
Starting production in interactive and immersive sound

Robert Bleidt and Dennis Baxter – DTV Audio Group at SVG Summit - Dec. 2014

Starting production in interactive and immersive sound

- Mic'ing
- Mixing
- Monitoring

Implementing MPEG-H in TV Broadcasting

Testing MPEG-H in the field

- Winter extreme sports competition (skiing, snowboarding, snowmobile racing) carried on major cable network
- Summer extreme sports competition (skateboarding, motorcycle racing) carried on major cable network
- NASCAR race (with pit crew radios) using material from NASCAR
- DTM (European race series) auto race carried on major European sports channels



Tonmiester Stenzel adjusting 3D microphone array at Aspen half-pipe



Sound Designer Baxter adjusting spot mic at Austin skateboard ramp

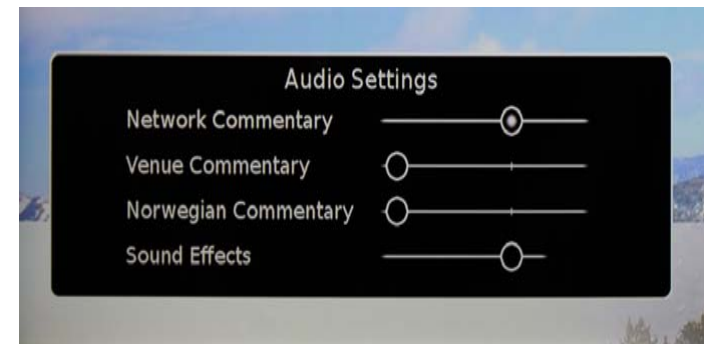


Post-production mixing at Technicolor/Paramount in Hollywood

MPEG-H Audio improves the listening experience

Personalize the sound to what you want to hear

- Examples:
 - 2014 Field Test with leading U.S. sports network at winter sports event
 - Pick your announcer and language
 - Want to hear more sound effects?
More audience sounds?
 - Demo content from NASCAR race
 - Pick your announcer and language
 - Mix in driver's radio
 - Hear car sounds/transducers
- Real-time decoding and rendering
- User selects audio mix from on-screen display sliders or **preset buttons**



Starting with Interactive Sound

- Decide on what elements should be interactive:
 - Commentary
 - Alternate language commentary
 - Athlete, Driver, Official radios
 - Referees / Coaches
 - Equipment Sounds
 - Microphone Operators

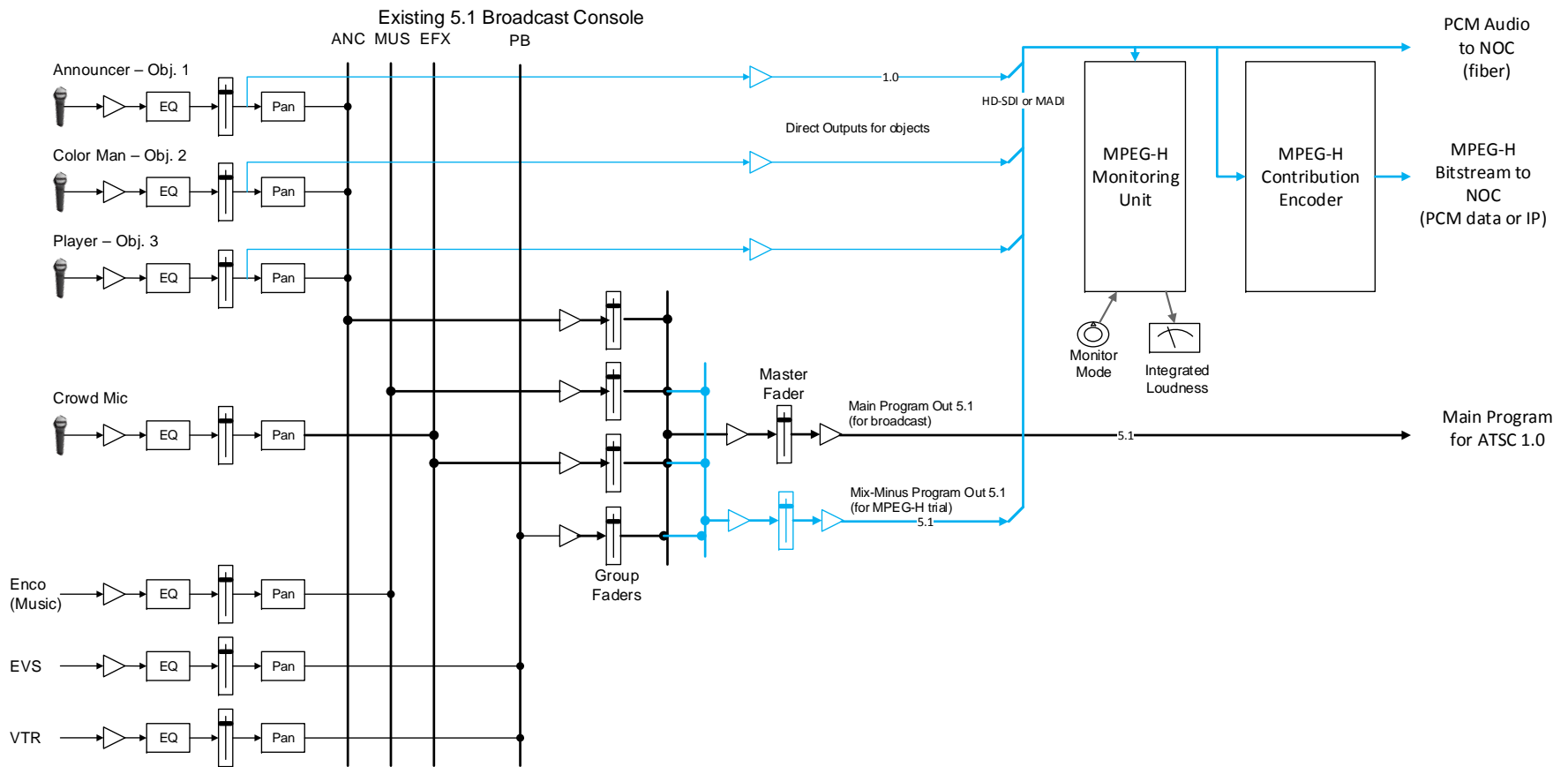
- All over a bed of ambience/nat sound, music, etc

Plan on 30 kb/s for each mono object or element

Interactive Sound

- Decide on what audio components should be controllable.
 - Effects
 - Ambiance
 - Atmosphere
- Similar Workflow - Break these audio feeds out on Pre Fade Sends on your console
- Send all elements to Monitoring Unit and to NOC

Setting up a console for an interactive broadcast



From the remote to the network op center or ACR

- Example:
 - 5.1 bed: ambience/nat sound, music, effects
 - Commentary
 - Effects/field mikes
 - 8 channels total
- If you have fiber with spare PCM channels:
 - Put the individual elements and a mix-minus bed on the spare channels
- If you have satellite or fiber with no spares:
 - Encode the audio with MPEG-H at contribution rates (500-1500 kb/s) and send as IP or in PCM data stream

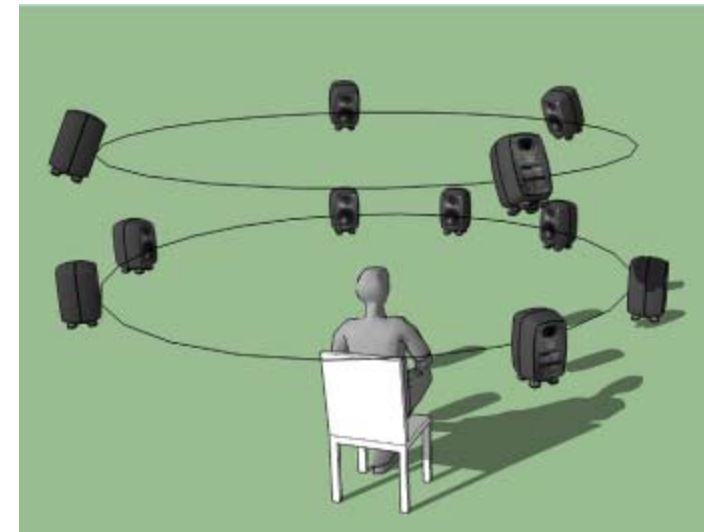
Adding Immersive Sound

- Mic'ing
 - Need to capture signals for height channels
 - Three (or more) options:
 - Practical mike arrangements with existing mikes
 - Formal mike trees
 - HOA with Eigenmike
- Mixing
 - Need to mix in 3D
 - Use your existing console for now
- Monitoring
 - Need to monitor immersive sound
 - Three options

MPEG-H Audio improves the listening experience

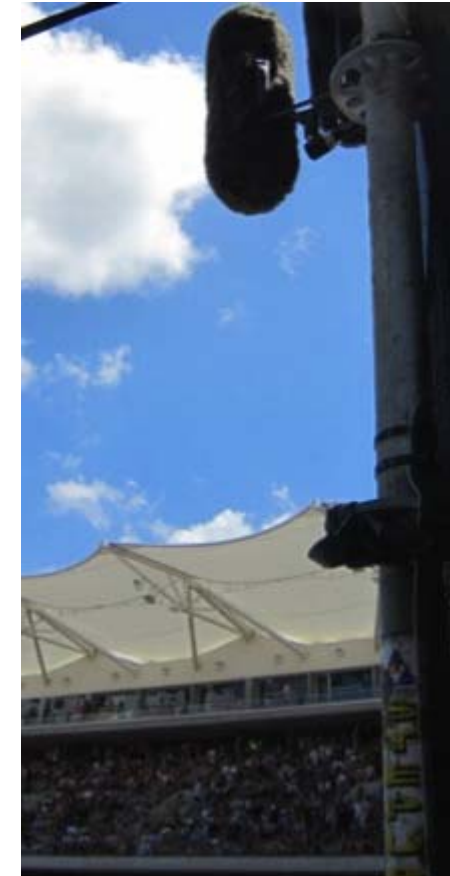
Making surround sound more realistic

- MPEG-H currently has defined speaker configurations from 1.0 (mono) to 22.2
 - Bitstream support for up to 128 channels and 128 objects
- **Our recommendation for immersive sound:**
 - **7.1 Blu-ray surround configuration**
 - **4 Height Speakers above corner speakers as shown**
- Other configurations are possible, for example:
 - 5.1 + 4H
 - Using front wide 7.1 configuration or 9.1



Different Approaches to 3D Microphones

- Widely de-correlated combinations of microphones.
- Spaced pairs of mono and stereo microphones
- Large Diaphragm AT4050ST
- Stereo Shotgun BP4029 Microphones
- Placed at various distances from the crowd to give Layers and texture of sound.
- Different samples with different sonic characteristics.
- Natural capture and reproduction of sonic space
- Combining slices.



Different Approaches to 3D Microphones



Closely spaced concentric layers of cardioid microphones.

Precision machined mike rails, Schoeps cardioid capsules, Rycote windscreens.

Eight XLRs to recorder or stage box.



Closely Spaced Cardioid AT4050

Build 4.0 upper and lower layers



Eigenmike® from MH Acoustics.

32 (16) Capsule – Capture and Reproduction

One Ethernet cable to PC.

3D Production



Production Tools – Panning Mono Microphones



Microphone and Production Guide Lines and Sound Designs for Television Entertainment and Sports

3D - Sound Design – Experience



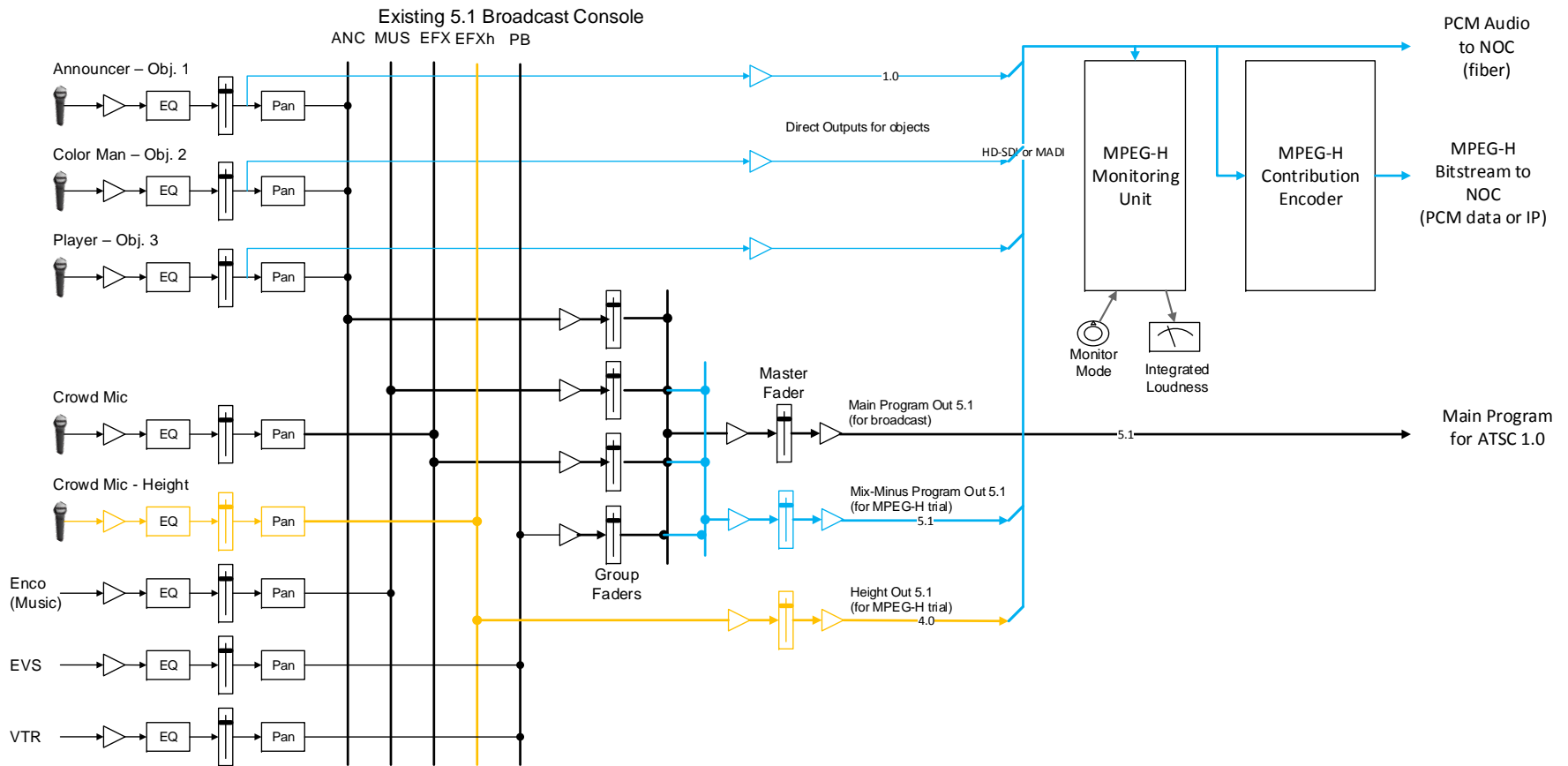
Enhance Point Of View – Bobsleigh



Enhance Stadium Experience – World Cup

3D - Sound Design
Enhanced Story Possibilities

Setting up a console for an immersive broadcast



Monitoring Immersive Sound

- Add four height speakers to existing 5.1 or 7.1 speakers
- In remote trucks:
 - Small speakers for height, wide power bandwidth not needed, no “spaceship flyover”
 - Mix surround/immersive mix in remote studio (as for FIFA World Cup 2014)
 - Use immersive headphones
 - Real rendering with head tracking, individual HRTF
- For QC or confidence monitoring: MPEG-H binaural rendering on ordinary headphones