Saturday 28 April 16.00h
SDCTV session, chairman Brian McCarty

**Topic** : “Implications of Standards changes in Cinema Sound on DVD and Home theater”

“Importance of compatibility between Pro Cinema & Home Cinema audio standards”

By Wilfried Van Baelen (CEO Galaxy Studios, Auro Technologies)
HISTORY

- Cinema Industry was in the past leading about setting audio standards
- Stereo (1934), Surround (1941) ... -> WHAT IS NEXT?
- Dolby 7.1 seemed not to become the next gen standard -> WHY?

TRENDS & FACTS

- Other AV content markets became much bigger than Cinema -> Games, Broadcast...
- Interactivity (realtime operation) is gaining importance : issue -> latency of lossy codecs
- Too many incompatible distribution formats & codecs -> need for more compatibility
- “Back to PCM” -> HDMI, BluRay, DCP, Game engines, Broadcast ...
Home Cinema is gaining market ... = power

WHY A NEW AUDIO STANDARD FOR CINEMA?

- Exhibitors interested in a new experience that can not be achieved at Home ... (yet)
- Exhibitors want to keep their extra revenue on tickets (cfr Stereo 3D) using 3D Audio
- Exhibitors want to differentiate themselves -> added value to attract customers

BUT... WHAT ABOUT HOME CINEMA DRIVING THE CINEMA STANDARD??

- 3D Audio at Home: better immersive experience (localization) with much less channels
- 3D Audio by Games & Broadcast (nr.1 content makers) -> more influence than Cinema?
- Cinema shouldn’t make the mistake to think they have still the same power as before
- Importance of alternative content (with 3D Audio) ... MISSION = BE COMPATIBLE!
- If Cinema standards are too ‘isolated’ from Home standards -> VERY RISKY FUTURE!
Home Cinema Market

WHICH 3D AUDIO SETUP IS ‘MOST EFFICIENT AT HOME’?

- How many channels necessary? -> Each channel cost money...
- Ceiling channels (right above listeners’ head) -> in most cases not an option!
- Height channels “around” the listener to get full immersive 3D Audio experience
- FULL Backwards compatibility with 5.1 Surround setups and formats (DVD, Blu-Ray)
- Compatibility with other CES -> cars (VOG channels not possible), mobile, headphones

‘WHAT IF’ NEXT GEN CINEMA CONTENT IS LESS IMMERSIVE AT HOME?

- If Cinema 3D Audio standards & content have bad compatibility with Home 3D Setup?
- Exhibitors will get the opposite effect from what they hoped to achieve with 3D Audio!
- Conclusion -> a good detailed study of “compatibility” is KEY for CINEMA INDUSTRY!!
Compatibility between Pro Cinema & Home Cinema

- **FINANCIAL / ECONOMICAL**
  - Is key parameter for all people involved in content creation up till consumers
- **EASY COMPATIBILITY between ALL CONTENT FORMATS & MARKETS -> MUST ?!**
  - All kind of content playable on Pro Cinema, Home Cinema, Cars, Mobile devices
  - Alternative content for Pro Cinema becomes very important
  - 81% of revenue of Movie industry is not coming anymore from ticket sales
- **HOW TO ACHIEVE MAXIMUM COMPATIBILITY BETWEEN BOTH ?**
  - “Professional” (large rooms) versus “Consumer” (small rooms)
  - DEFINE these PARAMETERS -> detailed investigation necessary !
- **HOW IMPORTANT IS THAT COMPATIBILITY ?**
  - Determines the integration and easy acceptance of a new 3D audio standard
The HIGHER the “Compatibility” => The BIGGER the “Standard”

- THE MORE COST SAVINGS for **Content Makers**
  - Production up till distribution from Movies, Games, Broadcast..

- THE MORE COST SAVINGS for **Post Production Houses**
  - Investments, Workflow, Efficiency, Reliability ..

- THE MORE COST SAVINGS for **Consumers**
  - Upgrade model on existing setup + “single inventory solutions”

“Compatibility” = driving the other ‘decision making parameters’: quality, financial, flexibility, speed, easy
### “Decision Making Parameters”

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"Compatibility"

**Listening Formats**
- Backwards with 5.1 standard
- Between 3D Audio Speaker Layouts
- Channel based versus Object based
- Theatre, Home, Cars, Headphone
- Between Mix Stages and Theatres
- Loudness issues (dynamic range)
- **Creative control over each PB format**;
  - biggest issue of “Speaker agnostic” systems

**Technical Solutions**
- Natural compatibility with PCM
- Professional -> DCI Compliant :
  - **DCP = PCM only (no lossy data codecs)**
  - Watermarking ! (in media-server)
- Consumer-> With HDMI :
  - **HDMI = max 8 PCM channels**
- Over Speakers & Headphones
- Existing Workflows & Equipment

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“Financial”

**Listening Formats**

- Upgrade on existing 5.1 install
- Most efficient solution:
  - Max “Sound in 3D” result
  - With “Minimum” amount of channels
  - Each extra channel cost money
    - Pro users ; each edit suite, controlroom
    - During production & post production
- Speaker Agnostic has ‘its price’

**Technical Solutions**

- PCM already in all Audio devices
- Bandwidth reduction <-> lossless
- “Single Inventory Distribution”
  - How many formats in it ? Bandwidth ?
  - Cross media Compatibility ? Markets ?
- Easy integration (HW & SW)
- On existing DAW stations
- Maintain existing workflows

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“Quality”

Listening Formats

- Channel based system
  - Less issues than “Object based” systems
  - Sounds more “Natural” -> less phase issues
- Same experience at each seat
  - Enlarge “Sweet spot”
  - “Same Audio/Video experience”
- Loudness (dynamic range)
  - Keep the “movie-experience” alive
  - How to solve ? Home versus Mobile systems ?

Technical Solutions

- PCM Based
  - Magic of uncompressed audio quality
  - Bandwidth needed versus formats ?
- Upmixing (upconverting)
  - No change to original sound & reverbs
  - Should not have any phase issues
- Speed => “Lipsync operation”
  - New interactive markets -> realtime !
“Easy”

**Listening Formats**

- Easy to install for users
  - Professionals -> edit suites, mixing rooms
  - Consumers -> What is realistic at home?
- Easy to find content
  - Net based content delivery?
  - Request for DCI compliant content at Home
- Loudness parameters
  - Offset necessary by just 1 digit number
  - Remote + Personalized solutions

**Technical Solutions**

- “Push on 1 button” - solutions
  - Very simple for customers
- “ONE CARRIER”
  - Playable on all audio devices
  - Containing the artistic mixes of each format (Stereo, 5.1, 3D Audio)
- Easy Tools for Professionals
  - Easy to create compatible solutions
  - Easy to control each artistic mixed output
“COMPATIBILITY” is determining the most important aspects;

- **FINANCIAL & ECONOMICAL**
  - In ALL kind of content ... Games, Movie, Broadcast, Music, Events etc.
  - Engineers & Production houses..
    - Workflow, Efficiency, Reliability, Quality .... Easy to install everywhere
  - Cinema theaters & Consumers
    - Backwards compatibility, Easy to use, playable on all devices
  - Reduces Distribution costs in Pro World as well for Consumers
    - Flexibility is key .. 1 download in which more formats

- **NEW 3D AUDIO EXPERIENCE** -> same spheric experience everywhere

- **DOES REQUIRE A DEEP INVESTIGATION** -> detail level = important

**CAN CINEMA INDUSTRY AFFORD THE RISK TO HAVE BAD HOME COMPATIBILITY ??**
How to achieve a “next gen audio standard”?

only if EVERYBODY = HAPPY ... and in ALL markets !!!

- Content makers -> no extra investment, better IP protection
- Professional engineers -> reliable, practical and flexible technology
- Postproduction facilities -> small investments, “compatible” formats
- Broadcast facilities -> Robust signal, no extra bandwidth, lipsync
- Hardware manufacturers -> easy to implement, low cost, all markets
- Consumers -> easy to set up, easy use, good content

How to maximize immersive experience with minimum investments?
Wilfried Van Baelen (Belgium)

- Professional Musician / Composer / Programmer / Arranger
  - Classic -> Concert Organist (first price Royal Conservatorium), Trumpet, Trombone
  - Pop -> Synthesizers & Pop Organ, Music Director

- Engineer & Producer
  - Music -> More than 20 Platinum Albums
  - Film Mixing -> More than 20 Feature Films (incl. Golden Lion of the Future Award, Venice 2006)

- Founder & CEO “Galaxy Studios”
  - 1982 -> Started with Music productions only & Since 1999 Scoring & Sound for Picture
  - 2006 -> Addition of Postproduction Facility for Picture (4K DI Workflow incl. Printmasters)

- Founder & CEO “Mollywood”
  - Feature Film production company: financing & co-productions

- Founder & CEO “Auro Technologies”
  - Auro-codec, Auro-Matic etc.

- Inventor of the “Auro-3D Format & Concept” (2005)

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