An analysis and rebuttal to Peter Shann Ford's conclusion about what Neil Armstrong said Garth D. Wiebe, October 18, 2006

Here is what Peter Shann Ford did: (see http://www.controlbionics.com/cb_one_small_a.htm)

He made the claim that the "a" was present in "One small step for (a) man" based on the following methodology:

He used a simple, low cost (\$45) audio wave editor (GoldWave v5.14) to examine the audio waveform.

First he used the editor to select the background noise in the waveform where Neil Armstrong was not speaking.

Then he used the editor's capability to filter the whole waveform based on that background noise profile.

Then he visually zoomed in on the area in question and visually noticed that there was still something there. He assumed that this was the missing "a" sound.

What he saw was only the crackly noise that existed there in the first place, although somewhat reduced by the filtering, which efficiently reduced the background noise, but not the crackly noise transients in question.

He stated that the "a" sound was too quick to be humanly perceived, as it was "0.035 seconds" long.

Here is what I did:

I likewise created a filtered version of the original recording, in the same way that he did. Original: <u>http://www.wiebefamily.com/62284main_onesmall2.wav</u> (from NASA website) Filtered: <u>http://www.wiebefamily.com/62284main_onesmall2_CD_filtered.mp3</u>

I used a more advanced audio editor (Adobe Audition 2.0) to create a two-dimensional, color-graded frequency plot, called a "spectrogram," of both the filtered and unfiltered versions. In it you can separately see the hum (straight continuous lines), crackly noise (vertical intrusions), and his voice (long wavy lines consisting of his fundamental pitch plus harmonic overtones above it. (See page 2.)

I used a second, very state of the art utility (Celemony Melodyne 3.0) to plot his fundamental vocal pitch on a "note by note" basis on what is called a "piano roll." One can flip back and forth between the piano roll and the spectrogram and correlate them. Melodyne is not able to discern a voiced vowel pitch ("a") during the spot in question, because it detects only noise there. (See page 3.)

I showed that the crackly noise transients were still there in the filtered version, of sufficient magnitude to mislead someone looking at just the waveform into thinking that the desired object was there. (See page 4.)

On page 2, I show exactly where the "a" is still missing in the spectrogram. You can see this clearly in the spectrogram, whereas a simple waveform cannot reveal it. I circled that place where the "a" should appear as a fundamental tone of his voice, beneath the noise, if it was there.

I used the aforementioned advanced audio editor to slow down the section in question by a factor of ten, so that Mr. Ford's "0.035 second" section is now 0.35 seconds long. This alleviates Mr. Ford's contention that "0.035 seconds" is too quick to be humanly discerned.

Listening to the slowed down version, you can hear that the "a" still cannot be discerned, and that the sound progresses evenly from the "r" sound to the "m" sound with nothing in between. Slow filtered version: <u>http://www.wiebefamily.com/62284main_onesmall2_CD_filtered_stretched.mp3</u> Slow unfiltered version: <u>http://www.wiebefamily.com/62284main_onesmall2_CD_stretched.mp3</u>

Garth D. Wiebe is an electrical engineer, a computer hardware designer by profession for 28 years. He has been involved in professional audio, including both live sound and studio recording non-professionally on the side for the last 20 years and, lately, digital audio product development as a business.



-70 -69 -68 -67 -66 -65 -64 -63 -62 -61 -60 -59 -58 -57 -56 -55 -54 -53 -52 -51 -50 -49 -48 -47 -46 -45 -44 -43 -42 -41 -40 -39 -38 -37 -36 -35 -34 -33 -32 -31 -30 -29 -28 -27

dB

Stopped

-24 -23 -22 -21 -20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -1 -26 -25 -4 -57.3 dB @ 0:17.471, 68.06Hz 11025 • 8-bit • Mono 259 K 0:24.112 Spectral Frequency

Melodyne - [One_small_step_for_man.mar - 62284main_onesmall2_32 File Edit Definition View Navigation MIDI Window ?	2bit_filtered] Transport Bar
▶ \$ um ⊂ +++ ··· ···	Cycle 00:00:00.000 00:00:17.068 4 13
₽ 00:16	□ Punch Out □ Punch Out Sync □
After noise reduction, showing Melc	odyne "note" quantization and pitch mappir
Vertical scale is piano keyboard. The	hin line is musical pitch of voice (follows vo
Gb	
F	
ЕЬ	
155.6 Hz	
146.8 Hz	
138.6Hz That's Ope	emoli eto
	Sinali Sle
C3	
в	
РЬ	
A	
Note 👻	





- 8 ×