

AUTOMATED STUDIO PRODUCTION

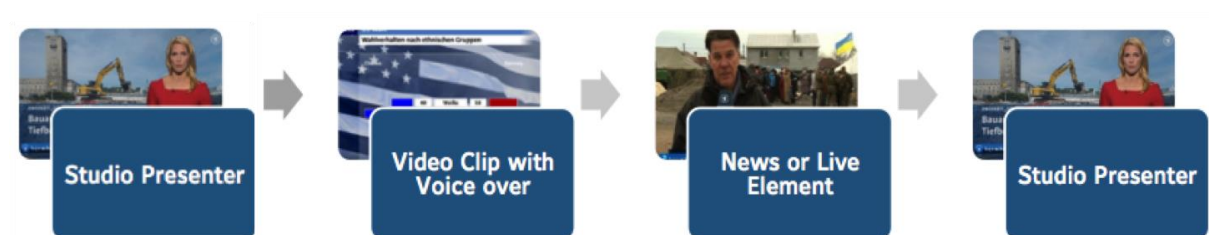
Over the recent years, many of the traditionally manual operations within a TV or Radio playout environment have gradually given way to automated processes leading to an increased level of reliability, and most importantly, greater efficiency. As automation software platforms are becoming more and more sophisticated and widely adopted by broadcasters, this paper will look at ways of incorporating automatic audio production into modern broadcast workflows.

Although many types of live broadcast and media productions such as sports or chat shows are by their very nature "unpredictable", in the sense that the content evolves in real time, many are also rehearsed and repeated and therefore have a more consistent linear nature. These types of production lend themselves very well to having major elements under the control of an intelligent automation system including:

- Audio
- Video
- Lighting
- Robotic Cameras
- Graphics

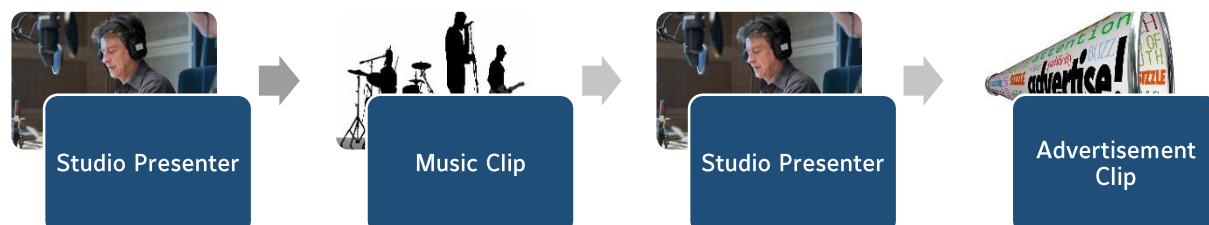
Taking the example of a regular daily news bulletin or a weekly magazine type of program, a typical content flow might be as follows:

TV broadcast:



- A studio presenter will read out information about a certain subject or topic
- This will be followed by a pre-recorded video clip with just background audio
- Next may come a live OB contribution with foreground and background audio
- Then back to the presenter to introduce the next item or segment

Radio broadcast:



- The studio presenter will be speaking and introducing the next piece of music
- A pre-recorded music track will be played out from the server
- Then back to the presenter speaking again
- Next could be an ad break or promo clip

The key to maximizing efficiency in these automated playout situations is to pre-condition all the individual audio sources in advance. Numerous adaptive processes can be applied to manage raw content and prepare it for automated mixing.

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Processing for pre-recorded content:

Spectral Signature

Jünger Audio's Spectral Signature™ dynamic equalizer is a powerful creative tool allowing adaptive control of the spectral balance of your content. Spectral Signature™ analyzes incoming audio and compares its spectral structure with a predetermined "reference" curve. This allows dynamic EQ corrections to be applied only if necessary to achieve a consistent sound image and tonal balance

Parametric EQ

A digital full parametric IR filter set offers five bands of EQ for static equalization such as background noise filtering.

Dynamics

In addition to a traditional upward compressor, a threshold based downward compressor is also included. Both types adaptively adjust timing parameters based on the incoming audio structure. An expander/gate removes low level noise without introducing artefacts.

Level Magic™

Based on a unique multi-loop control principle, the Level Magic™ algorithm provides adaptive wideband loudness control with exceptionally high audio quality that is free of coloration, pumping, distortion or modulation effects. Level Magic™ combines three major gain changing elements:

- Adaptive AGC (automatic gain control)
- Transient Processor
- Distortion-free true peak limiter

Processing for voice sources:

Phase Rotator

The Phase Rotator automatically detects imbalanced audio waveforms and restores symmetry to prevent transients that may unnecessarily trigger downstream processing.

Spectral Signature

Jünger Audio's Spectral Signature™ dynamic equalizer is a powerful creative tool allowing adaptive control of the spectral balance of your content. Optimized for Voice signals Spectral Signature™ creates sonic consistence for voice applications. Spectral Signature™ analyzes incoming audio and compares its spectral structure with a predetermined "reference" curve. This allows dynamic EQ corrections to be applied only if necessary to achieve a consistent sound image and tonal balance.

De-esser

The De-esser greatly reduces the effect of excessive sibilance from spoken voices.

Voice Leveler

Based on a unique multi-loop control principle, the Level Magic™ algorithm provides adaptive wideband voice optimized level control with exceptionally high audio quality that is free of coloration, pumping, distortion or modulation effects. Level Magic™ combines three major gain changing elements:

- Adaptive AGC (automatic gain control)
- Transient Processor
- Distortion-free true peak limiter

Voice Dynamics

In addition to a traditional upward compressor, a threshold based downward compressor is also included. Both types adaptively adjust timing parameters based on the incoming audio structure. An expander/gate removes low level noise without introducing artefacts.

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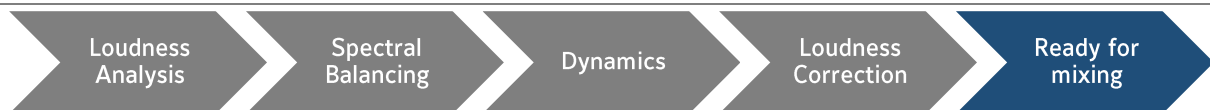
1. LIVE TALENT MICROPHONE

Source condition	Processing applied	Result
Inconsistent level	Level Magic™ levelling	Consistent level
Inconsistent spectral balance	Spectral Signature™ dynamic EQ	Consistent spectral balance
Poor signal/noise ratio	Parametric EQ	Optimized signal/noise ratio
High dynamic range	Dynamics processing	Controlled dynamic range
Uncontrolled peak level	Limiting	Controlled peak level



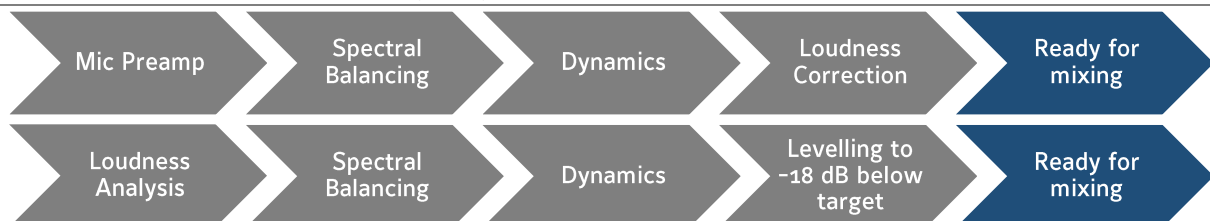
2. PRE RECORDED CONTENT FROM SERVER

Source condition	Processing applied	Result
Consistent level	No processing	Consistent level
Inconsistent spectral balance	Spectral Signature™ dynamic EQ	Consistent spectral balance
High dynamic range	Dynamics processing	Controlled dynamic range



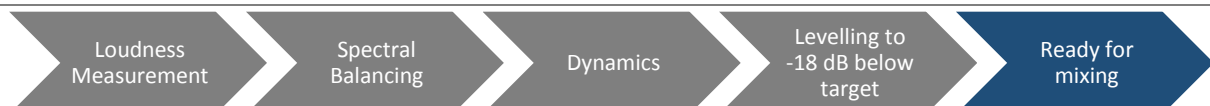
3. PRE RECORDED CONTENT WITH LIVE VOICEOVER

Source condition	Processing applied	Result
Mic processing as in example 1.	Mic processing as in example 1.	Consistent mic signal
Content preprocessing as in example 2.	Content preprocessing as in example 2.	Consistent background signal
Content on full level	Set target level to background setting (-18 dB)	Signal ready for auto mixing



4. EXTERNAL SOURCES

Source condition	Processing applied	Result
Unknown spectral balance	Spectral Signature™ dynamic EQ	Consistent spectral balance
Unknown target level	Level Magic™ levelling	Levelled to known target



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