

# **HPL Final Report**

**Integrating Online Meeting Participants with In-Person  
Meetings**

**Jeff Isenman**

**November 15, 2020**



# Table of Contents

- PROGRAM PLAN..... 5
  - Project Description..... 5
  - Mission Statement..... 5
  - The Vision..... 5
  - Action Plan ..... 5
    - 1. Team Assignments are as follows: ..... 5
    - 2. Select Team Leads:..... 6
    - 3. Top Level Requirements: ..... 6
    - 4. Situational Analysis: ..... 6
    - 5. Team Reports: ..... 6
    - 6. Collaboration Meeting: ..... 6
    - 7. System Design: ..... 7
    - 8. Preliminary Design Review Meeting: ..... 7
    - 9. Final Design Review Meeting: ..... 7
    - 10. Project Report: ..... 7
- SYSTEM DESIGN ..... 8
  - Overview ..... 8
  - Equipment Layout and Laptop 1/Camera 1 Placement..... 8
  - Camera 2 Placement ..... 9
  - Microphone Placement..... 10
  - Display 1 Placement..... 12
  - Laptop 2/Display 2 Placement ..... 13
  - Club Specific Concerns ..... 14
    - Agua Fria ..... 14
    - Estrella..... 14
    - Equipment Donation Vs. Equipment Loans ..... 14
  - Hardware Components ..... 14
    - Laptop 1/Camera 1 ..... 14
    - 2X Zoom Lens ..... 15
    - Camera 2 ..... 15

Microphone.....	16
Display 1.....	16
Screen Mirror Dongle.....	17
Laptop 2/Display 2 .....	17
Materials List.....	18
ZoomMaster Duties .....	18
Written Speech Evaluations for Online Speeches.....	19

## Table of Figures

Figure 1 - Laptop 1/Camera 1 Location.....	8
Figure 2 - Camera 2 Placement .....	9
Figure 3 - Microphone Placement.....	10
Figure 4 - Alternate Room Arrangement .....	11
Figure 5 - Display 1 Placement.....	12
Figure 6 - Laptop 2/Display 2 Placement .....	13
Figure 7 - SHUTTERMOON Lens Kit.....	15
Figure 8 - Spedal 120 Degree Webcam.....	15
Figure 9 - TONOR USB Conference Microphone.....	16
Figure 10 - HDMI Screen Mirror Dongle .....	17
Figure 11 - Example Available Low Cost Chromebook.....	17

# PROGRAM PLAN

## Project Description

The goal of this project was to determine how to most effectively incorporate online meeting participants with in-person meetings. Most of the work centered on integrating online meeting participants with the in-person environment. Online participants must be able to clearly see and hear all elements of the meeting. In-person participants must also be able to easily see and hear the online participants.

## Mission Statement

Develop an integrated low cost hardware/software solution for incorporating online meeting participants into in person meetings.

## The Vision

I see Toastmasters club meetings where all members, both in person and online, are easily able to fully participate in the meetings.

## Action Plan

Task	Task Name	Assignee	Due Date	Status
1	Team Assignments	Project Lead	9/23/2020	Complete
2	Select Team Leads	Project Lead	9/25/2020	Complete
3	Top Level Requirements Definition	System Architect	9/23/2020	Complete
4	Situational Analysis	Club Teams	10/9/2020	Complete
5	Team Reports	Team Leader	10/14/2020	Complete
6	Collaboration Meeting	Project Lead	10/21/2020	Complete
7	System Design	System Architect	11/4/2020	Complete
8	Preliminary Design Review Meeting	System Architect	11/4/2020	Complete
9	Final Design Review Meeting	System Architect	11/11/2020	Complete
10	Project Report	Project Lead	11/18/2020	Complete

Table 1 - Action Plan Tasks

### 1. Team Assignments are as follows:

Project Lead/System Architect:  
Jeff Isenman

Estrella Team:  
-----, Team Lead  
-----,  
-----

Agua Fria Team:

-----, Team Lead  
-----,  
-----,  
-----,  
-----

## 2. Select Team Leads:

Project Lead will ask for volunteers and will make suggestions.

## 3. Top Level Requirements:

1. All meeting participants shall be able to fully partake and experience all meeting elements.
2. In-person meeting participants shall be able to see and hear all virtual meeting participants.
3. Virtual meeting participants shall be able to see and hear all in-person meeting participants.
4. In-person meeting participants shall be able to see and hear any visual or auditory meeting content contributed by virtual members.
5. Virtual meeting participants shall be able to see and hear any visual or auditory meeting content contributed by in-person members.
6. As a goal the final system design shall be as simple and as low cost as possible.
7. The Sergeant at Arms or other responsible person shall be able to set up all required equipment, log onto accounts and connect to the meeting server in a maximum of ten minutes with a goal of a maximum of five minutes.

## 4. Situational Analysis:

The Estrella and Agua Fria teams will independently consider how to meet the requirements (implementation methodology) taking into account any special conditions related to their meeting space and currently owned club property. The team leader will compile and deliver to the project leader a list of suggestions, ideas, and concerns. The system architect will be available to answer questions but will not lead the team.

## 5. Team Reports:

Each team lead shall deliver to the project lead a report detailing the suggestions, ideas and concerns developed during the completion of the Situational Analysis task.

## 6. Collaboration Meeting:

The System Architect shall hold a collaboration meeting to bring together both the Estrella and Agua Fria teams to share and discuss implementation strategies.

## **7. System Design:**

The System Architect will work with the teams to design a low-cost integrated hardware/software solution that satisfies the high-level requirements.

## **8. Preliminary Design Review Meeting:**

The System Architect will conduct a Preliminary Design Review (PDR) meeting with all team members to review the system design and solicit feedback.

## **9. Final Design Review Meeting:**

The System Architect will conduct a Final Design Review (FDR) meeting to review the final design with all team members.

## **10. Project Report:**

The Project Lead will prepare and distribute a written project report to all team members.

## SYSTEM DESIGN

### Overview

The System Architect working in collaboration with both the Estrella and Agua Fria teams produced a design intended to meet all of the top level requirements. The design includes a single microphone, two laptops, two cameras, and two displays.

### Equipment Layout and Laptop 1/Camera 1 Placement

For the purposes of determining the optimal equipment layout the System Architect used a room size of 20 feet by 25 feet. Tables have been assumed to be 2 feet by 6 feet. Figure 1 shows the first room configuration considered and shows the position of Laptop 1 (L1)/Camera 1 (C1).

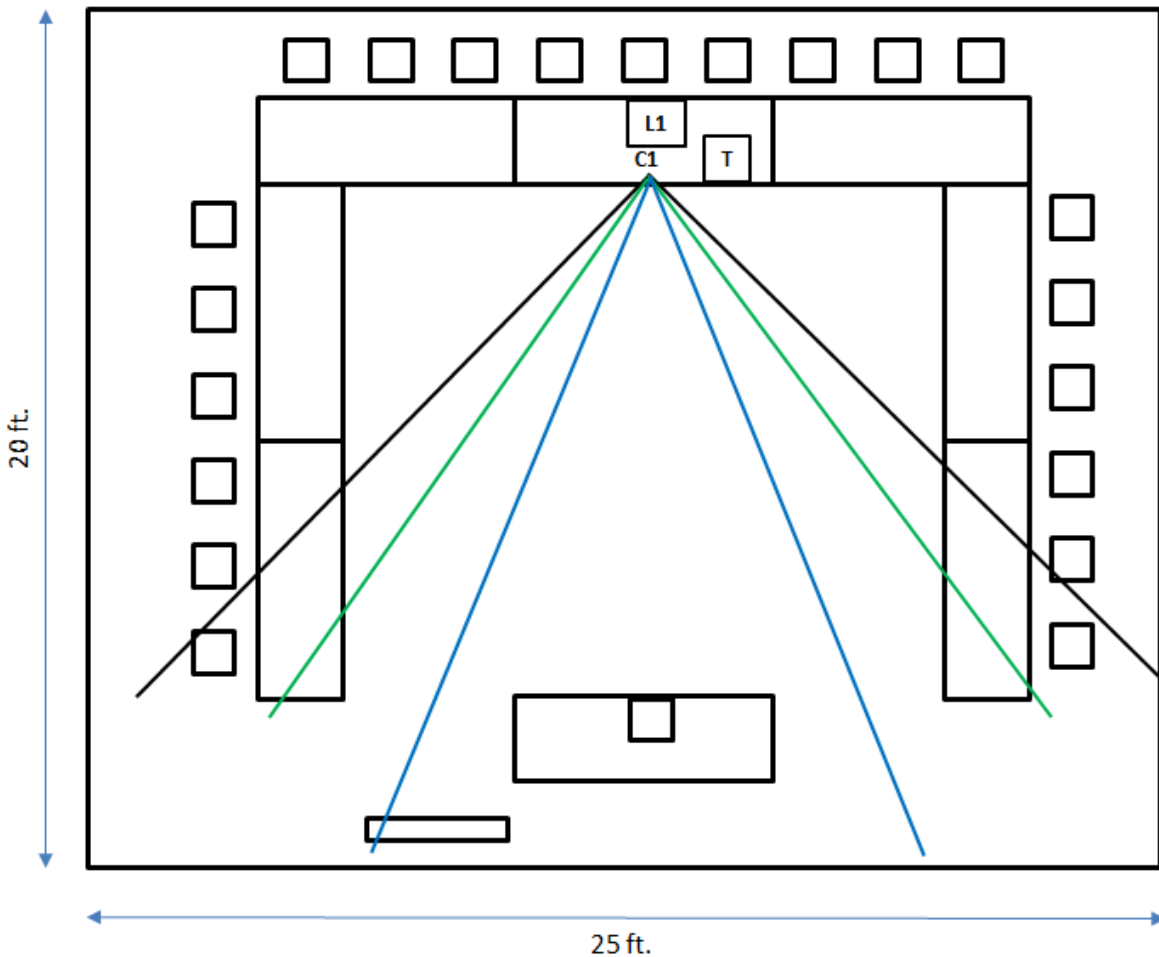


Figure 1 - Laptop 1/Camera 1 Location

Laptop 1 will be placed on a rear table centered in the room and will be the primary computer resource in the room. It will serve as the Zoom host machine. The laptop's internal camera will serve as Camera 1. The primary purpose of Camera 1 is to display the person at the lectern at the front of the room.



Three different camera fields of view were considered – 90 degrees, 70 degrees, and 45 degrees. The 90 and 70 degree fields (represented by the black and green wedges) of view are typical of most laptops. Due to the wide coverage of even the 70 degree field of view a 45 degree field of view was considered. The smaller field of view will make the person at the lectern appear larger in a Zoom window and will allow online participants to better see this person.

In order to control costs it has been assumed that laptop 1 will be donated to the club. In order to reduce the field of view to 45 degrees it will be necessary to add a 2 times zoom clip-on lens to the laptop camera. The clip-on lens description can be found in the equipment description section.

### Camera 2 Placement

Figure 2 shows the placement of Camera 2 (C2).

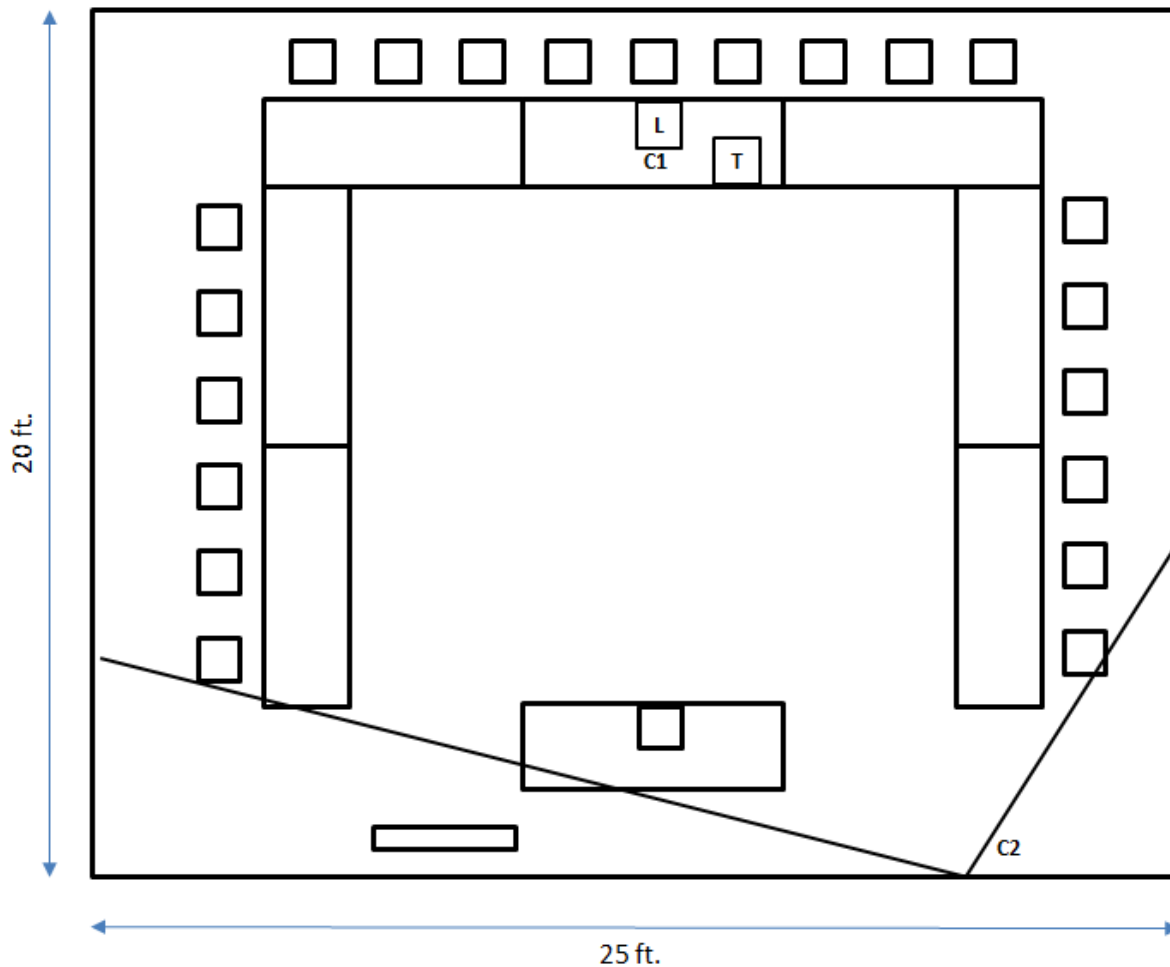


Figure 2 - Camera 2 Placement

Camera 2 will be placed in the front of the room to the side of the front table and will have a 120 degree field of view. This camera will be wireless and will be connected to Laptop 2. Its purpose is to display all in-person audience participants to the online meeting participants.

### Microphone Placement

The design calls for the use of just one microphone (M) placed in the middle of the room. Its placement is shown in Figure 3.

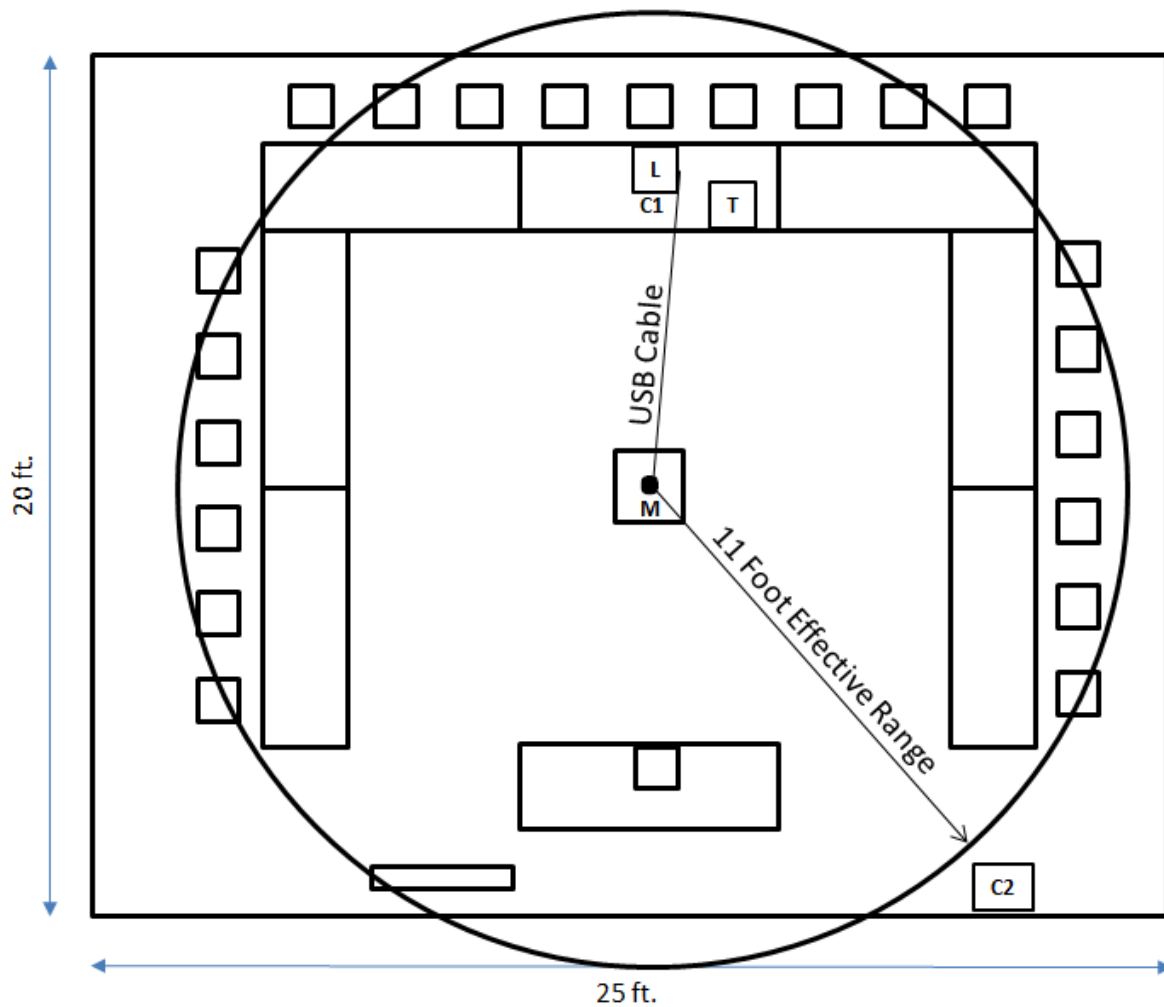


Figure 3 - Microphone Placement

The omnidirectional microphone will be placed on a table in the center of the room. The chosen microphone will be attached to Laptop 1 using a USB cable. The effective range of the microphone is advertised to be 11.5 feet. Figure 3 shows the predicted effective range of the microphone as a circle with an 11 foot radius. If the microphone does not perform as advertised, an audio amplifier will need to be added.

An alternate room arrangement (Figure 4) was considered that allows better microphone coverage.

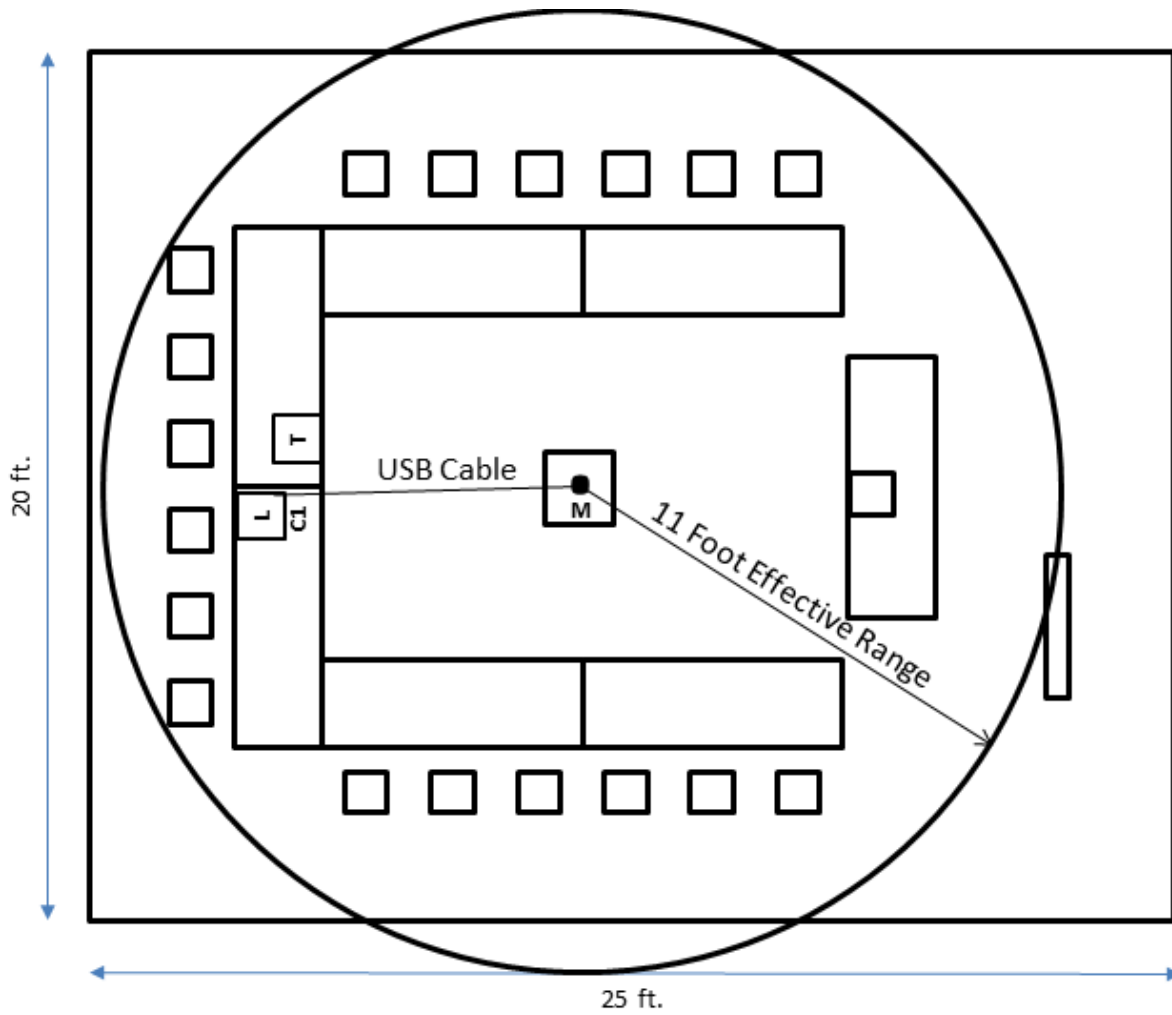


Figure 4 - Alternate Room Arrangement

Using this more compact room arrangement allows all meeting participants to be fully within the effective radius of the microphone.

## Display 1 Placement

Figure 5 shows the placement of Display 1.

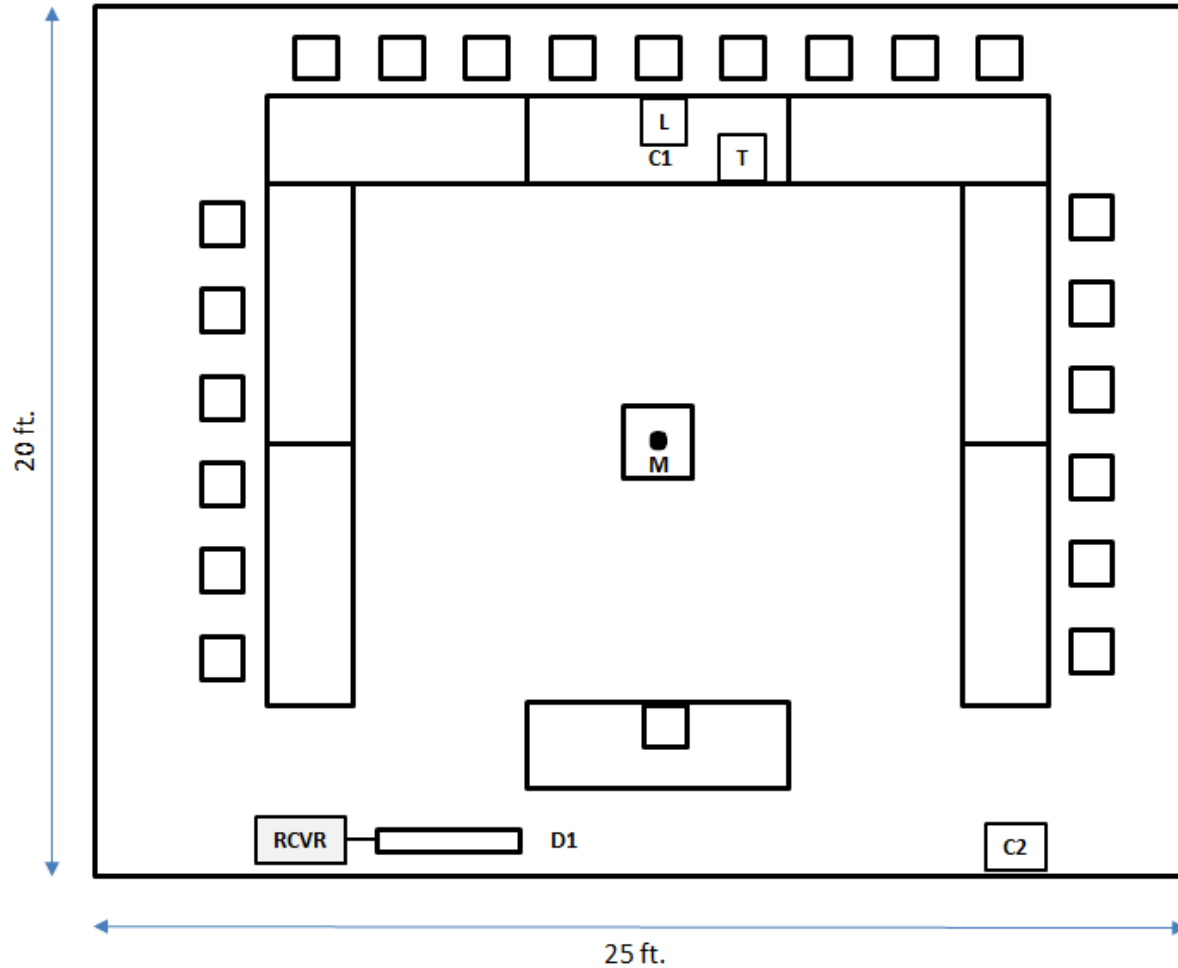


Figure 5 - Display 1 Placement

Display 1 (D1) will be located in the front of the room to the side of the front table on the opposite side from Camera 2. The purpose of Display 1 is to show all of the online meeting participants to all in-person participants except the person speaking at the lectern.

Display 1 will be connected to Laptop 1 using a wireless screen mirroring receiver dongle attached to Display 1. This connection method requires that Laptop 1 be fully MiraCast/WiDi certified.

Three methods of connection Display 1 to Laptop 1 were considered.

1. HDMI Cable,
2. Full Wireless HDMI,
3. Wireless Screen Mirroring.

The use of an HDMI cable is the simplest and least expensive (approximately \$20.00) solution but requires that persons walking to the lectern step over the cable. This represents a trip hazard and the decision was made to reject this option. Full wireless HDMI requires attaching Display 1 to a receiver and attaching a transmitter to Laptop 1. This is the most expensive (approximately \$160.00) solution and was rejected in favor of the third option. Wireless screen mirroring is only slightly more expensive (\$30.00) than an HDMI cable and is significantly less expensive than full wireless HDMI.

## Laptop 2/Display 2 Placement

Figure 6 shows the placement of Laptop 2 (L2)/Display 2(D2)

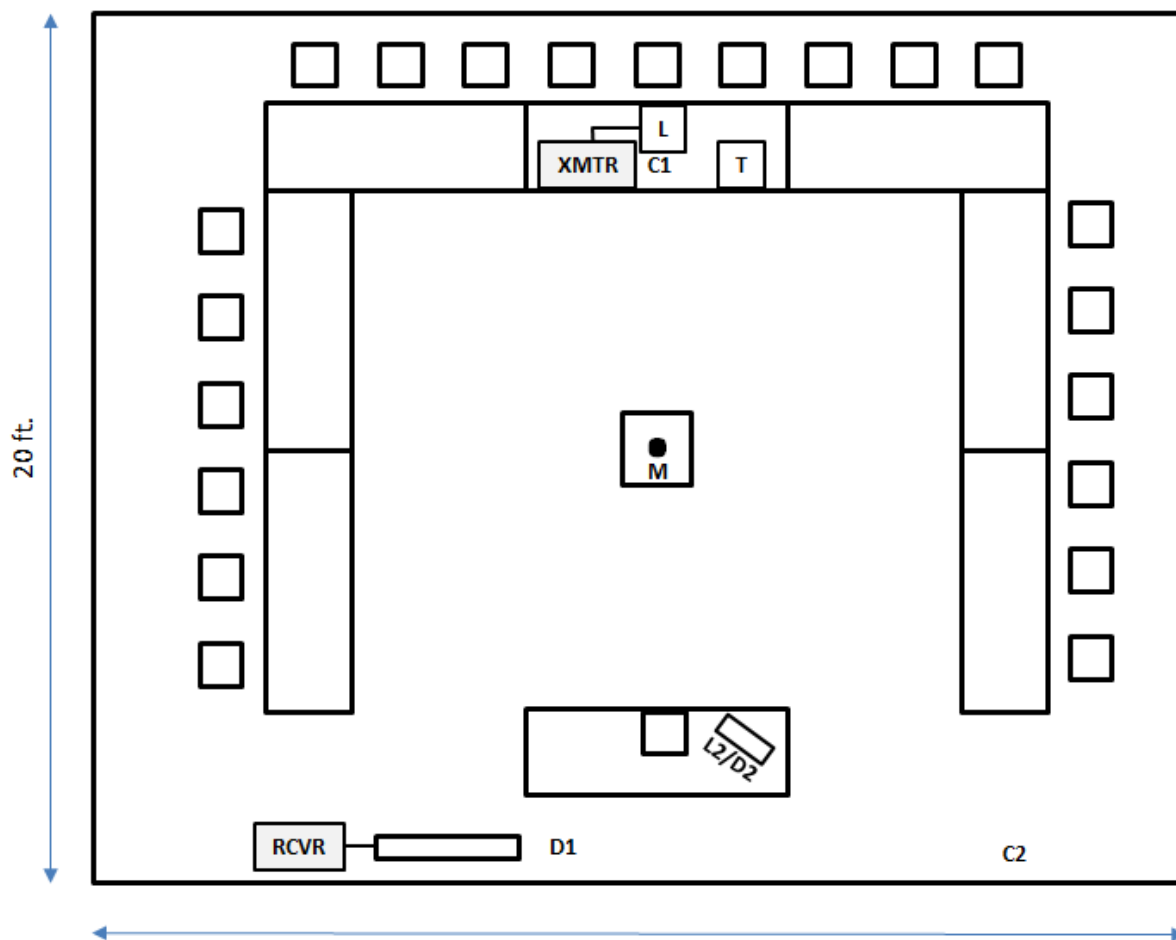


Figure 6 - Laptop 2/Display 2 Placement

Laptop 2/Display 2 will be running Zoom as a meeting participant and will serve two purposes. First, it will allow the person standing at the lectern to easily see and interact with online meeting participants. Second, Camera 2 will be attached to Laptop 2. The person at the lectern will not perform any functions using Laptop 2.

## **Club Specific Concerns**

The room layout and selected equipment described in this document represent a generic solution that may be implemented by any club. Each club owns or has available to it different equipment. It is anticipated that each club will solicit the donation of at least one and preferably two laptop computers.

### **Agua Fria**

It is anticipated that the Agua Fria club will use the large screen television in the library conference room for Display 1. All other equipment will either be purchased by or donated to the club.

### **Estrella**

It is anticipated that the Estrella club will use its club owned projector as Display 1. In addition, if the Estrella club does not find laptop sound adequate to hear the online meeting participants, it may be necessary to add a Bluetooth speaker to either Laptop 1 or Laptop 2. Other than the club owned projector it is anticipated that all other required equipment will either be purchased by or donated to the club.

## **Equipment Donation Vs. Equipment Loans**

While members may be willing to allow clubs to use their personal equipment it would be most desirable for the clubs to arrange for equipment to be permanently donated to the club. Such equipment will be owned by the club and will remain in the possession of the club SAA or ZoomMaster. This approach eliminates the possibility of equipment not being available if the member owning and loaning the equipment does not attend meetings. Also, this avoids the need for the club to find replacement equipment if the member owning and loaning the equipment terminates their membership and association with the club.

## **Hardware Components**

### **Laptop 1/Camera 1**

It is anticipated that Laptop 1/Camera 1 will be donated to the club. It must have adequate capabilities to perform all functions. Specifically it must be Miracast/WiDi certified.

## 2X Zoom Lens

The least expensive way to procure a clip-on 2X zoom lens is to purchase a lens kit such as the SHUTTERMOON Lens Kit shown in Figure 7.



Figure 7 - SHUTTERMOON Lens Kit

## Camera 2

In order to include the entire in-person audience in one frame it is necessary to use a camera with a 120 degree field of view. The lowest priced such camera currently available is a Speda 120 Degree webcam as shown in Figure 8.



Figure 8 - Speda 120 Degree Webcam

## Microphone

The microphone is perhaps the most critical component. The chosen microphone, the TONOR USB Conference Microphone (Figure 9), is advertised to have an effective useful range of 11.5 feet. If this microphone does not perform as advertised, additional amplification will be required.



Figure 9 - TONOR USB Conference Microphone

## Display 1

It is anticipated that each club will utilize equipment that is already available to the club. The Estrella club will use their club owned projector. The Agua Fria club will use the large screen television in the library conference room.



## Screen Mirror Dongle

Laptop 1 will connect to Display 1 using an HDMI Screen Mirror Dongle receiver. The lowest cost device is shown in Figure 10.



Figure 10 - HDMI Screen Mirror Dongle

## Laptop 2/Display 2

It is anticipated that Laptop 2/Display 2 will be donated to the club or will be purchased by the club. Figure 11 shows one currently available inexpensive refurbished Chromebook for sale for \$149.00.

Roll over image to zoom in

### Samsung Chromebook

48 | [Ask a question](#)

**Refurbished** **Save 63%**

SKU: 7511 [f](#) [p](#) [t](#) [m](#)

**Price:** **\$149** ~~-\$399~~  
or 4 interest-free installments of \$37.25 by [afterpay](#)

**Quantity:**

[Get it by Sat, Nov 14](#) with **Express Shipping**  
Ship to: **89101** ([Change](#)) | [View all shipping options](#)

[Add to cart](#)

Figure 11 - Example Available Low Cost Chromebook

## Materials List

ITEM	COST
Laptop 1	Donated *
SHUTTERMOON Lens Kit	\$17.99
Spedal 120 Degree Webcam with Tripod	\$57.92
TONOR USB Conference Microphone	\$36.99
Screen Mirror Dongle	\$29.99
Miscellaneous Cables	\$30.00
Laptop 2/Display 2	Donated (or < \$200 Chromebook)
<b>TOTAL</b>	<b>\$172.89</b>

Table 2 - Materials List

\* Laptop 1 must have adequate capability to perform all functions

This material list does not include estimates for taxes and shipping.

## ZoomMaster Duties

In order to ensure that the club continues to conduct quality meetings a new meeting role called the ZoomMaster will be created. The ZoomMaster will be responsible for all aspects of the online conduct of the meeting. The duties of the ZoomMaster include the following.

1. The ZoomMaster will work jointly with the SAA to set up and configure all equipment.
2. The ZoomMaster will serve as the Zoom host and will be logged into the Zoom host account on Laptop 1.
3. The ZoomMaster will log into Laptop 2 as a meeting participant and not as the host.
4. During the meeting the ZoomMaster will switch Display 1 to speaker mode when an online meeting participant is performing a speaking role.
5. During the meeting the ZoomMaster will switch Display 1 to gallery mode when no online meeting participant is performing a speaking role.
6. The ZoomMaster will display color backgrounds to relay timing information to online participants if they are not able to easily see and interpret colors on the in-room timing lights.
7. The ZoomMaster will conduct polling of the online meeting participants for all “best of” votes.

8. The ZoomMaster will transfer polling results to the ballot counter.
9. The ZoomMaster will insert the SurveyMonkey speech evaluation form links into the Zoom chat.

It is anticipated that the ZoomMaster will be fully occupied during the meeting and will devote their full attention to their duties. As such, it is also anticipated that the ZoomMaster will not otherwise be called upon to perform or participate in any other meeting roles.

In order to relieve the burden of the weekly ZoomMaster duties the club will need at least two fully trained and qualified ZoomMasters who will perform the duties of ZoomMaster on alternate weeks. Ideally, multiple members will be fully trained and qualified to perform the role of ZoomMaster. When multiple members are able to fill the role of ZoomMaster the role will be filled on a rotating basis among all members who are qualified and able to competently perform the role.

## Written Speech Evaluations for Online Speeches

Any of several methods may be employed to allow online speakers to receive the content of written evaluations that are prepared by in-person meeting attendees.

1. The SurveyMonkey master may collect the written evaluations for each online speaker. The SurveyMonkey Master will then scan the paper copies and email the scanned copies to the speaker along with the link to the SurveyMonkey speech evaluation results.
2. Individual members may take a picture of their written evaluation and then email it to the speaker.
3. Individual members may submit their comments to the speaker using the Pathways feedback function.

The club will select the desired method and establish the method as the standard practice encouraging all members to follow the prescribed method.