



THE AVIXA AUDIO SUITE

ALEC GRAHAM, CTS-D, CTS-I, AURECON



What's in Store...

About Me

About AVIXA

How to develop a Standard

The AVIXA Audio Suite

ACU Deep Dive

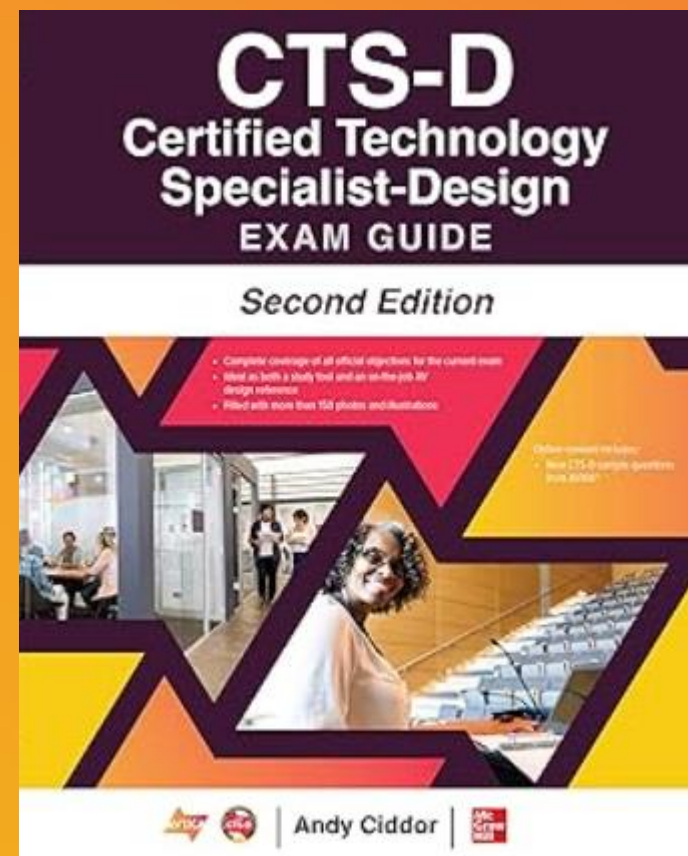
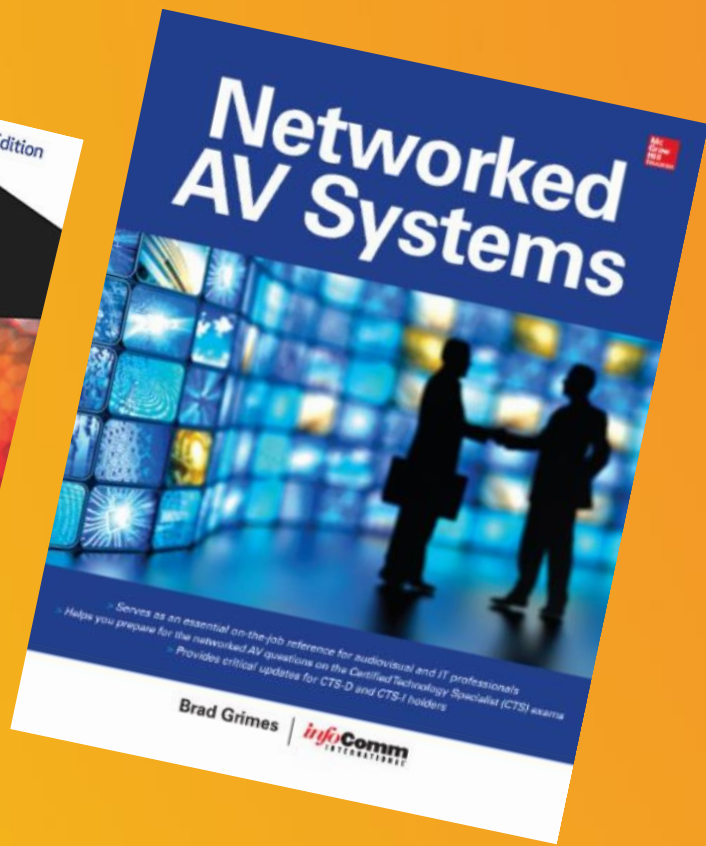


Questions & Discussion

About me...



Virtual CTS Prep Class for Asia Pacific
March 12 - 21 March 2024

Instructor
Rod Brown, CTS-D, CTS-I



My involvement with AVIXA



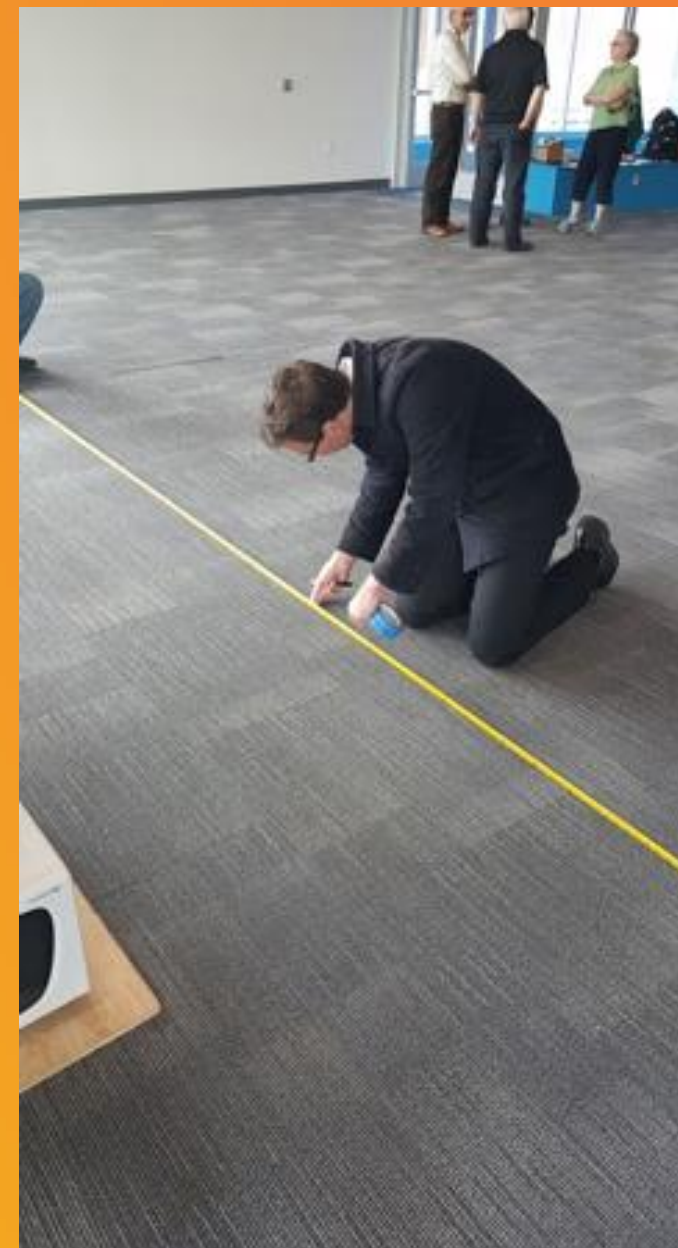
2006



2009



2013



AudioTools - dB, Sound & Audio (4+)
RTA, Acoustics Measurement SPL
Andrew Smith
Designed for iPad
#44 in Music
★★★★ 4.8 • 4.5K Ratings
\$19.99 · Offers In-App Purchases



POLL #1

**Who has used an Audio Standard before
and what was the purpose?**

What's so good about standards anyway?

They are objective rather than subjective

They are repeatable and comparable

They demonstrates value

They reduce risk

STANDARDS

EVALUATING A SYSTEM¹:

- Is it loud enough?
- Can everybody hear?
- Can everybody understand?
- Will it feed back?

Goal

- Objective Evaluation of a Subjective Topic

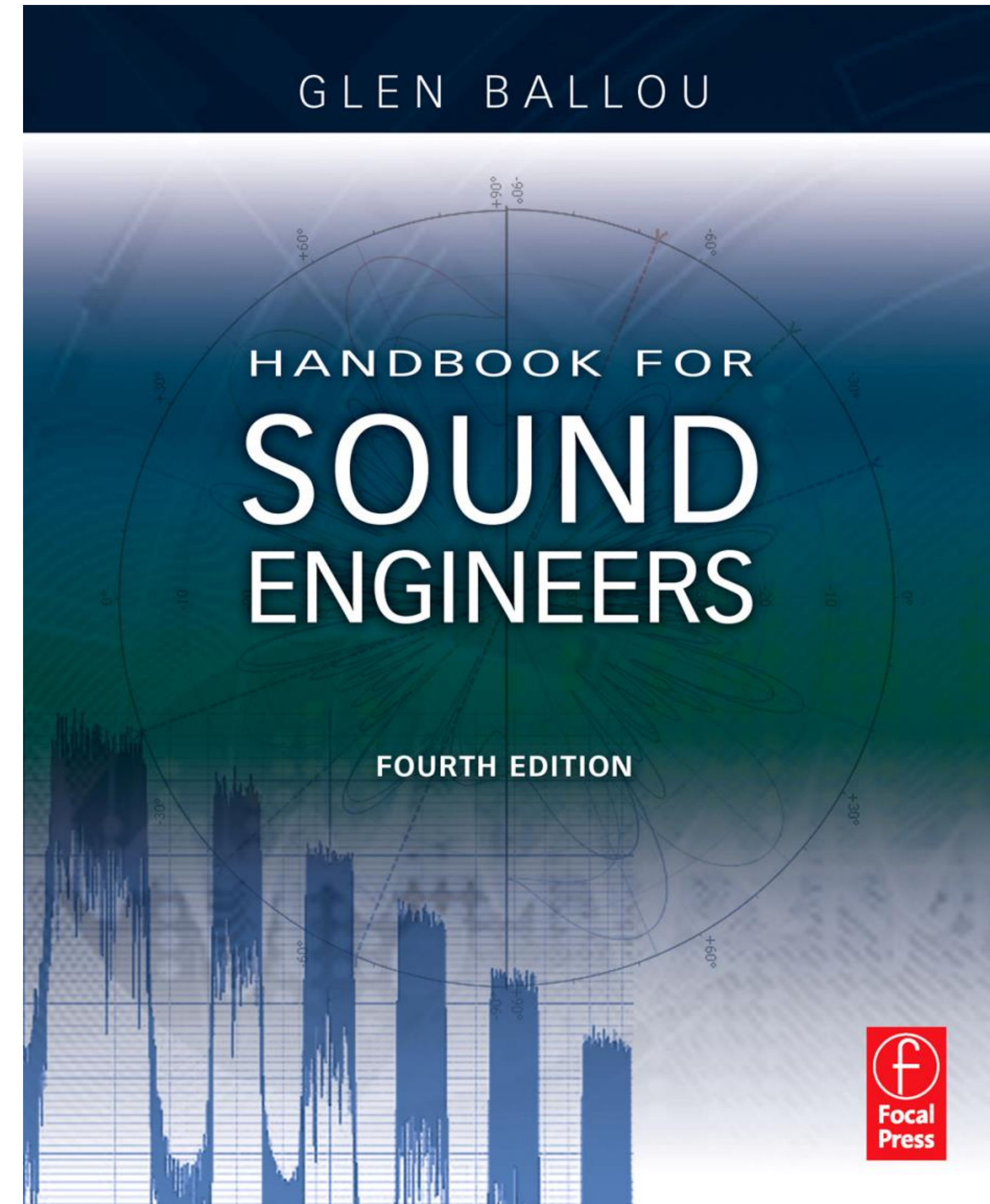
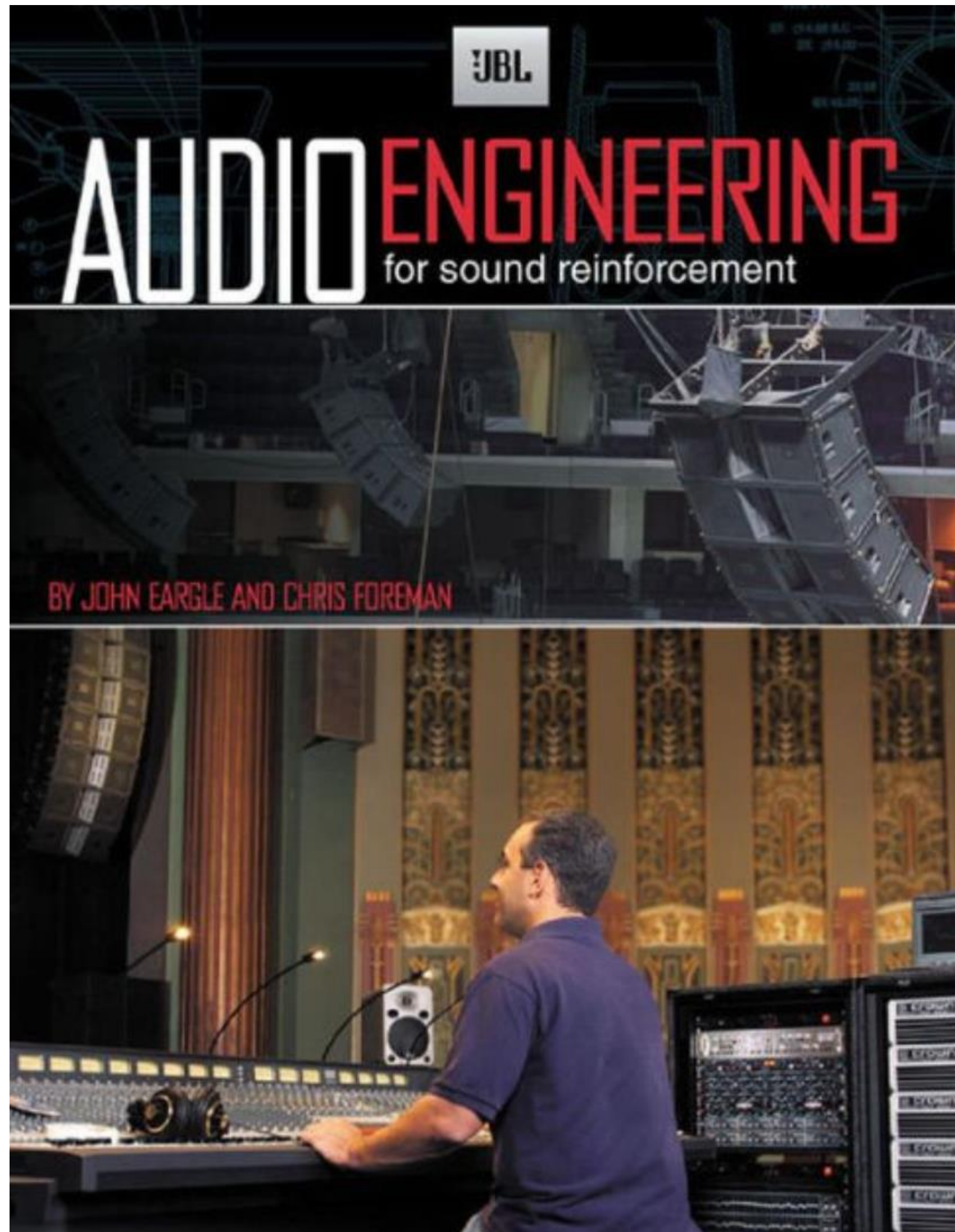
ACU

“...to establish a method by which an audio system’s coverage can be assessed and classified...”²

CAN EVERYBODY HEAR?

¹ Handbook for Sound Engineers: The New Audio Cyclopedia, Chris Foreman (4th Edition page 1239)

² ANSI/INFOCOMM A102.01:2017, InfoComm International, (Section 1.2.1)



The Audio Standards Suite

(How can we bring rigour and science to a hitherto subjective field?)

3 Standards:

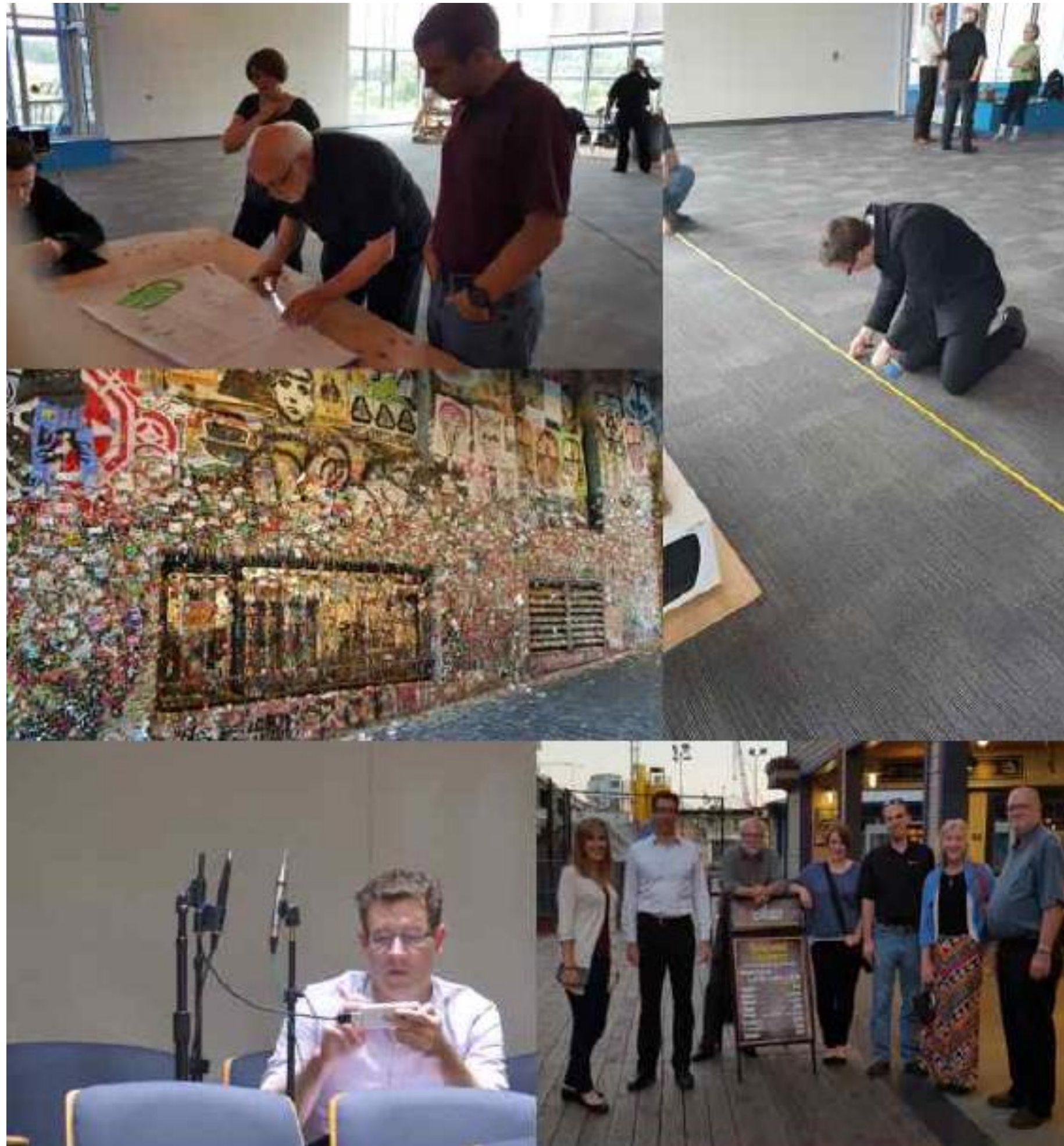
Spectral Balance

Dynamic Range

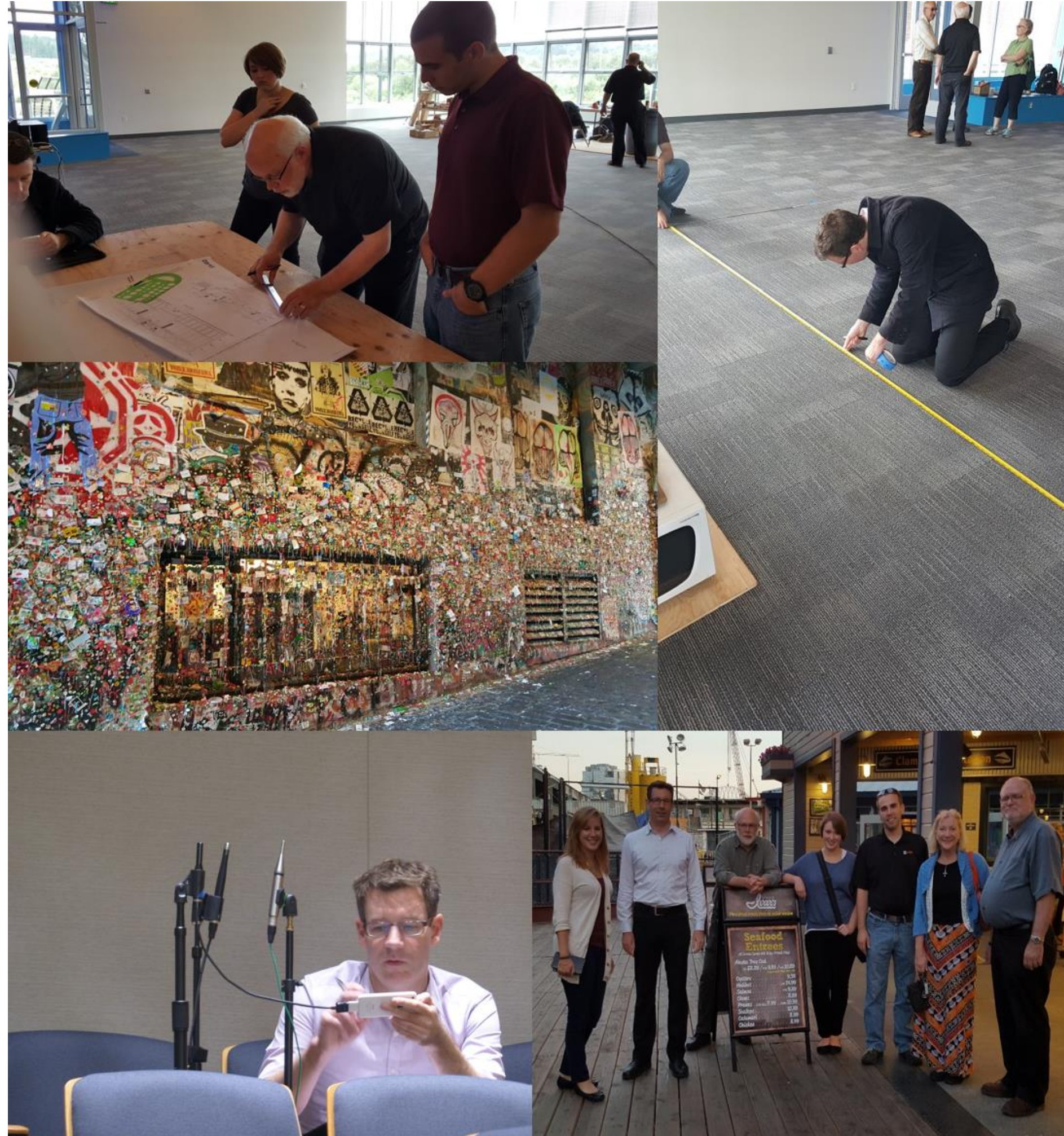
Audio Coverage Uniformity (ACU)

About the ACU Standard

- InfoComm's first standard, 2009
- Task Group formed to revise, 2014
- Revised Standard released, 2017
- Field Guide completed, 2018
- Latest Revision Released, 2023

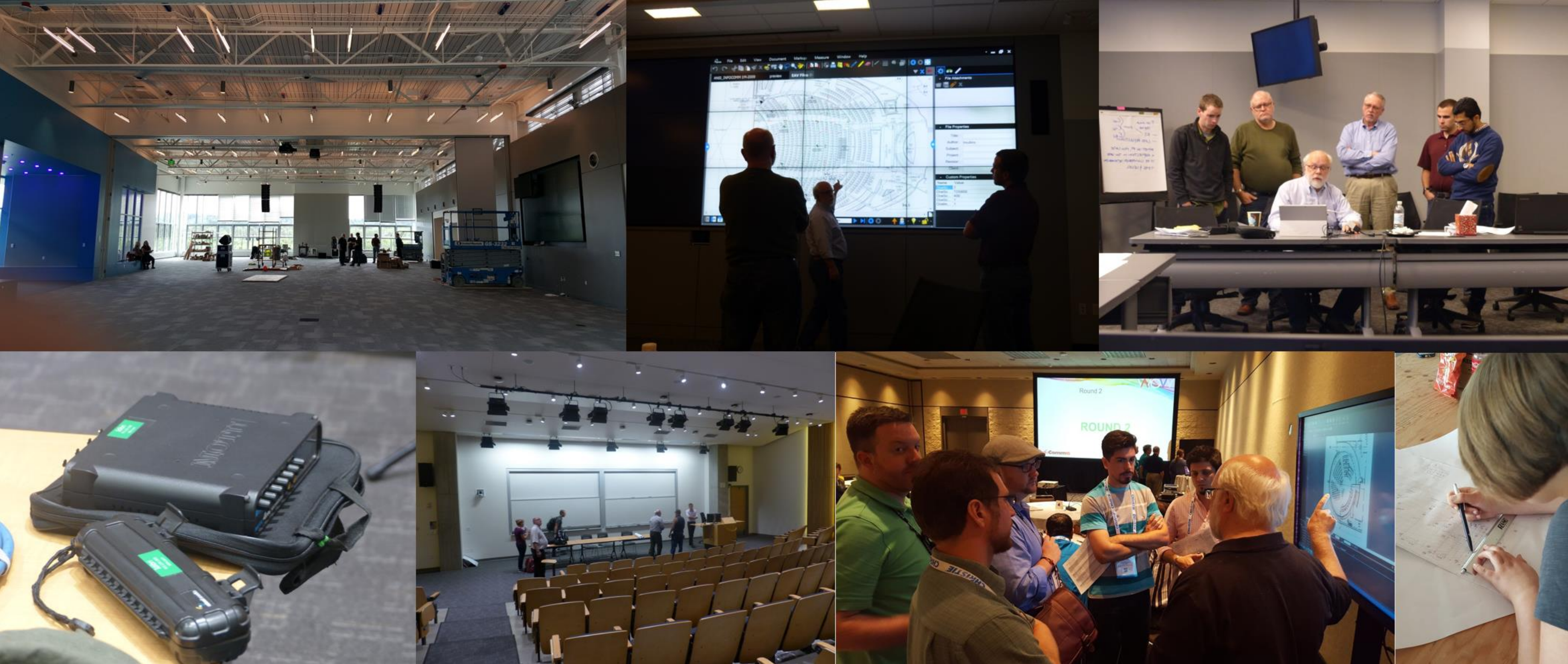


How to develop a Standard?



- Assemble a team
- Review the current standard
 - Revise, Renew, Withdraw
- What needs to change? Why?
- Research, test, adjust, write, review, & release

The Standards Process



POLL #2

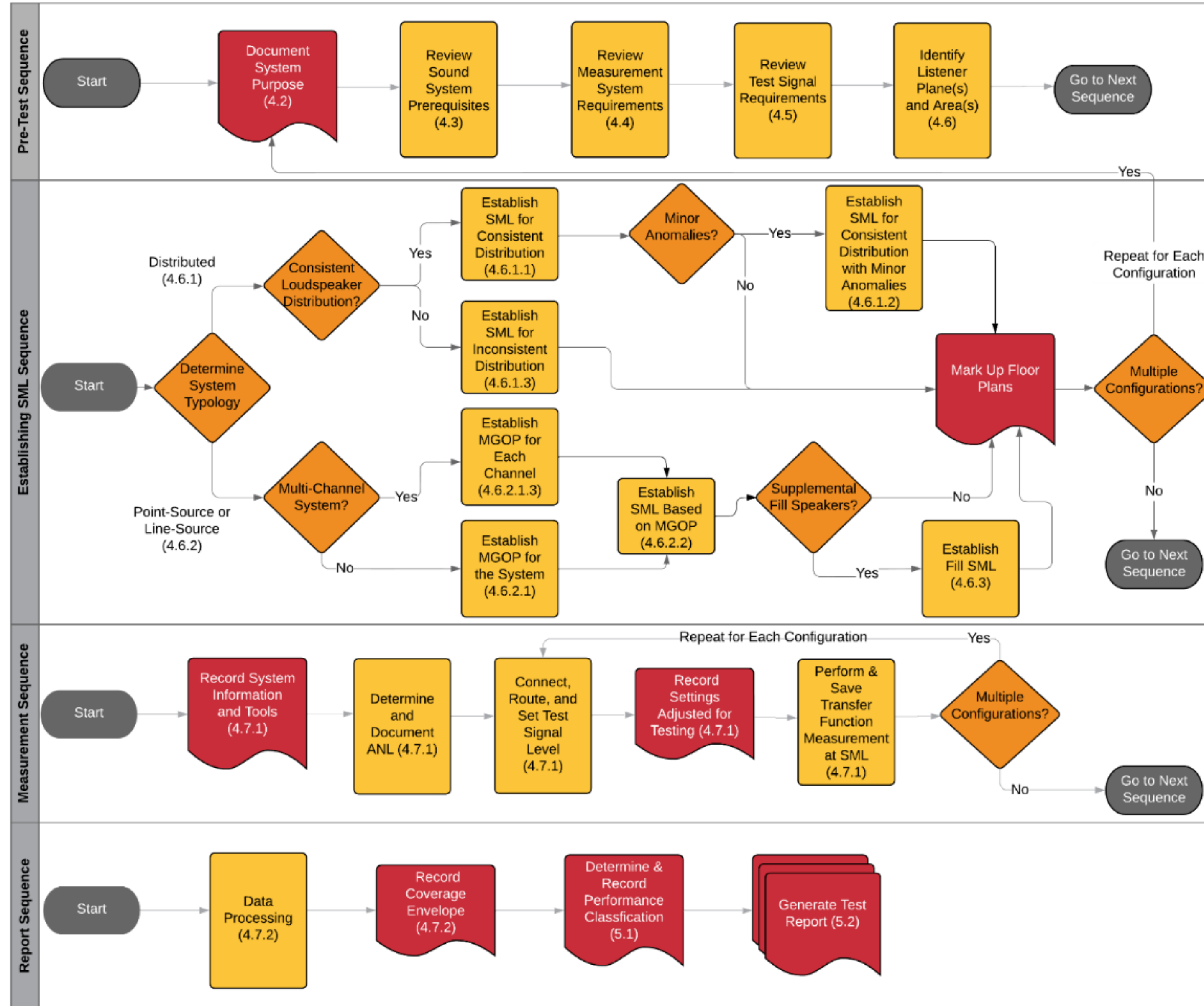
**Before today, who has heard of the
AVIXA audio standards?**

A Closer Look at ACU

Undertaking ACU Testing

- Bring the right tools for the job
 - Class 1 Calibrated Measurement System
 - Cables, Stands and Accessories
- Decide on the system type
 - Paging, Limited or Full Bandwidth
 - Point Source or Distributed
- Use the ACU Process Map

Annex A — Process map (informative)



Key:

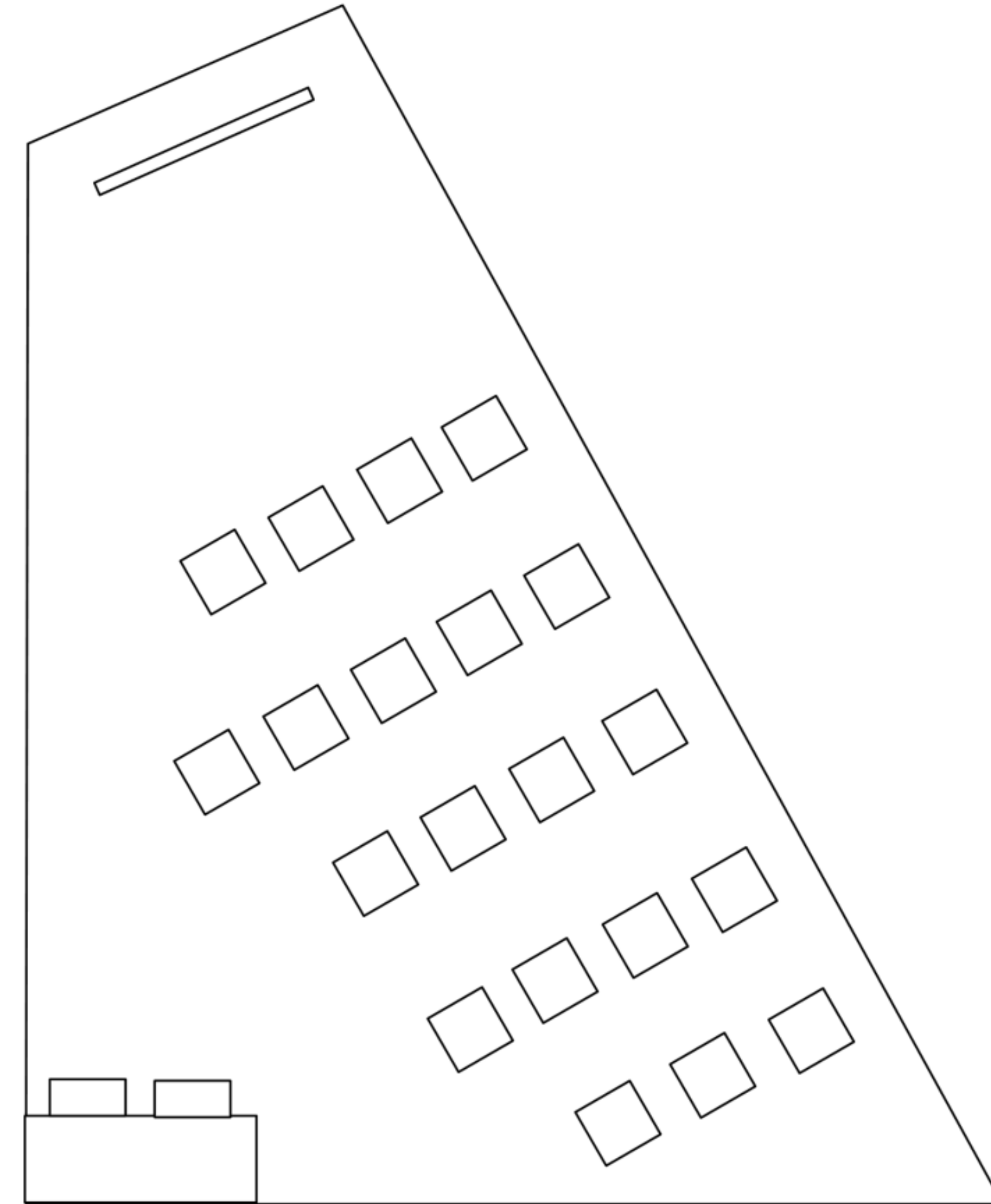
MGOP = Measurement Grid Origin Point

SML = Standardized Measurement Location(s)

- Action
- Decision
- Document
- Start/Go To

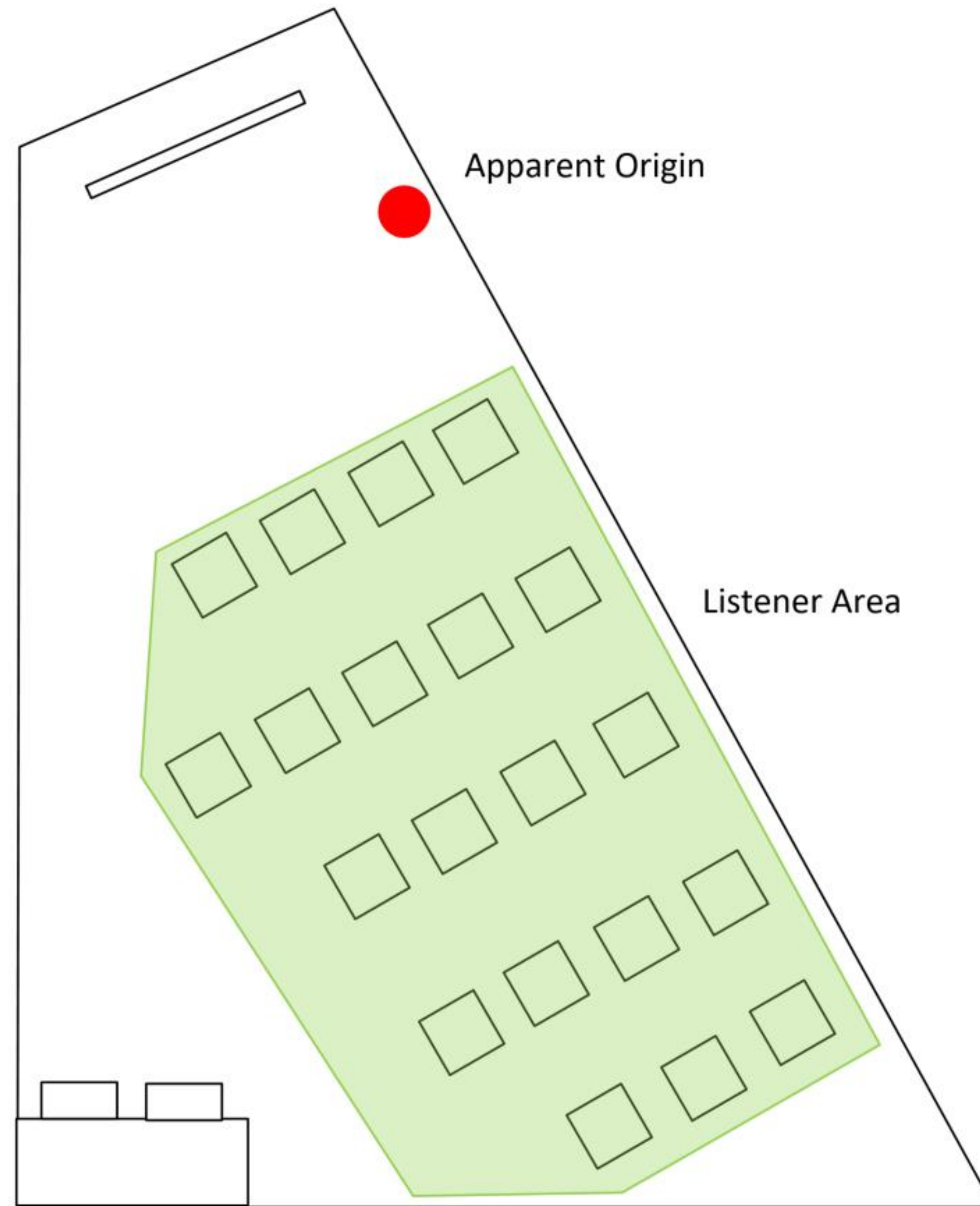
Step 1: Create a Measurement Plan

Prepare a Plan View of the Area



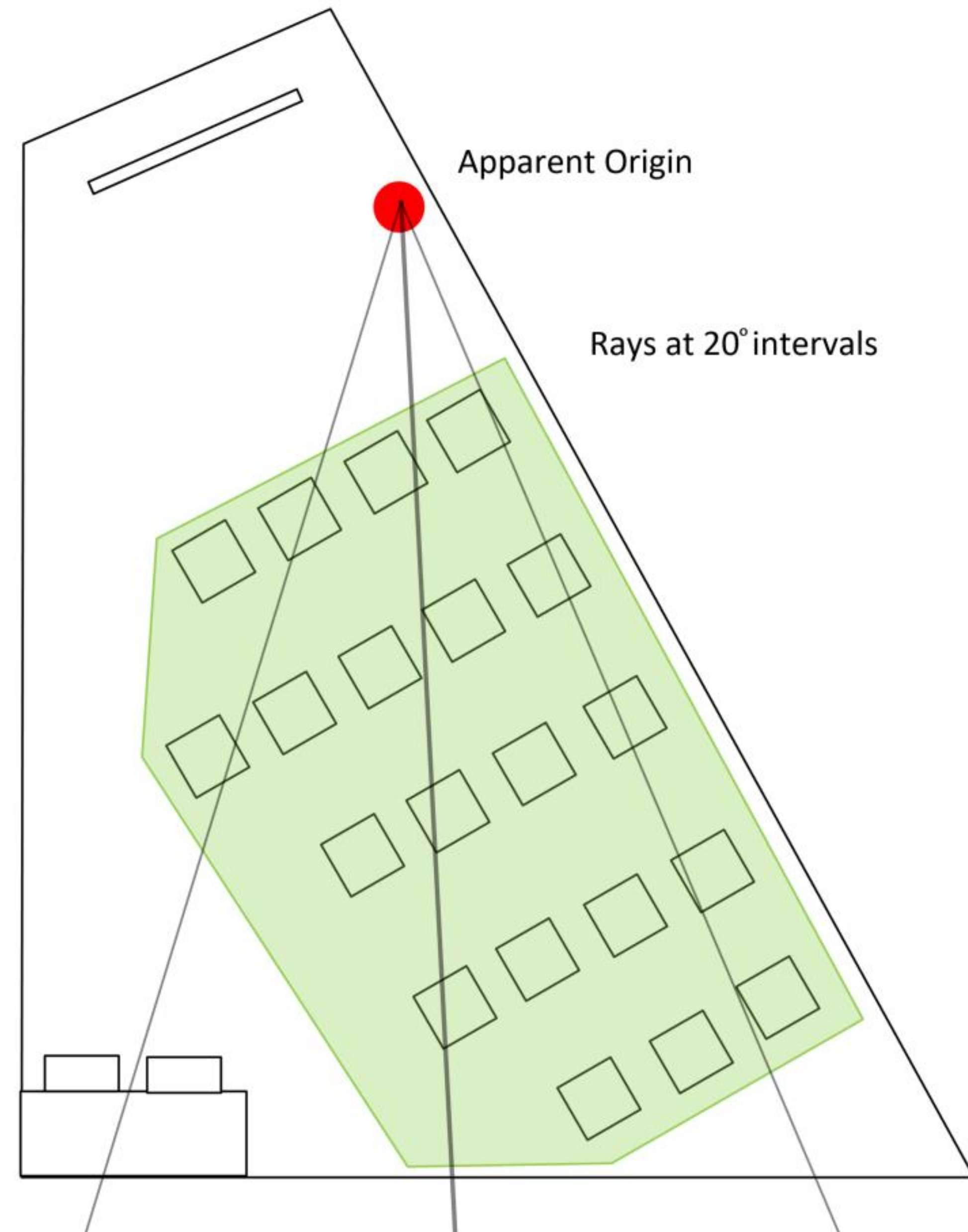
Identify the Apparent Origin

Mark the Listener Area



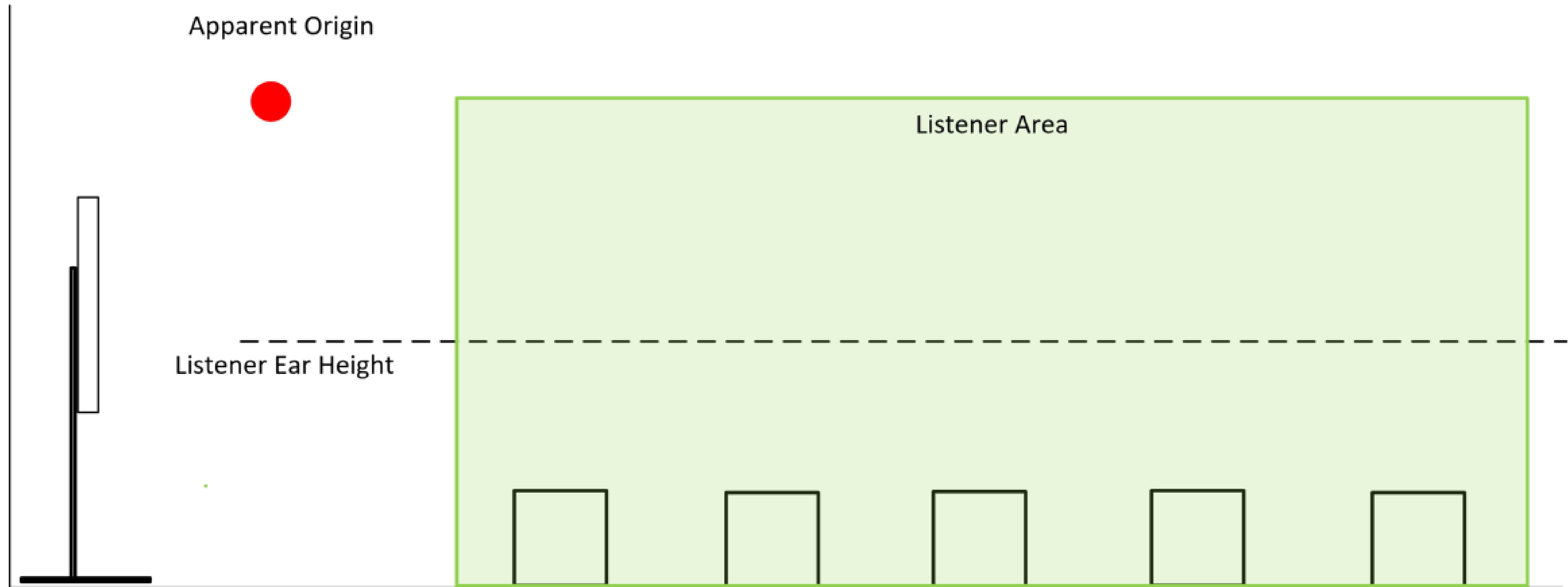
Draw a line from the Apparent Origin through the centre of the listening area

Draw lines to either side of this at 20° , 40° , 60° , etc



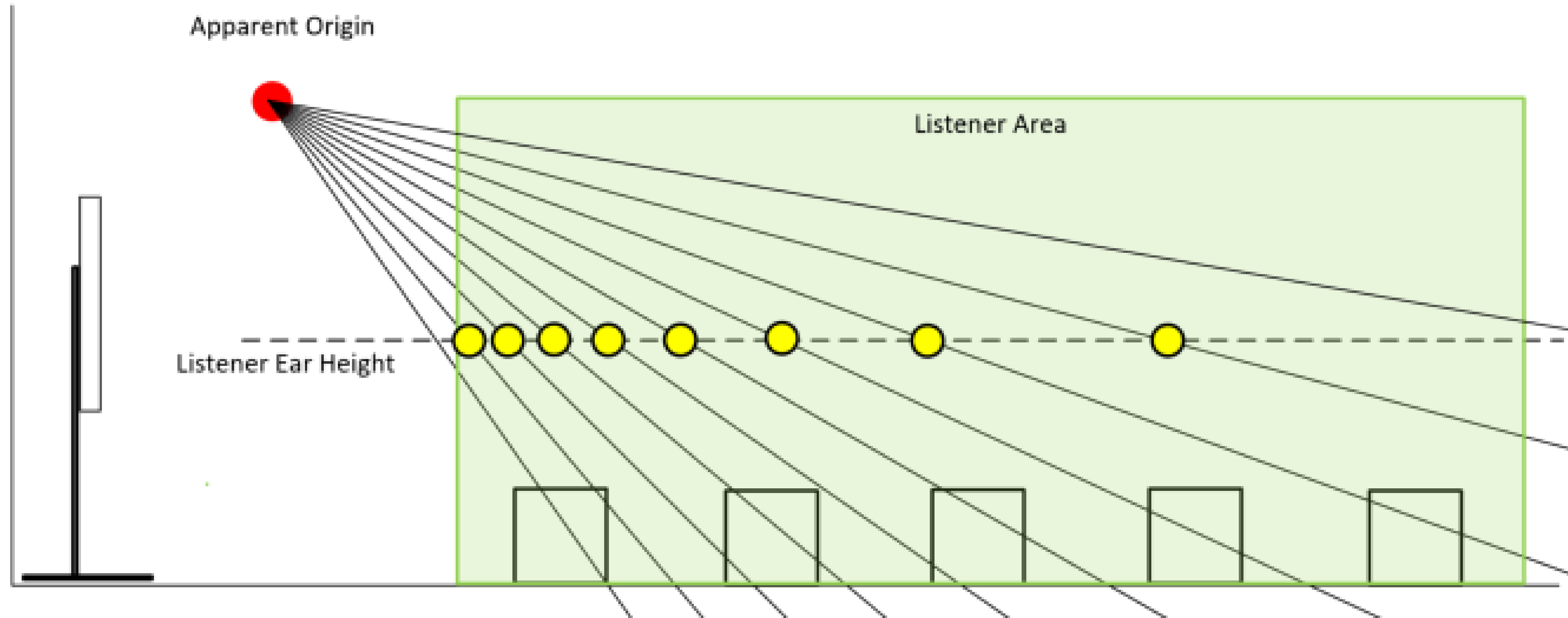
Prepare a Side Elevation

Mark the Listener Area, Listener Ear Height and Apparent Origin

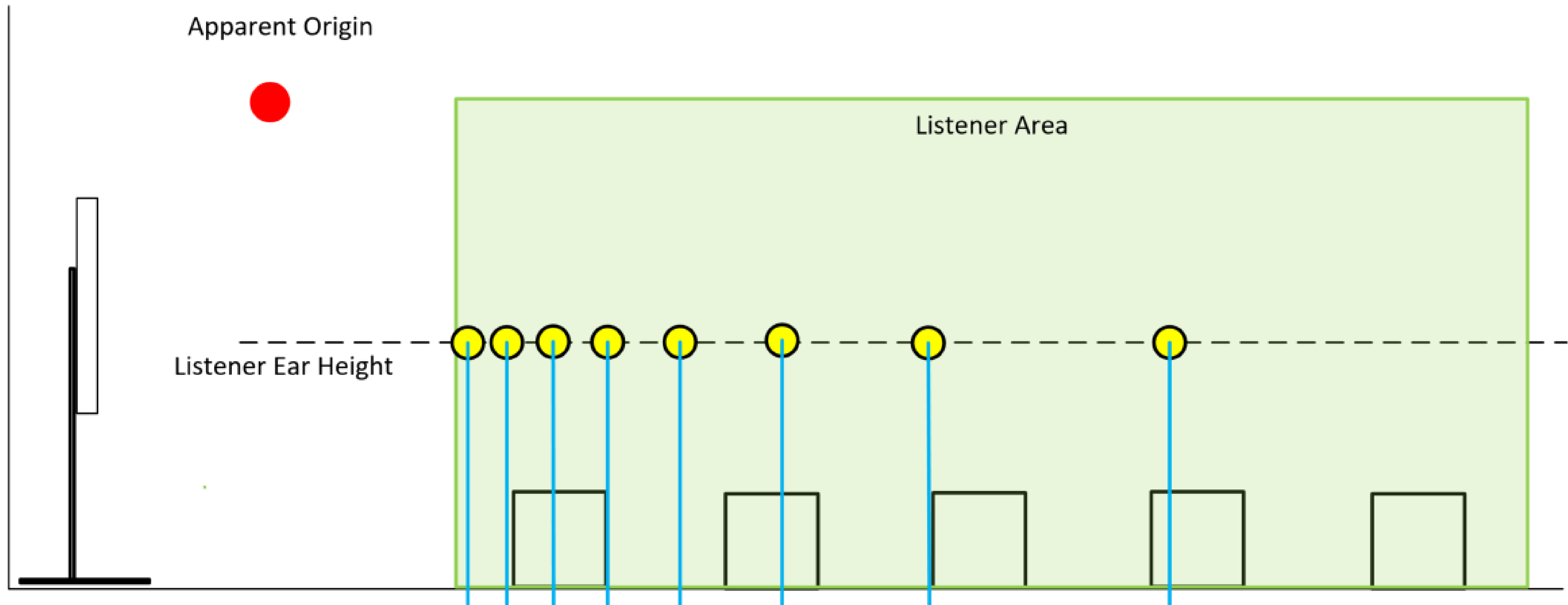


Add 'Rays' at 5° intervals

Mark the points at which the 5° rays intersect with the listener plane

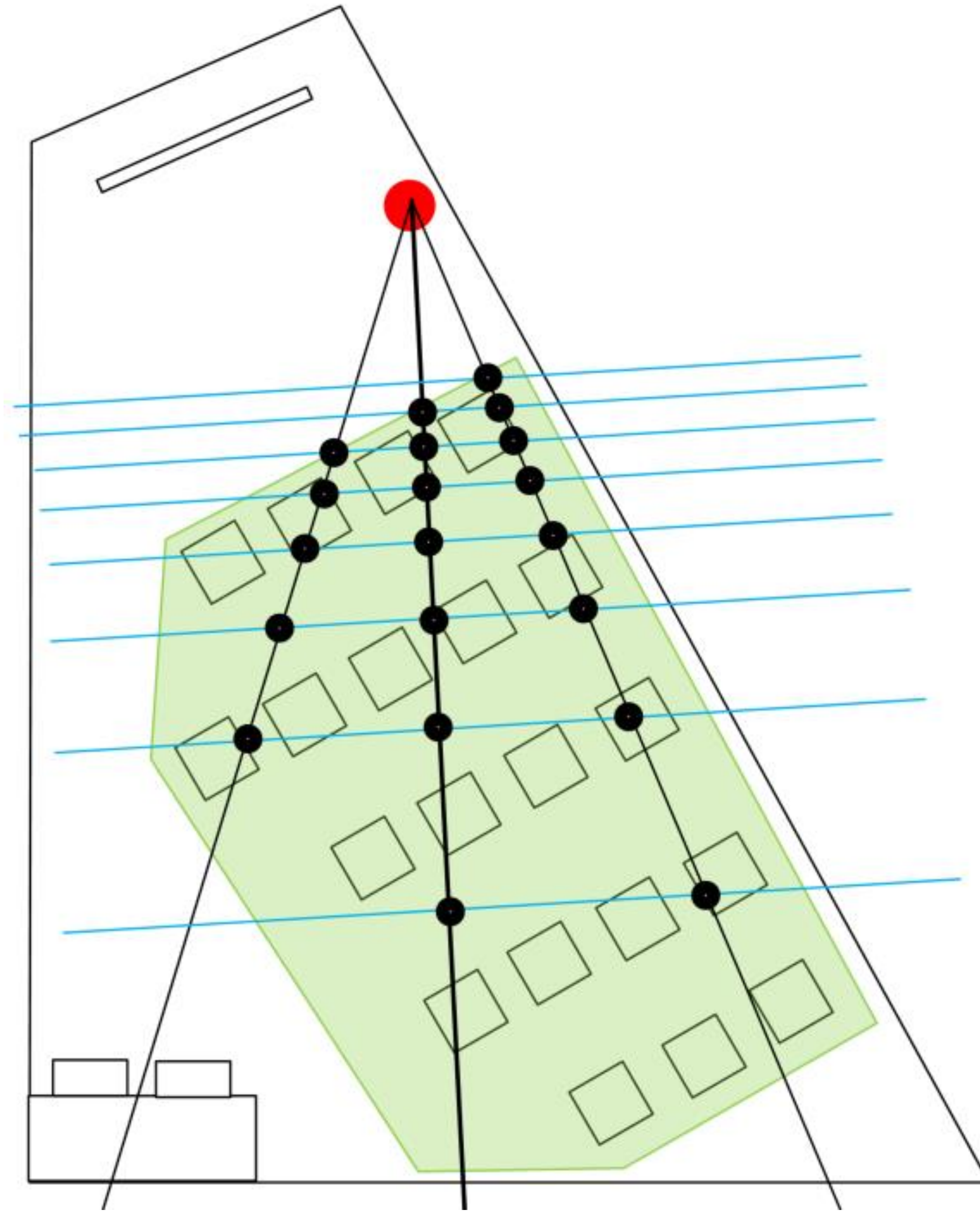


Drop a line from each listener position



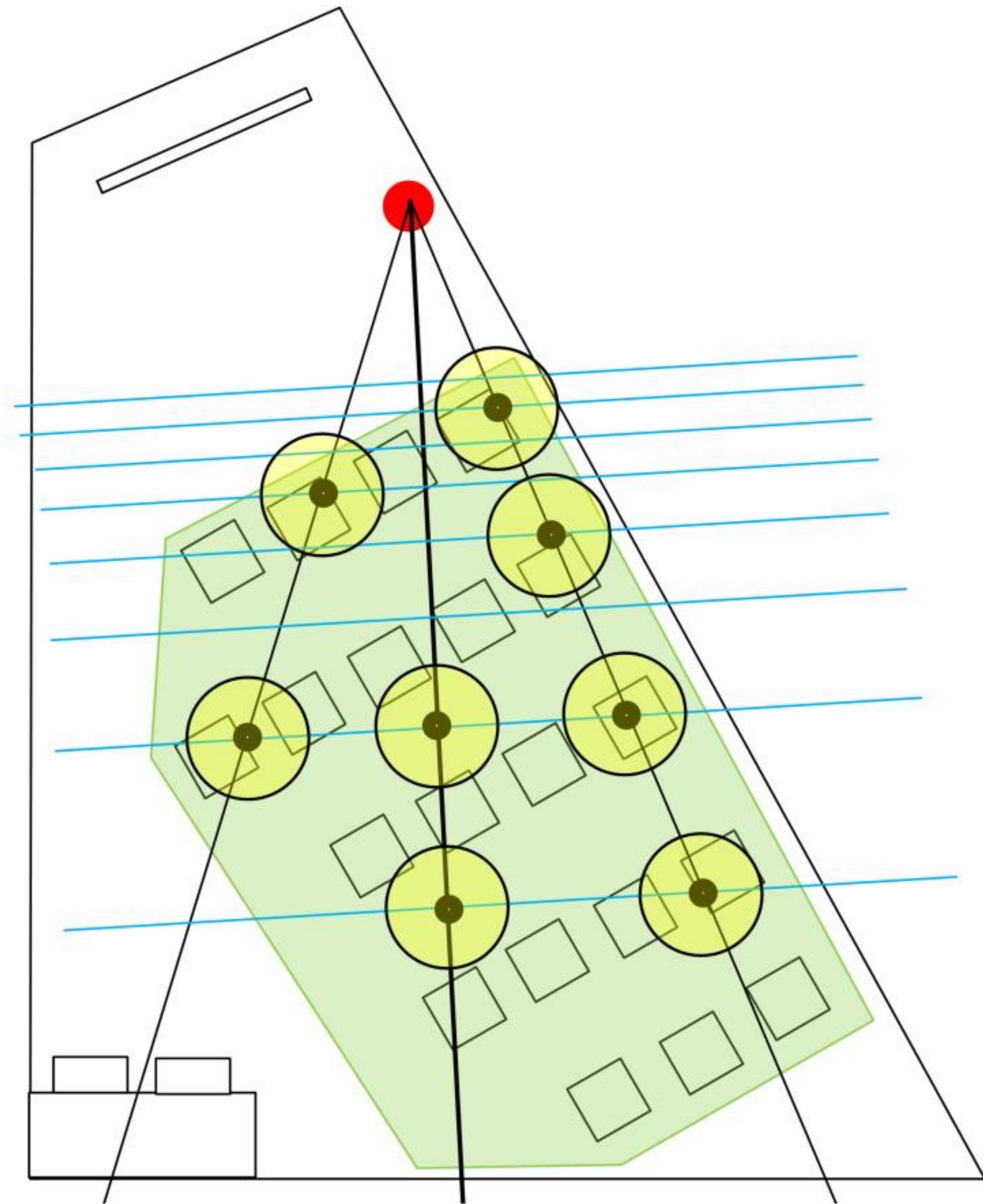
Copy the lines from the elevation
onto the plan

Mark the points at which the Rays
intersect

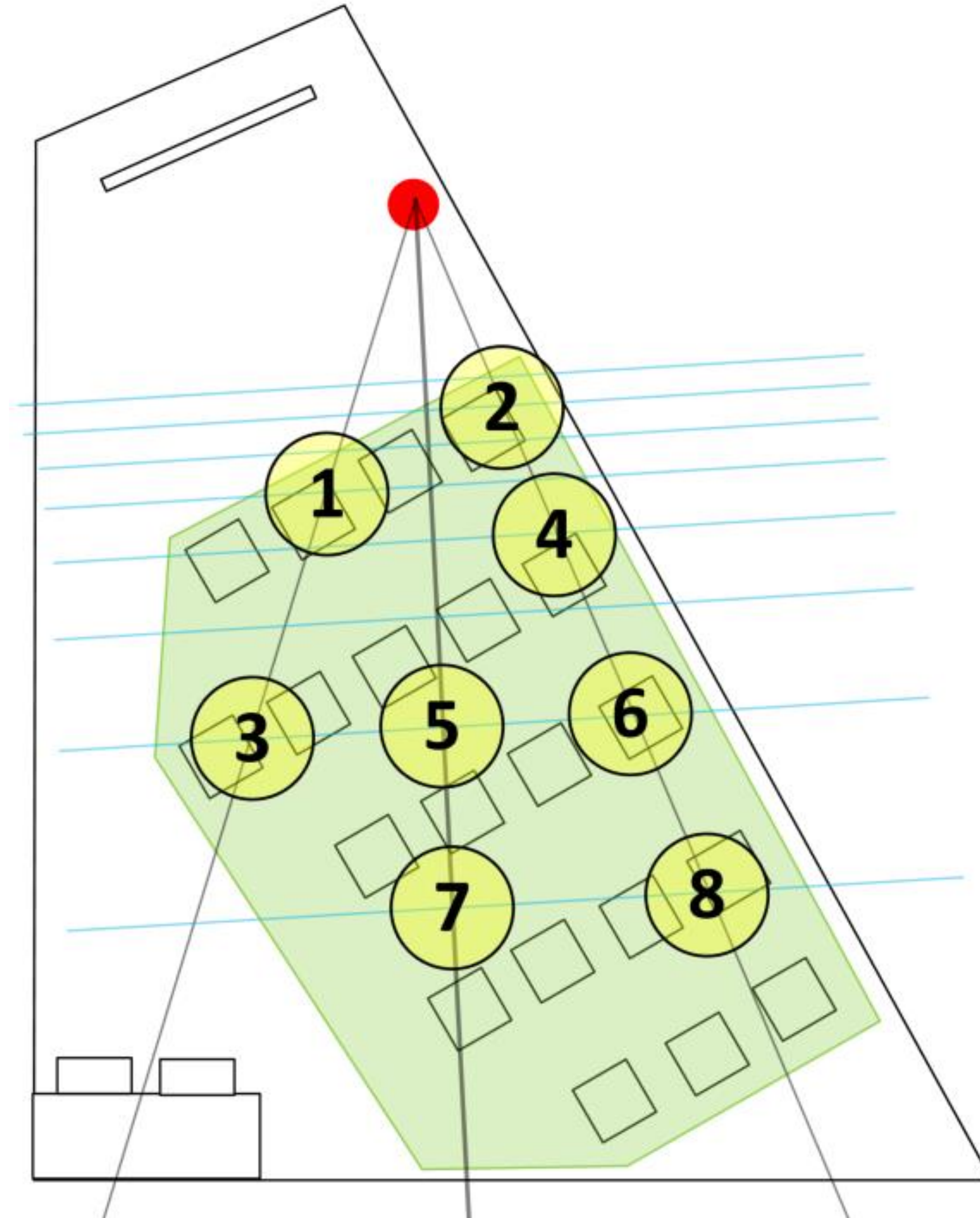


Eliminate Points less than 1m apart to arrive at the final measurement locations

If there are delay or fill speakers then add a point for each overlap between speaker coverage zones



Number the final points and print the ACU Measurement Plan for use on site



Step 2: Take Measurements

- Mark each measurement point with a piece of tape or similar
- Measure the Ambient Noise Level in the Listening Area and add 15dB
- Adjust system gain to exceed this minimum
- Record transfer functions at each location and save this data for processing

Step 3: Process the Data

- Use your software tools to derive an overall SPL for each location.
- Document these results.

| Transfer function values | |
|--------------------------|-------|
| Measurement location | Value |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |
| 10 | |
| 11 | |
| 12 | |
| Minimum level | |
| Maximum level | |
| Coverage envelope | |

Included with report:

- Plan and/or elevation drawings showing measurement locations.

Step 4: Classify the System and Prepare the Report

| System classification |
|-----------------------|
| 3 dB |
| 6 dB |
| 9 dB |
| 12 dB |
| > 12 dB |

Questions and Discussion

Thank you!

