



## Bryan Neumeister

IEEE, IPVM, ABRE, DLA, AES, SAM, CAGE, ASCAP

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39 EMMY AWARDS for Technical Excellence - 12 individual achievement Emmy statues

40 Years Professional Experience

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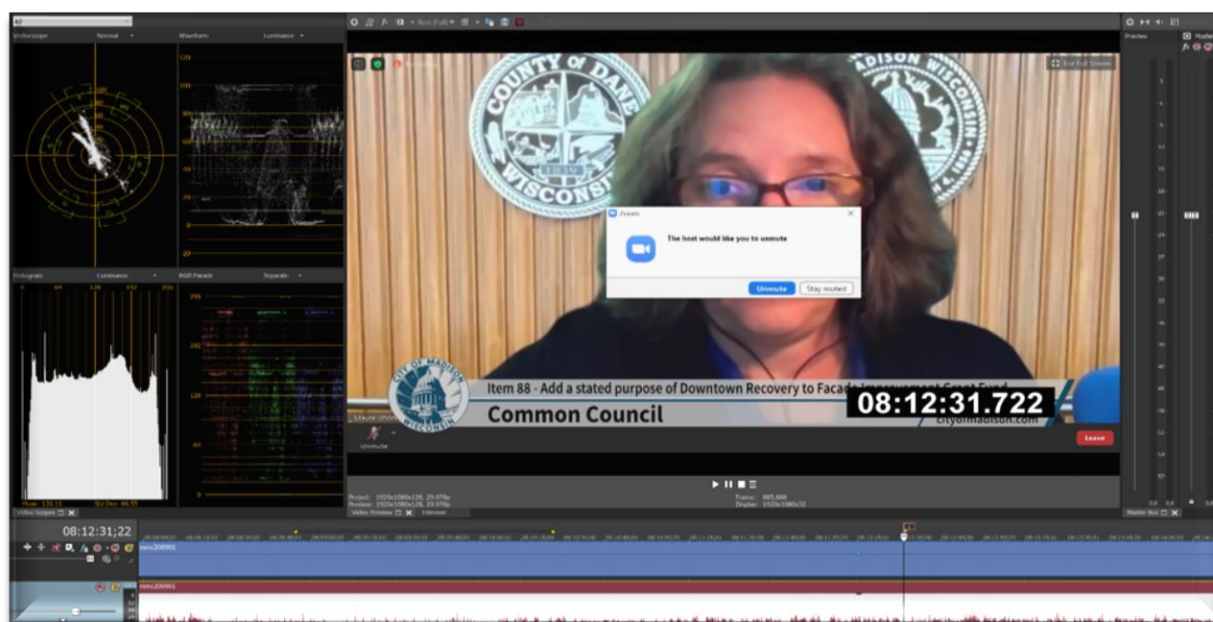
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## Madison Common Council Tuesday 9/21/2020 Voice and Zoom Review Executive Summary:

On September 1, 2020, the Madison Common Council met over Zoom for a lengthy meeting. At the 8 hours, 12 minutes, and 27 seconds mark, a male voice was heard to say, off-camera, the word “cunt”. As no law was broken, no charges were filed, but City leaders wanted to know who said the offensive word during this meeting which was open to the public.

When USAForensic takes on a case, we do not want to know anyone’s interpretation of the data as to us the data must be unbiased. We work for both prosecution and defense. In this case were asked to do a voice comparison and verification. Which is normally a simple procedure using Zoom, as all audio tracks are usually separate and indicated by an IP address. However, this was not to be the case.

File analyzed: feed.mmc200901.mp4 **EX 1**      Total Running Time (TRT) 09:07:42:23



**EX 1**

**Hash values:** feed.mmc200901.mp4 **EX 2**

<b>File:</b>	E:\Madison Wiz ZOOM\mmc200901.mp4
<b>CRC32</b> <input checked="" type="checkbox"/>	F7BEA311
<b>MD5</b> <input checked="" type="checkbox"/>	0A182F3D938386F8C60AB7DFF9F04C3C
<b>SHA-1</b> <input checked="" type="checkbox"/>	1B72760E3C02BDD85B8BA8BBEBCB43DB89A53693
<b>SHA-256</b> <input checked="" type="checkbox"/>	B6034D4988B119400B577C825127C327EC116A694188DA4A70C3E08598009A7C

**EX 2**

**Background of Bryan Neumeister, owner, and founder of USA Forensic, LLC, and the audio expert in this case:**

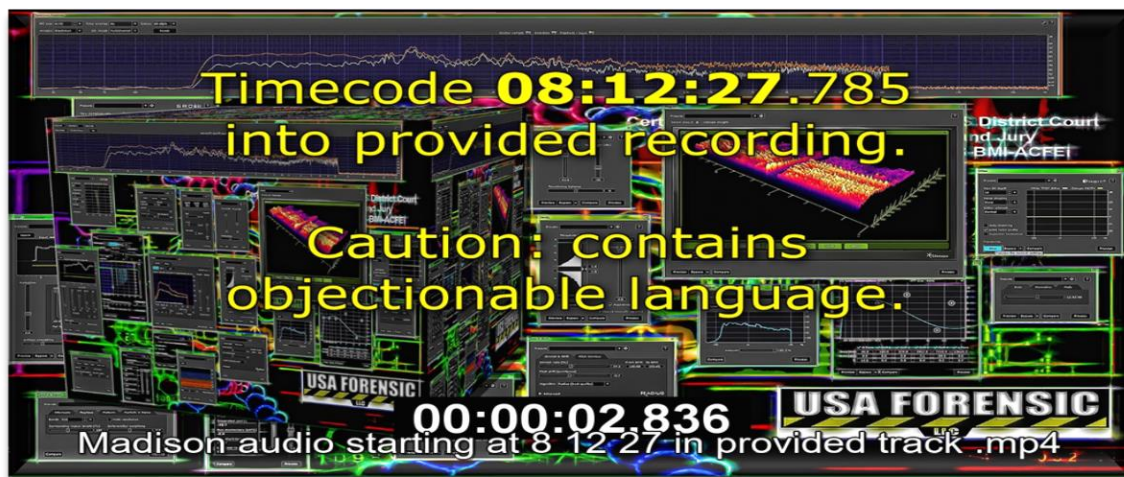
I have been working professionally full-time with audio for a little over 40 years. During that time, I have worked on well over 20,000 voice tracks covering just about every angle of the business from the broadcast television industry to the music industry, as well as film. Awards in these fields are noted in my CV.

In the last decade, however, my work in audio has been strictly forensics. I have worked on voice clarification and identification for various federal, state, and international agencies, including voices in foreign languages and in cases overseas. I have also worked on many private sector cases clarifying and on voice comparison. There has never been a time when we did not have the latest in state-of-the-art equipment. Clarifying voice tracks, removing background sounds, and isolating conversations is usually a daily forensic job for me.

**Assignment given to USA Forensic, LLC:**

- A) Clarify and possibly match a person speaking with a voice on the provided Zoom meeting. (feed.mmc200901.mp4, **EX1 & 3**)
- B) Review the Zoom operational log file from 9/21/2020 to garner the possible IP address of the person speaking.

**Audio Analysis:**



**EX 3**

The area in question was 8 hours, 12 minutes & 27 seconds into the meeting video provided.

This is where a usually simple case, became more difficult. It was just one word. It is not scientifically valid to do a voice comparison on one spoken word, in this case “*cunt*”, and this word was spoken under a male’s breath.

Though still not a problem, we should be able to track it through Zoom.

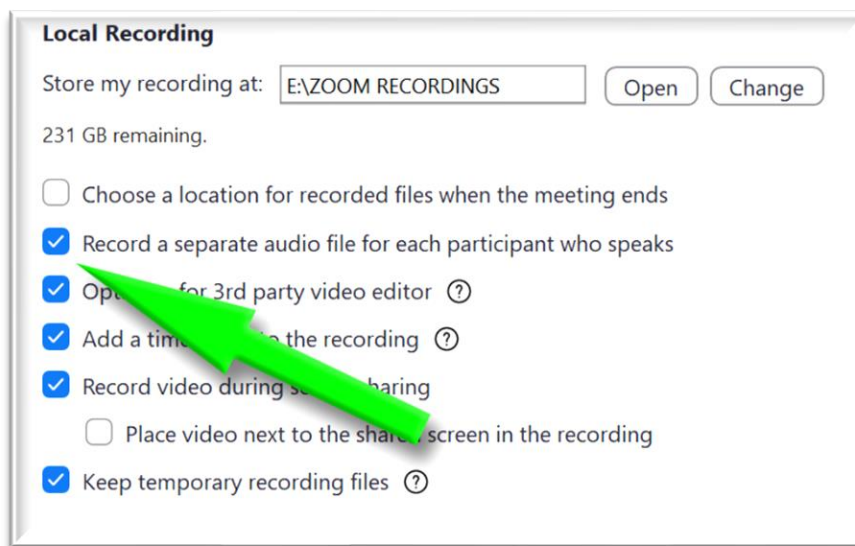
The straightforward methodology is to review **all** the individual recorded audio tracks at the time and see what was on each person’s track at 8 hours, 12 minutes and 27 seconds into the recording. Zoom can record all audio feeds independently, which also ties them to an IP address.

The camera may or may not be on the person speaking as there is a camera switching algorithm determined either by enough voice activity to trigger the camera switch *or* “far-end camera control” which is managed by a person in a meeting. The administrator of the Zoom conference.

As we deal mostly with law practices, law enforcement agencies, the DOD and similar, all Zoom audio tracks are separated, each microphone with its own track. This is done in case several people are talking at once. Each track can be reviewed separately.

In this instance all the tracks were summed into one track. So instead of having for example a dozen individually timecoded separate audio tracks we have a mixed down track.

This was likely set to save space when recording a lot of data. In this instance a 9-hour meeting.



EX 1A

The next step since we did not have dedicated audio tracks was to contact Zoom to get a breakdown of what data was transmitted and when in [feed.mmc200901.mp4](#).

The reports are attached: Since this is not a criminal investigation, the results were limited as there was **no warrant**. The data we did get from Zoom, though comprehensive, did not give us the audio bandwidth for each channel broken down precisely enough to say, it came from a specific IP address, since the video had not switched with the audio.

Participant	Device	IP Address	Location	Network Type	Microphone	Speaker	Camera	Data Center	Connection Type	Join Time	Leave Time	
1												
2	President Carter – Dist 14	Windows	Public IP: 47.34.6	Madison (US)	Wifi	lantronics	lantronics B	VGA WebCam	ates (Cl	UDP	6:21 PM	03:40 AM( President Carter – Dist 14 left the meeting.Reason: left the meeting.)
3	Ald Bidar – Dist 5	Windows	Public IP: 192.25	(US)	Wired	rray (Rea	phones (Re	Integrated Webcam	ates (Cl	SSL	8:19 PM	02:55 AM(Ald Bidar – Dist 5 left the meeting.Reason: left the meeting.)
4	Ald Martin – Dist 11	Mac	Public IP: 99.100	Madison (US)	Wifi	one (Mac	akers (Mac	Bime HD Camera	(Butates (Cl	UDP	6:26 PM	03:40 AM(Ald Martin – Dist 11 left the meeting.Reason: left the meeting.)
5	Amy Owen	Windows	Public IP: 71.8.15	Madison (US)	Wifi	itek High	itek High	Definition Audio	ited States (Cl	UDP	6:02 PM	03:40 AM(Amy Owen left the meeting.Reason: Host closed the meeting.)
6	Clerk - Jennifer Haar	Windows	Public IP: 204.14	Madison (US)	Wired	ie (Sennhe	(Sennheis	Integrated Webcam	ates (Cl	UDP	5:36 PM	03:40 AM(Clerk - Jennifer Haar left the meeting.Reason: Host closed the meeting.)
7	Joseph Schraven	Windows	Public IP: 68.187	Madison (US)	Wifi	rray (Rea	phones (Re	Integrated Webcam	ates (Cl	UDP	5:31 PM	03:40 AM(Joseph Schraven left the meeting.Reason: Host ended the meeting.)
8	Laura Valderrama	Mac	Public IP: 71.86.1	Madison (US)	Wifi	one (Interp	(Internal	Speakers)United	ates (Cl	UDP	7:20 PM	03:03 AM(Laura Valderrama left the meeting.Reason: left the meeting.)
9	Ald Furman – Dist 19	Windows	Public IP: 71.86.1	Madison (US)	Wired	ie (Jabra	r (Jabra Eng	USB Video Device	ates (Cl	UDP	6:27 PM	03:40 AM(Ald Furman – Dist 19 left the meeting.Reason: left the meeting.)
10	Mayor Rhodes-Conway	Windows	Public IP: 204.14	Madison (US)	Wired	ie (Plantra	ee (Plantron	Integrated Webcam	ates (Cl	UDP	11:04 PM	03:40 AM( Mayor Rhodes-Conway left the meeting.Reason: Host closed the meeting.)
11	Ald Baldeh – Dist 17	Windows	Public IP: 172.22	Madison (US)	Wifi	rray (Synr	s (Synaptic	Integrated Camera	ates (Cl	UDP	6:31 PM	03:40 AM(Ald Baldeh – Dist 17 left the meeting.Reason: left the meeting.)
12	Ald Lemmer – Dist 3	Mac	Public IP: 172.22	Madison (US)	Wifi	one (Mac	akers (Mac	Bime HD Camera	(Butates (Cl	UDP	6:27 PM	03:40 AM(Ald Lemmer – Dist 3 left the meeting.Reason: Host closed the meeting.)
13	Staff - Atty Michael Haas	Windows	Public IP: 204.14	Madison (US)	Wired	rray (Rea	phones (Re	Integrated Webcam	ates (Cl	UDP	6:26 PM	03:40 AM(Staff - Atty Michael Haas left the meeting.Reason: Host closed the meeting.)
14	Staff - Matt Mikolajewski	Windows	Public IP: 172.22	Madison (US)	Wifi	rray (Rea	phones (Re	Integrated Webcam	ates (Cl	UDP	6:29 PM	03:24 AM(Staff - Matt Mikolajewski left the meeting.Reason: left the meeting.)
15	Steaming B (Paul Schmidt)	Windows	Public IP: 204.14	Madison (US)	Wired	rray (Rea	phones (Rea	ltek(R) Audio	ited States (Cl	UDP	5:34 PM	03:40 AM(Steaming B left the meeting.Reason: Host closed the meeting.)
16	Ald Tierney – Dist 16	Windows	Public IP: 75.100	Verona (US)	Wifi	Realtek	altek High	D HD WebCam	ates (Cl	UDP	6:24 PM	03:40 AM(Ald Tierney – Dist 16 left the meeting.Reason: Host closed the meeting.)
17	Ald Foster – Dist 15	Windows	Public IP: 47.34.5	Madison (US)	Wifi	rray (Rea	phones (F	User Facing Right	ates (Cl	UDP	6:28 PM	03:40 AM(Ald Foster – Dist 15 left the meeting.Reason: Host closed the meeting.)
18	VP Abbas – Dist 12	Windows	Public IP: 208.19	Madison (US)	Wifi	ie (Realte	e (Realtek	HP HD Camera	ates (Cl	UDP	6:27 PM	03:40 AM( VP Abbas – Dist 12 left the meeting.Reason: left the meeting.)
19	Staff - Marci Paulsen	Windows	Public IP: 204.14	Madison (US)	Wired	rray (Rea	phones (Re	Integrated Webcam	ates (Cl	UDP	6:18 PM	03:39 AM(Staff - Marci Paulsen left the meeting.Reason: left the meeting.)
20	Staff - Chief Wahl	Windows	Public IP: 204.14	Madison (US)	Wired	rray (Rea	phones (F	User Facing Right	ates (Cl	UDP	6:31 PM	03:39 AM(Staff - Chief Wahl left the meeting.Reason: left the meeting.)
21												
22												
23												
24												
25												

EX 4

Participant	Device	IP Address	Location	Network Type	
1					
2	President Carter – Dist 14	Windows	Public IP: 47.34.6	Madison (US)	Wifi
3	Ald Bidar – Dist 5	Windows	Public IP: 192.25	(US)	Wired
4	Ald Martin – Dist 11	Mac	Public IP: 99.100	Madison (US)	Wifi
5	Amy Owen	Windows	Public IP: 71.8.15	Madison (US)	Wifi
6	Clerk - Jennifer Haar	Windows	Public IP: 204.14	Madison (US)	Wired
7	Joseph Schraven	Windows	Public IP: 68.187	Madison (US)	Wifi
8	Laura Valderrama	Mac	Public IP: 71.86.1	Madison (US)	Wifi
9	Ald Furman – Dist 19	Windows	Public IP: 71.86.1	Madison (US)	Wired
10	Mayor Rhodes-Conway	Windows	Public IP: 204.14	Madison (US)	Wired
11	Ald Baldeh – Dist 17	Windows	Public IP: 172.22	Madison (US)	Wifi
12	Ald Lemmer – Dist 3	Mac	Public IP: 172.22	Madison (US)	Wifi
13	Staff - Atty Michael Haas	Windows	Public IP: 204.14	Madison (US)	Wired
14	Staff - Matt Mikolajewski	Windows	Public IP: 172.22	Madison (US)	Wifi
15	Steaming B (Paul Schmidt)	Windows	Public IP: 204.14	Madison (US)	Wired
16	Ald Tierney – Dist 16	Windows	Public IP: 75.100	Verona (US)	Wifi
17	Ald Foster – Dist 15	Windows	Public IP: 47.34.5	Madison (US)	Wifi
18	VP Abbas – Dist 12	Windows	Public IP: 208.19	Madison (US)	Wifi
19	Staff - Marci Paulsen	Windows	Public IP: 204.14	Madison (US)	Wired
20	Staff - Chief Wahl	Windows	Public IP: 204.14	Madison (US)	Wired

EX 5

Audio (Sending) Bitrate	Audio (Receiving) Latency	Audio (Sending) Latency	Audio (Receiving) Jitter	Audio (Sending) Jitter	Audio (Receiving) Packet Loss-Avg(Max)	Audio (Sending) Packet Loss-Avg(Max)	Video (Receiving) Bitrate	Video (Sending) Bitrate	Video (Receiving) Latency	Video (Sending) Latency	Video (Receiving) Jitter	Video (Sending) Jitter	Video (Receiving) Packet Loss-Avg(Max)	Video (Sending) Packet Loss-Avg(Max)	Video (Receiving) Resolution	Video (Sending) Resolution	Video (Receiving) Frame Rate	Video (Sending) Frame Rate
44 kbps	40 ms	55 ms	8 ms	10 ms	0.01%(0.52%)	0.04%(1.69%)	1205 kbps	183 kbps	50 ms	54 ms	9 ms	10 ms	0.01%(1.15%)	0.06%(1.65%)	256*144	320*180	10 fps	12 fps
27 kbps	41 ms	48 ms	7 ms	7 ms	0.53%(13.74%)	0.01%(0.14%)	1186 kbps	153 kbps	46 ms	50 ms	11 ms	8 ms	-	-	160*90	-	11 fps	11 fps
8 kbps	50 ms	53 ms	7 ms	5 ms	0.02%(1.45%)	0.55%(2.1%)	796 kbps	79 kbps	50 ms	54 ms	7 ms	7 ms	0.02%(2.41%)	0.61%(3.94%)	160*90	160*90	12 fps	11 fps
43 kbps	31 ms	35 ms	7 ms	7 ms	-0.0025	0.17%(2.69%)	1134 kbps	202 kbps	31 ms	33 ms	7 ms	7 ms	-0.0052	0.06%(2.88%)	160*90	320*180	10 fps	13 fps
39 kbps	46 ms	48 ms	7 ms	10 ms	-0.0041	0.02%(0.86%)	1019 kbps	318 kbps	47 ms	51 ms	7 ms	9 ms	-0.0096	-0.0011	640*360	160*90	16 fps	12 fps
43 kbps	47 ms	54 ms	7 ms	11 ms	0.14%(4.52%)	0.02%(0.59%)	1223 kbps	81 kbps	47 ms	50 ms	7 ms	9 ms	0.15%(7.35%)	0.03%(0.88%)	256*144	160*90	10 fps	11 fps
39 kbps	27 ms	31 ms	6 ms	6 ms	-0.001	-	1156 kbps	305 kbps	25 ms	30 ms	6 ms	7 ms	-0.0039	0.01%(0.38%)	160*90	640*360	11 fps	13 fps
46 kbps	44 ms	50 ms	7 ms	8 ms	0.03%(1.66%)	-0.0002	1224 kbps	130 kbps	45 ms	50 ms	8 ms	7 ms	0.03%(3.48%)	-0.0003	256*144	160*90	10 fps	11 fps
18 kbps	37 ms	41 ms	7 ms	7 ms	0.01%(0.89%)	1.84%(3.02%)	1095 kbps	106 kbps	38 ms	43 ms	8 ms	8 ms	0.01%(2.12%)	0.69%(1.95%)	256*144	160*90	12 fps	11 fps
54 kbps	57 ms	63 ms	7 ms	9 ms	0.02%(0.46%)	-0.0017	1175 kbps	149 kbps	57 ms	62 ms	7 ms	7 ms	0.02%(0.62%)	-0.0008	256*144	-	10 fps	12 fps
75 kbps	47 ms	50 ms	8 ms	10 ms	0.13%(2.8%)	-0.0197	845 kbps	626 kbps	47 ms	47 ms	9 ms	10 ms	0.07%(3.27%)	-0.0046	256*144	320*180	10 fps	17 fps
54 kbps	37 ms	24 ms	7 ms	8 ms	0.01%(0.71%)	-	1184 kbps	191 kbps	17 ms	23 ms	7 ms	8 ms	0.01%(1.3%)	-	256*144	160*90	10 fps	13 fps
40 kbps	49 ms	47 ms	9 ms	9 ms	0.21%(5.97%)	-	1214 kbps	79 kbps	50 ms	54 ms	11 ms	9 ms	0.22%(11.21%)	-0.0001	160*90	160*90	10 fps	11 fps
46 kbps	59 ms	75 ms	11 ms	30 ms	0.17%(2.51%)	1.58%(15.8%)	1169 kbps	161 kbps	53 ms	62 ms	10 ms	20 ms	0.1%(3.07%)	1.47%(13.99%)	256*144	160*90	11 fps	12 fps
30 kbps	30 ms	7 ms	7 ms	7 ms	0.02%(0.46%)	-	456 kbps	35 kbps	35 ms	35 ms	6 ms	6 ms	0.03%(0.84%)	-	640*360	-	11 fps	-
92 kbps	34 ms	40 ms	7 ms	8 ms	0.03%(1.25%)	0.01%(0.82%)	1033 kbps	723 kbps	34 ms	39 ms	7 ms	9 ms	0.02%(2.84%)	0.01%(1.02%)	256*144	640*360	10 fps	15 fps

## EX 6

With a warrant more detailed information may have been available.

### What the above charts break down:

- We know who was “officially logged on.”
- The operating system they were running.
- The IP address (which we have purposely blurred.)
- Location,
- Network Type,
- Microphone-Speaker-Camera make & model,
- Data Center,
- Connection Type,
- Join time & Leave time,
- Zoom software version,
- Video / audio receiving & sending bitrate,
- Video / audio sending & receiving latency,
- Video/ audio receiving & sending jitter,
- Video / audio sending & receiving packet loss.
- Zoom CPU use on each system,
- Frame rates both sending & receiving,
- Video resolution

In this case, since there is no criminal complaint filed, we are working without the complete data a warrant can provide. There is a limited scope of data that is “publicly available.”

- Switching of the cameras, due to low decibel and limited duration of the spoken word, did not happen.
- We do not have access to the switching data, or the data packet (audio & video data) of people that were not directly on camera at any given time. In other words, the switching data we have available is only garnered by who is on camera.
- Zoom also updates their software quite often and incrementally.
- Users in the above log were using software ranging from **5.0.24046.0510** to **5.2.44052.0816** on both PC & Mac platforms.

- Without access to Zoom's system log files, it is unknown if this impacted what data was harvested.
- The system registry and log file could give us more data, but what more could be provided is uncertain.
- We do know the person was in very close proximity to the microphone when the word was spoken, it was not just "someone else in a room."

**Forensics:** We have one word spoken, under breath, no separate Zoom audio channels, no warrant to get all the data records from Zoom.

From a forensic standpoint we are at a "*not enough information provided*" to narrow it down with a scientific degree of certainty.

Normally in a forensic examination we end at this point and document that the data provided does not provide enough verifiable evidence to warrant a scientific conclusion unless more data becomes available for further review.

This was reported early on in January of 2021.

### **POST Forensics:**

After several conference calls, we were asked to review numerous timecoded segments of males who spoke throughout the 9-hour period. The idea was to clarify the audio enough that an ID could be made by people familiar with the voices. Not a scientific analysis, but to clarify and aid for local review.

### **Procedure:**

In doing voice comparisons and identification you must be able to rule someone IN conclusively, not just rule them OUT.

Pitch, articulation, voice, metrical structure, timbre, vocal intensity, segmental, patterns of speech, vowels, consonants, glides, fricatives, nasality, dialects as well as everything from nasal qualities to colloquial traits must be analyzed. The frequency response and the recording quality comes into play here as well.

There must be a long enough of an exemplar to analyze attributes available. Length & quality of the exemplar *and* comparable samples are both critical to identification.

Not having a long exemplar in this case, (1-word in a 9-hour recording) is a critical issue. Outside of pitch and perhaps dialect there is very little to go on, and the word is said under normal spoken volume (i.e., muttered).

To make a valid exam one needs a good normal speech sample of the person in question speaking in their normal voice to compare to recordings in question. In this situation, again we are dealing with

one word spoken below normal vocal projection. **EX 11** is a phonetic table we use as a starting point reviewing the English language. It breaks down the spoken word into “parts” to examine using sonographs, spectrographs and 3d special audio as in **EX 5,6,7,8, & 9** This is a situation where we do not have enough data to do a forensic workup that would meet Daubert or Frye standards, which are legal standards for admissibility in court.

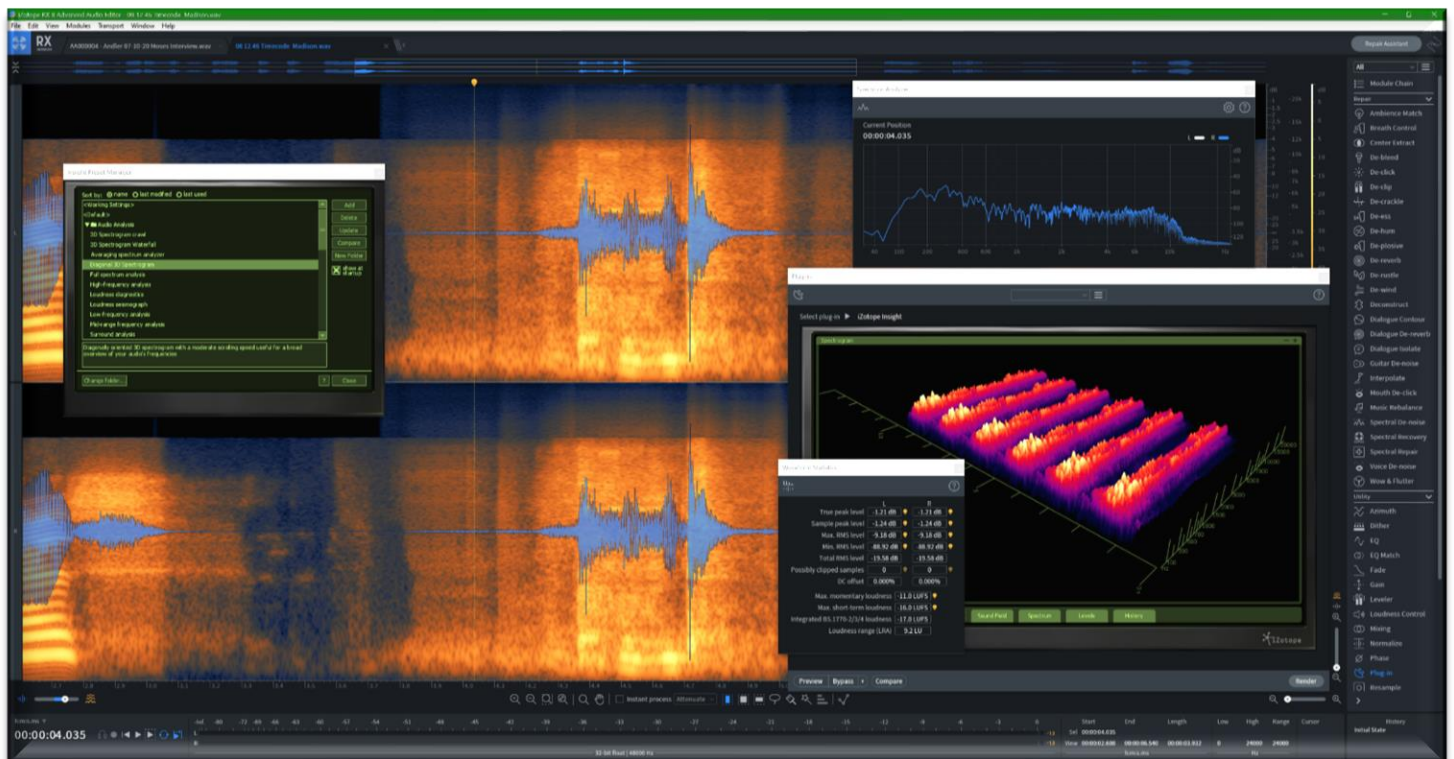
In cleaning up the audio there is no “push button solution” it usually takes a number of programs that can get you in the ballpark, the rest is “hand painting” out backgrounds to isolate a particular voice. (“Hand painting” is manually extracting audio background noise with a brush tool in iZotope RX 8 advanced spectrographic audio editor.)

In **EX 5, 6, 7 & 8** the word in question is isolated and analyzed for frequency response and attributes such as vowel and consonant. Programs such as Voicegrid, Praat, Vocalize, IKAR, Speech Analyzer, Phonexia, Sestek and many more require a larger database than one word to do an analysis.

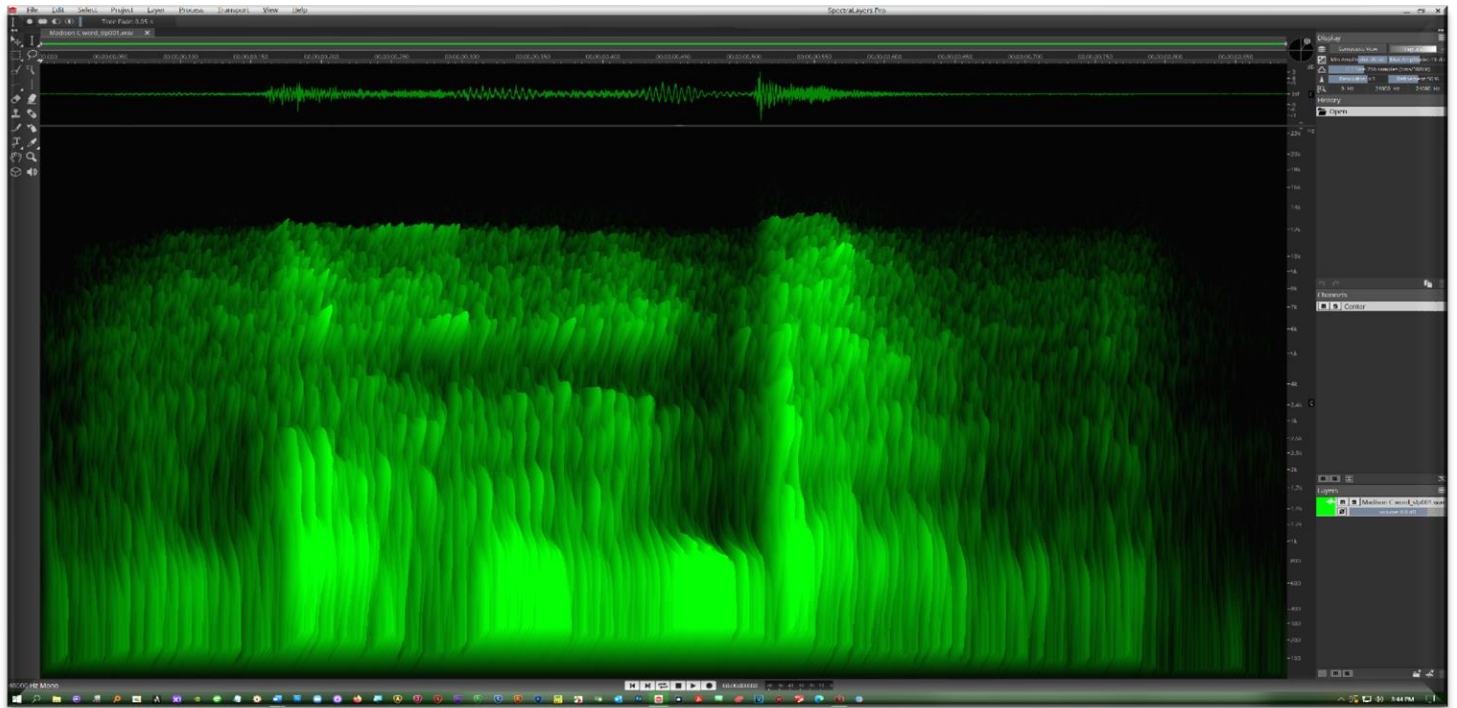
The 5 graphs below are measuring the pitch of each part of the word. The Nyquist Theorem would suggest that the recording was natively recorded at 32kHz- which is correct for Zoom.

On **EX 5, 6, 7 & 8 & 9** are different types of analysis of the word in question. The voices of 11 suggested males went through the same process of isolating the voice from background sounds.

I started to isolate the background sounds. The ambience of a recording can tell you a lot about the type of location and type of room it was recorded in. As an example, a carpeted living room with drapes as opposed to a police station with reflective hard surfaces which cause acoustic reflections. Restaurants, people, birds, church bells, airport or public transportation, harbor sounds, basically sounds of everyday life are often useful in determining the environment of a recording.



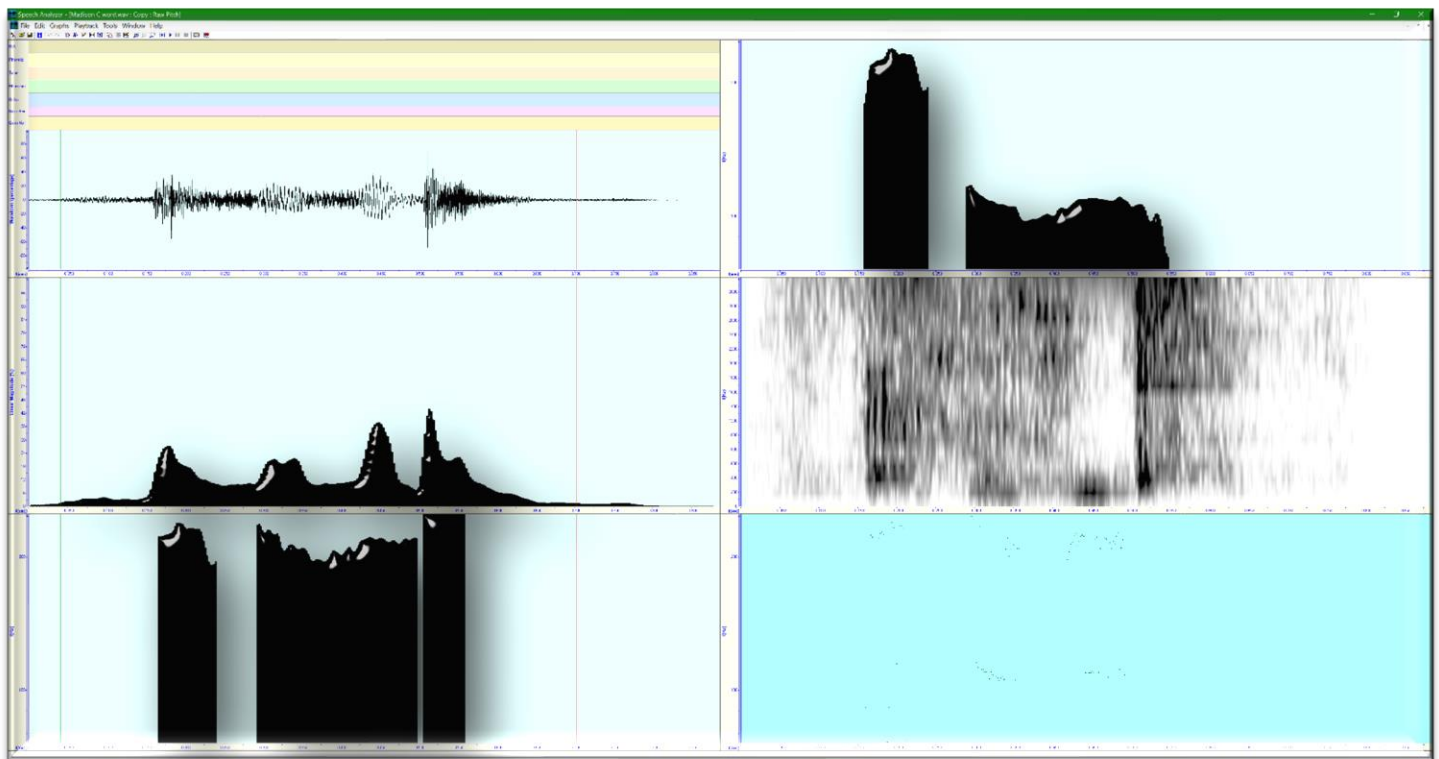
**EX 5 Clarification of the area surrounding the word (room tone and noise removal)**



**EX 6 3D analysis of the word to remove any digital artifacts.**

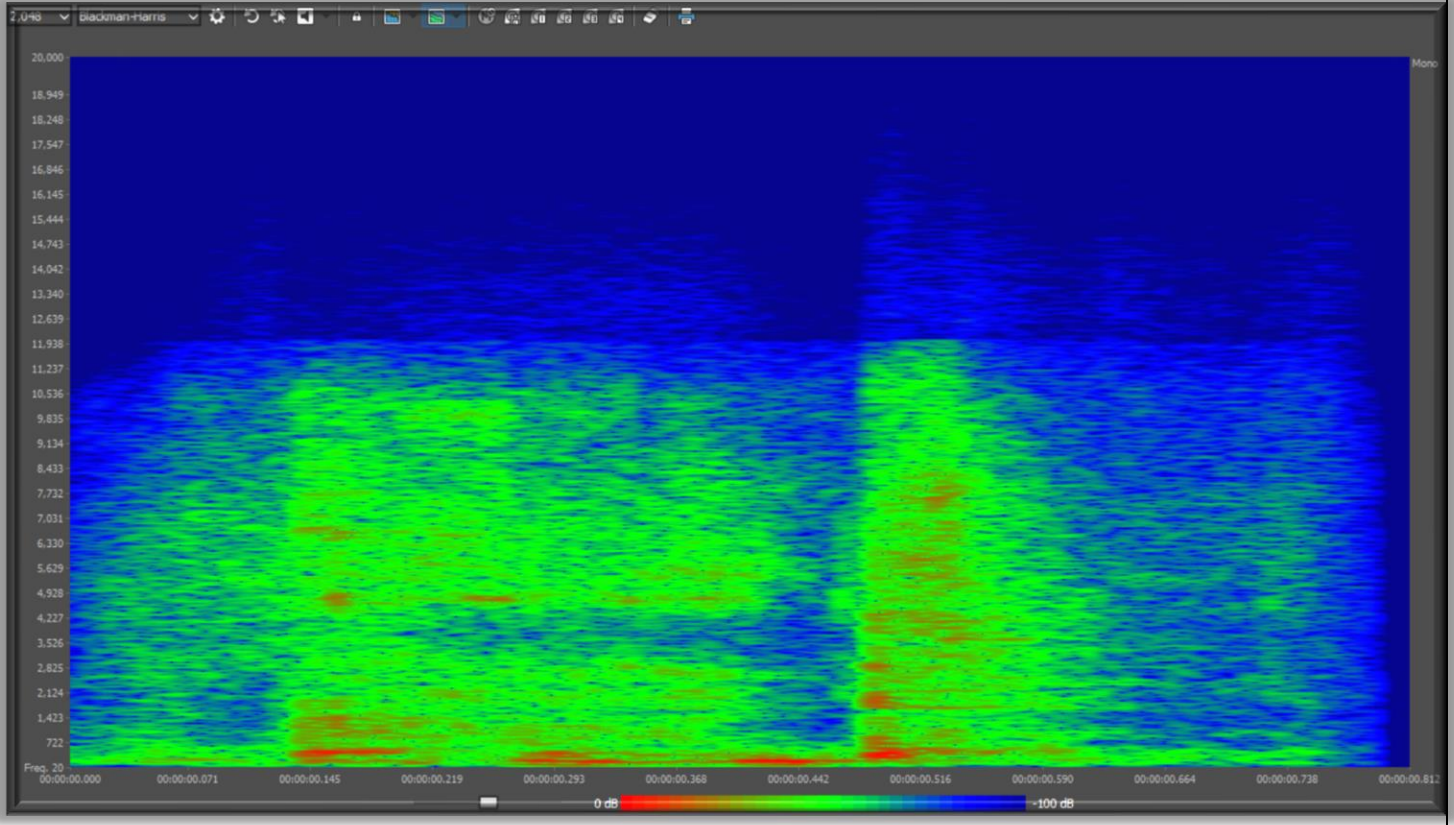
Once the voice was isolated from the background it became clear one issue stood out.

The speaker's Proximity to the microphone.



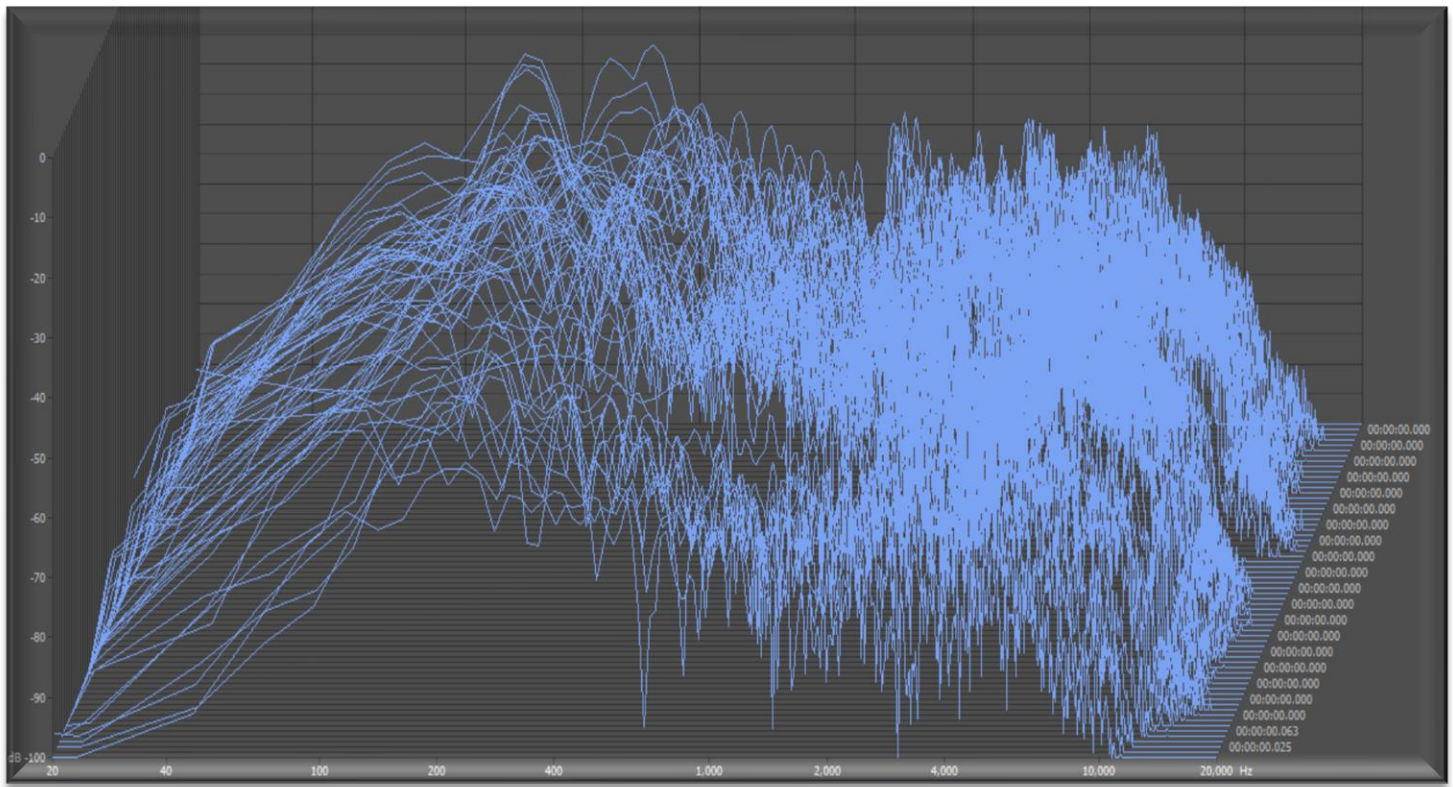
**EX 7 reviewing the phonetic and consonant structure of the word. The word's building blocks so to speak.**





**EX 8** reviewing ambience to isolate the word from background noises and white noise from other channels.

9



**EX 9** 64-layer Blackman-Harris frequency chart v. time

	L	R
True peak level	-1.21 dB	-1.21 dB
Sample peak level	-1.24 dB	-1.24 dB
Max. RMS level	-9.18 dB	-9.18 dB
Min. RMS level	-88.92 dB	-88.92 dB
Total RMS level	-19.58 dB	-19.58 dB
Possibly clipped samples	0	0
DC offset	0.000%	0.000%
Max. momentary loudness	-11.0 LUFS	
Max. short-term loudness	-16.0 LUFS	
Integrated BS.1770-2/3/4 loudness	-17.0 LUFS	
Loudness range (LRA)	9.2 LU	

**EX 10** Measuring decibel level of the word in question, which is significantly lower than normal conversation on the Zoom recording.

**THE INTERNATIONAL PHONETIC ALPHABET (revised to 1993, corrected 1996)**

CONSONANTS (PULMONIC)

	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal		m ɱ		n ɳ		ɳ̺	ɲ	ŋ	ɴ		
Trill		ʙ		ʀ					ʀ		
Tap or Flap				ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

CONSONANTS (NON-PULMONIC)

Clicks	Voiced implosives	Ejectives
ʘ Bilabial	ɓ Bilabial	ʼ Examples:
Ʉ Dental	ɗ Dental/alveolar	ɓ' Bilabial
ǀ (Postalveolar)	ɗ' Dental/alveolar	ɗ' Dental/alveolar
ǃ Palatoalveolar	ɠ Velar	k' Velar
ǂ Alveolar lateral	ɠ' Uvular	s' Alveolar fricative

OTHER SYMBOLS

ʍ Voiceless labial-velar fricative	ʎ Alveolo-palatal fricatives
ʋ Voiced labial-velar approximant	ɭ Alveolar lateral flap
ɥ Voiced labial-palatal approximant	ɥ Simultaneous ʃ and x
ħ Voiceless epiglottal fricative	Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary.
ʕ Voiced epiglottal fricative	
ʔ Epiglottal plosive	

DIACRITICS Diacritics may be placed above a symbol with a descender, e.g. ɳ̥̂

o Voiceless	ɳ̥ ɖ̥	.. Breathily voiced	ɓ̤ ɑ̤	ˠ Dental	t̠ d̠
h Voiced	ʂ̥ ʐ̥	ˠ Creaky voiced	ɓ̰ ɑ̰	ˡ Apical	t̡ d̡
̥ Aspirated	t̚ ɖ̚	ˠ Linguotabial	t̚ ɖ̚	ˠ Laminar	t̚ d̚
ˠ More rounded	ɔ̠ ɔ̠	ˠ Labialized	t̚ˠ ɖ̚ˠ	ˠ Nasalized	ẽ̃
ˠ Less rounded	ɔ̠ ɔ̠	ˠ Palatalized	t̚ˠ ɖ̚ˠ	ˠ Nasal release	d̠ˠ
ˠ Advanced	ɥ̠	ˠ Velarized	t̚ˠ ɖ̚ˠ	ˠ Lateral release	d̠ˠ
ˠ Retracted	ẽ̠	ˠ Pharyngealized	t̚ˠ ɖ̚ˠ	ˠ No audible release	d̠ˠ
ˠ Centralized	ẽ̠	ˠ Velarized or pharyngealized	ɬ̠		
ˠ Mid-centralized	ẽ̠	ˠ Raised	ɛ̠ (ɹ̠ = voiced alveolar fricative)		
ˠ Syllabic	ɳ̥	ˠ Lowered	ɛ̠ (β̠ = voiced bilabial approximant)		
ˠ Non-syllabic	ɳ̥	ˠ Advanced Tongue Root	ɛ̠		
ˠ Rhoticity	ɳ̥ ɑ̠	ˠ Retracted Tongue Root	ɛ̠		

VOWELS

Where symbols appear in pairs, the one to the right represents a rounded vowel.

SUPRASEGMENTALS

- ˈ Primary stress
- ˌ Secondary stress
- ː Long e: founˈɑːtʃən
- ˑ Half-long eˑ
- ˑ Extra-short eˑ
- ˑ Minor (foot) group
- ˑ Major (intonation) group
- ˑ Syllable break ʃi.ækt
- ˑ Linking (absence of a break)

TONES AND WORD ACCENTS

LEVEL

- ˥ Extra high
- ˨ High
- ˩ Mid
- ˪ Low
- ˫ Extra low
- ˧ Downstep
- ˦ Upstep

CONTOUR

- ˥˩ or ˩˥ Rising
- ˥˨ or ˩˨ Falling
- ˥˩˨ High rising Low
- ˥˩˨˨ Low rising
- ˥˩˨˨˨ Extra low rising-falling
- ˩˨˩˨˩ Global rise
- ˩˨˩˨˩˩ Global fall

### EX 11

**EX 11** The findings are normally worked in with Phonetic standards if a large enough sample is provided to look for similarities in pronunciation of plosives, nasals, trill, tap, flip, lateral fricatives, approximant, and lateral approximants.

All in all, there are over 40 different comparison models...if you have a large enough sample to work with. Which we did not.

As of 1/27/21 this is where we stood.

Zoom has been asked for more data, but there is only so much, as we understand it, that we may obtain without a warrant.

Due to it being a single spoken word, it is uncertain how that would stand out as a **data packet**.

In my estimation, as the word in question is spoken at a specific time in the recording and is isolated, the correct packet data would give us the correct IP address, if run-time records are kept by Zoom.

Given their meticulous records available publicly, it would seem likely that their system log files would have recorded this network traffic data.

**3/4/21**

I was requested to do a “process of elimination” using any other control factors.

This is not a scientific algorithm, but a deduction based on 40 years of full-time audio experience.

There was only one word spoken, under the speaker’s breath. After reviewing each male voice in segments, a key issue stood out. Proximity to the microphone.

There is also very little room ambience behind the word. The further away a person is from a microphone while speaking the greater the chance of picking up room-tone or background noise.

Leaning into a microphone on a laptop for example to say one word, would cause a quick gating of the AGC (Automatic Gain Control) circuit, which would be apparent on a spectroscope. This did not happen.

The word in question was spoken in very close proximity to a microphone. This more than likely was on a headset.

All these voices were run through 3D Spectral Audio, Sonographs & Spectrographs to look for background telling ambience and room tone.

Two people can be ruled out right away due to their accents. Pitch, Diction, and tests that could be used with larger samples were not used due to the nature of the way the word was spoken. Again, a singular word.

Two people can be ruled out right away due to their accents & dialect.



Samba Baldah ruled out.



Syed Abbas ruled out.

NEXT: Background sound overwhelming voice & distance from microphone



Wahl ruled out:



Grant Foster ruled out.



Milolajewski ruled out.



Michael Haas ruled out.



Paul Skidmore – close to mic, but no headset



Facilitator Joe Schraven: on headset



Keith Furman on headset



Michael Tierney on headset

Due to the proximity to the microphone, it's likely we are working with a headset. It is possible someone could have leaned into a microphone, however the AGC circuit (automatic gain control) would have likely attenuated, making that easy to see on a scope.

Since we are beyond forensics which is our field, we are simply forensically cleaning up audio to make it easier for people who know the individuals in the Zoom to perhaps identify a person.

A clarified, time-coded segment of everyone indicated was provided for analysis to Madison.

So why did this report take such an extended time to work through?

- 1) Zoom data, without a warrant is limited.
- 2) No individual audio files for each person were kept. This is an option on Zoom, to record all audio files of each participant separately, but it takes up a lot of hard drive space. As such all the files are combined into a merged track.
- 3) Camera switching does not always trigger due to data lag and the amount of data needed to switch video to a new user.
- 4) Ability to obtain data from other parties during a pandemic.
- 5) Our current and heavy caseload.
- 6) Reaching a dead end from the scientific standpoint on 1/27/21

If more data becomes available, this report will be amended to reflect it.

Respectfully,

## **Bryan Neumeister**

IEEE, IPVM, ABRE, DLA, AES, SAM, CAGE, ASCAP

Court Certified: Military, Federal, State, Civil US District Court, Department of Justice,

US Grand Jury, State, Civil & Aviation Audio, Video & Photographic Forensic Expert

39 EMMY AWARDS for Technical Excellence - 12 individual achievement Emmy statues

40 Years Professional Experience

USAForensic, llc. Court Certified Audio, Video, Computer, Cell Phone & Cell Tower Forensic Experts.

(602) 740-6128: 44 W. Monroe St. 33<sup>rd</sup> floor, Phoenix, Az. 85003

[www.USAForensic.com](http://www.USAForensic.com)

United States Department of Defense - (SAMS Forensic contract with C.I.D. / JAG)

United States District Courts: Contracted Technical Expert

US Department of Justice: Contracted Technical Expert

Defense, Law Enforcement and Government Agencies.

Special Prosecutor's Office on Corruption - P.A.N.E.L. - US & Puerto Rico

Audio Engineering Society- Member & Lecturer

DLA- DARPA: Defense Advanced Research Projects Agency (classified)

Institute of Electrical and Electronics Engineers – Member

Technical work in 23 countries

Recipient of 12 individual and 39 total EMMY AWARDS – National Association of Television Arts & Sciences for Technical Excellence

Gold at both the Cannes (Golden Lion) & Calgary film festivals for audio.



### Legal & Technical:

40 Years Professional Full-time Audio & Video Experience  
Professional Audio & Video Enhancement,  
Computer Drive Recovery,  
Cell Phone Forensics – Tower Analysis  
Federal & State Government Agencies Computer Drive Recovery  
DLA, DOE, DARPA: Defense Advanced Research Projects Agency (classified)  
Law Enforcement Agencies, National, State & Local  
8 Years Search & Helicopter Rescue (MCSO-DPS- Arizona)  
Worked Internal Affairs cases for Phoenix Police Department & The AZ Department of Public Safety.  
US Military – Army, Navy, Air Force, Marines & Coast Guard (SAM contract)  
Los Angeles District Attorney's Office -NELOS  
Department of Defense (classified & non-classified)  
Beta Tester for Various Forensic Systems Manufacturers  
United States District Court system: Forensic Consultant  
United States Grand Jury system: Forensic Consultant  
U.S. Department of Justice: Forensic Consultant- Audio forensic work  
OPDS and Office of the Public Defender: Vendor number  
Work with US Army CID Prosecutors Office & Maricopa County Prosecutors Office  
Phoenix PD Homicide - Mesa PD Homicide- Case Video & Audio Evidence Enhancement  
Work with various Innocence Projects - Nation wide  
10 Years with NBC Television - Technical Video / Audio  
Federal, State, Aviation and Civil Law cases - Court Certified Technical Expert  
2 State of the Art Facilities. Over 75 custom Computers & Processors  
State of the Art HD Video and Audio Gear.  
Gear and Software Upgraded Daily  
3D Sonographs, Spectrographs, Spectral 3D -HD Video & 192kHz - 64-bit Audio  
Expert Cell Phone Analysis (Oxygen, Cellebrite, Secure-View): Towers, Transmitters, Phones & Software  
D.O.E. Military Forensic High-Speed Video Expert  
Photo Enhancement using Clear-ID, Pixel Stacking & Frame averaging etc.  
ACLU, Innocence Project cases  
Graduated Pi Sigma Alpha- California State University Northridge - 1980 (Political Science, emphasis on Journalism)  
Have worked in 23 Countries as a Technical Expert  
Published Nationally

### Over 200+ Forensic Cases in the past 36 months:

Non-Military court cases include: Federal, US District, Grand Jury, RICO, Homicide, Murder for Hire, Fraud, Robbery, Armed Robbery, Assault with a Deadly Weapon, Arson, Kidnapping, Bank Robbery, DUI, DWI, Civil Cases...etc. Currently working over a dozen Homicide and Capital cases nationwide. For Defense, Prosecution, Civil and Insurance carriers.

### Large Cases (Small Sample):

**United States v. YN2 Charmaine K. March-** (Arson) Federal Military Court Martial **Retained by the Department of Defense US Navy Defense (in 2020)** to debunk "Police Cell Tower Tracking Techniques". Daubert hearing determined the Practice was **not a Science** and was *inadmissible*, as it did not meet Daubert standards in Federal or US Military Court.  
**State of Texas v. Fredrick Lee** - (Capital Murder) - Retained by **Defense** as Surveillance Video Expert: *V: Not Guilty*  
**State of Arizona v. Steven Jones (NAU)** – Video Expert for **Defense** – State's scene measurement & reenactment video ruled inadmissible due to scientific inaccuracy depicting the scene and possible bias.  
**State of Arizona v. Keshawn Green** (1<sup>st</sup> degree murder) - Retained by the **Prosecution** as Surveillance Video Expert: *V: Guilty*  
**US Government v U-Haul Philadelphia** – Retained by **Defense** as Surveillance Video Expert: *V: Settled*  
**US Grand Jury Cleveland, Ohio: Hope Steffi** - Retained as Surveillance Video Expert: *V. Civil large settlement*  
**Government of India: Sri Nithyananda Swami** - Retained by **Defense** as Video Expert: *V. Not Guilty*  
**LA District Attorney's Office** - USAForensic retained by **Prosecution** as Cell Tower Experts: *V. Guilty*  
**US Government v. Charles Keating** - In Trial, Retained by **Defense** as Video Expert: *V. Not Guilty*  
**United Kingdom (London, Barrister) V. Tyrone Williams** - Retained as Audio Expert: *Civil Settlement*  
**State of Arizona v. Michael Allen Voden-** Retained by the **Prosecution** as Audio Expert: *V. Guilty*  
**US Government v. Charles Keating III** - In Trial, Retained by **Defense** as Aerial Video Expert: *V. Not Guilty*

**Scaffide v. Lincoln County Wyoming**- Retained by **Government** as Surveillance Video Expert: *V. Not Guilty*

**State of Arizona v. Jeffery Martinson** - Retained by **Defense** as Video Expert

**State of AZ v. Antonio Brown** (rape) retained by pro per- **Not guilty** Willits issued against prosecution.

**City of Phoenix v. Copeland**: retained by **City** as Cell Tower Experts: *V Civil, favorable settlement.*

**State of Montana v. Daniel Pallet**- Retained by **Defense** as Surveillance Video Expert: *V. Dismissed with Prejudice*

**State of Arizona v. Pedro Barraza** – Retained by **Defense** as Surveillance Video chain-of-custody Expert: *V. Not Guilty*

**State of Arizona v. Alan Champagne** (1<sup>st</sup> Degree Murder) - Retained by the **Prosecution** as Surveillance Video Expert: *V. Guilty*

**State of Arizona v. Jodi Arias – Penalty Phase – Defense** Computer Expert - *"During the first trial in 2013 and earlier in this trial, Mesa police experts testified that there was no porn and or viruses on the computer. Martinez had used that testimony to impeach Arias' claims that there were both, and it furthered his portrayal of Arias as a liar. But defense experts subsequently found porn and the viruses associated with the device. Mesa police have since admitted it was there all along."* –Gannett

### Precedent Setting Cases:

**United States v. YN2 Charmaine K. March-** (Arson) Federal Military Court Martial **Cell Tower expert for the Defense** Retained by the Department of Defense (*in 2020*) to debunk "Police Cell Tower Tracking techniques" - Tower Tracking was ruled inadmissible in trial as "a practice, rather than actual science". In a Daubert hearing the only use granted by the Federal Court was that the Prosecution's expert could say the phone connected in either the East or West coast of the United States. *The Judge had a technical background.* Not Guilty

**State of Arizona v. Steven Jones (referred to in the media as the NAU Shooter)** – Video Expert for **Defense** – State's scene measurement & reenactment video ruled inadmissible due to possible bias and scientific inaccuracy depicting the scene. Charge reduced from initial 1<sup>st</sup> degree Murder to Manslaughter.

**US v. Daniel Scott Pallett**, CR 18-11-M-DLC According to the federal rules of evidence 902-13/14 there must be metadata (hash values) connecting the submitted files presented to the original data. Since the original data was never presented and the original files never Hashed- there was a chain of custody issue. The Case was dismissed with prejudice Missoula, Montana on exactly those Daubert grounds. (Attorney Nick Kirby Brooke)

**State of AZ v. Pedro Barraza** CR2016-002708 The judge dismissed several of the charges lodged against the defendant, as police could not authenticate the video which was the strongest evidence they had against Barraza. Proper procedures, protocols were not followed when they obtained it, the video was not allowed into evidence. Not guilty verdicts for four defendants. (Attorney Marcus Finefrock)

**State of AZ v. William James Hartwell** CR2015-001482 When asked to preclude video in this trial, the judge (Sheri Stephens) ruled that because the video on a hard drive had been simply viewed without a write-blocker, the dates-last-modified were changed and the video wasn't valid in court. (Attorney Rick Poster)

### Books

- "**Earthbound Misfit**" (Helicopter Rescue, TV Helicopters, Medivac & work with Law Enforcement agencies)591 pages - *senior contributing author & consultant.*
- "**The Secrets of the Blue Oyster Cult**" - Bryan Neumeister discussed as Blue Oyster Cult musician & composer on "*Curse of the Hidden Mirror*" & "*Heaven Forbid*" Albums.
- "**After You're Dead**" -Featured as Forensic expert *character*, "Bry", in #1 bestselling series of Crime/Fiction books by author Cary Allen Stone.
- "**Career of Evil**" – **Author J.K. Rowling** (Harry Potter) - Lyrics used in book from Blue Oyster Cult album I co-wrote songs on.
- "**SEEDS, The Journey Begins**" – Science Fiction. Character likeness and full name used in book as a scientist. -Autor #1 bestselling Amazon author Cary Allen Stone. 2019
- "**SEEDS, The Journey Continues**" – Science Fiction. Character likeness and full name used in book as a scientist. -Autor #1 bestselling Amazon author Cary Allen Stone. 2020

- ***“SEEDS, The Journey Home”***– Science Fiction. Character likeness and full name used in book as a scientist. -Autor #1 bestselling Amazon author Cary Allen Stone. 2021

**National News Media: Forensic Analyst:**

**FOX Business Network:** Featured Forensic Expert

**CNN:** Advisory Video Expert

**The Science Channel** Six 1-hour Episodes on Video & Audio Forensics

**Universal Studios/BBC & MSNBC:** Video Forensic Expert: ***Real, Fake or Unknown*** TV series

Six 1-hour episodes of TV series analyzing viral videos with unknown metadata

**CNN: Jodi Arias:** Audio & Photographic Forensic Expert (in Trial testimony)

**FOX News: Boston Bombings:** Forensic Surveillance Expert (analyst)

**CNN: Trayvon Martin / Zimmerman:** Audio Forensic Expert (analyst)

**NBC/Gannett:** Forensic Surveillance Expert 2019

**Publications:**

Published Nationally

The Legal Investigator Magazine- Surveillance Systems - TV vs. Reality

High Tech, High Stakes Published in Expert Ease - National Forensic Publication.

Consultant to CPU Magazine as a Forensic Audio and Video Expert on Hardware and Software.

Featured by NEAT Video in online publication & mailer re forensic video clarification.

**Lectures:**

**2019 State Bar of Arizona (CLE)**

*Latest in forensic (beta) technology and what can now be done forensically with electronic data*

**2018 Audio Engineering Society:**

*Metadata and chain of custody of files: dithering / file conversion*

**2018 CLA Conference:**

*Digital Forensics (Facility) Cell phones, Towers, Metadata, Photos, Computers Audio & Video Forensic*

**2018 AACJ Annual Attorney Winter Conference (Facility)**

*Digital forensics: Audio, Video, Social Media, Cell Phones, Towers, Computers & Photography*

**2107 Audio Engineering Society:**

*Cellphone forensic audio re metadata, chain of custody, forensic acquisition of audio*

**2016 Federal Habeas Conference**

*Cellphone and Tower forensics*

**2016 Audio Engineering Society:**

**Topics:** *Multi-Pathing of Transmitted RF Signals, Forensic audio*

**2015 Inns of Court:**

**Topics:** *Cell Phone metadata, Audio & Video Forensics*

**2015 Audio Engineering Society:**

**Topics:** *Pareidolia, Dithering, Forensic Audio & NyQuist Theorem*

**2014 Audio Engineering Society & Conservatory of Recording Arts**

**Topics:** *NyQuist Theorem, Sample Dithering & Forensic Audio*

**Opening of the 2013 APDA (Arizona Public Defenders Conference)**

**Topics:** *Audio, Video, Photographic & Surveillance Forensics*

**APDA Faculty Member - 1,550+ Attorneys attended conference (June 26-28, 2013)**

**Television: National & International Broadcast:**

Recipient of **39 EMMY AWARDS** from The National Association of Television Arts and Sciences for Technical Excellence

**40+ additional National & International Awards.**

**Winner CANNES Film Festival (Gold) (Technical Audio Excellence)**

**Winner CALGARY Film Festival (Gold) (Technical Audio Excellence)**

**Worked for NPR & NBC Television News stations for 12+ Years.**

**Phi Sigma Alpha - National Political Science Honor Society – Lifetime Member.**

**Member: NAB, BMI, ASCAP, AES, ERA, NATAS**

**Winner: Film Advisory Board Gold Medal, Parents Choice Award**

### Film & Television Clients:

NBC - ABC - CBS - PBS - BBC - FOX - DREAMWORKS - SCREEN GEMS FILMS - TOUCHSTONE FILMS - LUCASFILMS LTD. - LEVIS - COCA COLA - AMBLIN ENTERTAINMENT - PEPSI - VOLKSWAGEN - TOYOTA - CHEVROLET - NISSAN - AMERICAN EXPRESS - UNIVERSAL PICTURES - LORIMAR - TRIMARK FILMS - TRIMARK ENTERTAINMENT - GANNETT - A&E - DISCOVERY CHANNEL - FOX - DIAL SOAP - COORS BEER - BUDWEISER - MTV - PIZZA HUT - MOTOROLA - UNION CARBIDE - DISNEY - INTEL - MICROSOFT - VISA - MASTERCARD - ARMY - NAVY - AIR FORCE - MARINES - UNITED AIRLINES - CONTINENTAL AIRLINES - PARTNERS FILMS CANADA - PRTV - NATIONAL MEDIA - MOMENTUM FILMS - DFXTV - LOTTO/LOTTERY - GREYSTONE PICTURES - HISTORY CHANNEL - DISCOVERY CHANNEL - WARNER BROTHERS - DAIRY QUEEN - AT&T - MLB - NBA - NFL - SUPER BOWL XXX - ESPN - MAJOR LEAGUE BASEBALL - McDonald's - MCI - HARLEY DAVIDSON - STOUFFER'S - CARQUEST - MD HELICOPTERS - BOEING - "FUTUREWEAPONS", "MYTHBUSTERS" {THE LUXOR - FLAMINGO - STRATOSPHERE - CESAR'S PALACE - MGM GRAND - NYNY - The HARD ROCK...CASINOS all in LAS VEGAS} - NUMEROUS ADVERTISING AGENCIES...

### Certified Cell Phone Forensics:

Latest Cellebrite Ultimate 4PC, Secure-View Forensics, Oxygen Detective, CheckM8, APEX Laboratory and Field systems  
2021 Cellebrite Cloud Analyzer. Oxygen Detective Cloud Jet Extractor  
SV Striker box, PassWare Forensic, EnCase, etc.

D.A.R.T Tower Tracking and signal software- latest versions.

PassWare Complete Forensic Decryption of 280+ encryption methods using 16 core liquid cooled systems

Recovery of deleted apps and data from over 14,000 cell phones.

All cell phone communications Apps, iCloud, iOS9, Android Lollipop, Windows OS etc. Password decryption & recovery.

DCode, Plist, SQLite Browser, Opanda, Kies, EnCase Extractor, EnCase readers, FTK, Stellar Phoenix Professional data recovery

Six fly-pack MSI 8/12 Core multi SSD Field-Units for extraction at any location

### CELL TOWERS & CDR: NOTE: plotting is a practice and not a science

In a Daubert Hearing in US Federal Court Norfolk VA, (2020) Hired by Department of Defense to debunk "cell tower tracking: Police Tower Tracking ruled inadmissible in US Federal and Military court - as a practice but NOT a Science. Does not meet FRE 702 standards of evidence.

D.A.R.T & 2021 Oxygen Detective Plotting

2016- Call Data Records & Towers (Lucent, Samsung, Nortel) PATC certification

AT&T, Verizon, Sprint, T-Mobile, Cricket, US Cellular, Tracfone, MetroPCS and subsidies...

Call Records Analysis - Switching analysis. Cloud, SMS, MMS E-Mail.

TOWER Dumps: Lucent, Samsung, Motorola, Ericsson etc. PATC 2016

Cellebrite Cloud analyzer. Oxygen Detective Jet

GPS, NELOS, WiFi and Blue tooth tracking and E911-FCC mandated data location logs.

D.A.R.T. advanced and HTCI Mapping to verify if a call did hit a specific Tower Switcher.

Paperwork for legal requests for all the above available on [www.USAForensic.com](http://www.USAForensic.com).

### Forensic Video & Surveillance Video Recovery/ Analysis

DME Forensics DVR Examiner, iNput-Ace, Omnivore, D-plex Pro Forensic, D-Tective, ClearID Forensics and numerous forensic systems with over 200 clarification plug-ins. 8K file handling.

Artificial Intelligence software updated weekly.

Latest computer and cell phone programs such as FTK, Autopsy, Cellebrite, Apex, Secure-view, Oxygen, EnCase...

Beta Tester of Software & Hardware for leading Forensic Companies (Clear-ID, iZotope, DC8 Forensics etc)

Hard drive recovery for US Military (SAMs vendor) - Forensic drive analysis.

Recover damaged files, Deleted files, Changes in Registry & Meta-Data, Hash values, SHA2 etc

All Surveillance Systems as well as Computer Drives

Validate video pixel by pixel with iNput-Ace

Tampering or Keying detected.

Restore corrupted photographic or video files.

Photo Enhancement using Clear-ID, Pixel Stacking & Frame averaging etc.

Working with computers since 1977. 3 Field Extraction teams available.

Network analysis, Tor tracing, Brute force & PassWare decryption etc.

PassWare Forensic Decryption of 280+ encryption methods using 16 core liquid cooled systems

Determining how files got onto a computer

Validating dates of files/ changes to files via Sha2 HASH values.

## Computers

EnCase Ultimate, X-Ways, Autopsy, FTK and many other specialized tools:  
PassWare Forensic decryption. Custom 36 core liquid cooled machines.  
First code written in 1977 while attending Cal State University.  
Recovery using Tableau write-blockers USB 3.0 T8-R2 & T35ES-R2 Tableau & DME forensic Imaging.  
Beta tester of Software & Hardware for leading Forensic Companies (Clear-ID, iZotope, DC8 Forensics etc)  
Hard drive recovery for US Military (SAMs vendor) - Forensic drive analysis.  
Recover damaged files, deleted files, Changes in Registry & Meta-Data, Hash values  
All Surveillance Systems as well as Computer Drives  
Restore corrupted photographic files.  
Photo Enhancement using Artificial Intelligence, Clear-ID, Pixel Stacking & Frame averaging etc.  
Working with computers since 1977. 3 Field Extraction teams available.  
Network analysis, Tor tracing, Brute force & PassWare decryption etc.  
PassWare Forensic Decryption of 280+ encryption methods using 36 core liquid cooled systems  
Determining how files got onto a computer  
Validating dates of files/ changes to files via Sha2 HASH values.  
Header Data verification

## Forensic Photographic work:

Photographic clarification, metadata validation  
Lux, Luminance & RGB analysis  
Film, Digital, thermal imaging and infra-red cameras  
Clear ID Forensics, iINPUT-ACE, Omnivore, Deplex-Pro  
Vectorscope, Waveform scope, Luminance and RGB scopes in Lap  
Pixel data analysis / Frame & Field level analysis  
Lens and lens-aberration analytics  
Lens MM relations to chip size and format  
Lens wide-angle distortions correction using metadata  
Deleted or Damaged Photo data memory cards recovered  
Cellphone camera metadata work.  
Geo data verification  
Dozens of forensic photo analytical plug-ins  
Stills lifted from 8k video and clarified  
All 17.5 x 11 -inch stills printed on heavy photo stock at 1200 PPI.  
Studied from 1974-1979 with Dr Bill Wallner (co-inventor of infra-red photography)  
Cameras from high-end Hasselblad thru Panavision down to GoPro  
Ultra-High-speed camerawork with Phantom-V cameras  
Cineflix & Cine-Alta.  
Helicopter mounts 14,500 hours aerial cinematography  
Have shot professionally in 23 countries  
Complete 8K up-Rez in lab.  
8K, 10-bit calibrated video cards and monitors.  
Pantone charting and color correction in field and lab  
Lux and Luminance lighting measurement in accident or crime scene cases.  
3-axis gyro-stabilized cameras  
All available camera mounts for GoPro 4K cameras for accident and test work.  
DOD and DOE military testing high speed and aerial photography.  
FAA licensed 4K Drone operator  
Testified numerous times on photographic issues in Federal, Criminal, civil Military and aviation cases.  
Photo Work published internationally

## Field Cameras

For evidence gathering and accident recreation include Red & Cinealta 8K, Sony 4K & HD cameras, DJI Osmo, 3Axis stabilized 4k system, GoPro 4Ks all mounts and FAA Licensed 4k Drone. Fuji 3D Camera. Ultra-slow-mo Phantom Cameras available. Meralli stabilization and Re-SpeedR. Editing and all monitors are true 4k = 4086\*2160.

Thermal Imaging.

Thermal Video and still along with mixed format Thermal.

Emmy Award winning crews for crime scene Recreation.

### Professional Sound & Music:

Over 20,000 voice tracks professionally worked with since 1980

Federal, US District Court, State, US Military, Civil and Aviation cases to TV Network television, commercials, video games and films

Sonographs, Spectrographs and 3D Audio Decibel and Frequency Mapping

iZotope RX professional, 3D Spectral Audio, DC10 Forensics, Pro Tools, Plugins from Cedar,

Waves, iZotope, Plugin-Alliance BX-Series, Bauer, SSL, NovelTech, BlueCat, SPL, FabFilters, Sony, Sequoia & Many others

Over 200 forensic plugins and programs running on 16 core liquid cooled computers

Federal and State voice comparison cases

Set Daubert standard for voice comparison in Arizona

Phonetic breakdown of spoken words on spectrograph.

Sonographs, Spectrographs and 3D Spectral audio graphs printed and embedded in forensic reports.

Human Voice separated from background noises and ambience

Tampering detection

Metadata analysis

Nyquist Theorem analysis

Edit detection

Dithering analysis

Re-sampling analysis

Audio background continuity

Sine wave detection or embedded frequency (agency)

AC power ground loop & harmonics removal.

Background noise removal.

Phase cancellation and removal of music from dialog

Voice clarification, harmonic enhancement for muffled audio

Removal of reverb (jail hallways or lecture halls etc)

Removal of mic thumps and clicks that can be misidentified as edits.

Transfer of tape to HQ digital medium: cassette, micro cassette, reel to reel

Police radios split tracked

32 bit audio running in 64 bit systems

192 kHz field units.

Conversion of any audio codec to another PROPERLY with correct dithering

Time coding of audio for clients down to thousandths of a second for easy reference.

IEEE engineering standards

Written & Recorded Music with *Blue Oyster Cult*, 25+ million albums sold - Gold & Platinum records & *Credence Clear Water Revival* recording artist Tom Fogerty (Movie Score).

-Mixed & Engineered for numerous top recording acts; Jazz, Rock & Classical.

-Written music for hundreds of commercials including music cuts for Super Bowl XXX

-Written Music/SFX for 5 popular Video Games.

-Worked "Live" sound as sound mixer for concerts with crowds up to 35,000. *Challenging live mixes like: Chick Corea, Return to Forever, Ronnie Laws, Gerald Wilson's 24 piece Big Band etc.*

-Recently won another Emmy Award for best music on a Television series (Written & Performed).

I have Mixed and Mastered hundreds of National, International & Regional Television Shows.

### Aerial Photography / Rescue / Surveillance:

Over 14,000+ Flight Hours of Jet Helicopter Photography – Film, HD Video, Research, Surveillance, Search & Rescue for Law Enforcement & Wildlife Rescue - Civilian Military Contractor.

Currently: Advisory Partner & Photographer - 4:4:4 Professional Film & TV Helicopter (*SaberCat HD*)

Pilot received the Harmon Flight Trophy from President Reagan at the White house. The Trophy is currently on display in the Smithsonian Air and Space Museum.

**FAA Licensed: AERIAL 4K GPS-guided VIDEO DRONE**

FAA licensed 4K Video-drone, *Phantom Quadcopter*: Satellite-GPS controlled: Owner & Operator); Mounted camera *GoPro Hero 4K Black Edition* Thermal Imaging & Thermal Video Recording with image on image technology Night Vision & Infra-Red OSMO 3-axis stabilized 4k system, fully loaded.

**Forensic Counter-Surveillance:**

Radio Frequency Response 10MHz ~ 10GHz (20+ GHz if needed)  
Analog, Digital, WiFi, Cellular GSM/GPRS/EDGE/3G/4G signals all will set off alarms.  
Detection Frequencies: GSM 880-915MHz, CDMA 824-849MHz, WCDMA (1920-1980MHz), and DCS (1710-1785MHz)  
Digital 'Burst' Signal Detect for all GSM/3G/4G Trackers/SMS(Text) detection  
Series and Parallel transmitters  
Automobile GPS transmitters  
Transmitting GPS trackers (only when GPS device is transmitting signal location)  
Devices on internet phone and IP phone  
Detect & Prevent:  
Wire telephone tapping  
Laser tapping  
Recordings of a voice recorder, tape, digital and parabolic reflector using white noise & sibilance generators  
40HZ 100-watt sine-wave generators to eliminate laser recording from windows  
Thermal Imaging & Thermal Video Recording with image on image technology  
1080P Sony Night Vision Cameras & Infra-Red Lighting  
OSMO 3-axis stabilized 4k system

**Weapons: Classified & Non-Classified:**

- Worked many homicide cases involving gunfire sound analysis, frequency, location & Triangulated acoustics.
- Worked with numerous surveillance videos to enhance shooting scenes for law enforcement and attorneys.
- Gunshots analyzed, compared & enhanced from: cell phones, land lines, surveillance equipment, 2-way communication, Police Duplex & Simplex, etc.
- Worked numerous cases requiring gunfire video enhancement from surveillance systems, cell phones and various recording devices.
- Have access to many renown civilian & military firearms experts for testimony as needed.
- Over 2-million rounds fired for high speed filming and forensic testing over 33 years. Work & have worked with -US Navy Seal Teams 1, 2 & 6, SOCOM, DEVGRU, 160th Night Stalkers. US Army Sniper teams. DOD & DOE.
- Additionally, work with many US Government retained Military contractors.
- I currently have US Military SAMS / DUNS contract.
- Worked with numerous SWAT and TOU teams in actual field operations.
- Worked with LAPD, w/ Krav Maga training.
- MSCO Helicopter Rappel Trainer (1980s Tac-Ops-Unit) - MSCO Helicopter Search & Rescue = SKY12 & DPS
- Worked with Springfield Armory testing the initial launch of the entire XD Pistol line. 9 mm, .40, .357, .45
- Work often with DillonAero on the M-134 Mini-gun project (over 20 years working together).
- Analyze Muzzle flash and sound signature of McMillan Sniper rifles for US Army Snipers (over 10 years of work together).
- Air to Ground target acquisition and aerial sniper training documentation. Thousands of hours of aerial law enforcement, search & rescue & air to ground gunship work.
- Assigned to USS CVN70 Carl Vinson and Helicopter-Carrier USS New Orleans as civilian videographer.
- Have been a "go to" guy for live Weapons Photography & Sound Recording for The Military Channel, History Channel, MythBusters, Future Weapons, Discovery Channel, National Geographic, BBC and many others.
- Produced one of the largest selling automatic weapons DVDs ever made, "Firestorm in the Desert" &
- Produced one of the largest selling handgun training DVDs of all time with Rob Leatham, "Shooter Ready

Civilian Technical Advisor on the board of CowTown Range & Studios, which is an extremely active 88 acre Training facility for SOCOM, Swat Teams, Navy Seal Teams, DEVGRU, Homeland Security and many Special Operations teams. CowTown Range is currently under DOD and various Agency contracts for range work, tactical training and weapons development.

**Weapon recording analysis for cases includes**

Variou rounds recorded over surveillance systems, cell phones, 4k, HD, SD and high speed Phantom video cameras.

Diverse types of pressure, loads, powders, barrel length and calibers recorded for analysis.

Cell phone cases include NyQuist Theorem frequencies relating to cell Phone FQ range, Sample Rate and Bit depth of recordings

Cell phone line noise and background audio of conversations recovered from 911 calls.

Dithering artifacts created during sample rate conversions.

Dithering harmonics relating to audio captured by Cellebrite or Oxygen Forensics, when transferred to 44.1-16 bit for distribution.

Cell call transmission, multi-pathing of signal, tower horn tracking v. switcher tracking, topographical anomalies of transmissions, transmission artifacts

Phase cancellation of recordings due to microphone set ups.

Distances of cell phone to firearm (FARO 130 system)

Shootings captured by police wire or boomerang unit

Sonographs and spectrographs along with 3D Spectral recording to narrow down gunshots to 1,000ths of a second.

Shooting weapons in range shoot houses or gun ranges recorded over cell phones.

Shots recorded over cell phones in cars, houses, open acoustic spaces

Ambiance and acoustics graphed and measured of gunshots on surveillance and cell phone

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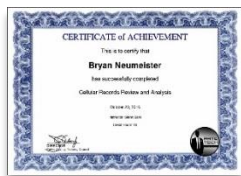
**USA FORENSIC: AUDIO & VIDEO FORENSIC LABS**

**USA Forensic, Ilc. (40 Years *Professional Experience*)**

**Certified Audio & Video Forensic Experts: Federal, Military, State, Civil & Aviation**

**United States District Courts - U.S. Grand Jury- DOJ, - DOE (Classified-Unclassified)**

**IEEE, IPVVM, ABRE, DLA, AES, SAM, CAGE, ASCAP**







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