OPEN THE ROOM

Reducing the barriers to community journalism

A guide to providing inexpensive access to local government meetings for every citizen by David Danto and Mike Wheeler.

As emerging technologies lower the cost and complexity of recording and archiving public meetings, the public will be able to access any meeting from any internet-connected device. This effort will provide a roadmap and step-by-step directions for community journalists, towns and citizens to build a scalable video recording and archiving system for community deliberation of public policy.

There has been a decline in local communities in the United States. Citizens are not engaging in their local governments.

Voting in local elections in non-presidential years is hovering around 20 percent.

Local journalism has been severely impacted by the transition of the newspaper industry.

Consumers cutting the cord are reducing the amount of funding that cable/telco operators provide to support local access Government and Education Television so citizens can observe their city or town government in action.

Cities and towns need to strive to use all of the tools available today to engage residents in the governance of their communities and civic activities.

Founder Mark Zuckerberg has announced that Facebook is extending its mission from "Connecting the world" to ["Giving people the power to build community."](#)

They are developing new tools for Facebook users to create robust hyper communities around a diverse set of local interests such as their schools and neighborhoods.

At the same time, a new generation of video software automation is launching where the technologies available to cover local meetings and events has dramatically improved and their relative costs have been significantly lowered.

Not only can the City Council meeting and the high school football game be streamed, but so can every committee or commission meeting — along with the Wednesday afternoon wrestling match and high school debate. If residents or parents opt in, they can be alerted when an event starts, and be able to watch it on any platform at a time of their choosing.

This report provides a roadmap and step-by-step directions for community journalists, citizen activists and city and town administrators to build a scalable, video recording and archiving system for the streaming of all public meetings, local sports events and other town events.

We offer multiple solutions - from a citizen with a smartphone and social media account, to automated products and services that negate the need for broadcast television equipment and crews.

We detail the first generation of products using 100% software automation to stream meetings.

The solutions capture the audio and video of the active speaker in a room automatically - with no one required to operate the camera or microphones.

Some of these are hand-held, some are portable and some require permanent installation – but all are game changing for the space.

We also introduce companies that are automating the coverage of not only meetings, but many sports (football, soccer, basketball, lacrosse, volleyball, hockey, wrestling) — eliminating the need for a camera crew. They provide a cost efficient alternative to multi-camera productions.

Local journalists and activists, city and town administrators can engage with residents to create highly targeted community groups of local interest using the same social media techniques as major media outlets, celebrities and sports stars.

Effective use of social media coupled with emerging automation technologies can open all the auditoriums and meeting rooms, playing fields and gyms where local governments and events are taking place, bringing residents together to build robust local communities.

Contents

1. Introduction

1.1. Overview — Simplifying video and audio recording in "The Room Where It Happens"

The song ["The Room Where It Happens"](#) from the 2015 Broadway musical Hamilton excellently summarizes the basis of this report.

At a secret meeting in June, 1790, Alexander Hamilton, Thomas Jefferson, and James Madison created the compromise to move the nation's capital to the Potomac in exchange for support of Hamilton's financial system.

Outside, Aaron Burr sings of his frustration at not being invited to the room where it happened:

"No one really knows how the game is played
The art of the trade
How the sausage gets made
We just assume that it happens
But no one else is in
The room where it happens."

If citizens and journalists aren't in "the room where it happens", then decisions will be made without constituent knowledge.

1.2. What has happened to community journalism

Through Open Meeting laws, citizens have access to local meetings. However, due to economic and other factors, many local journalists who would cover these meetings on behalf of citizens have lost their jobs.

Community journalism is in transformation. At many town council and committee meetings across America, there are no journalists. The only official record of what happens is the minutes taken by a participant.

Many states and cities are served by Government Access Television Channels (GATV) that broadcast public meetings. They are largely funded by a mandated surcharge added to consumer bills by the cable/telco operator. As consumers "cut the cord" (discontinue the use of traditional cable television at home) they lose access to their GATV channels. With fewer consumers subscribing to cable, there is less funding for GATV.

Fortunately, emerging technologies are lowering the cost and complexity of recording and archiving public meetings and events, enabling citizens to access any meeting from any internet connected device.

In addition, these technologies can have the ability to alert citizens — with a personalized email — of pending meetings that are of interest to them. Citizens can also consume this content "on-demand" (able to watch any town meeting when their schedule permit.)

1.3. How this report and guide can help

This report will introduce the first software solutions that can automatically broadcast a public meeting and certain sports events without a camera operator.

Social media is also changing the dynamics of civic engagement. Cities, towns and local media outlets can actively engage with citizens. This report will provide a roadmap and step by step directions for community journalists, towns and/or citizens to build a scalable video recording and archiving system for the commu-

nity deliberation on public policy.

We will also provide a guide to using social media to engage with citizens.

Citizens won't have to go to the town website or GATV channel to look for a town meeting. They can be alerted of a meeting and sent the agenda in advance. The broadcast of the meeting can come directly to them on multiple platforms to watch on their schedule.

These technologies and methodologies should become an essential part of increasing citizen involvement and engagement in local government.

With today's technology and social media tools, "The Room Where It Happens" can come to citizens wherever they are and whenever they are available on whatever device they chose.

2. Assessing Your Environment

In order to capture your organization's or community's meeting on video, it is important to understand the situation and environment that you are walking into.

Will the people being recorded / streamed welcome your efforts or be hostile toward them? In a hostile environment it is not likely that any permanent, or even more complex temporary equipment, set-up will be permitted. It is also less likely that power and internet connections will be provided for you. If your efforts are welcomed, appreciated or sanctioned by the people being recorded / streamed then you are able to request support in the form of facilities, power and data connections, tables / chairs / a section of the room specifically for the camera, and / or the items needed for a permanent installation.

Understanding what level of acceptance you will experience is critical to making decisions about approach and methodologies chosen.

If you are an individual / citizen journalist, it is also important to know what your rights as an individual are in your jurisdiction. BallotPedia has an interactive map that can be used to find the laws for your state here: https://ballot-pedia.org/State_open_meetings_laws.

If you represent the organization that is holding the meetings, while permission to record / stream may be tacitly implied, there may be compliance regulations that affect the content you're streaming / recording. You may be required to keep content for a specific period of time, and/or destroy content after a specific period of time. Legal advice about your specific situation is a highly advisable first step.

2.1. Determining funding / participation

If you are a citizen or media outlet and the meeting you want to cover is public, you have the right to broadcast it. However, as a courtesy, you should draft a letter to the chairperson of the committee indicating that it is your intention to stream / record the proceedings. Ask about access to a power source and Wi-Fi. Ask if there is a technical or facilities contact at the meeting location that you can speak with to coordinate efforts.

If the environment will be hostile, then it is relatively sure that you will need to focus on one of our mobile solutions below. If there is cooperation, the automated package or integrated package may be applicable.

2.2. Assessing meeting rooms / Determining Approach

The physical layout of the room where the meeting will take place is key to selecting an appropriate technical package of equipment and accessories.

- If you are a citizen or local media organization, you will probably be selecting our mobile package. You own the content and have full editing rights.

- If you are a city or town, you have all three of our solutions from which to choose to give you maximum flexibility.
- If the room changes frequently then a fully portable package may be your only option. If the meeting takes place in the same room every time, then a more permanent installation may be a better choice.
- If the camera needs to be far away from the people speaking then a supplemental microphone may be needed. If it is close to the action, then the built-in microphone on the camera may be fine.
- If the room does not have a PA (public address) system, then our automated package or mobile packages are your best options.
- If the room has microphones and a PA system, the automated package is not an option because the automation technology will not be able to tell where the voice is coming from. Our mobile and integrated solutions will work in those environments.
(The packages and their components are detailed in section 3 of this report.)

2.3. Assessing number of meetings on weekly, monthly, and annual basis

Start slowly. Pick one board or council whose meetings have the most interest with the public. Unless there is a timely controversial issue, interest peaks at budget time. We recommend you use our social media strategic roadmap to gauge where the most interest is in your community. It usually centers around the Board of Education.

2.3.1. Develop a budget for your approach

Once you've determined which approach is appropriate you should develop a budget for the equipment and services so that there are no hidden costs later on.

2.3.2. Assessing connectivity (internet)

Availability of internet connectivity will also be a determining factor in your approach. If the space has no cellular coverage and the organization being covered will not provide internet connectivity, your only option is to record the meeting for future use. Storage could quickly become a problem. It will be important to invest in a SanDisk 128GB Thumb drive for an iPhone or a similar device for whatever smart device you are using.

First, you have to estimate if you have enough storage space on your smartphone to record the meeting. Use the AT&T estimator in section 2.3.4.

If not, you will need to transfer existing files from your smartphone to the SanDisk to free up space on your smartphone.

If you have enough space on your smartphone to record the meeting, after the meeting is over, copy the video of the meeting from your smartphone to the SanDisk and then upload the recording of the meeting to a storage device or service (laptop or Dropbox) or a platform (Facebook, YouTube, or Vimeo). You want to get the meeting video off your smartphone or you will run out of storage space quickly.

If there is cellular service, simple streaming options (like Facebook Live) become possible but at a high cost to your data plan.

Facebook has launched a Wi-Fi Finder. To find Wi-Fi hotspots, open your Facebook app, click on the "More" tab and then "Find Wi-Fi." Once in the "Find Wi-Fi" tab you may need to turn it on. You can then browse the closest available hotspots on a map.

If the organization is providing Wi-Fi/internet access for you, that will be the best solution. Test it in advance. At some events we have shot, the Wi-Fi hotspots provided by the cable/telco operator worked better than the public town Wi-Fi.

We recommend that you download the app Speedtest by Ooookla for iOS, Android, or Windows to test how good your internet access is at potential meeting locations. It does not matter how good the download number is in your test. You want to pay attention to the upload speed. That is the data you will be streaming.

Turn off any Wi-Fi and run a test just for your cellular

data. Then turn your cell service off and run a test for the Wi-Fi. You will need at least 1-1.5MB on either Wi-Fi or cellular.

It is also important to note that you probably are doing your bandwidth tests when few people are in the room. When the room fills, you will be competing with anyone with a mobile device for bandwidth.

If you don't have that much bandwidth, you will have to record the meeting to your phone for later uploading.

2.3.3. Live (broadcast) video — Only if possible

If you are going to broadcast live, we recommend [Facebook Live](#), especially if you are going to incorporate a social media plan. That is where the viewers are. YouTube requires you to have 1,000 subscribers to your channel before you are enabled to live stream. [(We_provide_instructions_on_how_to_connect_to_Facebook_Live in sections 3.1.9)](#)

[Twitter](#) is another option to broadcast live — using its Periscope platform — that can tie into alerts to those who follow you on Twitter.

[Vimeo](#) has a live streaming option. Viewers would need the link in advance.

2.3.4. On-demand (archived) video

You can easily create your own channel to store your video on your own [YouTube channel](#). Vimeo offers an attractive option as well. They do charge for storage. Their $5.00 per month package allows for from 5 to 7 hours of video, depending on video quality. Use the [AT&T calculator](#) (https://www.att.com/esupport/data-calculator/index.jsp) to estimate how much storage you are likely to need.

2.3.5. Closed captioning and text-searchable video

There are several options for creating a transcript for your public meetings.

At the high end, there are professional transcription companies where humans largely do the transcriptions and they will be 99% accurate. You will also pay $1.00 a minute or more.

Transcripts driven by speech recognition software are improving but you will still need to manually edited what is returned.

The accuracy for the industry is reportedly 92%.

We reviewed three services.

[Scribe](#) (not to be confused with [Scribie](#) which uses human transcribers and charges 10X more) uses the Google Speech API.

[PopUp Archive](#) dates back to 2010 and has attracted investment from Bloomberg's venture capital fund, [Bloomberg Beta](#), the [National Endowment for the Humanities](#), [500 Startups](#) and [The Knight Foundation](#).

[Trint](#) was founded in 2016 by Emmy award winner Jeff Kofman who says "They glue the text output of automated speech-to-text to the original source audio. And that means that you can follow it like karaoke."

Prices are changing as the industry gets more competitive. Scribe charges $0.10 a minute. PopUp and Trint charge $0.20 to $0.25 with some monthly minimums and volume discounts.

We also tested Google's enhanced [automatic captioning](#) and found it much improved.

Google offers automatic captions in English, Dutch, French, German, Italian, Japanese, Korean, Portuguese, Russian and Spanish.

Closed captioning remains an important topic for cities and towns. Closed captioning on YouTube provides a viable option to serve the hearing impaired.

We also are monitoring IBM's Watson Speech to Text machine learning project. [Pietro Passarelli](#), a Knight-Mozilla Fellow at Vox Media, has created an open-source tool called [autoEdit 2](#) to allow for low cost transcriptions using IBM's Watson or Gentle Open Source speech to text. Its use requires someone with technical skills.

The improvement in speech to text will be incremental. It will never be 100%. There will always be a challenge with understanding regional accents and complex names or terms. The software can be taught and will improve, but some editing will always be required.

3. Acquisition Technology Guidelines —
The Technical Details

In order to most effectively capture the audio and video "that happens in the room," we've divided the solutions into three categories — mobile is for citizens and journalists. With a higher price point, our automated solutions are probably reserved for media outlets and cities and towns. Our integrated solutions require permanent installations into room public address systems.

In recording technology, the transition from analog to digital is almost complete — the quality gets better with every new generation of device. (For example, iPhone 7 video quality is significantly better than iPhone 5 capabilities.) Journalists around the world are beginning to use smartphones to replace traditional video gear.

Our automated solutions are in their first generation. They are not better than a human camera operator or a producer controlling fixed position PZT cameras. However they also don't require identifying a camera person, making sure he or she is available for the meeting, and / or having the budget to compensate the camera person.

Current generation automated solutions provide a very acceptable alternative when resources are limited.

Here are brief descriptions of our three categories:

Mobile

This is the low cost solution that is intended for citizens and local media. It is meant to be carried into a room before a meeting and operated by an individual attendee. This category is appropriate for concerned citizens and local journalists. Solutions in this category can be completely self-sustaining — requiring no extra access to the room, no local power and no data services (other than the wireless services on a smartphone or tablet if live streaming is desired.) The content captured via this category is meant to be streamed to a platform like Facebook Live, or recorded locally on the device and uploaded at a later time. Anyone with a smartphone can operate this system.

Automated

This package is intended for long-term temporary or permanent installations in a room where set up time would be permitted, but where there is not an existing public address system. The automated solution is meant to be set-up prior to a meeting — connecting to the location's power and Wi-Fi or internal network services. It captures audio and video of the active speaker in a room automatically. The camera is placed directly in front of speakers sitting at a dais or table and points to whomever is speaking, zooming and panning as needed. The content captured via this category is meant to be streamed to Facebook Live, or recorded on a laptop and then uploaded to Facebook, YouTube, a town website, or transported via wire / fiber to an existing control room facility or cable TV / CATV interface. The value of the automated package is that it does not require any other audio or video equipment or manual operation and can be set up in fifteen minutes. Any technology-comfortable person can set up the system and initiate the recording / streaming process.

Integrated

This package is intended for permanent installations only, in rooms where there is an existing public address (voice lift) system, or rooms that simply already have existing microphones. It is meant to be set up permanently in a room and connected into the existing system. It captures audio and video of the active speaker in a room automatically — with no operator required to operate a camera. Once pre-set camera shots are programmed into the camera it points to whichever PA microphone is active, zooming and panning as needed. The content captured via this category is meant to be streamed to Facebook Live, or transported to an existing control room facility or cable TV / CATV interface. The value of the PA package is that it provides an "operator-less" camera that tracks the speakers in rooms with a PA system. A professional integrator is needed to install and set-up this package to work in conjunction with the existing technology.

If your organization doesn't want to develop and install the automated or integrated options, there are firms that will support you through a do-it-yourself model, and others that provide the production equipment and coordination in an "as a service" model. There are of course pros and cons to each approach. Many of these "full service" options are applicable for not only meetings, but automated coverage of local sporting events — webcasting games without the need for a video crew. Not only are these events of interest to the local community, but they can also help to fund the entire cost of the acquisition technology through subscriptions or sponsorships. We will provide information on these third party options — without any endorsement beyond identifying these firms as established providers in the space — in sections 3.5 and 3.6.

3.1. Mobile approach

3.1.1. Assessment review

3.1.1.1. Overview

The mobile solution is based entirely on the use of a smartphone as your equipment to broadcast or archive a public meeting. It is intended for a single individual to bring into a room to capture the proceedings

3.1.1.2. Appropriate use cases

The mobile solution is for the citizen or the local media outlet that wants to broadcast all or part of a public meeting. Since the meeting would be shot on the citizen's smartphone device, the citizen would also have the right to select highlights — similar to what a reporter covering the meeting would do with any text-based story he or she would write.

3.1.2. Solution detail

The smartphone is just a decade old, yet its functionality has revolutionized countless businesses. There have been hundreds of apps and pieces of gear that have launched just around this ability to shoot video on a smartphone.

We have narrowed the choices to create two simple solutions.

3.1.2.1. Kit for the citizen

This package is for the citizen who wants to broadcast live or record a town meeting.

With the release of the iPhone 7, Apple has eliminated the headphone audio jack. We have based our go-forward design based upon their lightning connector as a standard. However, there are a lot of earlier iPhones and Android phones with headphone audio jacks. We will provide a recommendation for both scenarios — smart devices using a headphone audio jack and iPhones using lightning connectors.

3.1.2.1.1. The basics — For any smartphone

The very simplest solution is to use your existing smartphone camera and microphone.

With this basic solution, you will be using just your smartphone's internal microphone. If you can hear the presenters clearly, your device can as well. However, if you are having trouble hearing, or if there is noise or audience talking that you can hear, your phone will hear that too.

You might want to consider adding an external microphone.

If there are external noises in the room and you are having trouble hearing the speakers, you probably need to use an external microphone.

If you are going to use your headphone audio jack, we recommend the Rode VideoMic Me Directional Microphone. It works with both iOS and Android. It also comes with a windscreen. There is also a headset input so you can monitor the audio. The headset input on the device must be on the opposite side of the camera itself to work. Here is an excellent tutorial on its use from Rode.

3.1.2.2. The kit for the professional — Using a Lightning connector

(Some of the devices mentioned below are shown with links for more details, however, in section 3.1.3, we provide links to all the mobile hardware and software mentioned below.)

Audio - using the Lightning connector to connect to your external microphone

In the iPhone 7, Apple made a decision to sacrifice the headphone audio jack to support various technical improvements. So, to connect an external microphone to any iPhone with a lightning connector, you will need a lightning to USB 3 camera adapter.

(Note: Many people have looked at this adapter and suggested it is not correct — that instead, an adapter is needed that provides two lightning ports. We have tested all adapters and can confirm that while the adapter below is counterintuitive, it is the correct one to use — a lightning plug on one end, a lightning port and a USB port on the other. This device allows the iPhone to be powered via the lightning port and recognizes the preamp detailed below as a digital audio source when connected to the USB port.)

You will need five different pieces of gear to shoot using a lightning connector.

The bridge that connects your smartphone to a microphone is a "pre amplifier". A preamp prepares the signal coming from a microphone for recording use by boosting its signal to an acceptable level. We recommend the iRigPro. Make sure you get the "Pro" model.

Now you need a microphone. We recommend the Rode VideoMICGo.

This microphone requires a 6.35 mm audio stereo plug to 3.5 mm stereo headphone jack adapter. They often come in packets of three.

How are you going to neatly mount the iPhone, the external microphone and the preamp? You will need a Shoulderpod X 1 to either hold yourself or attach to a tripod.

Besides mounting a microphone on your Shoulderpod, there are three other options for obtaining better audio.

For better pickup, you can purchase a tabletop microphone (called a boundary microphone) to place on a table near the presenters and attach it to your preamp.

If you would prefer to not use a cord, you can buy a wireless transmitter and receiver to use with your boundary microphone.

If you are shooting in a room that has a public address system, and a mult box / press box is provided, you can connect your preamp to the mult box to get better quality sound. You will need a cord that reaches the mult box. This could be the same cord you would use for the boundary microphone. Different mult boxes use different adapters. If you might need to use a mult box, we recommend you invest in an adapter kit to make sure you have the connectors you need.

Batteries

Nothing kills a smartphone battery more quickly than shooting video. If you want to charge your battery or use external power while shooting a long meeting, you can use your smartphone's standard charger, or a battery with your smartphone's existing charging cable, using the Lightning To USB Camera Adapter as seen in the diagram below. We like the Ventev Powercell 6000.

Below is a diagram that shows how to connect all of the pieces we have described using an iPhone with a lightning connector (port).

External Connections To iPhones For Recording

In All Use Cases:

iRig output cable to standard USB plug

iPhone with Lightning jack

iRig Pro preamp

Apple USB Adapter

Standard iPhone charging cable - w/ Lightning plug

Connect any of the choices illustrated at right to input here

AC Power Supply or Battery

Input to iRig Pro preamp

Input Choices:

For using improved microphone near iPhone location

For using a cable to a microphone on a table near the presenters

For wirelessly using a microphone on a table near the presenters

Possible adaptor as needed

For connection to a Press Feed / Mult-box

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Storage

If you have broadcast a long meeting and then saved it to your smartphone, in addition to draining your battery you have used a lot of storage space. 1 min. of streaming standard-definition video can take up 11.7MB (700MB/hr.). 1 min. of streaming high-definition video 41.7MB (2.44GB/hr.). AT&T offers a [data calculator](#) to help figure storage out.

We recommend traveling with a flash drive that will allow you to free up space on your smartphone. [SanDisk](#) (and other firms) make a 128GB flash drive that can meet this need by connecting to both your iPhone Lighting connector and your computer's USB port.

3.1.2.3. Steadying the camera

Meetings can run very long. To hold the camera steady for the extended time, we recommend three options.

Handheld mode

If you want to hold the smartphone, we recommend the [Shoulderpod S2 Handgrip.](#)

Your other alternatives are to use a desktop or standing tripod. In order to attach your smartphone to a tripod, first, you need a tripod mount.

We are recommending two different mounts for your Tripod. You will need to determine if you want to shoot in landscape or portrait.

Facebook Live will allow you to shoot in either. If you start recording in landscape on Facebook Live, it will stay in landscape until you stop recording.

Those viewers who want to hold their smartphones vertically will see the landscape converted to a square.

Tripod mount

The [Glif mount](#) has been redesigned to hold your smartphone in either portrait or landscape mode.

As the smartphone began to be used as a video camera, traditionalists castigated anyone who shot in portrait mode. Now as more video is being consumed on a smartphone, viewers seem to prefer to hold their phone vertically or in portrait mode.

The [Ulanzi Tripod Mount /Vertical Bracket Smartphone Holder](#) will allow you to shoot portrait or landscape as well.

Mini tripod for desktop or for holding

The Mini Tripod lets you rest your smartphone on a desktop. If there is an outlet nearby, you can continuously charge your smartphone while shooting.

We recommend the [Manfrotto MTPIXI-B PIXI Mini Tripod](#) in black.

You can attach just your smartphone using one of the two mounts recommended above.

You can use a lightweight standing tripod. Use one of the mounts to connect your smartphone. We recommend the [Amazon 60-Inch Lightweight Tripod with Bag](#).

3.1.2.4. Lenses and cases

A shoot can be enhanced by adding lenses to get a wider or tighter shot. It gives you more flexibility.

There are separate lenses for iPhones and for the Galaxy. We recommend the [Olloclip 4-in-1-Lens Set](#) for iPhone 6 or 7 and the Olloclip cases for iPhone 6 or 7. For the Galaxy, the Olloclip 4-in-1 Lens for Galaxy 4 or 5.

3.1.2.5. Software

Now you have the gear you need. However, if want to visibly monitor the audio levels while shooting, perform simple edits and/or add some simple graphics, we recommend these options below.

For iPhone:
[iMovie](#) — Good
It comes loaded with your iPhone 7.
$4.99 for older phones
[FiLMiC Pro](#) — Best
It offers more features than you could ever use.
$9.99

For Android:
[Video Editor](#) — Good
Android's basic editor
[FiLMiC Pro](#) — Best
Now comes with an Android version.
$9.99

3.1.2.6. We are live

How do videographers let the people in the room know that the meeting is being recorded? They can post a sign. Another, more visible option is wearing a [recording alert bracelet](#).

3.1.3. List Of Technology Required

Rode VideoMIC Me Directional Microphone for Smartphones
http://a.co/ay8Apy0
$59.00

Shouldergrip S2 Handle Grip
https://bhpho.to/2mD2YtI
$39.99

Glif Mount
https://www.studioneat.com/products/glif
$28.00

Ulanzi Tripod Mount /Vertical Bracket Smartphone Holder/Phone
http://a.co/fcXQa6A
$7.99

Manfrotto MTPIXI-B PIXI Mini Tripod, Black
http://a.co/7S6wgP8
$18.99

Amazon 60-Inch Lightweight Tripod with Bag
http://a.co/jfzZMzA
$23.49

Lightning to USB 3 Camera Adapter
http://a.co/3m0kd9c
$39.00

iRigPro
https://bhpho.to/2mGnhY5
$99.00

Rode VideoMIC Go
http://amzn.to/2hrAHIB
$99.00

eBoot 6.35 mm Audio Stereo Plug to 3.5 mm Stereo Headphone Jack Adapter, Pack of 3
http://a.co/fK3DKVh
$4.99

Shoulderpod X1 Pro Rig for Smartphones
http://a.co/c6vHMjf
$119.99

Audio-Technica U851RO Omnidirectional boundary mic
http://a.co/7qSeOY4
$239.00

XLR M to XLR F Microphone Cable - 20'
https://bhpho.to/2cCmvcO
$18.99

Sennheiser SKP 100 G# Plug On Transmitter For Use With Evolution G3 100 Series
http://a.co/9sV0JXt
$299.95

Sennheiser EK 100 G3 Compact Wireless Receiver, CH A
http://a.co/217MAC5
$429.95

Comprehensive Audio Adapter Kit
https://bhpho.to/2mMnfgf
$149.95

Ventev powercell 600-Two Port 600mAh Portable Battery
http://a.co/0GWCeh5
$40.60

SanDisk iXpand Flash Drive 128GB
http://a.co/cYPs6Cx
$82.85

Recording Alert Bracelet
http://a.co/6A7dEyb
$8.95

Olloclip 4-in-1-Lens for iPhone 6 or 7
https://www.olloclip.com/shop/

Olloclip 4-in1 Cases for iPhone 6 or 7
https://www.olloclip.com/shop/
Prices vary from $69-$99

Olloclip 4-in-1 Look for Galaxy 4 or 5
https://www.olloclip.com/shop/
$29.99

3.1.7. Other equipment options for a mobile solution

The simplest route — but the most expensive — is to build a gear package around an iPad.

The iPad offers an excellent option for professionally recording a meeting.

Padcaster.com has created a "build your own" package for most iPads and iPad minis.

iPads currently still have a headphone jack, so the devices specified below count on that. If the headphone jack is removed in later versions, changes will be required to the solution below.

This is the Padcaster package we would recommend. As of June 2017, it sells for $784.92.

3.1.8. Expected refresh cycle

Improvements in the gear and software will be incremental as the smartphone enters maturity. Each new release of a smartphone brings some gear enhancements that are mostly targeted at filmmakers.

We will continue to monitor the marketplace and provide updates if there is a game-changer to the workflow or cost.

3.1.9. Going live on Facebook — The basics

The following instructions come from Kirk Vartan, a local activist in Silicon Valley, pizza guy and former hi-tech executive. You can follow his work at https://www.facebook.com/TriVillageSV/.

Kirk and his colleagues cover hundreds of public meetings in the Bay Area. They even cover public meetings that are being broadcast by the town. However, they shoot the meeting from the point of view of a journalist. They have a camera that can also focus on the audience to record its reaction to what is being said from the dais.

Instructions for going live on Facebook from Kirk Vartan

1. Turn on your iPhone with power switch on top or side of the phone.

2. Unlock the phone and hit the "Home" button.

3. Set iPhone on local Wi-Fi. Warning: If you connect without Wi-Fi and stream over LTE, your data will go fast!

> **a.** Click on the settings gear and click on Wi-Fi.
> **b.** Set up the wireless connection. You will need to ask the meeting organizer if a pass-word is necessary.

4. Hit the home button and launch Facebook.

5. Log into your Facebook account.

6. Click on the "What's on your mind" area to start a post.

> **a.** Write what you want. Tag your friends. Select a location if you like. Say why the meeting is important. In the world of "fake news," your live meeting broadcast is au-thentic.
> **b.** Click the "Live Video" button and you are good to go.

7. Under your name you will see an audience tag. It will probably say "Friends" or "Public."

> **a.** Click on this and it will bring up a menu. You can select "more" and it will reveal "Special Friends."
> **b.** Enter anyone that you want to be able to see the video. You can always change this later.

8. Hit "go live." It will give you a three second countdown and then you will be streaming!

9. At the end, hit "Finish" and then "Post."

When you go live, Facebook will push it to those who like your page. Unless they have opted out, they will be notified when you go live.

Not only can you broadcast from anywhere, your viewers can watch on any platform.

It is normal to be nervous the first time you broadcast on Facebook Live.

We suggest you practice. First change your privacy settings on Facebook to "only me" so you are the only one to see your test. When you are comfortable, adjust your privacy settings accordingly.
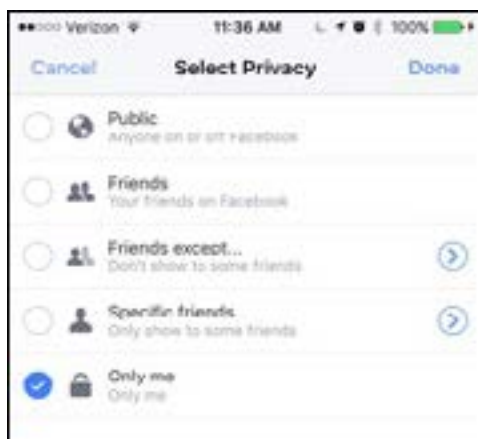
If you are only going to use Facebook Live to stream and store your video, you might choose to shoot in vertical. However if you are going to repurpose your video to YouTube or your website, you should shoot horizontally. Facebook makes the adjustment and does not force the viewers to turn their smartphones horizontally.

The Facebook Live application is very limited. You can't adjust exposure or focus. Keep it simple. Pay the most attention to the audio. Your first investment should be in one of the microphones we recommended.

In our social media section, we will show you how to build a Facebook page or group to discover or identify those who might be most interested in your content. Although YouTube does not have any minimum subscriber requirements to build your own YouTube channel to host your videos, YouTube does require a minimum of 1,000 subscribers to broadcast or stream live on YouTube.

Check the analytics to see how you did

On Facebook Live posts specifically, you can check out all kinds of analytics to see how people interacted with the stream. See how many overall views you received, how many people stayed longer than 10 seconds, how many people liked, commented, clicked, etc., and use that information to inform your next livestream.

If you had a lot of views but not very many people staying longer than 10 seconds, perhaps the subject matter was less interesting than you anticipated to the audience. If you had a lot of people watching but no comments or reactions, maybe you needed to prompt the audience in the comments section a bit more.

3.2. Automated approach

3.2.1. Assessment review

3.2.1.1. Overview

The automated solution for meeting rooms relies upon an emerging technology category of cameras and microphone arrays that "listens" for who is talking and "focuses" the camera shot on that person. Some cameras in this case do not have moving parts or motors — they electronically frame the best shot from the overall area being captured using facial recognition and voice tracking technologies. Over the course of the next eighteen months, many new products in this category will be released and available. Our report identifies one of these systems for meeting coverage that is available today. (We also reviewed and rejected some types of cameras using this technology, as we determined that they were inadequate to cover the meeting content required for one or more reasons. One popular camera meant for streaming has poor audio capabilities, and did not work in a single speaker / meeting room environment.)

Automated technologies have matured more quickly in coverage of sporting events such as basketball, soccer, lacrosse, volleyball, and wrestling — where predictive algorithms can be used to follow the action. As above, the production does not require a camera crew, or in many cases, does not require local involvement at all. (We detail these options in section 3.6.)

3.2.1.2. Appropriate use cases

The Automated solution for meeting rooms is meant to be placed in front of a table or dais of individuals speaking. In order to function correctly, these individuals must be on one side of the table or dais, and the system is placed on a small table facing them. See the diagram below.

3.2.2. Solution detail

Our selected technology for this specific application is the Panacast 2 Active Speaker Tracking solutioon provided by Altia Systems. This system provides a 180 degree tracking camera and a beamforming array microphone that tracks the voice speaking.

It requires a Microsoft Surface or similar PC (with a Windows OS 8.1 or newer OS) to process the data and provide a combined audio / video output. That same PC can be used to stream the audio and video sig-nals to Facebook Live (or similar) or it can be used to output that feed (via HDMI) to an external device for local facility transport or streaming.) The manufactur-er provided detail of this system on the next pages:
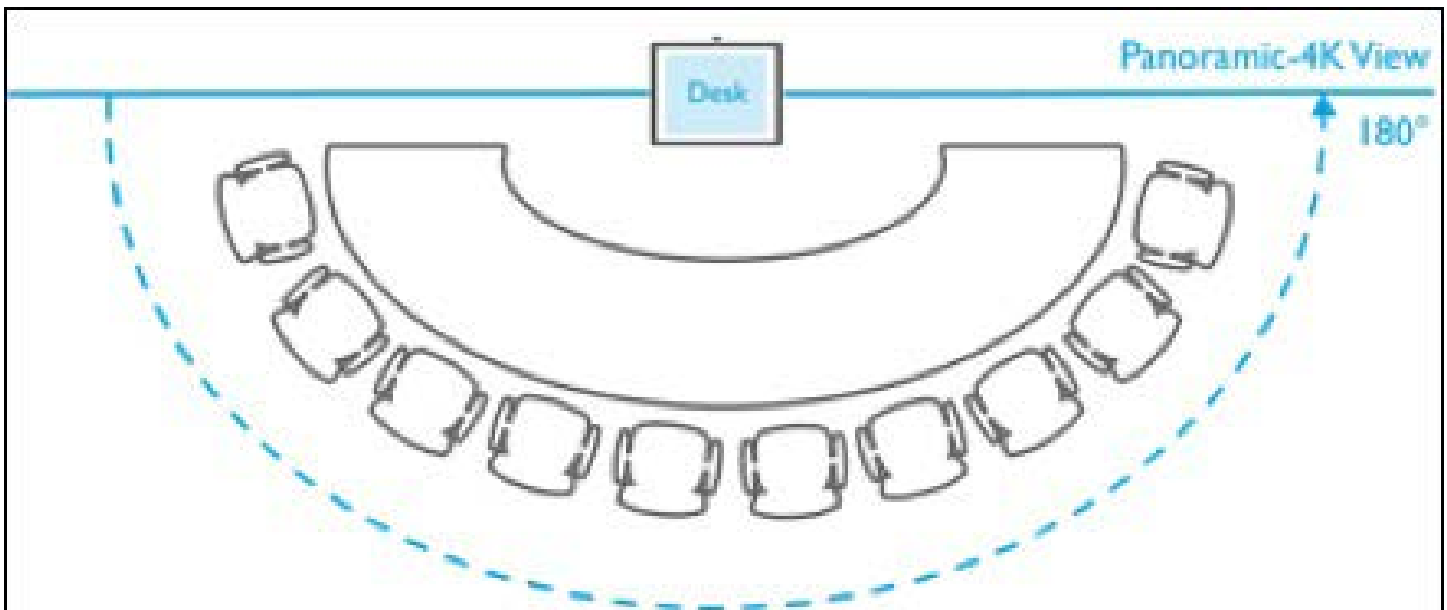
SOLUTION OVERVIEW

PanaCast® Active Speaker Tracking (AST) Webcast/ Webinar Solution for Windows Conferencing Apps

When multiple presenters participate in a webcast or webinar video conference from the same room and talk interactively — such as in a panel discussion — remote participants have difficulty in identifying and tracking the active speaker. With a typical camera, as the number of panelists increases, either the camera needs to be placed further away to include all of them in the field of view (so the image size of every speaker is reduced) or a camera operator is required. When the camera is too far away, remote participants have trouble identifying and following the tiny active speaker. An operated camera requires that operator to be present at every event. The Panacast Automatic Active Speaker Tracking solution solves those problems.

Automatic detection and zoom-in on the active speakerfollows our natural instinct to focus our attention on whoever is talking, and can help participants more easily follow the discussion — particularly if it is done unobtrusively and quietly. This capability can make webcasts and webinars more natural and productive for remote participants.

Figure 1: Comparison of static wide webcam image with actual speaker-tracked zoomed image

The PanaCast 2 AST system provides a unique advantage to build an active speaker tracking solution because of its 180 degree panoramic field-of-view. PanaCast 2 can see all the speakers in the room all the time, and, when integrated with directional audio pick-up, it can quietly and automatically zoom-in on the active speaker. The directional audio input is provided by a specialized array microphone system capable of providing real-time data on the location of the active speaker.

The PanaCast Active Speaker Tracking application is built on the Windows platform and can be used by all video conferencing and webcasting application which run on PCs without any additional configuration or setup requirements.

Benefits
- Single active speaker focus
- Natural and unobtrusive zoom
- Inclusive zoom for multiple active speakers
- Works with any video conferencing applications, such as Zoom, Skype, etc.
- Automated active speaker tracking with smooth transitions
- Enhances participant engagement during the webinar, webcast, videoconference, etc.

PanaCast Active Speaker Tracking Solution Details

The PanaCast AST Solution consists of hardware and software components. The hardware consists of one PanaCast® 2 camera system and one Acoustic Magic Voice TrackerTM II array microphone. The software required is the PanaCast ePTZ app, which has now been enhanced with this additional software capabil-ity; it runs the active speaker tracking algorithm on any Windows platform, such as Microsoft Surface and Windows PCs. The PanaCast 2 camera system and the Acoustic Magic array microphone device are connected to a PC through USB ports. The array microphone provides standard audio input and active speaker audio location data to the PanaCast ePTZ application.

Figure 2: PanaCast Active Speaker Tracking Solution Components

The PanaCast ePTZ application takes video input from the PanaCast 2 camera system and direction-al audio data from the array microphone. It runs real-time algorithms to map directional audio to the active speaker in the panoramic video. The active speaker view is automatically adjusted if one or more people speak at a time. Cross-dissolve transitions are applied when changing the view of speakers, to provide a natural and smooth visual transition.

This active speaker view is presented to third-party video conference applications as a virtual camera. These apps can select this virtual camera, named "PanaCast ePTZ," instead of the built-in webcam through their video conference settings. These applications do not need any special processing for active speaker viewing.
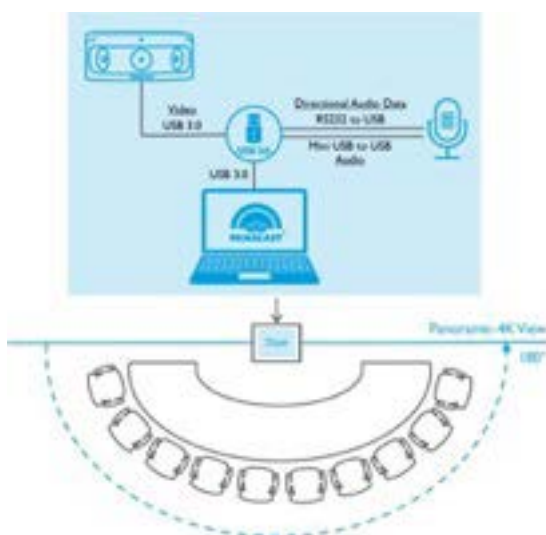
Figure 3: PanaCast Active Speaker Tracking System Setup

The PanaCast AST Solution is designed to be used by the host of a one-way online webinar, webcast or video conference, where there is a panel meeting ongoing or for a single host presenter who may be constantly moving across the room. The PanaCast Active Speaker Tracking solution improves the participants' web or video conferencing experience by automatically track-ing the active speaker with smooth transitions. In this way, remote participants can easily follow the discus-sion or conversations, and be more engaged. The audio tracking works best for a distance range of 7-10 feet between the camera-microphone setup and the speak-ers / panelists. The system has been tested for a panel of 10 speakers. The room is required to be completely silent and without any other audio sources, like wall or celling mount speakers or microphone arrays, which can create false audio sources.

Figure 4: Automatically Track the Active Speaker to Optimize Remote Participants' Audio/Video Experience

Features and specifications

Features
- Up to 10 speakers around the camera
- Automatic Active Speaker Zoom-in within~5s
- Input video resolution is 3840 x1080
- ePTZ video output is 1280 x 720
- Maximum zoom-in video resolution is up to ~4x digital zoom on the active speaker
- Smooth, professional cross-dissolve zoom out and zoom in transitions to active speakers
- Works with all Windows webcasting and video conferencing applications

PC/Surface system requirements
- Windows OS 8.1 and 10
- Intel i7 Processor
- USB 3.0 Port

What's in the bundle?
- PanaCast 2 with Table Stand
- Acoustic Magic Voice TrackerTM II
- Quick Reference Guide
- USB 3.0 Hub
- USB 3.0 Cables
- Power Adapter

Hardware specifications
- PanaCast 2 Camera System
- Panoramic-4K, 3840 x 1080
- HD: 1920 x 1080
- ~180° (H) x 54° (V)
- Frame rate up to 30fps
- Acoustic Magic Voice TrackerTM II Array Microphone
- 20+ feet for meeting recording
- Convergence time of less than 100ms
- 5°talker location signal accuracy

Software specifications
- PanaCaste ePTZ App, 6.0 and above, enhanced with Active Speaker Tracking feature: provides active speaker detection and tracking output as a virtual video camera

3.2.3. List Of technology required

The specified system requires:

- The Panacast 2 AST system (camera, beamforming array microphone, required cables)
- A Microsoft Surface or similar PC for proximate location to the camera
- Optional device to connect video/audio out of PC to streaming services
- Optional device to connect video / audio out of PC to and encoder / decoder for transport to other rooms / control rooms / local cable TV feed within a facility

3.2.4. Where to find more information / purchase

Details on purchasing the system can be found at the Altia Systems website here: http://getpanacast.com/panacast-solutions-active-speaker-tracking/. A video of one of the beta tests of the system can be seen here: https://youtu.be/77N5d1G7xk8

3.2.5. Estimated cost

List price of the Panacast2 AST system is $1,999 plus an annual fee of $199 to use the needed software.

3.2.6. Content transport

The PC specified for this solution (with a Windows 8.1 or newer OS) can be used to directly send the audio and video to Facebook Live, YouTube, and other streaming services. It can also be used to send the signals via a videoconferencing application such as BlueJeans, Zoom, Skype or other similar system. The output of the PC can alternately be sent to a discrete device (such as those directly below) to stream, or for transport to another room within the facility.

3.2.7. Other options in this category

3.2.7.1. Option A — Streaming device

A hardware device that can connect to the PC and perform the streaming.

You may not want to perform the streaming tasks from the PC that is managing the camera control — if the stream is being operated from another location, or if the designated PC lacks memory or speed. Here is a link to a video showing a device that can stream the output of the system to Facebook Live or YouTube. It's called the Webcaster X1: https://www.youtube.com/watch?v=FARAd9UGhNM.

3.2.7.2. Option B — CAT6 transport

A hardware device that can connect the output of the system to another location (control room, CATV input room, etc.) up to 100 meters away over point-to-point wiring.

If you already have a location within your facilities where the video needs to go to – such as a control room or hub-input to a CATV system – you can use this device to transport the signal from the room with the camera to where it needs to go over standard CAT6 twisted pair cabling — Crestron HD-EXT3-C: https://www.crestron.com/products/model/HD-EXT3-C.

3.2.7.3. Option C — Network transport

A hardware device that can connect the output of the system to another location (control room, CATV input room, etc.) up to 100 meters away over a local network.

If you already have a location within your facilities where the video needs to go to- such as a control room or hub-input to a CATV system, you can use these devices to transport the signal from the room with the camera to where it needs to go over an existing IP Network – Use CrestronDM-TXRX-100-STR on the encode side and DM-RMC-100-str on the decode side. https://www.crestron.com/products/model/dm-txrx-100-str.

3.2.8. Alternative technology

As this report was close to publishing, a new product was released onto the market that will likely have applications for automated recording. OwlLabs released a device called MeetingOwl.

It is a roughly cylindrical device intended to convey an in-room experience to remote participants when meetings are taking place around a table in huddle rooms and small conference rooms.

It produces a 360 degree image of a room in a strip at the top of the screen, and will show the people speaking (by tracking their voices) in single, dual or three shots side-by-side at the bottom of the screen.

The device and firm are both very new, and while there are specifications on their website, we have not been able to thoroughly test the unit for effectiveness. If the unit performs as its demonstrations show, it would be another effective automated camera tracking solution, especially when meetings are taking place around a table, or video is needed at events beyond the 180 degrees covered by the Panacast solution. The specifications state that it functions effectively in a 24' diameter, so thorough testing is required to determine appropriate applications.

A video explaining its camera's capabilities is available to view at https://fast.wistia.com/embed/iframe/al4gixbab2.

The Meeting Owl is selling for $799.00 and is in limit-

ed production until fall 2017.

More information about the Meeting Owl can be found at https://www.owllabs.com.

3.2.9. Expected refresh cycle

As we mentioned, these are the first viable solutions to come to market in this category. We are aware of other prototype solutions in various, different form factors. Some of these devices are meant to sit in the center of a conference table and capture all participants that surround it. In theory, these could also be used to capture the audience participants in a dais scenario like the one above. As these product and others come to market, there's no doubt that these systems will improve. This solution should be investigated for refresh 18 to 24 months after installation.

3.3. Integrated approach

3.3.1. Assessment review

3.3.1.1. Overview

The integrated package is intended for permanent installations only. It is applicable in rooms where there is an existing public address / voice lift system, or in rooms where there are simply existing microphones used to record the participants.

Where our automated systems uses a beamforming array microphone to identify who is speaking and aim the camera at him or her, in a room with a public address system, the sound will always come from the wall or ceiling mounted speakers, making identifying the person speaking from a directional microphone impossible. This system is meant to identify which of the already existing microphones is in use and aims a modern, small PTZ camera toward the direction that has been associated with that microphone during the installation. Once these "presets locations" are programmed into the camera, it points to whichever microphone is active, zooming and panning as needed.

The package is designed to be easy to insert between existing microphones and inputs of an existing PA or recording system of any kind and act as a pass-

through. The active microphone information produced by the Digital Signal Processor (DSP) will aim the camera at a programmable preset. Different modes of operation will be possible (priority, filibuster, etc). The camera tracking system will be intelligent enough to address cross-talk (multiple people speaking over each other) and command the camera to default to a wide shot until a clear source is identified.

The value of the integrated package is that it provides an "operator-less" camera that tracks the speakers in rooms with existing microphones. The professional integrator that installed the room's existing system (or an alternate integration firm) is needed to insert and set up this package to work in conjunction with the existing technology.

3.3.1.2. Appropriate use cases

The integrated solution is meant to be used in any environment where there is an existing PA system or other microphone system. The camera can sit on a table or stand that faces the people speaking, or it can be permanently mounted on a wall or fascia. More complex versions of the integrated package that utilize multiple cameras can be designed by the integrator installing it. Only the concept and simple one-camera system is detailed here.

3.3.2. Solution detail

The firms Peavey and VDO 360 have worked together to create this product solution, called the [Automatic Camera Track System (Peavey ACTS.)](#) This solution inserts easily into an existing PA system at the microphone input point without changing any of its capabilities.

## 3.3.2.1. ACTS Option A — Analog mics

Used for systems where up to 16 analog microphones are operated without a control system. Either mics do not have Push To Talk (PTT) capability, or the PTT is used only for muting each individual mic (locally at the mic.)

To configure the system, wiring between the mics and audio system will be interrupted with the solution depicted here in green. Wiring is dependent on the

microphones used as well as existing cabling standards, distances, etc. Cables depicted in green are included with the solution.

3.3.2.2. ACTS Option B — Digital mics (Dante)

With growing popularity of digital microphones, this option considers the microphones as network devices. This option may be used in systems where up to 32 Dante microphones are operated without a control system. Either mics do not have Push To Talk (PTT) capability, or the PTT is used only for muting each individual mic (locally at the mic.)
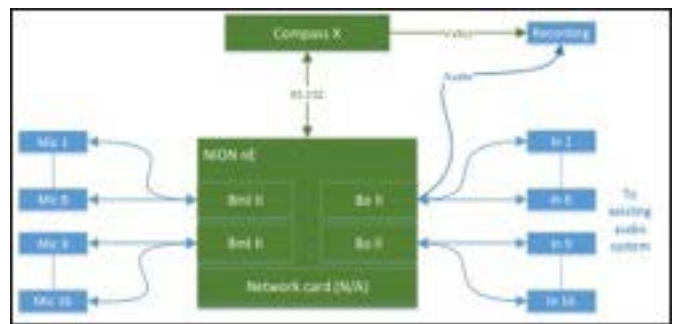
Typically, DANTE enabled microphones are capable of transmitting to multiple sources. As such, the DANTE microphones need to be reconfigured to also transmit audio to the NION for the camera tracking information.

3.3.2.3. ACTS Option C (Custom) — Existing DSP/Control system
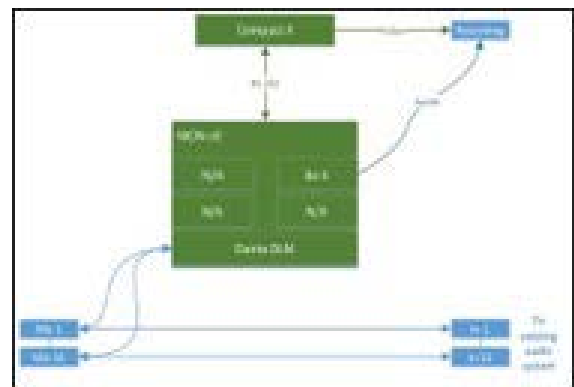
If the existing PA system or room location is extremely complex (using push-to-talk microphones, requiring multiple cameras, or already using a complex, customized control system) then the basic components

recommended as part of the integrated package can be utilized for a customized solution — to be designed by the existing system's integrator.

3.3.3. List of technology required

The specified system requires:

• An existing PA system installed or managed by a competent technician or systems integration firm (or existing microphones intended to record the presenters.)

• Peavey NION NE — A floating point, programmable DSP system capable of detecting and processing audio signals and generating camera controls based on building blocks constructed in the nWare software environment. May house one digital audio card and up to four analog audio cards.

• Peavey nTouch 180HD — Programmable touch panel controller capable of housing logic and control capabilities using the same blocks as the NION and also configured from the nWare software environment. Provides a direct RS-232 connection to the CompassX camera as well as other connections.

• CompassX PTZ camera — High quality USB camera with full pan, tilt and zoom capabilities. Controlled from the NION or nTouch 180HD via RS-232 connection. Output from the camera should plug directly into recording or streaming unit.

3.3.4. Where to find more information / purchase

Details on purchasing the ACTS system can be found at Peavey website here: https://www.opentheroom.com.

A video of a demo of the system (on a trade show floor) can be seen here: https://youtu.be/uFl-R0LEC1o.

3.3.5. Estimated cost

List price of the Peavey ACTS system (without installation) ranges from $7,500 to $9,000 depending upon the options required.

3.3.6. Content transport

This audio and video of this system can connect to a PC or hardware device that can be used to directly send the audio and video to Facebook Live, YouTube and other streaming services. It can also be used to send the signals via a videoconferencing application such as BlueJeans, Zoom, Skype or other similar system. Your integrator can help select the best device and/or software for your specific environment.

The output of this optional PC could alternately be sent to a discrete device (such as those directly below) for transport to another room within the facility.

3.3.7. Other options in this category

3.3.7.1. Option A — CAT 6 transport

A hardware device that can connect the output of the system to another location (control room, CATV input room, etc.) up to 100 meters away over point-to-point wiring.

If you already have a location within your facilities where the video needs to go to- such as a control room or hub-input to a CATV system, you can use this device to transport the signal from the room with the camera to where it needs to go over standard CAT6 twisted pair cabling — Crestron HD-EXT3-C; https://www.crestron.com/products/model/HD-EXT3-C.

3.3.7.2. Option B — Network transport

A hardware device that can connect the output of the system to another location (control room, CATV input room, etc.) up to 100 meters away over a local network. If you already have a location within your facilities where the video needs to go to- such as a control room or hub-input to a CATV system, you can use these devices to transport the signal from the room with the camera to where it needs to go over an existing IP Network — Use CrestronDM-TXRX-100-STR on the encode side and DM-RMC-100-str on the decode side: https://www.crestron.com/products/model/dm-txrx-100-str.

3.3.7.3. Option C — Customized, multi-camera solutions

If your room has an existing PA system and special requirements such as multiple cameras and/or audience cameras, the engine of this solution can still be utilized, however it will require extensive custom programming and some additional camera switching hardware and logic. Many global parliamentary institutions use similar systems, where the activation of a microphone switches to a correctly positioned and focused camera. These situations need to be discussed with your integrator to detail the devices and programming required.

3.3.8. Expected refresh cycle

We believe that once installed, the DSP and camera specified in the ACTS system will function well for 3-5 years. Camera and processing technology always improves, so users should check with the ACTS website every 18 months to ensure that no significant changes in system design have been made that might affect future installs.

3.4. Going live on Facebook Live from automated and integrated Solutions

Unfortunately it is not as simple to broadcast to Facebook Live with these solutions as it is on a smartphone. You will need encoding software or hardware that supports rtmp or rtmps.

Facebook has created The Facebook Journalism Project. Here is a link (https://www.facebook.com/facebookmedia/get-started/live) to Facebook's Guide to Publishers. It provides not only instructions but also tips on getting started, best practices and support. Facebook seems to constantly update its instructions as new tools are introduced.

3.4.1. Boxcast

Boxcast has created a product called the Boxcaster that can acquire video from numerous sources including cameras, switchers and iOS devices. It then sends the video to the cloud and optimizes it so that viewers anywhere can watch the stream live.

With Boxcast, it's easy to stream to simultaneously:

- Facebook Live
- YouTube Live
- Apple TV and Roku
- Your website

Here is a video that describes it: https://www.youtube.com/watch?v=3RSCblnoJVk.

3.5. Support available

If your organization needs assistance in selecting and / or implementing any of these packages, a third party consultant or design/build integrator can be hired to provide such services. Keep in mind, however, that the systems recommended in this report are significantly less expensive than the broadcast equipment and solutions that traditionally were used for these applications. Identifying a third party that will recommend these less expensive options may be difficult. See Section 5 for guidelines regarding identifying an appropriate support resource.

3.6. "As a service" offerings

If your organization doesn't want to develop and install any of the three options, there are firms that will provide the production equipment and coordination in an "as a service" model. There are of course pros and cons to this approach.

Pros:
- There are minimal to no set up costs
- No expertise is required to install and enable the system
- • Established firms have expertise in covering these environments
- Other events (such as sports games) can be covered with the same technology

Cons:
- Services require ongoing fees which vary based upon the service package you select
- These firms will require access to your meetings / content which may be restricted by confidentially issues
- It may be difficult to change service providers (should your organization wish to) once you commit to one that has archived your content

Following are two firms we identified that provide this service. We are providing descriptive information about them without any endorsement.

3.6.1. Granicus

Granicus is a firm that provides communications technology specifically for government organizations. They offer a full-service solution (hardware, software, installation and hosting) for community and government meetings. Granicus claims products connect more than 150 million people.

Granicus can provide not only the capturing and dis-

tribution of event audio and video, but they also provide agenda preparation, social media services, website creation and more – intending to provide a full service solution for government and community groups of all sizes. Their fee structure is based upon a sliding scale, so it is more affordable that other providers for smaller communities and agencies.

[Here is an example](#) from a Plymouth, Minn., City Council meeting.
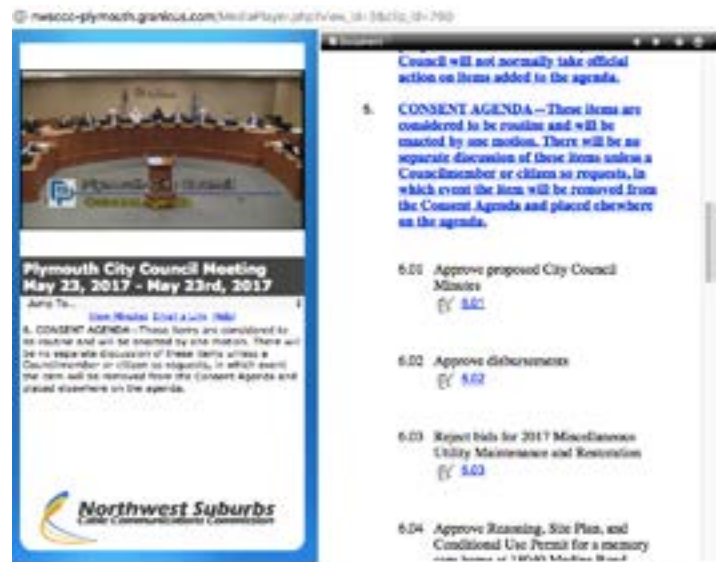
CCX Media, formerly Channel 12, is a service of Northwest Community Television providing award-winning professionally-produced local news, sports and special events coverage for cable subscribers in the northwest suburbs of Minneapolis. They broadcast public meetings integrating the agenda for the meeting. When a viewer clicks on a topic of the agenda, the video jumps to that portion of the agenda. It works on a PC, tablet or smartphone.

Granicus can be reached at https://granicus.com/.

3.6.2. ClerkBase

ClerkBase is a firm that provides recording and indexing services for municipal meetings. They focus on cities and towns from 5,000 to 150,000 in population.

Their OpenGOVideo's turnkey video solution for public agencies provides live and on-demand video

streaming of meetings.

Video is streamed live and timestamped during each meeting. After the meeting, links in the agenda, minutes and supporting documentation allow the user to skip to those parts of the video that are relevant to their interests. Using ClerkBase's search feature, users can locate agenda topics of interest, and view any associated video.

Their features include:

- On-site pre-installation consultation
- Live streaming of meetings
- Perpetual archive
- Meeting and non-meeting videos
- Unlimited bandwidth
- Time stamped video linked to agenda and minutes
- Software updates

Contact ClerkBase at 401-727-1567 or www.clerkbase.com for more information.

3.7. Automated sports solutions

High school sports are woven into the fabric of every community. However, sports production can be expensive and labor intensive.

Companies are emerging that completely automate the production for many sports like football, soccer, basketball, lacrosse, volleyball and wrestling. Each use fixed installed cameras that automatically capture and produce games without the need of a video production team. The solutions also extend to performance arenas and auditoriums.

Each also offers a streamlined production system for other sports that still require a minimal production crew.

Their business models are somewhat different. Early adopting high schools are experimenting with subscription and sponsorship models to cover the costs and/or raise incremental revenue.

We are providing descriptive information about them without any endorsement.

3.7.1. GameOnStream

GameOnStream (G.O.S.) is a Canadian-based automated broadcast management system that offers a full-service solution. Their system can be used for all sports, plays, recitals, speeches, lectures and any other type of performance. Its automation eliminates the need for specialized IT, production support and camera personnel. G.O.S. is the first broadcast system we found that automates football.

G.O.S.'s platform and technology — named the Automated Broadcast Management System ("ABMS") — includes G.O.S.'s patented play tracking technology, unmanned network cameras, multiple camera views, automated content management system and web platform for streaming content live and on-demand to any connected device, such as laptops, mobile phones and tablets.

Here is a clip from their automated software of a football game.
Here is a clip from their automated software of a hockey game.

Contact GOS at info@gameonstream.com, 416-961-2500 or at www.gameonstream.com.

3.7.2. PlayOn!Sports and Pixellot

PlayOn! Sports, operator of the National Federation of State High School Association Network (NFHS Network) is the exclusive distributor to high schools of Pixellot, an international provider of automated sports production solutions.

PlayOn! Sports has been serving high schools since 2008 with traditional video capture technology.

For soccer, basketball, volleyball, lacrosse and wrestling, Pixellot's patented technology solution streamlines production workflow by deploying an unmanned multi-camera system in a fixed rig, with additional

angles as required, to cover the entire field, offering a stitched panoramic image. Advanced algorithms enable automatic coverage of the flow of play and high-light generation.

PlayOn! Sports sells the necessary equipment and can install it for an additional cost. The participating schools and NFHS enter into a revenue share on subscriptions to view the broadcasts.

The Pixellot unit is equipped with four high definition cameras which cover the length of the playing surface, and then focus in on the ball and player movement to deliver the action.

The unit communicates with the scoreboard to insert a time and score graphic on the screen. Ambient audio is picked up by the device, but the play-by-play of an in-person announce team can also be patched in.

Otisville Lakeville High School in Genesee County, Mich., is piloting the Pixellot solution.

"We are going to do everything that takes place in our gym," said Drew Johnson, athletics director at Otisville Lakeville High School. "We're all so excited about being able to record our practices as well."

All that has to be done from a schools perspective is type the event schedule and promote the fact that the games are going to be available on mhsaaTV. Pixelot does the rest. The unit can also be set up to isolate a camera on a fixed location, which allows for activities like wrestling to be streamed.

Here is a link to a Lakeville game using Pixellot's automated solution: http://bit.ly/2rVzACD.

All sporting events — live or delayed — are available on a subscription basis only for their first 72 hours online. They become available for free, on-demand viewing approximately 72 hours following their completion.

3.7.3. Strivecast

StriveCast is a live and on demand streaming video production and broadcasting solution. You can stream live immediately without any third party integrator needed.
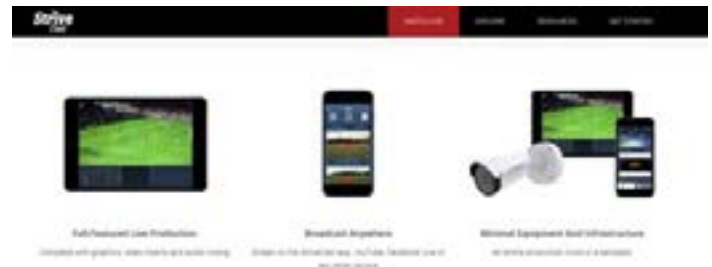
Their offering is interesting for two reasons:

Their goal is to lower the cost of production and simplify production using an iPad app. They offer a lightweight solution — based on fixed (security type) video cameras. Their hardware and software can be installed permanently at a venue or used in a portable mode. Their platform can work in school gyms, outdoor fields, meeting rooms, or auditoriums. The only thing needed is a strong Wi-Fi connection to the internet.

The video can be streamed to any destination: Facebook, school or town website, or their own StriveCast TV, and viewed on any device including smartphones, laptops, and/or tablets.

See their demo video at the link: http://seastar-website.s3.amazonaws.com/video/learnhowitworks.mp4.

StriveCast charges an upfront fee for the hardware — camera and processor — and monthly fees for cloud and production services.

They offer three options for hosting:

- Public: Anyone can view the event on their apps and portal.
- Subscription/Pay: Only those who have paid a subscription or event fee can view.
- Only staff of that organization can access this event — for allowing coaches or staff to view the events, like a practice session.

StriveCast is also introducing software automation for a number of sports that uses artificial intelligence to follow the action — without the need for an operator or camera crew. The official scorer, public address announcer or scoreboard operator can start and stop the stream. StriveCast's technology does the rest. A play-by-play announcer and graphics can be easily added. Soccer and basketball are available now as automated offerings. Football will be piloted in fall 2017.

A clip of their automated basketball application can be wtached at the following link: http://bit.ly/2sHt8iC There was no camera operator involved in this production.

The Hart School District in Santa Clarita, Calif., is installing cameras in gyms, on fields, and possibly in performing arts centers in the fall of 2017. The program will be funded through a sponsorship model. StriveCast is hosting the video on its internet cloud.
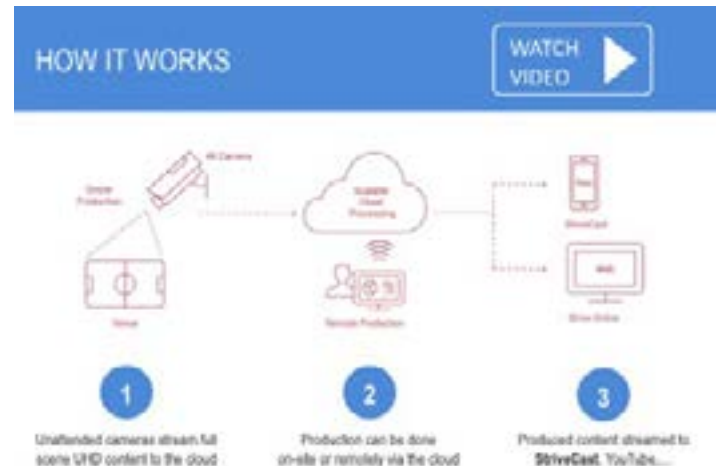
StriveCast can be reached at StriveCast.tv or at 877-952-0924. Rajiv Sohal is the founder and CEO.

4. Social Media
Building an Audience for your Programming

Viewers are not going to find your content. You are going to have to find them where they live: on email and social media.

Media now comes to consumers in the form of email newsletters, Facebook, Twitter, Instagram and Snapchat.

For purposes of our social media handbook, we are going to focus on newsletters, Facebook and Twitter.

4.1. Setting goals — Questions to ask yourself

What are your priorities for your video coverage of live and archived meeting? Do you want to increase attendance at live meetings? Do you want to increase viewership?

Who is the audience that you are trying to reach?

Do you have any data about how many people are currently watching any town meetings that are broadcast either live or on demand? Which meetings draw the largest audiences?

What communications channels have you used to reach your audience in the past?

- Website?
- Email?
- Social Media?
    - Facebook, Twitter, Instagram, Snapchat, Blog
- Newspaper releases?

Do you have any data on the success of any of your efforts using these channels?

Here are the basic steps to create a simple communications strategy to prioritize what you cover and then build an audience for that content.

4.2. Example from The Columbia Missourian — Identify your audience

In spring 2017, Kylie Boyce and Stephen Daw, members of the Columbia Missourian Social Outreach team under the direction of director of community outreach Matt Dulin, experimented with several tactics to build an audience for public meetings with both in-person and online viewership.

The Missourian has not been broadcasting any city or county meetings. Most key City of Columbia meetings are webcast by the city. However no Boone County, Mo., commission meetings were being webcast. Citizens have to attend in person, or depend upon irregularly reporting local media or the minutes taken by the commission.

Here are the steps Kylie and Stephen used to determine community interest in their own words.

4.2.1. Step1: Figure out what citizens want

Before you can provide people with a guide to meetings that they want to know about, you actually have to know what they want to know about.

It's your job to find that out. Set up a survey (using Google Docs or SurveyMonkey) and ask citizens to select what they want to hear more about from a list of issues or public meetings. Give them some space to write about specifically what they want to see. Ask them how they want to get that information.

Publish the document on your Facebook page or website, or send it to an email list if you have one. Pick a date that you want to close the survey.
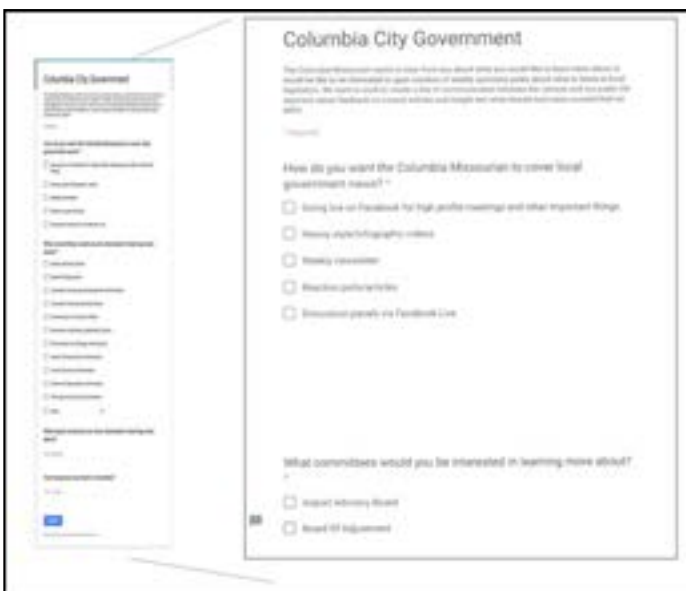
After you have your timeline, heavily promote the survey. Let the people in your target group know that you want their input — every day if necessary.

When the survey is completed look at the data to see what topics people actually want to hear more about.

4.2.2. Step 2: Make a list of these organizations /contacts

So now you know what citizens want, it's time to get your process organized.

Based upon the responses you've received for your survey, start pulling together the information you're going to need later on. Figure out what organizations represent the things your audience wants to know about. Then, put together a list with these organizations, and make sure to include all of the following information:

- Website URL
- Names of those in charge of the organization / the public relations workers of that organization.
- Email addresses and phone numbers for those in charge of the organization / the public relations department of that organization.

If you want to go above and beyond, take all that information, organize it in a Google Doc or a Google Sheet, and put it in a folder on your internal website. That way, other current and future volunteers with have access to the responses.

4.2.3. Step 3: Calendars, calendars, calendars and decisions

You're going to have to be constantly checking and keeping yourself updated on city calendars. The city, town or county commissions and committees are a great jumping-off point. However, meetings frequently get postponed and rescheduled.

Something that you need to keep in mind — agendas for meetings are typically released on the Fridays leading up to that week. So, this is where your list from Step 2 is going to come in handy. Start reaching out to all those people who you listed and ask them if they can tell you what items on the agenda might have the most public interest.

Unfortunately, some organizations might want to hide what is important. That is where your knowledge of the community is important. Once you have your agendas for the meetings for the upcoming week, pick what meetings are going to be the most important.

4.2.4. Step 4: Let's get to writing

So now it's time to get to writing. Here's how to structure an Open the Room story.

First, write an intro. It doesn't need to be very long. You just have to capture why it's important to the citizen. Here's an example of an effective "Open the Room" intro:

> "This week in "Open the Room" we are calling attention to several public meetings regarding education, pedestrian safety and Columbia's central neighborhood." — Open the Room article from March 13, 2017

Next, you want to list each meeting that you're highlighting. With each meeting, include all of the following things in this order:

- The name of the meeting — make sure to put these in big bold letters so that readers can differentiate between all of the different meetings on your list.
- "When" — give readers the start time of the event and the date (otherwise how could they show up?)
- "Where" — tell the readers where the meeting is going to be at (otherwise how could they show up again?)
- A short blurb about what they'll be talking about. Just make sure that the citizen knows why it's important to him or her.
- Promote if you will be webcasting the meeting and where citizens can find the links to watch either live or on demand.

Then promote your live coverage (in this sample, the Parks and Recreation Commission meeting) on your Facebook newsfeed. It's very important to indicate why the meeting is important to the citizen. Lighting at a park was going to be the key issue discussed in this sample.

Add your Twitter feed to your list of promotional tools.

Follow-up with the meeting going Live on Facebook Live.

The key is to reach out to your audience through all of your social media channels frequently.

You cannot expect viewers to remember to come to watch a traditional webcast at an appointed hour unless you provide constant reminders.

4.2.5. Step 5: Adding email to your arsenal

Email is still the best tactic to use to build awareness of events. As ReDef executive Jason Hirschhorn told the New York Times, email is "the cockroach of the internet." However, you still need a plan.

Where do you start in creating an online newsletter? Crosscut Public Media, in partnership with the Donald W. Reynolds Journalism Institute, created Opt-In, the newsletter optimizer.

This free tool was built for newsrooms and freelancers "to begin to address the challenges of newsletter curation." The Opt-In team used newsletter best practices and strategies to create a newsletter wizard which takes you through the decisions needed to curate a newsletter.

You are asked about your primary intention for creating the newsletter and helps you to create a playbook for your newsletter program. Just create an account. The planning process should take an hour.


Once you have narrowed down your goals and objectives, it is time to create a newsletter provider.

There are dozens of email services. We evaluated a number of email services and chose Emma and MailChimp to highlight.

Emma has been the solution for the Reynolds Journalism Institute for the past three years. Emma allows RJI readers to customize the newsletters they would like to see.

Emma allows you to build a simple template to offer highly targeted newsletters to reach the right people with meetings or topics they have indicated they want to know about. You can see in real time from Emma's analytics section what is working.

RJI allows readers to select what newsletters they want to receive. A local media outlet or Government Access TV station might ask what webcasts of committee meetings or topics citizens would like to be notified.
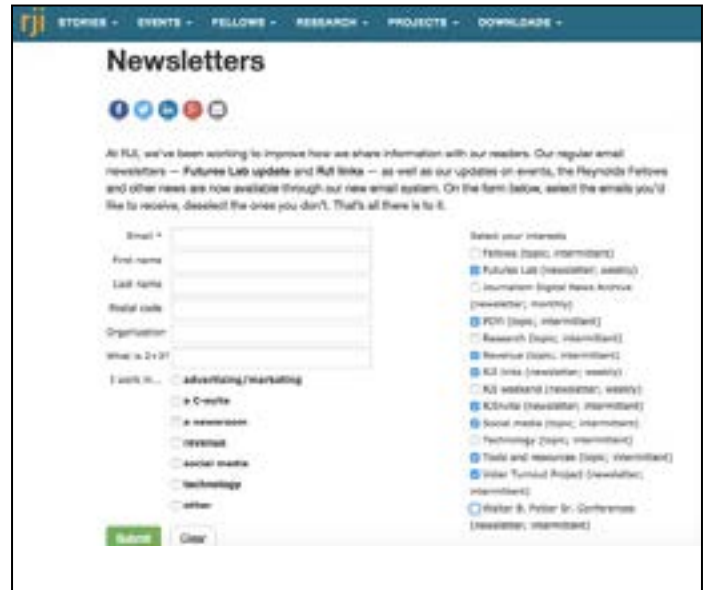
In our prior example, if the Missourian readers chose Parks and Recreation, they would be notified with a customized email of the Parks and Recreation meeting and what issues are scheduled to be covered.

Building your audience

The more names you have, the better chance to build your audience.

There are some tactics you can use to build your list. Organizations usually have some existing lists of contacts that can be uploaded and used immediately.

On your webpage, you list your Facebook and Twitter links. Add an email icon as well to sign-up for a customized newsletter with times of live meetings or links to those recently archived.

Consider adding an overlay to your site. Non-subscribers will be prompted to sign up.

Do you rotate images or stories in the middle of your home page? Use one of the slides to sign up for your weekly programming schedule.

Also add the option to subscribing to your TV Program newsletter on popular internal pages on your website.

4.2.6. Facebook

In June 2017, Founder Mark Zuckerberg expanded Facebook's mission to "Give people the power to build community and bring the world closer together." In his 50 state tour of the United States, he realized users were connecting with old friends but not with people in their neighborhoods, schools and churches.

Facebook is introducing new tools to offer any individual or organization expanded ways to build highly targeted community groups.

You can easily build both using Facebook pages and Facebook groups.

4.3. Step 6: Analyze what you are doing and determine what works

Email services and Facebook have excellent analytics. Set some metric goals? How many subscribers do you want to have? How many do you want in 3 months? How many people watch your public meetings? How many would you like in 3 months?

Without specific measurable goals, you won't know what is working and what isn't.

4.4. Example from Darien, Conn.: TV79

TV79 out of Darien, Conn., takes a much simpler

weekly newsletter approach. Every Friday, Program Manager Jim Cameron puts together a weekly programming guide of events that will not only be broadcast live on TV79's linear channel but also be archived on the TV79's Vimeo channel.

The Program Guide is also posted on the town website and distributed to local media outlets.

TV•79 Darien

Effective Friday May 19, 2017

DARIEN GOVERNMENT ACCESS TELEVISION - TV79

Airing on TV79 Cablevision this week…   **Web Links**

>> Community Matters: Teens & Drugs 5-15 Runs 58 min   **INFO VIMEO**
Airs: 3:13, 8:50 AM & PM

>> Planning & Zoning Comm. 5-2   Runs 1:58   **AGENDA   VIMEO**
Airs: 11:31 AM & PM

>> Commission on Aging   5-17   Runs 17 min   **AGENDA   VIMEO**
Airs: 2:56, 8:33 AM & PM

>> DPW Garage Bldg Comm. 5-16 Runs 1:06   **AGENDA   VIMEO**
Airs: 6:00, 10:25 AM & PM

>> Noroton Hts Redevelopment 5-11   Runs 1:27   **INFO   VIMEO**
Airs: 1:29, 7:06 AM & PM

>> Darien Mens Assoc – Veterans 5-17   Runs 37 min   **VIMEO**
Airs: 4:11, 9:48 AM & PM

Available only on Vimeo:

>> Planning & Zoning Commission 5-16 Runs 2:33   **AGENDA   VIMEO**

To watch any TV79 program "On Demand" on our Vimeo channel, CLICK HERE
To watch our live programming "stream" as seen on air, CLICK HERE
For updates, follow us on Twitter: @DarienTV79

Planned coverage for week ahead:

Day	Time	Program		Link
Tuesday	12:00 N	Annual Volunteers Luncheon	TAPED	INFO
	7:30 pm	TV79 Advisory Comm	TAPED	AGENDA
	8:00 pm	Board of Education	TAPED	AGENDA
Wednesday	6:30 pm	Mtg re: Noroton Hts Redevelopment	TAPED	INFO
Thursday	12:00 N	Darien LWV Luncheon	TAPED	INFO
	6:30 pm	Bd of Finance & Bd of Selectmen	TAPED	AGENDA

To receive TV79's weekly program schedule, e-mail us at channel79@darienct.gov or follow us on Twitter: @DarienTV79   Copies of TV79 coverage are available for $25 per DVD.

If you receive multiple copies of this Program Guide or wish to unsubscribe, just e-mail us at channel79@darienct.gov or call 656-7300 ext 7484 and give us your e-mail address.

5. Where To Go For Help

If everything in this report has seemed like it was in a foreign language or has seemed overly daunting for you or your organization, you may want to consider retaining an outside professional or organization that can help. This section can help provide some guidelines for that process.

5.1. Engage a consultant

A consultant is a skilled individual that can help you and / or your organization make the critical determina-tions detailed above. He or she has the ability to recog-nize the needs more rapidly than someone unfamiliar with the technologies and typical issues, and can help choose the best path much more rapidly. Any good consultant will charge for their efforts. These costs need to be weighed against the potential of making a poor choice and hitting avoidable mistakes / road-blocks. If you do not have a consultant that would act as your trusted advisor, feel free to contact the authors of this report for assistance in identifying one.

5.1.1. Professionally assess your unique situation and obtain customized guidelines / instructions

The most basic level of support a consultant can

provide would likely involve discussing your situation with you, visiting the site in question, and preparing a written report / guide. Consultants can provide further support in the form of designs, coordination with vendors, managing an RFP process, supervising third party installations, and coordinating activities for initial broadcasts / recordings.

5.1.2. How to contact the authors of this report

There are many good (and bad) consultants and consulting firms in the field today. If specific advice or recommendations from this report's authors are desired, we are happy to help:

David Danto — David@opentheroom.org
Mike Wheeler — Mike@opentheroom.org

5.2. Utilize one of the identified full service providers

If performing the needed assessments and tasks — even with the help of a consultant — seems daunting for your organization then you might want to consider having a full service organization do all of the work for you. See the providers we mentioned in section 3.6 and 3.7.

6. End Note

6.1. Comments / Acknowledgements from the authors

6.1.1. Comments from Mike Wheeler

Forty-seven years ago, every Wednesday morning, two classmates and I would be at the KFRU newsroom at 5 a.m. to assist Professor Roger Gafke prepare his newscasts. What a privilege to still be able to work with him on projects all these years later and benefit from his mentoring and enthusiasm with the same goal in mind: inform the public.

The idea for OpenTheRoom.org came out of conversations with Roger about how to inform citizens with all of the cutbacks in local journalism.

Randy Picht, Ginger Robinson and Becky Acton were always there to provide support and quick approvals. I would also like to thank Matt Dulin, the director of community outreach at The Columbia Missourian and two of his students, Kylie Boyce and Stephen Daw, for their input on our social media strategy for citizen journalists, community activists, and cities and towns. Caitlin Lukin did a fabulous job designing and copy editing.

In 1995, Kirk Vartan and I worked together to launch CNBC Desktop Video. It was the first of its kind. Then our mission was to give individual investors access to the same meetings with company CEO's that professional investors had. Today, we both want to give every citizen access in person or on multiple platforms to public meetings of their elected or appointed officials.

Lamar Henderson has been enormously helpful in assisting us to evaluate the vendors and incorporate email newsletters into our social media strategy.

Thanks also to Jennifer Nelson and Nate Brown for launch support.

It was inspiring to get to know the other Fellows and follow the development of their projects.

Darien, Conn., TV79, where I serve as chair of the advisory committee, celebrates its tenth anniversary. I have learned so much from Program Director Jim Cameron, General Manager David Dever and crew members Cecil Wade and John Amarilios. I was able to test our portable and automated solutions at various Darien town meetings.

In the late 1980's, David Danto and I had a chance to work together at the Financial News Network. Even back then, he saw how technology could improve com-munication and collaborating. Thirty years later, he is still a thought leader in the collaborative work space.

6.1.2. Comments From David Danto

It would be impossible for me to do my job as a technology consultant and advisor, much less co-author this report, if not for the many manufacturers and service providers in the AV, Collaboration and UC industries that keep me informed about the wonderful projects they are working on. I would not have known about the emerging technologies that are only beginning to move collaboration and production towards an automated future. My appreciation goes to them all, with special thanks to Altia Systems, VDO360, and

Peavey for stepping up to help develop solutions to advance the marketplace.

It would similarly be impossible to be informed about the space if I didn't attend industry conferences such as CES, InfoComm and NAB. These experiences are irreplaceable opportunities to speak with vendors and network with peers. Many of the technologies and firms mentioned in this report came directly from meetings at those events. My thanks go to the often unsung teams that put these conferences on every year.

I frequently write articles about technology and its use. When I do, I always write them from the perspective of the user, not the reseller. I write what I myself would want to know before investing time, energy and money in a product or solution. More than once this has resulted in flack coming my way, in the form of a manufacturer or service provider complaining about an honest statement I made about them. Those are very uncomfortable situations to say the least. However, every time someone walks up to me at a conference or drops me a note and says "I follow what you write and appreciate that you're always honest" I know that staying truthful is the right thing for my clients and readers… and as I've learned over the years, it's never wrong to do the right thing.

My colleague Mike Wheeler and I were hired at FNN within a few days of each other almost exactly 30 years ago. It was a great opportunity to learn – so early in my professional career – about the value of personal networking, and of steadiness in the face of a storm – especially from such a master of both. Over the years since then I've learned more from him than I could possibly detail here.

6.2. About the authors

Mike Wheeler

Mike Wheeler is (BJ '71, MA '11, Missouri School of Journalism) is Managing Partner of Westerly Partners, LLC, an investor advisory that provides strategic, financial, and technology solutions to early stage companies focused on new media and technology.

Mike brings more than 40 years of senior management experience at NBC, CNBC, MTV, Showtime, The Financial News Network, Meredith Broadcasting, and CBS. Apropos of this fellowship application, he is a Chairman of the advisory committee of TV79, the Government Access TV channel in Darien, Conn. TV79 covers more than 600 hours of local public meetings annually. He also serves on the boards of Library Ideas, a company that sells digital products to libraries , ASC Services, verbatim transcripts of Political, Broadcast, Financial and General Business Content, Winview, a pioneer of synchronized two-screen TV and Cycorp. a leading provider of semantic technologies and common sense reasoning to a wide variety of software applications.

Mike is also an advisor to the Reynolds Journalism Institute since its founding and is currently the curator of MobileVideoDIY. His complete biography can be found on LinkedIn.

David J. Danto

David J. Danto has had nearly four decades of delivering successful business outcomes in media and collaboration technology. He developed and executed global technology strategies in leadership roles with JPMorgan Chase and Lehman Brothers, and led media technology facility design and execution for organizations including Bloomberg LP, The Charlie Rose Show, NYU, AT&T, and Financial News Network. His efforts have been recognized by many premiere industry organizations, serving as The Director of Emerging Technologies for the non-profit Interactive Multimedia & Collaborative Communications Alliance; as an Emerging Technology Fellow for InfoComm International; as a National Association of Broadcasters "Pick-Hits" judge for Broadcast Engineering; and as a CES Innovation Awards judge.

David is an award-winning blogger and contributor to technology publications, a frequent presenter at industry events, an industry analyst, and is a member of many industry advisory boards. He also works directly with organizations as a Consultant and Advisor specializing in the Collaboration Technology space.

His full bio is viewable at Danto.info.