# DIY Isolation Booth

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### Brief

The brief is a modular, low cost DIY friendly isolation booth for The Edge Recording Studio. Although mainly for vocal recording, the booth should be large enough for two people podcasting, or a small drum kit set-up, solo instrumental recording or as in isolation booth for guitar amp.

## Requirements

- fits minimum two people, including one wheelchair or mobility scooter
- meets or exceeds relevant ISO standards[1)] for acoustic isolation
- provides disability access
- uses commonly available, low cost materials
- fits with existing State Library decor and level of finish
- can be pre-assembled
- plans are open sourced at end of prototyping

## Design

The prototype has been designed in Fusion 360[2)]. The model is available on the web to view and annotate: https://a360.co/2Sfz8gC

The design is a basic double walled shell, with variable configuration of panels and some parameters.

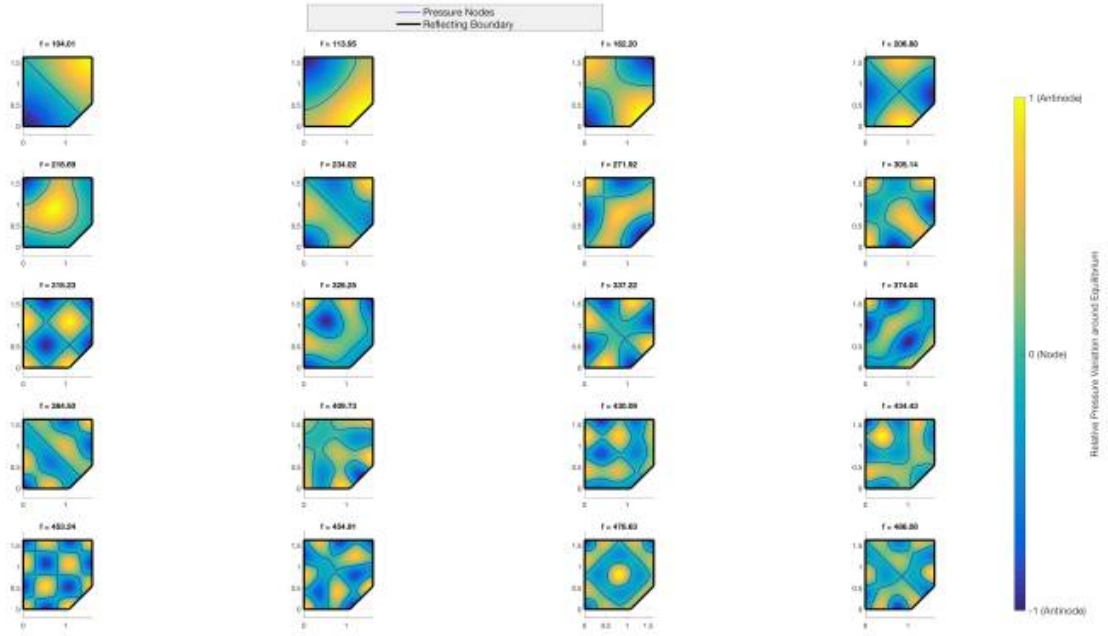
The unit will fit within 1.8mx 1.8m, which is approximately half the width of the recording studio.

Acoustics, internal fittings, fixings, penetrations and ventilation need to be considered at the meet-ups.

## Acoustics

# Analysis

Thanks to Jon South and Adrian Diery we have a plot of the room resonances:




A similar tool can be found online here

## Acoustic Treatment

Given the resonances present in the analysis, broad low frequency absorption is appropriate. Our challenge will be to fit effective absorption is such a small space. Options include:

- Panel bass traps
  - resonant
  - broadband
- Corner bass traps

### Low Frequency absorption with Acoustic Metamaterials

Over the last few years, research into acoustic metamaterials produced with 3D printers has achieved some interesting results for low frequency absorbtion. While there have been no products released (that we can find) that use these materials, there are a couple of papers that explore some likely

looking options.

https://www.nature.com/articles/s41598-019-49982-5

https://aip.scitation.org/doi/10.1063/1.4895617

# Ventilation

Once the booth has been framed up, we will look at the best way to build in ventilation. Discussion at this point has been around a couple of boxes on the back of the booth, one for input, one for output, with a labyrinthine baffled passage to reduce noise transmission.

# Cabling

Existing wall plate has a number of ports, wired into the studio patchbay :

- 4 XLR male sockets
- Stereo RCA
- HDMI
- 2 x ethernet
- 5 x BNC RGBHV

The aim is to patch from these ports where possible.

## Audio

Six outputs from the booth (XLR) with 2 stereo inputs (TRS).

## Video

Single HDMI input.

# Disability Access

Wheelchair access requires doorway clear access of 850mm. The current door provides 880mm.

## Access Ramp

Maximum slope for wheelchair access is 10:1. The base of booth is approx 116mm from the floor,

which means the ramp must be approx 1200mm.

### Door Access and Handle

AS 1428.1—2009 13.5.2 Design and performance - supplies the maximum force:

(i) To initially open the door. ..... 20 N

(ii) To swing or slide the door .....20 N.

(iii) To hold the door open between 60° and 90°.....20 N.

## Fittings

### Furnishings

Laptop table/rest. Foldable?

#### Mic Stand

Permanent mic stand mounted on wall or ceiling with swing arm.

## Plans

Plans will be generated as drawings from Fusion 360 - see examples in resources.

## Materials

### Outer Shell

## Tools

## Construction

# Resources

slqedgevocalbooth_1.8m_1.0_drawing_base_v1.pdf

slqedgevocalbooth_1.8m_1.0_base_front_frame_v2.pdf

# Research

https://www.bunnings.com.au/trade-essentials-3600-x-900-x-19mm-green-tongue-particle-board-flooring_p0460014

https://loopphonebooths.com/office-privacy-solutions/solo-office-pod/

https://zenbooth.net/blogs/zenbooth-blog/office-phone-booth-pricing-models-from-4999-18-999

https://www.frameryacoustics.com/en/products/

https://au.room.com/

https://www.iso.org/obp/ui/#iso:std:iso:23351:-1:dis:ed-1:v1:en

https://www.iso.org/obp/ui/#iso:std:iso:4043:ed-3:v1:en

https://www.ultrafonic.com.au/vocal-booth

http://www.jpemball.fr/eng/polytcab-interpretation-soundproof-booth.html

1)
https://www.iso.org/obp/ui/#iso:std:iso:23351:-1:dis:ed-1:v1:en
https://www.iso.org/obp/ui/#iso:std:iso:4043:ed-3:v1:en

2)
Fusion360 has a hobbyist, education and start-up licenses available.