

A SCIENTIST IN THE COCKPIT: THE CASE HISTORY AND ANALYSIS OF A UFO SIGHTING*

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(Received 6 July, 1971)

Abstract. A UFO sighting took place during a night instrument training flight on which the author served as flight instructor. The UFO was in the form of a bright light approaching on a collision course at a very high rate of speed – a rapid deceleration and hovering – a rapid acceleration away from the author's plane followed by another deceleration and hovering. This apparent reconnoitering activity was repeated approximately ten times after which the object failed to reappear.

The paper describes the struggle the author went through, after the first stages of alarm subsided, in an attempt to explain by means of scientific principles what was being seen. A satisfactory tentative explanation was discovered and the method by which this came about is discussed as is the manner in which the explanation was tested in the cockpit.

On the night of May 28, 1968 this author served as flight instructor on a night cross-country instrument training flight under actual instrument conditions. The aircraft was a Cessna 150 training plane. The student held a commercial pilot's license and was in the final stages of his instrument instruction. The flight departed Ontario International Airport in Southern California at about 7:00 p.m. local time and landed at Lindberg Field, San Diego approximately one hour later. The weather was nearly ideal for this type of training flight with a ceiling of about 500 ft, visibility two miles with light rain and drizzle. There was a well defined coastal cloud layer about 2000 ft thick with very stable air conditions. The trip from Ontario to San Diego was routine for such a flight and about an hour was spent on the ground in San Diego discussing the first leg of the flight and planning the return. Departure from Lindberg Field took place at 9:00 p.m. local time. The flight profiles for the departure and the transition to the enroute segment were uneventful. But the strange events that took place in the cockpit on this dark moonless night were far from uneventful.

1. Flight Instructor's Subjective Report

Taxiing out and the runup at Lindberg Field were normal and we awaited release from Air Traffic Control. Since the airplane would be entering the cloud layer soon after lift-off and I would not be able to see anything, anyway, I told my student to leave the cabin lights on so he could more easily read his charts. Takeoff was in a westerly direction out over the ocean. Shortly after lift-off the tower operator instructed us to contact Departure Control, which we did. The departure controller gave us positive radar identification and cleared us to proceed to the San Diego VOR (a radio position

* A version of this paper was read at the Aerospace Medical Association Convention in April, 1970, St. Louis, Mo.

fix) by means of our own navigation. About this time we entered the cloud layer and all visual contact with the outside was lost. My student proceeded to turn northwesterly to the proper heading, trimmed the aircraft for normal climb speed and when all was stabilized he began diverting some of his attention to planning ahead for the next series of tasks that would confront him. Meanwhile, my job was to observe his flying, monitor all radio communications and think ahead of him so that nothing would catch us by surprise. The air was very calm and there was no sense of movement. Suddenly we broke out of the cloud layer – I remember the windshield was wet and I noticed a bright white light slightly above and to the left. My first thought was that it was another plane quite a way off with its landing light on, so I kept an eye on it. The windshield dried quickly and as I watched the light it became obvious that it was coming right towards us and very, very fast. It got to what I would guess was three to five miles away and suddenly stopped. Shortly before the light stopped I became alarmed by its approach thinking it might be a high speed Navy jet, so I reached up and turned off the cabin light with the comment to my student that I had some traffic to watch. I was plainly scared and noticed later that I was soaked with sweat under my armpits. I then noticed that the light had stopped and seemed to be hovering out ahead. I thought that I had an explanation for that. In the past, I have experienced a plane at night out ahead of me that would be turning and for a short period of time the relative velocities between the two planes would be zero and the white light on the tail would appear to be standing still in midair. Suddenly to my utter surprise the light took off – straight away from me at a rate of speed I have never witnessed before – something like a couple thousand miles an hour. The thing flew up the coast till it stopped and hovered out off the coast of Los Angeles I would estimate. It held there motionless for a moment and then came wheeling back straight at us again. Now I was not only alarmed but I became very angry at the radar controller for not warning us of this traffic. I reached over and turned on our landing lights to signal the other craft of our position whereupon it came to an incredible halt and just waited out there – seemingly playing with us. I remember swearing under my breath and reaching down to pick up the mike to call radar. As I did so the thing took off once again up the coast at a remarkable speed. Up to this point I was just dealing rapidly with the kinds of stressing situations a pilot sometimes encounters. But now a strange sensation overcame me. I hung the mike back up and noticed I was trembling as I did so. My hands were wet and terror began to spread sickeningly through my belly and somehow the clot in my throat made me not want to talk. The thing had not gone as far up the coast this time – perhaps as far as Long Beach ; and now it was coming back and I knew the helpless dread of seeing something not of this world, doing as it pleased.

I haven't survived 21 yrs of flying by coming apart emotionally in emergencies. So I began that strange trek back to rationality that all experienced pilots must know. I began acting like a disinterested third party to the whole business. I remember saying to myself, 'Come on, Harv, goddamn it, you don't believe in flying saucers. Whatever that is out there tearing up and down the coast it's not a flying saucer. It's an illusion –

just like the one caused by a car that night coming into Ontario with the weather at minimums. Do as you did then – just stare at your gauges and it'll be okay.' So I did; I read each gauge and everything was normal. I looked at my student; he was busy and unaware. I looked up and here came that thing straight at me again. I then had a new fear that maybe I was going crazy – that this was an hallucination not an illusion. 'Perhaps this is it,' I thought; 'that this is what it's like and in a few moments I'll have lost all touch with reality and have flipped.' But once again I came back to my third person and said, 'Harv, you're supposed to be a scientist – look for a rational explanation. That's what all those years in graduate school were about – you're being superstitious.' But when I tried to be rational nothing would come to mind and I was angry with myself for being so stupid.

2. The Hypothesis

So much for the instructor's report. Its main purpose is to describe the visual experience and convince the reader that it was very real and not to be taken lightly. The visual experience persisted and the assumption was made that some motion of the airplane produced this illusion. Thereupon, each instrument was scrutinized in turn for any hint of variation, such as fluctuations in engine speed or vertical movements, but none was observed. At this point the instructor placed his left elbow on his left knee and rested his chin on his fist and just tried to think of something. This position brought his face very close to the artificial horizon and while he was staring and thinking he noticed a gradual shift up and down of the airplane reference over the horizon line. The total displacement was only about half the width of the horizon line and the rate of change was so slow as to make this almost imperceptible from a normal distance. This gave rise to the hypothesis that the airplane was oscillating about an axis that could be described as the slope of its climb gradient and that this oscillation somehow gave rise to the illusion. It should be noted that all the negative emotional responses that were mentioned earlier began to wane and were replaced with the excitement and pleasant suspense associated with testing a new idea. By observing the artificial horizon instrument and waiting for indications of the oscillation and then looking out through the windshield at the light it became obvious that the motion of the nose of the plane and the sense of approach and retreat of the light were directly correlated. As the nose came up the light seemed to retreat; as the nose came down the light seemed to approach.

By this time the instructor's eyes had dark adapted and the star background was clearly visible. The bright light seemed to be a planet and it was suspected of being Jupiter. With a new frame of mind (and a sense of relief at not having called the radar operator) an attempt was made to break the illusion – to, so-to-speak say, 'I know you are a point source of light at optical infinity and since I can predict which way you will appear to move and when, I will make that prediction then fixate on you and see you as a planet embedded among the stars and not as a moving light.' However, all attempts at this failed and the illusion persisted through several attempts. The air-

craft then reached its cruising altitude. The student leveled out, accelerated to cruise speed, and retrimmed the airplane. The result was that the low amplitude, slow wave oscillation ceased and the illusion disappeared.

3. Theoretical Considerations

To say that a certain visual experience occurred within an observer because the airplane he was riding in was slowly oscillating about its longitudinal axis, is more a description of events than an explanation. Its great value resides in the suggestion that a less primitive explanation lies in some physical principles having to do with the way in which creatures process information and not in ascribing intention to an otherwise seemingly inanimate object.

The light source was almost assuredly the planet Jupiter. The instructor's post flight estimate of the light's position was: bearing from San Diego 300° magnetic and elevation 30° . The actual position of Jupiter from San Diego at that time was: 277° magnetic and 37° elevation; easily acceptable limits of estimate error. That a planet could appear so bright might seem unlikely at first. However, the apparent diameter of Jupiter varies during the year between 32 and 50 sec of arc, as compared with the apparent diameter of Alpha Canis Major (Sirius, the dog star) of 0.006 sec of arc. Jupiter appears about six times as bright as Alpha Canis Major which is a star of greater than first magnitude.

To someone versed in the literature of perception, two phenomena appear at first as likely candidates to serve as prototypes to explain the event discussed here. One is the Moon illusion and the other is the autokinetic effect. The Moon illusion refers to the fact that the Moon appears larger at horizon, approximately 1.2 to 1.5 times the apparent diameter at zenith. Restle (1970) using Adaptation-Level (A-L) theory, argues very convincingly that the Moon illusion is a function of the horizon's serving as a reference that establishes a different A-L than does the diffuse field of the zenith sky. It might be speculated that as Jupiter got closer to the effective horizon, the cowling of the airplane, it would appear larger. However, since things in nature don't usually suddenly appear larger unless they are coming closer, the organism would process these inputs so that the psychological response would be to see the light as approaching. This is in contradistinction to what was observed, however, for as the effective horizon and the light came closer together, the light appeared to recede. Somewhat earlier attempts at explaining the moon illusion (e.g., Kaufman and Rock, 1962; Rock and Kaufman, 1962) don't seem to suggest any solutions but the early explanations of Boring and Holway suggesting that the tilt of the head and eyes is involved, are suggestive as will be seen later (Boring, 1946).

The autokinetic effect refers to the fact that a stationary point source of light observed in a dark room soon appears to move about in a wandering fashion even though the observer's head is held still. Experiments reviewed by Dember (1965), suggest that the effect occurs as a result of reducing retinal stimulation to a point source and that the effect disappears when visual diversity is introduced. The problem with this ex-

planation for the present events is that even though the light first appeared as the only thing in the field defined by the windshield, as dark adaptation took place after turning off the cabin light, a complex star field appeared but the illusion persisted. Edwards (1959), suggests that the autokinetic effect might simply be due to the size of the stimulus – that stimuli large enough to project into the peripheral visual field become frames to which motion in the central part of the field can be referred.

From the vantage point of a pilot in a cockpit an object moving away from him in the same direction he is going would appear to get closer to the horizon. On the other hand, an object coming towards him would appear to rise higher and higher in his windshield. Normally, as a pilot's cowling moves up towards some stimulus point such as a star, signals from the otolith organ of the inner ear provide cues that he is moving and the point is seen as stationary. However, if the rate of change about the vertical axis is less than two degrees per second, the otolith organ cannot detect it. It might be hypothesized that if the pilot cannot tell that he is tilting and his cowling moves towards a distant light, the light will either be perceived as going straight down or as going away. But objects off in the distance rarely go up or down very significantly. More often distant objects approaching the horizon are receding. Therefore, the information inputs would be processed to describe the most probable event that would match what little information was available.

The weakness with this argument is that the organism also gets kinesthetic cues for tilt as a result of changing pressures on the back and seat. However, if the amount of tilt were small enough, perhaps as in this case, the general vibration level in the aircraft might mask out small changes.

4. The Experimental Plan

The UFO phenomenon persists as a matter of almost compulsive public and professional interest (Sagan, 1967). Consequently, solving the mystery of one of these sightings, even at the modest level of analysis described above, is probably worth reporting. However, the cockpit analysis described here suggests some challenging theoretical questions about how the human organism processes perceptual information which are best answered in the laboratory. Attempts to replicate the experience described using an airplane have failed, presumably because it has been impossible to produce the necessary low amplitude slow wave oscillations manually.

Preparations are now underway to develop a series of laboratory experiments which can be performed in safety and which will permit the control of such variables as apparent diameter and intensity of light source, visual field complexity, rate and extent of oscillatory excursions, psychological set, position of the effective horizon and framing of the field of view.

The plan is to utilize a mechanized chair that can reproduce the necessary oscillation profile and to which can be attached such horizon indicators as cowling and instrument panel and a reference frame similar to that provided by a windshield. Responses by the subject will be non-verbal, such as moving a lever to match any per-

ceived stimulus motion. The research will explore the necessary information input parameters that will reproduce the illusion experienced in the cockpit. The information gained to that point should make possible the specification of exact hypotheses to then be tested.

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