DRM – Digital Radio Mondiale

Content for DRM (and DAB)

DRM+ Band III Symposium
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DRM – Digital Radio Mondiale

- **DRM:**
  Global open standard for digital radio
  - covering SW, MW, LW and band I/II (FM)
  - AM: ETSI Standard ratified in 2003, endorsed by the ITU in 2002
  - FM: ETSI/ITU standard update as of August 2009
- **DRM Consortium founded in 1998**
  - **non-commercial**, promotes the adoption of the DRM standard
  - **around 100 members** incl. broadcasters, manufacturers, network operators, regulators, research institutes, etc.

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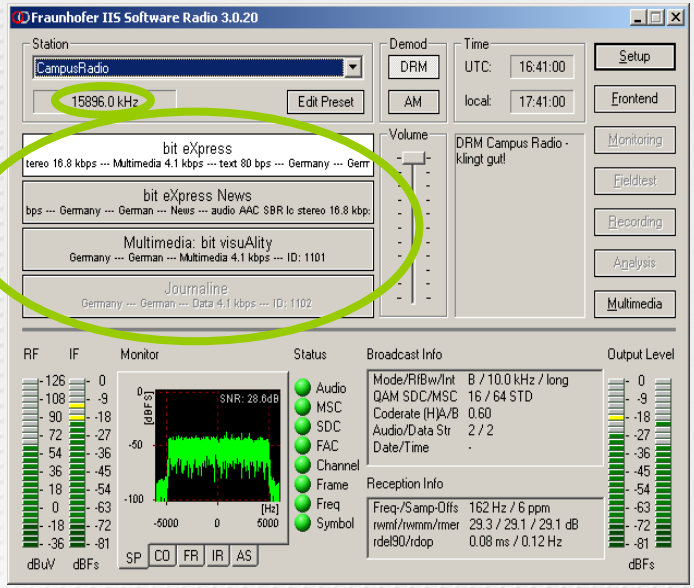
Services & Structure



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

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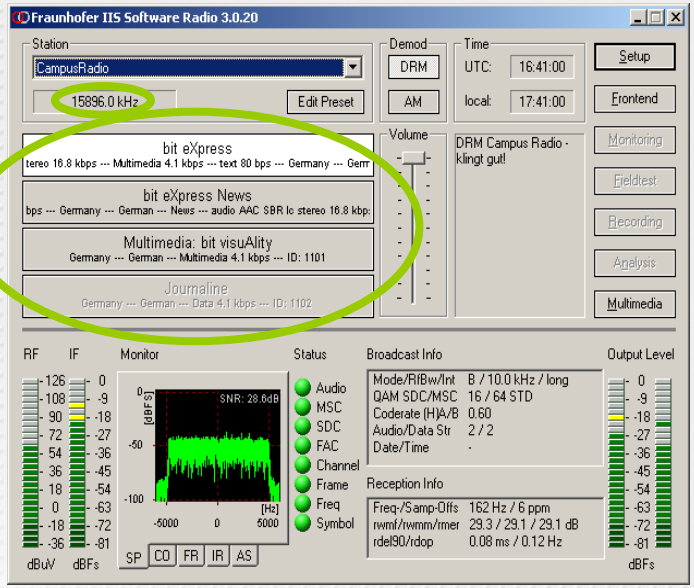
Services & Structure



Convenient **Service Information**, incl.

- **Station Label** (Unicode support, all scripts)
- **Programme Type** and **Language**
- **Country** of Origin
- **Announcements** (Traffic, Weather, News, ...)
- Current **date / time**

→ **Search and select** a Service **by name,** not by frequency

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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

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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)

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Dynamic Reconfigurations

- Switch of DRM Multiplex configuration
- Pre-announced to receivers
- Often without audio interruption
- Two versions:
  - **Service Reconfiguration**
    new/changed DRM Services, signaling parameters
  - **Multiplex Reconfiguration**
    change in DRM Multiplex parameters
    (affecting overall bitrate)
    → **MW nighttime adjustments!**

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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 benefitial for **Broadcasters** and **Multi-standard receivers**

- Data service categories:
  - Visible to user
  - Invisible to user (machine-to-machine)

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Multimedia Applications

RSS

NewsService Journaline®

- **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 !**

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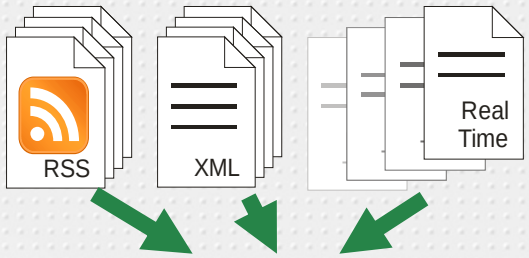
Multimedia Applications – Journaline



NewsService 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.

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Multimedia Applications – Journaline

NewsService Journaline®

Source: Fraunhofer IIS (Audi MMI)

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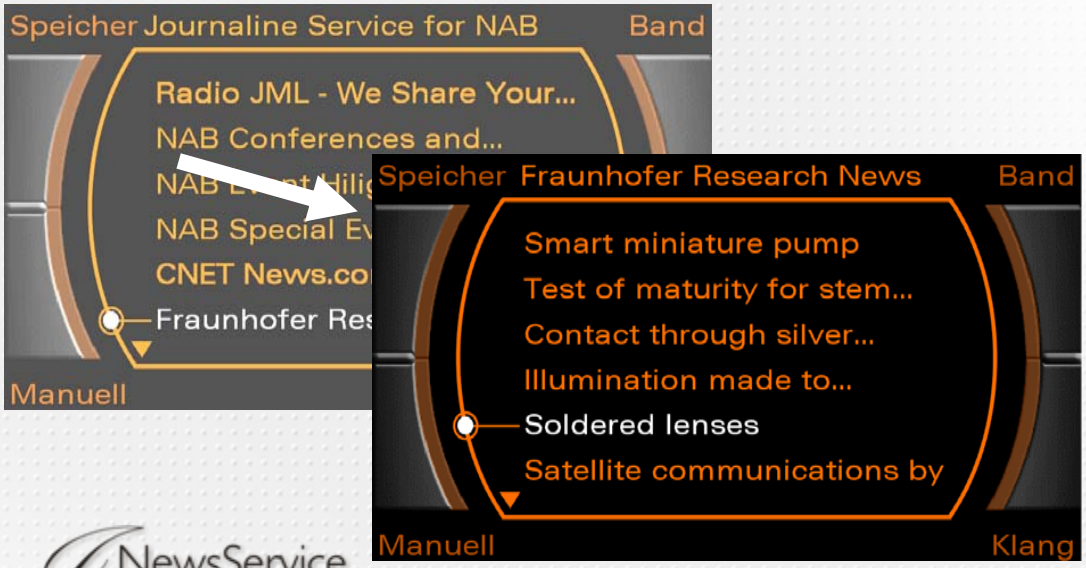
Multimedia Applications – Journaline



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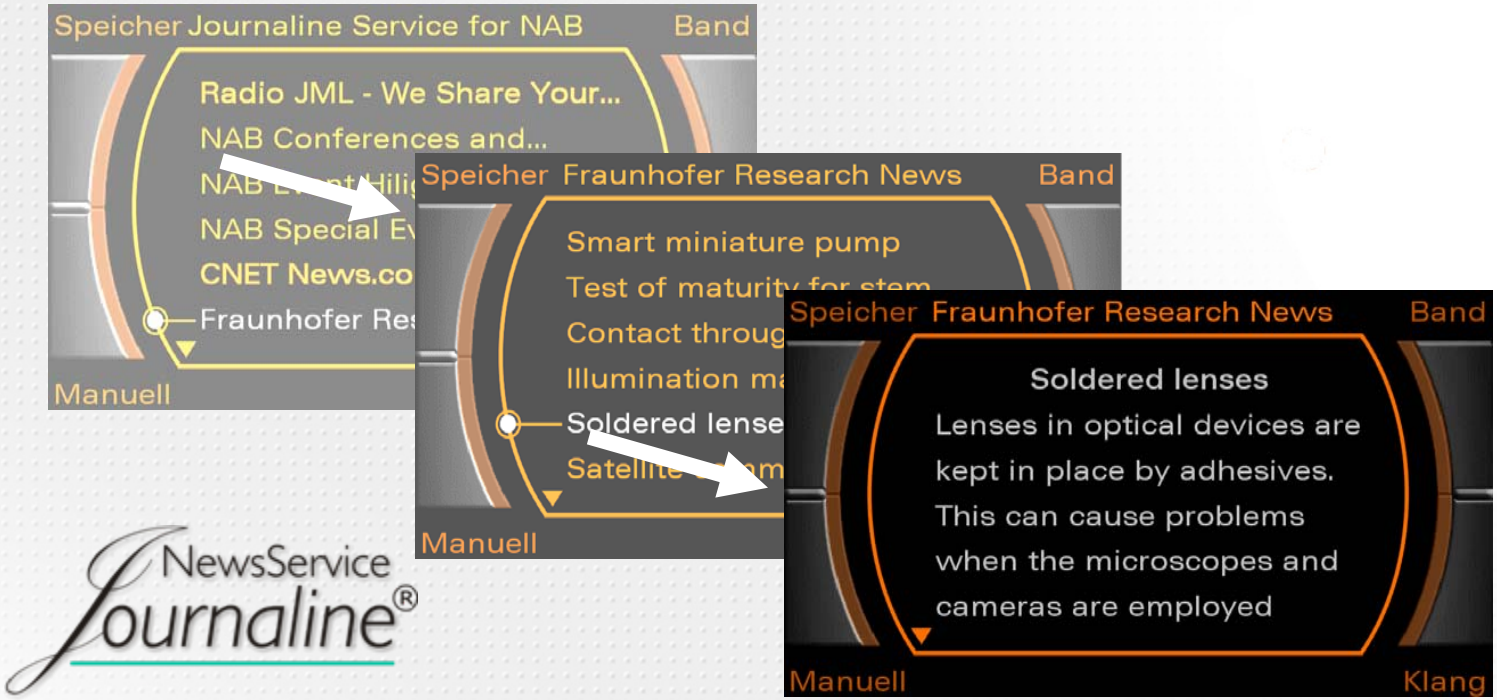
Multimedia Applications – Journaline



Source: Fraunhofer IIS (Audi MMI)

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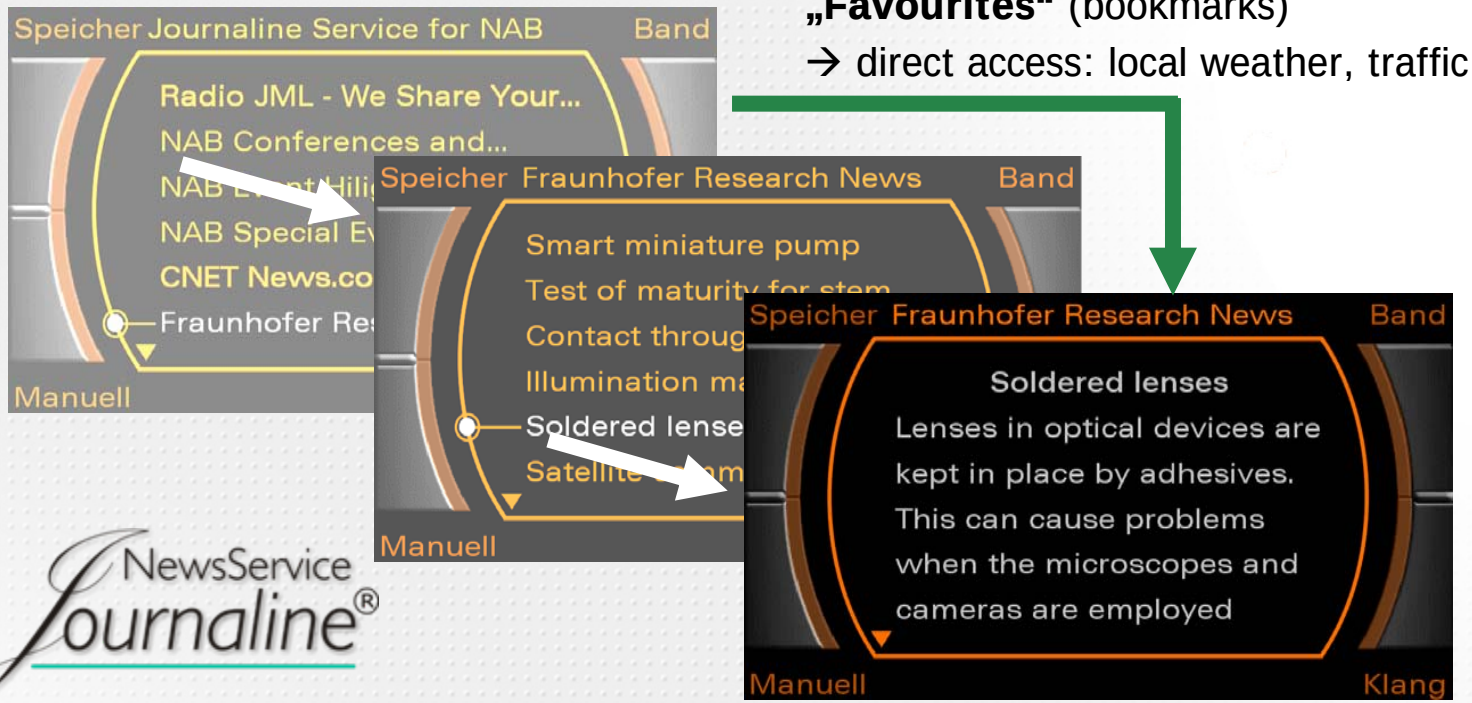
Multimedia Applications – Journaline



Source: Fraunhofer IIS (Audi MMI)

„Favourites“ (bookmarks)
→ direct access: local weather, traffic,...

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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
- ...

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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**

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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

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DRM Surround Sound – Benefits

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

- The next Evolutional Step:

Mono →	**Stereo** →	**5.1 Surround**
past	present	future!

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

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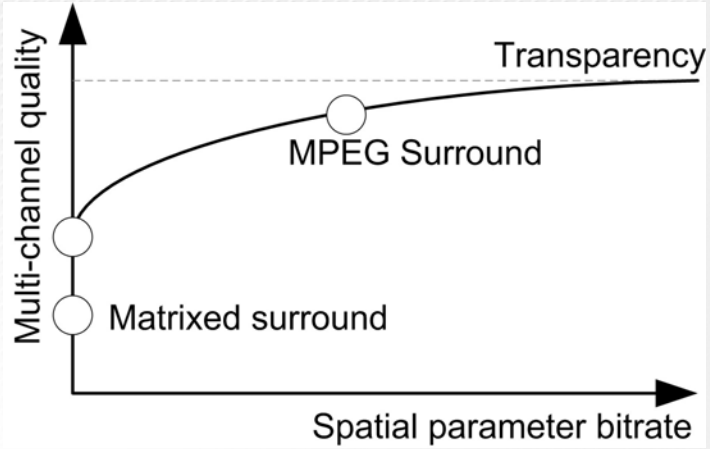
DRM Surround Sound – Delivery



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**

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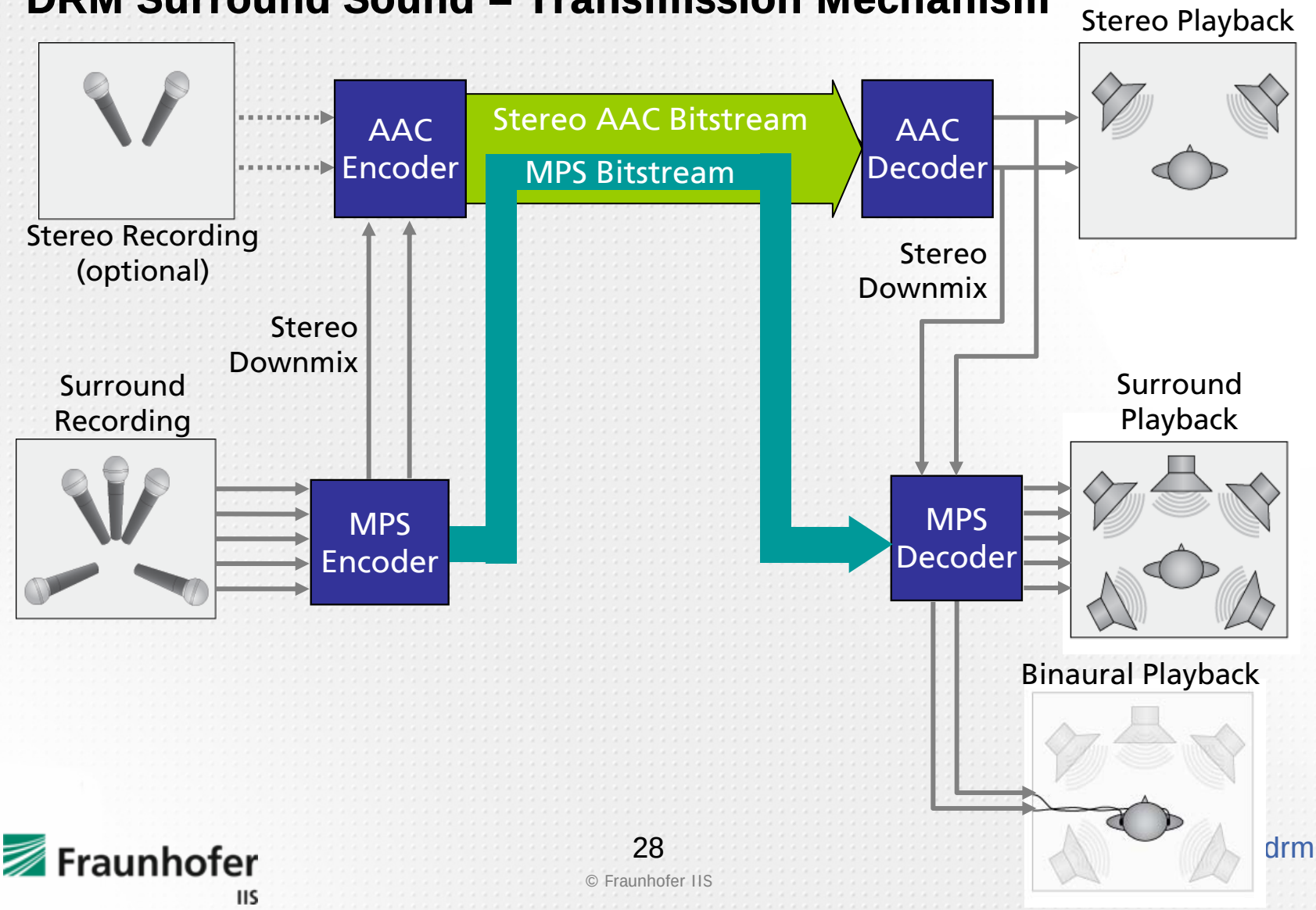
DRM Surround Sound – Transmission Mechanism



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DRM Receiver Profiles

- Content:
  Minimum expected Rx functionality
  (not technical implementation)
- **Two Profiles**:
  – Standard Receiver (text screen)
  – Rich-Media Receiver (color graphics screen)
- Aiming to give **Confidence**
  → to **broadcasters:** content can be received
  → to **rx manufacturers:** content on air
- Focus on DRM functionality,
  align well for multi-standard receivers
- Published by DRM Consortium 2009-09

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DRM Receiver Profiles

Increasing Functionality

DRM Global Receiver Profiles

Rich-Media Receiver
Journaline + Slideshow mandatory,
MPEG Surround recommended

Standard Receiver
Text + warning/alert mandatory,
Journaline + EPG recommended

Minimum Receiver Requirements
Technical receiver functionality requirements,
Reception quality measurement parameters

Logo requirement

DRM System Specification
ETSI ES 201 980:
System definition, technical functionality description

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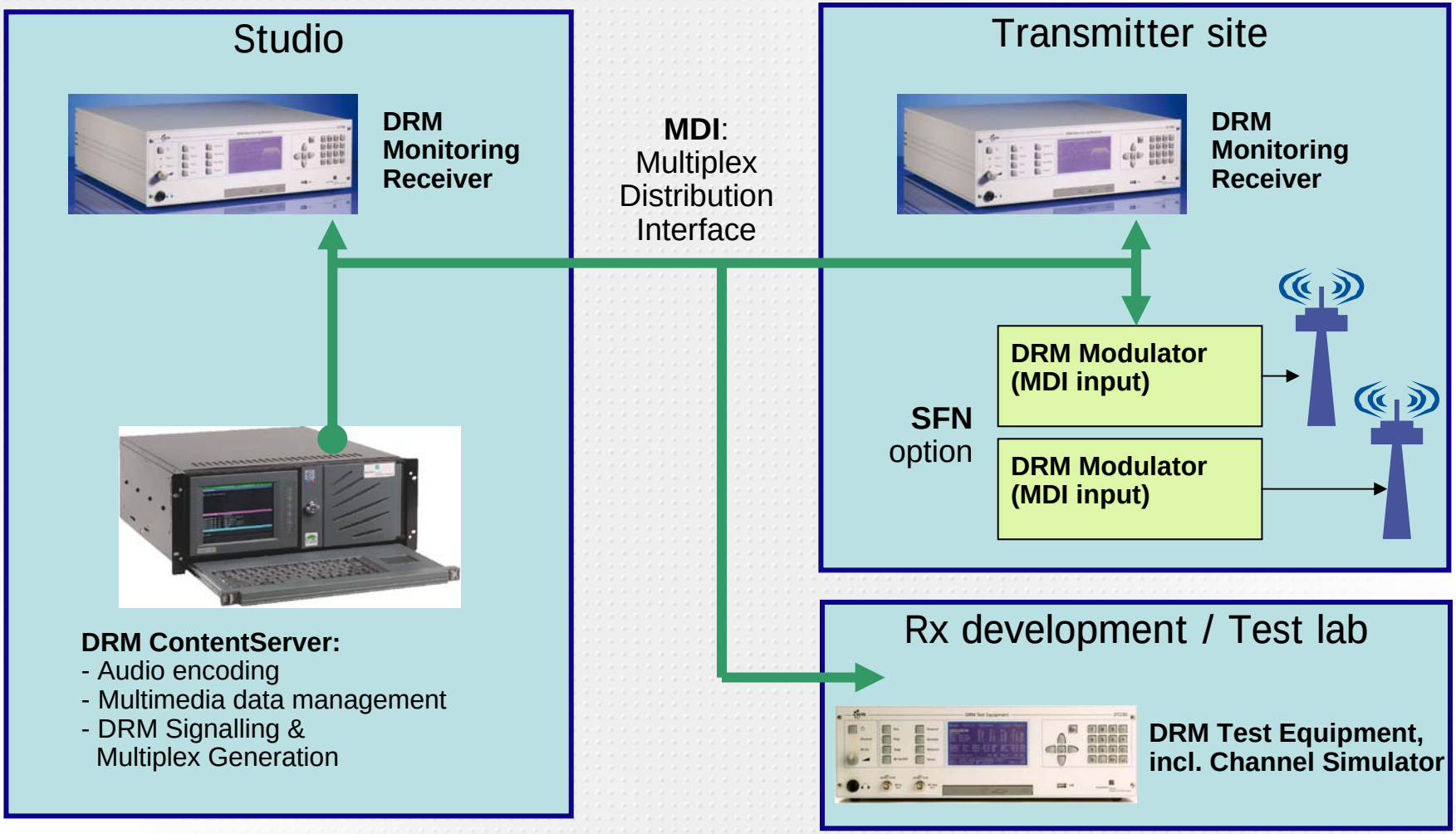
Broadcast Chain and Signal Distribution Infrastructure



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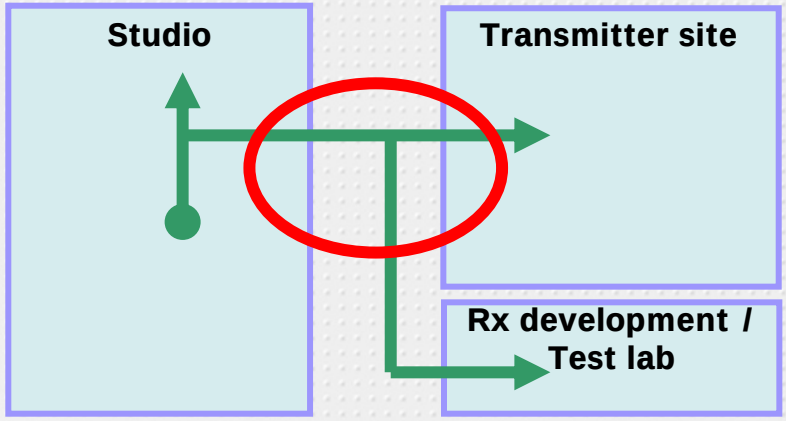
Broadcast Chain and Signal Distribution Infrastructure



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

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DRM and DAB Complementary Co-Deployment

DIGITAL radio mondiale

WORLD DAB Digital Multimedia Broadcasting
Radio • Mobile TV • Multimedia • Traffic Data

Core system **features are shared** between DRM and DAB (DAB Classic, DAB+):

- **Audio codec**:
  DRM/DAB+/DMB all use HE-AAC v2
- **Data Applications**:
  Text Messages/Dynamic Label, EPG, Journaline, Slideshow, BWS, TMC, etc.
- **COFDM modulation scheme**
  enabling SFN single frequency networks
- **Signalling features**
  Service ID, announcements, warning/alert, program type, alternative frequencies, etc.

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DRM and DAB Complementary Co-Deployment

- **Full service linking / cross referencing** to/from DAB and DRM (+ FM, AM) broadcasts
  → receivers can switch automatically
  → user remains on selected radio station independent from system/frequency

➔ Seamless and transparent **"Digital Radio" for users**

➔ Relatively little extra effort for **multi-standard receivers**

➔ **Same set of applications, services and interfaces** available for broadcasters

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DRM and DAB Complementary Co-Deployment

DRM or DAB?

(a very general attempt for classification)

DRM: one broadcaster per frequency
DAB: multiplex with multiple programs

➔ Several programs share the same local/regional coverage area: **DAB Multiplex**

➔ Single programs for a particular local/regional coverage area: **DRM**(+)

➔ International coverage required: **DRM**(30)

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DRM and DAB Complementary Co-Deployment

DIGITAL radio mondiale

WORLD DAB Digital Multimedia Broadcasting
Radio • Mobile TV • Multimedia • Traffic Data

➔ **DRM and DAB are complementary Digital Radio systems**
and ready for easy co-deployment

➔ Independent from
actual broadcast frequency

➔ Individual decision for using
DAB or DRM depends on:
- broadcaster's situation / requirements
- regulatory framework

DRM and DAB are
One Family of Digital Radio Standards

Thank you

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