Figure 1 Alignment of light pole damage with interior damage in the Pentagon.

Pentagon Approach Path of a Boeing 757 on 9/11/2001

By David Chandler

This paper presents evidence of a large plane, consistent with a Boeing 757, flying into the Pentagon on 9/11/2001, making contact with a number of obstacles along the approach path. This is a follow-up to the earlier paper in the IC911 Debated Topics Forum, "Large Plane Impact Damage to the Wall of the Pentagon and Adjacent Objects" by David Chandler and Wayne Coste. That paper considered evidence for impact by a large plane, consistent with a 757, based on the impact damage to the generator trailer, chain link fence, low concrete retaining wall, the large tree in front of Column 16, and the face of the Pentagon itself. As will be shown here, there is a substantial amount of corroborating physical evidence prior to the first contact of the plane with the generator trailer.

In this paper I will primarily cover the damaged light poles, the missing rung on the freeway traffic camera pole, the notch in the tree at the Hwy 27 overpass, and the video imagery from the two parking lot security cameras. I will also briefly discuss the Pilots for 9/11 Truth (P4T) calculation of the pull-up g's needed to level out the plane.

The High g Pull-up Claim Is Based on an Unjustified Assumption

The Pentagon building lies in a depression. In order for an incoming plane to hit the building in level flight at ground level it would have to approach in a shallow dive, then pull up through some radius of curvature, with a concomitant upwardly directed centripetal force (experienced as a "g-force"). The corresponding g-force experienced by the plane and the passengers is a function of the speed of the plane and the radius of curvature of the pull-up maneuver. Pilots for 9/11 Truth (P4T) long featured a calculation on their website[1], asserting the impossibility of such a pull-up maneuver, claiming it would necessarily involve a g-force of 10.14 g's, which would be far beyond the capabilities of a 757. This calculation was based on the unjustified assumption that the entire pull-up maneuver would have to be completed within the width of Hwy 27. Such a small radius of curvature would require an impossibly high centripetal acceleration. The P4T calculation assumes a straight-line approach to the first light pole on Hwy 27, followed by a rapid transition through a small arc to horizontal flight, followed by straight-line flight all the way across the lawn. There is no physical necessity for such a brief transition. In actuality there are multiple solutions for a pull-up maneuver that fit the evidence and hit the Pentagon wall horizontally without disturbing the lawn. The late Frank Legge pointed out this error in 2011. At the time I started working with Frank I made a similar but independent calculation with virtually identical results.[2] Our calculations show various feasible paths with g-loads as low as 1.6 g. The maximum upward acceleration measured by the FDR is 2.26 g, which is consistent with our calculations and well within the design limits of a Boeing 757. Our conclusion is that the high g objection is based on an unjustified assumption and is therefore irrelevant.

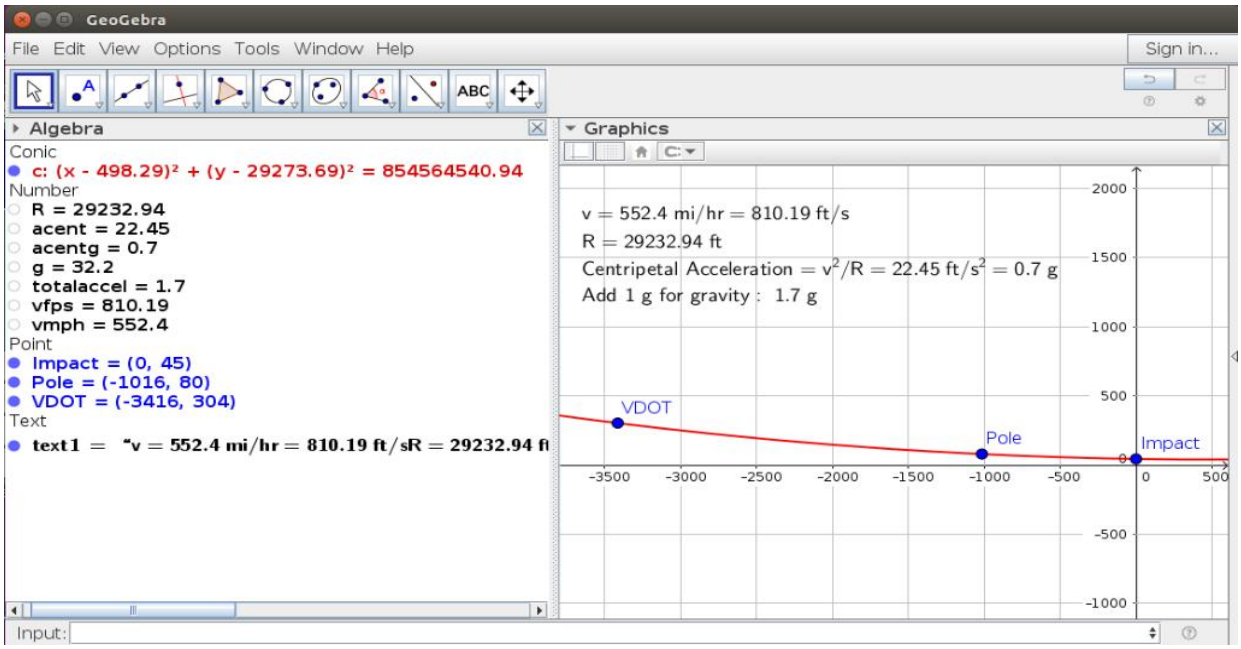

Figure 2 Graphical calculation of the g-force for a path from the top of the VDOT antenna, through the first light pole, avoiding the lawn, and striking the Pentagon first floor horizontally.

Impacts with Obstructions Approaching the Pentagon

Impacts with five light poles, a tree, and a Virginia Department of Transportation (VDOT) traffic camera pole, leading from the Hwy 27 overpass to the entrance hole at Column 14 in the Pentagon wall, provide significant evidence for

1. The location and direction of motion of the plane along the approach path,
2. The wingspan of the plane, and
3. Alignment with the radar path leading toward the Pentagon (Figure 4), the damage path inside the Pentagon (Figure 1), and the direction of motion indicated by the Flight Data Recorder (FDR), which was recovered in the Pentagon. (The FDR direction of motion is indicated by the red line in Figure 3. The FDR and radar data will be considered in detail in a separate paper.)

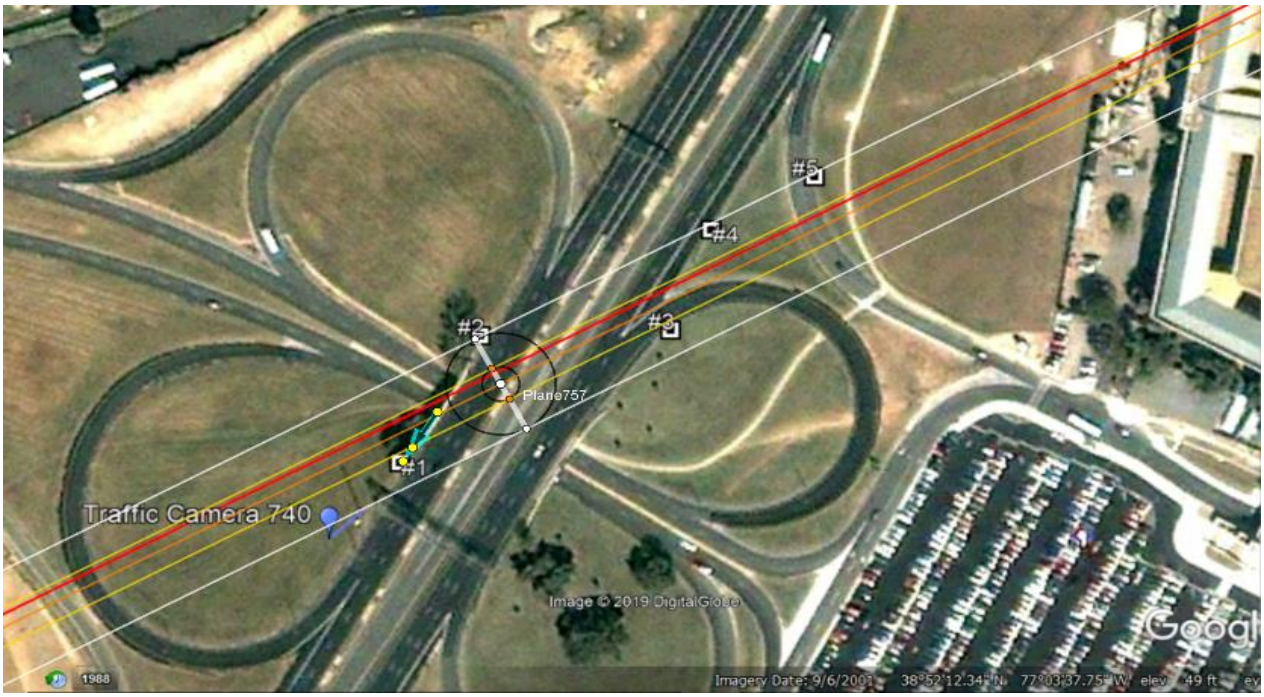

Figure 3 Precise location of the flight path through the light poles with the right engine (yellow line) impacting the front quarter of the generator trailer.

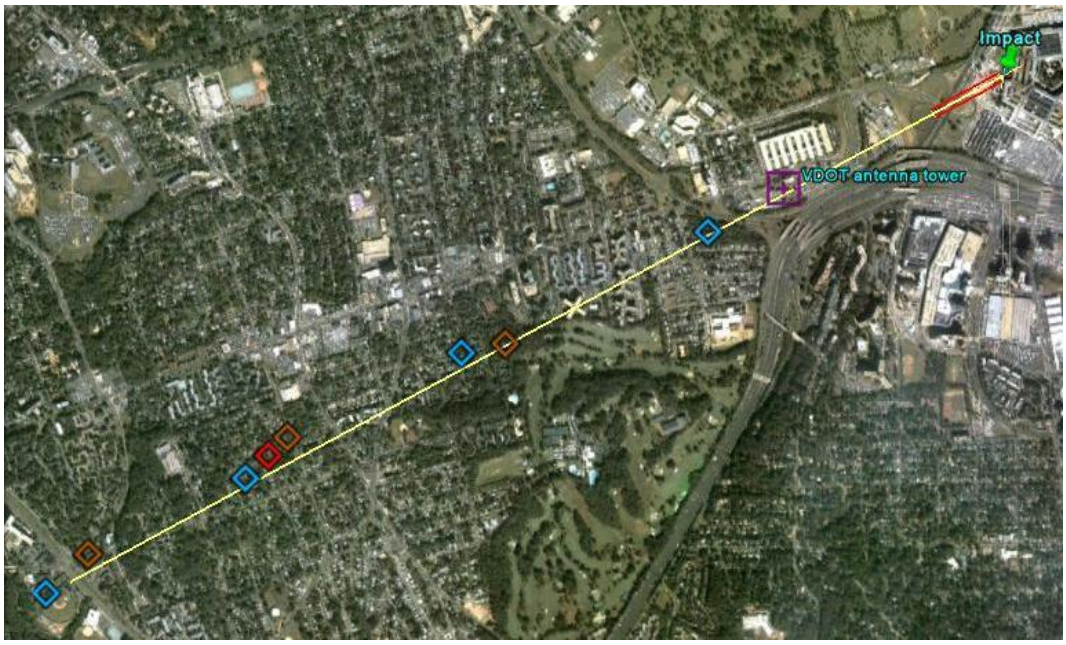

Figure 4 Extended backward, the path through the light poles is in alignment with the direction of motion indicated by the FDR (yellow line) and the radar path of the plane determined by several independent military and civilian radar stations (color coded boxes).

The first light pole was hit solidly by the right wing just beyond the engine. It was broken into four pieces, all of which can be identified on the highway overpass (Figure 5).[3]

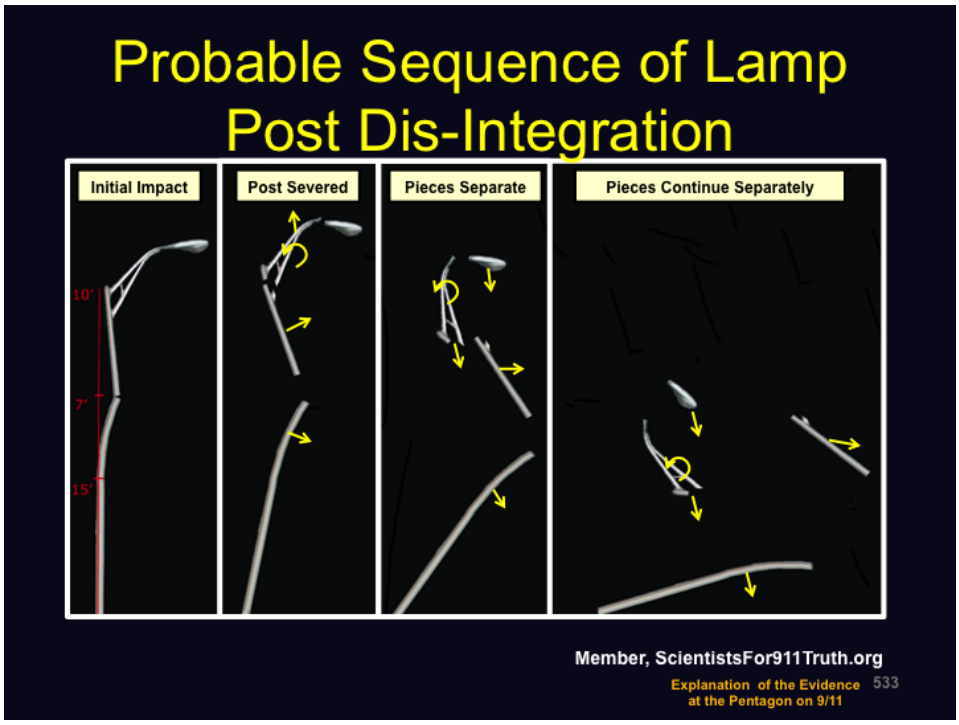

Figure 5 Analysis of breakup of first light pole.

Some have wondered how the pieces could remain close to the original pole position given the high speed of impact. The answer is based on the physics of collisions. In order for an impact to throw an object, momentum must be transferred to it. Transfer of momentum is proportional to a quantity called "impulse", which is the product of the force and the time of interaction. A high-speed impact (think of a bullet) may deform or destroy the impacted object at the point of contact, but has minimal time of interaction and thus reduced impulse. That is why a bullet can put a hole in someone without throwing them across the room. On the other hand, the ability of a moving object to inflict damage depends on its kinetic energy, which is proportional to the velocity squared, so increasing the speed disproportionately increases the kinetic energy. The plane had high kinetic energy because of its high speed, but could only transfer minimal momentum to the pole fragments, so the pieces were severed and broken at weak connection points but not thrown far.

The third light pole was also severed by the right wing. One would expect the multiple impacts to damage not only the light poles but the wing. In fact, we know the wing was indeed damaged. There is a piece on the lawn which can be identified as a right wing slat, a movable section of the wing that extends to increase the wing's surface area during normal takeoffs and landings. This piece appears to have fallen off prior to the plane's impact with the generator tailer. (See Figures 6 and 7).

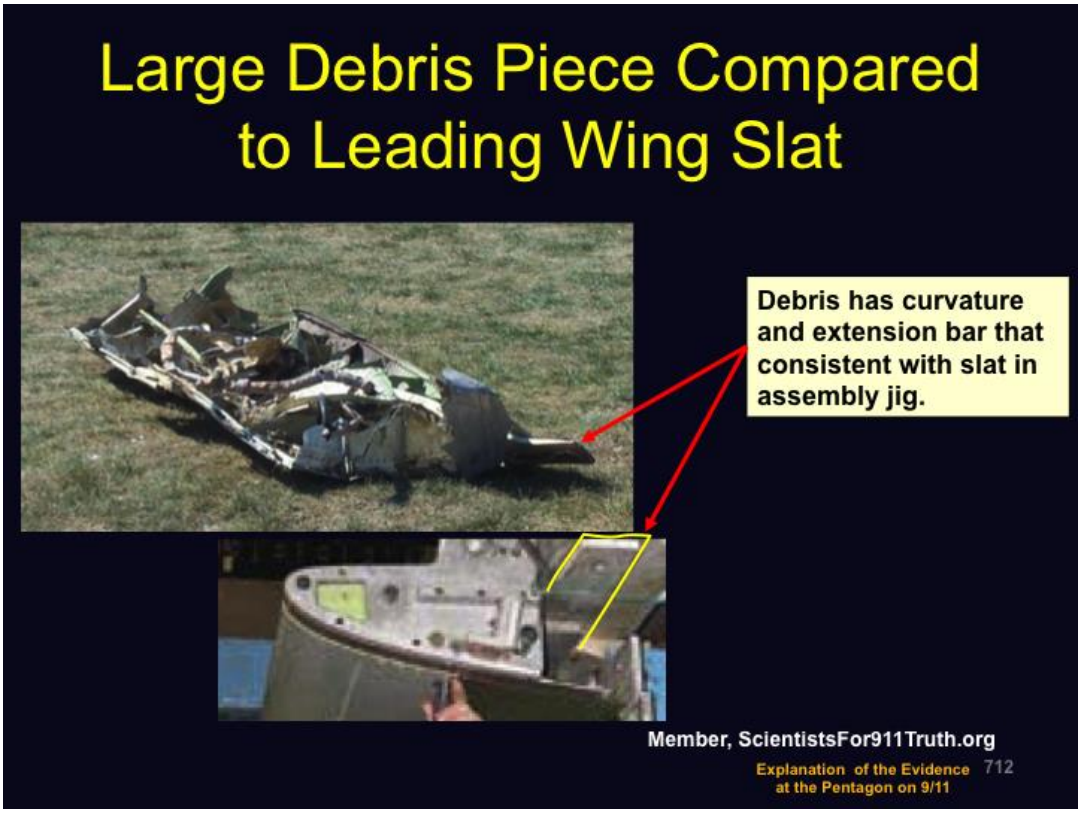

Figure 6 Leading wing slat found under path of right wing, which had hit light poles 1 and 3.

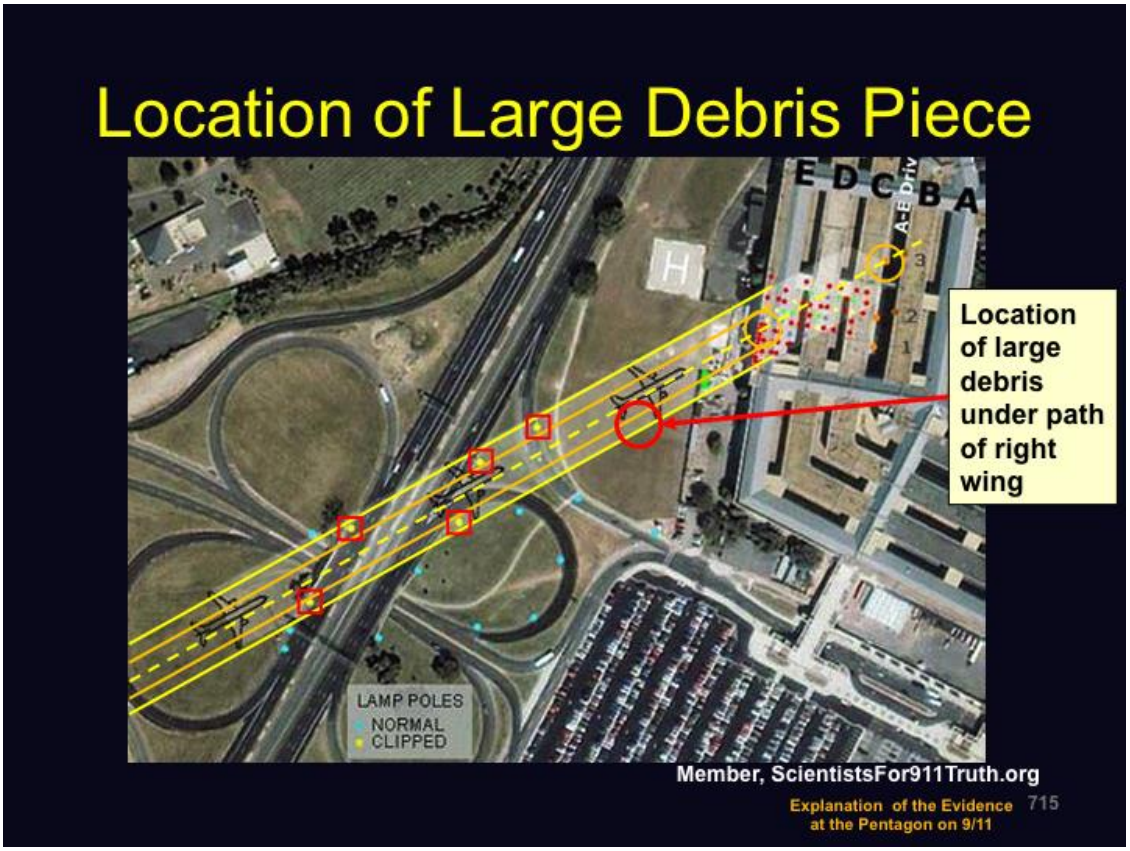

Figure 7 Location of leading wing slat on the lawn between the third light pole and the Pentagon.

The tall, vertical section of the second light pole was bent but not severed when hit by the left wing. This means the pole was grazed by the wingtip, rather than being subjected to a direct hit. The pole can be seen after impact lying on the west side of Hwy 27 (Figure 8).

Figure 8 Mast of second light pole, bent and lying on the side of Hwy 27, but not severed.

If the left wingtip grazed the second light pole, we can refine the description of the path of the plane with a precise data point. The wingspan of a 757 is 124'10". Plotting the paths of the wingtips based on this wingspan (Figure 3), we would expect the right wingtip to have grazed a camera pole overlooking Hwy 27 (Figures 9 and 10)[4].

Figure 9 A photograph taken by Staff Sgt Gary Coppage shows a notch cut out of the tree on the left and a scar and missing run on the VDOT traffic camera pole at the top right. Note that this photograph was taken at least a half hour after the impact because the roof of the Pentagon can be seen to have collapsed.

Figure 10 Detailed view of scar and missing rung on freeway traffic camera zoomed and cropped from Staff Sgt Gary Coppage Photo.

Figure 11 Detailed view showing the notch taken out of the overpass tree. Note the stripped and cut branches.

Examining that camera pole we find a scar and a missing rung. This damage was noted long ago, and the question whether it was caused by the plane was considered a matter of speculation. But with the new measurements that precisely locate the plane in relation to the light poles, the cause of the scar and missing rung can be inferred with high probability.

Near the camera pole and first light pole there is a tree at the top of the overpass with a circular notch with frayed ends scooped out as with a dull blade.

The notch in the top of the tree is not visible in the overhead view in Google Earth. I have therefore measured the location of the notch from a side view and transferred the proportions, indicated by the blue and black arrows in Figure 12 to the overhead view (Figure 13) to locate it more reliably.

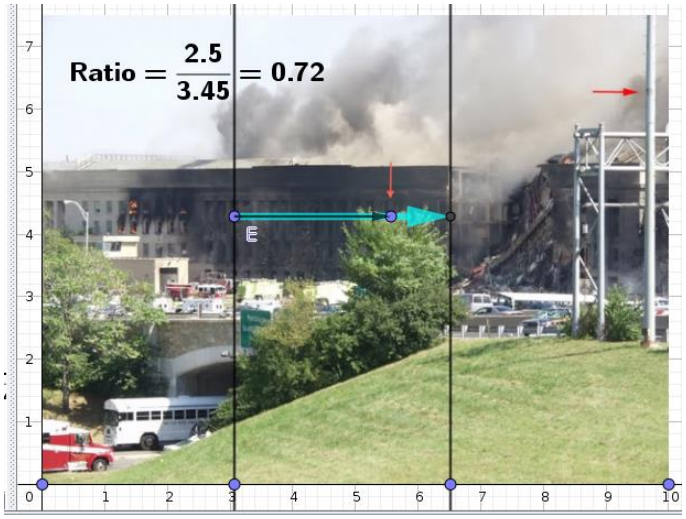

Figure 12 Locating the notch in the tree, side view.

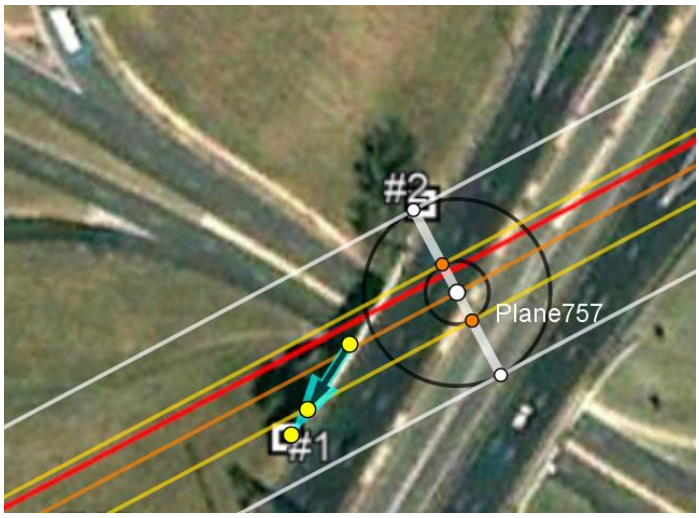

Figure 13 Locating the notch in the tree, Google Earth view.

Based on the dimensions of a 757 and precise location of the wingtips of the plane as it grazed the freeway camera pole and the second light pole, the position of the right engine can be identified with certainty as the cause of a semicircular gouge at the top of a tree on the overpass. The roundedness of the edge of the intake to the jet engine is not an issue. The front edge of the engine, moving at over 500 mi/hr, would act like a dull mower blade cutting through brush, leaving clipped and stripped whitish tipped branch ends along the notch outline.

The data content of the flight data recorder (FDR), whose memory module was recovered in the Pentagon rubble, provides a precise direction of motion for the last seconds of the flight. If that direction of motion is used, in conjunction with the precise location of the plane as it flew over the overpass, the right engine projects forward to the precise location of the damage to the generator trailer and the left engine projects forward to the curved notch in the low concrete retaining wall near the Pentagon wall. The research leading to these conclusions is presented in the video, *AA Flight 77 at the Pentagon*.[5]

Figure 14 Memory module of Flight Data Recorder (FDR) found in the Pentagon. The data found on this memory module will be discussed in a separate paper yet to come.

There were two security cameras located on the north side of the lawn set up to monitor cars entering the parking lot. They scanned adjacent lanes and both faced the same direction looking across the lawn nearly parallel with the west wall of the Pentagon. The two data streams were recorded onto the same recording device with a slight offset that Wayne Coste has measured to be 4/30 sec[6]. Five frames from one of the cameras were released (leaked?) in March, 2002. One of the frames purported to show the plane crossing the lawn, but the object in question was mostly hidden behind a post that contained the second security camera. Those five frames raised more questions than answers. The most notable feature was a turbulent white cloudy streak, which some (most notably Massimo Mazzucco in his film, The New Pearl Harbor, which appears to utilize 2006-era compressed and degraded YouTube video footage) interpreted to be the nose of the plane, but which upon closer inspection, is a smoke plume trailing the plane, as will be discussed below.

Figure 15 Plane crossing lawn obscured behind foreground post containing second camera. The diffuse whiteness is a smoke cloud being emitted from the far engine.

In 2006 the two security camera videos, filmed at 1 frame per second, were released under a FOIA, one of which contained the previously released 5 frames. One frame from each video captures the plane. Using a blink comparator technique the image of the plane becomes visible and it is clear that the white turbulent mass is a smoke plume.[7] The earlier frame shows a short plume, with some recognizable edge details, and the later frame shows the same details with

Figure 16 Plane as shown in second camera, housed in the foreground post mentioned above. Note that the smoke cloud is less developed at this time.

Figure 17 Plane outlined for identification purposes only.

additional length appended. The blinked images show the nose, fuselage, and tail of a large plane. Since the plane is near the edge of a wide angle photograph it appears compressed due to barrel distortion. When the barrel distortion is algorithmically removed, the plane image is substantially lengthened. Under these conditions the plane closely resembles a 757 with smoke billowing out of the right engine, on the far side of the plane as seen by the cameras. (These improved results are possible because they utilize images from the original FOIA release, not images degraded by YouTube compression.)

Why the smoke trail? The existence of a smoke trail gave early impetus to some, myself included, to consider the missile hypothesis, because missiles emit smoke trails whereas planes do not. (Contrails are low temperature condensation phenomena which occur only at high altitudes.) The discovery of the circular notch in tree on the overpass (pointed out to me by Ken Jenkins) and the recognition that the leaves that would be ingested by the right engine could account for the smoke trail, eliminated what had become a sticking point in understanding the security camera images as a plane crossing the lawn.

Conclusions

We conclude that a plane with the dimensions of a Boeing 757, initially in a shallow dive, pulled up with a vertical acceleration of ~2g as it crossed the Pentagon lawn to hit the Pentagon horizontally at near ground level. On the way the right engine scooped out part of a tree on the Hwy 27 overpass, the right wingtip left a scar on a VDOT camera pole, the left wingtip grazed the second light pole, folding the large vertical section of the pole and knocking it over. The right wing solidly impacted the first and third light poles, causing the leading wing slat of the right wing to break off and fall onto the lawn. The physical evidence is self-consistent and consistent with the impact damage described in “Large Plane Impact Damage to the Wall of the Pentagon and Adjacent Objects” by David Chandler and Wayne Coste. The evidence is not consistent with a smaller plane, a missile, or any other scenario that has been proposed.

[1] Both the pilotsfor911truth.org website and all snapshots of the site in Archive.org have had their access blocked. However the PilotsFor911Truth video, "G- Forces--Scene from 9/11: Attack on the Pentagon" https://www.youtube.com/watch?v=PtlzCyKbw5Q contains their calculation.

[2] Frank Legge's calculation: http://911blogger.com/sites/911blogger.com/files/G-force_calculator_Pilots7.xls. My calculation: https://911speakout.org/wp-content/uploads/g-force-summary-final.pdf. Wayne Coste has also made a similar calculation using slightly different assumptions, but with similar results: https://www.youtube.com/watch?v=cXhvsdoprW0.

[3] See Wayne Coste's analysis of the probable mechanics of the breakup of the pole at the 7:06 minute mark of https://www.youtube.com/watch?v=pQED7Q1Mxy0

[4] Source of original photograph: U.S. Air Force file photo by Staff Sgt Gary Coppage, https://www.33fw.af.mil/News/Photos/igphoto/2000030817/mediaid/1336168.

[5] Discussion at https://911speakout.org/aa-flight-77-at-the-pentagon-2/, video at https://www.youtube.com/watch?v=lGb2D-FZWk0

[6] https://www.youtube.com/watch?v=SunhDlCMJJc

[7] For a detailed discussion of the video frames showing the Pentagon plane, and a description of the Blink Comparator process, see the video Seeing the Pentagon Plane, https://www.youtube.com/watch?v=yxC-BnJ2GU8