Live Drum Microphone Experiment

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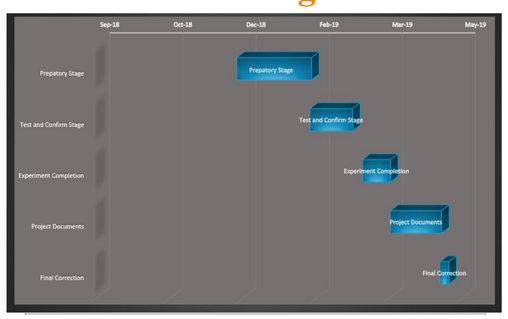
Introduction:

The drum set or drum kit is a combination of drums and other percussion instruments. The drum kit incorporates instruments such as cymbals, toms, hi-hats, and a kick, etc. Each of the drums and percussion instruments within the kit can produce its own sound. There are specific microphones that are made to complement and amplify each part of the kit. For this experiment, I combined both my insight as a drummer and the technical knowledge I acquired about audio during my semesters at City Tech to show why this is the case. My goal was to collect and provide evidence that supports the idea that each microphone picks up specific frequencies differently. To accomplish this, I used a Fast Fourier Transform analyzer software called SMAART along with the manufactures frequency response chart to visually see the response of each microphone. SMAART is a software that uses an FFT analyzer to visually observe the different frequency responses of signals. Audio Engineers often utilize this software to monitor microphone signals and make decisions in order to prevent feedback.

Thesis :

1. Why certain mics are used for particular parts of the drum set?
2. Do the frequency responses I observe match the manufacturers data?
3. Microphone comparison.

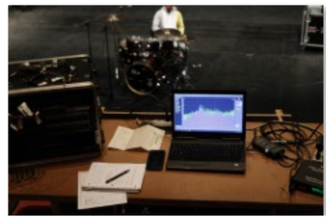
Calendar / Budget:



Project
BUDGET

EXPENSE	AMOUNT	NAME	NOTES
Microphone	$99.00	Shure Sm57	Borrowed from New York City College of Technology
Microphone	$199.00	AKG D112	Borrowed from New York City College of Technology
Microphone	$599.00	AKG C414	Borrowed from New York City College of Technology
Microphone	$99.00	AT 2020	Borrowed from New York City College of Technology
Microphone	$699.00	Earthwork M30	Borrowed from New York City College of Technology
Laptop	$300.00	Dell	Borrowed from New York City College of Technology
MOTU	$494.00	MOTU Ultralite-MK3	Borrowed from New York City College of Technology
Software	$995.00	SMAART	Borrowed from New York City College of Technology
Drum Kit	$999.00	PDP(7piece)	Borrowed from New York City College of Technology
Cable	$4.75	USB A to USB B	Borrowed from New York City College of Technology
Cables	$21.00	XLR (2)	Borrowed from New York City College of Technology
Microphone	$399.00	AKG Drum KIT	Borrowed from New York City College of Technology
Total	$4,907.75		

Methods & Material



Methods:

1. How Measurement Was Taken

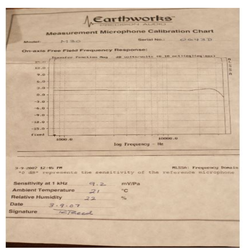
- A drum kit was set up
- An Earthworks microphone was set up near the instrument.
- Both the microphone that was being compared and measurement microphone were plugged into a MOTU in order to receive the frequency information.
- The MOTU was connected to a laptop with SMAART software downloaded on to it.

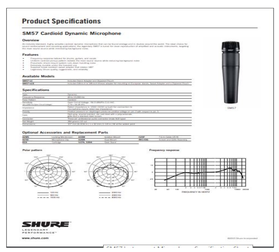
2. How SMAART Software Was Used

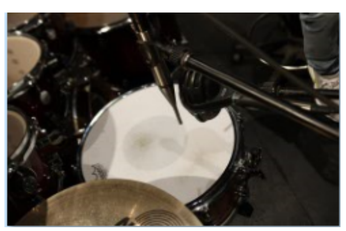
- As the drummer played, SMAART displayed the signal that was being picked up.
- Visual display of frequency response that Earthworks microphone was picking up.
- Visual display of frequency response that the different manufactures microphones were picking up.
- Displayed low to high frequencies (100-25k)
- Take snapshots of measurement received for comparison.

Materials:

- Dell laptop
- MOTU
- Earthworks microphone
- Shure SM57
- AKG D122
- AT20202
- AKG C414
- AKG Drum microphone set
- PDP drum kit
- SMAART software







Conclusion:

In the entertainment industry, the artists vision for their project is equally important to them as it is to the people who are working behind the scenes to make it come into existence. As an audio engineer, my job is to provide the highest quality sound possible for the client. Furthermore, the greater insight I have on why certain microphones are commonly used for certain instruments would increase the chances of a smoother and more successful event. In fact, understanding the frequency response of microphones does not only help to prevent feedback but also avoid unnecessary expenses. The software SMAART contributes to producing quality audio by visually displaying the frequency response of live signals. By using SMAART, the viewer gains a better understanding of what each microphone is picking up.

What I learned:

- How SMAART is used within the entertainment industry.
- Certain microphones are used because they emphasize frequency bands that are more desirable than the others. Example; Kick drum, snare, etc.
- Kit microphone can give you the same or better results than the pro microphones.

Literature cited:

- https://www.mixonline.com/
- http://www.lightingandsoundamerica.com/
- https://www.shure.com
- https://www.rationalacoustics.com

Acknowledgements:

1. Alexandria Bottiglieri
2. City Tech Faculty
3. Jared Soleyn