Near-zero-cost at-home multi camera production micro case study

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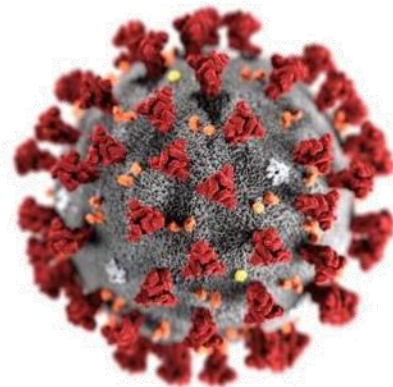
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A Covid-19 at-home production micro case study

The challenge of 2020!

- Our church pre-covid: Normally music team of 10 people, plus 5 other contributors to service, plus 4 technical production team – so up to 20 people

- For first 2 months of covid, no one else allowed in house or garden
- In following months, up to 6 people in garden only
- Later in year, small team allowed in church building

- The show (well, service!) must go on (if at all possible)

Some inherent technical challenges

- Best efforts networks

- Internet latency

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The toolkit – the software apps

OBS studio

NDI scan converter

NewTeK Connect

Skype with NDI plugin

X32 remote control

Teamviewer

VLC

M3W icecast streamer

Audacity

Easy Worship

Youtube studio

Darkwood metering

GStreamer

All FOC for home use apart from Easy worship

Teamviewer remote machine control gives us:

- Firewall-friendly peer-to-peer connectivity
- Low latency uni-directional video
- Low latency bi-directional audio
- Low latency uni-directional machine control
- Bandwidth optimised
- Audio can provide intercom capability as well as remote listening

The remote control team
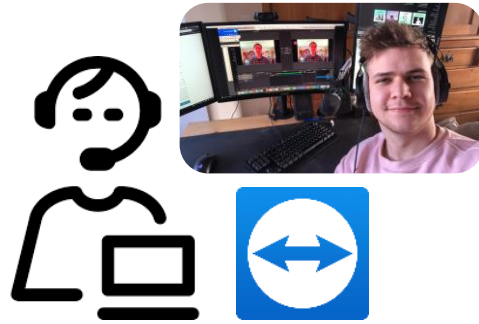
Vision mixer

Sound mixer

Graphics controller

The video flows

Remote feeds via Skype with NDI plugin

Local Graphics, Video & Audio replay with NDI Scan converter

3 local camera HDMI capture with NewTek Connect app.

OBS with NDI & local inputs streaming to Youtube studio

The audio flows

Graphics, Video & audio replay

Remote video & audio

AES50 local stage box

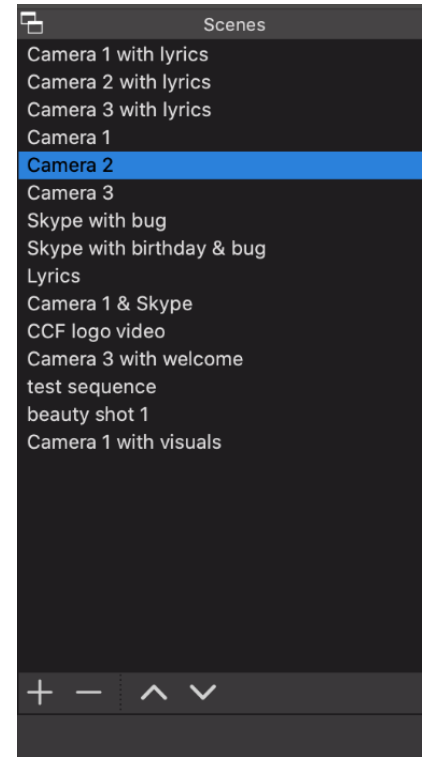Radio streaming via M3W->Casterfm
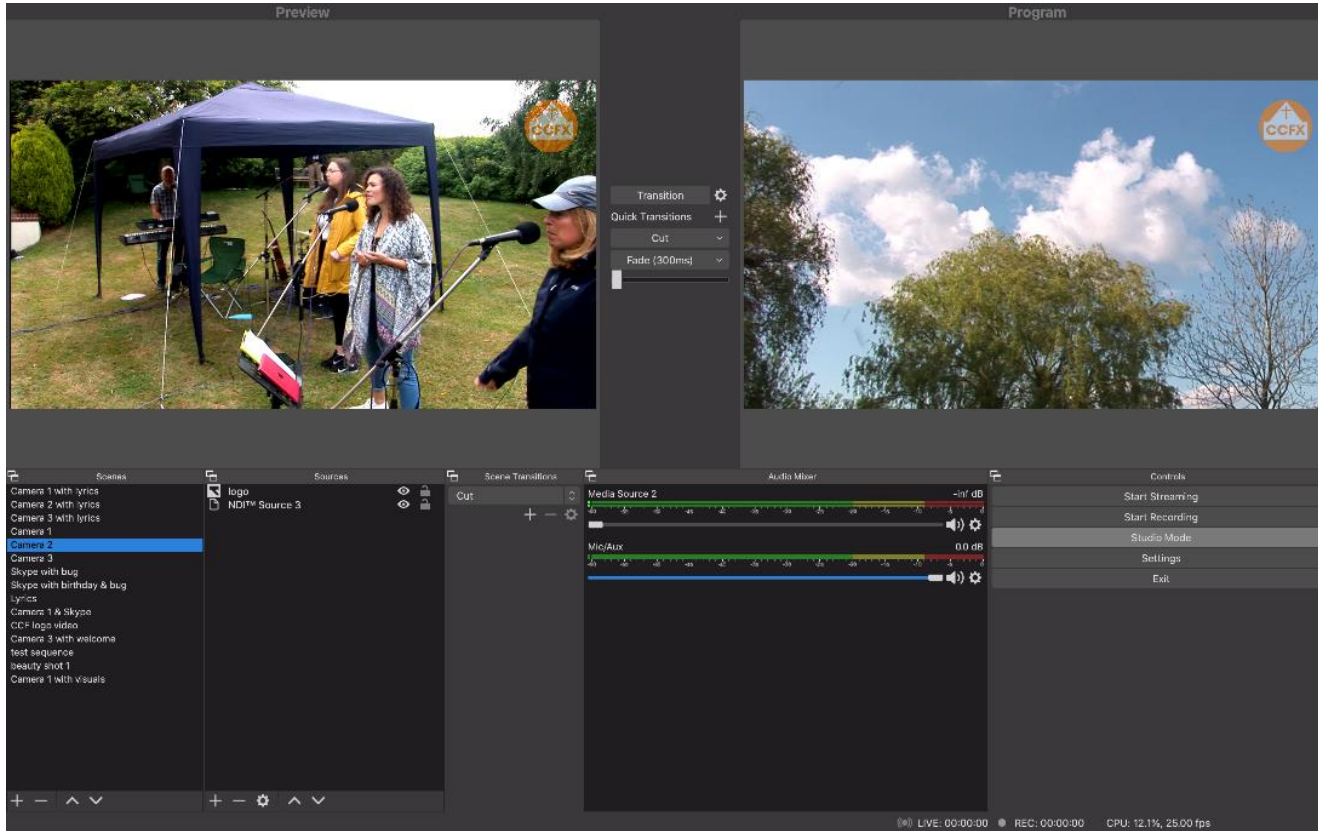
Video stream via OBS-> Youtube

The NDI bit

- Low latency compression used Each HD stream compressed to ~50-100Mbps VBR - DCT intra compression
- Plug and play discovery uses mDNS
  - Local network – need an mDNS gateway to go routed
- Media transport unicast using TCP
- Skype has integrated NDI individual video feed extraction
- NDI scanner makes any graphics head available

The OBS -> Youtube bit

- RTMP – TCP based
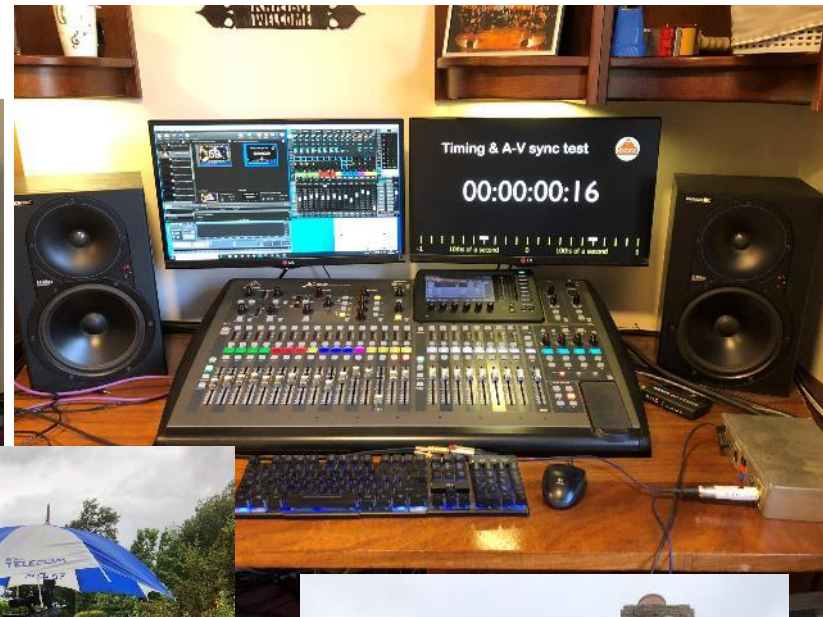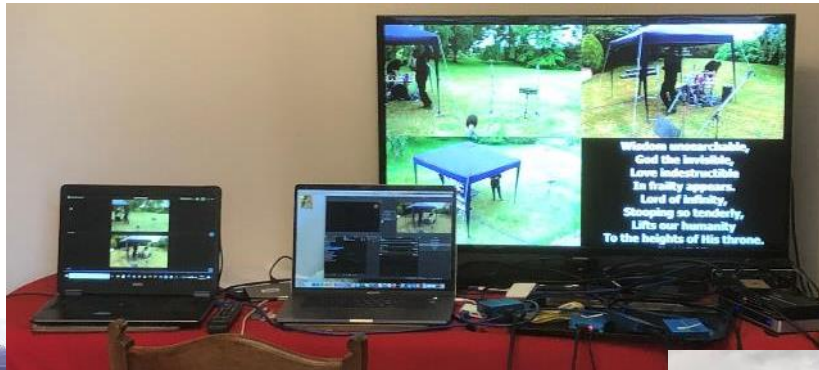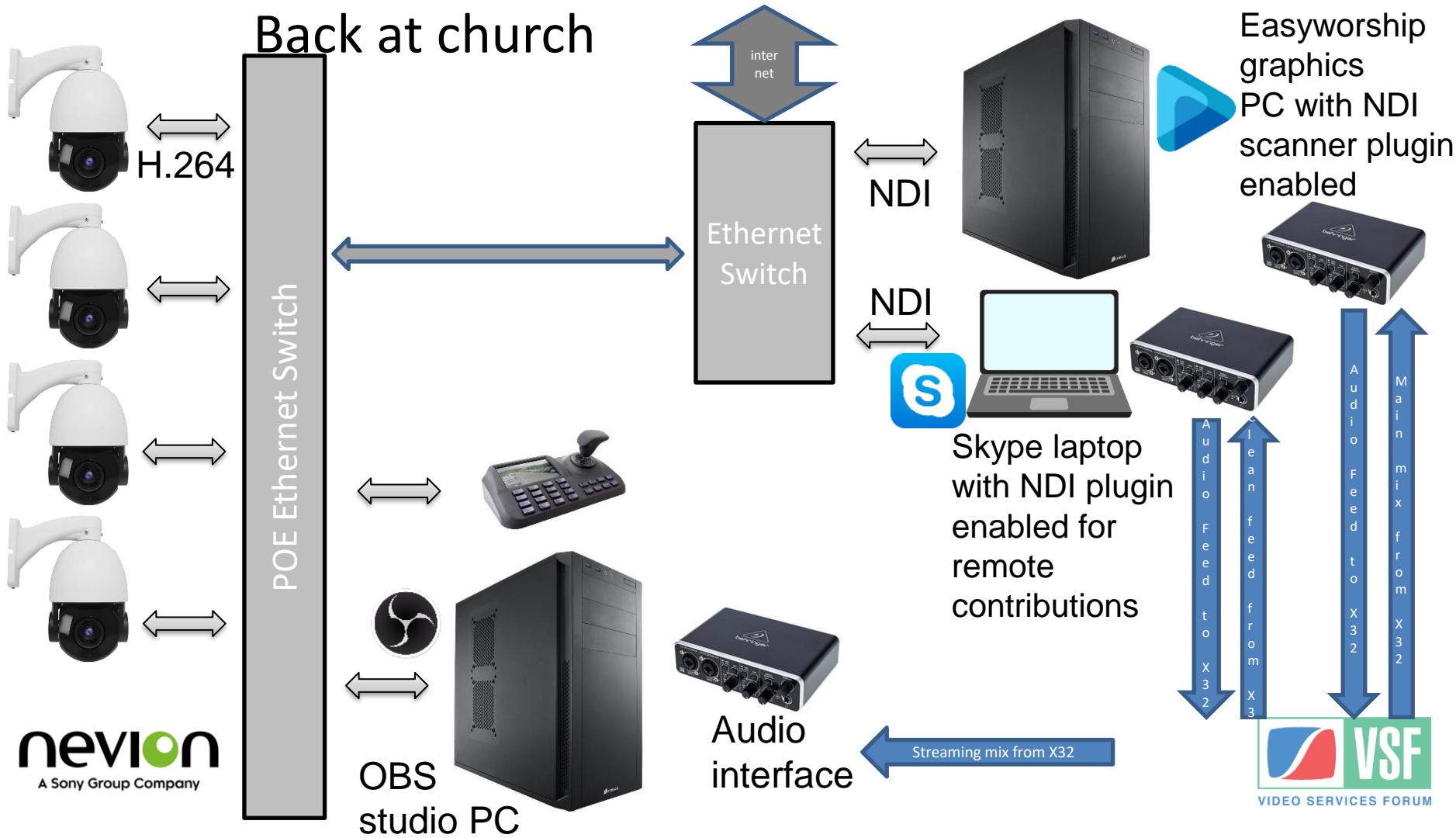- Longer delay – latency not critical at this point

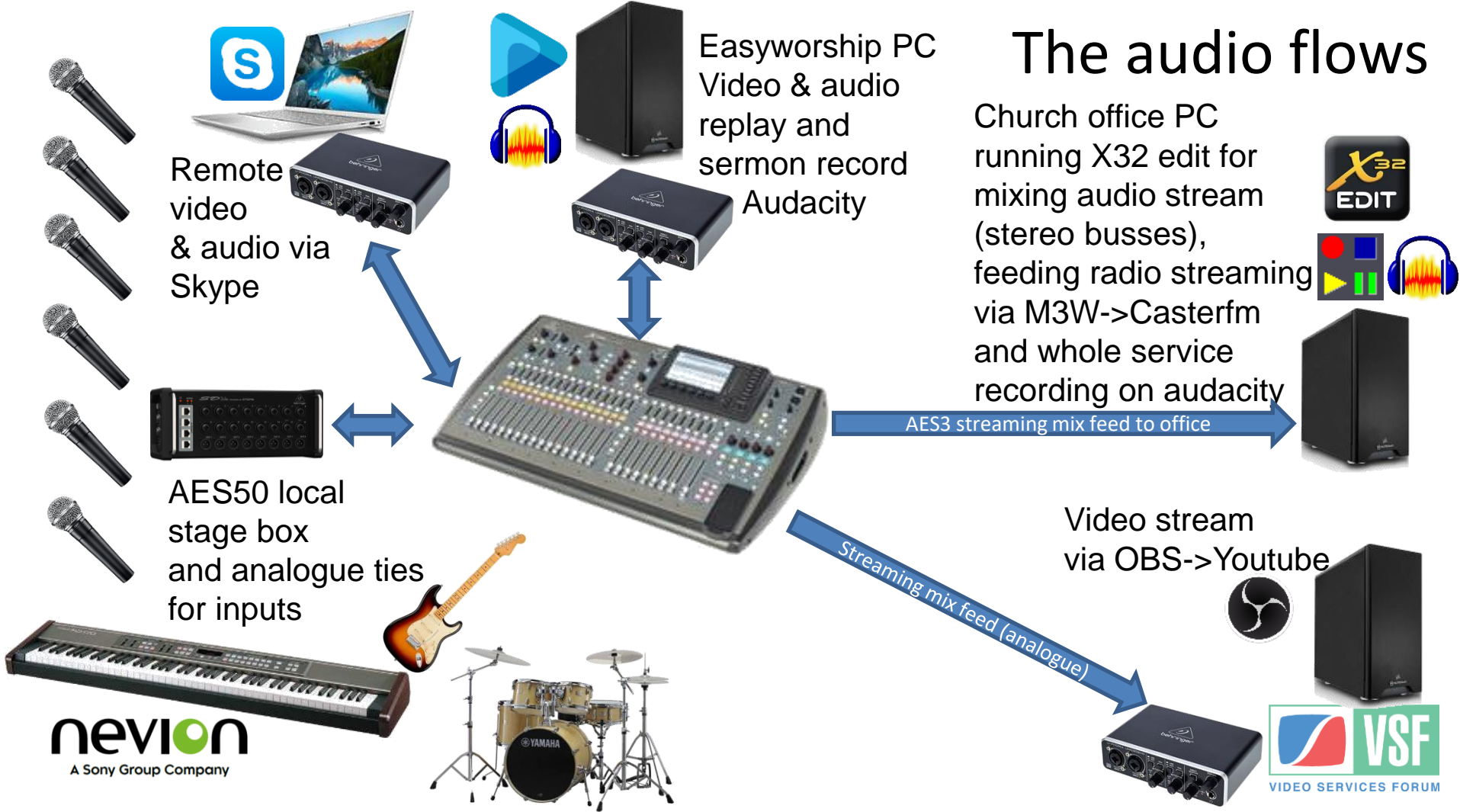# The OBS studio bit

Phase 1 indoor

Phase 2 – outside

Back at church

H.264

POE Ethernet Switch

inter net

Ethernet Switch

NDI

Easyworship graphics PC with NDI scanner plugin enabled

NDI

Skype laptop with NDI plugin enabled for remote contributions

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OBS studio PC

Audio interface

Streaming mix from X32

Audio Feed to X32

lean feed from X3

Audio Feed to X32

Main mix from X32

VSF
VIDEO SERVICES FORUM

The audio flows

Remote video & audio via Skype

Easyworship PC Video & audio replay and sermon record Audacity

Church office PC running X32 edit for mixing audio stream (stereo busses), feeding radio streaming via M3W->Casterfm and whole service recording on audacity

AES50 local stage box and analogue ties for inputs

AES3 streaming mix feed to office

Video stream via OBS->Youtube

Streaming mix feed (analogue)

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Audio & video mixing for the streaming at church

Multitrack post-rehearsal mix tweaking

Private stream during rehearsal

Examples of system components

- HD 1080P PTZ POE 30x optical CCTV camera from ebay
  - ~£130 each
  - alternative/addition is HDMI camera with an HDMI-USB converter
- I7 9k series processor PC with windows 10, 6GB Turing GPU, 16GB RAM, 1TB HDD, 256GB SSD & two monitors
  - ~£1000 (excluding monitors – standard 24" HDMI)
- 8 port POE Gigabit Ethernet switch
  - ~ £50
- IP PTZ onvif controller from ebay
  - ~£120
- Behringer U-Phoria UMC204HD USB Audio Interface
  - ~£80

Roughly accurate as-of Jan 2021

Challenges – only one main one!
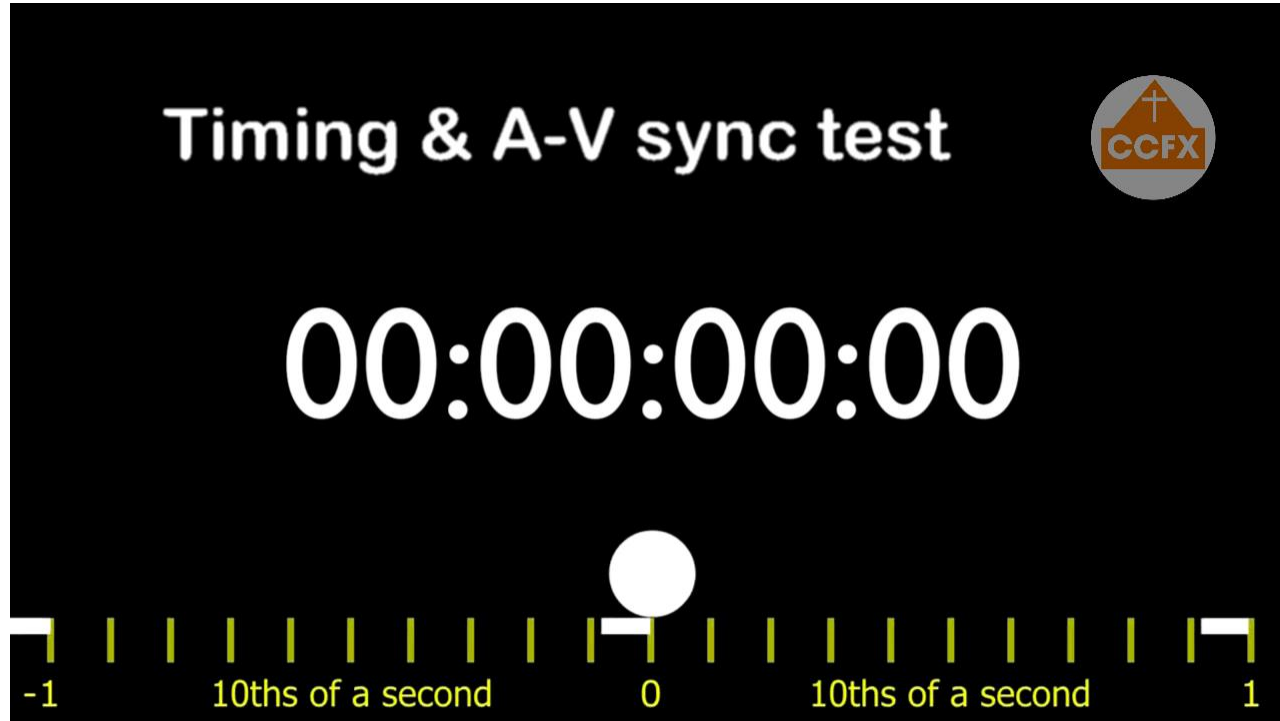
Through the last year…..

April 2020
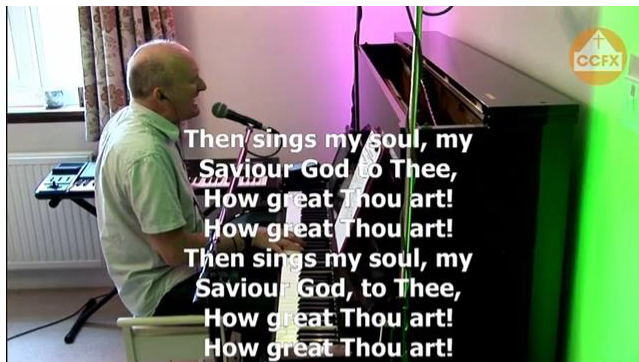
August 2020

July 2020

January 2021

Thank you!

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