Synchronizing broadcast DVB-T2 and beyond

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OSCILLOQUARTZ
An ADVA Company

Two Markets, Professional and Terrestrial Broadcast Networks

Professional broadcast networks

- Interconnecting professional broadcast applications such as cameras, recorders, frame synchronizers, among others

Terrestrial broadcast networks

- Digital video broadcast networks for connecting TV sets over radio frequency systems using DVB-T/T2 technology

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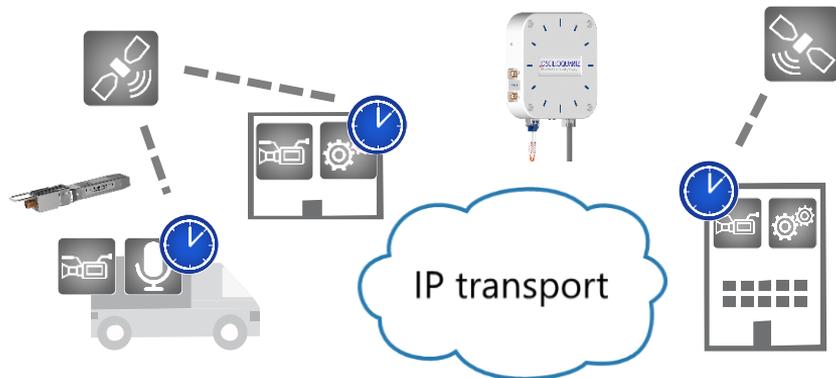An ADVA Company

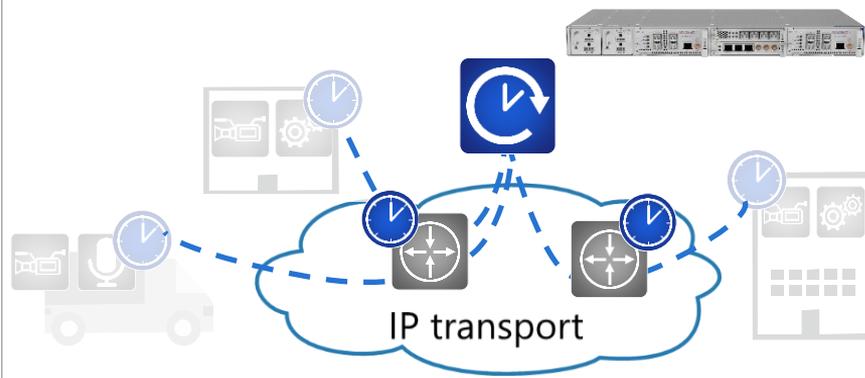# Seamlessly introducing PTP in broadcasting networks

Step 1: Synchronizing broadcasting devices

- Installing very compact grandmasters
- Satellite-based timing at any site
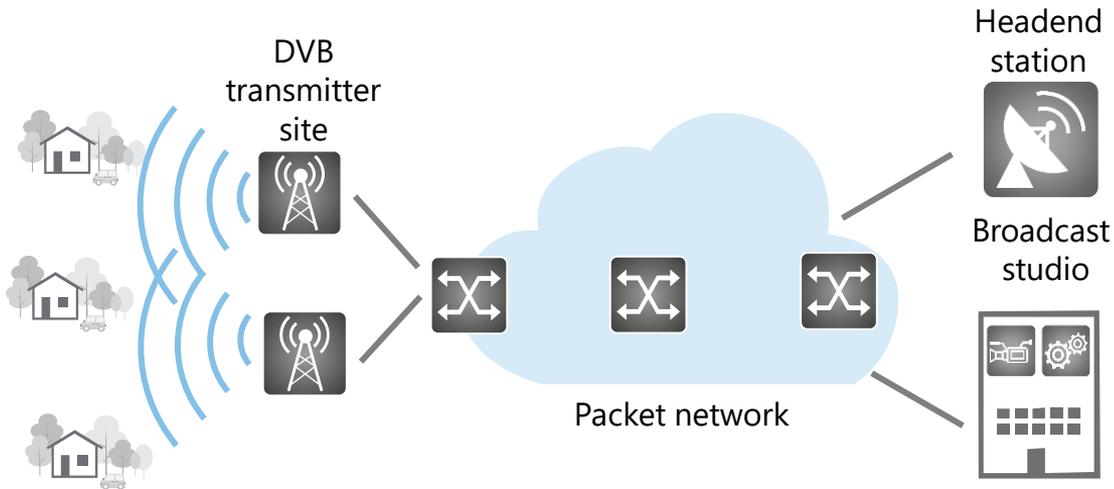- Backed up by network-based PTP

Step 2: Improving PTP network delivery

- Central, redundant high-performance grandmasters
- Sync-aware network devices (TC, BC)

## Combining GNSS-based and network-based timing for best performance

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Synchronizing terrestrial broadcast networks

DVB transmitter site

Headend station

Broadcast studio

Packet network

GNSS

Clock/LPN   PPS

DVB modulator | Sync unit | Packet network interface

DVB transmitter site

Video signal is sourced from play-out station, broadcast studio or headend
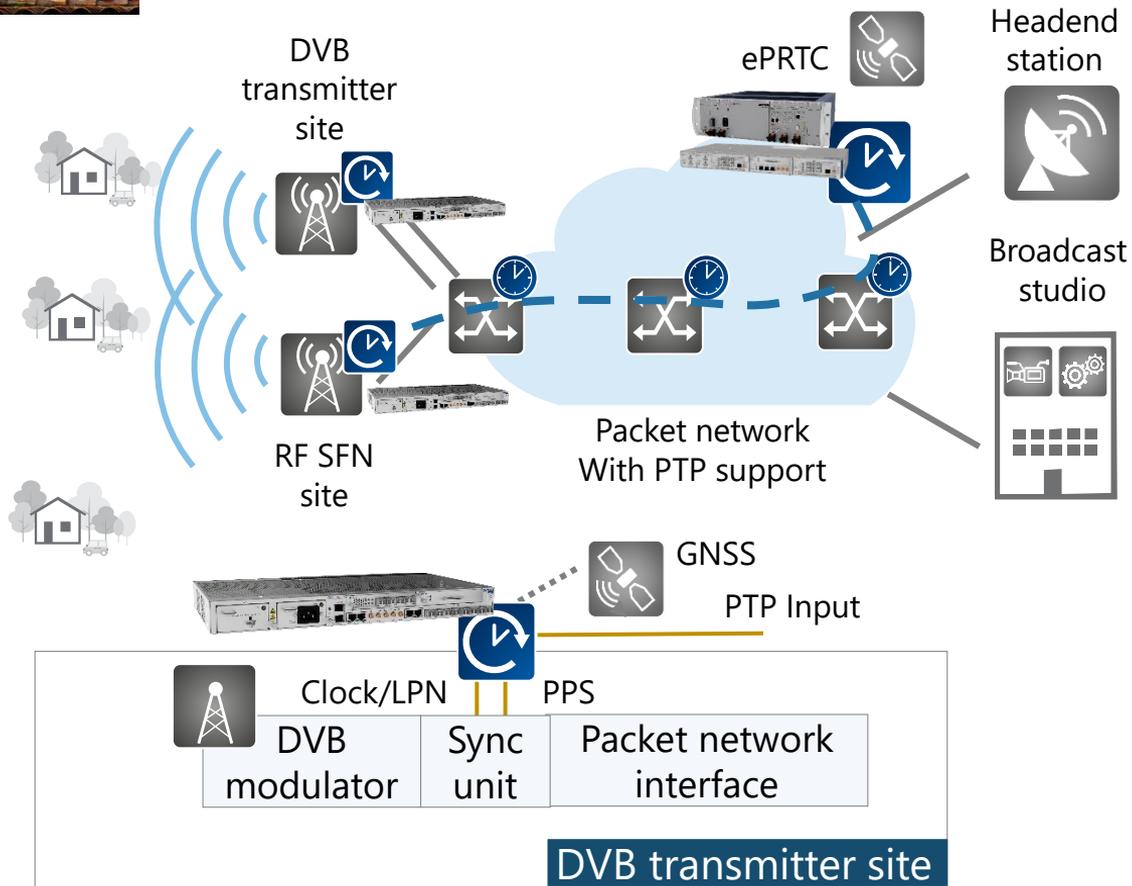
Packet network delivers video stream

Local synchronization (phase+freq) to avoid interfaces
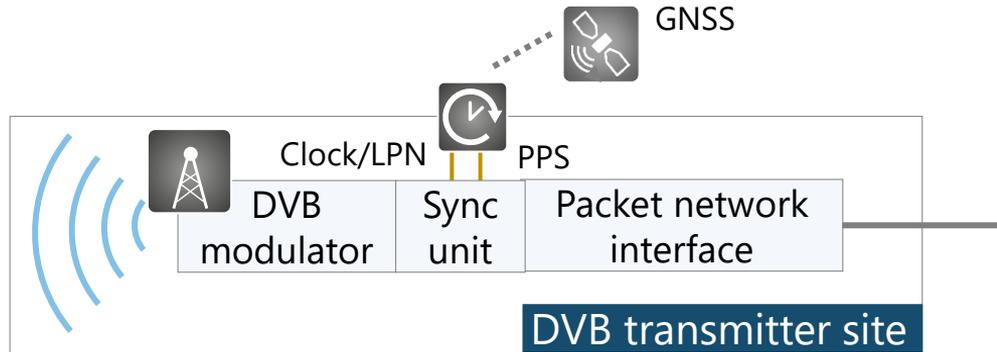
Synchronization with GNSS receiver locally and sync interfaces such as PPS/ clock

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Making synchronization robust

DVB transmitter site

ePRTC

Headend station

RF SFN site

Packet network With PTP support

Broadcast studio

GNSS

PTP Input

Clock/LPN   PPS

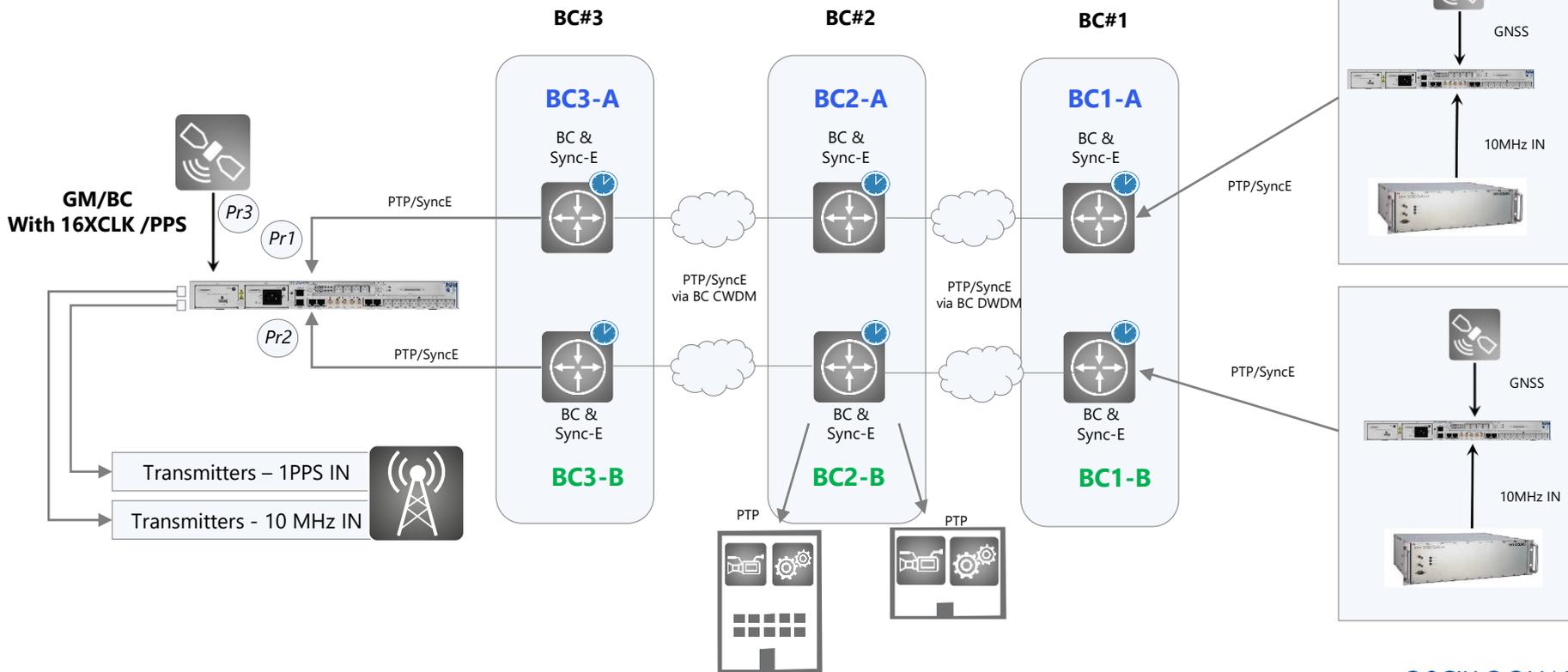| DVB modulator	Sync unit	Packet network interface

DVB transmitter site

- GNSS-disciplined atomic clock in core e.g. ePRTC

- Packet network is delivering PTP , typically using telecom profile G.8275.1

- PTP gateway at DVB transmitter site is translating PTP into BITS and LPN clock

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Customer examples (Europe)

- Ethernet L2 multicast G.8275.1 profile & SyncE towards BC in the network
- GM/BC at transmitter side convert PTP to multiple PPS/CLK

BC#3 **BC#2** **BC#1**

Assured Time

BC3-A — BC & Sync-E

BC2-A — BC & Sync-E

BC1-A — BC & Sync-E

GNSS

10MHz IN

GM/BC With 16XCLK /PPS

Pr3 · Pr1 · Pr2

PTP/SyncE

PTP/SyncE via BC CWDM

PTP/SyncE via BC DWDM

PTP/SyncE

Transmitters – 1PPS IN

Transmitters - 10 MHz IN

BC3-B — BC & Sync-E

BC2-B — BC & Sync-E

BC1-B — BC & Sync-E

GNSS

10MHz IN

PTP · PTP

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Customer examples (Europe)

- Ethernet L2 multicast G.8275.1 profile & SyncE towards BC in the network
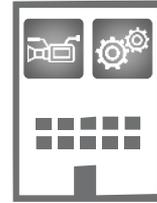- GM/BC at transmitter side convert to Broadcast PTP
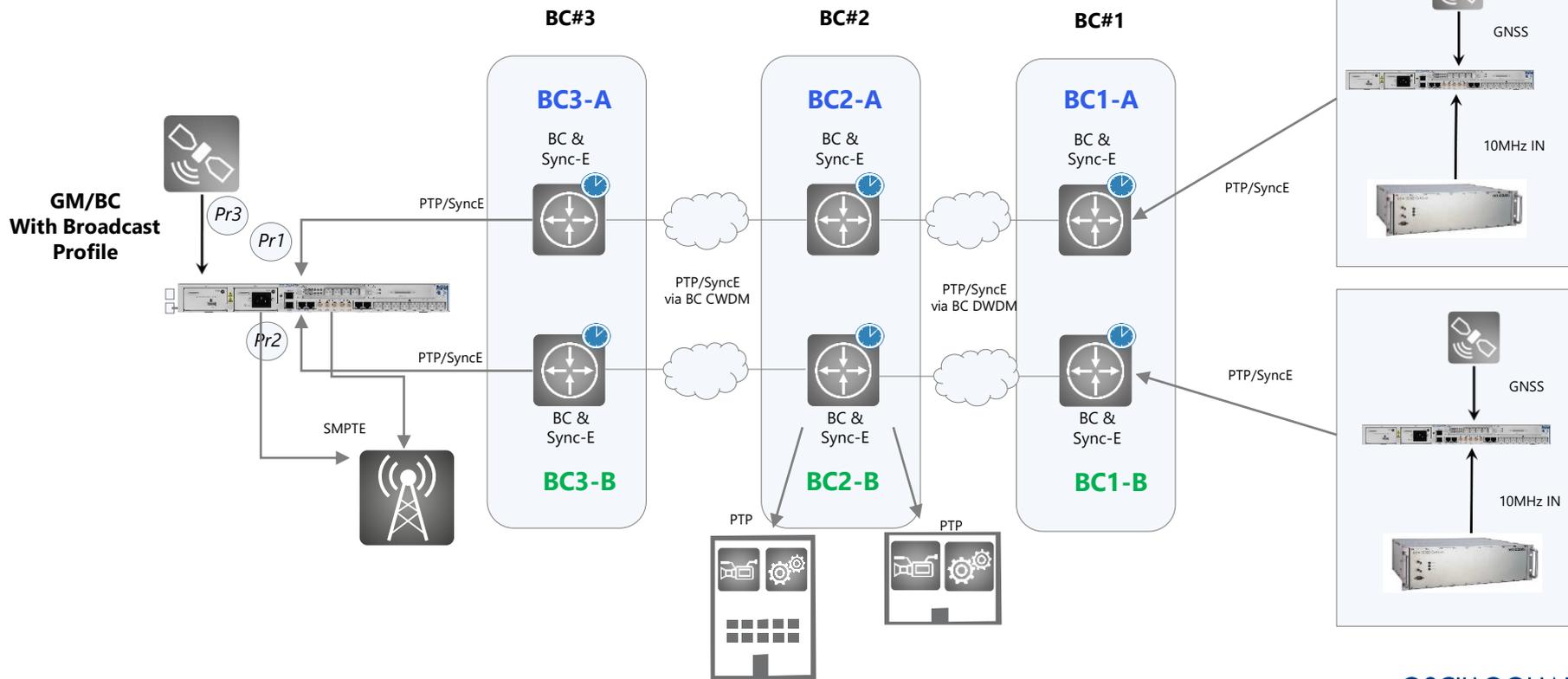
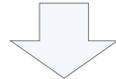# Drivers for IP in broadcasting networks

Regional studio

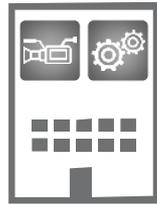Mobile studio

legacy
SDI transport

Production studio

SDI at appliances

IP transport

Ethernet/IP at appliances

SDI is a synchronous, broadcast-specific transport technology

SDI monolithically integrates video signals, framing and timing into hardware, creating complexity and inflexibility

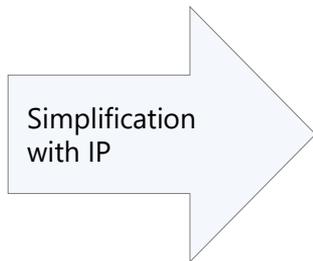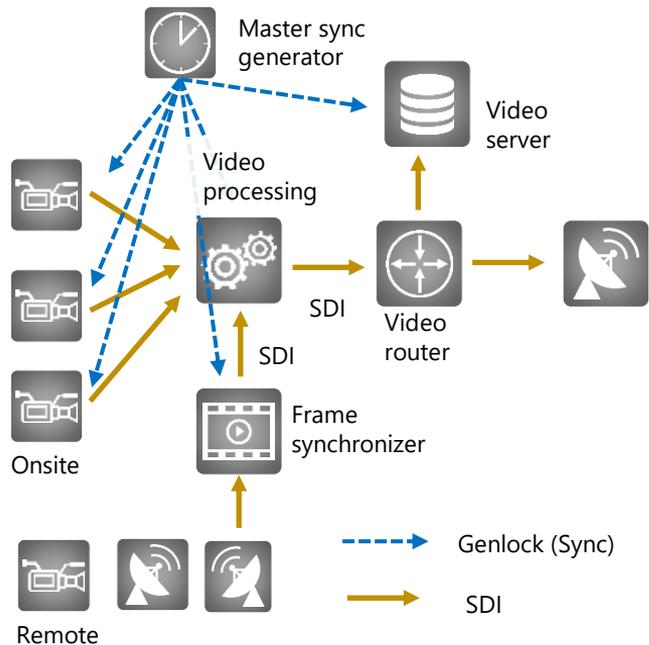challenges with synchronizing audio and video

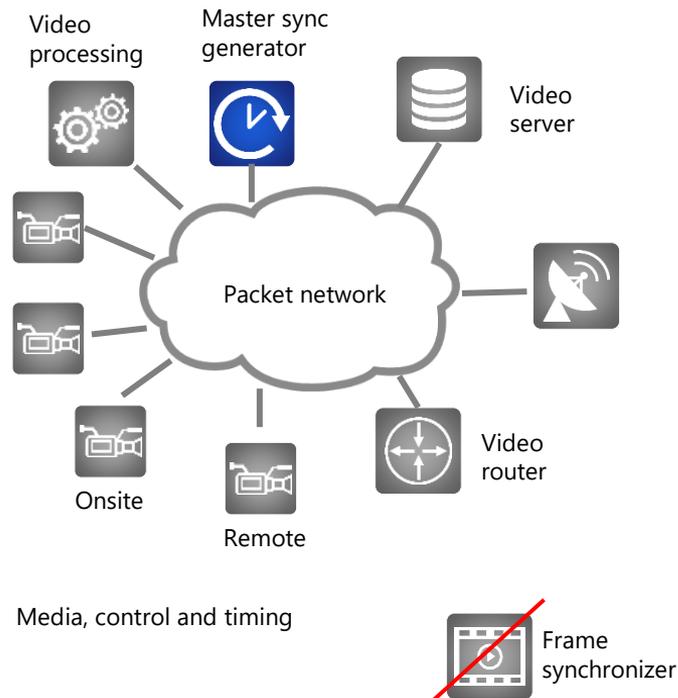Evolve towards IP network with flexible processing of video and audio and ancillary data

Towards standard IP transport of video, audio, ancillary data as well as time

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PTP (SMPTE 2059) replaces

Master sync generator

Video processing

Video server

SDI

SDI

Video router

Frame synchronizer

Onsite

Remote

- - - → Genlock (Sync)
───→ SDI

Simplification with IP

Video processing

Master sync generator

Video server

Packet network

Onsite

Remote

Video router

──── Media, control and timing

Frame synchronizer

SMPTE 2059 uses PTP IP packets to do the job traditional SPGs do:

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Small Form Factor based GM clocks provides simplest solution
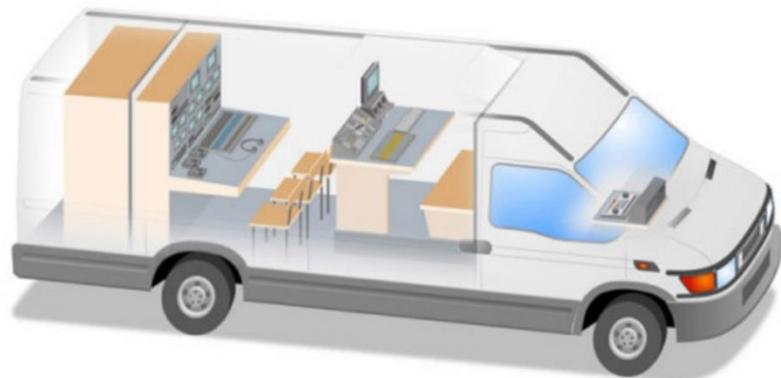
Reduce On Site Equipment Requirements

A Small Master clock source can be added to a mobile unit easily to provide timing to all equipment used to capture audio and video in the field.

Zero footprint: no additional physical space required.

Leverages host equipment.

Small size = low price

Low price = can be deployed in many mobile locations.

Small master clock is easy to install, low footprint and low cost!

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Thank you

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