



Immersive Coverage of
Spatially Outspread
Live Events

Acquisition and Data Flow

Jürgen Schmidt (Technicolor R&I)

Marcus Thaler (JOANNEUM RESEARCH)

Audio Visual Gestalt Workshop

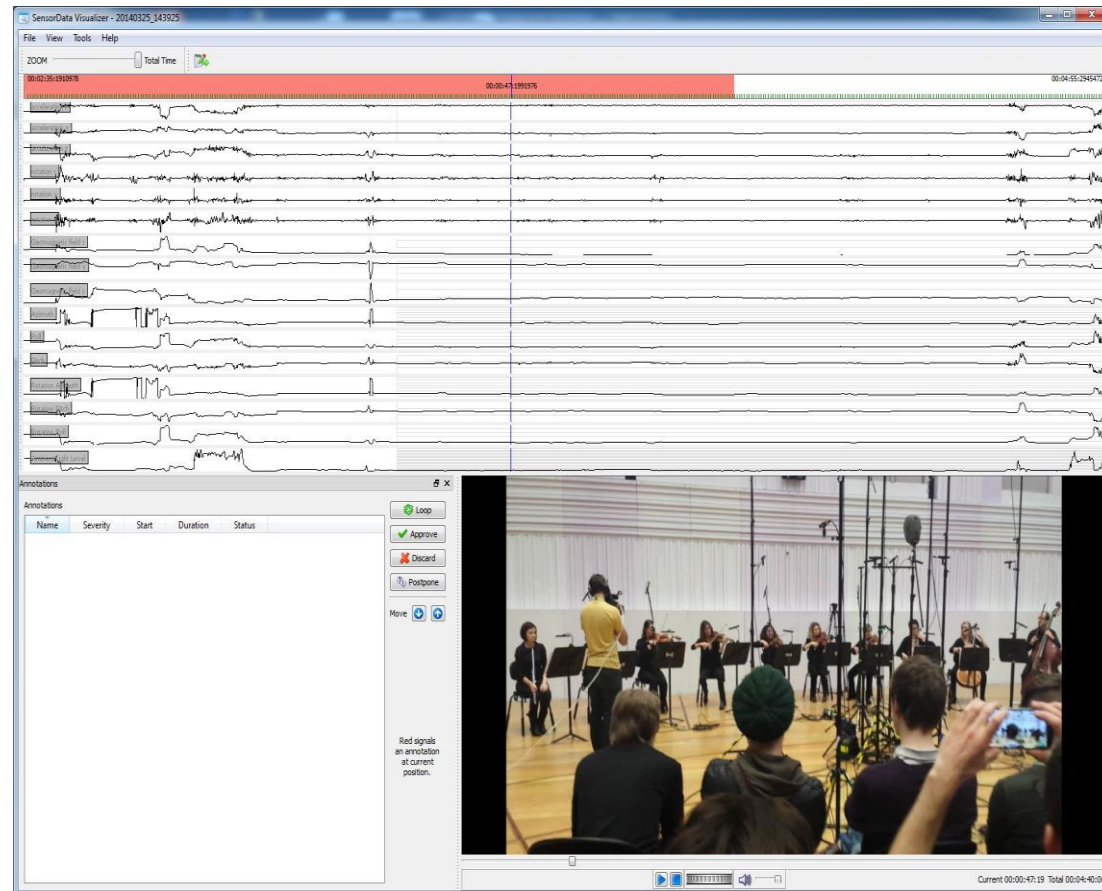
Bremen, 30 September 2014



This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no610370.

Acquisition

- Seamless integration professional and user generated content
- Professional
 - 4K and HD cameras
 - Omnidirectional camera
- UGC
 - Smartphones, tablets (IOS, Android)
 - Semi Pro: DSLR
 - GoPro
- Sensor Data
 - GPS, acceleration, ...
- Spot microphones
- Microphone arrays
 - 3D Sound (Pro / UGC)



UGC Challenges



- Multimedia streaming from mobile devices
 - Varying bandwidth conditions of mobile networks
 - Close to Real-time

- Energy efficiency for mobile devices
 - Short battery lifetime while streaming
 - Video encoding

- Approach
 - Latest Network standards, e.g. LTE
 - Improvements in codecs and adaptive streaming methods
 - Efficient and standard-compliant integration of metadata
 - Quality analysis of UGC live streams
 - On the device before transmission



UGC Video Content Selection/Filtering

- Automatic video quality analysis (on mobile devices)
 - Simple QA (mobile devices site)
 - Luminance level, over/under exposure, severe blur, noise at low light (may also be an indication for blocking), severe instability
 - Complex QA (server site)
 - Blocking, blur, motion blur, transmission problems (freeze frame, drop frame), light/moderate instability
 - Investigate reliability of sensor data
 - Support/replace visual analysis
 - Prioritising streams
 - Based on quality, complementarity

- Development of tailored mobile apps
 - Sensor data recording (Android and iOS)
 - Video quality analysis (Android 4.3 needed)

UGC Audio Content Selection/Filtering



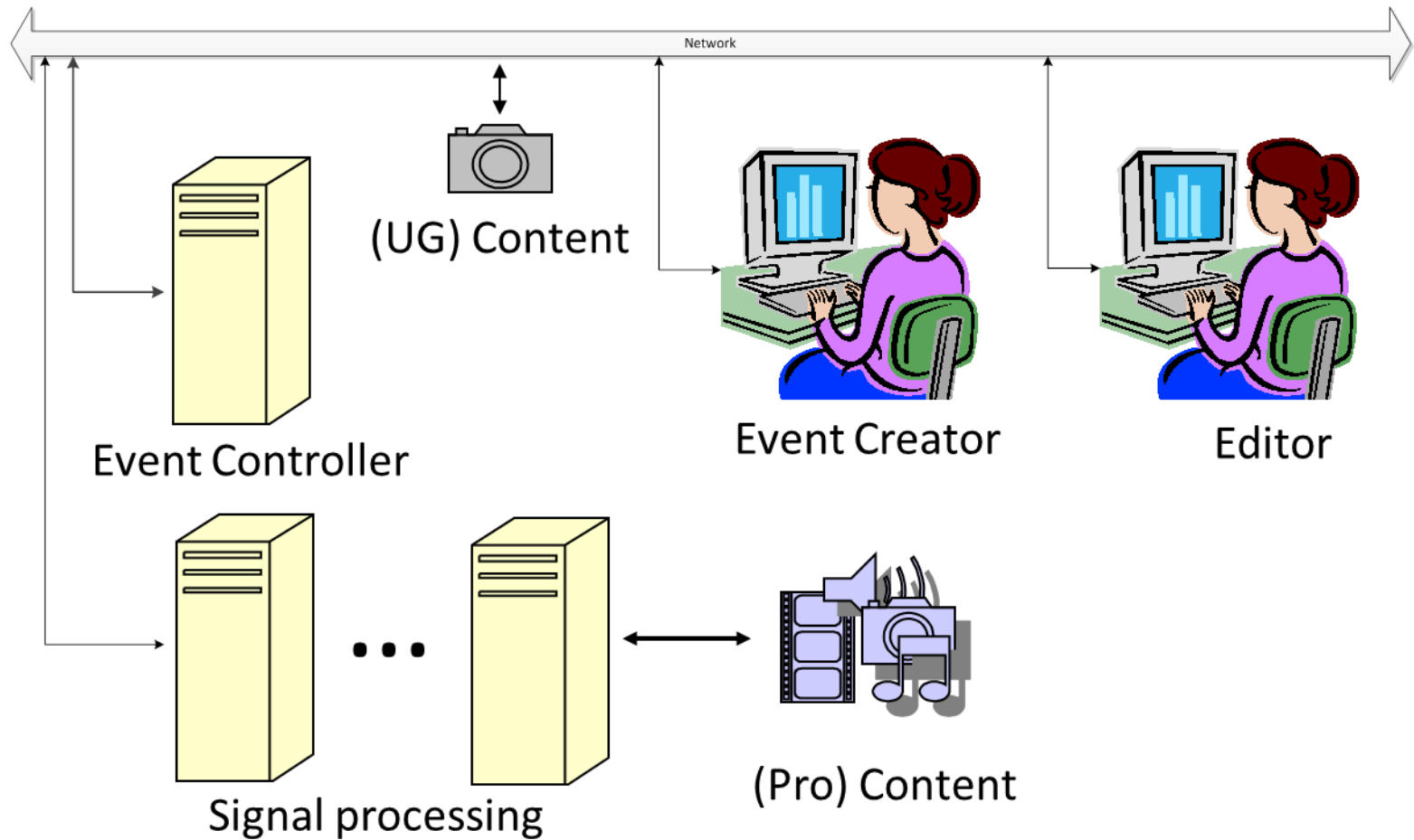
- Automatic audio quality analysis
 - Simple QA (mobile devices site)
 - Dynamic, distortion, frequency response, severe instability
 - Complex QA (server site)
 - Audio coding artifacts, transmission problems (freeze frame, drop frame affects audio), source movement

- Sensor fusion
 - Microphone array for 3D audio generation

- Development of tailored mobile apps
 - Similar to video content selection/filtering



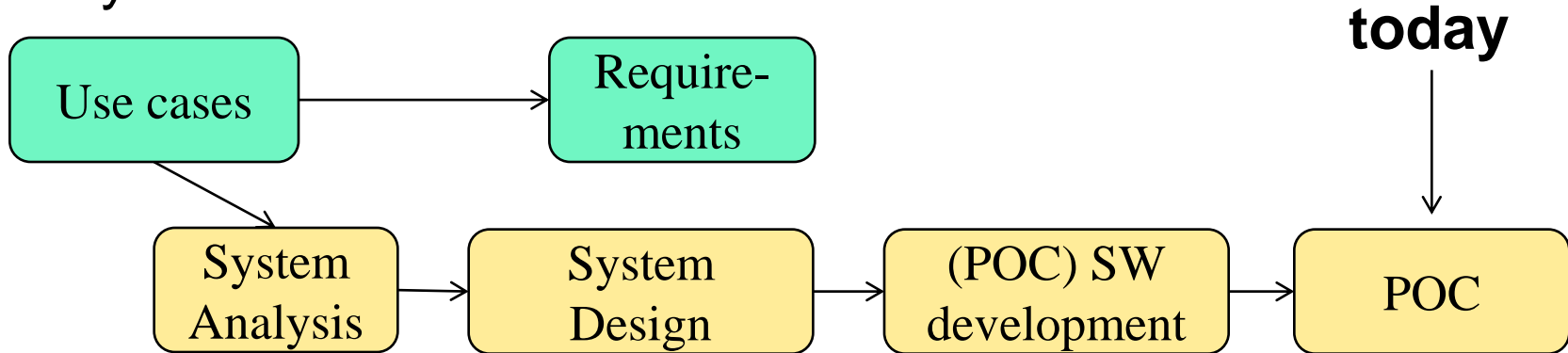
ICoSOLE System



Software Development Tactics



■ System



■ Processing

- Use of established frameworks & standards
 - Gstreamer (Open Source) or similar
 - IPStudio (BBC)
 - MPEG-DASH (ISO/IEC Std)
 - MPEG-H (ISO/IEC Std)
 - ...



marcus.thaler@joanneum.at
juergen.schmidt@technicolor.com