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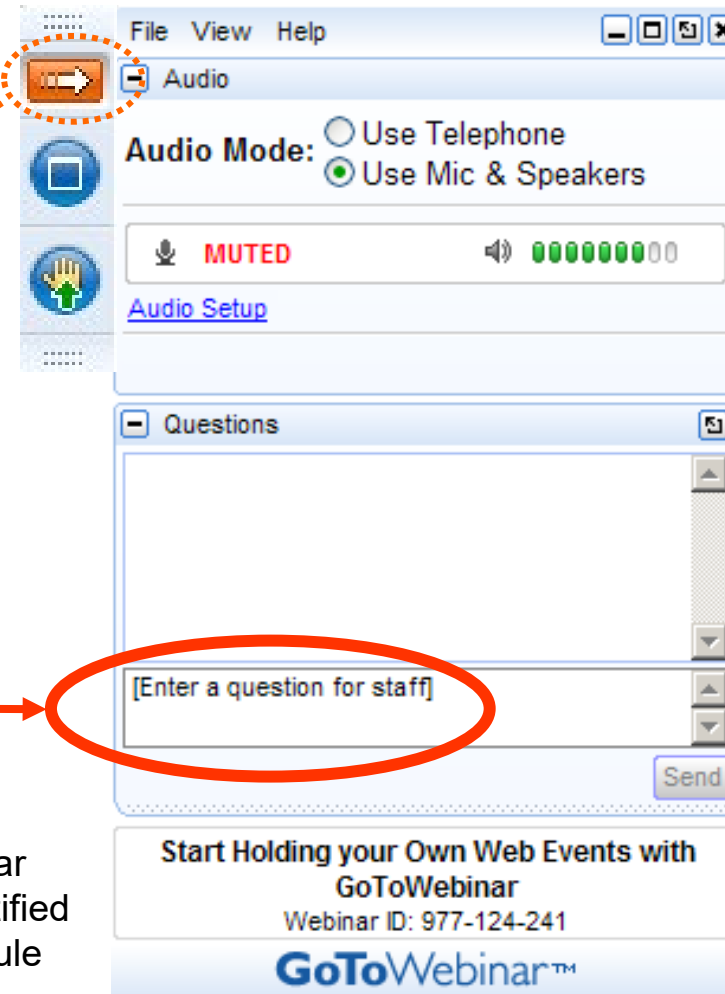


# HD Primer

# Your questions please?

(if you don't see the control panel, click on the orange arrow icon to expand it)

Please enter your questions in the text box of the webinar control panel (remember to press send)



The screenshot shows a GoToWebinar control panel window. At the top, there is a menu bar with 'File', 'View', and 'Help'. Below the menu bar, there is a vertical sidebar with several icons: a blue square, a blue square with a white arrow, a blue square with a white hand, and a blue square with a white hand. The main area of the control panel is divided into two sections. The top section is titled 'Audio' and contains the following elements: 'Audio Mode:' with two radio buttons, 'Use Telephone' (unselected) and 'Use Mic & Speakers' (selected); a 'MUTED' status indicator with a microphone icon and a volume level indicator showing 00; and a link for 'Audio Setup'. The bottom section is titled 'Questions' and contains a large text input field with the placeholder text '[Enter a question for staff]' and a 'Send' button. A red arrow points to the orange arrow icon in the sidebar, and another red arrow points to the text input field. At the bottom of the control panel, there is a promotional banner for GoToWebinar with the text 'Start Holding your Own Web Events with GoToWebinar' and 'Webinar ID: 977-124-241'.



Remember: The completion of a Nautel webinar qualifies for  $\frac{1}{2}$  SBE re-certification credit, identified under Category I of the Re-certification Schedule for SBE Certifications.

# Ideas for things to discuss

- **Combining Methods**
  - Pros and cons of each
- **Quality issues**
  - Coverage
  - Audio
  - Stability
- **Synchronization**
  - Best bang for the buck?
- **Other thoughts**
  - How to cut costs and maintain quality

# Transmitters: High level injection

- Less transmitter cost than hybrid
- No additional antenna required
- Higher HD injection level may reduce the analog TPO capability
- Much higher cost of operation, due to losses in injector
- Much bigger footprint
- Overall project cost could exceed other options significantly
- Requires a reject load



# Transmitters: Space Combined

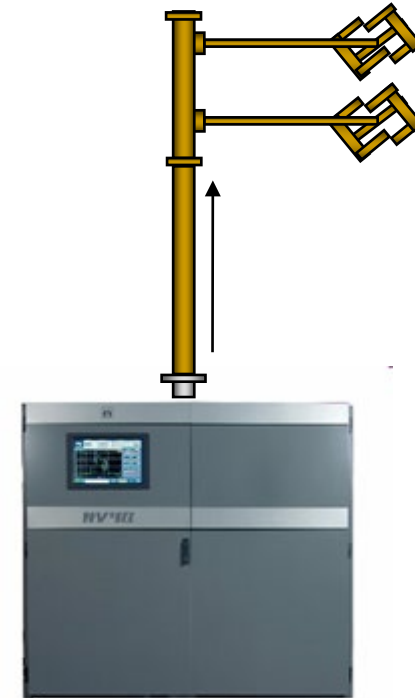
- More efficient
- Digital transmitter/antenna can be used as backup
- Takes up more space
  - In site
  - On tower
- **Pattern replication issues**



# Transmitters: Higher Power Hybrid

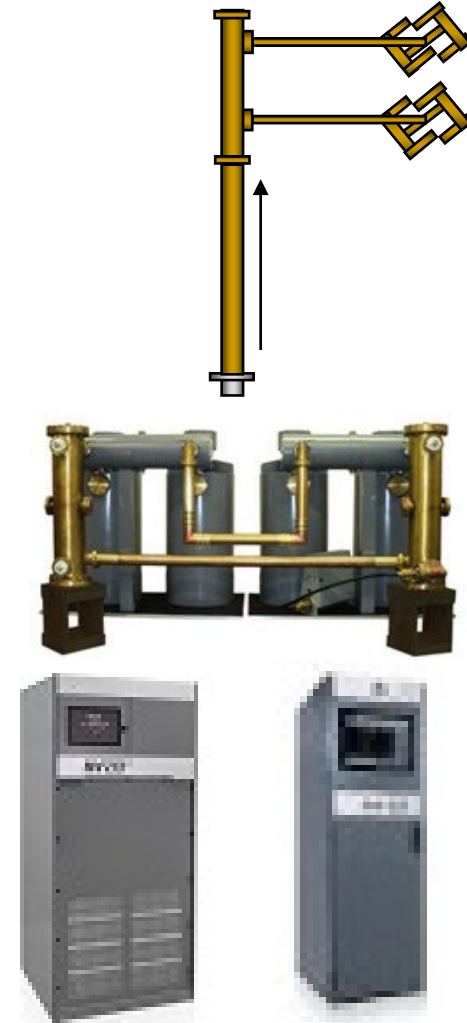
- Simple architecture
- Single box installation
- Higher HD injection level may reduce the analog TPO capability
- May need to replace your transmitter or combine another for higher total power
- Higher injection levels reduce efficiency\*

\* HD PowerBoost increases digital injection and efficiency of an existing transmitter.



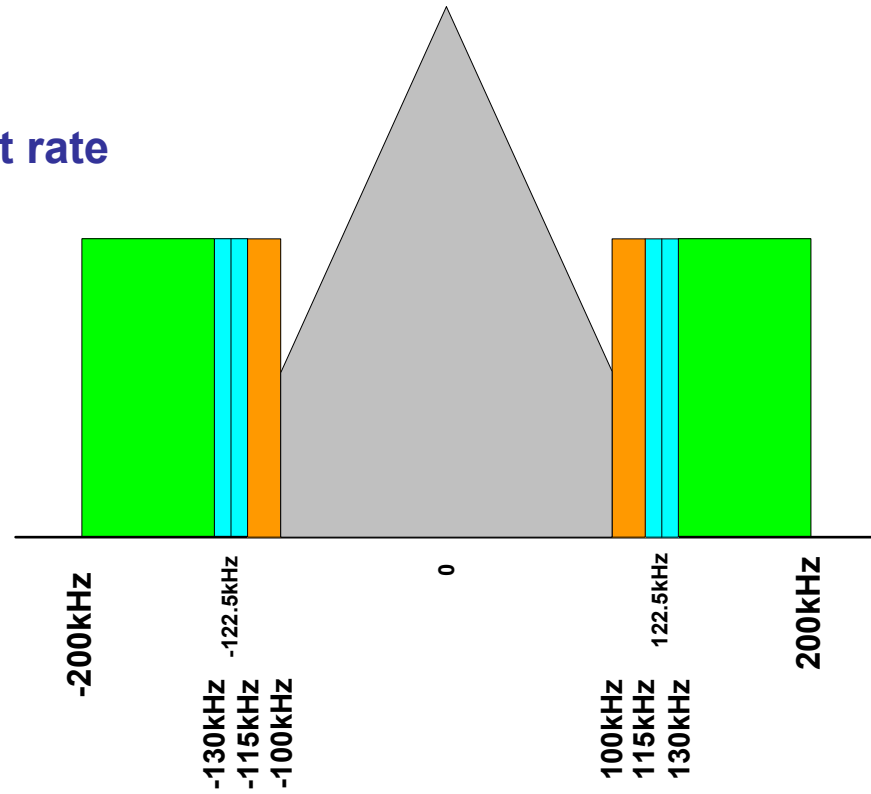
# Transmitters: Backfed Combiner

- Sometimes effective in channel combiner applications, with multiple stations on site.
- Can be significantly restricted by combiner capabilities
- Cost of operation breaks even with hybrid at higher injection levels.



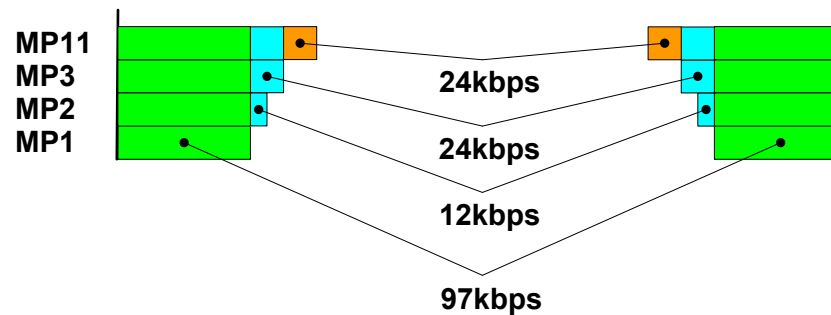
# Hybrid FM modes

Frequency allocation vs. bit rate



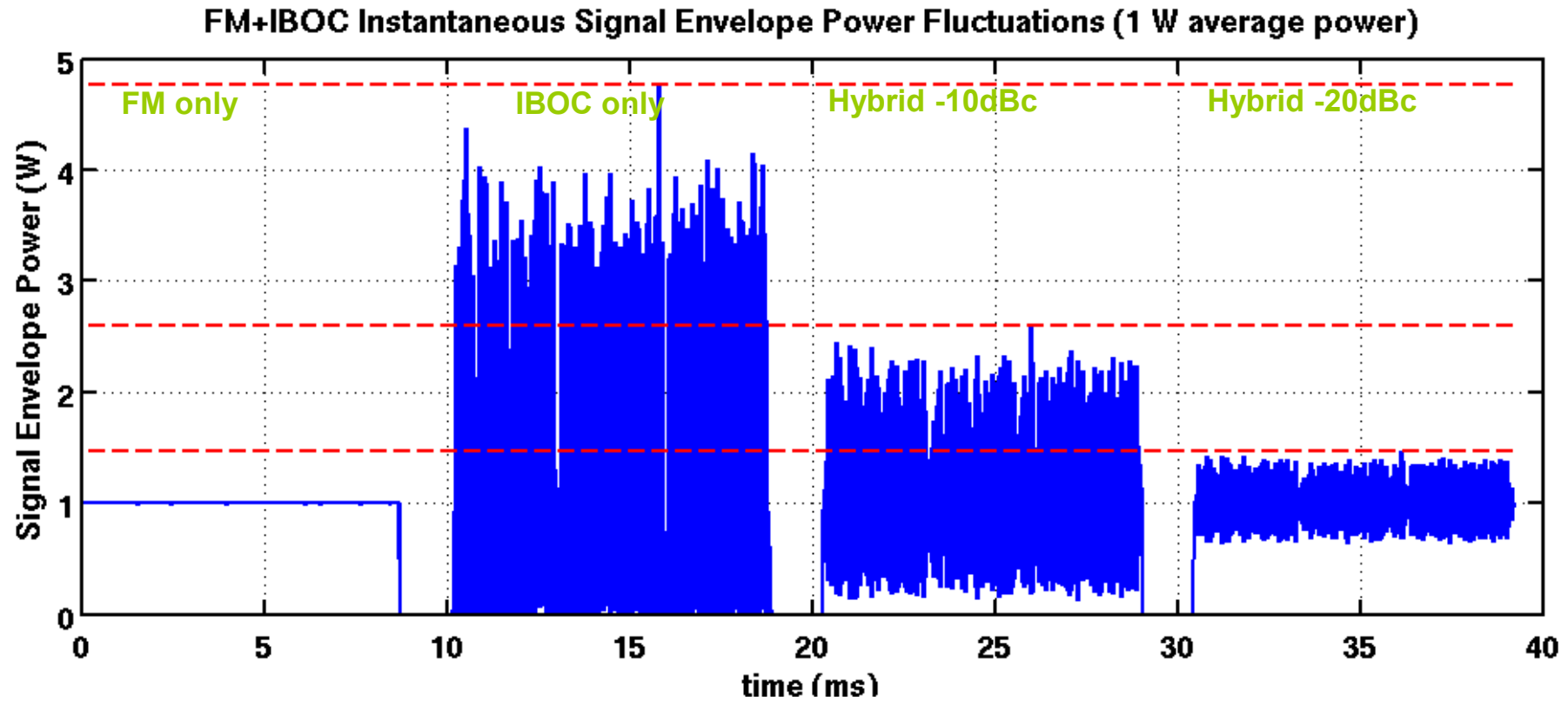
Total bit rate

- 145kbps
- 121kbps
- 109kbps
- 97kbps





# Relative Power Requirements



# Coverage

## Analyze your digital coverage

- High noise environment?
- Interference to other stations?
- Interference to your own analog?
- Regulatory clearance beyond -14?

## Consultants can help

**-15dB**

**-16dB**

**-14dB**

**-12dB**



**-13dB**

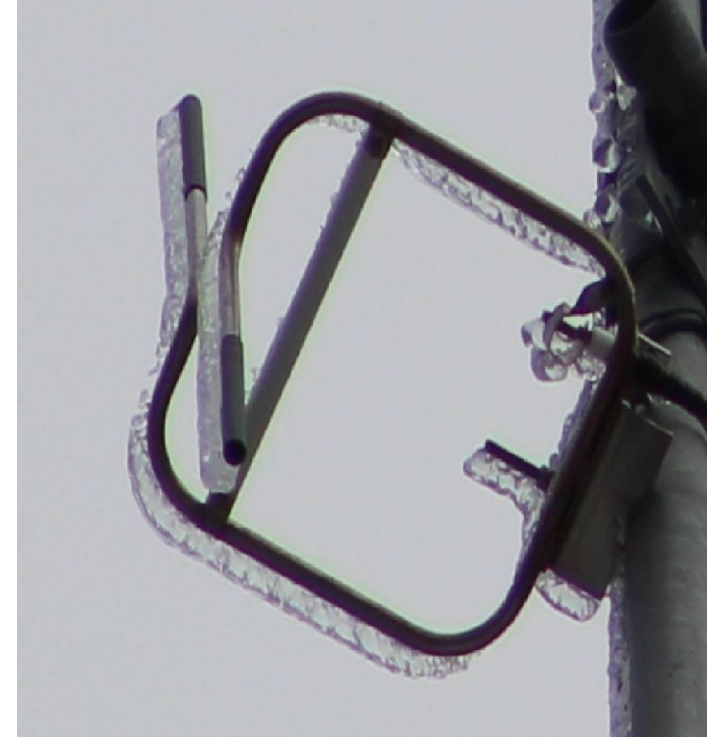
**-10dB**

# Coverage

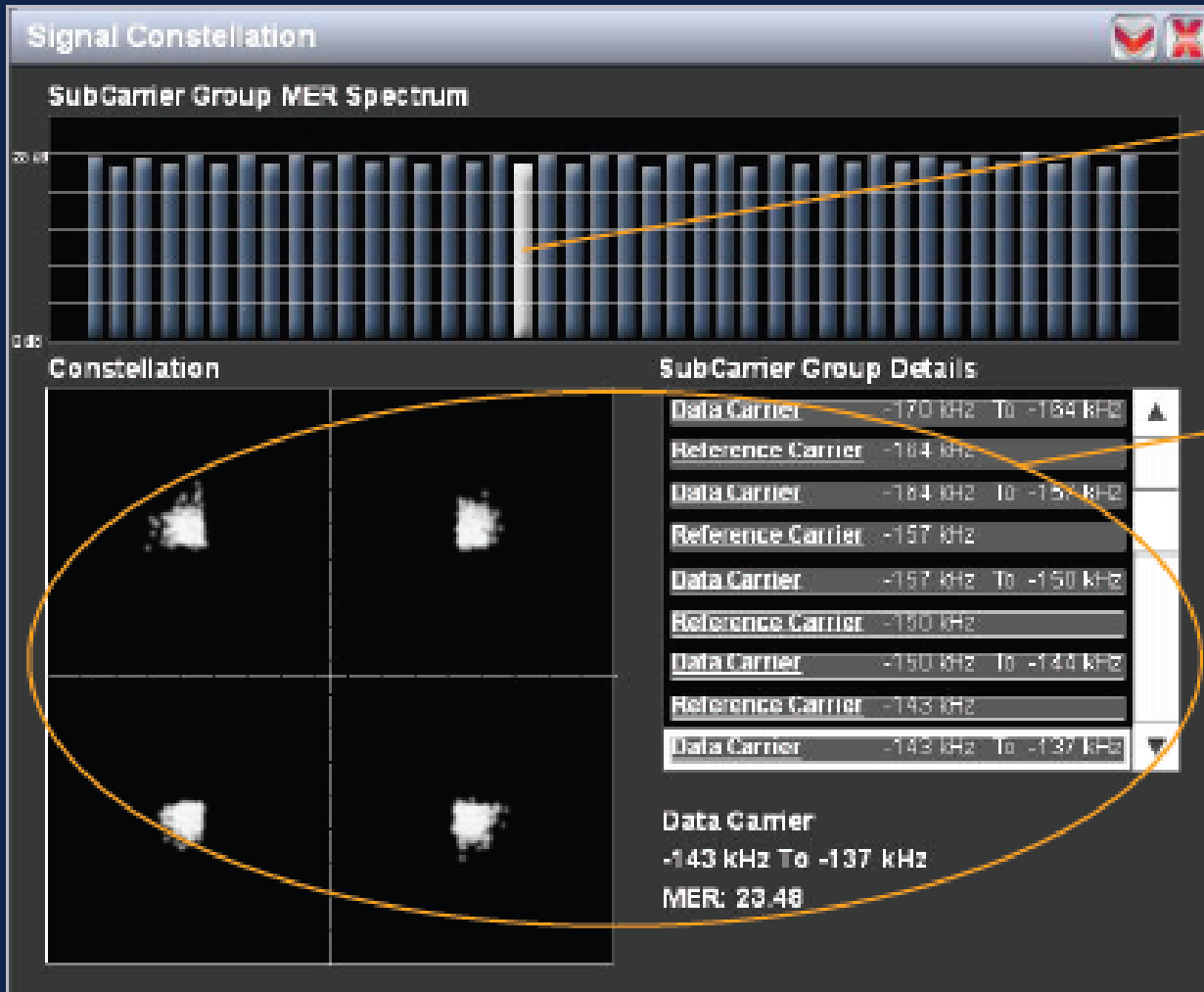


Photo credit: ERI ([www.eriinc.com](http://www.eriinc.com))

- **MER can be impacted by various things**
  - **Bandwidth**
  - **Tuning**
  - **Interference**



# MER metering



Select a subcarrier using the mouse or AUI touchscreen

Full MER analysis shown for the subcarrier

Signal Constellation View

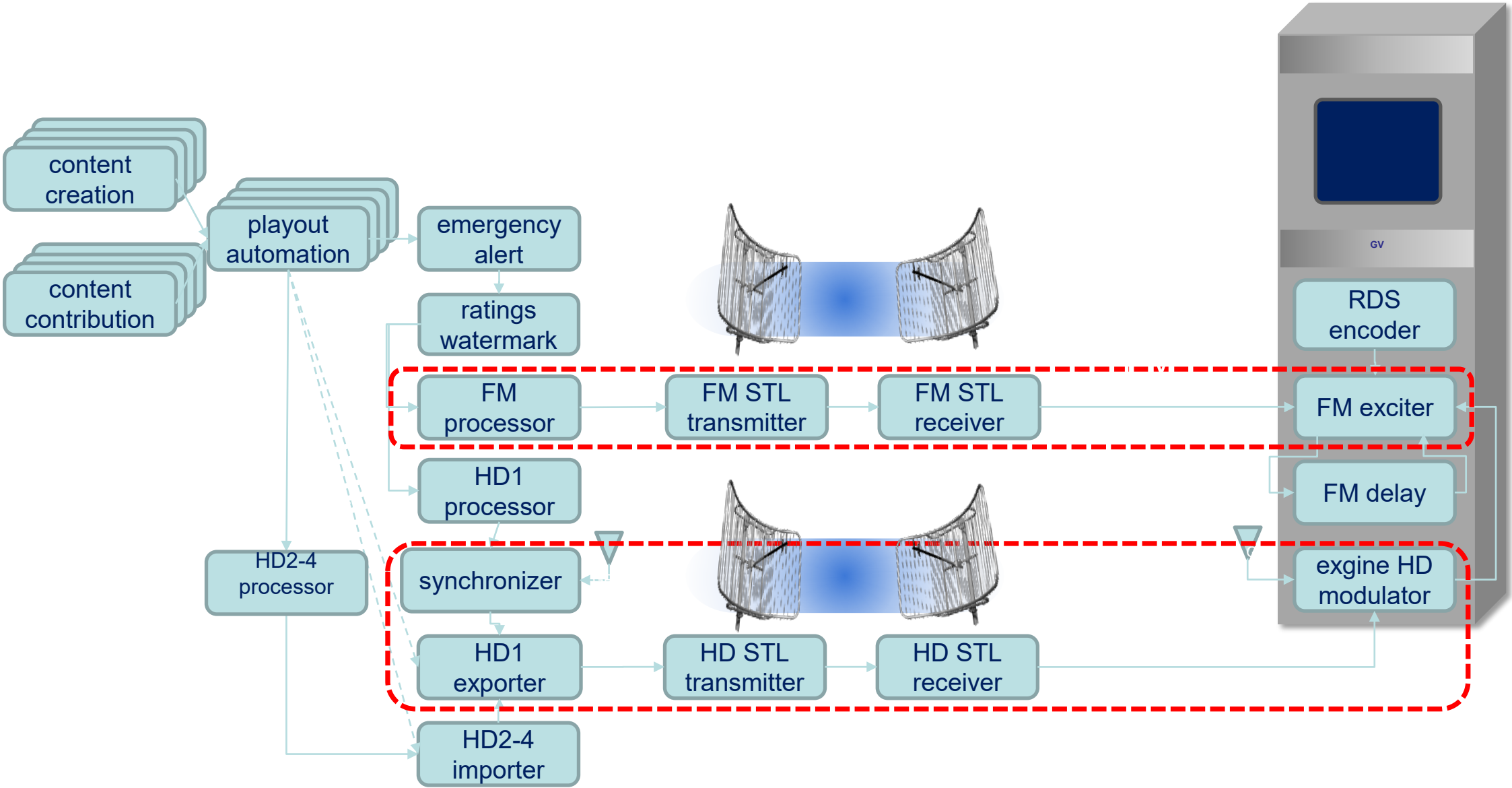


# Audio Quality

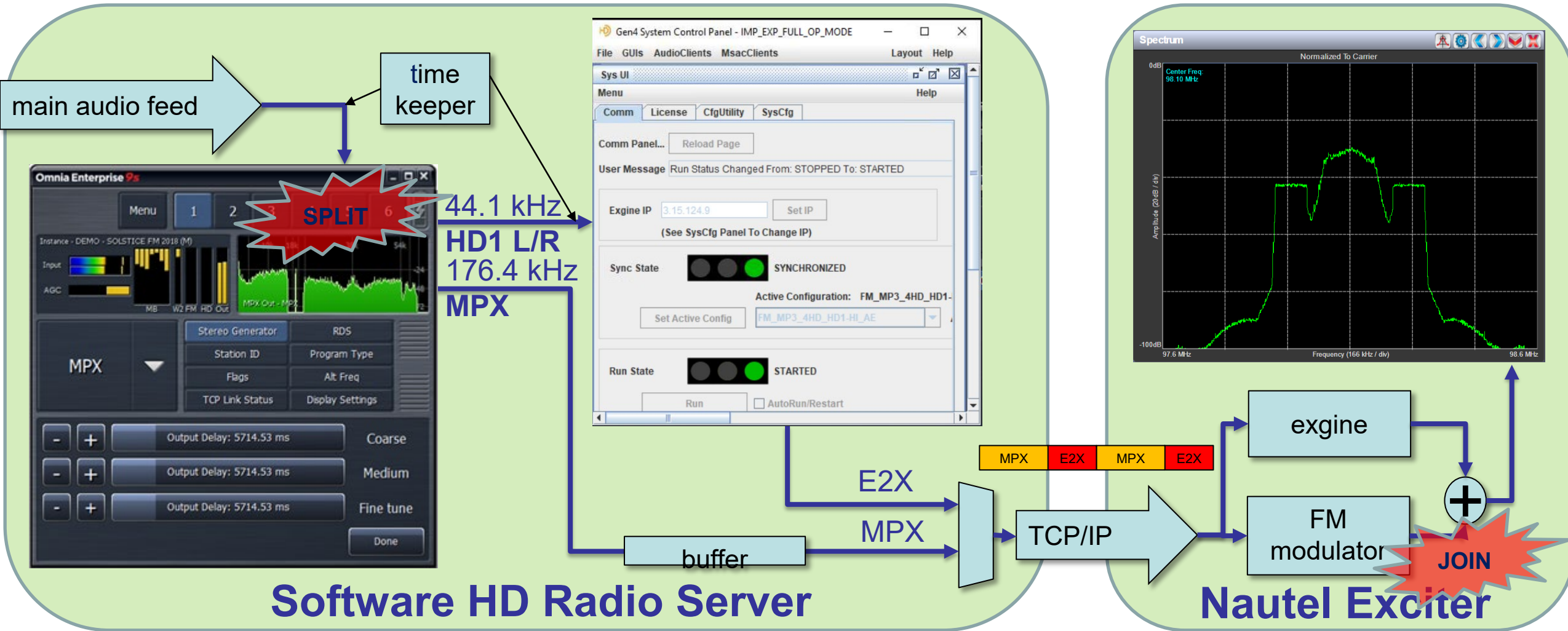
- Don't overprocess
- Avoid SRC
  - Upconversion is bad
- Streaming processors



# Wandering Delay



# Synchronous System from **SPLIT** to **JOIN**



# Online Information



## **Webinars**

<https://www.nautel.com/resources/webinars/>



## **Nautel Waves Newsletter**

<https://www.nautel.com/newsletters/>



## **YouTube**

<http://www.youtube.com/user/NautelLtd>



# THANK YOU!

