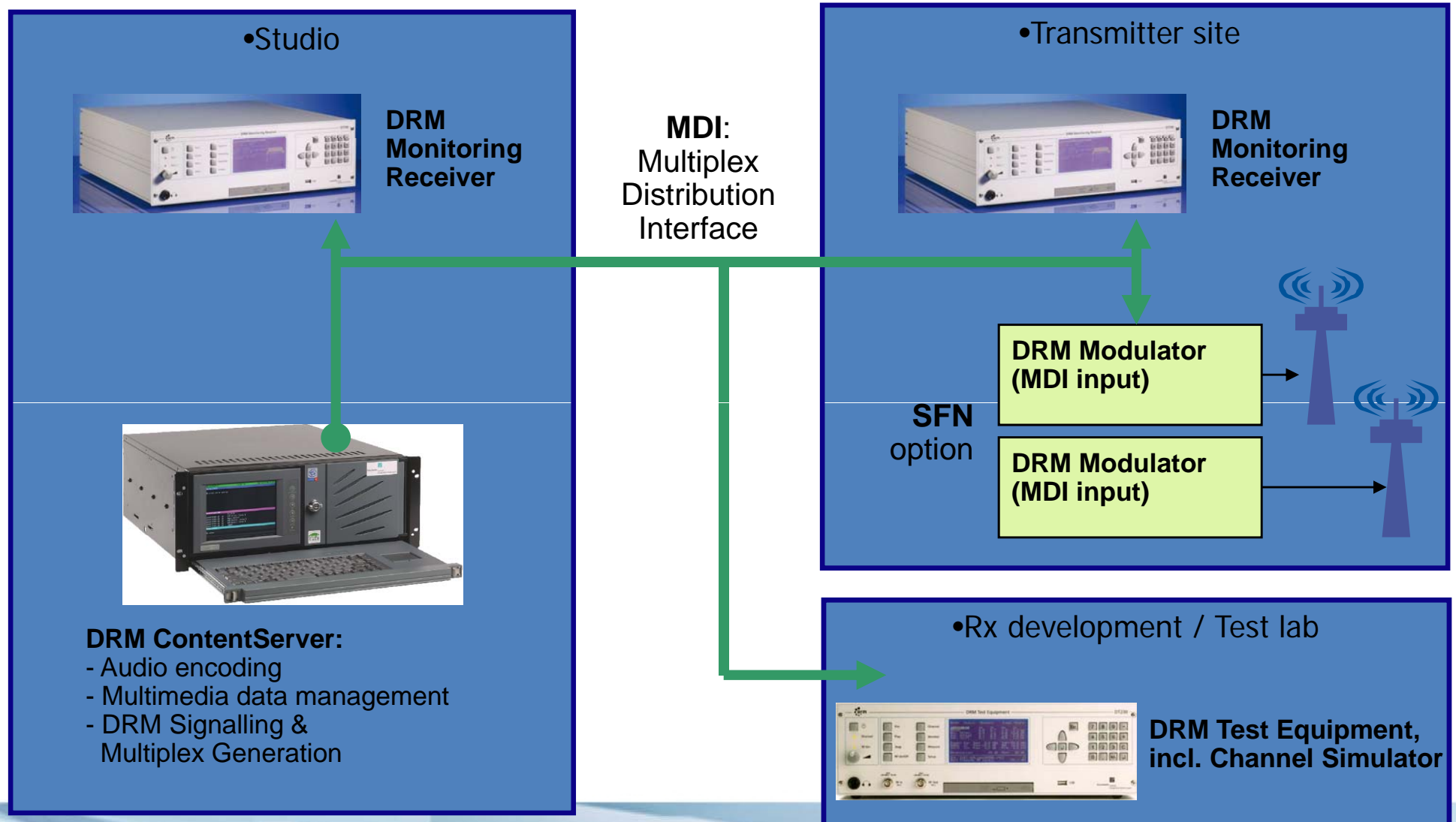


# DRM Surround Sound – How to Enjoy

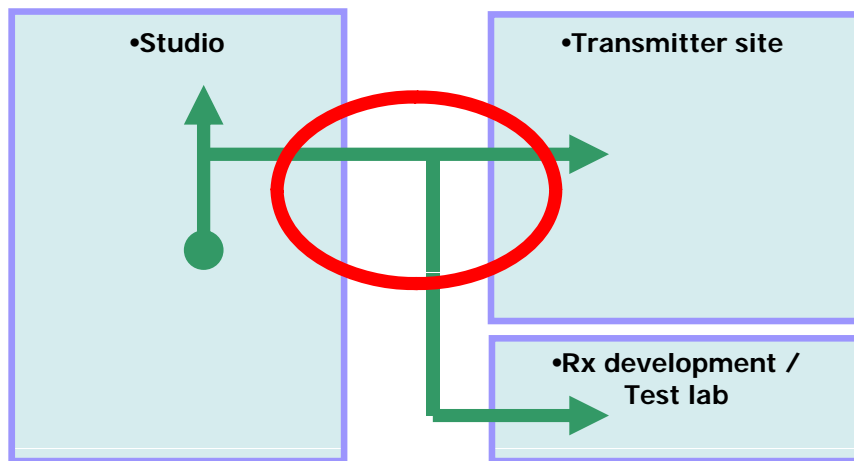
- 5.1 playback through stationary radio reception:
  - **Home Cinema installation**  
already wide-spread through DVD / Blu-ray
  - **In-Car entertainment**  
5.1 speaker setup built into high-end models today;  
→ perfect listening environment
- While on the move:
  - **Binaural Rendering**  
for mobile radio reception, mp3 player devices
  - **5.1 playback on regular stereo headphones**  
by mathematically simulating  
a perfect listening environment



# Broadcast Chain and Signal Distribution Infrastructure



# Broadcast Chain and Signal Distribution Infrastructure



- ETSI standardized:
- **MDI – Multiplex Distribution Interface**
  - Absolute time stamps for SFN operation
- Based on **DCP – Distribution & Communication Protocol**:
  - via serial line / IP / file
  - unidirectional / bidirectional
  - provides:  
**Forward Error Correction, Fragmentation, Addressing**

→ **Full interoperability**  
among all manufacturers

# Thank you

Alexander Zink  
Fraunhofer IIS  
[alexander.zink@iis.fraunhofer.de](mailto:alexander.zink@iis.fraunhofer.de)