How many shots were fired on 22. November 1963 in Dealey Plaza?

Jorma Jormakka
jorma.o.jormakka@gmail.com
Docent at Aalto University
Department of Communications and Networking

1. Introduction

Three shells were found from the Texas School Book Depository. According to the Warren Commission Lee Harvey Oswald fired three shots at John F. Kennedy in about eight seconds. The sniper missed the first bullet to a slowly moving target less than 122 m away. The second was the magic bullet, which made in total seven entry or exit wounds on Kennedy and Connally, but was found in an astonishingly good shape. The last bullet blew half of Kennedy´s head off, though it was not an explosive bullet. The shot came from behind, but while Kennedy`s head first jerked forward, the President fell paradoxically to the back and left. Many people have found the Warren Commission scenario unbelievable and proposed alternative explanations.

The House Select Committee of Assassinations (HSCA) concluded in 1979 that the assassination was a probable conspiracy. This opinion was mainly based on the report of echo correlation analysis of the recording of the Dallas Police radio, called the Kennedy assassination Dictabelt. A report [5], authored by James E. Barger and dated to the year 1979, describes this echo correlation analysis. It describes a scenario with four bullets, three were shot from the Texas Schoolbook Depository and one was shot from the grassy knoll. Later the findings of HSCA were found incorrect. The goal of the present article is to take another look at this problem. The present article is by no means the first to do so. Donald B. Thomas published an article in 2001 [1] and it was rebutted some years after [2][3]. Still the author feels that the question is not settled yet.

Let us see why the echo correlation in [5] was not accepted as a proof. First we must find what impulses they identified as gunshot noise on the Dictabelt. The report [5] informs that there is a bell sound in the Dictabelt at 152.5 s. In the Dictabelt version that the author copied from the *youtube* this bell sound is at 56.2 s. This is enough for calculating the times of the shots in the report [5]. The first shot identified in [5] was at 137.2 s from the beginning of the recording, i.e., 15.3 seconds before the bell sound. The Dallas Police Dispatcher delivers the time announcement 12:30 about 18 seconds before the order to go to the hospital. It follows that Kennedy was shot soon after 13:30 and if the first shot is 15.3 seconds before the bell sound, the bell rang about half a minute after 12:30.

	Time in the report [5]	Time in the Dictabelt in this study
Shot 1.	137.2 s	40.9 s
Shot 2.	138.8 s	42.5 s
Shot 3.	145.0 s	48.7 s
Shot 4.	145.5 s	49.2 s

Table 1. Location of the gunshot impulses on the Dictabelt as identified in [5].

We see that there is 8.3 s between the first and the last shot, there is 1.6 s between the shots 1 and 2, which would have been a problem for Oswald. Accodring to the FBI, his rifle could not

be fired again faster than in 2.3 s. There is 6.7 s from the second shot to the fourth, which is quite long for Oswald. The third shot was analyzed as coming from the grassy knoll. Very clearly these times are quite problematic and they have been obtained by a questionable method of fitting echo patterns to noisy data.

One major problem with these gunshot times is that the Dictabelt has no impulses with thick tails fitting these times. There is only typical bursty noise form a motorcycle and human voice. The identification of gunshot noises in [5] was rejected in 1978, and will be rejected also here. In this article we will consider as putative gunshots only such impulses on the Dictabelt, which show two typical features of gunshot noise: firstly it should have a thicker tail in high frequencies than typical motorcycle noise or human voice, secondly it should look like a gunshot impulse in the time domain.

Let us look at the following two time domain plots from the Dictabelt. The traffic has been passed through *audacity* tool´s low-pass filter, which does not completely cut higher frequencies but attenuates them and the wide-spectrum impulses are easier detected.

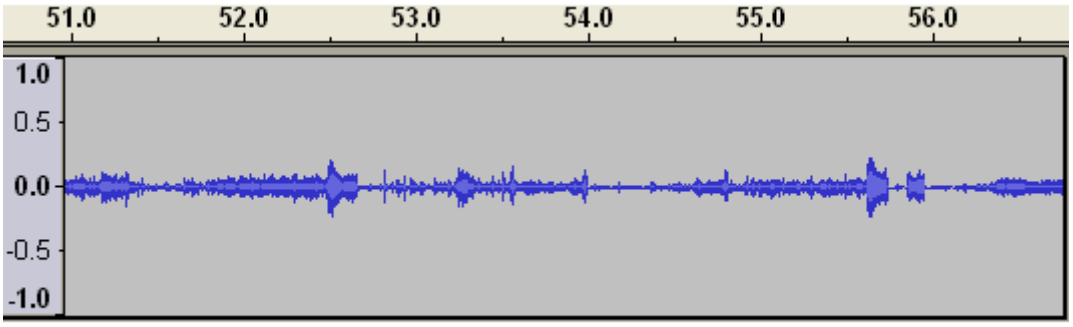

Figure 1. Putative gunshot sounds at 52.5 s, 55.6 s and possibly at 55.8 s.

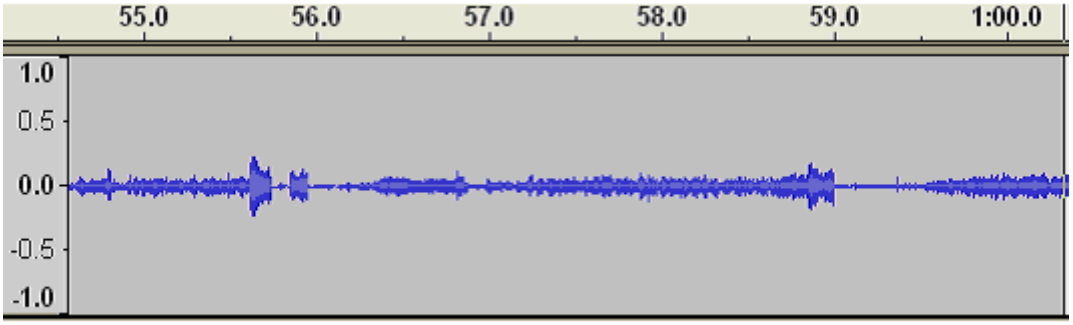

Figure 2. Putative gunshot sounds at 55.6 s, 58.8 s and possibly at 55.8 s.

In the frequency domain the impulses in figs. 1 and 2 give power spectrums shown in fig. 3.

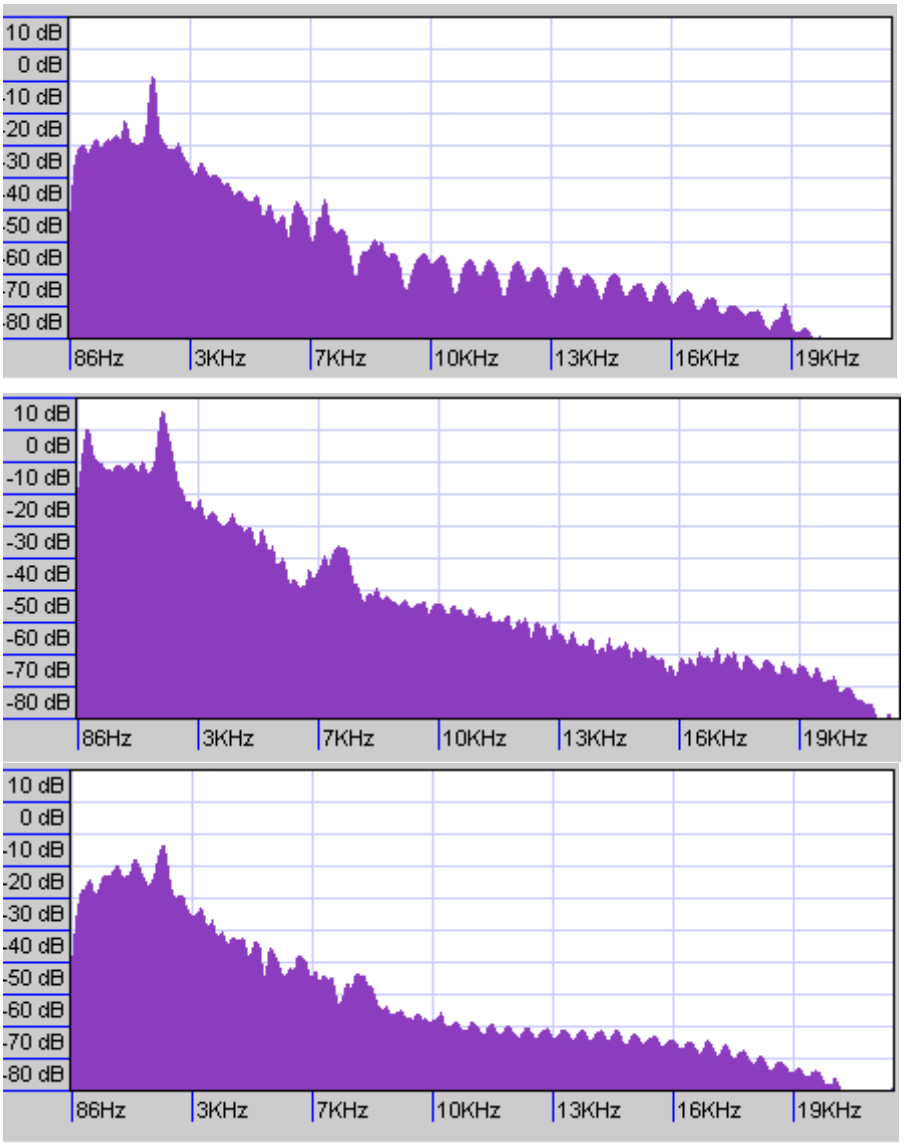

Figure 3. Power spectrums of the impulses at 52.5 s (top), 55.6 s (middle) and 58.8 s (down). All signals have a beep at around 2 kHz, but they also have a thick power spectrum on high frequencies, and they show periodicity from which the pulse length follows.

2. Are these impulses gunshot noise or not?

A square pulse of length τ gives a power spectrum, which has periodicity of period $1/\tau$. This is simply because the Fourier transform of $v(t) = Au(t/\tau)$, where $u(t)$ is the unit pulse, is $V(f) = A\tau\mathrm{sinc}(f\tau)$. The power spectrum $V(f)V^*(f)$ of this function shows periodicity on higher frequencies in a very similar manner as the power spectra in fig. 3. The putative gunshot impulses are not exactly square pulses as can be seen in figs. 1 and 2, but the shape of their Fourier transform can be guessed. The envelope curves of the pulses in figs. 1 and 2 are rather square and on higher time resolution we would see fast oscillations. Thus, the pulse is like a product of the envelope and a unit signal with fast oscillations. The Fourier transform is then like a convolution of the transforms of these two, and the transform of the envelope has periodicity on higher frequencies. As a result, the power spectrum has periodicity on high frequencies. We will see such periodicity in fig. 3 and the period is roughly $1/\tau$ of the

impulse duration τ. From figs. 3 we can calculate the impulse duration. The impulse at 55.2 s has five peaks in 3 kHz, thus $\tau = 1.67 ms$. The impulse at 55.6 s has 8 peaks in 3 KHz, thus $\tau = 2.67 ms$, and the one at 58.8 ms has 7 peaks, giving $\tau = 2.33 ms$.

Do such impulse durations agree with gunshot noise? Actually they do. The initial peak of a gunshot is much faster than these times, it is 0.1-0.2 ms, but an electromechanical microphone, as was used in police radios from 1963, cannot follow so fast impulses. After the initial peak, the gunshot signal vibrates on both sides of zero for some 1-2 ms, which is then the effective duration of the impulse and which agrees with the periodicity seen in the power spectrums. The power spectrum of a rifle shot typically has a round peak around 1600 Hz. It rises up slowly with growing frequency and after reaching the peak it slowly decreases creating a thick tail for high frequencies, similar to those tail distributions in fig. 3. Noise from a motorcycle, human voice and radio beeps typically has a thinner power spectrum on high frequencies, see fig. 4.

Low frequencies do not travel so well in the air. Therefore the power spectrum of a gunshot is small in low frequencies. In the power spectra in fig. 3, low frequencies are not small, but that can be the result of summing the motorcycle noise, human voice and other sounds to a gunshot impulse. The power spectra in figs. 3 agree with what would be obtained from summation signals of lower frequency sounds and gunshot noise.

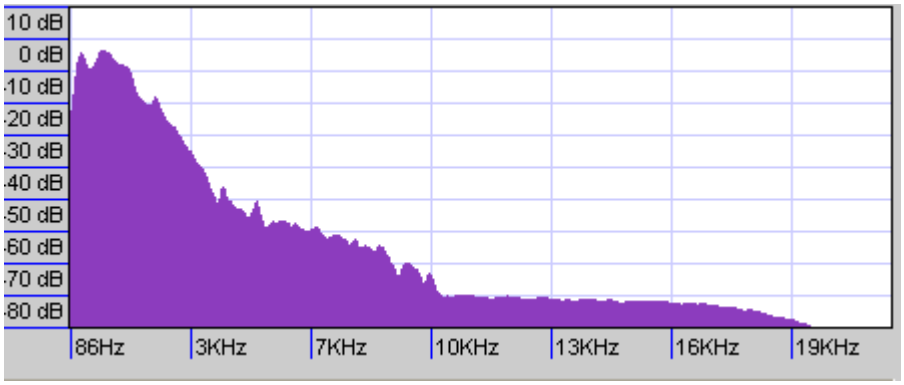

Figure 4. The power spectrum of typical motorcycle noise from the Dictabelt.

The Dictabelt has a few other impulses with thick tails in addition to the ones in fig. 3. There are two very short impulses on the Dictabelt, one at 2:47.95 s and another at 4:12.8 s. They are most probably static electricity peaks: they are too short, 0.2 ms or less, to be audio signals from the microphone. At the time 4:12.2 there is human voice shown in fig. 5. There is slightly less power on high frequencies in fig. 5 than in fig. 3.

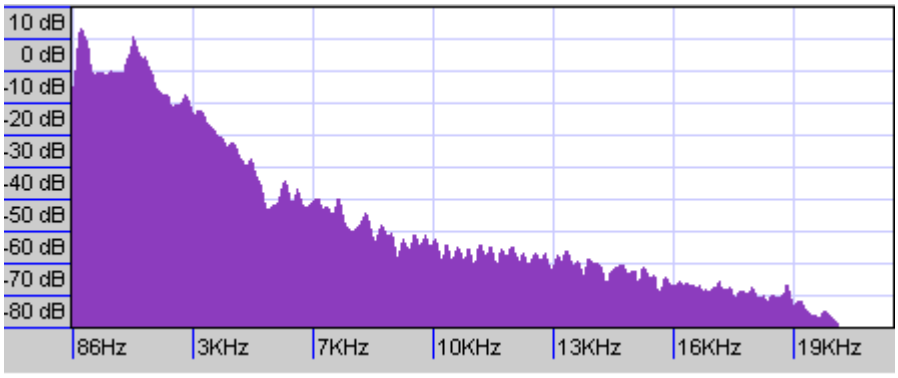

Figure 5. Impulse at 4:12.2 s. It is human speech and additionally there are beeps.

Another case of human voice creating a thick tail is at 2:20.6. This impulse demonstrates that human voice and beeps together can have very similar characteristics in the power spectrum as what is seen in fig. 3. Still, the tail in fig. 6 is a bit thinner than in the spectra of fig. 3. In the time domain the impulse is easily noticed as voice. It is the part from 2:20.6 to 2:20.65. The plot can be compared with fig. 7 and the impulses in fig. 7 are not parts of other noise.

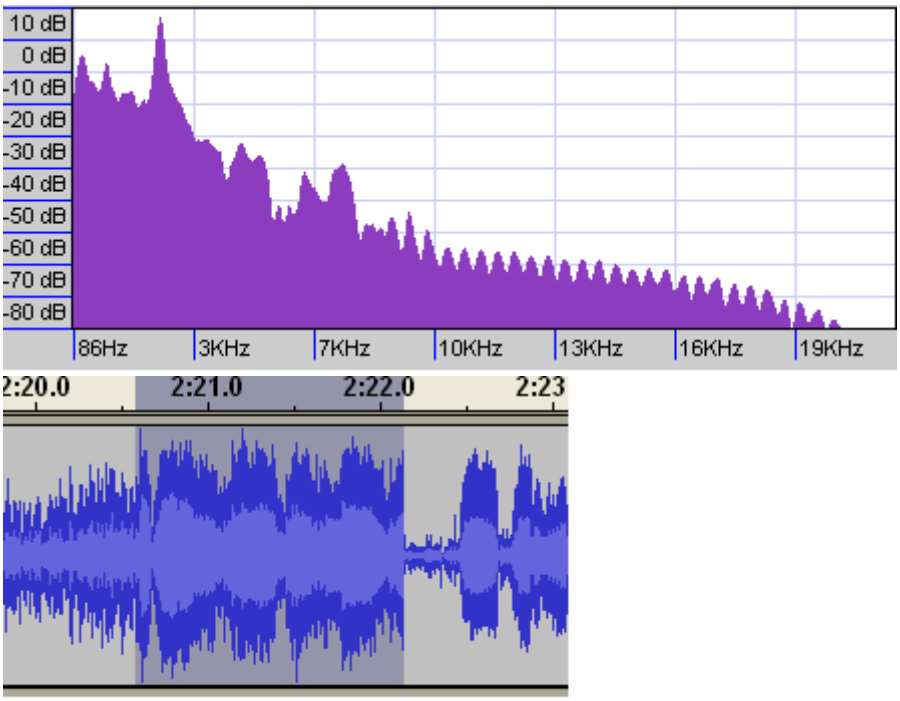

Figure 6. Power spectrum of the impulse at 2:20.6 s above, time domain plot below.

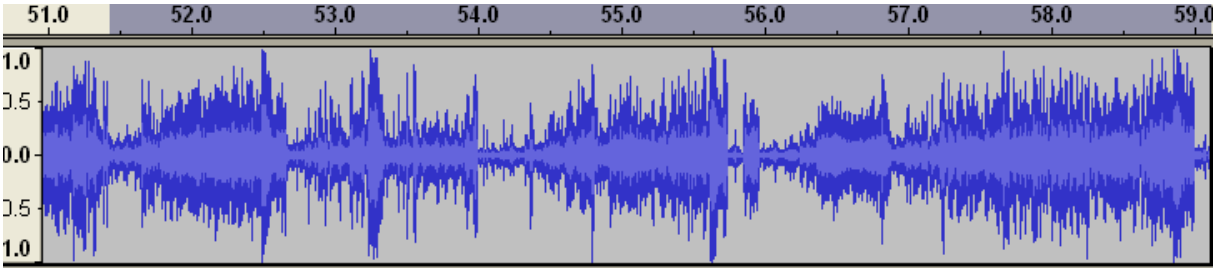

Figure 7. A time domain plot of putative gunshots for comparison with fig. 6. The impulses at 52.5, 55.6 and 58.8 s are quite clear and not parts of other noise.

The Dictabelt also has an impulse at 3:36.95-3:37.02 shown in fig. 8. The impulse does not sound like human voice and there are no beeps. It sounds like noise, but has a rather thick tail. Still, the tail is not quite as thick as in fig. 3 but more like in fig. 4.

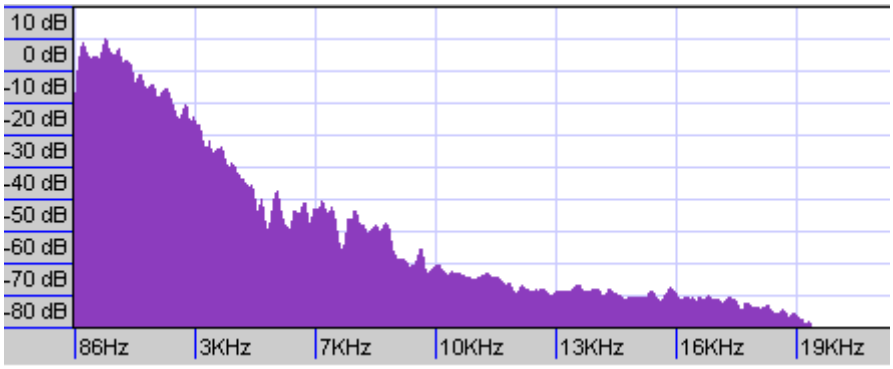

Figure 8. Power spectrum of the impulse at 3:36.95 s.

Figs. 6 and 8 illustrate why it is risky to claim that no other noise than gunshots could have created the thick tails in fig. 3. While the power spectrum of motorcycle noise, human voices and radio beeps on the Dictabelt has a thin tail on high frequencies in all but the two cases in figs. 6 and 8, it is intuitively believable that motorcycle noise may sometimes lead to a power spectrum with a quite thick tail: the sound of an exhaust pipe is said to resemble a gunshot, thus the signals must be fairly similar.

In each of the three plots of fig. 3 there is a high frequency at 2300-2500 Hz. It is a beep. It seems that when a radio asks for a connection it sends a beep. A beep is created by a signal generation circuit and it does not have a thick tail in the power spectrum: it is just a spectrum line. Thus, the beep is not the cause of the thick tail. Instead, the correct explanation may be that a loud impulse noise has turned an inactive radio on and it requests the right to transmit by sending a beep. Thus, the thick tail is transmitted by a radio, which already was active when the impulse came and it could transmit the gunshot, while the beep is transmitted by another radio, which was not yet active and can only send a beep so far. Consequently, the beeps are not all from the same radio and not on the same frequency, as seen in fig. 3.

Let`s look for the fourth putative shot. Fig. 9 shows the power spectrum of the impulse at 53.2 s. The signal has a rather thick tail, but not as thick as the ones in fig. 3. If this is a gunshot noise, and the ones in fig. 3 are also gunshot noises, the gun must have been different. This would have been a much more silent gun. Also in the time domain the signal at 53.2 s is much weaker than the other three.

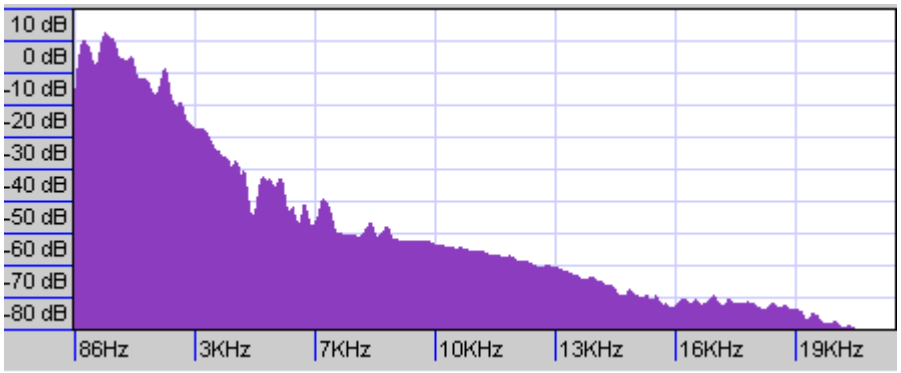

Figure 9. The power spectrum of the impulse at 53.2 s.

3. Synchronizing the Dictabelt with the Zapruder film

For evaluating if these impulses are gunshots we need some external source. The best such a source is the Zapruder film. We can try if the impulses and the film can be synchronized.

Kennedy gets shot on the head in the frame 313. Let us assign this frame to the time 58.8 s, the putative third (i.e., the last) gunshot. We select in total four putative gunshots: the first at 52.5 s, the additional at 53.2 s, the second at 55.6 s, and the third at 58.8 s. The unusual numbering is because the shot in 53.2 s is more uncertain than the other three. The other three have thick tails and they show periodicity: they look like gunshots. The Zapruder film has the speed 18.3 frames per second. These putative gunshot times correspond to the frames 197, 210, 254 and 313 of the Zapruder film respectively.

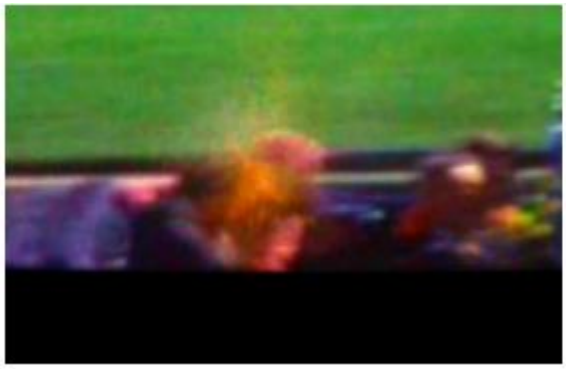

Figure 10. The last shot hits Kennedy in the head in the frame 313, here assumed to be 58.8 s.

Kennedy is hidden behind a traffic sign between the frames 206 and 224. Several frames before 206 are unclear, but it looks like he has not been hit up to the frame 196 as he is waving his hand to the audience. Kennedy still has one hand up in the frames 198-205 and looks the same also in frame 226. The Warren commission assumed that Kennedy was hit some time between the frames 210 and 225.

The frame 197 is especially blurred. One theory is that the cameraman Abraham Zapruder would have shaken the camera when hearing a sudden sound of a gunshot, and the corresponding frame should be blurred. Against this theory one can notice that the frame 313 is not blurred, while it is certain that the last shot came during that frame time. Blurring of a frame cannot be taken as a conclusive proof, but the blurred frame 197 may indicate the first shot. Was Kennedy hit at this time, or did the sniper miss? Both alternatives are possible. Kennedy keeps his hands in a strange way after the frame 226, he may have been shot, but it is also possible that he was shot later. Mild support from the Zapruder film for a gunshot at the time 52.6 s can be accepted: at the minimum, the film does not disprove the hypothesis of a gunshot at this time and the frame 197 is blurred.

Figure 11. Blurred frame 197 of the Zapruder film. Time is 52.5 s.

Frame 254 is not blurred, but it seems possible that Kennedy was shot at the neck at the time of that frame, 55.6 s. At the frame 254 he moves one hand to the neck. It is a question if the shot in the back exited from the neck wound, or if there were two hits. According to the autopsy, there was only one hit, from the back to the neck. It could have been in the frame 256, or earlier, in the frames 197 or 210.

Figure 12. At the frame 254 Kennedy may get a neck shot, time is 55.6 s.

There remains the additional putative gunshot at the time 53.2. This time corresponds to a blurred frame 210. This is the most likely shot to have caused the wounds of Connelly. Connelly and his wife both testified that Kennedy was hit by a previous bullet, but maybe there only was a missed shot. If so, and if the timing proposed here is correct, the previous bullet mentioned by the Mr. and Mrs. Connelly was the one on 52.5 s, frame 197.

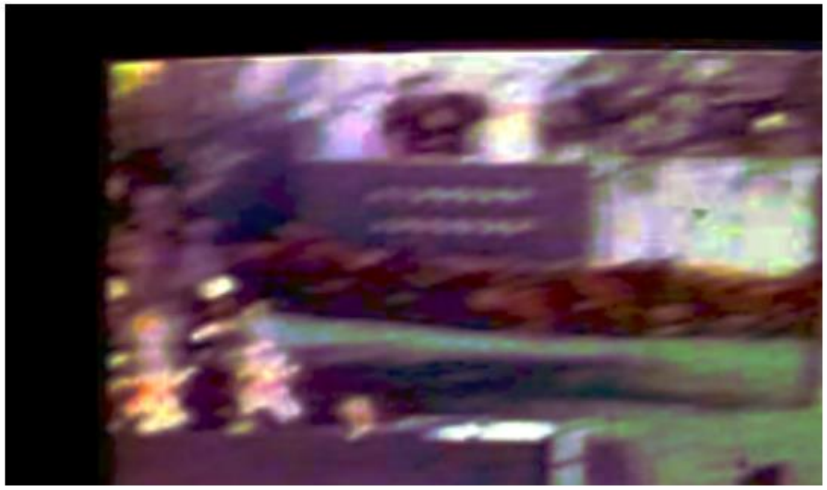
Figure 13. Frame 210 is blurred. Time should now be 53.2 s.

Connelly could have been hit at the time 55.6 s, frame 254, but there are reasons to think that he was hit earlier, such as at the time 53.2 s. Connally´s collar changes from frame 222 to 224. It has been suggested that he was shot at that time. There is an impulse in the Dictabelt at the corresponding time 53.8 s, but it does not very much look like a gunshot. A more natural interpretation of the collar change may be that it was caused by blood and the hit came a bit earlier, like on the frame 210.

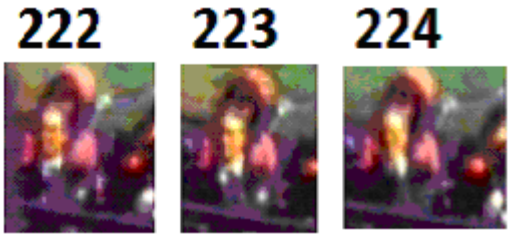

Figure 14. Connally´s collar changes.

The Warren Commission concluded that Connelly was hit no later than in the frame 240. This is supported by the red color, presumably blood, on Connally´s shoulder in the frame 241. Therefore Connally was hit before the frame 254. A likely choice is the frame 210. There are not many possible impulses in the Dictabelt.


Figure 15. Red on Connally´s shoulder in the frame 241 may be blood.

Finally, let us mention that there are impulses on the Dictabelt at 44.0 s and 45.3 s. The Zapruder film has a break of unknown duration between the frames 132 and 133. If the break was 25 frame times, that is, 1.3 s, then we find blurred frames 66 and 91, which correspond to the times 43.9 s and 45.3 s respectively. However, the impulses at 44.0 s and 45.3 s do not have thick tails at high frequencies, and they probably are not gunshots. They may have been some unidentified loud noises which disturbed the photographer.

As a conclusion, the Zapruder film has frames, which fit to the proposed gunshot times from the Dictabelt analysis, but the film does not completely tell what happened in which time. There is needed an interpretation of the events. Let us see why the Warren Commission scenario is not satisfactory in the light of the Zapruder film and the Dictabelt.

According to the Warren Commission interpretation there were three shots since there were three shells in the Texas School Book Depository. Oswald misses one shot and it causes a wound to the bystander. One shot, the magic bullet, makes the back and neck wounds of Kennedy and all wounds of Connelly. This bullet is fired between the frames 201 and 225. The last shot hits Kennedy in the head in the frame 313. If we assign the time 58.8 s to the frame 313, as we have to in order to fit the Dictabelt to the Zapruder film, then the magic bullet was fired 4.8-5.6 s earlier. There is only the 53.2 s impulse fitting to this range. It corresponds to the frame 210. Notice that we must take the impulse at 53.2 s as a shot, and that will give us four shots: three impulses looking like shots and the one in 53.2 s.

Oswald`s rifle could not be fired faster than once in 2.3 s. There are two alternatives for the third shot. If the third shot came before the one in the frame 210, it would have been fired latest at the frame 167 or 168, corresponding to the time 50.9 s. If the third shot was between 53.2 s and 58.8 s and at least 2.3 s from each, then the shot had to be fired between

the frames 252 and 271. There is no suitable impulse around time 50.9 s in the Dictabelt, but there is an impulse at 55.6 s, on the frame 256. The Zapruder film shows that Kennedy has not been hit in the frame 167. If the shot was so early, it must have been a miss, and it is a bit difficult to believe that a sniper misses the first shot from that distance. Therefore the shot was given at the frame 256. In the explanation of the Warren Commission this shot was a miss, since all wounds have been explained by the other two shots. This missed shot wounded the bystander. We see that this explanation has gunshots at the times 53.2 s, 55.6 s and 58.8 s, but it does not have a shot at 52.5 s. This explanation does not match our Dictabelt analysis. There is an impulse at the time 52.5 s, there are four shots, not three. Thus, the explanation of the Warren Commission with only three shots does not agree with the Dictabelt.

The magic bullet explanation given by the Warren Commission has three known problems. The first and the most serious is that the bullet seems to be in a too good shape for having made seven wounds. The second one is that the wound in Kennedy`s neck was not originally taken as an exit wound. It was made larger by tracheotomy in Parkland hospital and in the autopsy photos it looks like an exit wound. The third problem is that the wound in Kennedy`s back seems to be too low to match with the neck wound. Originally the hit in the back was assumed to have penetrated the body only some inches and not to have exited through any wound. Drawings of a possible trajectory of the bullet may explain off the third problem, but there is no good explanation for the first two.

An alternative theory is the following. Three bullets were fired from the Texas School Book Depository by Oswald or some other sniper. Kennedy was hit by the first bullet in the frame 197. This bullet came from the back and it is seen as the impulse at 52.5 s on the Dictabelt. Connelly was hit from the back in the frame 210. This is the impulse at 53.2 s. It cannot be from the same rifle as the first shot, since there is only 0.7 s between the shots. Therefore we call this shot the additional, or fourth, shot. Kennedy is hit second time in the frame 256. This frame time corresponds to 55.6 s and it would have been the second shot from the Texas School Book Depository, meaning that it came from the back, not from the front to the neck. The third shot from the Texas School Book Depository was the head shot at the frame 313 corresponding to the time 58.8 s. There was a fifth shot from the front immediately after the frame 313, at the time 58.9 s. It is needed to explain why Kennedy falls to the left and back after having been hit from behind.

There are then five shots and three shooters: one shoots three times from the back with a rifle at the times 52.5 s, 55.6 s and 58.8 s, one shoots once from the back with a more silent gun at 53.2 s, and one shoots once from the front with a more silent gun at 58.9 s.

In this explanation there are two alternatives for the first two hits on Kennedy. In the first alternative he is first hit in the back at the time 52.5 s and then he gets a fragment of something in the neck from the bullet fired at 55.6 s. This bullet is a miss and it wounded the bystander. The alternative theory is that the first bullet was a miss and a fragment from something it broke damaged Kennedy`s neck in the frame 197. The second shot hit Kennedy in the back in the frame 256. In neither version the neck hit is assumed to be an entry wound of a bullet. It is because if a rifle bullet has an entry wound in the neck, there must be an exit wound somewhere, and there is no such a wound. It is also impossible to explain the neck wound as caused by a fragment from the head shot in the frame 313, because Kennedy holds his neck already at the frame 256. Next we look at echo location analysis.

4. Echo correlation analysis

We finished the selection of gunshot noises into four impulses, those at 52.5, 53.2, 55.6 and 58.8 seconds. Additionally we will assume that 58.8 s impulse consists of two shots: from the

back at 58.8 s and from the front at 58.9 s. The following echo correlation analysis is done in a similar way as in [5], but it is simplified. The calculations in [5] take into account the movement of the presidential limousine and the motorcycle with the stuck radio is assumed to be in the motorcade. This level of consideration is not repeated here for the obvious reason that because there is motorcycle noise, the data is too noisy for elaborate calculations and the results can in the best case only be suggestive.

Table 2 has been composed from two results of test shots from the sniper´s nest and from the grassy knoll that were reported in [5]. These tests measured 11 echo peaks. Only six echo peaks have been included in the table. It is because the data is so noisy that smaller peaks disappear and also because six peaks are a sufficient test to check which location gives a better echo correlation. Echo peaks do not need to be exactly in the calculated places since we do not know where precisely was the radio that transmitted the gunshot impulse, assuming that the impulses are gunshots. It was not necessarily the radio which transmits the motorcycle noise, nor was it necessarily always the same radio. Some uncertainty must be accepted. Existence of a peak in the plot close to the calculated place can be made with a ruler even from the scanned plots of this article.

	Sniper´s nest	*Grassy Knoll*
1. echo	8.76 ms	5.98 ms
2. echo	16.45 ms	11.75 ms
3. echo	17.52 ms	14.96 ms
4. echo	23.08 ms	26.07 ms
5. echo	26.71 ms	37.39 ms
6. echo	48.50 ms	38.78 ms

Table 2. Six first (highest) echo peaks as heard from the motorcade location from test shots from two proposed shooter locations. The sniper´s nest is the Texas School Book Depository.

The first putative gunshot at 52.5 s matches all six echo peaks from the sniper´s nest and it does not match the peaks from the grassy knoll. Actually the peak is at 52.48 s. There are peaks at 52.489, 52.496, 52.498, 52.503, 52.507, and 52.529 s, but clearly there are many other peaks as well. The motorcycle, human and radio noise make the echo correlation analysis almost impossible to use. This method is good only if there is no noise. The signal form in fig.16 agrees with how a gunshot noise should look like. There should be an initial blast and a bit after it another blast when the bullet leaves the pipe, and then the echo peaks.

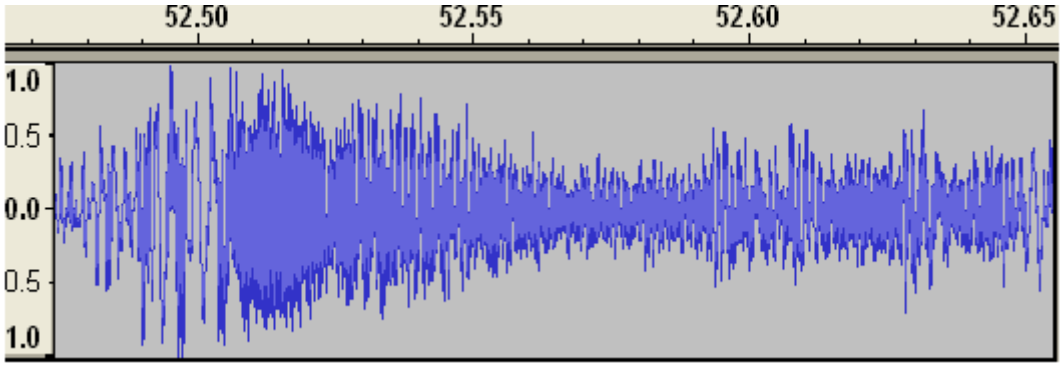

Figure 16. The putative gunshot at 52.5 s matches all echo peaks from the sniper´s nest.

The next plot should be the shot on the head from behind, the impulse at 58.8 s. All echo peaks from the sniper´s nest can be found. The impulse begins at 58.846 s. There are echo peaks at 58.855, 58.862, 58.864, 58.869, 58.873 and 58.895 s.

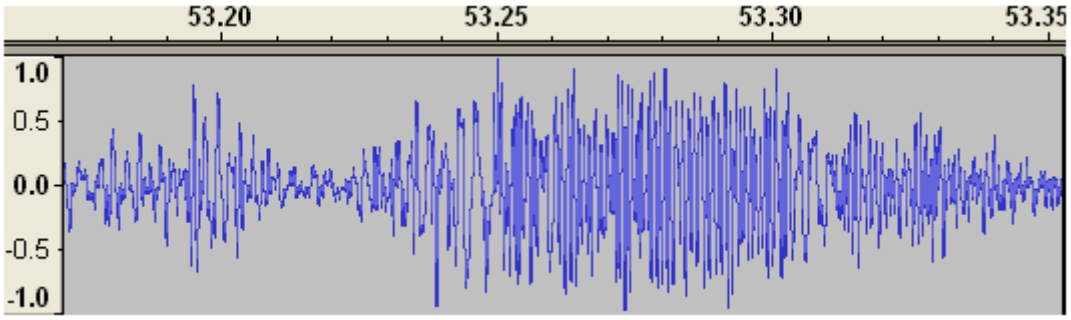

Figure 17. The putative gunshot at 58.8 s matches all echo peaks from the sniper´s nest.

Only from the Dictabelt data there is no reason to assume that there was a shot from the front immediately following the shot on the head from the back, but the Zapruder film shows Kennedy´s head first moving to the front, but then he falls to the back and left. The Dictabelt data does allow for another shot at 58.9 s. The signal is shown in fig.18. It does not match the echo pattern from the sniper´s nest, but it matches the pattern from the grassy knoll. The impulse start can be set at 58.935 s. There are echo peaks at 58.941, 58.947, 58.950, 58.961, 58.972 and 58.974, but there many other peaks as well. There is no peak at 58.984 s, which is in the echo pattern of the sniper´s nest, thus there is no match to the sniper´s nest.

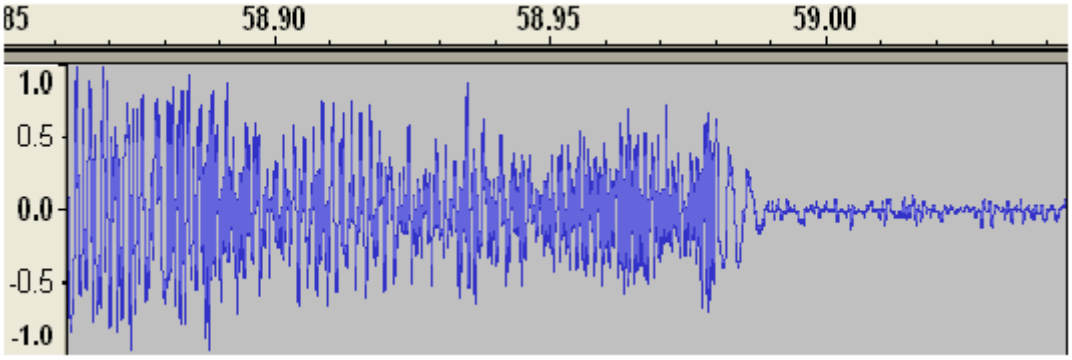

Figure 18. The putative fifth gunshot at 58.9 s matches all echo peaks from the grassy knoll.

Fig. 19 shows the additional putative gunshot at 53.2 s.

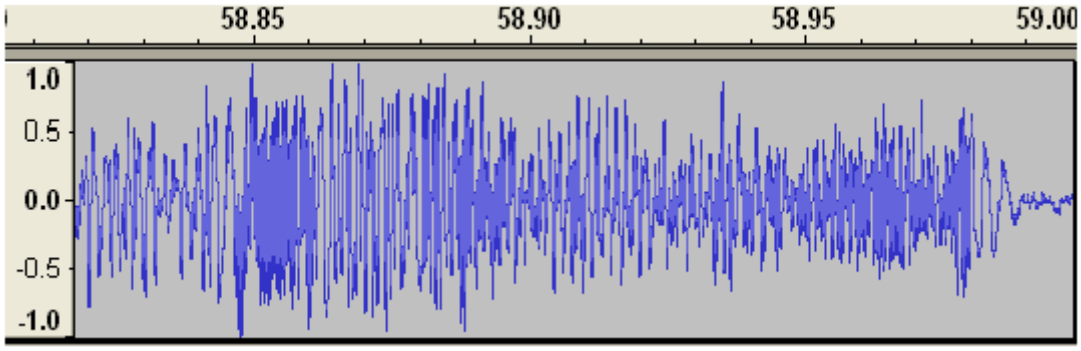

Figure 19. The putative gunshot at 53.2 s. There are six echo peaks from the sniper´s nest: 52.260, 53.267, 53.269, 53.274, 53.278, 53.300. From the grassy knoll pattern only 53.263 and 53.288 have peaks, while 53.257, 53.266, 53.288 and 53.290 do not.

This shot apparently came from behind, but not from the rifle used by Oswald. There is only 0.7 s between this shot and the one in 52.5 s . According to the FBI Oswald´s rifle required 2.3 s between shots. Without any echo analysis we can conclude that there had to be more than one shooter or an automatic rifle, if this is a gunshot impulse.

The final two pictures in fig. 20 show the impulses at 55.6 s and 55.8 s. The signal forms differ from the ones shown before. These are denser: they have strong beeps. It does not need to mean that there was no gunshot at 55.6 s. A gunshot could have turned an inactive radio active and it would have sent a beep to the headquarters as an indication of something to transmit. A loud beep could have covered the gunshot impulse. The signal in 55.6 s was analyzed for echo peaks. It does not match echo peaks from the sniper´s nest. The second impulse at 55.8 s was not analyzed since its power spectrum does not suggest it is a gunshot. Despite of failing the echo correlation test, the impulse at 55.6 s may be a gunshot coming from the sniper´s nest. The beep may simply be too strong and cover the echo peaks.

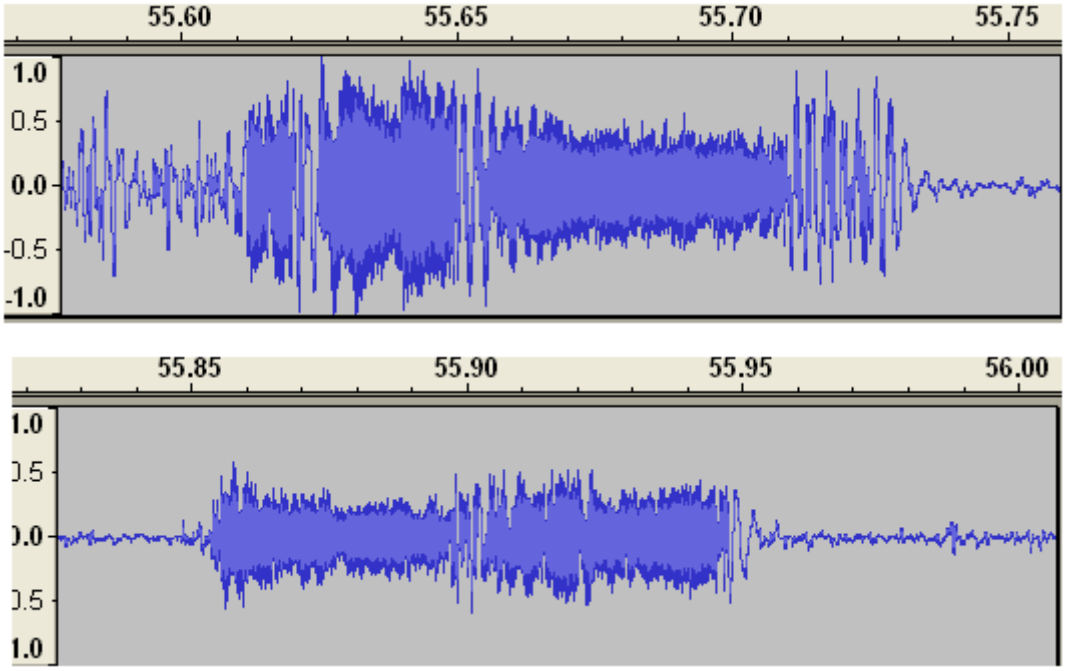

Figure Putative gunshots at 55.6 s and 55.8 s. The one at 55.6 s does not match all echo peaks from the sniper´s nest. The one at 55.8 s was not tried.

6. Conclusions

The conclusion from the echo correlation analysis in this article is that the data is too noisy for echo correlation analysis, and this was the case also in the year 1978. Rejection of that study was justified. Still, the conclusion that there were more than one shooter can be made.

The Dictabelt seems to have gunshot noises in the places identified here. These places match well with the Zapruder film. Assuming that the identified impulses are gunshots, there had to be more than one shooter. The argument is that Connally seems to be bleeding before Kennedy is shot to the neck. The only suitable Dictabelt impulse is at 53.2 s, thus Connally was shot at the frame 210 corresponding to this impulse. There had to be two shooters or a different rifle, since the time from 52.5 s to 53.2 s is too short for Oswald to have fired both of

them. There had to be a shot at 52.5 s if the impulses are from gunshots. It follows that there had to be at least four shots. The argument for the fifth gunshot is based on the Zapruder film. Kennedy falls to the back and left after his head initially moved to the front, this seems to imply that there was a shot at 58.9 s. This hypothesis is not contradicted by the Dictabelt. If there was such a fifth shot, echo correlation suggests it came from the grassy knoll.

There are many other mysterious things in this assassination, but arguments must be kept simple and they should have as few parts as possible. An argument for some end does not need to reconstruct everything, only to point out why some hypothesis is impossible. I think it has been shown that the Kennedy assassination was a probable conspiracy.

6. References:

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