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UFO UpDates Mailing List

Re: Kenneth Arnold's 'Flying Discs

From: David Rudiak DRudiak@aol.com
Date: Tue, 27 Jul 1999 02:04:48 EDT
Fwd Date: Tue, 27 Jul 1999 13:33:32 -0400
Subject: Re: Kenneth Arnold's 'Flying Discs

>From: Bruce Maccabee <brumac@compuserve.com>
>Date: Sun, 25 Jul 1999 17:07:57 -0400
>Fwd Date: Mon, 26 Jul 1999 10:38:45 -0400
>Subject: Re: Kenneth Arnold's 'Flying Discs

>Now, the Air Force, in 1948-49, decided that Arnold's
>story was so full of holes it wasn't worth analyzing (so why
>don't we all just accept the Air Force rejection of the sighting
>and shut up?). Why did they say this? Because the first
>"analyzer," Dr. J. Allen Hynek, could not accept one of the
>implications of Arnold's statement, namely that the objects would
>have been VERY LARGE, hundreds of feet in length, to be seen
>with any details at a distance of 20 miles or so. Arnold had
>claimed they were about 50 ft long. Hynek argued that if only 50
>ft long they would have been too small to see. Conversely, if
>Arnold could see details of shape of objects 20 miles away they
>would have to be huge.. (You would have to read my paper on
>Arnold to get the details.) Hence Hynek decided that the
>objects probably were about 50 ft long, fast fighter aircraft ,
>in which case they were not 20 miles away but only 6 miles away,
>and traveling not 1,200 or 1,700 mph, but about 400 mph. Hence
>there was a big contradiction between Arnold's size estimate and
>Hynek's size "estimate" (really a "preferred size") and so the
>Air Force took this as indication that Arnold's report was so
>full of contradictions and errors that it didn't merit further
>attention. Incidentally, the official AF explanation has nothing
>to do with Hynek's analysis. According to Project Blue Book
>files Arnold saw a "mirage!" Now there's a rock-solid bit of
>logic for you.

Actually what was full of holes was Hynek's analysis, not
Arnold's report. Hynek was an astronomer, which may have made
him an expert on the optics of telescopes and their resolution.
But he obviously knew nothing about measurement of human visual
acuity.

Hynek reasoned thusly. Arnold reported that when the objects
flew past Mt. Rainier and when seen edge on, they nearly
disappeared from view, looking like a dark thin line against the
snow white background. Furthermore, Arnold estimated their
length to thickness ratio at about 20 to 1. And finally, Arnold
guesstimated their distance from a subpeak of Rainier which he
said they flew and disappeared behind. That peak was about 23
miles from his position.

Well, says Hynek, humans can't see anything smaller than 3
minutes of arc (WRONG!!!), so when Arnold barely made out the
objects edge-on, the thickness couldn't have been less than 3
minarc, which translates to about 100 feet at 23 miles.

Furthermore, since Arnold estimated the objects to be 20 times

longer than thick, this would mean these craft would have been 100 feet thick and 2000 feet long. That was preposterous, said Hynek, so obviously Arnold screwed up. Maybe they were jet planes only 6 miles away and flying at conventional subsonic aircraft speeds.

Thus Hynek dismissed Arnold's sighting with the wave of his debunking hand. Hynek never saw the error of his ways, because he used the same argument in his "UFO believer" days 30 years later. (See, e.g., "The Hynek UFO Report, 1977")

Oddly, two seconds thought should have told Hynek his own argument was nonsense. E.g., how big would the "jet planes" have to be, using Hynek's own numbers, if you scaled the distance from 23 miles to 6 miles? Why the dimensions would be about one quarter of those numbers which he used to ridicule the Arnold sighting. Hynek's "jets" would have been over 500 feet long!

Hynek's big screw-up was in his statement that humans can't see anything smaller than 3 minutes of arc. A 3 minarc test object corresponds to 20/12 visual acuity. On an eye chart, the test target, say the letter 'E', would be 3 minutes of arc high, but the lines and gaps making up the letter actually measure 1/5th of this, or 0.6 minarc. So 20/12 acuity says the person is just able to resolve the white gaps between the dark lines that make up the letter 'E', or is resolving 0.6 minarc, not 3 minarc.

But this still wasn't Arnold's resolution task, since Arnold wasn't resolving two closely spaced parallel lines, but was discerning an isolated line against a contrasting background, an even simpler acuity task. It is possible, under controlled conditions, for humans to just make out a highly contrasting dark line against a light background, when the line subtends an angle of only 2 seconds of arc.

What really happens here is this. Under ideal conditions, the image of the line on the retina is smeared by pupillary diffraction to a width of about 4 minarc, which also corresponds to the width of the smallest photoreceptors in our retina (an example of evolution converging to an optimal solution). As long as the smeared dark line on the retina is above some small threshold of luminance difference with the surrounding light background (typically about .5% luminance difference), one is able to make out that a line is there, but no details.

If the dark line is near threshold in thinness, it appears to be extremely faint. As one thickens the angular size of the line up to about 0.4 minarc threshold, the line appears no thicker, but does get darker and much easier to detect.

What about Arnold's sighting? Edge-on, the objects almost seemed to disappear, looking like a dark line. Since Arnold saw the line as dark and not faint, but still barely visible, it suggests that the actual thickness was closer to about 0.4 minarc.

This is 7.5 times smaller than the bogus acuity number used by Hynek. Using Arnold's estimates of distance and length to thickness, the craft would actually have been about 14 feet thick, not 100, and 280 feet in length, not Hynek's hugely inflated 2000. So the craft in this analysis would have been jumbo jet size, hardly preposterous at all.

According to Ed Ruppelt, somebody at Project Sign apparently did a similar analysis to mine, and arrived at a figure of 210 to 280 feet in length. This may explain why they went to mirages to "explain" the Arnold sighting rather than use Hynek's bogus debunking argument. 200+ feet was no longer an unreasonable number for an aircraft.

One could easily imagine Arnold being in error about the length/thickness ratio, which is very difficult to estimate accurately when the ratio starts getting large. E.g., his drawing to the Air Force has the ratio at about 11 to 1, rather than 20 to 1. Using a smaller 10 to 1 ratio would bring the length down to about 140 feet, or more like commuter jet size.

Arnold gave other details in his report that provide additional clues to the angular dimension of the objects he saw. Using a cowling tool for a crude measuring device, he said that the

angular size of the objects was about the same as the distance between the inner engines of a DC-4 which he saw off in the distance. He estimated the DC-4 to be about 15 miles away.

Since the distance between the engines is about 60 feet, and scaling to Arnold's 23 miles, the objects would have been about 90 feet in length, which is less than arrived at above. However, one can legitimately quibble as to the accuracy of Arnold's estimates of plane distance and angular size of objects to engine separation. These were difficult perceptual tasks. Possible errors of up to 30-40% seem reasonable here. E.g., if Arnold overestimated the distance to the plane by 20% (meaning it was 12 miles instead of 15 miles away), and underestimated the angular width of the unknowns by 20% compared to the DC-4 engine spacing, then one again arrives at a figure of about 140 feet in length for the unknown objects at a distance of 23 miles.

Skeptics may howl about my assumptions here, but they are actually perfectly reasonable ones to make to resolve the inconsistencies. This sort of stuff is done all the time in the sciences. It's bracketing of values based on estimates of error. Arnold could be a little wrong here or there, but a self-consistent model of true size can be derived by making some assumptions of just how wrong Arnold might possibly be in one detail or another.

This also makes Hynek's jet-planes explanation half-way reasonable, at least in terms of size. Hynek's numbers would have made jet planes at 6 miles over 500 feet in length. But under the above assumptions they would have been more like 35 feet in length, which is just what you want for 1947 military jet planes. That's about how big they were back then.

Jet planes, however, do not explain the weird formation flying Arnold reported. Why the reverse-echelon formation? How do jet planes play "follow the leader" and weave like the tail of a kite, or appear to snake around mountain peaks, and at high speeds? This is all rather difficult to explain.

And why couldn't Arnold make out details on such planes, such as tails or wings or an exhaust trail? Arnold said his initial guess was that they might be a new kind of jet plane. He kept looking for tails, but couldn't make out any tails, a detail he should have been able to discern, as Arnold well knew from experience.

And whose jet planes? It seems the Air Force could easily have put the whole thing to rest by giving the identity of a flight of their jet planes. Didn't they know where their own planes were?

So jet planes is a barely viable hypothesis in terms of size and speed and bright flashing of light, but nothing else. It's still a much better hypothesis than "pelicans" or the latest debunking monstrosity apparently coming down the pike -- meteors.

David Rudiak

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