

## Web Streaming

This document was produced as an overview of the equipment, setup and lessons learned at St. David's as we began our streaming ministry. We hope this will be helpful as you begin your own streaming ministries.

## Equipment

### 1. Canon 32GB Vixia HFG20 Camera (refurbished / used) - \$600

<https://www.amazon.com/Canon-VIXIA-Camcorder-Internal-Memory/dp/B00AWZFHG0>

We purchased the Canon Vixia HF G20 because it was among the better options available in 2018 and had a strong optical zoom (since our filming location is near the back of our worship space). Refurbished units are still available, but the reality is that *any* digital camera with live HDMI monitor output will work.

### 2. Tripod with Pan/Tilt Head - \$70-100

[https://www.amazon.com/gp/product/B013JE6QJ2/ref=ppx\\_yo\\_dt\\_b\\_search\\_asin\\_title?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B013JE6QJ2/ref=ppx_yo_dt_b_search_asin_title?ie=UTF8&psc=1)

Any tripod will do, but we highly recommend a tripod that will stand up to use. We initially bought lightweight \$30 aluminum tripods from Amazon, but we have replaced them 3 times already. We recommend spending a little more to get a decent tripod with a good swivel head.

### 3. Class 10 SD Card 32GB - \$7

[https://www.amazon.com/Lexar-Professional-633x-32GB-UHS-I/dp/B012PL6EMY/ref=sr\\_1\\_8?keywords=3.+Class+10+SD+Card+32GB&qid=1583936604&s=electronics&sr=1-8](https://www.amazon.com/Lexar-Professional-633x-32GB-UHS-I/dp/B012PL6EMY/ref=sr_1_8?keywords=3.+Class+10+SD+Card+32GB&qid=1583936604&s=electronics&sr=1-8)

Depending on the video camera that you order, you may have sufficient on-board memory where additional SD cards are unnecessary. Alternatively, if you are not interested in recording the worship service or event for posting later (not live streamed), then you can forget this item entirely. We wanted the option though, in all honesty, we haven't needed it yet (2-years later).

### 4. HDMI Cable, 3 feet - \$8

[https://www.amazon.com/HDMI-Cable-3ft-Connectors-PlayStation/dp/B01CRA4L9G/ref=sr\\_1\\_4?keywords=hDMI+cable+3+feet&qid=1583936683&s=electronics&sr=1-4](https://www.amazon.com/HDMI-Cable-3ft-Connectors-PlayStation/dp/B01CRA4L9G/ref=sr_1_4?keywords=hDMI+cable+3+feet&qid=1583936683&s=electronics&sr=1-4)

We recommend cables that are branded and can withstand use, but there's no reason to pursue extremes either. Any decent quality HDMI cable will suffice.

### 5. fmuser FBE200 Encoder - \$158

[https://www.amazon.com/gp/product/B01N4PJDX2/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o07\\_s00?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B01N4PJDX2/ref=ppx_yo_dt_b_asin_title_o07_s00?ie=UTF8&psc=1)

When we initially setup our streaming ministry, we purchased a \$999 Teradek VidiU Pro (currently available used in the neighborhood of \$500). We don't recommend the Teradek. We found it slow to turn on, cumbersome to use and ours ultimately bricked from a bad firmware update and forced us into a replacement. Instead, these inexpensive streaming devices that I have linked here are more than sufficient for live streaming a church service, and we recommend this approach. We've been using one of these since early Fall 2019. Note that setup can be a bit more complicated than the Teradek, but once setup – it is setup for life. Your streamers will *not* be logging in on the backend of this streaming device to setup or start streams. Rather, once you plug in the power plug and HDMI signal to the fmuser FBE200 (or similar), it begins streaming within seconds. With the Teradek, there were extra hoops to jump through to go live, which required additional training, etc. The fmuser FBE200 (and similar) devices are generally preferable once setup due to long-term simplicity and initial costs.

**6. Saramonic UWMIC10 Dual Lavalier - \$400**

[https://www.bhphotovideo.com/c/product/1331757-REG/saramonic\\_rx9\\_tx9\\_tx9\\_uhf\\_wireless\\_lavalier\\_microphone.html](https://www.bhphotovideo.com/c/product/1331757-REG/saramonic_rx9_tx9_tx9_uhf_wireless_lavalier_microphone.html)

Depending on the size of your worship space and the preferences of your clergy, lavaliers may or may not be necessary. Note that we have found the broadcast range on these lavaliers to be somewhat disappointing (though generally adequate for our usage). They do work and the advantage of this particular package is that it contains *two* transmitters, so you can mic up 2 members of the clergy with 1 receiver on the camera. For the price, that's pretty good, but if I were to order our equipment again, I would probably spring for something with better range. Where I work, we employ the Sony UTX-B2 lavalier set, and have found its range extends to 40-50 yards (before there is even a hint of signal loss). Unfortunately, those broadcast on the 600Mhz range (which as of July 2020 will be illegal according to the FCC), so they are no longer an option. Instead, you might consider these Saramonics (which are legal), or some of the more modern options from Sony (but expect a higher price tag). If I were to re-do the equipment purchase for St. David's, I imagine I would downsize a bit on the camera and spend a little more on the lavalier mics.

**Our Net Equipment Budget: \$1,243**

Please don't be disappointed or discouraged by that budget. There are ways of saving money, and I am just presenting the budget we used at St. Davids. Omitting the lavaliers or going with a different video camera would shave several hundred dollars off the net spend, and you might find an old tripod laying around in a parishioner's basement/garage. For example, at the time that I write this document, B&H is selling used / refurbished Canon Vixia R800s for around \$160, and those cameras should have all that you would need on the camera end of things. Going with that camera, and omitting the lavaliers knocks \$840 off the budget right there.

## Infrastructure

Use a wired Internet connection for your streaming. At St. Davids, we attempted to use WiFi, but found it was unreliable in our scenario, and just not up to the task of transmitting the

volume of data required for streaming. Instead, we ran plenum-rated network cable through our drop ceiling and out to a wall jack to the rear of our worship space. This work was done by a parishioner, and could certainly be handled by someone with a modest technical background (or the wherewithal to watch a few YouTube videos on how to wire an Ethernet port). It is *not* difficult, provided your building and architecture provide the space to run the wire. In other contexts, consider running the Ethernet cables along walls and use gaffers tape to secure the wires from being trip hazards.

You will need broadband internet capable of uploading your stream. If you elect to broadcast in HD (we do), then you will need between 3.2Mbps and 5Mbps of upstream bandwidth. *Most* plans from Verizon and Comcast will supply that sort of upstream bandwidth. Go to <http://openspeedtest.com/> and run a test from your wired (Ethernet) connection, if you aren't sure. Only the "upload" speed really matters, and make sure that one is at or above the 3.2Mbps listed above. Test it a few times, as the numbers will fluctuate, and make sure it's generally above that 3.2 threshold. If so, you should be good to go.

At St. David's, we also ran a plenum-rated network cable to our parish hall with the theory that we might want to live stream our adult formation activities too. So, consider where else in your facility you might find live streaming valuable, and plan to install there at the same time. For St. David's, we did have to purchase a \$25 gigabit Ethernet switch (<https://www.amazon.com/NETGEAR-8-Port-Gigabit-Ethernet-Unmanaged/dp/B07PFYM5MZ/>) to expand the size of our network to accommodate the network run to our worship and parish hall, though that may not be true everywhere.

## Stream Host

You will need a service to host your live stream so users can tune in to watch. There are a variety of options available, and a variety of costs too.

At St. David's, we use ChristianWorldMedia.com (CWM) for our live streaming host. We use the basic plan at \$35 per month, which provides space for archival recordings. For us, the archival recordings are useful as our rector includes a link to the worship service from the previous week in every weekly email newsletter that goes out. For other congregations, the archival video recordings may not be as important, or you may prefer to save the recording to the camera or SD card and manually upload to YouTube (or similar video-sharing platform) to save the money. For us, the turn-key solution with CWM was worth the extra dollars.

The other benefit to CWM is the support they provide. It has been my experience that the M-F email support *is* available on weekends, and well into the evening. For the most part, we've been mostly pleased with the support from CWM.

Prior to selecting CWM, we demo'd and price shopped a number of other paid streaming providers, and we either found they were either not reliable (meaning, video streams would cut out) or that the tech support wasn't sufficient. Overall, we've found that CWM has the right balance of support and good reliability for St. David's. There certainly are more expensive options available, but we just didn't see the need to spend more. Note that we tried free streaming services from Facebook Live, but we found it to be extremely unreliable, as it would cut out at random intervals during worship. We were concerned about YouTube's Content ID

system and the music we sing on Sundays, so we did not pursue YouTube Live. In our minds, reliability is super important, and we just didn't want a weekly struggle to keep our streaming online. Hence, we went with CWM and we've been OK.

## Audio

For us, we use the microphone built into the camera to capture the sounds of our Sunday worship. Our pastor uses the lavalier, which is plugged into the room sound for our worship space, not the camera. I would imagine for many Episcopal churches, room sound will be sufficient for your broadcasts, just be sure that your streaming camera isn't located right next to your organ or other significant "noise makers". (You don't want to blow out your viewer's ears!)

Also, make sure you have a license for your Sunday music that includes broadcasting performances. You do not want to be sued. At St. David's, our ministry of music investigated the licensing and found that broadcasting was already included in our terms, so we were in good shape. Don't take that licensing for granted though, and do make sure you are legal.

## "Stream Team"

We call the lay-people who operate our camera and streaming device our "Stream Team". Though we didn't initially intend for the "Stream Team" to be a youth ministry, it's tended to work out that way for us. Our youth have tended to be attracted to the streaming technology (which is familiar to many of them) and we are blessed by their participation in the streaming ministry.

To get the stream team ready, we conducted a series of 15-20 minute "training sessions". Streamers were only required to attend 1 of those sessions, but we held several to accommodate as many people as possible. (Plan on these trainings being a routine part of your ministry recruitment efforts too, so you can on-board new stream team members over time.)

The training sessions were hands-on, and we first demonstrated how to setup the tripod, then attach the video camera to the tripod. Then, we showed how to run the AC power adapter to the camera, and then were to plug in the HDMI cable to the camera. Next, streamers were shown how to plug in the HDMI cable to the streaming appliance, along with the streaming appliance's network connection and power. All in, each participant was allowed to perform the same steps and observe the others in the group doing the same. It went well.

We have an adult produce a monthly schedule for the streamers, and this is sent out in our weekly and monthly newsletters. We also have the streamers included in our ministry schedule.

Each Sunday, the streamers show up 10-15 minutes before worship, and retrieve the streaming equipment from its locked storage. They setup, and bring the stream online about 5-10 minutes before service begins. They then use a personal cell phone (or an iPad that we have available) to verify that the web site streaming page shows the live stream. After that, the streamers do their best to keep the "Action" from our worship centered in the camera (and zoomed, where appropriate). After worship is concluded, the streamers dismantle the equipment and return it to locked storage.

We have found it most convenient for our streamers to participate in Eucharist with our choir members. That largely has to do with where the streamers are situated at St. David's, but you

might want to consider the protocol for how the streamers will receive, and what the streamers will focus on during “sensitive” moments of the service (e.g., during unctioining, etc.). I.e., you might want the streamers on hand at the camera during those moments, so the camera’s focus can be directed elsewhere.

### Equipment Storage

We store all of our streaming equipment in a \$60-70 metal filing cabinet. Ours has wheels, though this has not been essential in our case. Every Sunday, the streamers find their way into a locked office to retrieve the streaming equipment, and return the equipment to the same space after worship.

[https://www.staples.com/staples-2-drawer-vertical-file-cabinet-black-letter-18-d-52149/product\\_2806262](https://www.staples.com/staples-2-drawer-vertical-file-cabinet-black-letter-18-d-52149/product_2806262)

### Lessons We Learned

- **Don’t skimp on your tripod.** We bought cheap tripods, and have had to order 2 replacements prior to purchasing our latest “nice” tripod.
- **Don’t skimp on the streaming provider.** Worshipers are counting on you to have a reliable broadcast, and we just didn’t have good luck with any of the freebie platforms.
- **Do plan to hold repeat trainings to expand your ministry team.** Overtime, people will rotate off your “stream team” and you will want to onboard replacements, or provide reminder trainings to existing ministry team members.
- **Do plan on where your streaming camera will be setup.** For us, our stream team setup is in the rear of our worship space near our choir. So we knew that a camera with a decent optical zoom was required. For you, the zoom distance might be different, and if you *don’t* need as sophisticated a camera, then better to identify that and save the money on a lesser grade of camera, right? *Also, will the camera have a clear view of the altar during moments with the congregation is standing?*
- **Do plan for electricity needs.** The camera and streaming appliance both need electrical power, so make sure you can run electrical to wherever your camera is setup. Don’t depend on battery. With the Canon Vixa we have, the camera will actually try to turn off during streaming if it doesn’t have AC power. We find that AC power is more reliable than worrying about whether batteries are charged, etc.
- **Do plan ahead as to which locations you should wire for Ethernet.** It is possible that you will only ever stream from your worship space, but it is also easier to install all network wiring at once. If possible, account for where else you might want to stream within your building, and wire those locations up too.
- **Do consider and discuss your policies for what can and cannot be shown on the stream.** Should the streamers show a wide focus during Eucharist, or focus on stained glass in order to preserve privacy during that time? What about prayers for healing? Children’s sermon? Etc. Make sure all of your streamers are aware of the policy and do their best to comply.
- **Don’t use wireless (WiFi) for streaming, if you can avoid it.** We run a guest wireless network, so we had a lot of competition for bandwidth on Sundays from personal devices in the congregation. And we just found that the signal didn’t penetrate our walls reliably. We switched to wired network (Ethernet), and have not looked back.

- **Simpler streaming appliances are preferable.** Our first streaming device was an expensive Teradek VidiU Pro, and it died on us. Even before it bricked, we found it to be slow and clunky for our streamers. We “upgraded” to an inexpensive, device that is simple – when it has HDMI signal, power and Ethernet, then it streams. Simple as that. In retrospect, I wish we had started with something like this.
- **Do assign an adult or responsible teen the responsibility of generating the monthly streaming ministry schedule.** We do find that our stream team overlaps with other ministries (LEMs, Acolytes, etc.) so its helpful to see well in advance of Sunday when double -assignments exist. For us, the same person probably cannot be a LEM *and* a stream team member on any given Sunday, etc.
- **Do find a convenient, reliable place on our web site to house the stream, or provides a consistent link to the stream (if required).** When we were using the freebie streaming platforms from Facebook, we had to direct users to our church Facebook page, where those users had to sit and wait and keep refreshing their computer until our stream went live and showed up. That was not ideal. With CWM, we have a consistent “code” that we included on our web site. Users go to a particular page, and just wait until the stream goes live. No refreshing required, and no questions about where the stream will be. Its always in the same spot.
- **Do plan to go live 5-10 minutes ahead of worship.** For us, we leave the camera at a wide angle so home viewers can see our congregation entering the worship space. We feel this promotes a sense of community and inclusion for our stream viewers. Plus, this helps us discover and fix any simple technical mistakes ahead of time (e.g., someone forgot to remove a lens cap from the camera, etc.)
- **Do plan on whether recordings of worship are desired.** If recordings are not essential, then you can save money by eliminating the archival footage from your streaming plan. For us, the on-demand replay was essential as not everyone who does view the streams does so when its live. I.e., if there are illnesses at play, ill parishioners might value seeing the stream later in the week when they are feeling better.
- **Do advertise your streams.** Make sure your community knows where to go to view the streams, and include appropriate links on your social media. Encourage the congregation to “share” the links on their own walls, and get the word out.
- **Do test your stream ahead of time, especially for audio levels.** If you can, do a test stream with your clergy and verify that the camera can pick up their voice. Likewise, ensure that the streaming camera picks up your choir at *reasonable levels* too, or any other sources of sound that are important on Sundays. Notice the emphasis is on “reasonable levels” – your test stream will tell you if something is excessively loud too (in which case, move the camera further away, or find a way to reduce the volume otherwise.)
- **Do verify that you can broadcast performances of your music.** At St. David’s, our minister of music found that our license included the rights to broadcast, so we were in a good place. You should investigate the terms of your license(s) and verify that your broadcasts will be legal. Do not take this for granted as nobody wants to be sued in civil court for copyright violations. This is particularly important if you plan to use YouTube for your broadcasts or archival footage, and YouTube will take down any videos that contain unlicensed audio.

- **Don't get frustrated if it doesn't work right on the first try.** St. David's has had a streaming ministry since approximately March 2018, and it took us a while to shake out all the bugs. I hope this document will help a number of you avoid certain mistakes that we made, and shorten your learning curves, but have patience and persevere. Our problems were mostly related to unreliable, flakey free stream hosting on Facebook. If I could go back in time, I'd avoid that and go straight to CWM (or similar paid-hosting with tech support). Just know that this is a worthwhile ministry, which is something we are reminded of when we look at the data from CWM and see a handful of people tuning in on Sundays from all around the US and world.