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## The "Digital Solution", the answer to a lot of challenges within new production routines at today's broadcasting stations

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### ABSTRACT

The introduction of networked production systems allows a very actual, topical and efficient workflow especially within broadcast and TV applications. As a result production is moving closer to editorial work. Sound editing such as voice-over etc. has to be done more and more by editors who naturally don't have that special knowledge as a sound engineer. Life recordings and interactive TV in future will call for further steps to simplify the production processes and to enhance reliability.

We will explain practical examples of challenges from daily production routines, will give answers to solve the problems by using digital technology and will show the effects on a more simple and reliable workflow.

### 1. INTRODUCTION

The introduction of networked production systems allows a very actual, topical and efficient workflow especially within broadcast and TV applications. As a result production is moving closer to editorial work. Sound editing such as voice-over etc. has to be done more and more by editors who naturally don't have that special knowledge as a sound engineer.

Life recordings and interactive TV in future will call for further steps to simplify the production processes and to enhance reliability. Additionally the time disposable for setup, rehearsals and the recordings itself will become shorter and shorter.

In the following some practical examples of challenges from daily production routines will be presented, answers will be given to solve the problems by using digital technology and the effects on a more simple and reliable workflow will be shown.

Experts report from interesting recordings and from special challenges they had to manage. They explain the reasons for working with digital microphones and from their experiences by doing this.

They especially took advantage of some interesting features of the digital microphones used, which are most important to simplify the recording business and to shorten the time for setup, rehearsal & recording:

- Remote controlling of all microphone features in general
- Remote controlling of polar pattern

- Adjustable compressor/ limiter
- Automatic peak limiter

## 2. OUTDOOR FESTIVAL RECORDING

The first example is a classical music festival on a market square of Besançon, a little town in France. There is a busy market up to the afternoon with just a few hours left to clear the square, to set up the orchestra platform and to install the technical equipment.



Fig 1 View from stage to orchestra and FOH at the back

To run a concert just some hours later it is important that cable laying and plugging from stage to FOH is simple, reliable and fast. That means savings in terms of time, weight and space.

Their technical equipment consisted on 36 digital microphones with DMI-2 interfaces, an Ethersound network interfaced by Auvitran, 2x Digigram LX6464 sound cards and 2x SY48 Innovason mixing consoles.



Fig 2 DMI Digital Microphone Interfaces and Auvitran EtherSound Network

All connection from stage to the consoles was made by just one fiber optic cable for 90 channels plus one patch cable for controlling.



Fig 3 Fiber-optic & patch cable for audio & control

As a result the audio engineer in charge emphasized the extensive available dynamic range with noise-free transmission of soft sounds and no distortion problems in case of very loud sound signals at the same time. He felt as one of the most important features the fact that there was no need to preset gain.



Fig 4 ‘Outdoor’ orchestra recording with 36 digital mics

As a resume he experienced that several parameters are considerably simplified with digital microphones.

## 3. RECORDING FROM REMOTE

The next report is from Canada. The challenge there was to record an announcer living in Northern Ontario 500 km away from broadcast center in Toronto. There is no ISDN capability available, and no engineering or technical capabilities are available on the job.

To handle this problem the Post Sound Supervisor of CTV used Audio-over-IP technology to stream the an-

nouncer’s voice across the public Internet via a secure VPN connection with the existing LAN.

A digital (= remote controlled) microphone was taken together with a computer which hosts both the Digital Audio Workstation (ProTools), as well as the IP Audio codec and the appropriate software to control the microphone.



Fig 5 Announcer’s working place at home

The digital nature of the microphone allowed the use of a very cost effective digital interface for the DAW, thus streamlining the critical path between the microphone and the recording device by removing all analog components. This both saves money and maintains quality.

#### 4. ‘RECORDING FROM REMOTE’ WITH DIFFERENT FOCUS

The NDR TV station (Norddeutscher Rundfunk Hamburg) is using digital microphones for several years. Though remote controlling of the microphones was a topic as well, one of their most decisive factors for investing in digital microphones has been the fact that they are more cost effective when taking the overall system into account. The practical handling was a further aspect because it is even possible to transmit *microphone* signals from one building to another.

#### 5. VOICE ‘NON-LINEARITY’

Within another example from Canada digital microphone equipment solved problems with the ‘Non-linearity of Voices’:

The National and Local News operations are entirely non-linear in nature and centered on large server-based edit platforms. Many different reporter & journalists

who are not well trained speaker are giving a lot of spoken material as their input to be broadcasted. It is very time consuming to ‘equalize’ the audio material individually to get an adequate sound quality.

In order to maximize the efficiency of both the editors and the reporters, the technicians at CTV Canada designed a series of “Voice Over Kiosks”.



Fig 6 “Voice Over Kiosk” at CTV Canada

They allow journalists and anchors to record their own voice-overs, directly into the server environment. A member of the audio team does a listening test with any reporter and builds a microphone ‘preset’ on the remote controlling software for the digital microphones by determining settings for gain, polar pattern, compression & de-essing etc.

In operation, a reporter enters the booth and recalls his personal preset on the remote controlling software to ‘customize’ the microphone for his voice and to ensure optimal results for the resulting recording.

One of the direct operational benefits of this scheme is: The sound engineers can predict with a high degree of certainty that the recording will have an optimized level and a maximum peak signature which is ‘legal’ relative to their technical specifications.

This vastly simplifies editor training - since they learn quickly that the voice recordings’ level can be taken as ‘gospel’ - and all their other mix levels can be made relative to the voice.

#### 6. PICKUP OF LIVE AUDIENCE

One of the biggest challenges when mixing variety programmes, either in-studio or as Outside Broadcasts (Award Shows, Musical performance shows, Game shows, etc) is coping with the pickup of the live audience.

In this era of multi-track rehearsal recordings and consoles with complete automation, it's often the case that the toughest component of the mix is the very thing that makes it feel “live” - the audience - yet they're the only element of the mix that cannot reasonably be rehearsed!



Fig 7 View over the Game Show studio

The solution on MTV Canada for several projects over the past few years, including the daily production of “MTV Live!”, and the game show “Qubit” for Discovery Channel has been the use of digital miniature microphones.

They allow to take significant amounts of gain on the audience microphones without the fear of being caught out by an unexpectedly loud outburst.

They effectively are giving the mixer remote control of each microphone. Each microphone is able to control its own dynamics (including the all-important Peak Limiter).

This allows to face the first thunderous applause with greater confidence, and less reliance on heavy-handed downstream Compression/ Limiting.

## 7. LARGE-SCALE REMOTE RECORDING

On a recent Scoring session, CTV was asked to re-record a piece of music which has come to be known as Canada's “second National Anthem”.



Fig 8 Recording the “second national Anthem” with 30 digital microphones

The work was scrutinized by a nation of hockey fans, who'd been listening to the original version for 40 years.

They needed to track more than a dozen cues with a 52-piece Orchestra. The real challenge was a very short 3 hour session with a scant 6 minutes long soundcheck and failure was ‘not an option’.

Since there was no conveniently large recording studio available the orchestra was playing in a local concert hall. The ‘recording studio’ was an SSL C200-equipped mobile recording truck and they mounted the production as a Remote Recording.

Despite the otherwise excellent SSL and its remote mic preamps, they decided to essentially bypass the consoles Pres and conduct the recording using exclusively with digital microphones. The setup consisted on 30 Solution-D microphones as 2 Surround Arrays + Spot mics. Because of their wide dynamic range, as well as the Peak Limiter feature they could shorten the soundcheck period and could use more aggressive gain settings - while guaranteeing that they wouldn't be subjected to any accidental “overs”. So they completely could avoid any “broken takes” due to overloads.

The resulting recordings went on to both popular and critical success.

## 8. MICRO-SCALE REMOTE RECORDING

A quite different recording was made in a large cathedral with a large choir and a chamber ensemble along with the requisite pipe organ. A disc-based location multitrack recorder was used that usually has been employed for documentary work.



Fig 9 Cathedral site for large choir and organ recording

Using field-portable gear generally implies that you're prepared to sacrifice sound quality a bit in favour of the convenience to go anywhere.

But with digital microphones along to AES 42, any recording device with AES3 inputs instantly gives access to the equivalent of a studio-grade signal chain.

On the recording in question the principal advantage was once again the convenience of the remote-controlled nature of the microphones.

Since there was just one sound engineer involved he could not be in two places at once: In the cathedral for the technical setup for the recording and in the “recording studio” in a cathedral's side room.

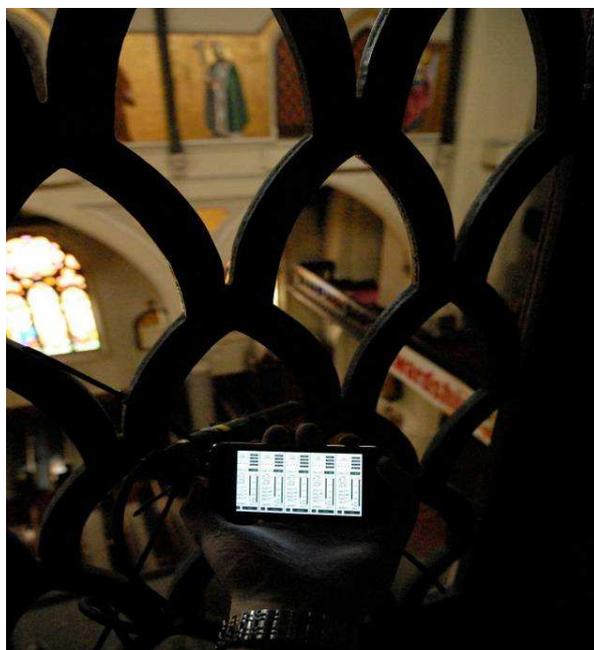


Fig 10 Small gallery overlooking the choir loft

With conventional microphones, this would have seriously lengthened the amount of time it took to complete the technical setup for the recording.

With the digital microphones though, he was able to exploit the RCS remote control software by using VNC software to take control of his MacBook which was running the RCS via an iPod Touch!

In this way, while he was crawling through a small gallery overlooking the choir loft, attempting to verify that the KM 183 D he was setting up was working correctly, he could see and interact with the RCS - despite the fact that he was several hundred feet away from the recordings setup.

## 9. RECORDING IN 'HOSTILE' ENVIRONMENT

To say that an aircraft carrier is a 'hostile' environment for sound recordings would be a huge understatement! This is especially true because of the extraordinarily powerful radar systems interfering with any electronic audio equipment. Therefore recordings aboard an aircraft carrier are a real challenge!



Fig 11 Recording crew aboard the USS Nimitz

The radar systems wreaked havoc on all of the audio gear except the digital microphones which were impervious to interference!

This is because of the fact that the digital signals inside the microphones are similar in nature to radio frequency signals. Any measures to prevent these signals from radiating outside the microphones are helpful as well to prevent rf signals from outside into the microphones.

## 10. CONCLUSION

Experts reported from interesting recordings and from some special challenges they were faced with. They explained the reasons for working with digital microphones to manage the challenges and from their experiences by doing this.

They especially took advantage of some interesting features of the digital microphones used, which can not be found within analog microphones and which are most important to simplify the recording business and to shorten the time for setup, rehearsal & recording. So they told in particular about

- remote controlling of all microphone features
- adjustable compressor/ limiter features
- the automatic peak limiter and last but not least
- the perfect imperviousness to interference.

## **11. ACKNOWLEDGEMENTS**

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