

Smoke Calculations Based Upon Fisher Sightings

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One of the things about this post is that for people who are really knowledgeable about the battle, the words I chose might make them feel like I am talking down to them. However, since this is a fairly technical post, I included information that less knowledgeable folks would need to understand it. I have found that striking the right balance between these two perspectives is hard to get right. You guys do it so well.....

All the pilots in the Ready Rooms onboard Yorktown, Enterprise and Hornet were fed spotting reports via teletype between 0540 and 0552 that said: "Two Carriers and battleships bearing 320 (from Midway) distance 180 (miles from Midway) course 135 speed 25 (knots)." Assuming Kido Butai would maintain this course (roughly) into the wind and speed in order to close Midway and recover their strike aircraft, a projected intercept course could be calculated based upon the location of the Enterprise and Hornet when launch was complete. In response to the sighting report Admiral Fletcher signaled Admiral Spruance "Proceed southwesterly and **attack enemy carriers** when definitely located...." Task Force 16 then went to 25 knots and turned southwest to close the distance to the intercept point.

Spruance considered launching immediately, however Captain Browning, his Chief of Staff, convinced him to hold in order to get within range of the torpedo bombers. Browning calculated the launch could commence at 0700 and be completed at a point where TF16 would be 155 miles from the calculated intercept point, barely within torpedo plane range. After launch TF 16 would close the interception point to reduce distance for the returning aircraft.

Even though Hornet had no previous combat experience, and its flight deck crews much less practiced than Enterprise's, Hornet's launch was completed without complications whereas Enterprise's was delayed. The Hornet Air Group (HAG) formed up and at 0746 departed for the enemy. There was a problem, however.

All pilots on Enterprise and Hornet calculated the closest interception point as being approximately 240 True based upon the sighting report. This was also the solution Lieutenant Commander Waldron calculated. Reporting to the Hornet's bridge for last-minute instructions, he was told to fly course 265 by HAG Commander Ring. Objecting to this heading, Waldron attempted to get it changed to 240 but was overruled by Captain Mitscher. Either Ring had miscalculated the heading to the Japanese carriers or Ring/Mitscher had decided to disobey Fletcher/Spruance's order to attack those specific two carriers and instead go after the two unreported carriers, which they thought may be trailing the leading two carriers. Based upon the fact Ring had gotten the HAG lost during pre-deployment training in the Gulf of Mexico, he was not known for his navigational skills, so it was left to Waldron to figure out which was true.

Captain Mitscher's after action report stated the HAG departed on a heading of 239. This was not challenged by any of the official Navy reports or the various books on the battle until 1982 when Bowen Weisheit investigated the loss of his friend Ensign Mark Kelly, who was a fighter pilot with the HAG. John Lundstrom first published Weisheit's research in his groundbreaking book "The First Team." Weisheit then published his book "The Last Flight of Ensign C. Markland Kelly, Junior, USNR."

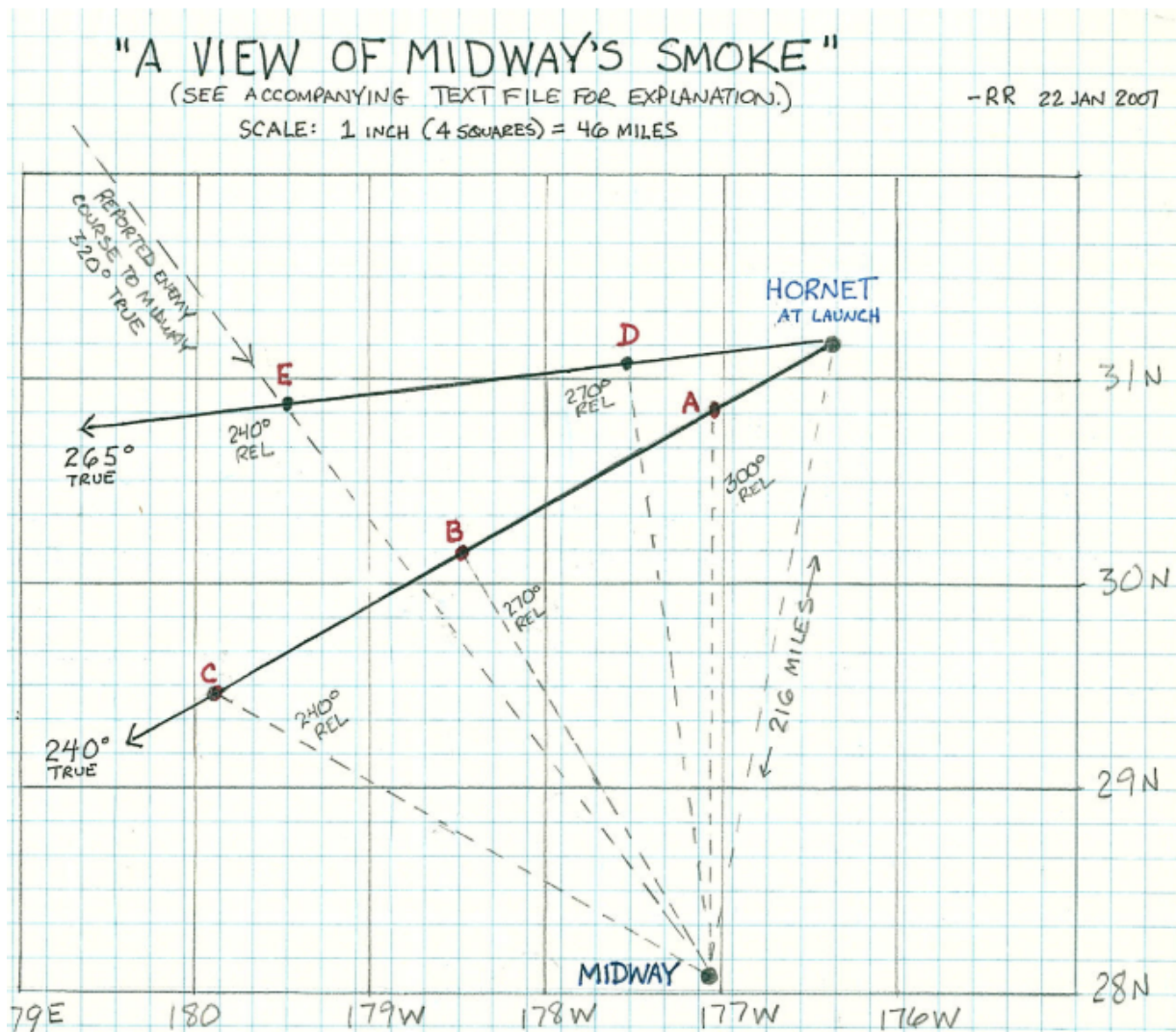
The Midway Roundtable examined these issues. In December 2021 Ron Russell wrote a thorough analysis of Weisheit's recordings and transcripts that he had obtained from the Naval History and Heritage

Command and provided links to these files on the website. One of the more interesting interviews was Weisheit's interview with retired Rear Admiral Rodee who stated the HAG flew 260 or 265. In my humble opinion given the information in these files, the details of the conversation on the bridgewing as reported by Robert Mrazek in his Appendix 1 and the Sources pages of his book "A Dawn Like Thunder," and Commander Fuchida's "Midway: The Battle that Doomed Japan, the Japanese Navy's Story" book that stated the first group of Navy torpedo bombers attacked from the Northeast, it was pretty definite to me they had departed on course 265 and that Waldron had broken southwest. Something I have also not seen in any of the analysis is this: If the HAG had flown 240, and given the fact that VB-6, VS-6 and VT-6 definitely flew 240, it is interesting that none of the HAG ever saw another aircraft after they departed on the way out and none of the aircraft from the other air groups ever saw any of the HAG! Rodee also says that when they turned, they flew south for about 10 to 15 minutes before heading back due east, that they saw Midway smoking, but didn't see any other airplanes. It is definitely true that if the HAG flew 265 out and roughly the reciprocal back, no other air group's aircraft would have been in that area, hence no sightings would have been made.

In Ron Russell's analysis the only support for Captain Mitscher's heading of 239 came from Ensign Clay Fisher who had flown wing on Ring and said they had taken course 240 and he had seen smoke (from the burning fuel tanks on Midway) during a portion of the outbound flight. In June of 2014 Ron Russell published a very well-done chart that he had initially completed in 2007 but chose not to publish it for seven years published. He concluded:

"The conclusion is that, based on Fisher's recollections regarding his view of the smoke and his elapsed flight time before seeing it, and assuming those recollections are accurate, course 240 d.t. is quite likely while course 265 d.t. does not seem possible. The one weakness in Fisher's recollections is flying at 14,000 ft. instead of 20,000 ft. His closest approach to Midway appears to be about 160 to 170 miles at Point B. One can only conclude that Midway might have been visible at that altitude and distance, but at 20,000 ft. it seems likely that the smoke and perhaps Midway itself would indeed have been quite visible.

Here is the chart from Ron's analysis:



Viewing the smoke from Midway
 (See accompanying chart.)

-RR 1/23/2007

If one accepts that the smoke seen by Fisher was indeed from Midway's burning oil tank, then the only possible scenario that's consistent with his recollections is the HAG on course 240, with Fisher flying at 20,000 ft. That's the only set of facts that makes the smoke visible to the pilot at all three points (A, B, and C) of the referenced: 8, 9, and 10 o'clock position relative to his heading. Smoke could not possibly be visible at the 8 o'clock position on course 265 (D), which defaults one's conclusion to course 240."

Ron used the well-known equation for calculating the distant horizon: Distance in Nautical miles equals the square root of 1.35 times Altitude in feet. Of course, cloud cover and other atmospheric conditions can also impact visibility, so this equation only works for optimal conditions. Fisher was unsure of his altitude, so Ron did the calculations at both 20,000 and 14,000 feet.

In my research I saw numerous sources that said the Hornet dive bombers flew at 19,000 feet and the VF8 fighters 2-3 thousand feet above them. So, I went with Lundstrom's Page 334 and calculated maximum distances at 19,000 and 22,000 feet of 160.1 miles and 172.3 miles. Per Ron's chart Point D is 207 miles

away from Midway so at 19,000 feet Midway was $207 - 160.1 = 46.9$ miles too far away to see. However, the thing that Ron did not consider in his analysis was that Fisher was **seeing the smoke** from the burning fuel tanks and not Midway Island.

The distance equation can be inverted to calculate how far an observer on the ground can just see a column of smoke. The inverted equation is Altitude in Feet equals Distance squared divided by 1.35. Plugging in 46.9 miles the equation says that an observer on the ground can see a 1629-foot-high column of smoke from 46.9 miles. So, the combination of Fisher's altitude and a minimum height of a smoke column of 1629 feet shows that Fisher could have seen this smoke at point D!

So how high would the column of smoke rise before dissipating? That is not easy to say because the strength of wind at various altitudes could disperse the smoke and must be considered. However, on page 142 of "A Dawn Like Thunder" Ensign Earnest recounts his return to Midway. His compass and other instruments were not working so he decided to climb. At four thousand feet he broke through his local cloud layer and to his relief sighted smoke to his southeast: Midway! Again, if you redo the calculations for Fisher's altitude of 4000 feet (he does not say how high the smoke extended ABOVE 4000 feet) that produces a distance of 73 miles. Using the scale on Ron's chart point E (the furthest point that Fisher could still see smoke) the distance to Midway is 237.8 miles. So, adding 160.1 to 73 equals 233.1 miles. If the smoke column was only **1972** feet and not 1629 feet and not even the 4000 as confirmed by Earnest, this could be seen at point E.

The final thing to consider is wind conditions. We know that the surface wind at TF16's launch location was only 4 knots from 140. Tomonaga reported he had completed his attack on Midway at 0645. The HAG formed up and departed at 0742. Fisher's point D was 90 minutes from 0742 or approximately 0912. At 4 knots between 0645 and 0912 the smoke from Midway could have traveled 11.27 miles closer to Point D if it doesn't totally dissipate. Then you have the report from Tomonaga on page 145 of "Shattered Sword" that said the wind at 12000 feet as he approached Midway was 9 meters/sec (20.132 mph) from 090. This shows that the winds at 12000 feet were blowing west...basically along the track the HAG took on course 265. No one can be sure how high the column of smoke rose or traveled before it dissipated but these two data points provide an additional margin in support of these calculations which would not have been true if the winds had been coming from the opposite direction and blew the plume south.

The bottom line is that based upon Fisher's altitude, the height of the smoke plume based upon Earnest's story, and Tomonaga's report, Fisher could have seen smoke on a departure course of 265 at points D and E, which corroborates eyewitness accounts and the consensus of historians that Mitscher and Ring did not order a departure course of 239-240.