

**To Whom It May Concern:**

It is no secret within the aviation community that aviation professionals sometimes encounter unidentified aerial phenomena or UAP. Stories of pilot and air traffic controllers who were confronted by unusual lights or objects, UAP, in the course of conducting their careers have been documented across the entire history of powered flight. Many of these reports arise from military and commercial aviation sources. Some of these reports have demonstrated that UAP can be a hazard to aviation.

The [National Aviation Reporting Center on Anomalous Phenomena](http://www.NARCAP.org) was founded to specifically examine these incidents and observations. Staffed by current and former aviation professionals and scientific experts, NARCAP seeks to collect data on aviation safety related UAP encounters. NARCAP publishes technical reports detailing examinations of UAP data and investigations of UAP incidents which are posted on its website at [www.NARCAP.org](http://www.NARCAP.org).

While these incidents are well documented outside of the aviation system, both the aviation community and the scientific community have declined to thoroughly investigate these reports. For many years this reluctance has prevailed over efforts to engage the situation. Though qualified individuals are responsibly reporting encounters with UAP they find that the aviation community is both unsympathetic to their concerns and unprepared to receive UAP reports. In some cases UAP witnesses may find that attempts to engage this issue can be hazardous to their careers.

Though the primary source for the most credible UAP reports has been the aviation community, all information about UAP was either stifled by a bias against reporting or flowed directly away from the aviation community. UAP observations and incidents have never been addressed as an issue that aviation professionals should be prepared for. This reluctance to discuss UAP encounters and examine UAP reports arose from specific causes during the Cold War and expresses itself as a bias against reporting and investigating UAP encounters that exists to the present day.

Aviation professionals are encouraged to make confidential reports involving UAP encounters to **both** the **NASA Aviation Safety Reporting System** and **NARCAP.org**. While there may be a bias within the greater aviation community, the safety concerns represented by the Aviation Safety Reporting System and by NARCAP are squarely focused on mitigating hazards to safe aviation regardless of their source. Both the ASRS and NARCAP are the safest and most effective places for aviation professionals to confidentially and responsibly report encounters with UAP without fear of retribution from employers or government agencies.

NARCAP invites any aviation professional who is either interested in the subject of UAP and aviation or would like to report an incident involving UAP to contact us through our website at [www.NARCAP.org](http://www.NARCAP.org) or directly at [ted\\_roe@narcap.org](mailto:ted_roe@narcap.org)

Report of an  
Unidentified Aerial Phenomenon and its Safety Implications  
at O'Hare International Airport on November 7, 2006  
Case 18

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<http://www.NARCAP.org>

National Aviation Reporting Center on Anomalous Phenomena<sup>1</sup>

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## 1.0 Executive Summary<sup>2</sup>

This report presents the results of an investigation into an interesting incident at O'Hare International Airport (ORD) on November 7, 2006 at about 1615 hrs (4:15 pm) CST that had definite safety implications. A number of highly reliable airline employees and others reported seeing a round, revolving, gray, metallic appearing object [hereafter called an *Unidentified Aerial Phenomenon* (UAP)] hovering approximately above United Airline's Gate C17 in Concourse C at an altitude less than 1,900 feet above ground level (AGL) and departing sometime between 4:18 and 4:33 pm. Since two United taxi mechanics reported seeing the object sometime after 4:00 pm the object could have been present for at least eighteen minutes or more. The following subjects are discussed here: Description of eye witness accounts, overview of O'Hare International Airport and its aviation operations, visibility from the control tower, weather conditions, the reported hole in the cloud allegedly caused by the UAP, radar technical considerations and possible primary contacts, safety implications of the incident, and a summary. Appendices also present a discussion of hoax data, press coverage of the event, reports of UAP made by other alleged witnesses in the area on that day, a description of typical cockpit duties during an approach, landing, and taxi to gate and other relevant documents.

Based on eye witness testimony the UAP would have ranged in size from about twenty-two to eighty eight feet diameter. It accelerated at a steeply inclined angle through the 1,900 ft cloud base leaving a round hole approximately its own size that lasted for as long as fourteen minutes. This is suggestive of a super heated object or otherwise radiated (microwave?) heat energy on the order of  $9.4 \text{ kJ/m}^3$ . According to the FAA nothing was detected by radar at this location or time of day or seen by air traffic controllers from the main tower. An examination of primary radar data supplied by the FAA confirmed the first claim. Nevertheless, an FAA inbound ground controller remarked about the "UFO" (UAP) at about 3:58:09 pm, long before the object had departed. No reference to a UAP IS made by any inbound or outbound flight crew other than two United maintenance taxi mechanics moving an empty airplane to the maintenance hanger on the north side of the airport. Of course this does not mean that there was no object present but only that these flight crew did not discuss it over the radio. Our analyses suggest that a potentially significant air safety problem existed at O'Hare International Airport on the afternoon of November 7, 2006. Anytime an airborne object can hover for several minutes over a busy airport but not be registered on radar or seen visually from the control tower, constitutes a potential threat to flight safety. The identity of the UAP remains unknown. An official government inquiry should be carried out to evaluate whether or not current sensing technologies are adequate to insure against a future incident such as this.

## 2.0 United Airline Employee Eye Witness Accounts

The following narrative presents an approximate chronological reconstruction of what took place during this incident showing where each eye witness<sup>3</sup> was at the time (Table 1). Numbered events and letter-identified witnesses are marked on an aerial photograph of the airport property taken from an altitude of 1,800 feet (Figure 1).<sup>4</sup> Letters represent the approximate location of each witness. As will be discussed, whether or not the UAP could be seen depended upon the vantage point of each witness.

<sup>2</sup> All sections of this report were prepared by the Senior Editor except where noted.

<sup>3</sup> The identity of all eye witnesses has been concealed at their request to safeguard their reputation and job security. It is very unlikely that witness A is "rampagentX" who posted a spurious account on the *AboveTopSecret.com* BLOG. (cf. Appendix E.5)

Table 1

## Airline Employee Eye Witnesses

Witness	Job Category (all United AL)	Location
A	Ramp Mechanic	Standing beside B737 at C17
B	Aviation Mechanic	Left Cockpit Seat in B-777 taxiing on Alpha
C	Supervisor	Outside at Gate B5
D	Ramp Mechanic	Near C17
E	Supervisor	Near B5
F	Capt. B737-500	Near C17
H	First Officer B737-500	Near C17
I	Aviation Mechanic	International Terminal ramp area



Figure 1. Aerial Photograph of United Concourses B and C from Altitude of 1,610 Feet.

Witness A. The earliest known witness was Mr. X.X. (witness A) who was assisting the push-back of a B-737-500 from gate C17. He was standing on the tarmac beside the nose of the jet with his communication headset cable plugged into a connection port in the nose of the airplane. Figure 2 is a photograph taken at gate B5 looking toward gate C17. At about 4:30 pm witness A said that, "...he was

<sup>4</sup> The interested reader can view this airport image using the Goggle-Earth utility and locating 41.97805 deg N.,87.90611 deg. W.

compelled to look straight up for some reason and was startled to see the craft hovering silently." He then made a radio call over his head-set to the airline's operation center to Sylvia, United Airlines Zone 5 control coordinator who is responsible for ten gates. He then told the cockpit crew in the airplane beside him about what he was looking at. One or both of the crew allegedly opened their side windows and looked up at the UAP<sup>5</sup>, however, this cannot be confirmed. Later, witness A said that he thought the object was between 500 and 1,000 feet altitude directly above his gate. He was sure that the UAP was round and rotating "pretty fast." He said that the object "shot off into the clouds about two (2) minutes after his initial sighting... (and) that it was about the same angular size as a quarter held at arm's length (26") (just over two (2) deg. arc) diameter." He estimated that between ten and fifteen people had seen the object.

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<sup>5</sup> As is noted in Section 3.5.2 and Appendix G.



Figure 2. View of United Concourse C with Gate C17 Visible at Center  
(United Ramp Control Tower Seen on Roof at Left-Center)



Figure 3 (Page 12) is an FAA airport diagram (04162) of Chicago-O'Hare International Airport (ORD) with the red box showing the outline of Figure 1.

Witnesses B (left cockpit seat) and C (right seat), both United aviation mechanics, were about to taxi an empty commercial jet airplane from the International ramp initially near D2 to the United Service Center hanger on the north side of the airport. At this point there are two slightly different alternative versions of what happened next.

In the first version, the details provided to NARCAP by witness B are given. He said that while they were parked they both overheard a radio message from the flight crew of the B-737-500 at gate C17 talking on their company frequency about, "...a circle or disc shapped (sic) object hovering over gate."<sup>6</sup> This fact tends to confirm that at least one of the two cockpit crewmen in the B-737-500 looked up at the object, i.e., either witness G and/or H.

Witness B continued, "At frist (sic) we laughed (sic) to each other and then the same pilot said again on the radio that it was about 700 feet agl (above ground level)... The radio irrupted (sic) with chatter about the object and the ATC controller that was handling ground traffic made a few smart comments about the alleged UFO siting (sic) above the C terminal." (cf. Section 3.5 and Appendix G)<sup>7</sup>

According to witness B then they began to taxi the airplane to the west around taxiway Alpha (approaching United Concourse C on their right).<sup>8</sup> Radio communications with the inbound ground controller showed that they began their taxi at 3:57:30 pm (see Table 6). The probable taxi path of this United airplane is shown by a dashed line in Figure 4. During their taxiing witness C was in radio contact with inbound ground control for directions to their destination; he would have used the call sign "United maintenance-44".

Just before reaching A-14 or A-13 both witnesses leaned forward and looked diagonally to the right in the direction of Gate C17. Witness B estimated that the object was hovering about 100 to 200 feet beneath the clouds. The UAP was seen in the upper right corner of left front cockpit windshield. It was stationary and did not appear to be revolving. To him it appeared "hazy" on its bottom and both ends<sup>9</sup> but clearer on top; even if they had not been alerted to its presence by a radio contact, it was clearly conspicuous to the naked eye.<sup>10</sup> It never changed brightness, color, or shape at any time during his thirty to sixty second-long viewing period. It didn't flash or give off any lights and, "...it was definitely not a

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<sup>6</sup> While both witnesses heard the ground controller only witness C handled the radio.

<sup>7</sup> It was because none of this alleged radio conversation was received by the Senior editor from his first FOIA request that a second request was made for all ground controller communications between 3:55 and 4:55 pm. (cf. Appendix I for details). It was discovered from the inbound ground controller's tape that he made only one "smart comment" as is recorded in Table 6.

<sup>8</sup> Unfortunately, the negative reaction of United management and some of his co-workers caused witness C to be totally unwilling to cooperate in any way with this investigation. A detailed questionnaire was mailed to him on November 24, 2006 but he did not respond.

<sup>9</sup> This detail is supported by witness J.H. (Appendix E.1 [2]).

<sup>10</sup> When questioned in depth the witness said that the object was quite conspicuous since the airport flood lights had not yet come on. When they are on, "it makes it much harder to see things in the sky around the terminal."

blimp." He said that it appeared as an oval with a width to height ratio of 2.7.<sup>11</sup> He also said, "I'll tell you definitely, it's not an airplane as we know it."

At no time during the entire (approximately) eighteen minute taxi time (witness A provided the following route "Alpha - Juliet - Zulu - Echo - Yankee - United Service Center") were any electrical problems noted in his cockpit nor was any unusual radio static heard. He overheard the United ramp controller ask if anyone could get a picture of it. He also overheard the ground controller say that the object wasn't seen from the ATC tower,<sup>12</sup> "...even though it would have been in their field of view."<sup>13</sup> Then the tower told us to move. We were facing west at the time and I could look at American Airlines, Terminal 3. The (ramp) tower guy said he didn't see it and I heard him laughing. Then we passed Concourse C where I looked over and didn't see it anymore<sup>14</sup> (but) my partner watched it go up into the clouds and (it) left a hole there."<sup>15</sup>

The taxi transit time of the B-777 is between fourteen and twenty two minutes from D2 to the maintenance hanger. Knowing this as well as the length of the airplane's taxi path it was estimated that the UAP could have been visible from the cockpit for between 3.2 and 5 minutes (mean = 4.1 minutes) between A17 and A8. United maintenance 44 made only one stop for an American MD-80 (Table 6) A total taxi time of about twenty four minutes is assumed.

Only after parking the aircraft near the hanger (located off taxiway Yankee) at about 4:22 pm (+/- 3 min) were witnesses B and C able to look back in the direction of the UAP where they could still see a "smooth round hole"<sup>16</sup> in the overcast but no object. Witness B estimated that the hole must have remained open about two minutes more although he could not be sure. Witness B remarked, "I guess it had just left." He felt that the object hovered from 100 to 200 feet under the cloud base and, "...it wasn't a reflection." He said he heard a tower controller say, "there's nothing there that would reflect lights."<sup>17</sup> Table 6 presents a brief conversation between the inbound ground controller and a taxi mechanic who said that he and others witnessed the object about one-half hour earlier.

He also remarked that, "There must have been hundreds of witnesses. I got some positive responses from about three other guys I work with." He also offered that the actions of the UAP seemed "very deliberate given the weather conditions and the airport operations at the time." He wrote, "I am still in absolute wonder and amazement at what I saw that afternoon." (Appendix G)

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<sup>11</sup> Witness B was interviewed anonymously as "Joe" by Gary Tuchman on CNN HeadlineTV News on January 6, 2007 where he approved of the general shape of the UAP made by an artist from his description.

<sup>12</sup> No such statement was made either by the inbound or outbound ground controller.

<sup>13</sup> This statement may or may not be accurate depending upon the altitude of the UAP. See Section 3.4 for further information on this important subject.

<sup>14</sup> At this orientation, his line of sight was cut off by the cockpit structure.

<sup>15</sup> The time would have been about 4:15:30 pm

<sup>16</sup> It must be assumed that what was meant was an oval which is what one would see when looking at a horizontally oriented circle (e.g., coin) from an oblique angle of about nineteen degrees from below. The distance between the witnesses near the maintenance hanger and gate C17 (cf. line in Figure 4) was about 5,500 feet. Also cf. similar testimony by witness J.H. in Appendix E.1 [9].

<sup>17</sup> No such statement was made either by an inbound our outbound ground controller.

A careful analysis of the inbound ground controller tapes showed that there were three United Airline airplanes taxiing to the maintenance hanger during this time, United maintenance 97 (a B747), United maintenance 5 (a B777), and United maintenance 44, (a B777). Cf. Figures 3 and 5 for all locations.<sup>18</sup> We are concerned only with that latter which contained witnesses B and C.

At 4:48:05 pm a male voice allegedly coming from one of the two above airplanes broke into an ongoing conversation between Gateway flight 5668 and the inbound ground controller. Here is that interaction starting at about 4:47:39 pm where: (A/C1 = Gateway 5668; : A/C2 = United 44; T = inbound ground controller)

T "Gateway 5668."

A/C1 "Gateway 5668."

T "Yeh... look out your window. Do you see anything above United concourse? They actually, believe it or not, they called us and said, somebody observed a flying disc about a thousand feet above the, ah... gate Charley 17. Do you see anything over there?"

-----  
 pause of about 5 sec.  
 -----

A/C1 "Not that I can tell. I thought my job was stressful" (laughter)

Approx. 4:48:05 pm

A/C2 (witness B)<sup>19</sup> "Oh, we saw it a half hour ago"

T "Who saw it?"

A/C2 "A whole bunch of us over at the, ah Charley concourse."

T "Really? You guys did? who is this?"

A/C2 "United taxi mechanics (5 sec. pause). We thought it was a balloon but we're not sure."

Note that a half-hour before this statement by the alleged eye witness would be about 4:18pm

<sup>18</sup> An airport diagram for O'Hare is found at: <<http://204.108.4.16/d-tpp/0704/00166AD.PDF>>

<sup>19</sup> At this point witness B and C are either at gate C10 or at the United maintenance hanger. NARCAP's recon-struction assumes the latter.



The dashed line in Figure 4 shows the taxi path of the empty jet taxied by witness B and C from A20 to the United maintenance hanger (labeled United 97)



Figure 4. Aerial Photograph of Taxi Path of B-777

According to a report submitted to the National UFO Reporting Center (Appendix G), witness D was working in his office when he heard the operation's center announcement about the UAP over the company's radio frequency at about 4:30 pm. He immediately left his office and walked to the Gate B5 area where he looked up and saw the UAP located at about a forty-five degree (vertical) angle. Figure 5 shows the location of Gate B5 from where he observed the object. Figure 6 is a photograph looking directly toward Gate B5 and witness D's position and also showing the old (left) and new (right) control tower in the background on a hazy day several months later.

He was quoted as saying, "I stood outside in the gate area not knowing what to think, just trying to figure out what it was... I knew no one would make a false call like that. But if somebody was bouncing a weather balloon or something else over O'Hare, we had to stop it because it was in very close proximity to our flight operations." (Hilkevitch, 2007)

He also said, "I'm absolutely convinced the object wasn't much bigger than 6 to 10 feet in diameter. It took me a second to find the UFO and I only noticed it because I knew where to look.<sup>20</sup> He described the UAP as an "elliptical sphere-like dark metal object...". From his location he said that the object rose almost instantaneously at a slight angle toward the east.<sup>21</sup> Its departure was so fast that he thought he could see a kind of blurred effect in his vision from the object. Another employee (witness E) was standing with him at the time. Later he admitted that if it ever happened again, "he probably would report it."

He also mentioned the presence of another airline employee (Witness F) who saw the object for about thirty seconds but, because of its small visual size, "...dismissed it as a bird and walked away. He immediately called the operations center to confirm the sighting" and returned to his office briefly and then drove over to concourse C to talk with the witnesses there. During this time the zone controller asked if the object was still present. It was she who called the FAA control tower to inquire about it. (see Section 3.5.2 for a transcript of the conversation between the United ramp control and the tower). The United shift manager, TSA, and the United WHQ Operations Center were also notified at about this time.

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<sup>20</sup> He reiterated this detail several times during later conversations. See Appendix E.1 [3] for independent support for this observation.

<sup>21</sup> Witness D estimated that the UAP did not travel more than between two hundred and four hundred feet laterally at the most before entering the clouds.



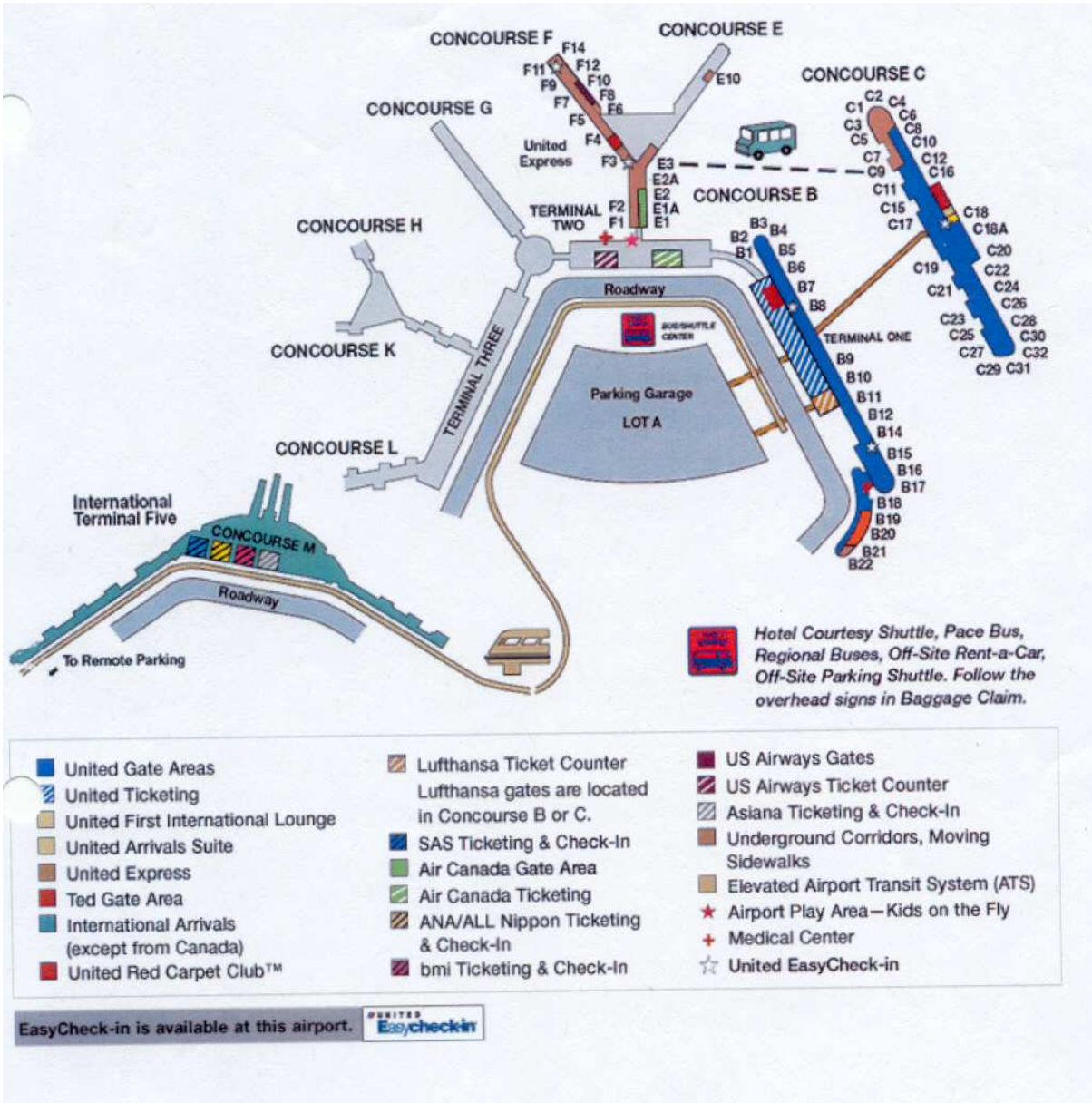


Figure 5. Gate Designations for ORD Concourses B, C, E & F



Figure 6. Photograph at Gate C17 Looking Toward Gate C5

Within about a day after the incident witness B met witness I, also a mechanic, at the International Terminal ramp area who admitted having also see the UAP from that vantage. Unfortunately, witness I could not be located for an interview.

Hilkevitch interviewed the First Officer of the B737-500 (Witness H) that was still parked at gate C17. He discovered that both of these flight crewmen saw the object for about five minutes. Both opened their cockpit side windows and looked up at the object. The First Officer, age 39 with over 13,000 flight hours, said the UAP was a dirty aluminum color, very stable and without any optical distortions near it. It was perfectly round and silent. He said that neither he nor the captain took a photo of the object. A company supervisor arrived and ordered them to push back for an scheduled departure time. The captain did not want to be interviewed.

How large was the UAP? Because the UAP hovered below a cloud base of about 1,900 feet AGL that fact established its maximum distance. Several witnesses provided angular diameter estimates for the UAP which made it possible to calculate its maximum diameter assuming it was at the distance of the



cloud base. Witness A said it was equivalent in angular size to a quarter held at arm's length or about 2 deg. 4 min arc. The object would have to be 88 feet across at 1,900 feet altitude to have the same angular size. Similarly, witness D said the UAP was about the same size as the end of a pencil held at arm's length (about 36 minutes of arc in diameter) which is equivalent to a 22 foot diameter object located 2,093 feet away.<sup>22</sup> If the UAP were at a lower altitude then its visual size would increase slightly. Thus, if it is assumed that the UAP was at 1,500 feet altitude these same two witness's estimates become 69 feet and 18 feet, respectively. Witness J.H. standing in a parking lot about a mile east (see Appendix E [4]) estimated its diameter to be from 25 to 30 feet. Witness 'Rampagent X' located somewhere near concourse C thought it was about twenty feet diameter. These are remarkably similar estimates.

At what altitude did the UAP hover? Estimates vary from five hundred feet to 1,700 feet above the ground. Interestingly, the two witnesses who were directly beneath the object (witness A and G) gave the lowest estimates and were in the poorest position to make such a judgment. Witness A thought it was from 500 to 1,000 feet and witness G, 700 feet. Other witnesses who were able to see the object from a greater distance and at an oblique (nearer to a side view) angle gave higher estimates of its altitude. Witness D standing about 878 feet from C17 and looking up at about a forty-five degree angle thought it was 1,000 feet high. This vertical angle would place the UAP at a calculated altitude of only 878 feet, however. Witness B near taxiway A17 at the International Terminal estimated its altitude at between 1,700 feet and 1,800 feet while witness J.H. some 5,400 feet away in the SW corner of the International Terminal's parking lot thought it was between 1,100 and 1,400 feet. These estimates are not in basic conflict with later calculated values given in Section 3.4 for the altitude of an object above C17 that could not be seen from the control tower, viz., between 1,438 feet and 1,802 feet (based on the FAA claim that the UAP was not seen from the control tower).

When did the UAP leave? This is an important yet difficult question to answer. It is possible to identify only an approximate range of times. Witness A said it left after about two minutes after he first saw it, or at about 4:32 pm. Witnesses B and C watched the object from the cockpit of a an empty B777 for at least 3.2 minutes (and as long as 5 minutes) sometime between 3:57:30 pm and about 4:18 pm. The UAP had gone by about 4:20 pm when they had reached their destination at the United maintenance hanger. Thus, according to them the object probably departed around 4:18 pm. Witness D said the object "disappeared within a fraction of a second"<sup>23</sup> after he had been looking at it for approximately one minute (i.e., at about 4:33 or 4:34 pm) depending on how long it took him to reach the viewing location at Gate C5.

The above time estimates appear to be at variance with the FAA's inbound ground controller's statement made at 3:58:09 pm to Gateway flight 5668 to, "...use caution for the ah, UFO" which is the first official mention of a UFO by the FAA. Does this difference in time suggest that the UAP remained above the airport for almost a full hour, that the officially certified time of the inbound ground controller's tape recording is in error, or for some other reason? Without definitive data we will assume that the UAP departed at about 4:34 pm. (+/- 1 min.) This time is important for the discussions of the hole in the cloud of Section 5.0, possible radar contact, and when ATC personnel looked for it from the control tower.

<sup>22</sup> The slant range of an object at 1,900 feet altitude and 878 feet horizontally away would be 2,093 feet.

<sup>23</sup> See Section E.1 [8] for an independent confirmation of this statement made by witness J.H. standing about a mile away to the east.

While witness J.H. said she saw the UAP for between ten and fourteen minutes total but did not note the time.

How did the UAP Rise? As substantiated by several witnesses, the UAP did not rise vertically but at a slight angle to the east. Witness D who was standing about 878 feet SE of gate C17; said that the object rose in an easterly direction (toward concourse B) and entered the cloud layer after travelling only about one-quarter to one-half the distance between concourse B and C or between 200 and 400 feet laterally. Witness J.H. was standing about a mile away to the east in the parking lot of the International Terminal. She said that it rose at, "...a very slight angle towards me and to my left - very slight angle... Where we were we could see the side ways motion and tell it was coming towards us a little." (cf. Appendix E.1 [7])

## 2.1 Other Unofficial and/or Unverified Responses

Over the course of the past several months many people besides airline employees have spoken out about what they allegedly saw or believed about this event at O'Hare International Airport. Of course, it is not possible to accept or reject any specific comment without verification or without knowing the specific identity of the reporter. Nonetheless, it is important to document several statements for their possible relevance to this investigation.

**2.1.1 FAA Tower and Other Personnel.** As is very clear from the transcripts of the control tower communications between the United ramp tower and several ATC personnel, (cf. Section 3.5.2) everyone made a joke out of the presence of the alleged object. It appeared as if they were embarrassed to be talking about it. According to witness B, "...the ATC controller that was handling ground traffic made a few smart comments about the alleged UFO siting (sic) above the C terminal." (Appendix G)

As early as November 27, 2006 an attempt was made to find out what the general feelings about this event were at FAA Headquarters. "Nothing of interest (was discovered at (FAA) headquarters, Washington, D.C.) except skepticism about the nature of the event."<sup>24</sup> When a NARCAP representative visited headquarters in January 2007 he was told that he had to contact the Chicago FAA office for any information about this incident.

In the first press release on this incident by J. Hilkevitch (Chicago Tribune, pg. 1, January 1, 2007), Craig Burzych, a union official and ATC specialist in the tower was quoted as saying about this event, "To fly 7 million light years to O'Hare and then have to turn around and go home because your gate was occupied is simply unacceptable." What is unacceptable is this extremely cavalier and trivializing attitude toward UAP that is representative of much of today's aviation community.

FAA spokeswoman, Elizabeth Isham Cory said that none of the tower controllers saw the object and "...a preliminary check of radar found nothing out of the ordinary." She also added that the sighting was caused by a "weather phenomenon." She continued, "Our theory on this is that it was a weather

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<sup>24</sup> Personal communication from a highly reliable government source.

phenomenon. That night was a perfect atmospheric condition in terms of low [cloud] ceiling and a lot of airport lights. When the lights shine up into the clouds sometimes you can see funny things. That's our take on it." This kind of grossly oversimplified generalization that is not based on the actual facts at the time of the sightings only contributes to an attitude of disbelief and skepticism in others. In fact, the airport ramp lights had not yet been turned on! One unfortunate result is that other witnesses are inhibited from reporting their sightings.

**2.1.2 Airline Management, Flight Crews, and Others.** The first airline employee to make a general announcement within the company and to the FAA tower of the (apparently) ongoing event was "Sylvia," a United Airlines zone coordinator in charge of ten gates. She received several calls about the UAP. Another woman named "Sue" contacted the ATC tower at 4:30 pm to see if they could see anything. She was told that tower personnel looked and didn't see any object.<sup>25</sup> This time is fifteen minutes *earlier* than the time recorded for this same call (see Table 3) by the FAA in its Daily Record of Facility Operation (see time 2245 UTC, column 1 in Figure 8). This discrepancy in time is discussed below.

United Airlines allegedly began its own internal safety review of this incident the day after the incident occurred but, sometime before November 10<sup>th</sup> decided against a full investigation. The findings of their safety review are not known.

The senior editor tried without success to discover the identity of the cockpit crew of United Flight 446. The two main reasons given for not providing this information were: (1) this was considered privileged company information in accordance with established policy, and (2) the flight operations department wasn't interested; they thought it was a waste of time. One might well ask why they weren't interested?

Megan McCarthy, a United Airlines spokeswoman told newspaper reporter J. Hilkevitch in December 2006 that, "There's nothing in the duty manager log, which is used to report unusual incidents. I checked around. There's no record of anything." A NARCAP initiated FOIA request (see Appendix I) for all tower logs and communications, however, clearly showed: (1) three separate telephone inquiries from the United ramp tower (and management) concerning the UAP and (2) a written notation of one of these calls in the FAA tower's "Daily Record of Facility Operation." (see Figure 8 below)

Airline employee interviews conducted by Hilkevitch (2007) said that they were interviewed by United management and "instructed to write reports and draw pictures of what they observed." They were also allegedly told to not talk about what they saw to anyone. The senior editor could not locate any airline employee who would confirm this allegation.

There is a definite possibility that pilots for a major airline saw this UAP during their approach to ORD that afternoon. However, this possibility has not been confirmed as of the publication of this report.

Appendix E.5 presents BLOG entries by an alleged witness who claimed to be a United baggage handler. The senior editor asked several eye witnesses to prepare descriptive reports of what they saw.

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<sup>25</sup> See Section 3.4 that provides supportive evidence for this assertion.

Copies of their reports are not included here to safeguard their identity. One airline employee summarized his company's attitude toward this incident using the cryptic phrase, "corporate culture of apathy."

**2.1.3 Passengers at the Terminal.** Over the ensuing months there has been some effort made to try to locate other eye witnesses in and around the O'Hare terminal. This was done mainly using notices placed on websites.<sup>26</sup> Many e-mails were sent in by both identified and anonymous "witnesses," however, very few have been able to be substantiated. One notable exception is Ms. J.H. who submitted twenty seven separate BLOG entries over a two-day period to the *AboveTopSecret.com* website. (see Appendix E.3). She was also interviewed by Sam Maranto on February 6 and 22, 2007; these interviews are presented in their entirety in Appendix E.1 and E.2, respectively. Her comments tend to support the testimony obtained from United Airlines employees in many respects and offer additional facts.

## 2.2 Aftermath Effects on Witnesses

How were these airline employee witnesses treated by others after this event? The answer(s) is familiar to those who study UAP seriously; the answer(s) underscores a reason why fewer and fewer legitimate witnesses are willing to come forward as time goes on.<sup>27</sup> According to the Chicago Tribune article (Hilkevitch, 2007), "One United employee (was) appeared emotionally shaken by the sighting and "experienced some religious issues" over it, one co-worker said." During a TV interview on CNN one of the witnesses said that his airline's management had not pressured him in any way to stay quiet and had only received occasional ribbing from some coworkers.

Most of the witnesses were very willing to cooperate with NARCAP immediately after the event *but before their management found out about the public's response*. Now, several months after this incident, some of the eye witnesses are experiencing typical aftermath effects. One of the witnesses wrote NARCAP saying, "...sorry for being paranoid, but this information cannot be tied to any XXXXX employee and must not publicly disclose my location. It is identifying. ... I cannot have sources continuing to show me as the leak as it builds a case against me.... Anyway, I totally trust you and want to make sure you know exactly what will identify me so something isn't accidentally disclosed." NARCAP has done everything it can to keep the identities of all witnesses confidential.

It took a long time for several witnesses to reply to the senior editor in writing from about one week after the event to two months afterward for some unknown reason. He realized the need to let things cool down and to not jeopardize their jobs. It is understandable that airline management is busy enough without having to deal with the tedious public relations aspects of an incident such as this yet it appears as if management simply wanted the whole incident to go away. Given the FAA's public conclusion that there was nothing detected on radar or seen from the tower it was easier for the airline to take this position.

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<sup>26</sup> Such an approach tends to be self-limiting and even self-defeating due to the fact that they are not read by everyone but (usually) by those who already have an interest in the subject.

<sup>27</sup> Legitimate witnesses seem to be replaced by others who, for one reason or another, wish to pose as real witnesses but who aren't. This social psychology phenomenon deserves more study.

The Chicago Tribune (2007) article stated, "Some of the witnesses, interviewed by the Tribune, said they are upset that neither the government nor the airline is probing the incident." In the words of an alleged United Airlines baggage handler witness, "Some of us are getting angry with this being hushed up with all the terrorism and TSA idiots hanging around. If we see a funny looking bag all damn hell breaks loose but park a funny silver thing a few hundred feet above a busy airport and everyone tries to hush it up. It just don't (sic.) make sense." (Appendix E.4, #5)

A passenger of an aircraft landing at O'Hare Airport at this same time submitted the following chatline comment:

"Asked a United pilot about this ironically as we were landing into Gate c17 at Ohare. (sic) He said it indeed was something a lot of his peers saw. He also stated that no pilot in his right mind would go on record with as serious and at the same time "goofy sounding" claim unless they were convinced they saw something extraordinary. He followed up this comment to it being like reporting little green gremlins on the wing of the plane, unless you want to be doing desk duty for the rest of your career, there are some things you just don't say.

"We proceeded to talk about it and I came to the conclusion that if as he stated about 100 people saw this object and the sighting was in Nov. 2006, WHY is it taking 6 weeks to make the press ... unless there's some SERIOUS type of government investigation going on that is.....hmm"<sup>28</sup>

To set the record straight, Peter Davenport, Director of the National UFO Reporting Center, who had received the original witness reports (see Appendix G) contacted the senior editor on the evening of November 7, 2006 because it appeared that this event might have aviation safety implications. He waited until November 14, 2006 before putting the witness reports on the NUFORC website so that NARCAP could obtain further important data. In addition to other historical facts given elsewhere<sup>29</sup> it can be mentioned that, after Davenport had discussed the sightings on the Coast-to-Coast radio program (November 15, 2006) and on the Jeff Rense Radio Program (December 12, 2006), he eventually contacted the Chicago Tribune to find out if they knew about the incident and whether they were interested in investigating it. And so this deliberately planned delay was intended to help NARCAP obtain as much first hand information as possible before press coverage, and the subsequent airline response to this publicity, would take its toll on witness cooperation.

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<sup>28</sup> <sup>28</sup> <http://www.flyertalk.com/forum/showthread.php?t=642107> posted early in January 2007.

<sup>29</sup> See the NUFORC website [www.nuforc.org/](http://www.nuforc.org/) for additional information concerning release of information regarding this incident.

### 2.3 The Possibility of a Conspiracy

What if all of these witnesses had conspired to perpetrate a hoax? This possibility needs to be examined if, for no other reason than to squelch the arguments raised by future skeptics. There are several reasons why a deliberate hoax is very unlikely. First, all participants would have to know one another in advance in order to work out the details of their stories. Yet only witness A, D, E and F knew each other and only one of them was willing to speak out to NARCAP! In addition, several were union employees and several management. Second, their stories would have to match one another in all major details. There are enough reported differences (considering the different ground vantage points) to suggest that a script-like narration is very unlikely. Third, given the intense and relatively prolonged public response to the press accounts of this incident the airline's management went first into a very brief investigative mode and then into damage control mode. While the details of their investigation are not known, subsequent witness statements about management reactions make it unlikely that anyone working for the airline would knowingly have tried to pull off a hoax that could endanger their jobs. If it was a hoax it backfired, leaving several of the "witnesses" afraid for their jobs. Fourth, the manner in which the major eye witnesses came forward appears to be independent from one another. Only a *very* well planned hoax would carefully schedule who and when each player in the "drama" would make their report. Additionally, as far as is known, witness A and E never made any public report at all except to their management. Fifth, the eye witnesses that the senior editor has stayed in contact with have always been very forthcoming with relevant information; their accounts never overlapped with what the other witnesses said in terms of narrative style or specific terminology. One might expect participants in a staged event to rehearse their "lines" together and adopt the same name and visual features for their UAP. This did not happen here as is suggested by the various names given to the UAP. For example, witness A referred to the UAP only as an "object." Witness B referred to the UAP as "small gray object," "dark gray round object," "looked like a Frisbee," "hazy sides and bottom." Witness D used such terms as "an object," "relatively small object," "dark metallic circle," and "the aircraft." Witness E thought it was only a "bird" of some kind. Ramp-agent X called it a "gray shiny thing," a "fat disc."

When taken all together, the above facts point away from a deliberate hoax event and toward a genuine event.

### 3.0 O'Hare International Airport - Overview

O'Hare International Airport is such a large and complex facility that it deserves more discussion in order to put this event into its proper perspective, particularly the apparent inability of the FAA to detect the UAP. Of the hundreds of statistics, measurements, and functions that characterize ORD we will concentrate on only two topics: (1) Geometry of ORD, and (2) Airport Operations. Radar characteristics and antenna site location details are presented below.

#### 3.1 Geometry of ORD<sup>30</sup>

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<sup>30</sup> The geographic coordinates of O'Hare International Airport are: 41.97805 deg N; 87.90611 deg W and its official three letter FAA designation is ORD. Digital ATIS and other airport information is available at <<http://www.fboweb.com/fb40/airport/ORD.html>>

Figure 3 and 5 shows the location of all major structures, runways, and taxiways at O'Hare. It should be noted that gate C17 (cf. Figure 5) where this incident occurred is located almost at the geometric center of the airport's runways. Located well off the flight path of any of O'Hare's runways, a hovering object above gate C17 would not interfere with normal flight operations.

The new control tower at O'Hare International Airport, completed in 1995, is 253 feet tall (905 feet MSL). It is shown in Figure 7. The ATC work area is at the level of the transparent outward sloping windows.

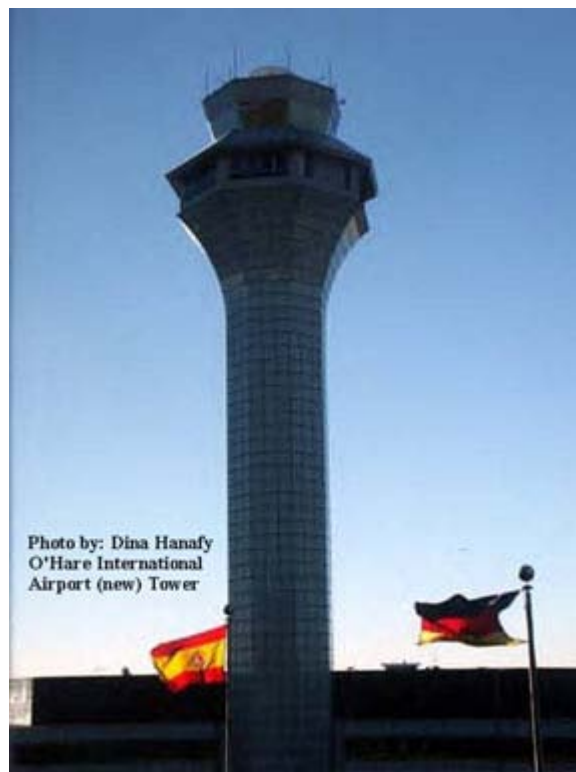


Figure 7. New O'Hare Airport Control Tower

### 3.2 Airport Operations at ORD

Of primary importance to this report is the fact that O'Hare International Airport is officially designated by the FAA as a Class B Airspace (FAA Order 7400/9F). The various operational and safety implications of this fact are presented later in section 8.0. Suffice it to say here that in order for these federal aviation regulations to be effective every airborne vehicle flying within this airspace must conform fully with the equipment, crew training, and procedural requirements of this order. Of course, the more flights into and out of any given airport the more critically important such regulations become. As will be pointed out, the

UAP in the present incident did not conform to these regulations.

According to an Associated Press article of July 3, 2006, quoting government statistics, O'Hare was the busiest airport in the nation during the first six months of 2006 with 477,001 flights (take-offs and landings). Wendy Abrams of the Chicago Department of Aviation said, "It (ORD) is a key aviation hub both nationally and internationally." To put this huge number of flights into a national perspective, consider that for the first ten months of 2006 U. S. airlines operated 8,822 million scheduled domestic and international flights<sup>31</sup> at all of its airports and 890,300 flights just in October 2006 alone. O'Hare's air traffic controllers typically handle about ninety six arrivals per hour or one every 38 seconds, usually on multiple runways. They are kept extremely busy.

O'Hare International Airport currently has four passenger terminals. Three are used by approximately thirty major and regional airlines. The International Terminal (Concourse M) serves approximately twenty seven airlines.

As of November 7, 2006 there were twenty seven cargo carriers operating in and out of ORD<sup>32</sup>. Official statistics point out that there were 30,537 arrivals and 30,535 departures in November 2006 from its six runways (see Table 2 in Section 3.5.1). The extremely large size of these numbers emphasize the critical importance of the nation's air traffic control system that is designed to keep aircraft from colliding both on the ground and in the air. As this report will show, the radar system at O'Hare was incapable of detecting the presence of an airborne, hovering object of significant size, nor was the object seen from the tower. If an object cannot be seen visually or on radar it does not officially exist and no specific actions can be taken to warn airplanes of its existence.

### 3.2.1 FAA Facility Operations Record.

Figure 8 is a certified copy of the ORD tower '*Daily Record of Facility Operation*' for November 7, 2006.<sup>33</sup> It contains several interesting points:

(1) At UTC 2245 (4:45 PM) the record states that "SUE FROM UNITED RAMP TOWER CALLED TO INQUIRE IF WE HAD SEEN A FLYING DISC OVER THE UNITED TERMINAL IN THE VICINITY OF GATE C17 AT ABOUT ONE THOUSAND FEET. I REPLIED THAT WE HAD NOT./DH. (2) UTC 2303 (5:03 PM) QAR CLSD ABOUT DISC. (3) E. GISH ON WCLC.

<sup>31</sup> Bureau of Transportation Statistics, January 11, 2007 press release.

<sup>32</sup> [http://en.wikipedia.org/wiki/O'Hare\\_International\\_Airport](http://en.wikipedia.org/wiki/O'Hare_International_Airport).

<sup>33</sup> Received on March 5, 2007 from F.O.I.A. request 2007-001234GL.



<b>DAILY RECORD OF FACILITY OPERATION</b>				PAGE NO. <b>1 of 1</b>
				DATE <b>11-07-06</b>
LOCATION	IDENTIFICATION	TYPE FACILITY	OPERATING POSITION	CHECKED BY
<b>O'Hare ATCT</b>	<b>ORD</b>	<b>TOWER</b>	<b>ALL</b>	MANAGER <b>William J. Mumper</b>
UTC	REMARKS			
0600	M. VANDINI ON WCLC. CARRYOVERS:RWY 32L GS OTS, RWY 32R ILS OTS, RWYS 9R AND 14L ALS OTS.D-BRITE CONTROLS @ POS003 KNOBS ARE NOT FUNCTIONAL, LAND RWY 14R, DEPART RWY 14R. ALL OTHER RWYS CLOSED			
1147	RWY 9R-27L OPEN			
1149	CONFIGURATION CHANGE 9R IN 32L OUT			
1150	TIPH WAIVER 98-T-53F IN EFFECT FOR RWY 32L			
1158	ALL RWYS OPEN. 9'S A PAIR.			
1202	C. MULBARGER ON. WCLC.			
Q 1255	NUMEROUS GO AROUNDS 9R. BELOW MINIMUMS.			
1230	WAIVER 98-T-53F NO LONGER IN USE FOR RWY 32L T10.			
1302	CONFIGURATION CHANGE: 27'S A PAIR.			
E 1311	RWY 14L GS OTM.			
Q 1412	UAL732 REPORTS POSSIBLY BEING CLIPPED BY FOLLOWING A/C (UAL672) AT II & T TAXING OUTBOUND TO T10. QA NOTIFIED.			
E 1430	TDWR OTM, TWR USING LLWAS.			
1450	SETTING UP FOR CAT II/III RWY 27R/27L. TSOC & CITY NOTIFIED.			
1513	TSOC ADVISES RWY 27R/27L NOW CERTIFIED CAT II/III.			
E 1547	RWY 14L PAPI'S OTS.			
1706	NO LONGER CATII/III CERTIFIED.			
1743	TSOC ADVISES ARTS TIME CHECKED AGAINST TIME SOURCE AND DVRS CHECKED AGAINST ARTS CLOCK AS REQUESTED.			
E 1837	RWY 14L PAPI RTS.			
1844	E. GISH ON WCLC			
Q 1848	EGF933 ABORTED RWY 22L, WARNING LIGHT			
1855	CONFIGURATION CHANGE PLAN WEIRD NO TRIP IFR			
E 1900	RWY 14L GS RTS.			
1921	VFR, TRIP AVAILABLE.			
E 1942	TDWR RTS.			
Q 2245	SUE FROM UNITED RAMP TOWER CALLED TO INQUIRE IF WE HAD SEEN A FLYING DISC OVER THE UNITED TERMINAL IN THE VICINITY OF GATE C17 AT ABOUT ONE THOUSAND FEET. I REPLIED THAT WE HAD NOT./DH			
Q 2303	QAR CLSD ABOUT DISC			
0148	WAIVER 98-T-53F IS IN EFFECT FOR RWY 32LT10 32RV			
Q 2340	UAL562 WAS SENT AROUND ON RWY 22R DUE TO COMPANY ON THE RWY			
0049	CONFIGURATION CHANGE PLAN X TRIP			
0110	D.DOBRINICH ON WCLC.			
0411	CONFIG CHG 14R IN 27L OUT. WAIVER 98-T-53F NO LONGER IN USE FOR RWY 32L T10, 32RV.			
0422	NORTHSIDE AND RWY 22L CLSD, RWY 27L DEPTS ONLY.			
0430	C. MULBARGER ON. WCLC.			
0440	SETTING UP FOR CAT II/III ON RWY 14R, TSOC NOTIFIED.			
0457	TSOC ADVISES CAT II/III CERTIFIED RWY 14R.			
0559	COB.			
<p>I CERTIFY that all entries above are correct; that scheduled operations have been accomplished, except as noted, and all abnormal occurrences and conditions have been recorded.</p> <p style="text-align: center;"><i>C. Mulbarger</i></p>				

Figure 8. Daily Record of Facility Operation, ORD, November 7, 2006

(1) According to the above daily operations record entry referring to Dave H., nothing unusual was seen from the tower either before (or after?) UTC 2245 (4:45 pm) which is about fifteen minutes after "Sue" in the United ramp tower called him the first time and perhaps twenty minutes after the initial sighting was made! Of course the question remains, why was this official tower log entry made so long after the event?<sup>34</sup> According to the eye witnesses they watched the object depart at about 4:34 or 4:35 pm at the latest so that, of course, by 4:45 pm there would be nothing to see in the sky! The transcript included in Table 3 of Section 3.5.2 indicates that "Sue," a United Airline ramp tower employee reported the UAP at 4:45 pm; there *was* about forty eight seconds of continuous discussion about the UAP on the tape recording. NARCAP asks, why is there a fifteen minute difference in these two times? Additionally, witness A said that he watched the object depart about two minutes after he first saw it, then the UAP would have been gone well before 4:45 pm.

(2) Also shown in this Facility Operations Record is the fact that the FAA Regional Quality Assurance office (QAR) closed this UAP incident at UTC 2303 (5:03 pm), some eighteen minutes after the tower was contacted from the United ramp tower. There are references to the Transportation Safety Administration (TSA) being informed as well. Apparently, the tower supervisor (and perhaps other officials) did not initiate any further formal internal investigation. It had quickly become a non-event. We may presume that during this time some attempt was made to back-check radar screens for the presence of the alleged hovering object. The senior editor has filed a FOIA request for all related communications between Scott AFB, Illinois and O'Hare Airport on the date and time in question to find out whether military aircraft were scrambled. No reply has been received as of mid April, 2007. NARCAP's independent study of the available radar data for the same period of time is presented in Section 7.0 of this report.

(3) Mr. E. Gish was officially on duty at 1844 UTC (12:44 pm) as indicated by the entry WCLC, i.e., "Watch Checklist Complete"

According to the Automatic Terminal Information Service (ATIS) data issued for November 7, 2006 (see Appendix H) the active instrument landing system (ILS) runways were 22R, 27L, and 27R and the active departure runways were 22L, 32R, and 32L. Apparently, no modifications were made to arrival routings during the afternoon of November 7, 2006.<sup>35</sup> However, this raises the possibility of a modification to departure operations due to the possible presence of the UAP.

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<sup>34</sup> One possibility is that the tower did not take the first call from Sue seriously enough to record it in their daily record and only did so after the second call from Sue at 4:47 pm

<sup>35</sup> An interesting but unverified BLOG entry by a Dennis Goethe of Durand, Illinois stated that he and other passengers on an airplane at Port Columbus, Ohio had to wait at least an extra hour on the afternoon of November 7, 2006 before they took off for O'Hare. The airplane was scheduled to land at 4:30 pm. Upon arriving at ORD it allegedly had to wait for "...about another hour and circled the airport waiting to land." The pilot did not give the passengers a reason for this alleged delay. (Google Earth Community, 2007)

As Ledger, a pilot and one of NARCAP's technical specialists<sup>36</sup> has pointed out, the presence of the alleged UAP might have resulted in a change in departures on runways 27L and 32R since the UAP above gate C17 could be seen from the takeoff end of each. The airplanes taking off from 32L would fly increasingly close to the location of the UAP as they climbed out such that the flight crew could look up at the bottom of the object from a distance of only about 1,500 feet away. As he points out in Appendix F.4, he would be extremely concerned about the intentions of this hovering object and the possibility that it might suddenly veer toward the airplane taking off and endangering his airplane, passengers, and crew. Executing a sudden avoidance maneuver at such low altitudes and airspeeds is fraught with danger. Nevertheless, no evidence could be found in official records that any modifications were made to any airport departure operations around the time of this incident. However, United Airlines flight 446 was delayed at least seventeen minutes from its scheduled push-back time for some unknown reason!

### 3.2.2. United Flight 446

This aircraft was at gate C17 and scheduled to depart for Charlotte, NC at 4:10 pm according to published airline flight data. This flight departure time was actually delayed to 4:27 pm. (or slightly longer?) According to a FOIA recording for the outbound ground controller's station, the following taxi instructions were given at about 4:30:19 pm: (A/C = flight 446; T = tower)

T "United 446, O'Hare ground. Thirty two L, T10, turn right on Alpha, go to Alpha 7 for Tango."

A/C "Alpha, Alpha 7, Tango (garbled) 446."

This radio communication indicates that the B737-500 airplane: (1) had finally pushed back from the gate area and had moved into the active taxiway area between concourse B and C, i.e., it had uncoupled from its pusher and was ready to move forward. (2) was headed for the T10 entry onto runway 32L for takeoff via taxiway Alpha, Alpha 7, and Tango.

Just about one and one-half minutes later at 4:31:44 pm the tower again contacted United 446 with the following instructions:

T "United 446. Come down on Tango. Give way to Northwest. Follow him. 132.7."

A/C "Follow Northwest, 132.7. Good day."

These instructions indicated that flight 446: (1) had to follow a Northwest Airlines airplane down taxiway Tango toward the SE which would have been facing away from gate C17, making it impossible for the crew to look back in that direction, and (2) was authorized to change radio frequencies to 132.7 which is the departure controller's frequency. That is, United flight 446 was now under the control of a different tower controller who would authorize his takeoff from runway 32L. We may assume that United 446 took off at about 4:34 pm.

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<sup>36</sup> Don Ledger, personal communications, March 1, 2007.

According to an official FAA voice tape recording received through NARCAP's first FOIA request, the crew of flight 446 contacted Chicago TRACON at 4:37:13 while climbing through 2,000 feet altitude which would call for a climb rate of about 620 fpm (+/-).

### 3.3 Miscellaneous Considerations

This incident involved (at minimum) five organizations each with its own administrative responsibilities, legal considerations, and procedures. These organizations are: Federal Aviation Administration (federal), Airport Administration Management and employees (city of Chicago), United Airlines Management and employees, a pilot union, and ground workers union. While access to internal airline working documents concerning this incident is very limited, NARCAP did receive some documents that were quite revealing. To include these documents here or even quote extensively from them would compromise the identity of their sources which NARCAP will not do. It is unfortunate but true that we must read between the lines for some needed evidence merely because of personal fear of what management might do to others for reporting this incident. See Appendix C and (Roe, 2004) for further discussion of this general subject.

### 3.4 Visibility from the Main ATC Tower

The FAA stated publicly that no one in the air traffic control tower saw the UAP. This statement is important since it is not qualified in any way. Calculations were therefore made to determine at what elevation above the ground an object hovering directly above gate C17 would not be visible to ATC tower personnel. It was determined that a five foot six inch tall ATC specialist standing next to the console<sup>37</sup> and facing gate C17 would have a vertical view (above the local horizontal) of about thirty (30) degrees arc before their vision would be blocked by the outside overhanging roof and upper window frame. Additionally, if the same viewer were to lean forward over the console so as to increase this vertical angle an additional seven to ten degrees arc would be gained. It remains to determine the approximate height above the ground of this viewer's eyes, the horizontal distance (D) between the viewer in the tower and gate C17, and two further heights (30 degree elevation (B) and 37 degree elevation (A) above the local horizontal.

Because the ground isn't exactly level in this area of the airport, topographic interpolations were made based on data obtained from the official Airport Diagram.<sup>38</sup> A ground elevation at gate C17 of 649 feet MSL is assumed or three feet lower than the base of the tower.

Note that the highest point on the tower is 905 feet MSL according to the Airport Diagram [AL-166 (FAA)] (see Fig. 3). Based on a side elevation photograph of the tower it was estimated that the middle of

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<sup>37</sup> A console is the horizontal work surface extending around the interior perimeter of the tower cab. The typical console is about 24 inches deep with other displays and controls on additional inclined panels located nearer the windows. <<http://ffc.arc.nasa.gov>>

<sup>38</sup> Ground elevation values are from Figure 3, interpolating elevations listed there using four points: (1) the southerly end of runway 32R (648 feet MSL), (2) the southerly end of runway 4L (656 feet), (3) the east end of runway 27L (651 feet), and (4) west end of runway 9R (666 feet).

the outward canted viewing windows was about twelve feet below the ASDE-3 radar antenna on its roof or 893 feet MSL. Since the base of the tower is at an elevation of approximately 652 feet MSL, the difference of  $H = 241$  feet being the air traffic controller's eye height above the ground at the base of the tower. Thus, the height above the ground at gate C17 that is the same height as the controller's eye level is 244 feet. The horizontal distance ( $D$ ) is about 2,068 feet. Figure 9 is an elevation drawing of the tower summarizing these values.

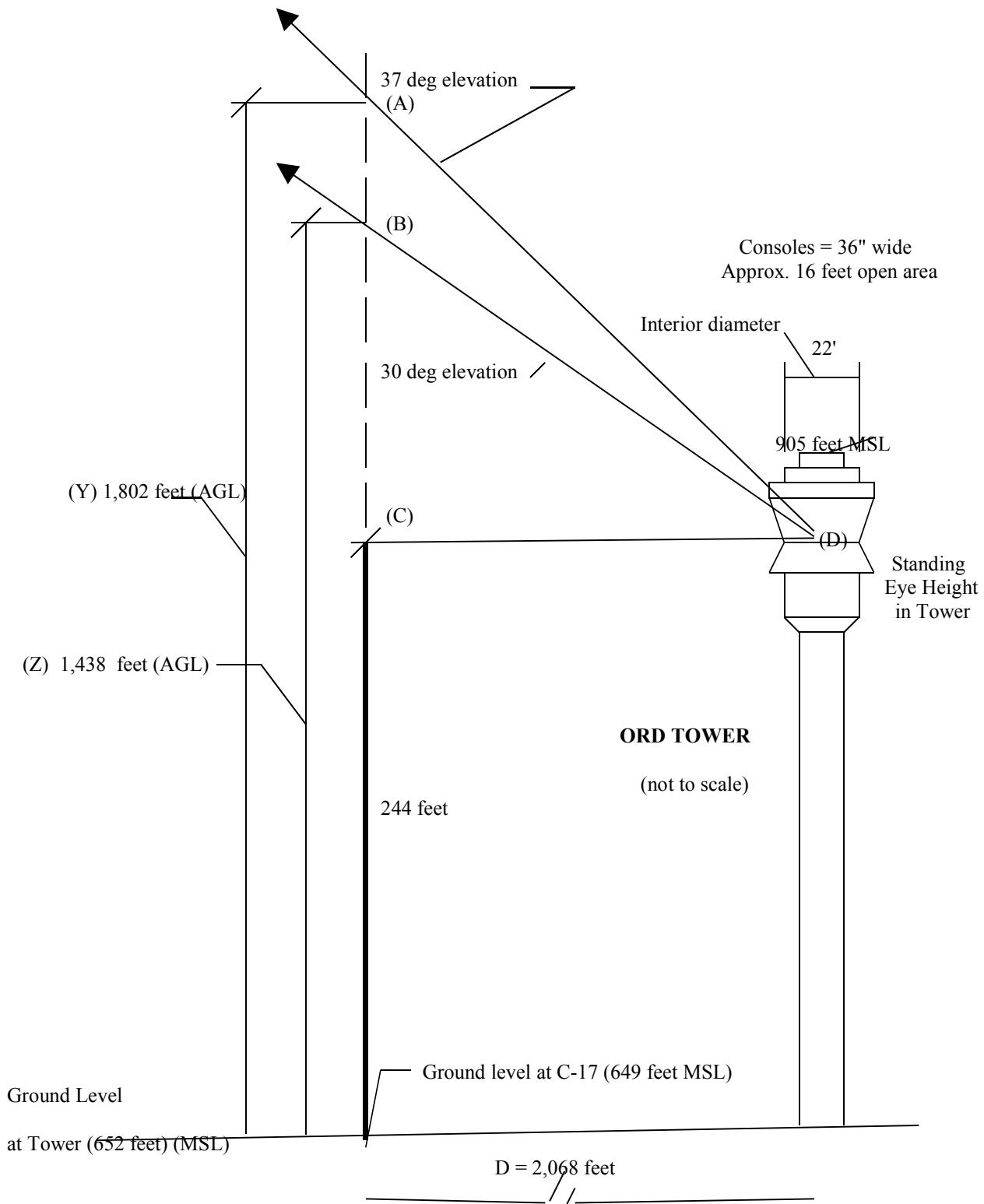


Figure 9. Vertical Visibility Limits from New Control Tower

Now it is possible to calculate the height (above the airport surface at gate C17) above which an object would not have been visible from the control tower for each of the two ATC controller body postures mentioned. For the 30 degree visual elevation condition we solve for the vertical segment (B) - (C) where  $\tan. 30 \text{ deg} = Ht/2068 = 1,194$  feet. Solving for the 37 degree visual elevation in the same way, the segment (A) - (C) = 1,558 feet. To each of these values must be added the height of the controller in the tower or 244 feet. Thus, if an object were above about 1,438 feet (AGL) it would not have been visible from the tower *without* leaning forward and looking upward. Likewise, if an object were above about 1,802 feet (AGL) directly above gate C17 it wouldn't be visible to a viewer in the tower *who is leaning forward* over the console and looking up into the sky. Perhaps this is why the tower controllers didn't see the object.

We are still faced with the dilemma of not knowing the actual altitude of the UAP except that it was beneath 1,900 feet AGL, the approximate base of the cloud layer at the time. For the remainder of this paper the claim by the FAA that the ATC specialist(s) in the tower did not see the UAP will be accepted. Therefore, the UAP hovered somewhere between about 1,438 feet and 1,900 feet altitude (AGL).

Finally, according to Jon Nowinski of the *Smoking Gun Research Agency*, officials at Scott Air Force Base some 250 miles SW of O'Hare Airport were aware of the sighting (as of January 8, 2007) but were not contacted by O'Hare ATC personnel which further supports their public statement that they didn't see anything from the tower.<sup>39</sup>

### 3.5 Flight Delays and Tower Communications on November 7, 2006

**3.5.1 Flight Delays.** General data on airport flight approach and departure delays for each hour of operation is available for O'Hare Airport and thirty others (Anon., 2006a). Delays are collected by the Bureau of Transportation Statistics ([www.bts.gov/](http://www.bts.gov/)) in accordance with 14 CFR Part 234 of DOT's regulations. There is much useful data presented in these monthly reports. However, in the tables giving the causes of delays only five categories are listed (Air Carrier Delay; Extreme Weather Delay; National Aviation System Delay; Security Delay; and Late Arriving Aircraft Delay). There is no miscellaneous category in which incidents of the kind discussed here might be included.<sup>40</sup>

An "on-time" operation means that a scheduled air carrier operated within 15 minutes of the scheduled time shown in the carrier's Computerized Reservation Systems. Arrivals refer to gate arrival. Of most interest here are two statistics: (1) Departure delays at ORD (across all airlines) within the time period 4:00 and 4:59 pm local time, and (2) Approach/Landing diversions or go-arounds (also called "missed approach") across all airlines during this same period. (Table 2). Either or both categories might possibly indicate that a situation had existed at ORD that constituted a flight hazard. Unfortunately, these values are continuously running totals over a twelve month period which masks smaller variations in operating statistics.

<sup>39</sup> A FOIA request was submitted to Scott AFB on March 22, 2007. No reply has been received as of date of publication of this report.

<sup>40</sup> It is possible that so-called UAP events might be included within the National Aviation System Delay category but there is no way to tell.

Table 2

Percentage of on-time Arrivals and Departures  
at ORD Across all Airlines for a Twelve Month Period  
Ending in the Month Indicated Between 4:00 and 4:59 pm<sup>41</sup>

Month	Arrivals	Departures	Total No.	Arrivals	Departures
June 2006	66.6	61.0	31,286	31,252	
July 2006	66.2	59.4	31,890	31,845	
Aug. 2006	65.1	62.1	32,338	32,321	
Sept. 2006	59.3	60.3	30,768	30,751	
Oct. 2006	56.3	54.7	32,244	32,247	
Nov. 2006	65.7	62.9	30,537	30,535	

Weather is a predominant factor in determining the above data. Nevertheless, it appears that there were no significant arrival or departure delays experienced on November 7, 2006 within the (relatively low) precision of these particular statistics.

It is known that ORD experienced at least one flight delay on November 7, 2006. UPI reported that on November 7, 2006 that two United Airline passenger planes contacted one another in fog conditions. This incident is noted in Figure 8 at time 1412 UTC (8:12 am). No injuries were reported.

An airline employee told the senior editor that he saw several safety vans in the vicinity of Z5 (i.e., gate C17) travelling toward C-11 at about 5:30 pm. He had never seen them before and did not know why they were there. He conjectured that they might have been there because of the earlier wing clip collision that morning.

**3.5.2 Tower and TRACON Communications.** NARCAP submitted a FOIA request in mid November 2006; the FOIA Analyst assigned to this job contacted the Senior editor on January 12, 2007 claiming that the O'Hare tower had "checked its voice tapes for the date and time in question and had found relevant portions only on three phone calls (all from United ramp control) and one inbound ground frequency." The FOIA package was finally received on March 5, 2007. The FAA provided three (3) separate recordings, viz., the three numbered boxes<sup>42</sup> diagrammed in Figure 10 as well as radio communications from 4:25 to 4:40 pm, between Chicago TRACON, south departure with numerous aircraft that had just taken off from O'Hare. One of these communications was with United flight 446.<sup>43</sup> Each of these recordings is discussed separately below. The results of NARCAP's second FOIA request

<sup>41</sup> Note that the total number of arrivals and departures are not limited to the one hour of the day indicated. < <http://airconsumer.ost.dot.gov/reports/atcr06.htm> >

<sup>42</sup> Certified by Karen Powalish, Quality Control Assurance Technician, Chicago O'Hare ATC Tower. At the end of these four recordings she states, "There were no other recordings found that involved the UFO incident."



resulting in box no. 4 and 5 in Figure 10 are discussed later.

It should be noted that for the thirty minute period from 4:30 to 5:00 pm three different communication channels were used (cf. right side of Figure 10). Data segments that were received extended from 4:30 to 4:32 pm (box #1), from 4:47 to 4:49 pm (box #3), from 4:52 to 4:53 pm (Box #2). All of these voice tape recordings were certified as being accurate.<sup>44</sup>

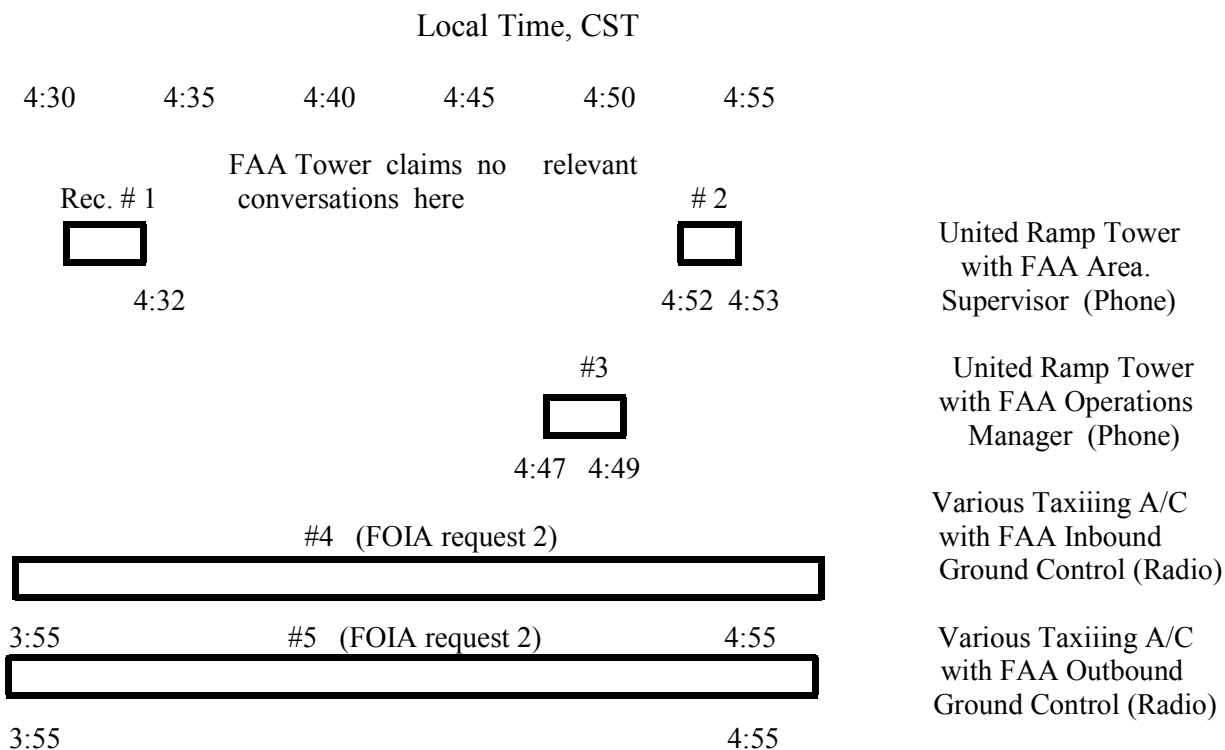


Figure 10. Diagram of Control Tower Voice Recordings Received Through NARCAP's F.O.I.A. Requests

Table 3 presents a transcript of the conversation held between the United Airlines ramp tower and the Area Supervisor Position in the O'Hare tower between 4:30 and 4:32 pm.

<sup>43</sup> FOIA Request No. 2007001234GL by senior editor. "All (FAA) control tower voice recordings, tower supervisor logs, notes, and all other documents such as telephone and radio communications notes memos, etc. and Tower Ground Controller logs, notes, and all other documents such as telephone and/or radio communications notes, memos, etc. " was specifically requested, for the time period 4:00 pm to 5:00 pm CST on November 7, 2006.

<sup>44</sup> Because of these time lapses where no data was provided the senior editor submitted a second FOIA request as discussed in Appendix I.

## Table 3

## Recording No. 1

Phone Conversation Between United Zone Controller (R)  
and FAA Area Supervisor (T1) in O'Hare Tower  
(Parentheses enclose editor's comments or uncertain transcription)

---

Start time: 4:30 pm

T1 "Tower, this is Dave" (initials DH: see Daily Record of Facility Operations, time 2245)  
R "Hey Dave, this is Sue in the United tower"  
T1 "Hey Sue"  
R "Hey, did you see a flying disc out by C17?"  
T1 "Oh, it starts Sue. (laughter) Oh, we're Sorry Sue, (feminine laughter  
in background) A flying ... you're seeing flying discs?"  
R "Well, that's what a pilot in the ramp area at C17 told us. They saw some flying  
disc above them. But we can't see above us."  
T1 "Common Sue"  
R (You didn't see it?)  
T1 "Hey, you guys been celebrating the holidays or anything, or what? You're celebrating  
Christmas today? I haven't seen anything Sue, and if I did I wouldn't admit to it.  
No, I have not seen any flying disc at gate C17. (Sue continues to laugh)  
Unless you've got a new aircraft you're bringing out that I don't know about."  
R "No" (Sue continues to laugh)  
T "No, I haven't seen anything Sue (he becomes more serious) (feminine laughter  
continues) ...nothing I know about"  
R "Alright"  
T1 "If I do I don't know what I'll do. (both laugh) I guess I'll back it up with you. . . but  
I'll keep an eye out"  
R "Alright" (continues to laugh)  
T1 "Alright"

End Time: approx. 4:31:10

---

The second recording was for the period 4:47 to 4:49 pm (lasting about 87 seconds) between the United Ramp Tower and the Operations Manager in the tower. It is presented in Table 4.

## Table 4

## Recording No. 3

Phone Conversation Between United Ramp Tower (R)  
and FAA Area Supervisor (T) in O'Hare Tower

---

Start time: 4:47 pm

T "Go ahead, tower, Dwight"  
R "Dwight?"  
T "Yes"  
R "What happened to Dave? Did he have to take a break because I called him?"  
T "No"  
R "This is Sue from United" (laughter)  
T "Yes" (serious tone)  
R (12 sec. pause) "There was a disc out there flying around"  
T "There was a what?"  
R "A disc"  
T "A disc?"  
R "Yeh"  
T "Can you hang on one second?"  
R "Sure"

-----  
(33 sec. pause) Contains ramp tower background chatter "He's working traffic",  
"OK, I'll be right back" "Alright"  
-----

T "OK, I'm sorry what can I do for you?"  
R "I'm sorry, there was, I told Dave, there was a disc flying outside above Charley 17  
and he thought I was pretty much high. But, um, I'm not high and I'm not  
drinking."  
T "Yeh"  
R "So, someone got a picture of it. So if you guys see it out there ...."  
T "A disc, like a Frisbee?"  
R "Like a UFO type thing"  
T "Yeh, OK."  
R "He got a picture of it." (laughs)  
T "How, how, how high above Charley 17?"  
R "Well, it was above our tower. So"  
T "Yeh"  
R "So, if you happen to see anything (she continues to laugh)"  
T "You know, I'll keep a peeled eye for that"  
R "OK"  
T "Bye"

R "Bye"  
T "Alright"

---

The third telephone conversation was recorded between a male in the United Ramp tower and the tower flight operations manager (Position T2) for the period 4:52 to 4:53 pm. it lasted 51 seconds and is presented in Table 5.

Table 5

Recording No. 2

Phone Conversation Between United Airlines (R)  
and FAA Area Supervisor (T) in O'Hare Tower

---

Start Time: 4:52 pm

T "Tower Cab, this is Dave"  
R "Hi Dave ??? (unintelligible: this is ABC or ADC?)  
T "Yeh Rog... (Rod?)" (unintelligible here)  
R (garbled) "Some of our employees... I don't know if you know anything about this, some of our pilots on the ground are reporting a ufo sighting at a thousand feet to the east side of the airport. Do you guys know anything about this?"  
T "You know, the ramp tower called me I want to say about ten - fifteen minutes ago. We have not seen anything up here."  
R "OK"  
T "And I guess she said it was right around gate C17"  
R "OK"  
T "But I mean, but since she called we have not seen anything up here."  
R "OK"  
T "Yeh, I mean, if we do, oh well ..." (chuckles)  
R "Yeh, ah, no, I was just wondering maybe we'll, maybe we'll have to give them the 27 right."  
T "Yeh, yeh, I know. Either that or you guys have unveiled a brand new aircraft and ain't been tellin anyone about it."  
R "Yeh" (laughter)  
T "But, ah, no, we haven't seen anything but we'll surely keep an eye out for it, that's for sure."  
R "Thank you very much."  
T "No Problem."

---

The fourth recording was for the period 4:47:39 to 4:47:58 pm (19 seconds total) between the Inbound Ground Controller Position at O'Hare and various aircraft that had landed and were taxiing to their gates.

He also directed other airplane surface movements. There are several interesting conversations found here. (Table 6).

Table 6

## Recording No. 4

Radio Conversations Between FAA Inbound Ground  
Controller (T), the Pilot of Gateway Airlines Flight 5668 (A/C1),  
United Maintenance 44 (A/C2) and Other Airplanes

Approx. Local Time hr:min:sec (p.m.)	Speaker	Statement(s)
Tape start time: 22:55 UTC = 3:55 pm.		
3:57:20	A/C2	"United maintenance forty-four. International ramp to, ah, north (port?)."
3:57:30	T	"United maintenance forty four. Join Alpha at Alpha eighteen. Taxi to north port via Alpha eighteen, Alpha."
3:57:30	A/C	"Alpha eighteen, Alpha, United forty-four."
3:57:33	T	"Ah, American, just coming across the bridge, who is that?"
3:57:35	A/C	"American nineteen ten."
3:57:37	T	"Yeh, what's your gate number again?"
3:57:38	A/C	"K-10."
3:57:39	T	"Yeh, Kilo ten. Give... ahh, OK. There's a United comin off the International (he'll) give way to you."
3:57:43	A/C	"Yeh, OK. He'll give way."
3:57:45	T	"Yeh, he'll give way to you. United, off the International ramp, the maintenance flight. You're to give way to one American"

MD-80 from your right and then continue."

- 3:57:50 A/C2 "Give way to the MD-80, United forty four."
- 3:57:52 T "United six twenty three, (instructions) ".. taxi to the gate."
- 3:58:04 A/C "Gateway 5668...(garbled) ... penalty box...we go to the north port."
- 3:58:09 T "Gateway 5668, you can use Alpha to northport and use caution for the, ah UFO." (spoken in a matter of fact tone)
- 3:58:13 A/C "For the northport. We'll take a look." (slight chuckle)
- (Note: The controller seems to be giving someone with him a situation briefing at this point.)*
- 3:58:18 T "I got the chicken liner (garbled)... ah information. Ah, we're ... I got a bit of information here. We're up to date here... (Currently?) our plan (here? or weird?)" ...(interrupted by call)
- 3:58:23 A/C "Ten-forty-four is on Bravo .. ah, Foxtrot one, Bravo."
- 3:58:27 T "Ten forty-four... continue via Bravo. Taxi to the gate."
- 3:58:30 A/C (garbled) (pilot acknowledges instruction)
- 3:58:31 T "Ah, these guys. (were on?)... (interrupted by incoming A/C call)
- (Note. It is now clear that a new person has arrived at the Inbound Ground Controller's Position. The controller is filling him in on what is taking place.)*
- 3:58:32 A/C " Eagle four nineteen .... on Bravo going to Delta seven."
- 3:58:35 T "Eagle four nineteen taxi via Bravo."
- 3:58:37 T "We got a couple guys on maintenance .. down on..(garbled) .. over at tango over here. We got a United maintenance flight... I think it's a ..." (brief pause)

*(Controller continues to explain what is happening to second person).*

3:58:44 T (speaks louder here as to a different person) "Yeh, United maintenance flight that's just joining Alpha from the International, what's your number again?"

3:58:47 A/C "United maintenance forty-four."

3:58:49 T "That's four-four, thank you."

3:58:50 A/C "Alright."

3:58:51 T "United forty four is goin' around the north (fork?) ... ah, yeh, Eagle and Skywest over here comin around this way. He's turnin in ... we've really got no other gate holds."

3:58:57 [second voice] "Alright."

3:58:59 T "Somebody reported a UFO or a flying disc above Charley concourse, seriously."

3:59:02 [second voice] "Excellent."

3:59:03 T "Yeh. ... Um, so nobody..."

3:59:04 [second voice] "I'll keep my eyes open."

3:59:04 T "Nobody can see it. But use caution."

3:59:06 [second voice] "Alright."

3:59:07 T "Um... and a... (laughter by two men) "that's pretty much it (garbled conversation)

3:59:11 (interrupted by female pilot voice)

---

4:47:39 T "Gateway 5668."

A/C1 "Gateway 5668."

T "Yeh... look out your window. Do you see anything above United concourse? They actually, believe it or not, they called us and said, somebody observed a flying disc about a thousand feet above the, ah... gate Charley 17. Do you see anything over there?"

-----  
pause of about 5 sec.  
-----

A/C1 "Not that I can tell. I thought my job was stressful" (laughter)

4:48:05 pm A/C2 (witness B)<sup>45</sup> "Oh, we saw it a half hour ago"

T "Who saw it?"

A/C2 "A whole bunch of us over at Charley concourse."

T "Really? You guys did? Who is this?"

A/C2 "United taxi mechanics (5 sec. pause). We thought it was a balloon but we're not sure."

---

As discussed in Section 2.0, it is very likely that the taxi mechanic who spoke with ground control at 4:48:05 in Table 6 was witness B based on the similarity of details provided. If the estimate that they had seen the UAP thirty minutes earlier is accurate then the time would be at about 4:18pm.

The inbound ground controller remarked to the pilot of Gateway 5668 that the tower had been called about the presence of the object over C17 and that is what prompted his request to look for the object. The first communication occurred at 4:30 pm and is transcribed in Table 3. A second and third communication from United Airlines occurred at 4:47 pm and 4:52 pm, respectively (Table 4 and 5). Exactly when the inbound controller first learned about the UAP cannot be determined but there are a number of relatively long periods of silence where this might have occurred, all of them were before United personnel made the first call to the tower. While NARCAP acknowledges that there are normal periods of high and low taxi activity that call for instructions from the controller the following blank periods become obvious when heard as part of a full hour's worth of recording. At 4:21:49, for instance, the controller said nothing for sixteen seconds; then, as if to catch up with his workload, he speaks faster and seems somewhat distracted immediately afterward. The next period of quiet begins at 4:24:07 for seventeen seconds followed by him thinking he had missed a pilot's comment when no such comment had been made by the pilot. The next period of quiet begins at 4:24:36 for eighteen seconds followed at 4:27:19 for twenty-four seconds and then at 4:28:44 for thirty-two seconds. These quiet periods would not seem so unusual except that for most of the preceding and following minutes (in the hour's recording) he was talking almost continuously.

The final recording received through NARCAP's first FOIA request was related only to TRACON radio communications with United flight 446. The entire certified<sup>46</sup> recording began at 4:25 pm and ended at 4:40 pm. However, the only radio communication with United Flight 446 found was a brief

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<sup>45</sup> At this point witness B and C are either at gate C10 or at the United maintenance hanger. NARCAP's reconstruction assumes the latter.

<sup>46</sup> Certified by Sharon Graham, Quality Program Assurance Specialist, Chicago TRACON.



radio contact between the jet and TRACON at about 4:37:15 pm soon after its takeoff. It is transcribed as follows:

Pilot "This is United 446, checking in with you. We're passing two thousand for five thousand."

TRACON "United 446, Chicago Departure, end of contact."

If the cockpit crew of United Flight 446 parked at gate C17 did see the UAP as suggested earlier they apparently did not comment about it to the TRACON controller.<sup>47</sup> There is also no mention of any UAP between this controller and other taxiing aircraft on this particular frequency.<sup>48</sup> The tape ends with ATC instructions for flight 446 to level off at 13,000 feet altitude. These official communications tend to support the FAA's contention that they knew nothing about the presence of a UAP over the airport.

#### 4.0 Weather Conditions

William Puckett<sup>49</sup>  
NARCAP Research Associate

The greater Chicago area was under the influence of a stable air mass with low pressure gradients. The air mass was moist below about 2,000 feet (AGL) and quite dry above 2,000 feet. Surface winds were below ten knots in the lower 5,000 feet. A few light rain showers had occurred earlier in the day. Cloud ceilings were 1,000 to 2,000 feet<sup>50</sup> with visibility restricted to three (3) to five (5) miles in haze and fog. Weather data for this and location and date from the Automated Surface Observation Station (ASOS) showed a cloud ceiling of 1,900 feet AGL at 4:51 pm. This overcast had been rising gradually since about 10:00 am. Additional regional weather data is included in Appendix A (prepared by W. Puckett). Table 7 presents the atmospheric lapse rate data for Davenport, Iowa on November 7, 2006 at 6:00 pm CST.

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<sup>47</sup> Given the unwritten censure and ridicule that usually accompanies reporting UAP to management pilots typically remain quiet about what they see. Cf. (Roe, 2001) for background information directly related to this unhealthy negative reporting bias.

<sup>48</sup> A second FOIA request was made to FAA O'Hare office on March 8, 2007. It confirmed that nothing was said about the UAP either by inbound or outbound ground controllers other than one brief query to an airplane with call sign Gateway 5668 at 4:47:39 pm. (See Table 6 for details).

<sup>49</sup> Atmospheric scientist, MS, retired.

<sup>50</sup> Cloud ceiling is determined using a laser ceilometer. Cf. <[http:// www.allweatherinc.com/meteorological/8340\\_ceilometer.html](http://www.allweatherinc.com/meteorological/8340_ceilometer.html)>

Table 7  
 Table of Lapse Rates, Humidity & Winds (Davenport, Iowa)  
 Nov. 7, 2006 – 6:00 pm CST

Pressure (Millibars)	Height (Meters)	Temperature (Degrees C)	Dew Point (Degrees C)	Relative Humidity (Percent)	Wind Direction (Degrees)	Wind Speed (Knots)
1000	72					
981	229	10.8	6.4	74	190	4
973	298	12.8	7.8	72	198	4
925	724	10	6.6	79	244	5
906	896	8.4	5.3	81	263	6
904	914	8.5	4.8	78	265	6
882	1118	9.2	-0.8	50	268	7
871.3	1219	9.1	-1.6	47	270	7
850	1424	8.8	-3.2	43	270	8
809	1829	6.3	-7.3	37	275	10
779.4	2134	4.5	-10.4	33	280	12
753	2415	2.8	-13.2	30	294	15
750.9	2438	2.8	-16.3	23	295	15
747	2480	2.8	-22.2	14	296	15
723.1	2743	2.3	-27.8	9	305	16
719	2789	2.2	-28.8	8	307	16
700	3004	0.4	-27.6	10	315	16
699	3015	0.4	-25.6	12	315	16
687	3154	-0.5	-4.9	72	317	17
670.1	3353	-0.7	-8	58	320	19
655	3535	-0.9	-10.9	47	320	21
645	3658	-1.5	-14.3	37	320	23
630	3845	-2.5	-19.5	26	315	25
597.2	4267	-5	-17.6	37	305	30
593	4323	-5.3	-17.3	38	306	29
567	4673	-7.9	-12.6	69	315	26
552.2	4877	-9.2	-14.8	64	320	24
530.7	5182	-11.1	-18	56	325	26
500	5640	-13.9	-22.9	47	325	32
470.3	6096	-17.6	-23.9	58	325	35
451.4	6401	-20.1	-24.5	68	325	38
420	6937	-24.5	-25.7	90	331	46
400	7290	-27.3	-28.8	87	335	51
385	7564	-29.3	-30.8	87	335	56
382	7620	-29.2	-32.5	73	335	57
376	7733	-28.9	-35.9	51	339	61
366	7925	-30.2	-37.5	49	345	67
346	8323	-32.9	-40.9	45	345	78
307.3	9144	-39.2	-44.6	56	345	101
300	9310	-40.5	-45.4	59	345	105

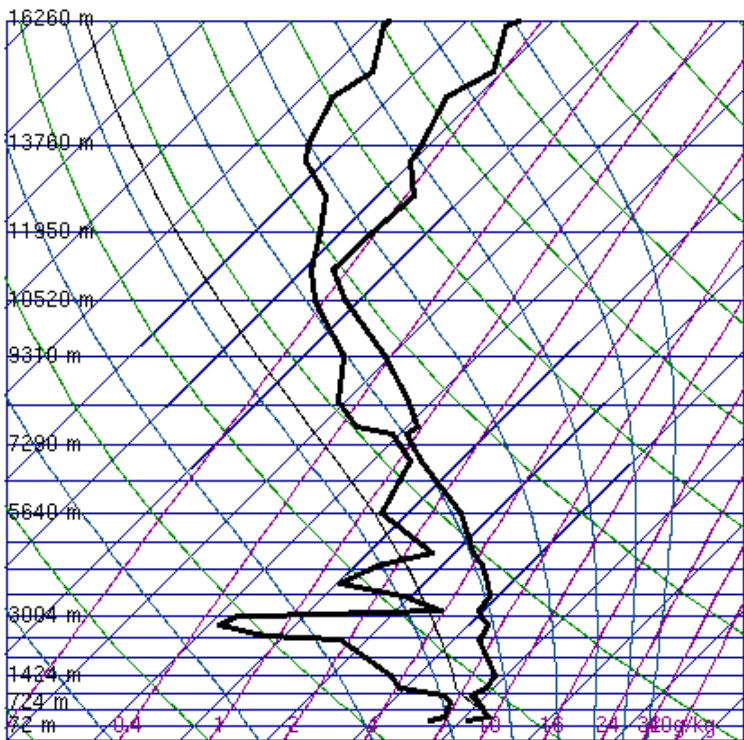
Astronomical Data Used:

Source: Weather Underground Web Site) <http://www.weatherunderground.com>

Figure 11 is a graph of the basic data of Table 7. The ordinate is temperature (deg. C) and the abscissa is altitude (m). The dark, irregular line on the right represents air temperature (deg. C) while the dark, irregular line on the left represents dew point temperature, i.e., the temperature at which relative humidity would be 100% if the air temperature were cooled to the dew point temperature. Clouds will generally form where the two lines are superimposed over each other since the air has become completely water saturated. See Appendix A for additional weather-related data.

74455 DVN Davenport

100  
200  
300  
400  
500  
600  
700  
800  
900



100  
200  
300  
400  
500  
600  
700  
800  
900  
 -40 -30 -20 -10 0 10 20 30 40

SLAT	41.61
SLON	-90.5
SELV	229.0
SHOW	10.90
LIFT	9.88
LFTV	9.90
SWET	48.00
KINX	-8.50
CTOT	10.70
VTOT	22.70
TOTL	33.40
CAPE	0.00
CAPV	0.00
CINS	0.00
CINV	0.00
EQLV	-9999
EQTV	-9999
LFCT	-9999
LFCV	-9999
BRCH	0.00
BRCV	0.00
LCLT	279.3
LCLP	893.0
MLTH	288.5
MLMR	6.72
THCK	5568.
PWAT	16.54

00Z 08 Nov 2006

University of Wyoming

Figure 11. Atmospheric Lapse Rate Data for Davenport, Iowa on November 7, 2006 at 6:00 pm CST

Surface Data Used:  
 (Source: University of Wyoming Weather Server): <http://weather.uwyo.edu>

### O'Hare International Airport – Chicago

Observation on November 7, 2006 at 4:51 PM CST:

Sky: Overcast With Ceiling at 1,900 feet

Visibility: 4 Miles Haze

Wind Direction: West (270 Degrees Compass)

Wind Speed: 7 Knots

Temperature: 53 Degrees F

Dew point: 48 Degrees F

Relative Humidity: 83%

Altimeter Setting: 29.80 Inches of Mercury

## 5.0 Hole-in-Cloud Considerations

Kim Efishoff, Research Associate and Larry Lemke, Executive Committee

**5.1 Introduction.** Other sections of this report present the basic descriptive facts surrounding the Chicago O'Hare International Airport UAP sightings of November 7, 2006 in greater detail. In this section we concentrate on one particularly striking assertion occurring in the reports namely, that the apparent oblate spheroid shaped object or phenomenon produced a sharp edged "hole in the clouds" (HIC). If we assume only that the witnesses are not mistaken or dissembling, then the HIC must be considered to be a physical trace capable in principle of providing some information about the nature of the object or phenomenon. What can the HIC tell us about whatever caused it? Ultimately, there is insufficient data in the reports to uniquely and definitively identify the presumptive "object" that caused the HIC. Indeed, we cannot even determine whether the "object" was solid or as ephemeral as, for example, a self-organized plasma. However, we may hope to eliminate from consideration classes of explanations which do not make physical sense. Thus even if we cannot identify the ultimate cause of the sighting reports, we can make some reasonable inferences about what it was not. As usual, in attempting this we should apply Occam's Razor, and avoid needlessly invoking any unconventional physics.

The phenomenon we are attempting to explain is described in the words of one of the witnesses: At around 4:30 in the afternoon of November 7 several employees of United Airline company witnessed a "disc shaped [sic] object" that was seen "hovering over gate C17 at the C concourse" of the Chicago O'Hare International Airport.<sup>51</sup> The object, which could not be identified by witnesses as any known aircraft, was said to be "holding very steady and appeared to be trying to stay close to the cloud cover." According to testimony given to NARCAP by one witness, after looking away for a short while, the witness "noticed that the craft...[was]... no longer there but there was an almost perfect circle in the

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<sup>51</sup> National UFO Reporting Center (NUFORC) Report Index, posted 12/7/2006

cloud layer where the craft had been, The hole disappeared a few minutes later.” As discussed in Section 2.0, one highly qualified witness (B) confirmed that he and witness (C) saw the hole at about 4:20 pm. He said, "I guess it had just left." Estimates given above (Section 2.0) for the time of departure of the UAP and a fairly definite time when the hole in the cloud was still visible range from five to ten (mean = seven and one-half) minutes!

The story of this unusual sighting broke on January 1, 2007, in the Chicago Tribune.<sup>52</sup> According to the Tribune story, reports by airlines employees state that “A flying saucer-like [sic] object hovered low over O’Hare International Airport for several minutes before bolting through the clouds with such an intense energy that it left an eerie hole in overcast skies...the object [was] estimated to be hovering 1,500 feet above the ground...[and] was seen to suddenly accelerate straight up through the solid overcast skies, which the FAA reported had 1,900-foot cloud ceiling at the time...It left behind an open hole of clear air in the cloud layer...[that] disappeared within a few minutes.” The Tribune attributes one airline employee with the statement, “It was like somebody punched a hole in the sky.”

**5.2 Historical Background.** Although the multiple eyewitness accounts of this HIC may be unusual, they are not unprecedented. Reports of this odd manifestation have been associated with UAP sightings as far back as 1947, and as far afield as Newfoundland, England and Scotland.

A declassified Army Air Force Intelligence Investigation Report held in the files of the Center for UFO Studies (CUFOS)<sup>53</sup>, provides a record of one such sighting that occurred approximately six miles SSW of Harmon Field, Newfoundland (1388<sup>th</sup> AAF Bu, NBC, ATLD, ATC. Harmon Field, Newfoundland) on July 10, 1947. According to the signed statements by witnesses – John E. Woodruff, Chief Mechanic, Pan American Airways; John N. Mehrman, Jr. Supervisor and Mechanic, Trans World Airway; and, Robert W. Leidy, Station Mechanic, Pan American Airways – at approximately 5:00 in the afternoon, Woodruff saw a “translucent disk like a wheel traveling at a terrific speed and opened the clouds as it went through the air.” The witnesses stopped the vehicle in which they were traveling and got out to observe the object. Though Woodruff was the only witness to actually see the “disk”, both Mehrman and Leidy saw the hole left in the cloud layer upon the departure of the object. Mehrman reported “the clouds were very scattered and were about 8,000 to 10,000 feet, the object passed through and cut the cloud leaving a gap where you could see the blue sky, like a knife had cut it. The edges were feathered similar to a weld, as if you cut a weld in half.” Leidy stated that “you could see the trail right through the cloud, it looked to be traveling in a big circle and it left sharp edges to the clouds.”

An article in the Fort Pierce (FL) Tribune from Feb 16, 2007 quotes from a formerly classified U.S. Government report released under the Freedom of Information Act, and states, in part:

“... on Oct. 28, 1947, Lt. Col. George Garrett prepared a so-called Intelligence Collection Memorandum for Air Force Intelligence which listed some commonly reported features of flying discs: "The ability to group together very quickly in a tight formation when more than one aircraft are together; evasive action ability indicates the possibility of being manually operated, or possibly by electronics or remote control;

<sup>52</sup> Jon Hilkevitch. “In the sky! A bird? A plane? A...UFO?” Chicago Tribune. 1/1/2007

<sup>53</sup> Col. W. R. Clingerman and Lt. Col. E. G. Nabell, of Hqrs., Air Material Command, Wright Field, Dayton, Ohio. “Flying Saucers.” July 1947

and under certain conditions the craft seems to have the ability to CUT A CLEAR PATH THROUGH CLOUDS ..."

This Air Force Intelligence Collection memorandum may, in fact, be a response to the Harmon Field incident occurring earlier in the same year.

On March 9, 1977 a "club master and professional golfer at the Ardeer golf course on the Ayrshire coast of south-west Scotland" observed a similar incident. The two reported seeing an odd light "hovering over the seventeenth tee, no higher than a telegraph pole. Its glare was so enormous that nothing could be seen behind it... After hovering for about four minutes, the light suddenly streaked upwards into the low cloud-cover, leaving a clear hole in it as it passed through. The cloud just seemed to evaporate and then close again around the UFO, eventually leaving it to shine through as just a veiled glow" before it shot out of sight. The object made no sound whatsoever throughout the entire episode.<sup>54</sup>

According to a 1979 article published in the British journal Flying Saucer Review<sup>55</sup>, at about 4:30 in the afternoon, December 30, 1977, 62-year old Edith Lane of Exhall, Warwickshire, England, observed an oval object in the sky over the residence in which she was staying. The object was "about 20 feet in diameter", and "was in view for about 5 minutes. The object suddenly began to move and accelerated rapidly to a tremendous speed...leaving a hole in the sky...where it had been hovering...All the clouds covering a roughly oval space, several times the diameter of the object, had dispersed. This condition remained many minutes after the object had gone, despite winds moving the clouds quite noticeably."

The final incident involving displaced clouds took place in the afternoon of December 6, 2002 at Ventura, California. Two college professors watched as a dark object moved across the sky toward the south over Ventura County at an estimated ten to fifteen thousand feet altitude. Then it stopped its forward travel for about five minutes while carrying out "...several unusually tight (seemingly) uncontrolled maneuvers ... and (appeared to) change shape from a disc to an oval." It then moved back toward the north until it disappeared out of sight over another five minute-long period. As the object moved it "displaced cloud formations in a circular area surrounding it, the area directly around the object was clear even when flying through cloud formations." (NUFORC report)

As demonstrated by the multiple-witness accounts documented in the foregoing reports, the HIC phenomenon associated with the sighting of a UAP witnessed at Chicago O'Hare International Airport on November 7, 2006 appears to be observable and repeatable over large separations of time and space. Groups of witnesses to the individual events could not plausibly have known of the existence of each other, so we consider the reports to be independent. The existence of an Air Force Intelligence Collection Memorandum in October, 1947 which refers to this phenomenon is also inferential evidence that the authors of this section are not the first ones to conclude that this phenomenon is both real and repeatable.

<sup>54</sup> Randles. J., UFO Reality: a Critical Look at their Physical Evidence. Robert Hale, London. 1983.

<sup>55</sup> Phillips. K., "UFO leaves hold in sky". Flying Saucer Review, FSR Publications Ltd., West Malling, Maidstone, Kent, England., Vol. 24, No. 4, 1979.

The obvious question is, “what could have created the holes in the clouds?” In seeking to answer this question, we should first describe as exactly as possible the features or characteristics of the phenomenon we consider in need of explanation. Briefly, the puzzling characteristics common to all the reports are:

1. A finite column or segment of cloud material was changed from visible to invisible.
2. The process causing the change from visible to invisible acted almost instantaneously, coincident with the passage of the object or phenomenon.
3. The process causing the hole(s) in the clouds—just larger than the presumed object or phenomenon preserved the shape of the object or phenomenon accurately and with sharp edges.

**5.3 Analysis and Discussion.** Within the portion of the Earth’s atmosphere in which the HIC phenomena have been observed (the Troposphere) water plays a unique role; it is the only naturally occurring substance which can exist in any or all three phases—gas, liquid, or solid. It is when water molecules in the atmosphere transition between these phases that clouds appear and disappear. For example, when water condenses out of the vapor phase into the liquid phase, it forms small liquid droplets which, collectively, become normal clouds. Liquid water droplets can be removed from the atmosphere by the reverse process of evaporation (requiring the addition of heat) or by the process of freezing into the solid phase (accompanied by the removal of heat). Freezing of liquid water into the solid phase is usually followed by precipitation, as the snow, hail, or sleet particles are often too large to remain aloft. All these processes involve the flow of energy and sometimes mass, and if we wish to arrive at a self-consistent explanation of what may or may not have caused the HIC phenomenon, we must be able to explain the details of the associated mass and energy balance.

The National Weather Service reported the synoptic conditions over O’Hare on November 7 as a stable low-pressure system. Temperature at the ground was about 10 deg, C. Wind was about 4 knots. There was a solid overcast layer at a constant 1,900 ft, AGL over the entire Chicago area. Data discussed in Appendix A.4 suggests that there were two cloud layers. The lowest extended from 1,900 to about 3,700 feet AGL and a second extending from about 8,000 to 9,000 feet. Freezing level was at 10,000 ft, AGL. In short, at 1,900 ft above the airport (where the HIC appeared), conditions closely approximated those for the formation of a simple “textbook” cloud deck, with no complicating factors such as temperature inversions, nearby freezing levels, winds, or convective activity.

The standard model of cloud formation starts from the knowledge that an average parcel of air anywhere in the Troposphere will almost certainly have water vapor in it. Water vapor is no more or less visible to the human eye than any other gaseous constituent, such as Nitrogen or Oxygen. It is only when the vapor condenses into either liquid droplets or freezes into ice particles that the accretions of water molecules become large enough to be seen, and therefore form visible clouds.

Because the freezing level above Chicago O’Hare on November 7, was at 10,000 ft, we know that the clouds in which the hole appeared consisted of water droplets, only. Although we do not have detailed weather reports for the other historical cases discussed above, we note that the 1947 case occurred in midsummer (on July 10), when, freezing conditions would presumably be extremely unlikely. Likewise, the Scottish case occurred in March of 1977 at an altitude no higher than that of a telegraph pole where

the conditions would also likely be above freezing. Thus, in at least 3 of the 4 cases we consider here, it is certain that the clouds in which the HIC appeared were composed of water droplets at a temperature above the freezing point.

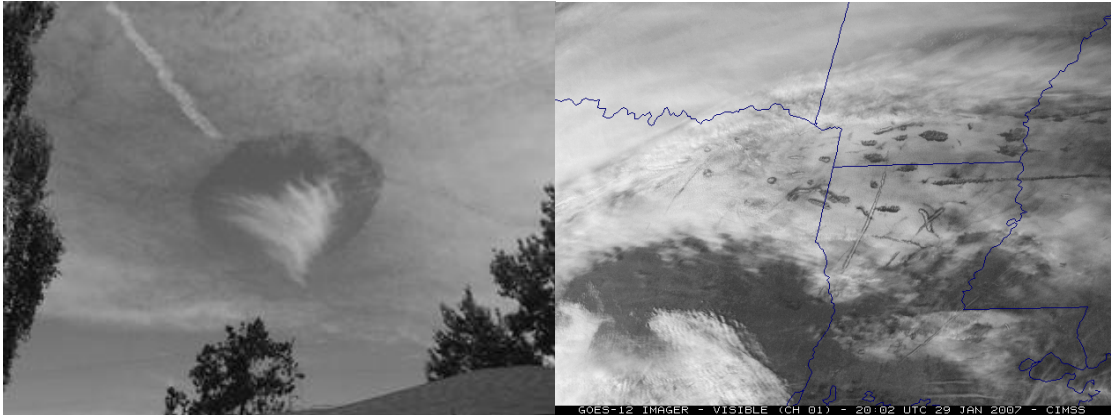
Classically, there are three ways to make a cloud of water droplets disappear; one way is to evaporate them (turning them back into invisible vapor), another way is to freeze them into ice particles (causing them to drop out of the sky), the third way is to aggregate them into large rain drops (which also fall out of the sky). We know it was not raining on November 7, 2006 or any of the other 3 cases, so we need only consider evaporation and freezing.

It has been suggested that a variation of the freezing phenomenon called the “Bergeron-Findeisen Process” (BFP) may have produced the HIC witnessed in the O’Hare incident, since the BFP is known to produce holes in clouds. For BFP to occur, a layer of water cloud must first exist in a temporary super cooled condition at or above the altitude of the freezing level. The term “super cooled” means that the temperature of the cloud is below the nominal freezing point of water yet most of the water present is still in the liquid state. In this condition, the cloud droplets will resist freezing if no ice particles are present upon which the water can adhere. This precondition is intrinsically unstable and will revert to a more stable condition if ice nuclei are provided from an external source.

Water is a natural and abundant component of the combustion products of, for example, jet fuel. The sudden introduction of water molecules in the “contrail” behind a conventional aircraft flying above a super cooled cloud deck can provide the source of ice nuclei needed for the water droplets in the cloud to freeze. In this hypothetical case, if the cloud temperature is below freezing, the air temperature at the altitude of the aircraft must be even lower (because it is higher in altitude). Therefore, the water vapor in the aircraft exhaust may freeze instantly and form ice crystals. Gravity will cause the ice crystal “seeds” to fall through the super cooled cloud region. As they do so, they accrete more ice and fall faster and farther. Eventually, the “seeds” and accreted ice fall out as snow (note the visible snow streaks in Figure 12, below). The net result is a hole in the cloud, with streaks of snow extending downward. This snow never reaches the ground because it sublimates (evaporates) in the drier and warmer air below. Figure 12a shows a single BFP HIC over Santa Rosa CA photographed from below and Figure 12b shows numerous HICs appearing in a large area of a super cooled cloud layer photographed from above by the MODIS instrument onboard NASA’s TERRA Satellite.

Essentially, in the BFP, a mass of super cooled water droplets supplies the energy potential to cause freezing; ice crystals falling under the influence of gravity provide the mass flow necessary to create a hole in the cloud. Neither this energy source nor this mass displacement mechanism was present on the day of the O’Hare sighting. Therefore, the BFP was not responsible for producing the HIC on November 7, 2006. The highly characteristic snow streaks were not in evidence in any of the 3 previous cases, either, so this phenomenon is not a tenable explanation. In fact, we may generalize this conclusion to eliminate any form of freezing as the removal method and concentrate instead on evaporation.





Figures 12a, b. Santa Rosa, CA. and Louisiana-Alabama Region. Photographs of “Holes in Clouds” Due to the Bergeron-Findeisen Phenomenon Photographed from Below (left) and From Above (right).

How much energy would have been required to evaporate water droplets in the clouds above O’Hare airport? Although we don’t have detailed data about the specific clouds above the airport on the day in question, we can estimate the answer to this question by considering the characteristics of typical “textbook” clouds. First, we should recognize that clouds forming in a continental air mass (such as above Chicago) are dominated by a process referred to as heterogeneous nucleation. This means that all the droplets form around small (i.e., sub-micron) nucleation particles, such as mineral grains, bacteria, pollen, salt crystals, etc. This is important because it places an approximate upper limit on the water content of the cloud. In a cloud formed by heterogeneous nucleation it is rare for the relative humidity to rise above about 101%. At this relative humidity, the minimum radius for a liquid droplet to exist or grow is about 0.1 micron. Droplets smaller than this will completely evaporate; droplets this size or larger will grow until they have consumed all the water vapor consistent with a relative humidity of 101%. This results in cloud droplets with a radius of about 10 microns and number densities of about  $10^9$  droplets per cubic meter of cloud<sup>56</sup>. Thus, the average density of liquid water suspended in a typical cloud is about  $4.2 \times 10^{-3} \text{ kg/m}^3$ . The latent heat of evaporation of water at 10 deg, C (the cloud temperature) is about 2260 kJ/kg. Thus, the minimum amount of heat required to evaporate a volume of cloud is about  $9.4 \text{ kJ/m}^3$ . On a relative scale, this is not a large amount of energy; each cubic meter of cloud would require the heat energy equivalent to the combustion of approximately 2 cubic centimeters (about one half teaspoon) of gasoline.

Could this amount of heat have been deposited in an air mass by the flight dynamics of some secret, or perhaps misidentified, but otherwise conventional aerospace craft? (By “conventional aerospace craft” we mean any combination of balloon, propeller aircraft, rotorcraft, turbojet, or rocket powered vehicle.) Such conventional aerospace craft all operate by pushing aside the air molecules in their flight path. Although the air in the wake of the craft returns to near its original position, work must be done on the air in passage of the craft. What we are interested in estimating is the fraction of the craft’s kinetic

<sup>56</sup> R.R. Rogers; A Short Course in Cloud Physics; Pergamon Press, 1976.

energy which could end up as heat in the atmosphere in the wake of the craft, and whether this energy is large enough to plausibly cause evaporation of the cloud droplets.

Witness accounts place the hovering object 300 to 400 feet below the bottom of the cloud deck and indicate that it went from hovering to “gone” in “a blink”. A conservative, upper-limit interpretation of the term “blink” is about 0.3 sec. If the object traversed 300 feet in 0.3 seconds, its average speed would have been 1000 ft/s. A more normal value for the speed of an eye blink is 0.2 sec. If the object traversed 400 feet in 0.2 seconds, its average speed would have been 2000 ft/s. Thus, estimates of the vertical speed of the object range from about 1000 to 2000 feet/sec (approximately 300 to 600 meter/sec). The lower end of this speed range is just barely subsonic ( $M = 0.9$ ) and the upper range is fully supersonic. No sonic boom was reported but certainly would have been if there had been a shock wave attached to a body several meters in diameter. If the object was moving subsonically, then it could have been a simple solid body displacing air molecules through collisions with the object’s outer skin. If the center of mass of the object was moving supersonically yet produced no sonic boom, then it would have to have had some additional means of interacting with the air molecules other than simple collisions. One such possibility would be a Magneto Hydrodynamic (MHD) interaction, which could keep the airflow locally subsonic over the object’s skin, while allowing the center of mass of the object to move supersonically. Here, we will assume the simpler case of simple collisional interaction. Witnesses described the object as looking like an oval from the side (with an aspect ratio of about 2:1) and a circle from below. The solid shape that fits this description best is an oblate spheroid whose major axis is twice the length of the minor axis. Apparently the “object” flew upward with its blunt side into the wind (i.e., in the most aerodynamically inefficient orientation).

Consider such a solid body passing through the atmosphere at velocity,  $v$ . The kinetic energy per unit volume of the airflow relative to the solid body is:

$$\text{K.E.} = \rho v^2/2, \text{ where } \rho \text{ is the atmospheric density.} \quad (1)$$

From the U. S. standard atmosphere,  $\rho$  at the cloud base  $\approx 1.13 \text{ kg/m}^3$ . Solving eq. (1) with this value of density and a flight speed of 300 m/sec yields an estimate for the specific kinetic energy of the air stream of about  $50 \text{ kJ/m}^3$ . Note that this kinetic energy density quantity is the same as the stagnation pressure, and it is a fraction of this stagnation pressure that shows up as aerodynamic drag. From Fig. 13, shape #4, we can see that the total drag coefficient of an oblate spheroid flying broad side-on is about 0.59.



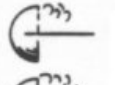















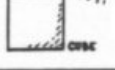
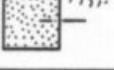
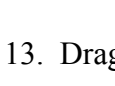
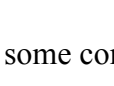
	SHAPE	$C_D$		SHAPE	$C_D$
1)	 STRING SUPPORT	0.47	12)		1.17
2)		0.38	13)		1.20
3)		0.42	14)		1.16
4)		0.59	15)		1.60
5)	 CUBE	0.80	16)		1.55
6)	 60°	0.50	17)		1.55
7)	 SEPARATION	1.17	18)	 VORTEX STREET	1.98
8)	 V	1.17	19)		2.00
9)		1.42	20)	 V	2.30
10)		1.38	21)		2.20
11)	 CUBE	1.05	22)		2.05

Figure 13. Drag Coefficients of some common shapes.

Thus, about 59% of the free stream kinetic energy— $29.5 \text{ kJ/m}^3$ —shows up as drag. However, the total drag force is comprised of pressure drag and viscous, or friction drag. Pressure forces are recovered in the wake of an object and it is only a portion of the viscous drag component that shows up immediately as localized heating of the air. For blunt bodies, the component of drag due to pressure is very much larger than the component due to viscosity or friction. Fig. 14 gives a graphical depiction of this situation.

Only about 10% of the total drag force of a blunt body moving at subsonic velocities could show up immediately as heat. This means that the presumed oblate spheroid which ascended nearly vertically above Chicago O'Hare on November 7, 2006 could only have provided about  $2.95 \text{ kJ/m}^3$  of heating to the surrounding air due to its kinetic energy. This calculation yields an effect more than 3 times too small to have produced cloud droplet evaporation and provides a semi-quantitative basis for the common sense observation that solid objects such as aircraft, rockets, artillery rounds, and the like do not punch sharp edged holes in clouds. We must look for an evaporation mechanism not limited to the energy transfer mechanism of aerodynamics.

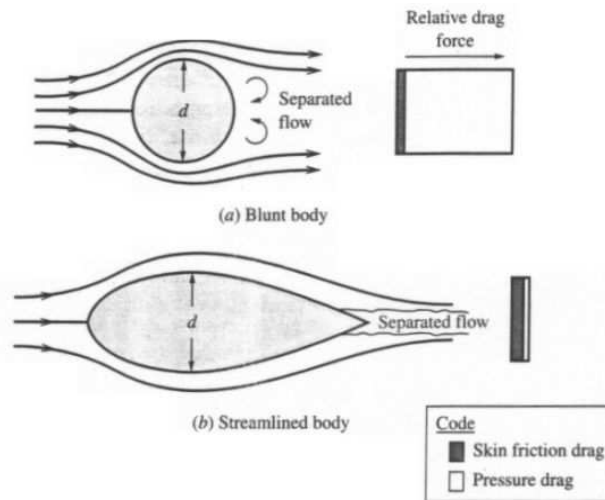


Figure 14. Comparison of viscous and pressure drag for blunt and streamlined bodies.

The HIC witnessed over the O’Hare airport matched the circular or “Frisbee” shape of the object observed, but as we have demonstrated above, cannot be explained by either liquid water or ice particles dropping through the cloud from above or by conventional aerospace objects ascending through the cloud from below. The fact that the HIC appeared immediately coincident with passage of the object or phenomenon and closely matched the size and shape of the object or phenomenon itself implies an influence attached to and centered on the ascending object or phenomenon. In order for the size and shape to be preserved, the cloud water droplets must have been evaporated out to a distance that is of the same order as the body radius. Moreover, all the energy required for this evaporation must have been transferred from the object to the cloud droplets during the brief period they were within this range (about 10 milliseconds). Consideration of this fact yields a startling realization regarding the motion of the “object”—the relatively high power associated with its passage.

For example, if the object were rising approximately vertically at 300 m/sec, in one second it would evaporate all the water droplets in a column 300 m long and approximately as large in diameter as the object itself. Estimates for the diameter of the object ranged from approximately 6.8 to 24 meters. Evaporating a column of cloud 300 meters long and 6.8 meters in diameter in one second requires an average power of approximately 100 megawatts (MW). By comparison, the steady state power consumption of a Boeing 747 cruising at about 0.9 Mach is about 60 MW.

We have eliminated aerodynamics, or motion of the object, as the cause of the evaporation energy source, but still require some sort of energy transfer mechanism that is attached to and centered on the phenomenon. As a practical matter, the options for explaining this type of energy transfer seem to be either a high external temperature of the oblate spheroid surface or high energy subatomic particles or electromagnetic radiation emitted from the surface in a spheroid or toroid pattern. We have not conducted detailed calculations or modeling regarding the high temperature surface hypothesis, however, it seems intuitively unlikely to explain the heat transfer because 1) it would require a high blackbody temperature with consequent visible light (which was not observed), 2) it operates through the relatively

slow processes of conduction and convection, and 3) it does not produce a sharp edged cutoff. Perhaps further examination of this possible mechanism would reveal it to be feasible.

On the other hand, energetic subatomic particles (e.g., electrons) or electromagnetic radiation (e.g., ultra violet (or UV) light) can transfer arbitrarily large amounts of energy at or near the speed of light. Because water molecules are electrically polar, many absorption resonances exist in the portion of the EM spectrum between about 10 and 1,000 microns, and could explain a relative short extinction length (i.e., sharp edges for the HIC). Ionizing UV light could cause instantaneous energy deposition in both air and water molecules. Likewise, high energy electrons (beta particles) are completely absorbed in less than 1 mm column density of normal materials and could also explain a sharp cutoff. We postulate that one or more of these energy sources emanated from the surface of the oblate spheroid and caused evaporation of the water droplets in its path.

It is interesting to note that high power lasers (a source of electromagnetic radiation) have been used to produce this same effect.<sup>57</sup> “Results of experimental attempts to produce an optically clear channel in a water cloud by evaporating the cloud droplets with a CO<sub>2</sub> laser...[have been demonstrated in the laboratory]. Using scattered light it is possible to visualize the clear channel produced. Measurements of the fraction of power transmitted through the channel at visible wavelengths give insight into the clearing mechanisms. The present data suggest that the water droplets explode in the process of clearing. By evaporating the liquid water in a cloud, it is possible to temporarily create an optically clear channel...In the present experiments, it appears that the droplets first explode resulting in an initial increase in turbidity. The smaller droplets formed by the explosion then evaporate leaving a partially cleared channel. This channel remains clear for a time period on the order of a second, finally closing by advection due to turbulence in the cloud.”

## 5.4 Summary and Conclusion

On November 7, 2006 multiple witnesses reported sighting a cryptic object or phenomenon over Chicago O’Hare International Airport. The object or phenomenon presented itself as an apparently solid yet featureless oblate spheroid which hovered at a fixed altitude and attitude for a period of minutes before suddenly ascending nearly vertically into and through the solid cloud layer. The passage of the object through the clouds apparently caused the creation of a sharp edged circular hole somewhat larger in diameter than the object itself. We review the literature and find that the Chicago incident appears to be the latest example in a series of rare, but not unprecedented incidents stretching back to at least 1947. Because of the similarity of the phenomena in the reports, we seek a common physical explanation for the HIC.

We consider the possibility that the HIC was produced by a naturally occurring precipitation process, but reject that hypothesis because neither freezing conditions, raindrops, nor falling ice crystals were

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<sup>57</sup>Caramana, E. J.; Morse, R. L.; Quigley, G.P.; Stephens, J. R.; Webster, R. B.; York, G. W. “Cloud hole-boring with infrared lasers: Theory and experiment”. Smithsonian/NASA ADS Physics Abstract Service. 1989.

present at the time and location in question. We postulate that sudden *in situ* evaporation of the water droplets constituting the cloud represents the least extraordinary physical process capable of explaining the observations. We estimate the minimum volumetric energy density required to cause such *in situ* evaporation as approximately  $9.4 \text{ kJ/m}^3$ , in the form of heat. We consider the remote possibility that a blunt body moving at high subsonic velocities through the air may dissipate sufficient amounts of aerodynamic energy through viscous friction to cause this amount of heating, but find that the likely heat production rate is too low. We postulate that the instantaneous nature of the HIC formation, the circular shape, and its sharp edges all point to the direct emission of, for example, electromagnetic radiation from the surface of the oblate spheroid as the proximate cause of the HIC. We cannot identify the object or phenomenon lying inside the oblate spheroid surface, but two conclusions seem inescapable: 1) the object or phenomenon observed would have to have been something objectively and externally real to create the HIC effect; and, 2) the HIC phenomenon associated with this object cannot be explained by either conventional weather phenomena or conventional aerospace craft, whether acknowledged or unacknowledged.

## 6.0 Radar<sup>58</sup> Coverage and Propagation Conditions

Martin Shough<sup>59</sup>  
NARCAP Research Associate

### 6.1 Abstract

Visual reports of an unidentified aerial phenomenon rising through a 1,900 foot overcast at Chicago O'Hare International Airport on Nov 7, 2006 raise the prospect of possible radar detection by FAA surveillance radars. The present section addresses:

6.2 Radar System Types and Characteristics: (Air Surveillance Radars, Weather Radars, Surface Surveillance Radars) with available technical specifications of ATC and joint-use defense surveillance radar heads (antenna) covering the relevant C-90 control area.

6.3 Antenna Sites

6.4 Radar Coverages (including results from National Weather Service Doppler weather radar coverage of the sighting locations).

6.5 Radar Propagation Conditions at the Time of the Reported Observations.

6.6 Preliminary Conclusions and factors likely to affect interpretation of possible radar data.

### 6.2 Radar System Types and Characteristics:

#### 6.2.1 Air Surveillance Radars

##### ASR-9 (Airport Surveillance Radar Model 9; Northrop Grumman)

This model radar is of principal interest in this study. FAA Terminal Radar Approach Control (TRACON) radars operating in primary and SSR modes, responsible for TRACON surveillance volume designated C-90, surface to 13,000 ft altitude<sup>60</sup> within 40 mile radius of O'Hare (ORD), remote cable feeds to central TRACON facility at Elgin, Ill., 30 miles NW of O'Hare. ASR-9 also has weather data channel, optionally integrating 6-level precipitation reflectivity data onto its display with a refresh rate of 30 seconds (a Weather Systems Processor [WSP] upgrade has been made to some ASR-9s adding doppler wind velocities and an improved update rate). (Table 8)

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<sup>58</sup> The term radar is an acronym that stands for "Radio Detection And Ranging."

<sup>59</sup> The author acknowledges assistance and advice from Joel Carpenter, Don Ledger and James Smith in the writing of this section.

<sup>60</sup> 44. The normal procedure for an airplane handoff from Center to TRACON would occur about 1,000 feet below 13,000 feet during climb and at 14,000 feet during a descent as a safety buffer.

Frequency	S-Band, 2.7-2.9 GHz (~10 cm)
Polarisation	Linear or r/h circular
Peak power	1.1 MW
Pulse width	1.08 microsec
Pulse Repetition Freq.	928 & 1193 pps
	1027 & 1321pps
Range performance	1m <sup>2</sup> @ 111 km (60 nmi)
Elevation beamwidth	4.8 Degrees
Azim. Beamwidth	1.4 Degrees
Beam shaping	Cosecant <sup>2</sup>
Rotation rate	12.5 RPM (4.8 sec)

Table 8. ASR-9 Specifications

This radar has a dual horn parabolic antenna producing two beams, utilising the same frequency but with different vertical profiles, giving high and low beams. The receiver toggles sequentially between the two patterns, which improves signal detectability at shorter ranges by minimizing clutter (coverage is discussed in Section 6.4 below). The PPI display has operator-selectable range scales to a maximum 60 nmi scale. The signal receiver/processor applies STC (Sensitivity-Time Control) swept video gain to the display product (suppressing echo strengths at shorter ranges to even out PPI brightness and improve subclutter visibility) and also uses Moving Target Detection (MTD) in its Doppler filtering software to further suppress ground clutter and enhance visibility of moving targets.

The ASR-9 divides its 60 nmi range domain into 960 annuli of 1/16 nmi (~375 ft) range depth, and each annulus into 256 azimuth cells of ~ 1.4 degs. Each azimuth cell (the dwell time of a point target in one beamwidth) is filled with 18 pulses, divided into two pulse repetition intervals of 10 pulses at a higher PRF followed by 8 pulses at a lower, which allows signal processing software to improve target detection and eliminate certain problems (see Section 6.6). Returned pulse echoes are assigned in batches to their appropriate range cell to be analysed by sets of 10 and 8 phase detectors respectively, which measure pulse-to-pulse changes in Doppler frequencies. The results for each cell are integrated and measured against a reactively adjusted noise threshold [or Constant False Alarm Rate (CFAR) filter] which allows the processor to



decide whether or not a target is present.

It can be seen that the cell size represents a limit of discrimination on the PPI defined by beam width and pulse length (actually 1/2 pulse length). It is not possible to determine the position of a target to a precision finer than the range and azimuth dimensions of the cell, or to resolve two targets physically closer than the dimensions of the cell. A similar "resolution cell" is a limitation of all types of surveillance radars.

### **ARSR-3 (Air Route Surveillance Radar Model 3; Westinghouse)**

Joint-use FAA and military. Long range (~200 nmi) primary surveillance radars for en- route ATC, operating with ATCBI-5/6 beacon interrogators for transponder traffic, remote feed to central ARTCC facility (ZAU) at Aurora, Ill. (Table 9)

Frequency	L-band, dual channel (1.25-1.35 GHz)
Polarization	Linear or circular
Peak power	5 MW
Average power	3.5 kW
Pulse width	2 microsec
Pulse Repetition Frequency	310-365 pps
Range	200 nmi: duplex 2m <sup>2</sup> @ 240 nmi simplex 2m <sup>2</sup> @ 193 nmi
Height cover	60,000 ft
Elevation beamwidth	+3.6 to +44 degrees +2 to +42 degrees
Azim. beamwidth	1.1 degree
Beam shaping	coscant <sup>2</sup>
Range resolution	0.25 nmi
Rotation rate	5 rpm (12 sec)

Table 9. ARSR-3 Specification

This is a dual channel radar with two separate transmitter, receiver and signal-processing channels

utilizing adjacent frequencies. A minimum frequency separation of 25 MHz and orthogonal polarization prevents co-interference. This frequency-diversity reduces signal degradation effects and improves the signal to noise ratio (S/N) for long range targets. It also allows improved high-elevation short-range coverage by using a low beam for long range low altitude coverage and a slightly higher beam which minimizes clutter at short ranges. Digital signal processing techniques include sliding window, Moving Target Indicator (MTI), Constant False Alarm Rate (CFAR), Range Azimuth Gating (RAG), and Sensitivity Time Control (STC or "swept gain"). Polarization diversity allows weather and target information to be displayed simultaneously.

The FAA National Airspace System architecture (see Ref. 12) describes the ARSR-3 as follows:

The Air Route Surveillance Radar Model 3 (ARSR-3) is a 1980s radar that provides primary long-range surveillance data, including slant range and azimuth data. It processes the returns which includes demodulation, analog-to-digital conversion, moving target indicator (MTI) function, sensitivity time control, range and azimuth gating, and digital target extraction - all of which are performed digitally (with the exception of the demodulation and analog-to-digital conversion). In addition, the ARSR-3 has a weather channel with associated processing to provide weather contour information in digital format.

#### **ARSR-4 (Air Route/Reconnaissance Surveillance Radar Model 4; Northrop Grumman)**

Joint-use, military and FAA, primarily air defence, longer range (~250 nmi) primary surveillance radar installed as part of FAA/Air Force Radar Replacement (FARR) upgrade of ARSR-3 radar for perimeter defence and first-contact coastal air traffic control of CONUS up to 100,000 ft altitude.(Table 10)

Frequency	L-band, 1.215 -1.400 GHz (~30cm) dual channel, frequency hopping
Polarization	linear or circular
Peak power	60 kW
Range	250 nmi in duplex mode
Pulse width	150 microsec
Height cover	100,000 ft
Azim. beamwidth	1.4 deg
Elevation beamwidth	-7 deg to +30 deg stacked beam phased array 9 x >2 deg beams
Elevation resolution	2 deg
Rotation rate	5 rpm (12 sec)

Table 10. ARSR-4 Specifications

ARSR-4 is a 3D radar producing slant range, azimuth and height data. Its electronics are all solid state for high reliability, low maintenance, having a phased array antenna that produces nine stacked beams, reducing in vertical resolution with increasing elevation. The lowest beam will tend to detect the most distant targets and hence has the finest elevation resolution (~2 degrees). Jamming and interference are suppressed by dual-channel frequency hopping (minimum channel separation 83 MHz) and by an antenna design producing low-gain sidelobes. Pulse length is on the order of 100 times that of ASR-9 and ARSR-3 radars, which allows a useful average power to be attained using much lower peak power. Range resolution is (presumably) preserved by using digital pulse compression techniques. However this does not rescue the radar from a severe minimum range limitation imposed by the uncompressed pulse length. In normal long range surveillance mode this is not an operational concern however.

### 6.2.2 Weather Radars

#### TDWR (Terminal Doppler Weather Radars; Raytheon)

TDWR radar employs multiple heads sited at Chicago O'Hare and Chicago Midway, producing multi-level digital surveillance and doppler precipitation and winds data at ~ 150m - 300m range resolution and <1 degree cross-range resolution (pencil beam) to ~ 250 miles range. Sited to detect wind shear, gust and microburst hazards along airplane flight approach paths. TDWR uses a complex scan algorithm including a low-elevation scan mode with a one-minute total update rate in a high-resolution 5 nmi window around the airport. (Table 11)

Frequency C-band	5.5 - 5.65 GHz
Polarization	Linear
Peak Power	250 KW
Pulse Width	1.1 microsec
PRF	2000 (max)
Receiver Sensitivity	0 dBz @ 190 km 1 m <sup>2</sup> @ 460 km
Elevation Beamwidth	0.55 Degrees (min)
Azim. Beamwidth	0.55 Degrees

Table 11. TDWR Specifications

### NEXRAD (Next Generation Weather Radar)

WSR-88D weather radars, multiple overlapping coverage with doppler resolution to 124 nmi and reflectivity to 248 nmi. Doppler resolution comparable to TDWR, reflectivity resolution approx 1 km data blocks. Complete volume scan update rate depends on mode of operation: over 10 mins in clear air mode; 5 - 6 mins in weather mode. (Table 12)

Frequency	S-band, 2.7 to 3.0 GHz
Peak power	750 kW
Average power	1.56 kW
Pulse widths	1.6 & 4.5 - 5.0 microsec
Pulse Repetition Freq.	318 - 382 pps 318 - 1304 pps
Antenna	9m parabolic
Beamwidth	0.99 deg
Polarisation	Linear horizontal
Sidelobes	-27 dB
Point target detection	4 cm <sup>2</sup> @ 100 km
Update rate	clear air mode >10 minutes weather mode >5 minutes

Table 12. WSR-88D Specifications

TDWR and NEXRAD data are integrated with the ASR-9 picture into the Integrated Terminal Weather System (ITWS) product displayed at Elgin TRACON. Chicago O'Hare ATC Tower is believed not to have access to full ITWS product but may have partial data (relies on forecast and updates from ARTCC meteorological centre, Aurora).

### **6.2.3 Surface Surveillance Radar**

#### **ASDE-3**

The ASDE-3 (Airfield Surface Detection Equipment) is a ground-scanning radar designed for managing planes, people and ground traffic on the runways and taxiways, detecting obstructions and predicting collision hazards in conjunction with Airfield Movement and Safety Systems (AMASS) software. Also used for perimeter security.

The ASDE-3 is a very short wavelength (millimeter) radar with 40 ns pulse giving very fine range resolution and a narrow (0.25 deg) azimuth beam width scanning the airport ground environment at 60 RPM. Its output is displayed in the Air Traffic Control tower. Capable of detecting individual persons on the airfield.

## **6.3 Antenna Sites**

### **6.3.1 Air Surveillance Radar Sites**

#### **ASR-9, ORD #1**

The main FAA surveillance radar serving Chicago O'Hare is designated in the FAA NAS Architecture (ref.12) as CHICAGO SRR (ORD) and is located in Dupage County, Illinois. Most of O'Hare Airport is located in Cook County. However satellite photos (Fig. 15) show what appears to be an ASR-9 radar antenna tower on the west side of the airfield, 600m over the county border inside Dupage County, consistent with the statement of a case witness and with the FAA supplied information.



Fig. 15 Aerial View of ASR-9, ORD #1, Chicago O'Hare, Dupage County, Ill.

It is possible that the second tower shown here to the north of the ASR-9 was for the now-disused ASR-7, retained in use temporarily as back-up until the relocation of ATC facilities to the new TRACON at Elgin, Illinois, too remote for effective data transmission from the ASR-7.

### ASR-9, ORD #3

Most references describe (and lament) a single ASR-9 radar source<sup>61</sup> but mention also a second back-up radar. A U.S. Dept. of Transportation Report (ref. 1) refers to:

Limited coverage of their two ASR-9 radars, mentioned attempts to get radar coverage to achieve 3 nm separations within 40 nm. The TRACON operates 2 ASR 9's with different coverage. The QXM radar does not cover the NE and NW cornerposts and when they use it, it affects the operations. Had upgrades over the summer but winters have been tough with radar outages. They have lost their ASR 7<sup>62</sup> and then must use QXM as the backup.

Press references locate the second back-up ASR-9 radar at South Tinley Park, about 25 miles S.S.W. of O'Hare. One source also indicates that this radar normally serves Chicago Midway, which airport was for this reason unaffected by recent downtime of the O'Hare radar. (Hilkevitch, 2006) It is known that the ASR-9 system fails, on the average, several times a year but was working at the time of this incident.

A National Transportation Safety Board report (ref. 2), identifies:

<sup>61</sup> The term "source" is used to refer to the radar antenna whose output is routed to central TRACON.

<sup>62</sup> The ASR-7 referred to is apparently the older analogue radar previously used as a back-up and removed a few years ago, shifting the burden onto QXM as regular back-up.

The ASR-9 (QXM) radar antenna that is located at latitude/longitude N41 37' 17.38" / W087 46' 10.12", elevation 669.7 feet, magnetic variation 2 degrees west. The radar antenna supplies data to an Automated Radar Terminal System (ARTS) IIIA at C90.

These coordinates locate the antenna shown in Fig. 16 near Oak Forest, Cook County, a couple of miles from Tinley Park and about 11 miles south of Chicago Midway Airport, confirming the identification of this site as the one designated in the FAA National Airspace System Architecture as CHICAGO-OAK FOREST (ORD #3) SRR [QXM].<sup>63</sup>



Figure 16. Aerial View of ASR-9, ORD #3, Oak Forest, Cook County, Ill.

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<sup>63</sup> Oddly, given the established designation of Oak Forest as ORD #3, CHICAGO SRR ORD #2, Cook County, does not yet exist but according to the FAA NAS architecture [Ref. 12; Appendix 1) is scheduled for installation in 2009.

**ARSR-3**

The FAA NAS Architecture locates this long-range en route radar at ELWOOD-JOLIET (JOL) approximately as shown in Fig. 17, but the antenna location has yet to be identified.

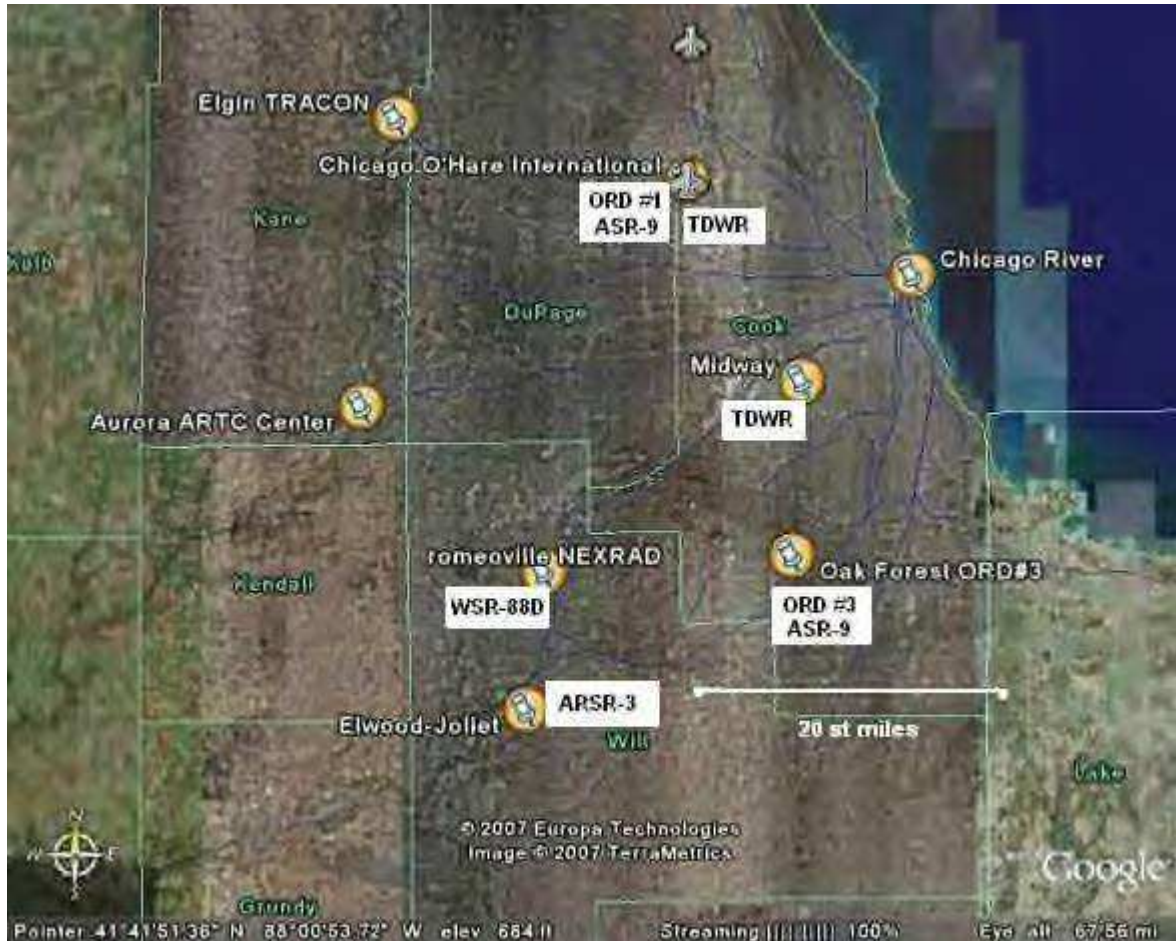


Figure 17. Locations of Chicago Area Radars



## ARSR-4

Nearest ARSR-4 site is at Empire, north Lake Michigan [QJA]. Fig. 18 shows the position of this long-range radar in relation to the Chicago area. The exact antenna location remains uncertain.



Figure 18. Radar Locations Around Lake Michigan Showing the ARSR-4 at Empire, Michigan, and ASR-9 at Milwaukee. The maximum range of the latter falls a few miles short of the area of the incident at Chicago O'Hare.

### 6.3.2 Weather Radar Sites

#### TDWR

TDWR weather radars are sited at both Chicago O'Hare and Chicago Midway airports. The exact antenna site location is unknown. See Section 6.4.

#### NEXRAD

The nearest NEXRAD WSR-88D radar is at Romeoville, Illinois (Fig. 19).



Figure 19. Aerial View of NEXRAD WSR-88D Weather Radar at Romeoville, Ill.

### 6.3.3 Surface Surveillance Radar Site

#### ASDE-3

The Airport Surface Detection Equipment (ASDE-3) antenna is located in a radome atop the new 250 ft Air Traffic Control Tower at the south corner of the main Chicago O'Hare terminal building complex.

## 6.4 Radar Coverages at Time of Incident.

### 6.4.1 Air Surveillance Radars

Surveillance radar coverage is a toroidal volume centered on the antenna. A radar horizon occurs beyond which targets at low altitude may not be detected due to the curvature of the earth. The distance to the radar horizon is generally about 15% greater than the distance to the visual horizon because microwaves, unlike visible light, are significantly refracted by the standard atmosphere. Locally, the distance to the horizon may be modified by intervening hills and other diffraction obstacles, as well as by propagation conditions.

radar type/location	max range ( n.miles)	range from O'Hare C17	antenna ht (ft AGL)	horizon ranges (n.mi) at		
				1 kt AGL	2 kt AGL	3 kt AGL
ASR-9 (ORD #1) / O'Hare	60	0.78	130	52	69	81
ASR-9 (OED #2) / unknown	60	unknown	n/a	n/a	n/a	n/a
ASR-9 (ORD #3) / Oak Forest	60	22	90	52.5	68.6	80.9
ARSR-3 / Joliot-Elwood	200	35	unknown	n/a	n/a	n/a
ARSR-4 / Empire	250	210	unknown	n/a	n/a	n/a

Table 13 Sample Range and Horizon Figures for Chicago Area Surveillance Radars

Some crude range and horizon information for these ASR and ARSR radars is summarised in Table 13. The maximum ranges are nominal, horizon ranges are calculated using standard refractivity assumptions (cf. Section 6.5) and calculated antenna heights. Shadow measurements on satellite photographs (see Figs. 13 and 14) were used to estimate antenna tower heights. The sun elevation angle is not known *a priori*, but shadows of nearby structures of relatively well-known scale were used to calibrate these measurements, which, given the uncertainty and the small difference, might reasonably be regarded as error brackets on a common tower height in the order of 100 ft. Tower heights were then added to local heights MSL to give true antenna heights relative to the sighting location.

In the case of ORD #1, sited at O'Hare, measurements AGL of antenna height and target height use a common datum point and there is no significant variation. Variation in local topography could be potentially significant for ORD #3 however. This was investigated by taking spot height<sup>64</sup> measurements at approximate 1.47 nmi (1.7 st. mi) intervals along the line of sight between Oak Forest and Chicago O'Hare as shown in Fig. 20.

<sup>64</sup> "Spot height" is a term used in surveying and cartography for the height (MSL) of a structure (etc.) measured at a particular location (spot) and marked by a dot, as distinguished from a contour height.

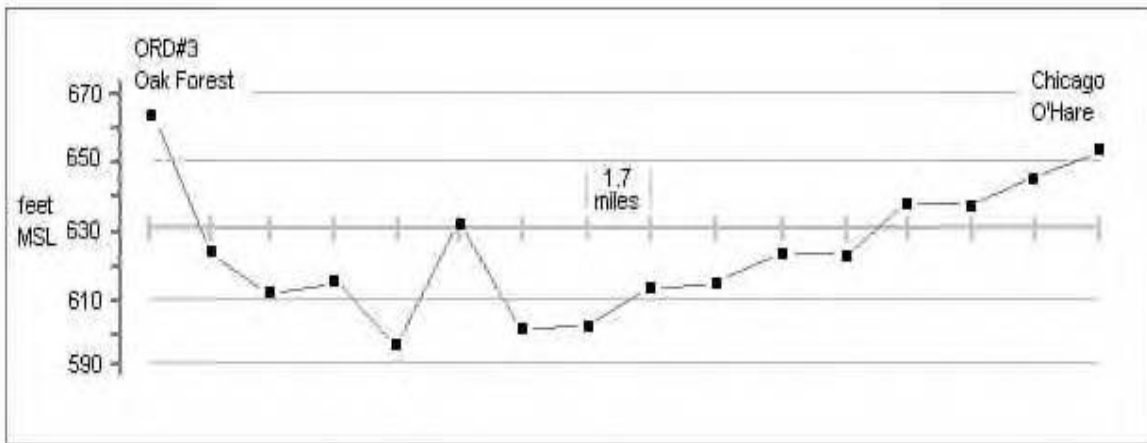


Figure 20. Topographic Profile on Line of Sight Between ORD #3 and Sighting Location

We find that ORD #3 is sited some 10 ft MSL higher than O'Hare (tending only to cancel out part of a possible difference in tower height) and that there is no evidence of significant diffraction obstacles in its line of sight. The terrain can be considered to be a fairly uniform flat reflector and coverage will be quite well represented by the theoretical curves (assuming standard propagation; see Section 6.5).

The ASR-9 coverage pattern was then investigated in more detail. A vertical polar diagram of an ASR-9 radiation pattern is shown in Fig. 21. Range performance is measured in terms of probability of detection ( $P_d$ ) of a target of a given cross-section, and maximum usable range is defined by a  $P_d = 0.8$  or greater. The two curves in Fig. 21 represent contours of equiprobability of detection for a target of  $1\text{m}^2$  in each of the two beams. The ASR-9 low beam is optimised for low elevation targets (peak sensitivity at  $\sim 2.5$  degs) at longer ranges generally beyond 15 - 20 nmi out to the maximum range of 60 nmi; the high beam (peak sensitivity at  $\sim 7$  degs) is optimised for subclutter visibility of shorter range targets at higher elevations.

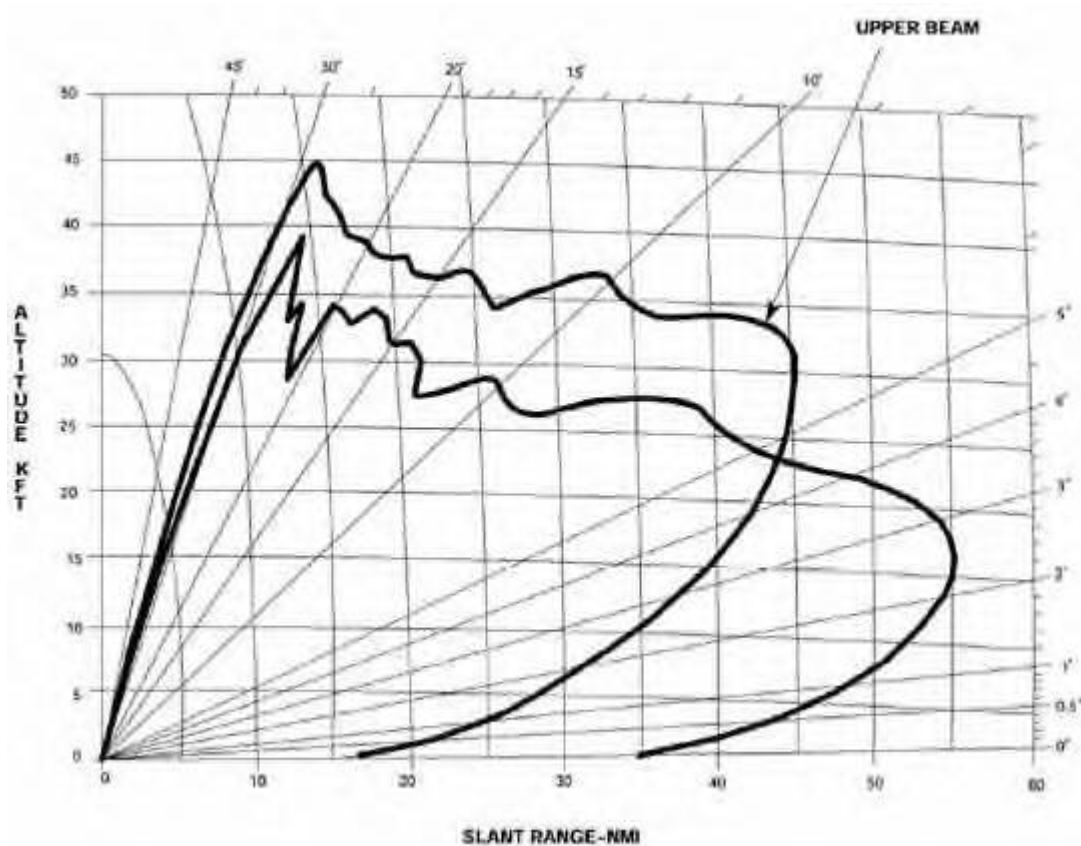


Figure 21. ASR-9 Radiation Pattern VPD Showing Contours of Equiprobability of Detection for a  $1\text{m}^2$  Target in High and Low Beams (from ref. 3)

These curves probably average-over some lobing detail at low elevations, especially in the case of the low beam, but can be interpreted to mean that a target of  $1\text{m}^2$  radar cross-section at a couple of thousand feet altitude 22 nautical miles from ORD #3 (i.e., above Chicago O'Hare Concourse C) would return a detectable signal with a  $P_d = 0.8$  or greater in either of the alternating beams.

The ORD #1 ASR-9 antenna at Chicago O'Hare is only about 0.8 nmi from the sighting location above Concourse C. The short range is not in itself a limitation (disregarding here PPI range scale, STC video gain, and other operational issues discussed in Section 6.6), since the short 1.08 microsec pulse of the ASR-9 permits a minimum range (half pulse length) as small as about 150 m. The elevation of a target close to the cloud base above Concourse C would be about 18 degs, at which elevation the ASR-9 low and high beams should detect a  $1\text{m}^2$  target to slant ranges of around 17 and 20 nmi respectively. High beam returns would be favoured, with a sensitivity 16% better than the low beam and enhanced subclutter visibility at the display.

The JOLIET-ELWOOD ARSR-3 is approximately 35 nmi from the target area. No detailed

topographic survey of the line of sight was made since neither the location nor the antenna height are known with accuracy. But the area is generally quite flat, with height variations only in the order of +/- 100ft at most and one would expect the horizon ranges to be similar to those given for the ASR-9s in Table 8. A target at or below the cloud base at O'Hare would, generally speaking, be above the radar horizon out to a range of about 64 nmi (given standard refractivity) or almost twice the distance to the sighting location.

The ARSR-4 at Empire, Michigan, is 210 nmi from the sighting location, which therefore falls inside the nominal maximum slant range of 250. But at 210 nmi range the radar horizon in normal propagation conditions will be around 26,000 ft.

## 6.4.2 Weather Radars

### TDWR

The coverage and refresh rate of the TDWR at O'Hare are uncertain, depending on siting and operational choices. The surveillance strategy is either:

- a)* narrow sector scans aligned on approach paths (the strategy favoured for early TDWR installations) in which case there would no coverage of the region above Concourse C, or
- b)* 360 deg complete volume scans of 5-6 minutes duration (a strategy often adopted later, saving wear on turning gear) incorporating automatic scan mode changes in response to hazard detections. In this volume scan mode TDWR can incorporate a low-elevation scan with one-minute update rate in a high-resolution 5nm window around airport, with automatic changes of scan mode in response to hazard detections.

At O'Hare (*b*) is considered more likely because of the number of runways on divergent headings, making dedicated sector-scanning of approach and departure paths uneconomical and inefficient. In this case the optimum siting for a TDWR antennas would usually be some 8 - 12 miles from the runways.

Another TDWR is believed to serve Chicago Midway, about 15 miles from Chicago O'Hare. Obviously the sighting location is well inside maximum range of both radars and TDWR data would be interesting to examine. But this not accessible on any public server, so far as can be ascertained.

### NEXRAD

At least four WSR-88D antennas give overlapping coverage of the Chicago O'Hare region. The nearest at Romeoville, Ill., is about 27 miles from Chicago O'Hare. Figure 22 shows radar data from this site for 1635 CST (top) and four enlargements for the O'Hare area for the times indicated. The author acknowledges the help of James C. Smith in supplying detail images of the Romeoville NEXRAD weather product for four VCP 32 Clear Air Mode antenna scans bracketing the observation period.

Figure 22. NEXRAD Base Reflectivity Radar Images  
Bracketing the Observation Period.

The 1635 scan has been enlarged in Figure 23.

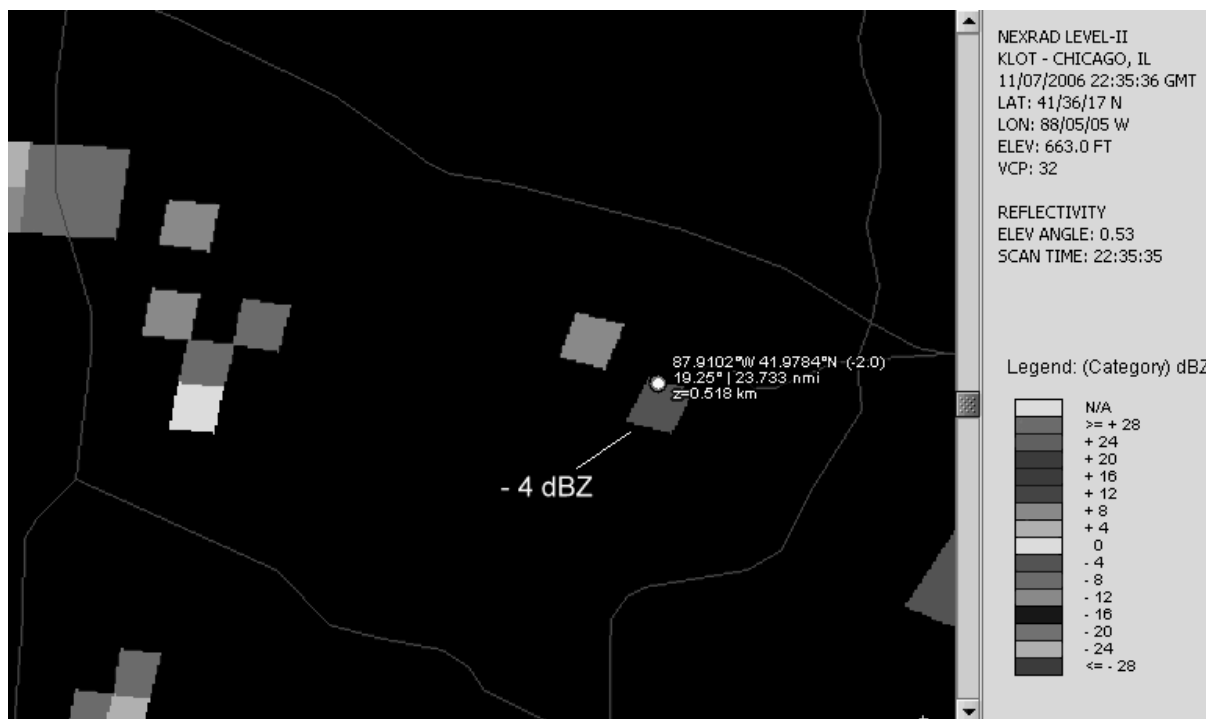


Figure 23. NEXRAD 0.5 degree Base Reflectivity Radar Image for 1635 CST Showing Echo Detail Over O'Hare Airport.

Fig. 24 shows the VCP 32 elevation coverage pattern of the radar. Complete volume coverage up to 4.3 degrees is accomplished in a number of scans of the ~1 degree beam at distinct elevations. The diagram shows that the full VCP 32 scan algorithm gives coverage at the range of the sighting location (27 nmi) up to an altitude of more than 15,000 ft. However for times around the sighting period only the lowest scan (0.53 deg) showed any data in the area of Chicago O'Hare, as shown in the images of the product from this scan in Fig. 22.

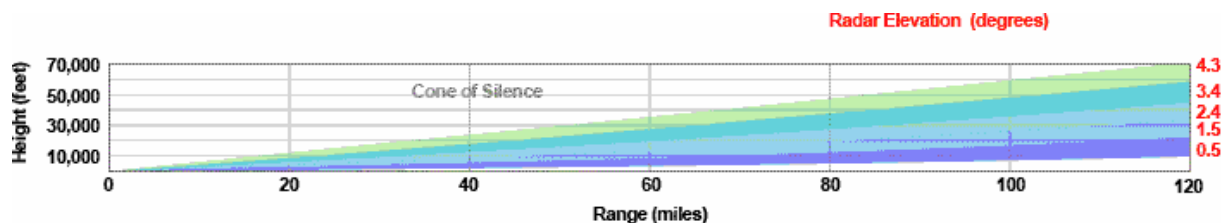


Figure 24. NEXRAD Volume Coverage Pattern VCP 31 & 32, Clear Air Mode (National Weather Service)



The images show that Romeoville WSR-88D did detect some echo, at the average signal reflectivity level less than light precipitation, in the resolution cell corresponding to the sighting location above Gate C17 and at an altitude not inconsistent with the visual reports, at 1616 CST, and again at 1635 CST. The latter is within a few minutes of the estimated sighting time. However, the ground foot print of the resolution cell is rather large (Figure 25) and there are several possible interpretations for the echo, making this a result of limited value (see Section 6).



Figure 25. Footprint of the NEXRAD Radar Resolution Cell  
Superimposed on the Sighting Location  
(adapted from image supplied by James Smith)

### 6.4.3 Surface Surveillance Radar

#### ASDE-3

The ASDE-3 pencil beam is oriented so as to direct radar energy at negative elevations down towards the ground and little will be wasted at high elevations. Although aircraft landing and taking off can be detected, according to Ref. 11, "The ASDE-3 displays all vehicles that can be detected by primary surface radar out to about four nautical miles in range and up to approximately two hundred feet above ground level." These figures correspond to a positive top-edge elevation of approximately

0. deg. A target 1,700 ft above Concourse C would be at nearly 20 degrees elevation even from the top of the tower. There seems to be little or no likelihood of relevant radar data from the ASDE-3.

### 6.5 Radar Propagation Conditions

Radar refractive index (RI) values were calculated for 32 elevated levels from 981 to 400 mbar using pressure, temperature and dewpoint readings from the 1800 CST Nov 7, 2006 Davenport, Ill., rawinsonde balloon supplied in the NARCAP case #18 meteorology report (Ref. 3). The surface weather report for the balloon site provided surface readings, giving a total of 32 pairs of levels between the surface and ~24,000 ft. Each pair provides a gradient of refractive index in N-units per thousand feet, where  $N = (n - 1) \times 10^6$ , as shown in Table 14 (Page 73).

The standard atmosphere, corresponding to the "4/3 earth" refractivity model used in calculations in Section 6.5, is considered to have vertical gradient of -12 N/kft over land (a figure of 18 N/kft is usually adopted over water). This is the mean of a range between 0 and -24 N/kft taken to represent normal propagation; outside this range the atmosphere refracts radio energy in various ways that are generally regarded as "anomalous propagation".

Negative gradients steeper than -24 N/kft indicate superrefractive conditions, bending the radar beam earthwards more than normal; a gradient steeper than -48 N/kft is severely superrefractive, a trapping gradient; positive gradients - i.e., more than 0 N/kft - are subrefractive, bending the radar beam upward. Such features generally occur in relatively narrow layers of wide horizontal extent in a stable atmosphere, often but not exclusively developing during pre-dawn hours. A widespread "flat" pressure regime indicated by the general meteorological report (Ref. 3) suggests conditions possibly favorable for widespread stratification in this case.

Of 32 gradients measured 25 were within the range of normal refractivity. Of 5 superrefractive pair gradients found, 2 are marginal (i.e., only one or two N-units outside the normal range) and 3 are significant. Of two subrefractive gradients, one is marginal (+5 N/kft) and one is significant. The results from Table 12 are graphed in the profile in Fig. 26, showing the 4 significant gradients.



pressure (mbar)	height (feet)	temp (°C)	dewpoint (°C)	R/I (N-units)	R/I gradient (N/ft)
1008.5	surface	11.1	6.7	320	
1000	236	—	—	—	0
981	751	10.8	6.4	320	-44
973	976	12.8	7.8	310	-14
925	2,375	10.0	6.6	300	-14
906	2,940	8.4	5.3	292	-51
904	2,959	6.5	4.6	269	-25
882	3,688	9.2	-0.8	272	-6
871	3,889	8.1	-1.6	270	-16
850	4,672	6.8	-3.2	259	-9
809	6,001	6.3	-7.3	252	-8
779	7,001	4.5	-10.4	240	-18
753	7,923	2.8	-13.2	223	-13
751	7,999	2.8	-16.3	222	-22
747	8,136	2.8	-22.2	219	-10
723	8,989	2.3	-27.8	210	-46
719	9,150	2.2	-28.8	203	-3
700	9,855	0.4	-27.6	201	-27
699	9,892	0.4	-25.6	200	+48
687	10,350	-0.5	-4.9	222	-14
670	11,000	-0.7	-8.0	213	-22
655	11,598	-0.9	-10.9	200	-17
645	12,001	-1.5	-14.3	193	-10
630	12,615	-2.5	-19.5	187	-11
597	13,889	-5.0	-17.6	179	+5
580	14,183	-5.3	-17.3	180	0
567	15,331	-7.9	-12.6	180	-7
552	15,000	-9.2	-14.6	175	-8
530	17,001	-11.1	-18.0	167	-17
500	18,504	-13.9	-22.9	158	-9
470	20,000	-17.6	-23.9	150	-8
451	21,000	-20.1	-24.5	142	-7
420	22,759	-24.5	-25.7	138	-8
400	23,517	-27.3	-28.8	131	

Table 14. Radar Refractive Index Gradients in N-units per 1000 ft. for 1800 CST Nov 7 (0000 GMT Nov 8) 2006, Davenport, Ill.

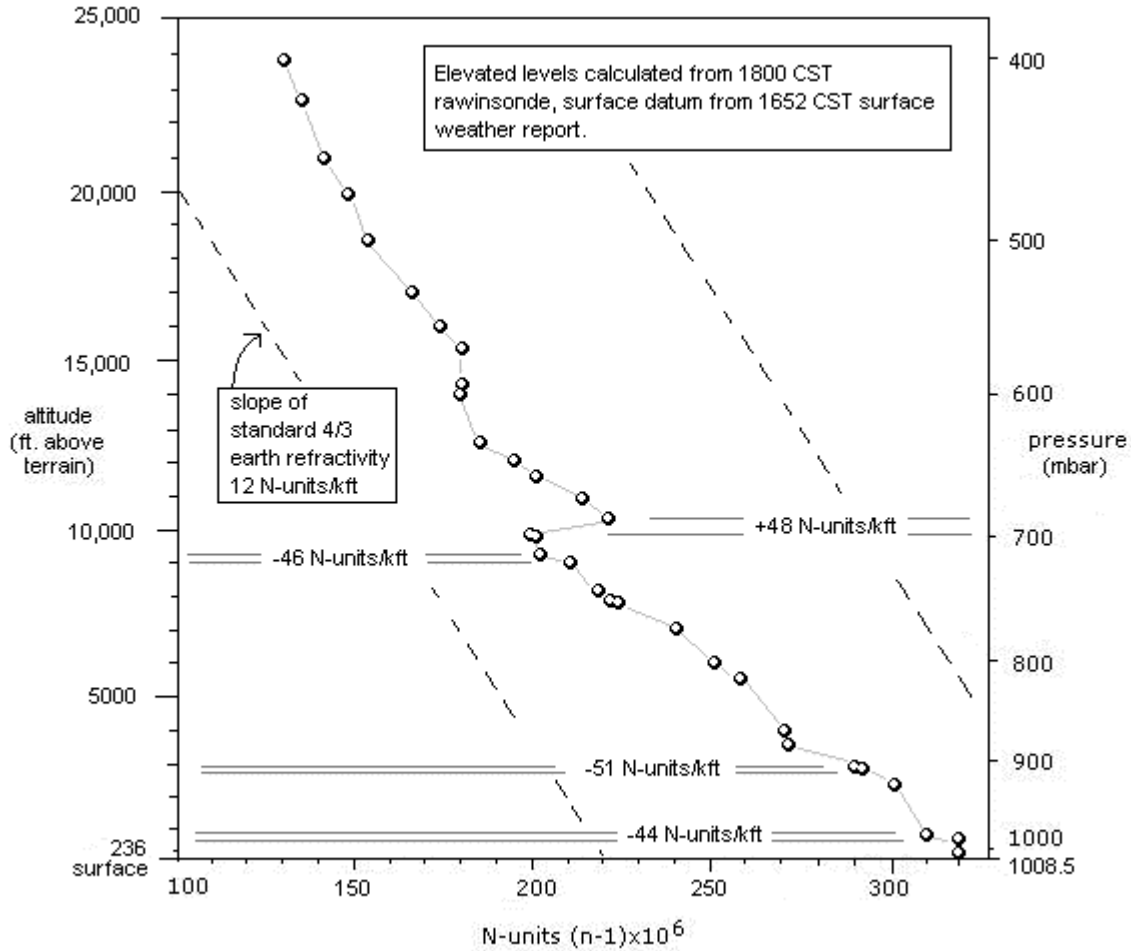


Figure 26. Radar Refractivity Profile for 1800 CST Nov 7, 2006 (0000 GMT Nov 8) 2006, Davenport, Ill., Showing Significant Layers.

Through the first 750 ft the average RI gradient is zero; in other words rays traced through this region would (averaged) be straight lines instead of the 4/3 earth curves of normal propagation, a situation on the verge of becoming subrefractive. If representative of conditions through the depth of this surface layer, this suggests that the distance to the radar horizon for energy emitted at low elevations will be somewhat reduced in radius, and the local area of permanent ground clutter would be somewhat reduced. This might enhance the sub-clutter visibility of targets at relatively short ranges from the radar.

Above this is a strongly superrefractive layer associated with a 2°C temperature inversion, the gradient then returning to normal above 1000 ft or so, until a narrow, sharp layer is encountered just below 3000 ft through which the RI drops by 51 N-units in about 60 ft of vertical ascent. This is a trapping gradient.

Radar energy entering this trapping layer can be refracted through an effective curve with a radius smaller than that of the Earth, returning to scatter off the surface some distance from the radar. If the layer is of large horizontal extent radar energy scattered back into the atmosphere from the surface after this process can be trapped a second time, and in this way a surface duct can be formed which may carry energy to large distances beyond the unambiguous range of the radar and return multiple-trip echoes by the same ray path. These echoes will display at arbitrary ranges on the PPI (the residual between some multiple of the unambiguous range and the true range to the remote reflector), but at the true azimuth of the reflector. Note however the dual PRF technique employed by the ASR-9 radars, which should eliminate multiple-trip returns.

Around 9,000 ft AGL there is another quite strongly superrefractive layer, and above that, passing through 10,000 ft, an unusual *sub*refractive layer with a strong positive gradient of +48 N/kft, associated with an overlying moist layer where relative humidity climbs from 12% to 72% through about 450 ft. Energy entering this layer will be refracted upwards, with the effect of reducing the radar horizon for some targets at higher elevations and leading heightfinder radars to underestimate altitudes for some targets above this layer.

Evidently there will be a general correlation between the severity of an RI gradient and the narrowness of the layer. Therefore, although there is no meteorological evidence of such, and although the highly stable unmixed air most favourable for extreme structures is least likely in the troposphere and in the late afternoon following solar warming, it is not possible to rule out the presence of sharper undetected gradients falling between the data points.

Research has indicated the possibility of gradients of  $10^3$  N-units per meter or more in certain conditions, which are capable of acting like radar mirrors. Such layers may have power reflection coefficients at low elevation angles capable of scattering significant energy to ground targets and back by near-specular partial reflection<sup>65</sup>, and in some cases incoherent forward scatter from turbulent domains propagating across layer surfaces under the influence of winds are believed capable of generating discrete moving echoes in clear air. The reflection geometry is such that these echoes tend to move at twice the speed of the wind at the layer altitude, in the direction of the wind or at a moderate angle to the wind, and at twice the layer altitude, with the most favourable conditions occurring where there is a wind shear across the layer boundary causing turbulence in the shear zone.

In the present case, with winds veering 190-335 degs and climbing through 4 to 50 knots between the surface and 400 mbar, one would expect such echoes to move, in general, at an order of displayed speed between about 10 kts (low levels) and 100 kts (~24, 000 ft) with preferential headings varying between SW - NE and NW - SE respectively.

Of the three types of surveillance radars considered, only the ARSR-4 is capable of displaying primary height information and this radar has essentially no coverage of any of the levels below 24, 000 ft studied here. However, by extrapolation from the winds aloft (rawinsonde readings are themselves only available up to about 30,000 ft) echoes from near-tropopausal layers (35,000 ft or

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<sup>65</sup> Efficiency is inversely proportional to the 6th power of the cosecant of the elevation angle.

more) on the ARSR-4 might be expected to show characteristic speeds of more than 200 knots on average headings between NW-SE or N-S.

There is no evidence of significant vertical velocity shear at any level while there *is* evidence of a significant RI gradient. The wind speed and direction changes across the four identified layers are shown in Table 15.

<b>press. level</b>	<b>wnd spd (kts)</b>	<b>wnd direct. (deg)</b>
687	17	315
699	16	317
719	16	305
723	16	307
904	6	263
906	6	265
973	4	190
981	4	198

Table 15. Wind Speed and Direction for Four Pairs of Levels Having Significant RI Gradients

Low level temperature inversion layers can produce wind shears by decoupling the momentum of winds above the inversion from surface friction forces on the winds below the inversion. Such shears can commonly reach tens of degrees of direction and tens of knots. In the present case, part of the -44 N/kft refractive index gradient above 981 mbar (750 ft) is contributed by a small temperature inversion of 2°C. This is associated with an anticyclonic directional shear of only 8 degrees, and a speed shear of zero, through a layer of ~230 ft. Such a very weak shear would not be expected to cause turbulence of significance to the radar.

## 6.6 Preliminary Conclusions

The NEXRAD weather radar data (Section 6.4.2) are not inconsistent with the presence of a radar-reflective target close to the 1,900 ft cloud base within several minutes of the time of the visual report (see Note 1), but this is not probative evidence given the spatial size of the resolution cell, the slow update rate, and the distribution of stochastic echo evident in the several screenshots shown in Figures 20 and 21. Some comments on these factors are appropriate.

The radar was operating in mode VCP-32, which is one of two Clear Air modes usually used for routine monitoring in periods of quiet weather. The scan pattern (see Fig. 22) takes over 10 minutes beginning with the low 0.5 deg cut. Two types of data are collected, the base reflectivity data (or simple echo intensity) and the doppler velocity data (measuring radial precipitation droplet velocity relative to the radar). The antenna then proceeds to scan several slices at higher elevations to build up the whole coverage volume. The data of interest here are for the 0.5 deg base reflectivity, obtained during the first 1-minute rotation of the scan pattern. (Neither the 0.5 deg doppler velocity product nor the higher cuts showed any data in the relevant area.)

The NEXRAD software generates automatic labels on the screen image. Referring to Fig. 22, we can see that the elevation angle of the nominal 0.5 degree cut is actually 0.53 deg, and that the calculated height AGL of the beam at the relevant range  $z = 0.518$  km, or about 1700 ft. This represents the boresight elevation, so the vertical coverage of the  $\sim 1$  deg cross-range pencil beam will be from about 450 ft to 2,950 ft. This will be calculated for a standard atmosphere, however, and given moderate superrefractivity (Section 6.4.2) these figures probably tend to overestimate the true heights. In any case, the reported object height clearly not only lies within the coverage zone but is quite close to the main gain. Note also that the WSR-88D employs horizontal linear polarisation to optimise reflectivity from the flattened lenticular profiles of falling water droplets. This would also tend to maximise echo from an object having the type of horizontal ellipsoidal symmetry reported.

In this Clear Air mode the radar is extremely "alert" to faint echo (it automatically switches to a less sensitive Precipitation Mode when significant weather is detected). The reflectivity shown is an average over the whole resolution cell (Fig. 25) and could be echo either from very weak sources dispersed over a large area, or from a localised region of much higher reflectivity somewhere inside that footprint. Surface weather reports state "no precipitation", and the 1635 echo is probably too faint for an area of precipitation anyway. However there is the possibility of transient surface clutter echoes. The splash of colour we see around the antenna in the small-scale area image is clearly ground clutter in this case. The echo we are interested in is not constant, i.e. doesn't appear on successive scans, so this might normally suggest it isn't ground echo. But it may be that AP conditions (for which there is evidence, see Section 6.4) fluctuate over time, allowing the radar to pick out faint ground echoes intermittently.

The radar can also image flocks of birds, or even insects and small airborne particulates, in addition to the summed reflectivity of one or more aircraft on approach or take-off that may be passing through that elevation slice at that time. The data block concerned (cf. Fig. 25) seems to cover mostly apron and taxiways, but conceivably aircraft airborne a few hundred feet near the SE and W ends respectively of runways 32L/14R or 9R/27L could be detected. Another conceivable source of intermittent faint echo in AP conditions might be airport buildings themselves, in particular the tall traffic control tower buildings. The ground-control tower appears to be within the radar cell footprint, although the new 250 ft. AGL tower building falls just outside it.

In summary, the NEXRAD VCP-32 radar mode is very sensitive and there are several possible sources of faint echo. Echo is found in the relevant cell timed at 1635 CST. However each of the four scans investigated, sampling roughly 10% of the total coverage period between 1616 and 1645, shows a certain amount of intermittent echo of this type in the general area. In fact there is echo more than twice ( $\sim 4$ dB) as strong in the same cell in the 1616 CST scan at a time when, apparently, no UFO was being seen. It can reasonably be argued that finding some echo within about a square km of the site within a few minutes of the sighting time is not too improbable. So whilst the height and location of the echo is



not inconsistent with the presence of an object as reported, caution is recommended in drawing any conclusions.

If better data can be obtained, some factors to be borne in mind regarding radar coverage of the sighting area include those numbered below:

1. The range/altitude performance of radars may be modified by the propagation conditions, differentially at low and high levels.
2. Pulse Doppler MTD on all surveillance radars studied allows sub-clutter visibility of moving targets, but a stationary target might be rejected by the Doppler filters.
3. On the two ASR-9 radars (ORD#1, ORD #3) multiple-trip anomalous propagation echoes from beyond the unambiguous range caused by trapping conditions should be filtered out by the staggered PRF technique employed.
4. The PPI display range scale selected may be a factor in detectability - on the ASR-9 at minimum scale (60 nmi) the range to the reported object location from ORD #1 (0.78 nmi) is only 1.3 % of the PPI radius, or less than 3 mm from the geometric tube center on a 15" PPI, which may not be resolvable.
5. Echo strength of close-in targets on the ASR-9 radars may also be artificially suppressed by the use of STC swept gain to suppress permanent clutter at the receiver/amplifier stage, which would affect the O'Hare ASR-9 (ORD #1) in particular. An attenuation of some 60 dB from the periphery to the centre of the scope may result with STC switched on, or a signal ratio of a million to one.
6. The resolution cell of the O'Hare ASR-9 (ORD #1) at the range of the sighting location (Concourse C, Gate 17) is about 375 feet on the range axis by about 115 feet in azimuth.
7. The resolution cell of the Oak Forest ASR-9 (ORD #3) at the range of the sighting location is about 375 feet on the range axis by about 3,230 feet in azimuth.
8. The potential radar sample rate is limited by the rotation periods of the various radars. Considering the three surveillance radars (ASR-9s and ARSR-3) they collectively offer a possible 30 paints per minute, or approximately 420 samples of the location during the reported sighting period of fourteen minutes.
9. All surveillance sets have switchable polarisation, which might conceivably affect the signal returned by certain targets, i.e. circular polarisation might prejudice the detectability of resonators with a large degree of spherical symmetry.
10. Other operational and human factors such as staffing, operator workload and vigilance etc., will affect the observation and reporting of any unidentified targets that are displayed - i.e., undeclared primary targets appearing at low level directly above the airport gates would be among the least anticipated potential hazards for air traffic controllers.

## 6.7 References for Radar Section

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## 6.8 Notes for Radar Section

Note 1. The actual "scan time" is given as 22:35:36 UCT. If this is the time when the radar delivers the finished product from its complete volume scan, then it would indicate that the echo was collected 10 mins earlier, between about 16:25 and 16:26 CST, i.e., some 5 minutes prior to the approximate 16:31 time when visual sightings were made. If on the other hand this is the start time, or end time, of the initial 0.5 deg cut, then the echo was collected sometime between 16:34:36 and 16:36:36 CST, i.e., several minutes after the visual sighting time. The author has not found an authoritative answer to this, but there is some internal evidence in favour of the second interpretation. This takes the form of a very interesting radial line at roughly 250 degs azimuth on the full area 16:35 image (Fig. 22). This is very close to the azimuth of the sun which set at ~ 247.5 deg from the radar shortly after 16:43. It seems certain that this radial feature is a "sun spike" caused by solar EM energy radiated directly into the antenna. At 16:35 the sun was about 9 mins of arc above the optical horizon - corrected for normal refractivity - and allowing for the ~15% longer radar horizon could very plausibly have been close to the peak gain of a ~1 degree beam boresighted on 0.5 deg elevation. However 10 minutes earlier at 16:25 the sun was at 1 deg 53' elevation and thus more than two solar diameters away from the antenna boresight. This position would have been tens of dB down from the peak gain, so much less likely to produce a sun spike, and the direction of any correction due to superrefracted radar ray paths close to the horizon would be to increase this discrepancy. So tentatively we conclude that 16:35 CST +/- 1 minute is the true time of detection of this echo.

Note 2. According to the FAA, "Primary Radar" is a system in which "...a minute portion of a radio pulse transmitted from a site is reflected by an object and then received back at that site for processing and display at an air traffic control facility." "Secondary Radar/Radar Beacon" (ATCRBS) is a system in which "...the object to be detected is fitted with cooperative equipment in the form of a radio receiver/transmitter (transponder)....". (Ref. 13)

## 7 .0 FAA Radar Data Analysis

Richard F. Haines Chief Scientist

The Senior Editor requested National Transportation Analysis Program (NTAP) primary and secondary radar data for November 7, 2006 for the (local) time period 4:25 to 4:40 pm from the FAA.<sup>66</sup> The area of coverage requested was from "any antenna that had the ability to "see" ORD. A set of thirteen digital data files, each containing approximately 500 kb of data were received on February 14, 2007 that covered the period 4:25 through 4:40 pm. Each data set covered one minute

<sup>66</sup> F.O.I.A. request No. 2007001234GL submitted on November 18, 2006. William Puckett, NARCAP, requested an independent set of radar data, see Appendix I for details. J. Hilkevitch also submitted a separate request for radar data but was told that no such data was available so he did not pursue the matter. (Personal communication, May 8, 2007).

and arrived in list 3 ASCII format. This section discusses the results of two independent analyses of these primary radar data carried out by NARCAP Research Associates William Puckett, and Martin Shough.

### **7.1 Findings by William Puckett.**

Primary (skin paint and/or "false") radar contacts in the vicinity of the airport for the time period 1625 to 1630 hrs are plotted with white circles in Figure 27. Gate B5 and C17 are shown by small red crosses at the upper center of this figure. There are a cluster of primary echoes to the west and southwest of runway 32L. The single return that is nearest gate C17 both in distance and the time of the sighting (i.e., 2230) was at 2231:18 about one mile to the west (point A); the altitude of these returns cannot be determined. (See page 83)



Figure 27. Primary Radar Returns Between 4:25 and 4:30 pm on November 7, 2006.

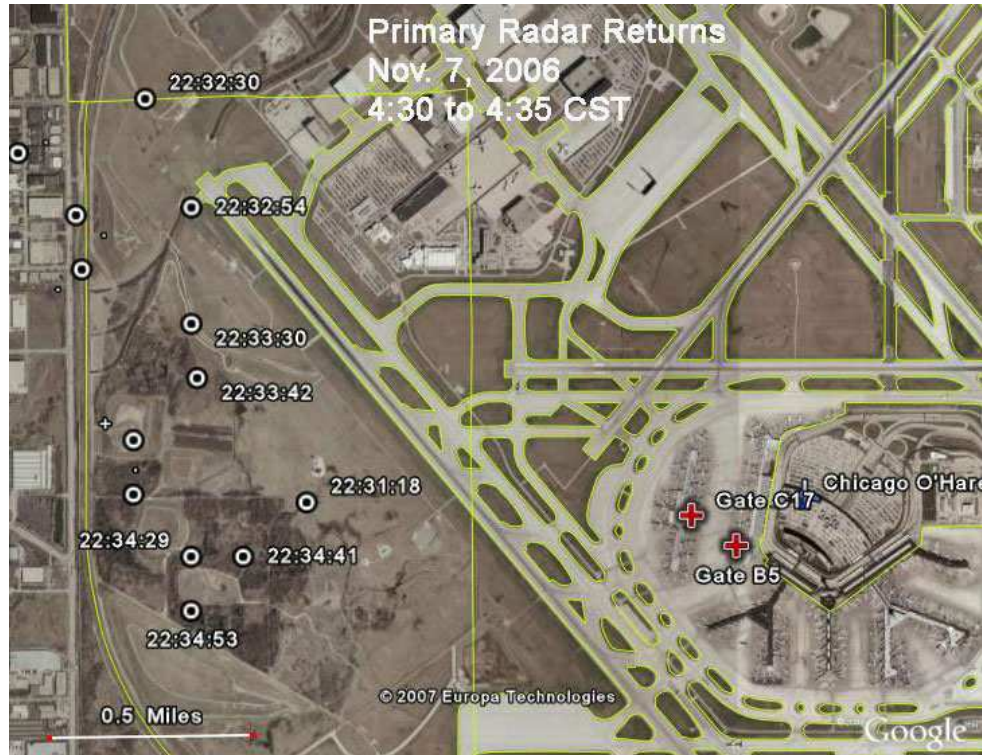


Figure 28. Primary Radar Returns Between 4:30 and 4:35 pm on November 7, 2006.

An interesting array of primary echoes was found in two different areas. Figure 27 shows one grouping along an approximately NNW - SSE line about one mile west of runway 32L but not parallel with it. There are a total of forty one primary returns found on the west side of the airport and another fifteen to the east (thirteen of which are grouped along a north-south oriented line to the SE of the airport (not shown here)). There were no primary returns found near gate C17 in these radar data.

Figure 28 shows primary returns for the period 4:30 to 4:35 pm. Here it is noted that a number of returns were recorded much nearer to the runways than in Figure 27. They are grouped generally along a N-S line and might possibly be second time-around targets, i.e., double or triple reflections off ground structures, vehicles, etc. that are not filtered out.



## 7.2 Findings by Martin Shough

In the 4 minutes of radar data examined between 2230:55 and 2233:54 UTC, eleven primary plots were identified within a radius of about 2 nmi of Chicago O'Hare gate C17, as shown in Figure 29. Numbers by each "tack" point represent minutes and seconds (hour designation is deleted). None of these points was found to correspond either with the observed static position of the UAP or with its inferred departure vector.

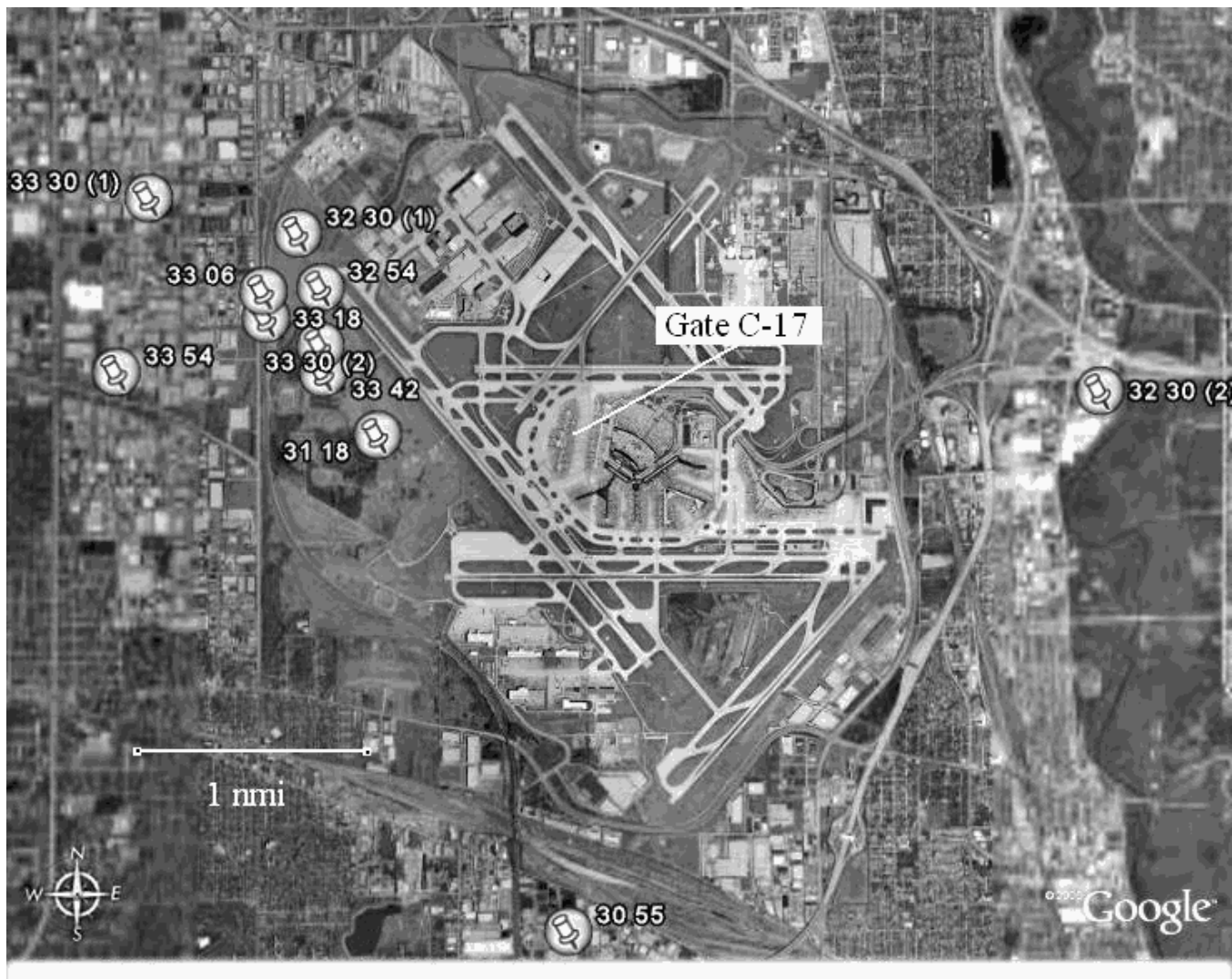


Figure 29. Plots of Primary Radar Targets in O'Hare Area Between 4:31 and 4:34  
(The numbers in parentheses indicate the time sequence of multiple plots occurring in the same second.)

The only feature of note was found by expanding the search area. The following time sequence of plots occurred during one second at 2230:55 UTC:

(plot)	(symb)	(code)	(alt)	(time, HMS)	(lat)	(long)
1	.			22 30 55	41 35 21N	087 55 54W
MCI	I	2453	070	22 30 55	42 02 52N	087 54 36W
2	.			22 30 55	41 56 37N	087 54 35W
3	.			22 30 55	42 13 28N	087 53 42W

The period symbol denotes "short run length primary tracks," and the capital "I" denotes an "MCI correlated track eligible for conflict alert." Reading from south to north, the coordinates define successive positions on a line that is for all practical purposes perfectly straight. A line ~ 43.8 miles long drawn between plots 1 and 3 passes through the coordinates of plot 2 within 350-400 feet. This line also passes about 200 ft to the east of the Chicago O'Hare Concourse C building. See Figure 30.





Fig. 30 Alignment of 3 Primary Radar Plots at 2330:55

The MCI correlated plot is spatially located between primary plots 1 and 2 (though it falls between plots 2 and 3 in the time sequence). It also falls within a few hundred feet of this alignment. MCI is a Mode C Intruder alert, when there is a predicted conflict risk between unknown IFR or VFR traffic and known IFR or VFR traffic with an altitude-reporting transponder. MCI triggers audio and visual alarms in the TRACON and is defined by FAA as requiring "immediate action" from the controller. The alert here was triggered by detecting a transponder in an aircraft with the flight code #2453 at an altimeter height of 7,000 ft MSL.

All of the above near-simultaneous events apparently happened within seconds of the reported 2231

time of the UAP observation above O'Hare Concourse C. This may well be no more than a curious coincidence. After all if one connects the 3 primary plots of Figure 30 into a single track you get a target rate of over 150,000 mph, which is presumably unphysical and suggests either a radar artifact or a chance alignment of three sporadic unrelated primary radar echoes. It is certainly a far cry from an object ascending vertically above C17, nor does the "track" originate or terminate at O'Hare.

MCI alerts are not in themselves very unusual, and the likelihood of an MCI alert occurring will presumably be skewed towards areas of highest flight density - i.e., near to O'Hare. The one minute block of data between 2230:00 and 2231:00 was searched, disclosing 59 examples, or a mean rate of about one MCI alert per second somewhere in the C-90 TRACON area, and flight #2453 (giving 10 transponder replies in total during this minute) was responsible for another 3 of these, at 30:19, 30:31, and 30:43, in addition to the alert at 30:55. Given that the control area is thousands of square miles, the occurrence of such an alert on a chance alignment of unrelated radar plots passing through the sighting location can still fairly be described as moderately unlikely *a priori*. But coincidence does happen and seems the most economical interpretation.

I also found the cluster of primary returns to the west of the runways that Puckett found. They lie within a sector that is approximately a mile or two from the ASR-9 (ORD#1) antenna (see Section 6.3.1). They couldn't be correlated with ground features (the atmosphere was superrefractive at the time) as the ground was flat nor do they correlate with roads or rail lines. Why aren't these returns filtered out by doppler filtering?

Referring only to the large cluster of primary returns in Puckett's Figure 26 lying to the west of the runways, careful analysis shows that they all tend to drift toward the SSE at about five knots velocity. One possibility is that they were caused by a flock of birds flying past the airport.<sup>67</sup> They might also have been produced by ground reflection of moving traffic on roadways in the area. There is a very low probability that these returns were from aircraft flying in the area without transponders since this is a Class B airspace (see Section 3.2).

### 7.3 Radar Cross Section (RCS) Issues

Richard F. Haines

None of the radar analyses presented above found evidence of primary radar returns at the approximate time of this sighting within even a mile of United Gate C17. It is little wonder that tower personnel were not alerted. However, it also should be made clear that lack of a radar return from the hovering object does not mean that the object was not really there. Indeed, there have been a number of documented instances where an object was seen visually by flight crew but there was no ground radar contact with it. The America West Airline sighting of May 25-26, 1995 qualifies well in this respect (Webb, 1996) as does TWA flight 842 on July 4, 1981 (Haines, 1982a, 1982b).<sup>68</sup> What this finding does

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<sup>67</sup> An ornithologist who investigates aviation-related incidents and accidents told Sam Maranto (March 2007) that he was certain these particular echoes were not caused by insects or birds at O'Hare. Nevertheless, the ATIS issued for November 7, 2006 cautioned pilots about bird activity in the vicinity of the airport.

<sup>68</sup> The interested reader should also consult Shough (2002) for a review of 21 ground and airborne radar contact reports related to aviation safety occurring between October 1948 and September 1976.

suggest is that current sensing technology is not adequate to insure against such intrusions into our nation's busy airspace.

All of the present eye witnesses agree that there was a physical object present and that it was round (as viewed from directly below) or a smooth sided oval (as viewed obliquely from below). This evidence also establishes that this oblate spheroid was most likely oriented with its maximum dimension parallel with the earth's surface. If this is accurate its radar cross section (RCS) to local radar surveillance would be minimal.

Radar cross section refers to the extent to which an object reflects radar pulses, usually with respect to their point of origin. While each pulse of energy that leaves the antenna may contain megawatts of power only a very small fraction of it reflects off the object back in the direction of the receiving antenna. This occurs for many reasons whose discussion are beyond the scope of this report.<sup>69</sup> The interested reader should consult the following references for more information. (Anon, 2007a; Anon, 2007b; ARC Technologies, 2005; Knott, et al., 2004; Skolnik, 1990). Suffice it to say here that RCS is technically expressed as an area (in square meters) and depends on three primary variables: *Geometric cross section* of the object facing the radar antenna, object *reflectivity* of the radar beam energy, and *directivity* which is the amount of backscattered power of the original beam that reflects back to the sending/receiving antenna.<sup>70</sup>

As discussed, the geometric cross section of the object to be detected by radar is one of the three important variables in determining its RCS. The RCS of a modern commercial airplane, for instance, will vary by a factor of over 100 depending on its orientation to the radar beam and other factors (Anon, 2001). The sophistication of so-called low observable technology has progressed steadily ever since WW-2 to the point where the large, manned B-2 Spirit stealth bomber, F-22 Raptor, F-35 Lightning II (and others, cf., Sweetman, 1993) can fly well within the coverage of ground-based radar units and still remain undetected.

Given the fact that current low observable, i.e., "stealth" technology, can defeat even sophisticated radar it is important to try to relate this fact to the present case without stretching the issue too far; we simply do not know enough about the various characteristics of the present UAP to properly apply RCS formulae.

Most aviation radar systems employ a very short, pulsed microwave beam sent out from their antenna (see Section 6.2). If a portion of that beam is reflected by the surface material (i.e., "skin") of a distant aircraft (or other object) back in the direction of the antenna and is strong enough to be detected then the system registers a "primary" contact. Its distance is measured by comparing each pulse's return time with the time the pulse was sent. We will not be concerned here with so-called secondary radar returns that are produced by a transponder on board the aircraft that emits a coded frequency signal back to the antenna to positively identify that aircraft.

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<sup>69</sup> A recent Google internet search on the term "Radar Cross Section" turned up over seventy seven thousand hits.

<sup>70</sup> Directivity is actually the ratio of backscattered power to the power that would have been scattered/reflected in that direction if the scattering were actually uniform in all directions.

It is known that if an object can radiate sufficient energy into the surrounding atmosphere to evaporate the water vapor (cloud) then it might also be possible for that object to increase its energy output to the point of creating an ionized plasma sheath around itself (Anon., 2007c). "This actually raises a possibility... that there may not have been a physical object inside the oblate spheroid surface at all. Both the radiant energy necessary to evaporate cloud droplets, and the ability to absorb incident radar beams are consistent with the idea that a self-organized plasma was formed and maintained at a trajectory in the air by some external energy source."<sup>71</sup>

One side note of possible interest is the fact that the Public Affairs Officer at Scott Air Force Base, in SW Illinois said their military radar did not detect any unidentified contacts around the airbase or the city of Chicago nor did they scramble any jets. (Nowinski, 2007).

In conclusion, we simply do not possess enough information about the present UAP to draw any reliable conclusions about its RCS and must continue to seek more and better data. This will continue to be a formidable task given the current attitude of denial and ridicule that is shown both by government and corporate aviation officials. In this instance we have lost yet another opportunity to learn more about the nature of UAP.

## 8.0 Discussion

One of the main objectives of NARCAP is to help improve aviation safety with specific regard to UAP while also collecting, analyzing, and reporting scientific data about UAP. This deliberate decision was not taken lightly. It resulted from an intensive study of many scores of pilot reports where an unusual object or visual phenomenon flew near their airplane for prolonged periods of time [Clark, 2003; Guzman, 2001; Haines, 1999, 2000; Haines and Weinstein, 2001; Orlandi, 2001; Smith, 1997; Weinstein, 2001] and caused disturbances of their cockpit instruments or crew communications and coordination. NARCAP felt that it was imperative to conduct its own investigation into this puzzling event at O'Hare International Airport. As more and more data was received it became clear yet again<sup>72</sup> that the FAA is not adequately equipped to detect all classes of atmospheric phenomena that could cause an aviation incident or accident in flight.

It is beyond the scope of this report to suggest specific solutions to this complex problem except to say that the United States of America still relies mainly on realtime, microwave-based (radar) systems to detect airborne vehicles, weather phenomena, birds, etc. Such systems are highly effective in most cases, and, when aircraft are equipped with transponders the level of their detectability (from the ground and from other aircraft) increases significantly. However, as this report has shown, there remains a class of phenomena that apparently is not detected by these particular radar wavelengths; indeed, America's aeronautical stealth technology has clearly demonstrated that it can defeat them! The tacit assumption that seems to be made within the FAA is that if a stealth vehicle belonging to the

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<sup>71</sup> Personal communication from Larry Lemke, March 20, 2007.

<sup>72</sup> Interested readers should review NARCAP's website and its technical reports at [www.narcap.org](http://www.narcap.org)

Department of Defense is going to fly within the airspace of large civilian airports the military branch involved will pre-announce it using appropriate means so that ATC personnel will not react inappropriately. The cryptic response made by the FAA in the present incident that nothing was seen from the tower leaves this (stealth) door open just a crack. However, NARCAP believes that the military would not test fly a hovercraft directly over a highly populated and busy international airport for many reasons not least of which is safety.

Of primary concern in the following section are the implications that this incident has for aviation safety.

### 8.1 Safety Implications

Current *See and Avoid* piloting practices<sup>73</sup> in America are supplemented by elaborate electronic technology including ground-based and airborne radar, on-board transponders, terminal collision avoidance system(s) (TCAS), and others all designed to keep airplanes apart.

The airspace above O'Hare International Airport is a class B Airspace (FAA Order 7400/9F). A plan view of this airspace is shown in Figure from a Chicago Sectional Aeronautical Chart (1:500,000). Note the generally concentric circles centered on the O'Hare. The smallest area at the center is an approximate cylindrical volume of air extending from the ground up to 7,000 feet [labeled 70/SURFACE). The next larger concentric region extends from 1,900 to 7,000 feet [labeled 70/19], etc.; it has been likened to an upside-down wedding cake with each layer stepping outward from the center.

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<sup>73</sup> This term refers to the requirement (when meteorological conditions permit) that the pilot is responsible to see and avoid other traffic, terrain or obstacles. (Anon., Federal Aviation Regulations/Aeronautical Information Manual, Section 5-5-8, Jeppesen Sanderson, Inc., Englewood, CO., 2000).



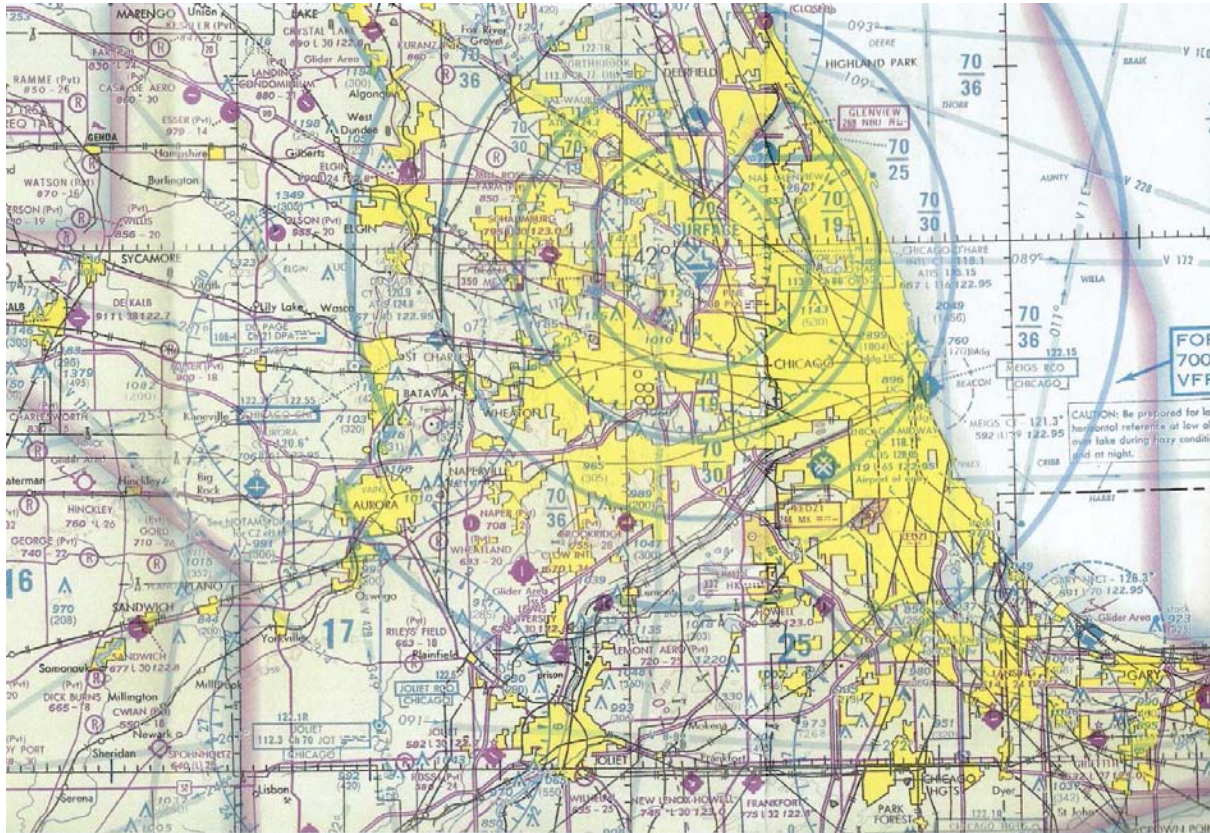


Figure 31. Sectional Avigation Chart of ORD Showing Class B Airspace

In order to fly legally within this controlled airspace "... all aircraft operators are subject to the minimum pilot qualification requirements, operating rules, and aircraft equipment requirements of Part 91...". The current Aeronautical Information Manual (AIM, Section 3-2-3) specifies that "Aircraft within Class B airspace are required to operate in accordance with current instrument flight rules (IFR) procedures. If someone wants to fly within a Class B airspace following visual flight rules (VFR) a clearance from air traffic control is required and they must also meet the requirements of FAR Part 91.215 and FAR Part 91.131. Thus, an operable two-way radio is required, the pilot must hold at least a private pilot certificate, and unless otherwise authorized by ATC, "each person operating a large turbine engine-powered airplane to or from a primary airport shall operate at or above the designated floors while within the lateral limits of Class B airspace." In addition, each aircraft must be equipped with an operable Very High Frequency Omnidirectional Range (VOR) or Tactical Air Navigation (TACAN) receiver and an operable radar beacon transponder with automatic altitude reporting equipment.<sup>74</sup> In order for the above federal regulations to function effectively all airborne objects must be able to communicate with the tower and should be detected on FAA radar as well as visually from the tower (given adequate atmospheric visibility). If either or both conditions do not exist then safety is

<sup>74</sup> Federal regulations do permit a deviation from the requirement that the airplane must have a 4096 transponder with altitude reporting capability, however, all requests for such a deviation must be submitted to the controlling ATC facility at least one hour before the proposed operation. [AIM, Section 3-2-3, B5 (c)]

compromised. *This was the case here.*

"The safety implications of any vehicle operating at low altitude over a major airport outside the authority of air-traffic control are obvious. Managers should want to hear about such vehicle operations before they become accidents or disasters," said Brian E. Smith, former manager of NASA's Aviation Safety and Security Program. He also remarked, "We need to encourage reporting of all incidents regardless of biases against particular categories of occurrences." (Kean, 2007) As the transcripts presented in Tables 3 - 5 make clear, this subject evokes mostly laughter and jokes rather than serious acceptance. According to the original Chicago Tribune article (Hilkevitch, 2007), some of the airline employee witnesses felt that the UAP could have interfered with radar or other equipment and "...even created a collision risk."

As this report has shown, both the extensive radar system and ATC personnel in the tower at O'Hare were incapable of detecting the presence of an airborne, hovering object of a relatively significant size, nor was the object (allegedly) seen from the tower. If an object cannot be seen visually or on radar it does not officially exist; indeed, no specific actions can be taken to warn airplanes of its existence. The known capabilities of the FAA radar equipment must not be ignored here.

A practical difficulty that is faced by the FAA in electronically detecting the kind of UAP reported at O'Hare on November 7, 2006 is that it *hovered* over the airport. Their long established use of so-called doppler filters in ground radar systems makes it possible to eliminate immovable ground detail such as airport buildings, etc. This makes moving aircraft targets more conspicuous. However, stationary UAP can become electronically invisible because of the use of this filter. Since airport surveillance radar antennas typically rotate about 12.5 times per minute a new radar update return cannot occur faster than about every 4.8 seconds. Thus, if the UAP can climb fast enough it can, theoretically, evade this radar detection. And even if the UAP were detected by a pulse or two during its ascent it would probably be ignored as spurious. The problem comes down to a matter of practicality.

Is it worth the expense and effort to try to detect stationary airborne objects by radar when they occur so infrequently? So far the answer has been no. However, if an airplane and UAP collide someday because the UAP was not detected on radar all of the expense and effort to do so would have been well worth it.

### 8.1.1 Radar Cross Section and Safety Implications.

The ASR-9 ORD#1 antenna is located only about 0.8 mile west of United Airline's Concourse C and about 955 feet from the west edge of runway 32L. Given the range sensitivity performance of this system (cf. Figure 21), one could postulate that in order to avoid detection by ORD#1 during its rapid ascent,<sup>75</sup> the upper limit on the effective RCS of the UAP at 2.7 to 2.9 GHz would be on the order of about  $10^{-6}$  sq. m (-60 dBsm) or about two orders of magnitude *smaller* than that of a B-2 or F-22 stealth airplane. Thus, an object smaller than about two feet width by

<sup>75</sup> It is assumed that the rising UAP is not filtered out by the doppler moving target detection filter. Other assumptions are also made about the specific nature of the polarization used on the ASR-9 at the time. Other factors may also play a role in causing the UAP to be invisible to the radar.

0.2 foot high by 0.6 foot long (using approximate B-2 dimensions for example) would be undetected by this antenna assuming the object did not otherwise possess other exotic radar canceling characteristics. Since the present UAP was visually estimated to be on the order of 20 feet diameter and most likely larger, it should have been detected by ORD#1 during its ascent. Why it was not is not known.

Also, since the ORD#1 antenna was relatively near to the reported location of the UAP its beam would have struck it from below, i.e., not have "pinged" it from a side-on angle during its ascent. Assuming a lateral separation of 5,497 feet and cloud base of 1,900 feet gives a vertical angle of about 19 degrees arc from the horizontal up to the cloud base at the antenna. As the UAP continued to rise, now invisible because of the cloud, if it maintained a horizontal orientation the ORD#1 beam would strike it at increasingly large angles which would have increased its RCS over time making it increasingly conspicuous.

By comparison, the effective upper limit of the effective RCS from ORD#3 antenna location, about eleven miles south of Midway Airport, one could postulate that in order to avoid detection by ORD#3 during the UAP's rapid ascent,<sup>76</sup> the upper limit on the effective RCS of the target at 2.7 to 2.9 GHz would be on the order of about  $10^{-2}$  sq. m (-20 dBsm) which is approximately that of a small bird.<sup>77</sup>

The reports that the UAP departed almost vertically is significant in that the airspace directly above Gate C17 at ORD, at least up to 7,000 feet altitude, is probably one of the lesser traveled areas of local sky above the airport. This is because commercial aircraft approach its runways from locations lying on radial extensions of the respective runway. On takeoff aircraft do not fly directly over the terminal area but along an approximate extension of their takeoff runway. Thus, the present UAP was hovering in perhaps one of the safest areas of the entire ORD airspace.

It is also interesting to note that this UAP hovered within the tower controllers' blind spot.

If the present UAP possessed advanced stealth capabilities it might explain its invisibility to radar. If this was a test of a new stealth technology one must ask why it was being tested over the busiest airport in America where, if it descended to the ground for some reason, could have caused a great deal of destruction.

Perhaps James Carrion, International Director of MUFON, summed the situation up best when he said, "They subjected it to dismissal and ridicule... it's appalling in this post 9-11 era how someone can say 'bomb' in an airport and get arrested, yet personnel at United Airlines see something like this and they (FAA and United Airlines) dismiss it."

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<sup>76</sup> The assumption is made that the rising UAP is not filtered out by the doppler moving target detection filter. Other assumptions have been made about the specific nature of the polarization used on the ASR-9 at the time. Additional factors may also play a role in causing the UAP to be invisible to the radar.

<sup>77</sup> The senior editor acknowledges the assistance of M. Shough here (March 22, 2007).



## 8.2 Possible Explanations for the UAP

Within several days of the event Elizabeth Isham Cory, an FAA official, suggested that all the witnesses had seen and misperceived was an abnormal weather phenomenon or perhaps ground lights shining upward and reflecting off the bottom of the cloud layer at the time. "That night was a perfect atmospheric condition in terms of low [cloud] ceiling and a lot of airport lights," she said. "When the lights shine up into the clouds, sometimes you can see funny things. That's our take on it."<sup>78</sup> It should be noted that witness B and J.H. confirmed, independently, that the airport (nighttime) ramp lights had not yet come on.<sup>79</sup> If the visual description of the UAP made by all of the present eye witnesses that were interviewed are accurate this particular explanation is absurd. It is so unreasonable as to be ludicrous and begs the question, how could someone who did not even see this particular UAP come to such a conclusion? As Maranto (2007) succinctly put it, "The answer to these questions (how can weather account for what was described) is that...the weather explanation is just complete and utter nonsense."

Soon after the story went public on January 1, 2007 many explanations were offered to try to explain what the object was. Each of them must be compared with all of the reported and calculated characteristics of the object such as size, shape, acceleration, lack of sound, hole in the cloud, etc. We will consider a number of such explanations here.

One explanation was that of a weather balloon. Most are round as seen from beneath, can hover silently, and could be twenty feet in diameter or more. Nevertheless, there are several reasons that argue strongly against this possibility.

The first problem with this hypothesis is where a weather balloon would come from in the first place. As Figure 33 shows, the nearest launch site for weather balloons is at Lincoln, Illinois, some 135 miles to the SW. With winds out of the south at only about four knots, both of the daily balloon launched from there (one at 6:00 am and the other at 6:00 pm CST) would have climbed above 1,900 feet after only about four minutes flight (assuming a nominal ascent rate of 500 ft/min)! According to the National Oceanographic and Atmospheric Administration (NOAA)<sup>80</sup> who launch about seventy weather balloons a day within conterminous America,<sup>81</sup> the standard tan latex (or synthetic rubber neoprene) balloon is about six foot diameter when launched but increases in size to about twenty feet at its nominal bursting altitude of at least 90,000 feet. At high altitudes they assume a teardrop form due to distortion from the weight of the radiosonde payload. They can travel up to 125 miles laterally during their nominal two hour-long flight life, depending on the velocity of the wind.

Second, in order to use radar to track the progress of these weather balloons each carries a

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<sup>78</sup> As quoted to J. Hilkevitch in his article "*In the Sky! A Bird? A plane? A ... UFO?*", Chicago Tribune, pg. 1, January 1, 2007.

<sup>79</sup> See Appendix E.1 [10] for additional confirmation of this.

<sup>80</sup> NARCAP is indebted to Bob Stahl, NARCAP National Technical Specialist, for his research into this subject.

<sup>81</sup> [http://www.erh.noaa.gov/gyx/weather\\_balloons.htm](http://www.erh.noaa.gov/gyx/weather_balloons.htm)

radiosonde transponder (with a frequency ranging from 1668.4 to 1700.0 MHz) of the same general kind as is used on commercial airplanes. In this way winds aloft can be determined. If the object over Gate C17 was a weather balloon why wasn't it detected by secondary ground radar? Also, why wasn't this type of payload seen by any witness if it was suspended under the balloon? The third problem is the prevailing horizontal wind.

Local winds would cause a balloon to move laterally during the five-minute (or longer) sighting duration disregarding its altitude above the airport. Assuming a nominal wind velocity of seven knots (equivalent to about twelve ft/sec.) a balloon would have traveled horizontally about 3,600 feet! None of the witnesses saw any horizontal movement of the object at all as it hovered.

The fourth problem with this explanation is the rapid rate at which the UAP rose, a rate that far exceeds meteorological balloons (see above). Also, what would make a balloon remain at a fixed altitude and then begin to ascend other than a ground tether or on-board ballast that was somehow jettisoned. No such tether line was reported.

The possibility that this UAP was some U. S. military stealth vehicle has already been discussed and appears quite unreasonable. The fact that no sonic boom was reported by anyone at ORD out of doors suggests that its departure velocity was subsonic. And the heavy cloud cover eliminates all potential astronomical explanations.

The relatively long sighting duration of at least several minutes and relatively consistent description of the UAP as being round (as seen from below and oval from an oblique angle) suggests a non-aerodynamic vehicle of some sort. As witness B said, "But I know what I saw and what a lot of other people saw stood out very clearly, and it definitely was not an [Earth] aircraft."

Another explanation was raised by Alan Boyle, a science reporter for Cosmic Log at MSNBC.com. He suggested that the UAP might have been a lenticular cloud. However, there are many differences between lenticular clouds and this UAP. They include differences in: (size; altitude; appearance; rotational motion; lateral stability of the UAP given the prevailing wind; high vertical acceleration; etc.). Boyle also suggested "some sort of weather related vortex" as the cause but did not give any facts with which to support it. Section 4.0 and Appendix A.1 make it clear just how stable the lower atmosphere was at the time of the incident.

Yet another explanation offered was that the hole in the cloud (see Section 5.0) may have been produced by a jet airplane flying through the cloud cover! Among the many arguments against this possibility are: (1) No airplanes typically fly through the location of this UAP at ORD, it being so far off the centerline of any of the runways. (2) Wingtip vortices of swept wing turbojets might cause a ragged rift in the clouds on each side of their flight path but the shape of these cloud disturbances would be far different than a neat, round, vertical hole of small dimensions, and (3) airplane-caused vortices would not produce such a long-lasting hole in the cloud as this UAP did.

The possibility exists that the UAP was actually some kind of very quiet helicopter hovering there for some unexplained reason. If this was the case one would expect ATC personnel to know about it and

to give that explanation in order to quell the excited inquiries of the press. Nevertheless, "All the witnesses to the O'Hare event... said they are certain - based on the disc's appearance and flight characteristics - that it was not an airplane, helicopter, weather balloon or any other craft known to man." (Chicago Tribune, January 1, 2007) See similar statements made by witness J.H. in Appendix E.1 [10].

This section concludes with the tongue-in-cheek op-ed assessment by Chicago Tribune's Eric Zorn (2007) in which he writes, "...it's even harder to explain how it (the UAP) could possibly be anything but an ordinary but misunderstood phenomenon (OBMP). Best bet: It was nothing."

If it was nothing then all of the present eye witness testimony can be discounted as worthless. Worse still, these witnesses probably should not be entrusted to carry out their jobs at the airport in the future because they are considered to be such unreliable observers, witnesses prone to see things that aren't there!

## 9.0 Summary and Conclusions

This investigation has determined that, based upon the testimony of multiple eye witnesses in different locations at O'Hare International Airport, a small physical, and apparently solid object hovered over the United Airlines concourse area for at least ten minutes or more but was not detected either by radar or visually by air traffic controllers in the tower. For this reason the object is considered a definite potential threat to flight operations at O'Hare.

Calculations have been presented which suggest that the UAP above Gate C17 possessed a high energy density that caused a hole to be produced in the cloud as it rose up through it. If the UAP was only 6.8 m in diameter the calculated power it would require to evaporate all the water droplets within a cloud column 300 m long (assuming a vertical velocity of 300m/sec.) in one second would require an average power of approximately one hundred megawatts (MW). By comparison, the steady state power (consumption) of a B-747 airplane cruising at about 0.9 Mach is approximately 60 MW. Whether or not such a heat source would impact flight safety remains to be seen.

There is theoretical evidence given in Section 8.1 dealing with safety implications to lead us to believe that, given usual non low-observable radar characteristics, the hovering object at O'Hare should have been registered on the ASR9 ORD#1 radar during its ascent into and through clouds above it. Nevertheless, there are many reports of pilots seeing an unidentifiable airborne object that is not detected by radar as is discussed in Section 7.4. There is a small chance that the FAA's NEXRAD system may have detected the presence of a radar reflective target close to the 1,900 foot cloud base within several minutes of the reported sighting as is discussed in Section 6.4.2. However, this finding is obscured by various technical considerations that cast some doubt on this possibility.

It is interesting to note that the UAP very likely hovered at an altitude and location that made it impossible to see both from the main tower and the United ramp control tower because of their roof overhang and window placement.

This incident is typical of many others before it in that an unknown phenomenon was able to avoid radar contact and, thus, official recognition and effective response. When combined with the deeply entrenched bias pilots have against reporting these sightings the FAA seemingly had justifiable grounds for ignoring this particular UAP as non-existent. As Tony Molinaro, FAA spokesman said in January, "absence of any kind of factual evidence" precludes an investigation." (Kean, 2007) NARCAP hopes that this report will contribute to the growing accumulation of factual evidence surrounding UAP and that U.S. government officials will be motivated to carry out an independent investigation of the nation's capacity to detect a much broader range of electromagnetic phenomena than heretofore. To do otherwise is to risk grave consequences.

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## **11.0 Appendices**

### **A. Weather Data**

William Puckett

#### **A.1 Regional Data**

##### Midway International Airport – Chicago

Observation on November 7, 2006 at 4:51 CST:

Sky: Broken Cloud 1,600 Feet (Ceiling). Overcast at 2,200 feet

Visibility: 4 Miles Haze

Winds: Calm

Temperature: 54 Degrees F.

Dew Point: 49 Degrees F.

Relative Humidity: 83%

Altimeter Setting: 29.81 Inches of Mercury

Doppler Radar Site – Romeoville, Illinois

Observation on November 7, 2006 at 4:52 CST

Sky: Overcast at 900 Feet

Visibility: 4 Miles Fog

Wind Direction: South (180 Degrees Compass)

Wind Speed: 4 Knots

Temperature: 52 Degrees F

Dew Point: 51 Degrees F

Relative Humidity: 97%

Altimeter Setting: 29.81 Inches of Mercury

Upper Air Site – Davenport, Iowa

Observation on November 7, 2006 at 4:52 CST

Sky: Clear

Visibility: 4 Miles Haze

Wind Direction: South (190 Degrees Compass)

Wind Speed: 4 Knots

Temperature: 52 Degrees F

Dew Point: 44 Degrees F

Relative Humidity: 74%

Altimeter Setting: 29.78 Inches of Mercury

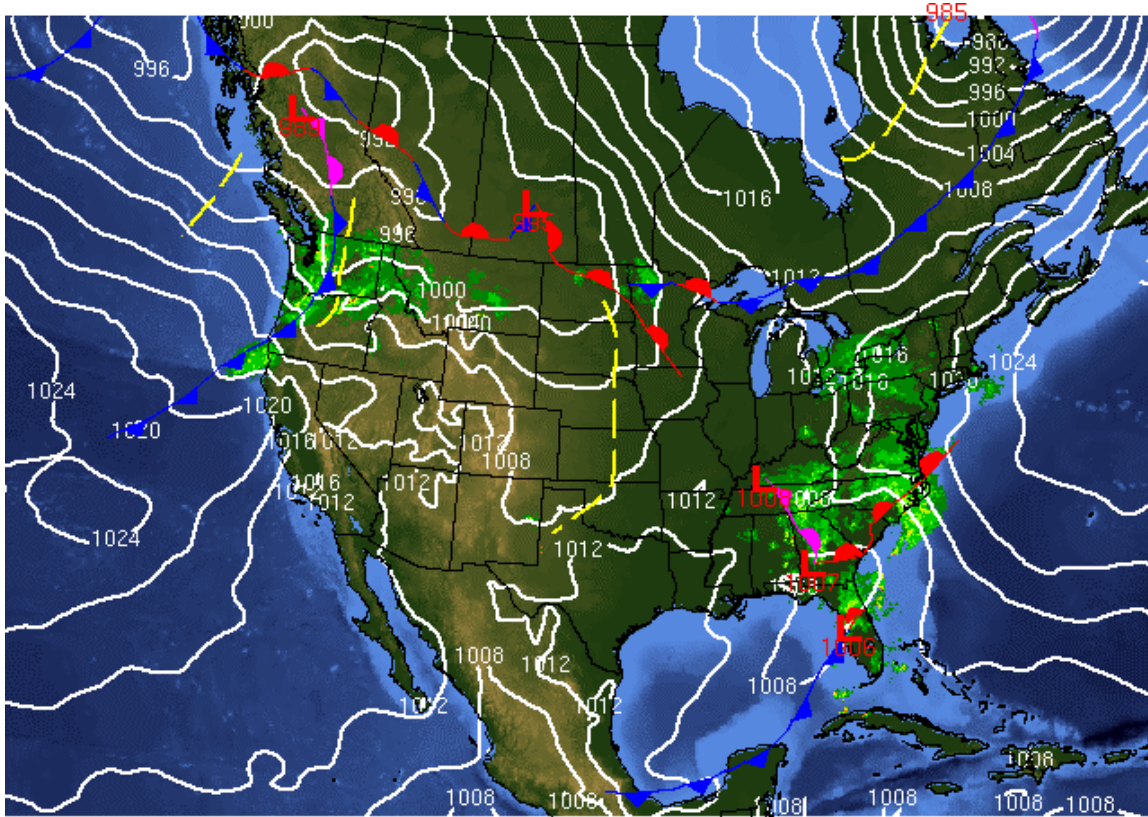


Figure 32. Surface Air Pressure Map for November 7, 2006 - 3 PM CST

### A.2 Upper Air Data<sup>82</sup>

Figure 33 shows the location of O'Hare Airport and the three closest upper air stations. Davenport, Iowa was chosen as the most representative site for O'Hare Airport at the time of the sighting because of its proximity and wind conditions at the time.

<sup>82</sup> Source: University of Wyoming Weather Server: <http://weather.uwyo.edu>





Figure 33. Map Showing Three Upper Air “Balloon Sites” Nearest O'Hare (The Most Representative Upper Air Site is Davenport, Iowa – 140 Miles Away)

Upper air observations (soundings) are taken twice daily at 6:00 am [12:00 Greenwich Meridian Time (GMT)] and 6:00 pm [00:00 GMT]. The 00:00 GMT sounding on November 8, 2006 was chosen for this analysis. This time equates to 6:00 pm CST on November 7, 2006.

The following information was extracted from the November 8, 2006, 00:00 GMT sounding at Davenport:

1. Cloud Thickness: Data presented in Appendix A.4 suggests that there were two cloud layers over O'Hare Airport, the lowest extending from 1,900 to about 3,700 feet AGL and a second extending from about 8,000 to 9,000 feet. The surface observation at O'Hare Airport showed a ceiling of 1,900 feet. Therefore the cloud top would be approximately 9,000 feet.
2. Winds at the surface at Davenport were from 190 degrees at 4 knots (South).
3. Winds at 1,000 feet were light and variable.
4. Winds at 2,000 feet were from 335 degrees (NNW) at 6 knots.
5. Winds at 5,000 feet were from 350 degrees (North) at 9 knots.
6. Lifted index was 9.88. Positive numbers indicate “a stable atmosphere” and thunderstorms are unlikely. Negative numbers indicate instability and thunderstorms are more likely. The lower the number, the more likely that thunderstorms will occur.

### A.3 Doppler Radar Data

Located approximately twenty eight miles SW of O'Hare International Airport is a doppler radar site at Romeoville, Illinois. Figure 34 presents scan data for November 7, 2006 at 1635 hrs CST for the "clear air" mode. (Also see Figure 22). No precipitation was occurring within radar range.

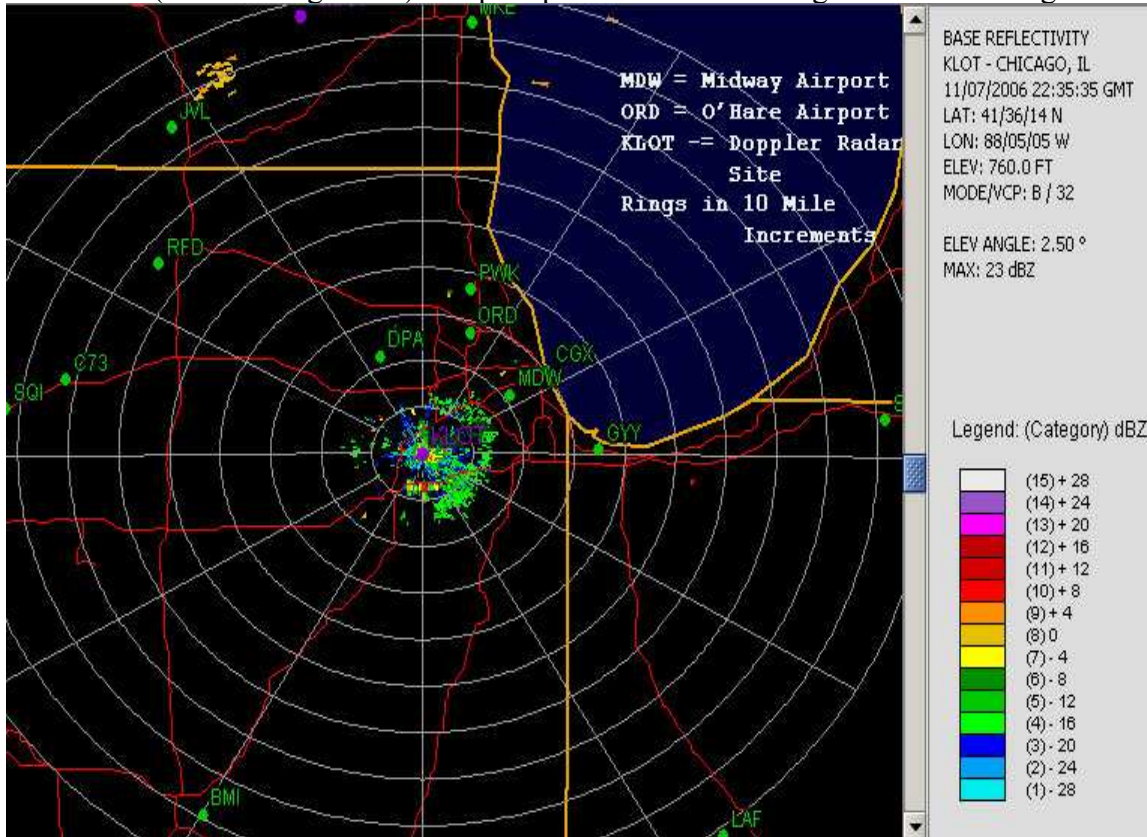


Figure 34. Doppler Radar Data for November 7, 2006 at 4:35pm

### A.4 Satellite Cloud Top Temperature Data

The sounding data (Figure 11) and lapse rate data (Table 7) show that two layers of clouds were likely in the lower 10,000 feet as discussed in Section A.2 above. These cloud top computations are supported by the satellite cloud top temperature data shown in Figure 35.

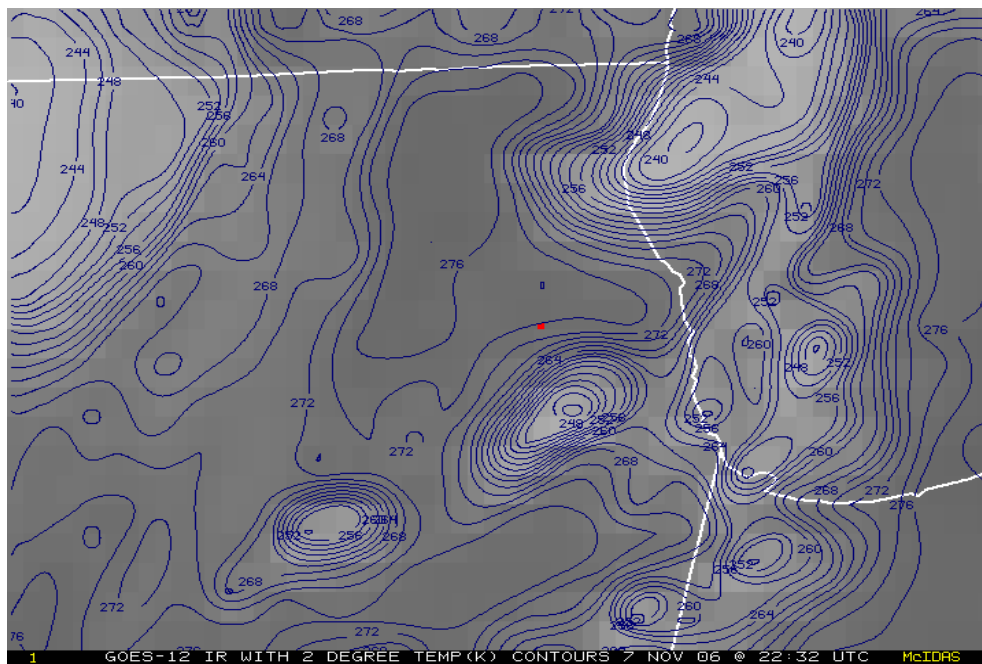


Figure 35. GOES-12 Satellite Cloud Top Temperature Profile for November 7, 2006 over the Greater Chicago Region

**B. United Airlines Published Departures and Arrivals**  
Between ORD and Charlotte, NC for 9 November 2006

**C. Investigation of Photographic and Other Hoaxes**

Ted Roe, Executive Director

Aviation incident investigators who are examining cases that might involve UAP are sometimes confronted with the added task of assessing photographic evidence. Technology has made digital cameras quite common and it is possible that some UAP events may be photographed or videotaped by pilots and/or the traveling public.<sup>83</sup> As UAP are currently a poorly documented phenomenon, investigators that find themselves confronted by photographic evidence must determine the authenticity of the photograph as well as the veracity of the photographer/witness. As Sue, a United Airlines ramp tower employee said to Dwight in the O'Hare control tower that day, "...someone got a picture of it... he got a picture of it."<sup>84</sup> (cf. Table 4)

In the case of the O'Hare incident, this situation has become even more complicated with the appearance of alleged photographs of the incident that were submitted by anonymous sources.<sup>85</sup> Further analysis of these photographs has demonstrated that most of them are the product of image manipulation and fraudulent claims. Often these hoaxers acquire photographs from internet sources and manipulate them with software, based upon public witness statements, to appear to be consistent with publicized reports. This situation will be addressed further in a future NARCAP report.

There are several approaches that can be taken to mitigate these potential hoaxes. First and foremost the aviation community needs to accept that aviation incidents involving UAP profiles do occur and deserve close examination. In the case of the O'Hare matter, if witnesses had been encouraged to forward their reports to a prepared and sympathetic aviation incident entity like the FAA's Aviation Safety Reporting System or even an agency such as NARCAP that practices rigorous confidentiality and information management and the normal course of investigation had ensued, public speculations and complications arising from that speculation like hoaxed photos could have been all but eliminated.

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<sup>83</sup> See (Haines and Puckett, 2007) for one such event.

<sup>84</sup> This assertion probably originated from witness A at the scene. If so, Sue is referring to one of the flight crew of United flight 446 and not from other ramp personnel (who would not necessarily have cameras available on the job.)

<sup>85</sup> As witness J.H. states in Appendix E, [I] "We ended up with a group of about seven people all together standing with us watching it. One fellow had a digital camera. He was taking many pictures. That much I do know. I saw other people taking photos too."

Figure 37 is an example of a hoaxed photograph of the November 7, 2006 O'Hare incident that was submitted anonymously via the internet by an individual who learned of the case prior to the completion of NARCAP's investigation. When this photo was shown to one of the primary witnesses he said that the aircraft pictured were MD-80s that United no longer flies, that the disc seen in the sky is "much too big, is in the wrong place, and is hazy."<sup>86</sup>

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<sup>86</sup> Personal correspondence received March 6, 2007. A second alleged UAP photo from this date, time, and location was also visually evaluated by this witness. It showed airport lights across its lower edge; most of the frame showed an evenly gray sky with a small oval image located in the upper right center of the photograph. Printed in the upper left and lower right corner of this photo was "*AboveTopSecret.com*" The witness said the object shown was not what he saw. It was "...too big and not enough contrast."



Figure 37. Hoaxed Photo at O'Hare

Many of these hoaxes have been revealed by sharp-eyed internet surfers who can find source photos on the internet and compare them with alleged incident photos. The picture above is actually a hoax that was resolved by comparing a photograph of O'Hare terminals found through an internet search with that of the alleged photo of the incident. It is clear that the original image had been acquired from an internet

website. The photograph was simply “reversed” and a UAP inserted, all done with the help of common computer imaging software.

Figure 38 shows the original source image.<sup>87</sup>



Figure 38. Original Photograph that was modified to create the Photographs in Fig. 37

Currently, per the FAA ARTCC manual, cases involving UAP profiles are forwarded to a non-investigative clearing house of “UFO” reports arising from every possible source. Then these cases are published and promoted in their raw form on the internet.<sup>88</sup> In the case of the O’Hare incident, there have also been at least a dozen fraudulent claims involving hoaxed photographs.

A very obvious and clearly unwanted result of this situation is that aviation facilities become bombarded by media inquiries, self-proclaimed “researchers” and “investigators” with no aviation investigation experience, as well as alien/ET chasers and an uncritical public at large. In response to this, airline management makes the decision to stifle discussion of the UAP incident and the result is a failure to gather information to mitigate a potential hazard to safe aviation operations.

Another unwanted result is the alienation of aviation personnel, who are trying to work and report within the framework of their jobs and suddenly find themselves dealing with the same issues – unqualified investigators, unwanted attention and worse. (see Section 2.2)

It is essential that aviation incident investigators follow the normal course of aviation investigations, secure the witnesses identities and their cooperation and keep the investigation closed until it is completed and they are ready to issue their findings.

<sup>87</sup> NARCAP thanks Seth Roberson for identifying this photograph.

<sup>88</sup> This usually results in much conjecture and rampant speculation.

Aviation Agencies, Airlines and Airport Management unwittingly compound this situation by choosing to declare the matter to be “something prosaic” without investigating it and then closing the discussion. Only by conducting a thorough investigation while maintaining rigorous investigative standards including security and by limiting public announcements can the great majority of criticisms, rampant speculations, undue attention and distraction, as well as fraudulent claims and hoaxes be eliminated.

The aviation community must acknowledge that due to the unusual nature of UAP incident profiles, photographs can become an important part of the investigation. This still leaves investigators with the possibility of encountering authentic photos of UAP in the course of their investigations and the need to determine the authenticity of these photos, their relationship to the incident in question and the veracity of the witnesses.

When incidents involving UAP occur near heavily populated areas such as airport terminals it is entirely possible that members of the public may also present photographs of the incident which may further compound the problems facing the investigator.

In the case of “normal” incidents involving aircraft it is fairly simple to accept or reject a photograph. However, in the case of UAP there are few benchmarks to establish authenticity beyond detailed photo-analysis as the phenomena are poorly documented. Aviation incident investigators who examine UAP related incidents should consider UAP photographs in the context of the overall incident. It is unlikely that a photograph could verify or debunk a UAP incident report. What it can really do is add to the data collected and find its use or disqualification when compared with similar data and incidents.

#### **D. Press Coverage Review**

Ruben Uriarte, NARCAP Research Associate  
and Richard F. Haines, Chief Scientist

The O'Hare incident has been reported extensively in the national and international press. This section presents a sampling of this coverage that began on December 7, 2006 with the first public announcement made by the National UFO Reporting Center. The first report was made by a person who is referred to here as witness D and the second for witness B. Both reports are included in Appendix G. Peter Davenport, NUFORC Director, contacted reporter Jon Hilkevitch on December 13, 2006 with details of the incident and Hilkevitch published his first article in the Chicago Tribune on New Year's day 2007. It was titled "In the Sky! A Bird? A Plane? A ...UFO?" This single article became the most read article on the newspaper's website and remained so for four days. Over one million page views were logged from around the world. To say that a good UFO story is still interesting to the public would be a gross understatement.

Jon Hilkevitch told the senior editor that his management was very supportive of his articles on this incident (despite the controversial subject matter) because of the huge public response that they garnered



for the Chicago Tribune. He was "...amazed at the level of interest in this subject (UAP) and how vast the field of study is." (personal communications, May 8, 2007)

Table 16 lists a number of articles in the newspaper, the internet press, radio interviews, and others.

Table 16

## Abbreviated List of Published Articles

Date	Title	Newspaper/Media	Author/Comments
11-15-06	Radio interview with Peter Davenport, NUFORC	Coast-to-Coast radio	George Noory
12-12-06	Radio Interview with Peter Davenport and a witness	Jeff Rense radio program	Jeff Rense
12-25-06	UFO Buzzes O'Hare Airport!	Sun, pg. 6.	Richard Ryan
12-29-06	Interview with J. Hilkevitch	CLTV, Oakbrook, Illinois	n/a
1-1-07	In the Sky! A Bird? A Plane? A ...UFO?	<u>Chicago Tribune</u> , pg. 1	Jon Hilkevitch
1-1-07	Airline Employee reports UFO Sighting at O'Hare: FAA Unconvinced	Associated Press	Anon
1-1-07	UFO is Reported at O'Hare; Feds are Silent	National Public Radio (Nation) All Things Considered Interview of Jon Hilkevitch	Melissa Block
1-1-07	UFO Over Chicago O'Hare Airport	Video Google	Anon
1-1-07	A UFO at O'Hare? Some Pilots Thought so	ABCNews Charleston, SC	News cast
1-1-07	UFO over Chicago O'Hare Airport	CLTV, Oak Brook Interview with Jon Hilkevitch	Anon

Case 18 Main Text	114	Rev. 07/24/07	R.F.Haines et al.
1-2-07 Airline Workers Say They Saw UFO: Mysterious Saucer-Shaped Craft over O'Hare?	MSNBC, Assoc. Press, 8:06 am	Anon	
1-2-07 A UFO at O'Hare? Some Pilots Thought so	Associated Press, 8:06 am PT	Anon	
1-2-07 FAA Dismisses O'Hare UFO	<u>Chicago Sun Times</u>	Staff & wire reports	
1-2-07 UFO Spotted Over O'Hare, FAA is Stumped	Google Earth Community #739336	Anon	
1-3-07 O'Hare UFO: Hoax or Real Sighting?	National Ledger	Jack Kramer	
1-3-07 UFO Sightings	New Scientist	Maggie Mckee	
1-3-07 O'Hare UFO Controversy: Witnesses Say Yes, Feds No	National Ledger	Keith W. Jones	
1-3-07 UFO Sighting Chalked up to Weird Weather	Stars and Stripes, pg. 10	Anon	
1-3-07 Chicago Airport UFO Discussed on CNN	CNN.com, Atlanta, GA	Juan Carlos Fanjul (J. Hilkevitch and Richard Dolan)	
1-4-07 UFO Sighted over O'Hare Airport	Associated Press	Anon	
1-4-07 Mystery Lingers over Chicago UFO Claims	MSNBC.com 2:33 pm CT	Jessica Bennett	
1-4-07 UFO Seen over O'Hare Airport	CUFOS.org	Mark Rodeghier	
1-4-07 Sighting of Disc-shaped Object Over Over O'Hare Airport, Chicago, Illinois at 16:30 hrs. (Central) on Tuesday, Nov. 7, 2006.	NUFORC website	Peter Davenport	
1-4-07 Peter Davenport's Newsweek	Newsweek - Web	Jessica Bennett	

Interview on O'Hare Airport  
UFO

1-4-07	Disc-shaped UFO over Chicago's O'Hare Airport Triggers National, International News Coverage	American Chronicle.com	Steve Hammons
1-4-07	Sighting of Disc-Shaped Object over O'Hare Airport, Chicago, Illinois, at 16:30 Hrs (Central) on Tuesday, November 7, 2006	Coast-to-Coast Radio	George Noory
1-5-07	UFO Takes a Look at O'Hare, Retreats	AVWeb	Anon
1-5-07	Change of Subject	Chicago Tribune Web Log	Eric Zorn
1-5-07	Airline Workers Say They Saw UFO	MSNBC.com	Anon
1-6-07	Not a Bird or a Plane?	Newsweek	Anon
1-7-07	They're Here! A Purported UFO Sighting at O'Hare Gives Flight to Hopes that We are not Alone	Chicagotribune.com	Jon Hilkevitch
1.8.7	1-8-07 Airline Employees Spot UFO over O'Hare	CBNNews.com	Anon
	1-8-07 UFO Report stirs Believers, Skeptics	Chicagotribune.com	Jon Hilkevitch
1.8.8	1-8-07 United Airlines Denies Reports UFO Casebook Magazine of Saucer-like Objects	Anon No. 237, Jan. 8, 2007	
	1-9-07 Hilkevitch On O'Hare 01-08-07	<u>Chicago Tribune</u>	Jon Hilkevitch
	1-12-07 Update - UFO over Chicago	youtube.com	Anon

Case 18 Main Text	116	Rev. 07/24/07	R.F.Haines et al.
1-19-07 O'Hare Airport UFO - More Information	UFOs/Aliens	Billy Booth	
1-20-07 The O'Hare UFO Sighting May be Start of a 'Flap'	EnjoyFrance News	Anon	
1-23-07 Pilots, UFOs and Job Discrimination	UFO Digest	Don Allis	
1-23-07 Government Fails to Look into O'Hare UFO	The Exponent-Purdue	Editorial Board	
1-30-07 Incidents (at O'Hare)	Wikipedia.org	Anon	
2-7-07 Incident at O'Hare	<u>Mutual UFO Journal</u> No. 466, Pp. 3-5, Feb. 2007	Sam Maranto	
2-7-07 UFOs and Homeland Security	<u>Mutual UFO Journal</u> No. 466, Pg. 1, Feb. 2007	James Carrion	
2-7-07 The O'Hare Morality Play	<u>Mutual UFO Journal</u> No. 466, Pp. 18-19, Feb. 2007	Stanton Friedman	
2-9-07 The Reality of Recent UFO Sightings	livescience.com	Benjamin Radford	
2-15-07 The Truth is Out There - Strand Columnist Anthony Marcusa & Lauren McPhillps Ponder our Existence in the Universe in the Wake of Recent Unexplained UFO Sightings	thestrاند.com	Anthony Marcusa Lauren McPhillps	
2-17-07 Chicago Phenomenon Rekindles UFO Debate	tcpalm.com	Don Almentano	
2-25-07 Unsettling Unidentified Incursions at O'Hare	Providence Journal	Leslie Kean	
2-25-07 For Many at O'Hare it was a UFO, For the FAA a 'Hole-Punch Cloud'	Sacramento Bee	Leslie Kean	

3-1-07 Aviation Investigations and Responsible Information Management NARCAP Web Site Ted Roe

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The number of reports submitted to the NUFORC website<sup>89</sup> each week in October, November, and December 2006 were counted (as of April 10, 2007) in order to see whether the widespread publicity afforded to this incident might have caused an increase in the number of NUFORC reports only for Illinois during and after November 7, 2006. As is shown in Table 17, this was not found to be the case.

Table 17

Number of Reports Made to NUFORC  
(Bold line indicates week of the O'Hare incident)

Week (2006)	No. Reports for Illinois	No. Reports for USA and Canada	Percentage of Illinois Cases
Oct. 1 - 7	1	109	0.9
Oct. 8 - 14	0	69	----
Oct. 15 - 21	3	60	5.0
Oct. 22 - 31	4	94	4.3
<b>Nov. 1 - 7</b>	<b>6</b>	<b>60</b>	<b>10</b>
Nov. 8 - 14	3	71	4.2
Nov. 15 - 21	1	75	1.3
Nov. 22 - 30	2	128	1.6
Dec. 1 - 7	2	73	2.7
Dec. 8 - 14	4	76	5.3
Dec. 15 - 21	2	82	2.4
Dec. 22 - 31	4	76	5.3

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The fact that the whole subject of UAP is fair game for the entertainment field is illustrated by the TV program "Boston Legal" written and produced by David E. Kelley that aired during the week of February 19, 2007. Facts from the O'Hare incident were used in an interesting way that included a courtroom scene at which an ORD tower controller was subpoenaed to testify. It's likely that such dramatic portrayals

<sup>89</sup> [www.nuforc.com](http://www.nuforc.com)

contribute to the fears professionals already have about this subject, making it even harder to get them to cooperate in legitimate research such as NARCAP is carrying out.

### E. Other Ground Observer Reports of UAP in the Area<sup>90</sup>

#### E.1 Interview 1 with Ms. J.H. (February 6, 2007)

Sam Maranto, MUFON, Illinois State Director<sup>91</sup>

The witness was turning off Mannheim Road into O'Hare to terminal five when she first noticed the object in the sky. Figure 39 shows an aerial view of the area involved. Mannheim Road is the yellow road on the right side running to the north.



<sup>90</sup> The testimony in this appendix includes two telephone interviews (E.1, E.2) between Sam Maranto, MUFON investigator and Illinois State Director and Ms. J.H. a 52 year old female alleged eye witness to this event. They took place on February 6, 2007 (82 minutes duration) and February 22, 2007 (approx. 50 minutes), respectively. The BLOG entries in E.3 were submitted to the *AboveTopSecret.com* website on January 26 and 27, 2007 by Ms. J.H. and another set of BLOG entries (E.4) were submitted to the same website between January 14 and 17, 2007 by an anonymous person named "Ramp Agent X."

<sup>91</sup> Bold numbers were inserted in the following interviews by the Senior Editor to mark key details that are related to testimony given by other witnesses in this report. Concerning the credibility of Ms. J.H., Maranto stated, "I am certain not only of her authenticity but the accuracy of her account of the event." (Personal communication, April 9, 2007). Nevertheless, Ms. J.H. was interviewed earlier by Mark Allin, (*AboveTopSecret.com* director) and Linda Moulton Howe so it isn't possible to accurately assess the likelihood of prior leading or biasing here.

Figure 39. Aerial Photograph of O'Hare Airport Related to Witness Testimony Provided by Ms. J. H. narcap#18\_MsJHroadpath1.jpg

Sam: So tell me what you observed last November 7<sup>th</sup> at O'Hare.

J.H.: When I first spotted it it was straight ahead of me slightly to the left<sup>92</sup> and just sitting there and it had this odd quality about its reflectivity. It didn't in any way look like a plane. It seemed very much to absorb and take on the colors of its surrounding. The top of it really... you can tell was independent of the sky but it did kind of absorb the color of the sky. The bottom of it not only was shadowed but to some extent was reflecting the darker ground. So from more underneath it really looked a dark gray. If you'd seen it more from the side angle it had this almost opalescent effect. It is so hard to describe. There is not a material that I can think of that really looks like it. I even wondered... my first reaction was this must be metallic but then, I have this moment where I thought it was like, maybe it's ceramic of some sort? Because it has, almost has, this...fuzzy opalescent quality to it. Not mirror-like reflection yet able to reflect but it didn't seem like a mirror-like metallic hard metal surface. It was awful but I have to say when I saw the reported "cell phone photograph".

Sam: "Yes".

J.H.: I'd have to say it really looked like the thing. I know I was seeing it at an angle ...well what I did when I saw it from the road, I was like "Oh my god we have to get to a parking lot really quickly." At first my friend didn't see (it). Then when it got to the point that she saw it too she said "We've got to get to the parking lot really quickly" so we turned into the International Terminal and parked at the first place we could park.

Sam: Now you saw it? You weren't responding to other people's reactions?

J.H.: No. No. No. I did see some other people on the road who obviously saw it and had digital cameras or cell phones I couldn't tell you which because I was in the middle of rush hour traffic so I did see people trying to take pictures. Then there were a number of people looking over that way. The sad thing is most people were focusing on driving, so they may have not seen it. Then we got into a place where we could park and got out. Most people you had to point it out to them but some people had already had done that. It took about two or three minutes for you to park. It was still there at that point. We stood there and pointed it out to people. We ended up with a group of about seven people all together standing with us watching it. One fellow had a digital camera. He was taking many pictures. That much I do know. I saw other people taking photos too.[1] My concern is that from as faraway as we were, that people with cell phone photos for example, that things may appear further away and it may be only a pixel or two and they might not even really think they have anything. Whereas with a good photo program. Now that I've talked to Jeff and everybody now I have some respect for what can be done with photos that look like they haven't really captured anything. In part my whole point coming out is that I

<sup>92</sup> It is difficult to reconcile this statement with Ms. J.H. driving north on Mannheim Road if the UAP was located above gate C17 which is almost due west of her at that time. Perhaps the object had not yet arrived above gate C17. This possibility is strengthened by an earlier testimony presented below in Appendix E.3 (BLOG entry 1. 27 at 19:27) where she said that, "When I saw it from Mannheim, it appeared much paler, but as I moved closer to underneath it it darkened."

saw people taking photos, I know there are photos out there; yes they may be taken from a farther distance - but they still can be of value. We didn't have binoculars with us but my friend had her reading glasses. We were actually adjusting our arms and looking at it through that. You knew even with the naked eye that it was something kind of oval, disk shaped. Not as hard edged as the stereotypical disk, it seemed to have a counter clock wise spin going on. If there was wobble it was so fast that this may be that was what was causing that fuzzy quality?[2]

Sam: So that fuzziness was like a distortion around the edge?

J.H.: There was a distortion in the immediate sky area very close up to it but a visible distortion [2] which I could see when I looked at it through the reading glasses.

Sam: How long did you observe it? Do you feel you witnessed the whole event?

J.H.: I must have. It was thirteen or fourteen minutes all together.

Sam: Were you viewing it from different perspectives or were you stationary in one spot?

J.H.: From the road and when we pulled into the International Terminal and pulled over. So I did see it basically from two different places which would put it up in the area of the runways to the farthest south at O'Hare the longest runways that run from Southwest to Northeast. It would put it down in the neighborhood of not quite the end of that maybe up a concourse a little from that.

Sam: So that area of concourse C does make sense?

J.H.: Yes, it totally makes sense.

Sam: Did you see it move lateral at all or only hover?

J.H.: Well here's the deal, there were times when I thought there was little movement. But for the most part I would have to say it was mainly still. If it moved laterally at all it was very little.

Sam: OK

J.H.: And very slowly. Though I was trying to pay attention to the object I was also looking around to see how many people were also seeing this. Where we were if you didn't know that it was there you probably wouldn't notice it [3] but once you did notice it, especially if you had reading glasses, binoculars, or a camera where you can zoom in, then it was really compelling.

Sam: Was there any other objects in the sky that can give you a reference of size?

J.H.: No but it seemed to me ...I'm somebody who has been around planes a lot. My dad was a Naval carrier command crew officer. I lived on Naval air stations. I am from the Washington D.C. area originally and there is a tremendous amount of air traffic around there. It has been that way since my



childhood. I know planes, how they look, how they move. I'm not a person that is inclined to panic. I'm just very observant. I was a reporter for a number of years. When I go into observer mode I try to remember everything so later when I am sorting through I have a really coherent set of thoughts. That is also why I was watching other people to see how many people are watching it, how many are photographing it, their reactions to it, and do they really know how odd this is.

Sam: So how many people did you actually see that observed it and how many took pictures?

J.H.: It would have to be several dozen people saw it from where I was. As far as photographing it there had to be at least half a dozen, possibly to a dozen. The one fellow that was standing with us took a tremendous amount of photos. Again I don't care if it was a bad digital camera he had to get images. Something could be done with it. A number of people too because it was the international terminal and god only knows what country they are from and may have taken them with them and may not have even heard about the sighting that others had seen it also and it had become somewhat of a big deal. One of the questions I had asked at *Above Top Secret*, "Here we have people from all over the world but how many of you heard about it from some place other than a web site?" The point being is, not everyone gets their information from the internet. So how many people heard about it on their country's news? I don't get the [Chicago Tribune](#) so I didn't know about it until I stumbled upon it online. It was on one of my regular news sites. I don't know if it was on MSNBC News where this article shows up. Not knowing that it had gotten any attention, my friend and I were talking non-stop about having seen it. For her it was the first unusual thing she had ever seen so she was going through the entire process of, you know, "What was that? What could it be? What did I see?" So we had talked about it a tremendous amount.

Sam: How far were you from the C concourse? Do you have any idea where that is because you were in the international terminal, right?

J.H.: Yes. The international terminal, number five, may be a quarter mile maybe around in there. I really figured because I certainly had seen planes that day in the same vicinity. It was smaller than conventional plane I was putting anywhere from twenty five to thirtyish feet.[4]

Sam: How would you describe it height wise? Did you get an idea of height?

J.H.: Well again it was at a slight angle to me so it was leaning to the left from my perspective. I was seeing some of the side view but also some of the bottom. It looked from my angle not as severely shaped as a freebie. I compare its width to its height. It seemed a little fatter a one to three ratio. For example, if it was twenty-five feet wide it would probably have been six to eight feet tall.[5] It wasn't like the stereotypical disk where the edges were really sharply put together. It seemed to be more rounded towards the edge than that.

Sam: So it was a little plumper?

J.H.: Yes, and that was something I was trying to analyze. Am I seeing that (it) is more disk shaped yet because of the angle it is to me it's looking more oval or am I seeing something fairly oval? When the

thing took off. It sort of angled just slightly in my direction. That is when it looked the most disk like. Again I was seeing more of its bottom than its side. It stayed at this angle during the whole interlude.

Sam: Now when it took off did it go straight up or was it at a bit of an angle  
(This was disclosed by the witness earlier. I am not leading the witness.)

J.H.: Very slight angle towards me and to my left very slight angle.[6] I think anyone standing close to it may very well have concluded that it would have (been) seen as (going) almost straight up. Where we were we could see the side ways motion and tell it was coming towards us a little.[7] It went from a dead zero to just god only knows what instant velocity ...I mean it just went![8] People gasped and some people totally squealed and it just took off. Because at that point it was kind of coming towards us a little and I think that is what freaked everybody out a little.

Sam: How, when it moved, and it may be hard to see, but was there any change in the color?

J.H.: No.

Sam: Now when you saw it go through the clouds did you see that hole appear or remain? (Not leading the witness this was disclosed voluntarily by the witness in a prior conversation before this recorded interview.)

J.H.: I could see the hole. I couldn't see up into it. A tight elliptical hole from my angle just about the size of the thing, it wasn't a huge hole but you could see that it had punched a hole in the cloud.[9]

Sam: Now when you were noticing people around you did you see by any chance drivers getting out of their cars or sticking their heads out of their car windows?

J.H.: You know, from where I was, you couldn't see a single taxi driver. I parked away from the terminal itself. I parked at the first place I could park and watch it. Because it was so low there was (sic) some buildings there so I didn't want to park on the side by the terminal because the terminal might be in the way.<sup>93</sup> After it left we had to park closer to the terminal. The people who would have had the best view of the hole would have been those working or closer to that concourse. Yet every one could have told you they saw it even though it was kind of subtle from our perspective. Everyone around us surely pointed it out. "Look, it punched a hole in the cloud," they were saying. You would have to have been much closer to see blue sky through it. Cloud cover wasn't that thick that day it was just low.

Sam: The FAA was trying to depict a night environment. What was the light condition at that time?

J.H.: It was a gloomy day there had been sprinkles but it wasn't anywhere near dark out yet. [10] There was plenty light enough to know what you were seeing, to the point that there was a pale reflection nearly white on the top of the craft and that was the color of the clouds at that time.

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<sup>93</sup> This assertion was verified by angular calculations. If the UAP was at an altitude (AGL) of 1,438 feet it would have been at an angle of only about 15 deg arc above the local horizontal.

Sam: So it was lighter on the top?

J.H.: Yes, but you knew it was the reflective property but it didn't seem like a hard mirror reflection. It seem a buffed metallic or even a ceramic just something that could reflect the intensity and quality of color.

Sam: Give a cross comparison to conventional military craft.

J.H.: I've even been around stealth bomber, the vertical take-off and landing jets... it was nothing like I had ever seen. It had no airfoils. There may have been an area on the bottom that was dropped a little though that may have been the effect of the wobble.

Sam: Slightly protruding?

J.H.: That was something I wasn't a hundred percent sure of. It had no wings. It had no rotors. It had no obvious means of propulsion. It (had) nothing that would distinguish it to be of our current technology or cutting edge technology. That is, unless you go perhaps deep into black ops. It was nothing that we have that we know of.**[11]**

Sam: Anything conventional just doesn't fall into play?

J.H.: No! It very obviously had means of propulsion that we don't know of. There were no downward facing engines for thrust (that) I could see (on) the bottom. There was no place for exhaust to be coming from and no visible air column that would keep something hovering.

Sam: Just to reiterate. The total length of time of the observation?

J.H.: Between forty seconds and a minute for the first observation. Then in the parking lot let's just say about ten minutes.

Sam: So when you got to the parking lot there were people already looking at it?

J.H.: Yes, and you could see groups of people, of maybe two or three people, that may have been traveling together. Though it was so low on the horizon most people don't go along looking in the sky. I believe those in the lot may have also originally seen it from the road on the way into the lot. There were several groups of people looking at it just in that lot.

Sam: Did you engage in conversation with anyone else?

J.H.: Just as our little group was breaking. You know everyone got kind of quiet. Even in the terminal we heard people discussing it.

Sam: Did you see security reacting to this?

J.H.: No! But I wouldn't have seen this because where I parked there is never a security presence out there. You never see as much security there at Terminal Five as you would at other parts of the airport. What I wish I'd been more observant to or had stuck around for was the supposed military aircraft that had supposedly come in. I'm kicking myself for that. It would have held some water if the military had responded to the event.

Sam: Do you know if they held back air traffic?

J.H.: Yes. There was a noticeable change in air traffic during the event and this is the busiest time of the day.

Sam: Did you see any small plane just too low enroute that may be being moved back or diverted?

J.H.: You know, I didn't notice if anything like that had happened or not, at that point I was so focused on observing the object. Though there were planes taking off. But not from that area.<sup>94</sup> The entire time I was watching it nothing took off from that area.

Sam: How much quicker in a comparable distance did this object move in reference to a conventional plane?

J.H.: There was no comparison whatsoever. This thing went from hovering to gone. I mean gone so fast that it made people gasp.[8]

Sam: As a percentage of the observable sky from the tops of buildings to the bottom of the cloud cover where would the object have been?

J.H.: Well it looked like the cloud cover had to have been between fifteen hundred and eighteen hundred feet. My guess is it would have to have been between three hundred and four hundred feet below that. The impression of the speed was, well usually, something has to get up to a running start. This thing went from not in motion to "Oh my god that thing's gone!" In a blink that it took, you could conclude that even in a few seconds this could be very far away. It was just an unbelievable speed generated in no time flat.[8]

Sam: Since that time you have talked to Mark? (i.e., Mark Allin from *Above Top Secret*- Internet BLOG / Website)

J.H.: I have to give these guys credit, I read through the entire some seventy pages of thread at that time and decided to talk about this because there were people out there with photos that have not been heard from.

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<sup>94</sup> If accurate, this assertion might suggest a possible departure delay on runway 32L since, of the three departure runways active at the time (viz., 32L, 32R, and 22L), it is the only runway lying directly beyond her line of sight to the west. Nevertheless, no official records of departure delays could be found. But, takeoffs do not necessarily occur on a regularly timed basis from all runways which could explain her observation.

J.H.: I had actually thought this thing was going to land. My friend said, "everything is going to change." How I hope she was right.<sup>95</sup>

E.2 Interview 2 with Ms. J.H. (February 22, 2007)

Sam Maranto, MUFON, Illinois State Director

Sam: Did you ever experience anything quite like that before?

J.H.: My father had trained me in this way, because he had actually had UFO sightings when he was in the military. He said, "People don't even report it...its too much hassle. They would have to change the log books and everything." He always wanted me to be astute and observant. I have seen anomalous things in the sky and I don't say anomalous lightly. Again, I can identify so many different phenomena. What is interesting is that I even have experience with lenticular clouds because I used to do high mountain climbing. I have seen a million of them. (a manner of expression)

Sam: So you had to have laughed when people were saying that it was a lenticular...

J.H.: Please, Please, yea I can't tell you how many lenticular clouds I've seen hovering over O'Hare then punching a hole in the cloud cover. Weather phenomena? It was very obvious! It was very obviously NOT clouds! It was very obviously a solid object! It didn't change shape in any way. It obviously wasn't a balloon that would be subject to the wind. It didn't move with the wind. This was very obvious ...it was a daytime thing . It wasn't lights acting unusual in the night. This was just a very blatant daytime sighting. [11] And no, it wasn't so dark out that we could tell what we were seeing...not at all, not by any stretch!

Sam: With that in mind were lights on, do you recall?

J.H.: It had no lights on. (referring to the object)

Sam: Was the area illuminated with lights?

J.H.: No! It was light enough that the main airport lights had not come on.[10]

Sam: So the whole concept (notion) of them saying that it was dark out...

J.H.: No they didn't even have the airport lights on... that's just bullshit.

Sam: Now how many people came back in your car?

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<sup>95</sup> Maranto wrote, "I had at this time invited her to consider coming forward in a Local Fox News piece that I was helping with. Her apprehension was warranted as the news piece was spun into garbage."

J.H.: Three.

Sam: Now the friend of yours that is a pilot did he get engaged in conversation at all?

J.H.: Yea we were talking about it and asking him and that's when he said, "Now that makes sense." Because when he got inside (the terminal) somebody had said, "did you see anything unusual." Now that's unusual that anyone would say that.

Sam: Who was it that was asking?

J.H.: It was one of his airline people. So if nothing else that kind of indicates that word has been passed ... because he doesn't work for United.

Sam: I See.

J.H.: So that kind of indicates that word has certainly spread to American-Airlines. At least to actual ramp people.

Sam: Now since that time have you talked to him?

J.H.: A couple of times, Yes. He is one of the people who has encouraged me to go forward with this.

Sam: Did he uncover anything in the mean time?

J. H.: He hasn't heard anything yet. He really doesn't have any connection with anyone in ATC at O'Hare or anything like that. Since he works at a different airlines he doesn't have a connection with the United people. He did say that he was going to get some feelers out to see if any people at American Airlines saw this. As I said we both found out about it on November seventh but people simply were not talking about it. Except apparently the people who worked for United who were just told to shut up. They were just trying to press forward saying, "Hey, look, I know what I saw." Outside of that, he hadn't really heard anything.

Sam: Here's one for you. Did you notice how many security cameras are around the airport?

J.H.: Not just in the airport but everywhere. That concourse area, all of the ramp areas including the mechanic area that surround this spot. I can't help but think a heck of a lot of people had seen this just in that area alone.

### E.3 Selected *BLOG* Postings by Ms. J.H.<sup>96</sup>

Richard F. Haines

All of the following *BLOG* entries are from a Ms. J.H. According to the *AboveTopSecret.com* website, she entered the *BLOG* site on January 26, 2007 posting seven entries and another twenty by the evening of January 27<sup>th</sup>. Some of her comments are included in this section for their possible relevance to this analysis. All of her *BLOG* entries were made more than a week before Maranto's interview with her which affords them some degree of precedence in terms of their accuracy and authenticity of details. These *BLOGs* clearly indicate that Ms. J.H. took her sighting seriously and wanted to share her experience with others.<sup>97</sup> All of her entries are available on the internet at: *AboveTopSecret.com* and are not repeated here.

Because some of her *BLOG* entries contain useful background data that adds to an understanding of this event and also adds credibility to her testimony selected comments from them are included below. It is interesting to note that her first two submissions took place within an hour of each other; the first elicited two responses (from: *fooffstarr*, who subsequently submitted at least four more comments/questions to her and *roadgravel* who subsequently submitted seven others) to which Ms. J.H. replied in her second *BLOG* entry. The psychological and sociological dynamics of "chat rooms" is not of interest here except to say that Ms. J.H. appeared to be highly motivated to try to answer the questions of many different people. One can almost hear the excitement in her "voice" as she tries to give answers - in some detail - to questions other *BLOG* participants asked her.

In the following entries the first bold number is a sequential number for sake of convenience in referencing while the second bold number is the original sequential number assigned by Mr. Allin at the *AboveTopSecret.com* website. The senior editor has merely deleted from particular *BLOG* entries details he felt were not directly relevant to an understanding either of the UAP or the credibility of the alleged witness. All underlined text is added by the senior editor for emphasis. A number of her entries are copied in their entirety to help establish her general frame of mind and key details that she felt were important.

#### **1. 27 -- Eyewitness posted on January 26, 2007 at 19:27 [single post](#) (Complete Version)**

Well, into the fray I go...

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<sup>96</sup> NARCAP acknowledges Ms. J.H. as owner and the website *AboveTopSecret.com* as co-owner of the information at <<http://www.AboveTopSecret.com/forum/thread236709/>>.

<sup>97</sup> According to Mark Allin who spoke with Ms. J.H. at length soon after January 27, 2007, he found her to be sincere, well educated, and very credible. (personal correspondence, April 23, 2007)

I saw the ORD UFO. I first sighted it while at the intersection of Irving Park Rd. and Mannheim Blvd., and again for just a bit<sup>98</sup> when I got to the parking lot of the international terminal. I was picking up a friend, an American Airline cockpit officer who was flying in from Charles de Gaulle International Airport. His plane, scheduled for a 4:55pm arrival time, was delayed because of the object.

The ostensible cell phone photo could have been the object, in that the UFO's perceptible coloration did alter somewhat depending on the viewer's angle. When I saw it from Mannheim, it appeared much paler, but as I moved closer to underneath it it darkened... my impression is that it was highly reflective, with the upper part mirroring the lighter sky and the underneath mirroring the darker areas (as well as being naturally shaded). "Mirroring" is actually an awkward word, as the "texture" of the craft didn't seem highly polished, but it's the only word I can think of that somewhat applies. I do know that there are other photos, as I saw a fair number of people, even several on Mannheim, take photos with cell phones or digital cameras.

It was definitely an object, not a lenticular cloud or any other weather phenomenon. At its closest, it was no more than a quarter of a mile from me, and I saw it fly off. It was very clearly a controlled craft of some sort. There were no lights in use on it at that time.

roadgravel, the winds were light that day... too light to require any directional TO [takeoff] or landing alterations.

nextguyinline, purduejake actually posted the sighting information, as an eyewitness, the day after the sighting on a local democratic forum... months before the Trib [Tribune] heard of it.

amongus, the weather that day would match the photo, and there were still many green leaves around... my leaves in NW Indiana, 40 miles from O'Hare, didn't fall until after the snow in late November. In fact, the weather had been ridiculously warm up till then.

I'm willing to talk with the moderators of this forum, either online or by phone. I'm not willing to give my name and information in an open forum, but I'll be glad to answer questions. For the record, I'm a 52 year-old woman, former radio news anchor and reporter with an ABC affiliate, former chef and restaurant owner, with many hours in the air and experience with many types of aircraft. This was nothing conventional, and I frankly doubt whether it was something manmade.

Again, to the moderators --- please email me if you wish more information... this truly was an amazing sighting, given the proximity and the location, and I hope the truth emerges. I do encourage all with photos of the craft to release them --- I think there are far more credible

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<sup>98</sup> Elsewhere she states that she watched the object for approximately ten minutes at this location (cf. E.1, and #8). This particular intersection is visible on Figure 39 in the lower right corner where the two yellow roads intersect.



photos out there than this one.

## 2. 26 -- Eyewitness posted on January 26, 2007 at 20:25 [single post](#) (Complete)

fooffstarr... yes, I imagine I will get a bit of hassle about posting, and it's taken me a few days of reading the full thread (and a devil of a lot of peer pressure from the friend who was with me and also saw it) to step over the edge of obscurity, lol. But this, to me, is a terribly important sighting, in part because of the mainstream media coverage. And as for how it impressed me --- I bought an 8-megapixel digital camera the very next day, and I don't leave home without it. That's a heck of a chunk of change to spend over a "weather phenomenon."

roadgravel, I haven't taken the time to try to make sense of where I was versus where the main terminals and concourses were, but I could indeed see it from part of the international terminal lot... if someone wants to do up a tighter map area that shows Mannheim and the international terminal and parking area, I can pretty well determine from that exactly where it was when I saw it from there. I watched it for a number of minutes from the parking lot, as did more than a few other people, although it did generally need to be pointed out, as most people walk around with their heads sort of down, or eyes focused on their destination. By the time it took off, there were six other people standing there with me watching it, plus others at other spots in the parking lot.

## 3. 25 -- Eyewitness posted on January 26, 2007 at 21:29 [single post](#) (Complete)

Jbird, when I told the friend I was picking up what I'd seen, he told me that that made sense, given that he'd been asked by the tower if he had "observed anything unusual" while holding. I'm admittedly surmising that the hold was put on because of the UFO, but there was a sudden and marked difference in the number of planes coming in for perhaps the last ten minutes of the sighting duration (while I was in the parking lot).<sup>99</sup> I frequently meet my friend's flights, and am very accustomed to the usual traffic at ORD at that time of day.

I did see it leave. It didn't go quite straight up, and from my angle I couldn't see blue sky at the top of the hole... but it surely did leave a hole, and it went from no movement to incredible speed in a split second... no noticeable acceleration, just gone. And no sonic boom. If I've got my own position in the parking lot adequately judged, it did angle up in an eastwardly direction. I'm in the process now of trying to locate it exactly, which I should be able to do, having seen it from two locations.

Skyway, you know, I'm indeed tentative on my ID of 00000000's photo... on the one hand, I can see where it would appear that way at a different angle, and I can even justify it not being centered (from my understanding, the copilot or pilot who took that shot opened his side window and stuck

<sup>99</sup> This assertion is not supported either by inbound or outbound ground control transmissions between 3:55 and 4:55 pm CST. A ten minute delay in takeoffs and/or landings at this time of day would have been clearly apparent in airplane taxi activity.

his cell phone out, and those windows aren't very conducive to much more than a quick shot at an angle). But the same object did look darker when I was more beneath it than it did when I was viewing it at a more sidelong angle from Mannheim. What I do know for sure is that a number of people in the parking lot photographed the object, and I encourage them to release their photos.

**4. 24 -- Eyewitness posted on January 26, 2007 at 21:59 [single post](#) (Complete)**

Skyway, it was when I was heading north on Mannheim that I got the best sidelong look at it, and it did look quite a bit like (I so hate to type this, lol) the ostensible cell phone photo --- evenly ovoid, overall lighter gray, a bit too distant to make out any features, if indeed features there were. From the parking lot, though, I was closer, but at a more underneath vantage point than a sideview one... from there, since I could still see it somewhat from the side but could see the bottom better, and it looked a little more disklike from the bottom, but there was enough sideview to see that it was a bit "higher" than the stereotypical flying disk... a little thicker than a Frisbee proportionately, in other words, and with much smoother curves. I saw no features whatsoever --- as I said before, there was something about the texture that halfway perplexed me, because while it seemed by its shading almost reflective, it didn't really seem to have a mirror like surface. Words really do escape me at some points regarding this, and I'm fairly well a walking dictionary, so that's noteworthy.

As to how I felt when I saw it --- initially on the road I was curious and a bit excited by it, because it was fairly apparent that it was something quite different. When I watched it from the parking lot, there was simply no doubt in me that I was seeing, under practically ideal circumstances, a craft that was under control, that was capable of moving in ways that would, with normal (known) technology, cause a human body quite a bit of discomfort, if not broken bones, and that it was, in fact, extraterrestrial in origin. I really thought it was going to land, and the friend who had ridden to the airport with me said at one point "This will change everything." Emotionally, part of me wanted it to come down fifty feet from me, and another part of me wanted to run and hide. Not very scientific-minded of me, granted, but it had that effect.

**5. 23 -- Eyewitness posted on January 26, 2007 at 22:24 [single post](#) (Complete)**

JBird, yes, sorry, less than the usual number of planes during the last minutes of the sighting. In the parking lot, when first seeing it people made comments, but we were mostly all rather dumbstruck after the first few moments of watching, because for a number of us it wasn't a superquick glimpse, it was an ongoing and static sighting, with a realness to it that basically just shortcircuited your speech center. After it swept up and off, no one near me even said anything like "What was that?" It was difficult to find words. My friend and I reparked (I'd parked a bit far from the terminal entrance to continue watching the object) and each recounted to the other exactly what we'd just seen... I think it must have been sort of our reality test. We've discussed it every single day since then. My friend on the incoming plane said he would nose about a bit to find out more if possible, but he's not a United pilot, nor is he based in Chicago, so I'm not sure how much he'll reasonably be able to learn.

**6. 22 -- Eyewitness posted on January 26, 2007 at 22:25 [single post](#) (Incomplete)**

I didn't feel anything unusual until around the time it left, and it was such a quick sensation that I wasn't quite sure what to make of it... sort of a skin-tingle, but truly so light that it easily could have been fear rather than a genuine physical effect... although I don't tend to be especially fearful by nature, and am generally quite level even in bizarre circumstances.

**7. 21 Not Included****8. 20 -- Eyewitness posted on January 27, 2007 at 00:07 [single post](#) (Incomplete)**

Hal9000, lol, . . .As to my writing style, well, I was a reporter and news anchor once upon a time, so it behooved me to be able to write lucidly and in detail. Basically, though, much of this is difficult to explain or define, especially when it comes down to how it made me feel. It made me feel some things I've never felt before, and it's hard to come up with words for those feelings. But I'm doing my best to answer the questions put to me, and the delays have only been due to several prolonged conversations with several people who operate this forum... I've given them my name and phone number, and I think they're finding me a highly credible witness.

As to why more witnesses haven't come forward to discuss this sighting, in part it's because it didn't even make the news here for a month and a half. We were surely talking about it on at least one local forum (where purduejake first mentioned it on 7 November, the day after the sighting). Once we learned from the Tribune article about the forum where purduejake (an airline employee who saw the object) posted the sighting on 7 November, the day after the sighting... up till then, though, I had no idea that anyone had posted the information anywhere, so I just discussed it with friends, which is what I assume other witnesses were doing, too. Since I didn't have photos, I wasn't really sure what I could do... wasn't sure that simply telling what I saw would be of much use. It was mostly at the insistence of friends that I decided to write this forum... and this is the only thread on this forum I've visited. . . .

Fiverz, granted, I was paying more attention to the sky than to the parking lot, but there were easily several dozen people watching it at various points. I watched it in the parking lot for about ten minutes, and pointed it out to a few people, who stood with us and watched until the object left. I did see a number of people taking photos, both with cell phones and with digital cameras, of the object, and a large part of my purpose in talking about this is to help persuade them to release their photos.

I first saw the object when we were just north of the intersection of Irving Park and Mannheim, for less than a minute. After we reached the parking lot, we watched for approximately ten minutes, until it tore off out of there.

**9. 19 -- Eyewitness posted on January 27, 2007 at 00:14 [single post](#) (Complete)**

apc, the object had an odd visual effect to it... the sort-of-mirrorlike-yet-sort-of-"fuzzyish" quality... but I did think it was rotating rapidly and counter-clockwise. There was a vague visual effect that seemed to

indicate a spinning motion and a slight disruption or distortion of the air very close to the object.

**10. 18 -- Eyewitness posted on January 27, 2007 at 00:55 [single post](#) (Incomplete)**

Fiverz, it's exactly because I used to be in the news racket that kept me from reporting it to the papers or to television stations --- and it pretty much played out that way locally, with the usual assortment of flakes being interviewed and the story being treated lightly. I have tried to contact the reporter at the Tribune and expect to speak with him soon. If I'd had photos, I would have been more forthcoming about it, and would have sent copies of them to a print reporter, but I frankly expected dozens of photos to hit the papers quite soon after the incident, and when they didn't that both surprised and silenced me for the time being. I did contact several UFO reporting agencies to see if they'd heard about the sighting and to see if photographs had been released to them, but at that time there were no official reports (there had been several others who had contacted them as I had, but without filing official reports), and no one had sent in any photographs. Again, it wasn't until the Tribune story came out that I realized that there were, at least, other witnesses coming forward (even though they were anonymous), and I didn't discover this thread until quite recently... then I spent a number of spare hours reading this to get up to speed and to ascertain if this was where I wanted to go semi-public. I do believe more people will come out with their stories and with photos . . .

**11. 17 -- Eyewitness posted on January 27, 2007 at 00:36 [single post](#) (Incomplete)**

fooffstarr, . . . After the sighting, we just moved to a closer parking space<sup>100</sup>, went inside the terminal, collected our friend, and left. As to whether or not I'll disclose my identity fully in public and decide to raise havoc with the FAA and/or United, I'm really not sure yet... it probably depends on whether more photographic evidence is released, because while I can't provide photos, I can surely identify likely real ones and probable hoaxes.

**12. 16 -- Eyewitness posted on January 27, 2007 at 00:28 [single post](#) (Incomplete)**

Atomic, there were more than fifteen people watching it just in the parking lot where I was... so the corroborating evidence can come from more than just airline employees. There are a lot of people out there who haven't come forward yet, and just from the amount of photo-taking I saw, there are a number of photos that haven't yet been released.

**13. 15 Not included.**

**14. 14 -- Eyewitness posted on January 27, 2007 at 01:42 [single post](#) (Incomplete)**

Watcher777, I heard no noise that seemed to be coming from the object... nothing other than traffic, plane engines, etc.... there may have been sound to it, but if so, it wasn't loud, either when it was "parked" or

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<sup>100</sup> This probably refers to a more westerly side of the parking lot nearer Terminal Five.

when it took off.

**15. 13 -- Eyewitness posted on January 27, 2007 at 01:10 [single post](#) (Incomplete)**

Atomic, . . .by the way, I have a very hard time believing that no one in the tower saw the object as it was... now, granted, air traffic controllers are more screen-bound than naked-eye-oriented, but still, the object was present for at least 13-14 minutes (that's a very close estimation of how long I watched it, from the first sighting on Mannheim until it took off when I was in the parking lot), and even without a radar return, that's plenty of time for the tower to have been notified by the pilots who saw it and had radios handy, and perhaps even by other airport workers and/or their supervisors.

**16. 12 -- Eyewitness posted on January 27, 2007 at 01:42 [single post](#) (Incomplete)**

Atomic, it "tore off" out of there extremely quickly, and did indeed punch a hole in the clouds. It left at a slight angle, slightly easterly.

JBird, . . . when I was on Mannheim it was in an 11:30 position, as in ahead and slightly to the left of me<sup>101</sup> (basically NNW), and when I was in the parking lot I was facing more WNW...

**17. 11 -- Eyewitness posted on January 27, 2007 at 20:00 [single post](#) (Incomplete)**

Hi again... I sent the lovely, talented and ever so sweet jritzmamm my best guestimate of my positions and the UFO's position, as well as takeoff direction, marked... will try to answer a few questions now.

fooffstarr, I thought that photo (the Dulles area cloud hole) was worth mentioning, too... verrrry similar, indeed, except that the ORD one was fairly straight up, and slightly angling towards me and left --- the Dulles cloud hole seems nearly perpendicular to the ground. But suffice it to say, after what I saw at O'Hare, it wouldn't exactly shock me to discover that some-one? -thing? was snooping around yet another airport.

**1. 10. Not included**

**19. 9 -- Eyewitness posted on January 27, 2007 at 21:17 [single post](#) (Incomplete)**

Skyway and roadgravel, I couldn't really see the runways where I was, because there was a low building between them and us, but knowing the airport somewhat I actually figured it was up at the far end of the

<sup>101</sup> As Figure 39 indicates (showing the route Ms. J.H. took to the airport) gate C17 is considerably farther to her left side from virtually any place along Mannheim Road. Does this fact suggest that she saw it in a different location before it hovered over gate C17 or that she made an error in direction here? A photograph published as part of an interview with Ms. J.H. on <earthfiles@earthfiles.com> entitled "O'Hare UFO Eyewitness Says Disc Spun Counterclockwise" also suggests this.

main runways near the terminal and concourses there, which would indeed put it in or quite close to the position jritzmann has located it on a satmap of O'Hare. He didn't show me that map until after I had already given him all my information as to personal identity and sighting particulars... but I'd say basically that it was slightly to the SE of the southernmost runways... those runways angle up in a northwesterly direction, somewhat up towards where I was watching... it did angle in the direction the runway goes, but only slightly off of vertical.

I am a bit directionally challenged, and am trying to remember compass directions based on jritzmann's map, so I actually might confuse things compasswise from time to time.

## 20. 8 Not included

### 21. 7 -- Eyewitness posted on January 27, 2007 at 21:20 [single post](#) (Incomplete)

roadgravel, . . . I think I already may have goofed up SE for SW for the direction of the object.. it was close to if not over the terminal area that's at the end of the runways that go from the SW edge of the airport and angle up somewhat northeasterly. Part of my problem is that the map I used had N at an angle on the right hand side, and I can't turn my monitor sideways, and it's frustrating the heck out of me. From where I was as I came into the airport area (I was coming from the east), the object was almost directly ahead of me --- sort of at an 11:30 position, if you know what I mean. At that point I knew it was in the vicinity of that southerly runway, probably up towards the end of it... in other words, up near the terminal that sits at the end of that runway (I think I mistakenly said "SE" of when it's really SW of the runway).

## 22. Not included

### 23. 5 -- Eyewitness posted on January 27, 2007 at 22:00 [single post](#) (Incomplete)

Roadgravel, . . . . For a bit the object was behind me, as I drove into the terminal five area. We initially parked as far SW as we could, as that provided the best visibility.<sup>102</sup>

[edit on 27-1-2007 by Eyewitness]

## 24 and 25 Not included

### 26. 2 -- Eyewitness posted on January 27, 2007 at 23:52 [single post](#) (Complete)

roadgravel, thanks... it was really hard for me to tell exactly where it was in relation to the buildings at the SW corner. My best view of that was actually when I was in traffic, and I had to keep looking back and forth between traffic, road turns and the object. All I could tell for sure was that it was over that southwestern area, and from what I knew of the airport, that put it down the line of that one outer runway

<sup>102</sup> The best visibility in the Terminal Five parking lot in the direction of gate C17 would be from the western end of the lot not the SW corner. Is this another directional mixup by the witness?

and over towards the one terminal/concourse area. Once I parked, the runways, etc., over that way weren't visible to me, but the object was still high enough to be visible... in fact, it seemed a little "fatter" to me there, which I took to indicate that it was either doing a fat wobble, which I couldn't outright see although that would account for the almost pearly-soft or "fuzzy" effect, or because of its angle I was now able to see a bit more of its underside and less of its top.

## 27. 1 Not included

### E.4 Selected Questions by Linda Moulton Howe and Answers by Ms. J.H.

Richard F. Haines

Research Journalist Linda Moulton Howe obtained the name and phone number of Ms. J.H. from Mark Allin (of *www.AboveTopSecret.com*) soon after she had posted her BLOG entries (presented above). Howe phoned her and asked a number of interesting questions (Q) that have been repeated here (by permission) from her website < *www.earthfiles.com* >. <sup>103</sup> They provide additional insights into her sighting (A).

Q. WOULD YOU SAY IT WAS EGG-SHAPED OR ANOTHER SHAPE?

A. "I would not say egg-shaped because the elliptical part of it was really even, whereas an egg is kind of bigger on one side than the other. This (the object) was more an even shape, but a very curved shape. I know some of the people who first described it said it looked like a Frisbee. But a Frisbee is a lot flatter than this was. It was not the stereotypical disc. There was a lot more structure to it than that."

Q. IF AN EGG WERE EVEN PROPORTIONED, WOULD THE DISK HAVE BEEN EGG-SHAPED IN THAT DEFINITION?

A. "Yes, a bit more when seen from the side. When seen from underneath or at the angle I saw it from the parking lot, you could kind of get a more disc-like look from it."

Q. SO IT WAS ROUND, BUT IT WOULD HAVE BEEN PERHAPS LIKE AN EXPANDED DISC, TALLER.

A. "Exactly. It would have to be taller in the middle with no serious sharp angles at the end - just rounded curve at the sides, rather than the usual saucer-on-saucer straight edge kind of joint."

Q. HOW HIGH WAS IT ABOVE YOU AS YOU STOOD WATCHING IT IN THE PARKING LOT?

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<sup>103</sup> The interested reader should consult this website for other information as well.

A. "I wasn't directly underneath it by a long shot. I was at an angle to it at that point. Where I stopped, I was looking close to due west, but that still put it over the main terminal airport area. But I was well under a quarter mile from it. I estimated at the time that the clouds were probably around 1800 feet high."

Q. I THINK OFFICIALLY IT WAS CLOSER TO 1500 FEET.

A. "It was a very low ceiling day and this thing was below the clouds. I wouldn't say it was much below the clouds."

Q. LET'S SAY THEN THAT IT WAS LESS THAN A QUARTER MILE FROM WHERE YOU ALL WERE IN THE INTERNATIONAL PARKING LOT AND MAYBE AT ABOUT 1,000 FEET?

A. "Yes, I would say 1,000 to 1,200 feet. It was a little under the cloud level. It was a hazy day, as well, though. But it was not foggy. Visibility was not that great, but within that quarter-mile distance, it was perfect. You couldn't mistake what you were seeing."

Q. YOU DESCRIBED THAT IT WAS SPINNING. COULD YOU SEE ANY KIND OF DISTORTION IN THE AIR AROUND IT?

A. "Yes, there was distortion very close to the craft. It did not at any point expand out from it that I saw. It was very close to the craft. It was almost as if you could see constant motion in the air very close to it.

"It almost seemed like the air was excited around it - that there was motion in it. It was almost visually like if you were watching a distant cloud of gnats. You would not be able to see the gnats, but you would be able to see the impression of motion. It was kind of like that around the object."

"...It did punch a hole through the clouds. I wasn't directly underneath the hole... It did leave a hole and it didn't even seem that the clouds moved as it punched through. But then after it was gone, they began filling back in...."

Q. AND YOU WERE THERE FOR AT LEAST TEN MINUTES

A. "I was there for about ten minutes and I had seen it on Mannheim Road for about three or four minutes earlier. So, overall from when I first saw it to when it punched a hole in the clouds, probably thirteen to fourteen minutes."

Q. YOU WERE SEEING IT STATIONARY WITH A SPINNING QUALITY AND THIS GNAT-LIKE DISTURBANCE OF THE ATMOSPHERE AROUND IT, WHEN IT



## MOVED, WAS IT JUST A STRAIGHT SHOT UP? WHAT HAPPENED?

A. "From a dead stop, suddenly you saw the motion. You saw it go up those few hundred feet, but it was almost so fast that you couldn't even process it until after it was gone. There was no acceleration. No noise that I could tell. But there were jet engines and there was the heavily trafficked road between us and the object. But there really seemed to be no noise that I could perceive from it. Probably the United workers fairly well under it could tell better on that.

"It just (sic) at a slight angle in our direction, which would have been slightly east, it just was gone!"

Q. THE HOLE WAS INSTANTANEOUS?

A. A. "Instantaneous."

Q. COULD YOU SEE BLUE SKY THROUGH IT?

A. "I wasn't under the hole right under it to see that. I could not see blue sky, but I could see the hole, the shadow. I could see that there was a hole there.

"This was the most impactful sighting I can imagine, unless it had dropped down completely to the ground and entities got out! I cannot imagine what it would take to be more convincing to anyone than seeing this object. There was no way it was anything other than a solid metallic object, (spinning counterclockwise)."

### E.5 Selected *BLOG* Postings by Ramp Agent X

Richard F. Haines

An anonymous person submitted a number of *BLOG* entries to *AboveTopSecret.com* between January 14, 2007 and January 17, 2007 under the name rampagentX making him or her the first person to claim to be an eye witness to this event. The senior editor devoted much effort to determine whether or not this individual was reliable and whether or not to include the details here. This effort was not entirely successful and this decision could have gone either way. When these *BLOG* entries were sent to two United Airline employee witnesses at ORD for their opinion, however, the results were surprisingly positive.

In support of the validity of these entries are the following points: (1) Ramp Agent X refers to himself and coworkers as United baggage handlers at United concourse C. Later he refers to himself as a 'rat' which is local jargon for "ramp rat." This term may not be generally known. (2) He makes a statement on January 15<sup>th</sup> that appears to correspond with something another witness had heard that could *not* have been common knowledge. (3) He refers to the small size of the UAP, "...Like one of those radio control (sic.) drones they use in Iraq." This corresponds with what another employee known to the senior editor said

among his co-workers that day.

Mitigating against the validity of these *BLOG* entries are the following points: (1) He said he would be fired if he talked about the incident which isn't necessarily true according to several other employees. (2) He claimed he and others were, "...ferrying a load of late bags for a 727 to F12 or 14." Yet, as another United official told me, "There are never any 727s around our work areas anymore." In a later entry he stated, "...my friend advised me to alter some important stuff so (sic.) prevent people from guessing who I am... We (do) get some old 727s from regional operators sometimes but its been a long time since I put bags in one."<sup>104</sup> (3) Just after the UAP rose up through the cloud layer he claimed that, "...there was definitely sunlight inside the hold (sic.)" and that he could, "...see sunlight for a bit." NARCAP's weather assessment suggests that this would be virtually impossible due to cloud thickness at the time. Not even witness A who was standing directly beneath the hole said he saw blue sky or sunlight. (4) On balance, ramp agent X 's testimony possesses more verified than clearly false information and is included here for the sake of completeness but without any particular endorsement. As will become apparent, rampagentX sounds remarkably like witness A.

As was done in the previous series of *BLOGs* the first bold number is a sequential number for use in referencing while the second bold number is the original chronological number assigned by Mr. Allin at the *AboveTopSecret.com* website who is acknowledged as the secondary source for this information. The senior editor has deleted some information from particular *BLOG* entries for the sake of brevity. All underlined text is added by the senior editor for emphasis.

**1. 7 -- rampagentX posted on January 14, 2007 at 13:16 [single post](#) (Complete)**

Hello. A friend told me about this website yesterday and said I should talk to you guys.

I saw the thing at O'Hare. It was a big thing for us, but then our supervisor said we'd get fired if we talked about it so Im (sic) kind of nervous.

Can they trace me here?

**2. 6 -- rampagentX posted on January 14, 2007 at 14:33 [single post](#) (Incomplete)**

Ok

What made me finally want to say something was all the news about this thing and was because we were told to stay quite. (sic) Like there is a cover up like you see in the movies. There are three of us baggage handlers who saw all of it. I never believed any of this stuff until now.

If you have any questions I can do my best to answer.

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<sup>104</sup> This is a clear admission that he did not transport late bags to a 727 model airplane.

**3. 5 -- rampagentX posted on January 14, 2007 at 21:39 [single post](#) (Complete)**

Okay. Im (sic) not good at chat, but here goes.

I work for United like you guessed by now.

We were ferrying a load of late bags for a 727 to F12 or 14, I don't remember now, when I saw what I thought was a widebody running off course out of the corner of my eye. When I looked up there it was just siting there, a gray shiny thing pretty high up, more than 1000 feet.

At first we thought it was really far away, because it was hard to focus on it, but it shifted left and right a couple times and that's when we knew it wasn't too far away. I looked up at the 727 cockpit and pointed to it. Then the crew saw it and was staring at it too. The pilot got on his radio and waving his arms like he was going nuts over what he was seeing. We figured it was a fat disc, like a M & M, about 20 feet wide but it was really hard to tell for sure because it was almost the same color as the clouds and if you looked away it was hard to find it and focus again. One of our crew ran to his locker to get his cell phone to take a picture.

It hung there moving really slightly from side to side for about another minute when we all felt our hair stand on end,<sup>105</sup> and it just shot straight up into the clouds faster than anything we ever seen. It disturbed the clouds, like it made a big shockwave and we could see sunlight for a bit. We never got a picture but I don't think it would have come out very good anyway.

We could see a few other rats staring up at the hole and everyone was talking about it for a few days. Then the sups came and talked to all of us that we cant (sic) talk about this to anyone or we'd get fired. They said something about federal regulations and unauthorized reporting of false airspace breeches.

Last week, the sups came down again and reminded everyone about the regulations. Thats (sic) what made me think theres (sic) more to the story so I started searching online. I play pool with a buddy who told me about this website chat room so here I am.

I always thought people who believe in aliens were crazy but I don't know what that thing was. We see lots of aircraft come in even the fancy stuff that stays in the air when the President lands, but this thing was like nothing none of us ever saw.

**4. 4 -- rampagentX posted on January 15, 2007 at 07:46 [single post](#) (Complete)**

I just got called in because they expect there to be delays from the weather. I'm normally off on Sunday and Monday so double time is fine by me.

I saw some of your questions and I can try and answer.

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<sup>105</sup> Witness J.H. also remarked about feeling "a sort of a skin-tingle" when the UAP departed (cf. her BLOG entry 6. 22 in Appendix E.3).

The clouds were normal low ceiling overcast so I don't know how thick. From where we were, we couldn't see directly up the hold (sic) the thing made but there was definately sunlight inside the hold so it went all the way through the clouds. And yes it looked like the hole was made by the thing as it went up.

I'm pretty sure the sup's words were unauthorized reporting of false airspace breech but it might be something slightly different. But it was we knew they want us to treat the thing as some freak weather and not a UFO.

I don't think there is a risk if you say they can't trace me here.

When our hair stood on end I'm certain it was just a couple seconds before it took off into the clouds like there was some build up of something. It felt like the static electricity of pulling off a sweater.

I don't think there are any pictures since none of us carry anything like a camera with us but a few people now are. We all talk about it almost every day and if there were pictures it would help us because the people that didn't see it are getting pissed and think we're all crazy.

Two other rats from C thought the thing flew away to the east but most of us saw it go straight up. The boss from C thinks this might mean there were maybe two different things\_ or the same thing showing up two different times. I'll find those guys and ask them today.

### **5. 3 -- rampagentX posted on January 15, 2007 at 22:05 [single post](#) (Incomplete)**

I don't think the thing was directly over C at least it didn't look that way to us. I've never been in the tower so I don't know if there is a way to look up but I think it would be hard to see the thing from the tower but I can't say for sure.

No one wants to talk about this so I don't think anyone is going to say anything. I havent (sic) even told anyone I'm chatting here.

If I report this to the [www.mufon.com](http://www.mufon.com) or [www.nuforc.org](http://www.nuforc.org) people will I need to give them my name and personal info? If so I won't do it.

We were concerned about the airspace breech too. Some of us are getting angry with this being hushed up with all the terrorism and TSA idiots hanging around. If we see a funny looking bag all damn hell breaks loose but park a funny silver thing a few hundred feet above a busy airport and everyone tries to hush it up. It just dont (sic) make sense.

We all think it was too small for a space ship too and thats (sic) why some of them think its (sic) something we made. Like one of those radio control drones they use in Iraq.

You say that youd (sic) tell your boss to screw it if he told you not to say anything but hell I got kids and

rats are rats because theres (sic) not much else we're qualified to do and the pay is pretty good for a luggage tester. hah! But we do have a contract that says we can't discuss company secrets and anything our sups tell us is a secret and we think theyre (sic) trying to male (sic) sure we know they think this is a secret.

We think there should be an investigation so we can feel better about seeing what we saw. I want to know why funny looking bags are more important than strange objects in the sky.

No one we know has any photo.

You guys were chatting a lot between youselfs (sic) so I think I got all your questions. I'll check in again in the morning. Thanks it feels better being able to tell someone about this.

## 6. Not Used.

### 7. 1 -- rampagentX posted on January 18, 2007 at 19:21 [single post](#) (Incomplete)

I was reading the chats and saw the one from pegasus1 and am worried.

Worried that you think I was playing a game. Well I guess part of it was since my friend advised me to alter some important stuff so prevent people from guessing who I am. I figured you guys wouldn't know about equipment and gate details and work schedules but United has many more Boeing than Airbus. We get some old 727s from regional operators sometimes but its been a long time since I put bags in one. Like I said, I'm not good at chating (sic) and screwed the pooch by trying to hide who I am with bad info.

I'm not brave enough at this to say it all with all the right details. Maybe now you have someone who is but I'm not so certain and maybe he's someone to scare me away. The reason I came to your chat was not to pretend I saw space ship but to call your attention to the real problem of its being silenced. Because we're all really pissed that something floating above an hub airport is treated like nothing and odd looking luggage causes all hell to break loose.

I'll shut up and watch for now.

## E.6 Another Possible Report

Richard F. Haines

While a relatively large number of people have claimed to have seen the UAP hovering above the United concourse very few have been verified. Considering the visibility and low cloud cover at that

time it would difficult to see a small, stationary object just under the cloud base from any great distance beyond the airport property itself. Other eye witnesses of this phenomenon in nearby suburbs of Chicago might possibly have seen it before or after its departure from O'Hare, however. One such report follows.

According to a report submitted to the *National UFO Reporting Center* from Aurora, Illinois, about 25 miles SW of O'Hare, a husband, wife and their children saw a shiny object hovering in the sky to *west* of them at 5:00 pm on November 7, 2006. It was "about level with the clouds" and was located in "an open area of the sky in between two sets of clouds." No trail of any kind was seen. Its altitude was estimated at about 1,000 feet. It was thought to be silver and round. It is problematic whether this was the same UAP as reported at the airport a half-hour earlier.

## **F. Pilot Workload During Landing of Heavy Commercial Aircraft**

Don Ledger, NARCAP International Technical Specialist )<sup>106</sup>

### F.1 Summary

Public perception of what goes on in the cockpit of the modern and the not so modern airliner and commuter aircraft of today is largely formulated upon the thinking of the writers and directors of the

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<sup>106</sup> Senior Editor's Comment. Given the "See-and-Avoid" flight rule discussed above (see footnote 56 in Section 8.1, Safety Implications) it becomes particularly critical to safe operations when an airborne object is present that is small, stationary, and otherwise difficult to see due to atmospheric visibility conditions and the object's coloring, background camouflage effects, etc. as was the case here. But in addition, as Ledger's discussion makes clear, the cockpit crew is extremely busy during an approach to landing and subsequent taxi operations. This makes it even harder for them to see and avoid such unexpected objects. Air traffic controllers in the tower are there to extend and reinforce the safety zone around the airport. Ledger is a rated pilot and very familiar with the cockpit activities he discusses.

movie and television industry. Often what occurs on the movie flight deck is tailored to the needs of the film; the action and the dialog almost always ignore the reality of a pilot's work in order to achieve the plotline's desired effect. The truth suffers as a result.

In fact the landing phase of any flight is extremely busy and requires a great deal of attention to many details in order to make sure that the landing is routine. The pilots not only have to deal with the mechanics of landing a two or 270 ton aircraft loaded with living, breathing human beings but they must also mentally process aural<sup>107</sup> as well as visual inputs while at the same time sensing the airplane's control movements.

Visually the pilots must constantly scan instruments for information that tell them the attitude, speed, altitude, rate of descent, angle of descent, fuel state, distance from, magnetic references from beacons and markers and a host of other instruments available to let the pilots know that the “good side” is still up, that is, that the airplane is right-side-up! There is also the “real” visual input from the outside world provided that the pilots can see the skies around them, the ground or the runway. Continual control inputs are necessary during the descent to the threshold of the runway.

It should therefore be obvious that for pilots to take time away from their duties to scan their surroundings other than to see the runway or quickly scan for other aircraft in their “safety” zone, and take notice of any anomaly it then must be something so important, so arresting, that they would deliberately take the time to look for it and either report it or make flight adjustments to avoid it.

While each approach and landing is different what follows is a general scenario of what pilots do when they are landing a large airplane. The actions and procedures that are followed are highly complex and are simplified for the purpose of this report; it takes a considerable amount of flight training and hundreds of hours of instrument flying to truly understand the procedures.

## F.2 The Three Phases of Flight

There are three phases to any flight; the take-off phase, the in-flight phase and the landing phase. In this case we are chiefly concerned with those three phases affecting commercial, passenger and corporate aircraft. Typically these aircraft vary in size and complexity and carry anywhere between 4 and 400 passengers.

Of the three phases, the landing phase is not only the most difficult but also the most dangerous. None of this is to say that every landing is accomplished on a prayer and a song but is in fact quite routine 99 percent of the time. The remaining one percent of landings account for what commercial pilots are paid for-for when things get difficult or suddenly go wrong, sometime during the in-flight phase or during the landing phase. Often things do go wrong at the end of the flight when certain controls are activated during the approach and landing phase to slow the airplane down and lose altitude so that the aircraft can touch down at its optimum speed at a point on the runway that will allow the aircraft to roll out, slow

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<sup>107</sup> These are usually artificial aural inputs arising from electronically generated tones, bells, highly noticeable warbles, woop-woop alarms and voice alerts.

down and exit the runway at a safe speed.

### Phase One - The Take-off

To examine the landing phase and hence the pilots' workload one must appreciate the various factors set in play from the very beginning during the take off phase. Not to dwell on the take-off, it need only be said that every effort is made to get the airplane up to speed, clear of the runway surface in the shortest distance possible and gain altitude as quickly as possible.<sup>108</sup> Speed and runway length plus the aircraft's own virtues are usually pushed to the limit to accomplish this gaining of altitude. The take off typically affects the rest of the entire flight via a predictability curve.

### Phase Two - The Flight

Once airborne it is then desirable to find that compromise necessary to fly an assigned altitude at a speed that is not only economical fuel wise, good for the airframe and closely matching the flight's Flight Plan but satisfying to the passengers on board who wish only to get to their destinations as soon as possible in relative comfort.

### Phase Three-The Landing

Having arrived in the vicinity of the destination airport it suddenly becomes necessary for the pilots to reduce their speed and altitude while complying with air traffic control's requests for turns, descents and speed increases (or reductions) while being "slotted" into the long line of other air traffic also approaching a busy airport and avoiding aircraft taking off from the same airport. Spacing between consecutive airplanes, both laterally and vertically, must be maintained by law and this is the responsibility of the air traffic controllers on the ground. But this does not-or should not-lessen the vigilance on the flight deck.

The pilots will scan the sky around them while monitoring their instruments for rate of descent, speed, and distance from the touchdown point on the runway once it is known which runway they have been directed to. At very large and busy airports such as Chicago O'Hare there may be three or four approach runways in operation at the same time, designated by the control tower while other runways are being used for departures.

Since the tower knows which airline is connected with the flight it will usually "slot" the aircraft into a lineup that will land it reasonably close to its arrival gate to facilitate fuel economy and speed up the deplaning of passengers. This is not only cost effective for the airline but helps with baggage dispatch and customs checks. Because of this it is in the back of the pilot's minds to land his airplane on the runway at a point where it will be able to leave the runway to the taxiway that is best situated to get his flight quickly and safely to its pre-assigned arrival gate. Once past a taxiway there is no possibility of the airplane turning around and going back to the desired taxiway any more than the driver of an 18 wheel freight-liner would turn around on a busy freeway to go back and take a missed exit.

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<sup>108</sup> Needless to say, it would be almost impossible for the flight crew to see a small UAP nearby during this phase of flight unless it was directly ahead of them.



Like the heavy truck the airliner would have to take the next available taxi exit which would not only cause a delay for their arrival at the designated gate but possibly cause some additional traffic confusion for Ground Control. The ground movements at a large airport often seem chaotic. Those responsible for ground movement in the tower are known to make their frustrations known when they are faced with conflicts on their taxiways and aprons.

All of this takes skill and an attention to detail that entails maneuvering the airliner to the desired point of touchdown. Getting that airplane into a position for the optimum touchdown point which satisfies the pilots, the airline, the approach controller, and ground controller starts many miles back during its final approach.

The above should be borne in mind when considering the adjustments and maneuvers the pilots must go through in order to make the aircraft land where they want it to, at a safe speed and with the absolute minimum of impact, none of which can be accomplished without forethought and experience.

At some point during the flight the airplane begins "letting" down from its assigned altitude after being directed to do so by air traffic control (ATC). The pilots switch to the appropriate approach frequency; contact approach control and are directed to descend and turn to whatever heading is necessary to put the aircraft in a position to eventually join the other flights queuing up for that destination while maintaining mandated aircraft separation.

The auto-pilot is disconnected and the pilots, usually - but not always - the Captain, assumes manual control of the aircraft. Because they are descending the pilots have to reduce engine power in order to lose airspeed so as to not over-speed the aircraft nor exceed the approach speed demanded by ATC. They will then trim the aircraft using smaller control surfaces on the main (wing) control surfaces to keep the aircraft descending at a predetermined angle to achieve a desired rate of descent.

"Bleeding off" (reducing) speed and losing altitude in order to reach the airport at the runway's touchdown point requires the use of the tools the pilots have at hand. They will deploy (extend) flaps that are situated on the inboard section of the trailing edge of the wings; these might deploy in concert with the leading edge wing slats which help change the camber [the upper curved surface] of the wings by adding the flaps and the slats [at the front of the wing] which droop downward. The flaps not only create lift as do the slats, but create drag as well thereby slowing the airplane while maintaining essential lift.

There is another device that can be deployed as well, the spoilers. The spoilers are strips of reinforced metal which pop up from the wing about one third of the way back from the wing's leading edge. These effectively cause turbulence over the top of the wing destroying (spoiling) the wings' lifting capability in that area. Spoilers are not only used when the aircraft has landed but sometimes in the air as well. The pilots can maintain forward speed and the aircraft's attitude (e.g., at level flight) but lose altitude at the same time. It is of course very important that the pilots be concerned about the position of the spoilers at all times.

Later model airliners are capable of landing themselves in what is called “auto-land” mode. Sometimes the pilots will select this mode to maintain their currency with “auto-land.” This entails “engaging” this mode and, upon a safe landing, disengaging the “auto-land” so that the aircraft can be directed off the runway and be taxied to the intended arrival gate. Selecting auto-land however requires that the aircraft has been set up for the final approach; it cannot accept any further commands. The aircraft's navigation system knows where it is and what runway it is required to land upon and sets about to do just that. The approach then is deliberate, stabilized, and at its correct speed and rate of descent. Landing at a busy airport like Chicago O'Hare might not permit such a landing due to constant changes in speed and direction demanded of the flight crew by the tower. In this brief review of cockpit activities we assume that the pilot is in manual control of the airplane.

The pilots have, by now, radioed approach control and have been “vectored” to their heading and told to descend to (cleared down to- but not below) a certain altitude or perhaps to maintain their present altitude; it is even possible they will be required to climb to avoid other traffic.

All through the landing phase the pilots will be referring to their landing checklists that contain everything from power reduction to the seatbelt signs.

The pilots also have to respond to radio calls from ATC and stay on that designated frequency. The airline's “company” radio might be in play at that time as well but is monitored in addition to the more important FAA tower frequencies. Usually the first officer [FO] will handle the radio work while the captain flies the airplane. The FO will also be handling certain tasks such as flap deployment, slat deployment and spoiler deployment or a combination of all three when the pilot calls for these at certain settings at particular times.

Each pilot has a Jeppesen approach plate (printed chart) clamped on a small clip-board on the control yoke in front of him. This plate contains a lot of useful information regarding the airport and available radio navigation aids. Under poor visibility conditions, as was the case on November 6, 2006 at O'Hare International Airport, the approach plate provided all required information for IFR (Instrument Flight Rules) standard instrument approach procedures. It also marks the locations and altitudes (AGL) of obstructions to flight such as mountains, towers, other controlled airspaces. Also included are various navigation beacons and electronic marker frequencies and their locations.

Figure 40 shows one approach plate for ORD that provides pilots with all of the radio navigation, radio frequency, and other information needed to make an approach to runway 27L. Large airports may require many such plates. For O'Hare plates see <http://www.fbweb.com/fb40/airport/ORD.html> The present UAP would have been most visible to a flight crew during an approach either to runway 27L or 27R if they had been looking for it.

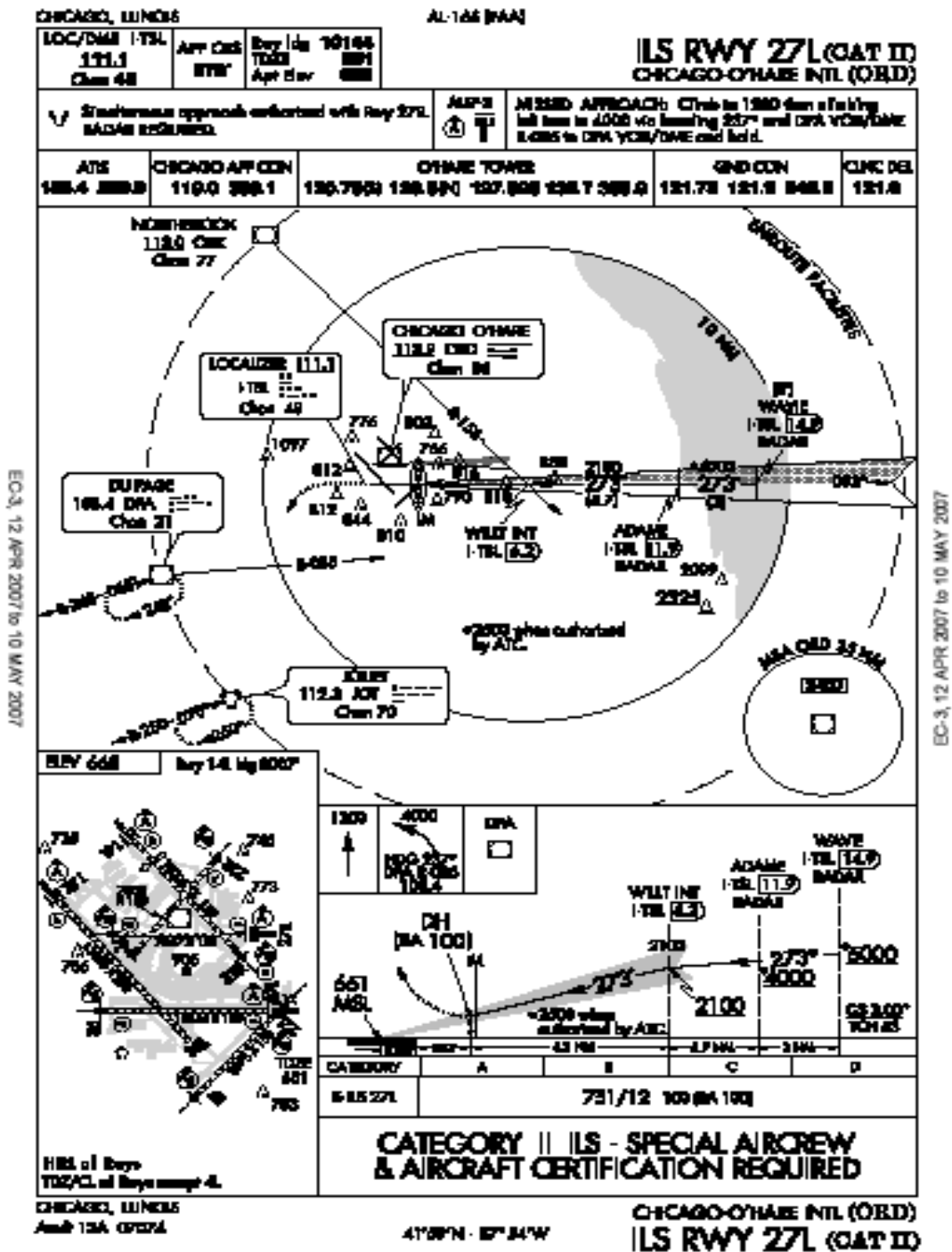


Figure 40. Approach Plate for ILS Runway 27L (Cat. II) at O'Hare International Airport

### F.3 The Outer Marker

The Outer Marker (OM) is an electronic beam oriented to transmit vertically in a narrow beam that alerts the pilot when the aircraft is a measured distance from the end of the run-way. Pilots typically refer to the end of the runway as the "button," the "numbers," or the "threshold." The OM is usually located four to five miles from the threshold. For the purposes of this report runway 27R<sup>109</sup> at Chicago O'Hare International Airport will be used.

The OM for RWY 27R is located at 41-59-03.535N / 087-47-20.476W, 4.5 nm (27,198 ft.) from the approach end of runway 27R. It broadcasts on 414 kHz the Morse code identifier IA which the incoming aircraft will intercept and begin their glide-slope for the runway advising the tower that they are over the outer marker. The landing gear is extended and the resultant drag produced by the wheels suddenly introduced into the airplane's "slipstream" will require adjustments to speed, "sink" rate and the aircraft's attitude.

At this point they are pretty much committed to a landing on that runway and will be working all of their controls (predominantly trim controls and throttles) to maintain a constant rate of descent, speed and glide angle. Finally, the tower will advise them that they are number one for runway 27R and clear them for landing. At 4.5 nautical miles or just over 5 statute miles from the runway's threshold at a speed of approximately 150 knots [173mph] the aircraft will cover that distance at 2.9 miles per minute for a total of one minute and 47 seconds. During this short period of time the pilots have to visually acquire the runway. This is easy enough to do on a clear day but at night and in cloud it's a different matter.<sup>110</sup> On the day in question in this report the cloud-base at Chicago O'Hare was measured at 1,900 by a laser ceilometer with likely additional layers of cloud above so that our theoretical aircraft would have been descending through cloud on an ILS (Instrument Landing System] approach and would have broken out of the cloud cover shortly before intercepting the Outer Marker.

Let's assume that the aircraft has now established itself out of "trail," i.e., in a string of aircraft approaching the airport, to be number one for the runway. It is covering the distance from the outer marker to the threshold swiftly and will be touching down on the runway in the location the pilot thinks is best suited to allow for reasonable braking and reverse thrust to allow them to "roll out" and exit the runway at a safe speed onto the taxiway that will take them expeditiously to their arrival gate.

Speed is all important. Enough speed must be maintained to prevent a stall (the wings stop producing lift) while still allowing the rate of descent [usually about 500 feet per minute] necessary to allow the aircraft to touch down where the pilots want. But that option is not always available if the tower wants the pilot to "expedite" (speed up) and get the airplane on the ground because of other airplanes backing up behind him.

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<sup>109</sup> The numbers on a runway are the first two digits of the runway's magnetic heading rounded to the nearest 10, in this case 270 degrees magnetic. Magnetic headings below 100 degrees are prefixed with a zero and the last digit is dropped so that 90 degrees becomes runway 09.

<sup>110</sup> Cf. Haines and Flatau (1992) for more information about flying at night.

Assuming that the Captain is flying the airplane the first officer is reading off altitudes and distance to the runway. The pilot might be looking outside toward the runway but flicking them back to the aircraft's speed and rate of descent displays. Pilots scan their primary instruments and engine instruments constantly looking for irregularities.<sup>111</sup> Adjustments are being made to trim and the flaps either increasing or decreasing the angle to the wing. To an observer on the flight deck the pilots may appear to be relaxed and making small movements but in fact they are carefully guiding a highly complex piece of machinery down an invisible slope at 160 to 200 miles per hour. It is the busiest period of the flight. At some point, and that point varies between aircraft and environmental conditions, they are committed to the landing.

The landing seems assured, both pilots are looking outside for a moment, looking for the runway and any hazards to the aircraft. Such hazards include runway incursions by airport vehicles and other aircraft. In addition, other aircraft could be on the ground or perhaps in the air taking off or landing on another runway. In the latter case these would be some error committed by either tower control or a pilot. Pilots expect aircraft on runways that diverge and converge with their own. They don't expect to see an aircraft where it shouldn't be.<sup>112</sup> If they do it is arresting and reason for concern; a reason to wonder if it is a threat to their aircraft. One way for the flight crew to find out is to radio the tower and ask. It is not something that would be done with the slightest degree of frivolity; not at this stage of the approach and not at a busy airport. There would have to be a very good reason to do so.

Now the power is being reduced, the engines are "spooling down" producing less power, the airplane in a controlled fall forward out of the sky. The aircraft reaches the "rotation" point and the pilot "flares" the airplane which should be just at its stall speed. It then settles gently (considering its weight) onto the runway. The nose wheel is held off the runway for a short time to use the plane's own profile as an aerobrake. The wheel drops when the slats and flaps are retracted and the spoilers are "popped" up to "kill" (eliminate) lift. The brakes are applied and the mechanical buckets deploy, swinging in behind the engines' exhaust, to force the thrust forward.

Once the aircraft has slowed sufficiently the tower will usually ask them to exit the runway on one of the taxiways running off at an angle to the runway. Once the aircraft has indeed safely turned onto the exit, the tower will tell them to contact *arrival ground control* (O'Hare - 121.75 Mhz) and at that point they are under ground controls authority. From there they are directed via a number of taxiways to their intended arrival gate. The pilots have shut down various functions in the aircraft and concern themselves with making sure they are clear of ground vehicles and other aircraft while crossing aprons and traversing the rest of the way to their assigned gate.

#### F.4 Personal Observations as a Pilot Related to Take-offs on Runway 32L and 27L at O'Hare Airport on November 7, 2006 at About 4:30 pm.

It would appear to me that if there was any change to runways due to the UAP's presence it would have most probably been departures on runways 27L and specifically 32L. An aircraft sitting on the

<sup>111</sup> It should go without saying that when the crew is doing this they cannot be looking outside the cockpit.

<sup>112</sup> It is safe to say that almost no pilots expect to see a UAP in the vicinity of an airport. Consequently, their mental "expectancy model" simply does not include a UAP. Research has shown that under such conditions pilots may not see a conspicuous object even if one is present. (Fischer, et al., 1980).

"button" of runway 32L would have had a clear view of something hovering over gate C17 almost regardless of the UAP's altitude. An aircraft departing on either of these runways would get increasingly closer to the object as they climbed out. An aircraft on 32L would have been looking up at the bottom of it from a distance of only approximately 1,500 feet laterally to the east. An aircraft taking off on 27L would have been at a greater altitude when passing the alleged UAP's position.

It could be that there were questions concerning this object's presence a few minutes before the people spotted it from the ground at gate C17. I think it is extremely unlikely that the tower was ignorant of what was going on and that they did not know of it. If I was in the pilots' positions and was either taking off and landing, I would be extremely concerned of its intentions; I would be antsy about the probability of this UAP suddenly veering toward my airplane and endangering my passengers and crew. The ramifications of an avoidance maneuver (collision avoidance turn) to avoid some object during the take-off phase when airspeeds are drastically reduced during any maneuver other than the best rate of climb versus best angle of climb and the subsequent deviation from it heading could be catastrophic.

Though there are very few instances of a UAP actually being involved with, or doing damage to an aircraft, there are other forces in play. The pilot's reactions must be fully considered during any encounter with a UAP. Perhaps that is where the real danger lies.

#### G. NUFORC Witness Reports

Figures 41 and 42 present the original witness reports submitted to the National UFO Reporting Center concerning this incident.

Occurred : 11/7/2006 16:30 (Entered as : 11/07/2006 16:40)

Reported: 11/13/2006 2:54:54 PM 14:54

Posted: 12/7/2006

Location: Chicago O'Hare Airport, IL

Shape: Disk

Duration: 2 minutes ((NUFORC Note: This report is a revised version of the original report submitted by this party, or parties. It was revised at NUFORC's request, in order to disguise the person submitting the report. The report accurately addresses the event, although we are satisfied that the person, or persons, who submitted the report cannot be identified from it. The above facts may be a synthesis of what dozens of individuals saw, summarized by one, or more, persons, who were witness to the activities surrounding the incident.

We would like to express our sincere gratitude to this source for the information provided!! The information that has been shared with our Center has proven to be flawlessly accurate, as established by objective corroboration.

This witness has indicated above that the event probably occurred at 16:40 hrs. (Central). We believe that

16:30 is a more accurate estimate, and we have amended the time above to reflect that estimate. Official FAA tapes, if they can be obtained, should provide the exact time that the incident was reported to the O'Hare Control Tower. PD))

Disc seen hovering over O'Hare Airport. Many witnesses. FAA and TSA contacted about incident.

I'm a management employee for a major airline and was sitting in my office at around 1630 on Nov. 7th when an employee made a radio call to our station operations center concerning an object hovering over gate C17 at O'hare International Airport. I ran out of my office and saw a relatively small object hovering in place over C17. The METAR was reporting OVC 1900 and I initially estimated the object hovering at about 1000 feet. After about a minute, I saw the aircraft zip to the east and disappeared.

I immediately called our operations center to confirm the sighting and the FAA was contacted while I drove to the other concourse to talk with the witnesses. I spoke with an employee working that gate who said he was compelled to look straight up for some reason and was startled to see the craft hovering silently. He then made the radio call and notified the pilots at that gate who opened the front windows and witnessed the object for themselves. The employee stated the object was 500-1000 feet above the ground, rotating, and metallic in nature with no lights. He said it looked like a frisbe and was directly above.

The FAA reported no radar blips and I believe the TSA was notified. Our shift manager was notified and the incident was immediately reported to our WHQ Operations Center.

All employees are very familiar with aircraft around the world's busiest airport - this was nothing we are familiar with. As a side note as it is probably unrelated, the next aircraft into that gate was experiencing electrical problems.

#### Figure 41. Witness D Report to the National UFO Reporting Center

Occurred : 11/7/2006 16:30 (Entered as : 110706 16:30)

Reported: 11/21/2006 4:08:16 PM 16:08

Posted: 12/7/2006

Location: Chicago O'Hare Airport, IL

Shape: Circle

Duration:20 min ((NUFORC Note: This individual was interviewed, at length, by one of the investigators involved in the follow-up investigation. The investigators were highly impressed with the witness's credentials, and with the accurate description of the event. We deem this witness to be extremely highly credible.

We express our sincere gratitude to this witness for his having shared the information about his sighting with NUFORC, and with his fellow American Citizens. PD))

## Figure 42. Witness B Report to the National UFO Reporting Center

## Chicago OHare UFO Report

Ok I have been hesitant about talking about this, but after hearing the report on Coast to Coast AM with Mr. Norey I can not be silent. I work for a major airline at OHare, I am a taxi mechanic. I have the job responsibility of moving aircraft under their own power from gate to gate or the hangar complex for maintenance. We also accomplish the engine run-up testing needed. So I hope that does something for establishing a little of credibility for my report. I am still in absolute wonder and amazement at what I saw that afternoon.

Around 1630 a pilot made a comment on the radio about a circle or disc shaped object hovering over gate C-17 at the C concourse in Chicago. At first we laughed to each other and then the same pilot said again on the radio that it was about 700 feet agl (above ground level). The day was overcast with the ceiling being reported at 1600 feet if I remember correctly. I was taxiing a Boeing 777 from the Intl Terminal to the Company Hanger on the North side of the Airport. As we passed the C Terminal on the Alpha taxiway we observed a dark gray hazy round object hovering over OHare Intl Airport. It was definitely over the C Terminal. It was holding very steady and appeared to be trying to stay close to the cloud cover. The radio interrupted with chatter about the object and the ATC controller that was handling ground traffic made a few smart comments about the alleged UFO sighting above the C terminal.

We had to continue moving the aircraft to the hangar. After parking I noticed the craft was no longer there but there was an almost perfect circle in the cloud layer where the craft had been. The hole disappeared a few minutes later.

For the rest of the night there were jokes made on the radio about the sighting.

((NUFORC Note: This individual was interviewed, at length, by one of the investigators involved in the follow-up investigation. The investigators were highly impressed with the witness's credentials, and with his description of what he saw. We deem this witness to be highly credible. PD))



Figure 43. ATIS Information for ORD, November 7, 2006

**Recorded at (UTC):** 11/7/2006 20:51**Airport:** ORD**Visibility:** 6 (mi) **Temperature:** 12 (c) **Dewpoint:** 9 (c) **Wind Direction:** 280 (deg) **Variable Wind Direction:** (deg) **Wind Speed:** 04 (kts) **Wind Gust:** (kts) **Altimeter:** 2979 (in) **Sky Condition:** HZ OVC017

**ATIS Message:** ORD ATIS INFO Q 2051Z. 28004KT 6SM HZ OVC017 12/09 A2979 TWO NINER SEVEN NINER. ARR EXP VECTORS ILS RWY 22R APCH, ILS RWY 27L APCH, ILS RWY 27R APCH. SIMUL APCHS IN USE. land and hold short operations are in effect. RWY 22R ARR MAY BE ASKED TO H/S OF RWY 27R, 6 THSD FIFTY FT AVBL. IF UNABLE, ADVISE APCH CTL. READBACK ALL RWY HOLD SHORT INSTRUCTIONS. DEPS EXP RWYS 22L, 32R, 32L FROM T10. 8800 FT AVBL. NOTAMS... TWY M3 CLSD TWY M4 CLSD TWY S CLSD BTN TWY S2 AND TWY T . USE CAUTION FOR NUMEROUS CONSTRUCTION CRANES IN THE VICINITY OF ORD. PLEASE REFER TO ALL NATIONAL AND LOCAL NOTAMS. PILOTS USE CTN FOR BIRD ACTIVITY IN the VICINITY OF the ARPT. Use caution for men and equip at numerous sites on the field. when ready to taxi contact gnd metering on freq 121.67. ...ADVS you have INFO Q.. .

**Flight Category:** MVFR**SUN Position:** Day Light

#### I. Freedom of Information Act Requests

The senior editor requested the following items by letter dated November 18, 2006 to the Freedom of Information Act (FOIA) Office, O'Hare Lake Office Center, 2300 E. Devon Avenue, Desplaines, Illinois 60018. All requested information was for November 7, 2006 for the period 4:00 pm to 5:00 pm local (CST) time. This request was assigned the tracking number: 2007-001234GL.

All FAA control tower voice recordings

Tower Supervisor logs, notes, and all other documents such as telephone and radio communications notes, memos, etc.

Tower Ground Controller logs, notes and all other documents such as telephone and/or radio communications notes, memos, etc.

All radar data that covers an area (only) within the airport's outer perimeter. We would prefer digital printout of these (radar) data if available along with available keys, symbol definitions, and other information required to

c orrectly interpret the data.

On January 12, 2007 FAA's Freedom of Information Act analyst, D.S., telephoned to say that the Chicago tower had informed her that "...they checked its voice tapes for the data and time in question and had found relevant portions only on one inbound ground frequency and two phone calls. I authorized her to send these items. Since D.S. informed me by telephone about this alleged incomplete voice communications data I requested a confirmation by e-mail on March 7, 2007. She sent this confirmation

on March 8, 2007.

A CD containing NTAP primary and secondary radar data was received on February 14, 2007. A second package containing the tower's daily record of facility operation (Figure 8), and two audio cassettes was received on March 5, 2007. When it was discovered that the voice communications tapes were not complete (cf. Figure 8) a second FOIA request was placed by e-mail on March 8, 2007 and confirmed the following day (also by e-mail). It was assigned the tracking number 2007-003352CS. It requested:

FAA control tower voice recordings from all ground control frequencies only for the time period 2155 to 2255 UTC.

FAA control tower voice recordings of all phone conversations from the Area Supervisor's position only for the time period 2231 to 2252 UTC.

All FAA Operations Manager phone conversations only for the time period 2155 to 2255 UTC.

These items were requested because, as Figure 10 illustrates, there were long periods of time in the initial tape recordings received where no recordings were provided but might possibly contain some reference to the UAP.

A package was received on March 31, 2007 (with cover letter dated March 9, 2007 from the ATO Central Service Area, Ft. Worth, TX.) containing one audio cassette. Because it only contained a repeat of the first cassette received and was not what was requested another letter and telephone call was made on April 3, 2007 to the FOIA analyst to request (again) what was originally requested. Two audio tapes were finally received on April 24, 2007. Both were for the time period 2155 to 2255 UTC (3:55 to 4:55 pm CST) on November 7, 2006 as requested. One included inbound and the other outbound ground control communications, the results of which have been included in this report.

The senior editor also filed a FOIA request with Scott AFB, Illinois on March 22, 2007 for information concerning all jet interceptor scrambles on November 7, 2006 as well as all available tower logs, communications records, memos and voice recordings having to do only with O'Hare International Airport for that date. No reply has been received as of April 25, 2007.

A second no reply was from R. Gibbons at Chicago TRACON.

Mr. William Puckett also filed several FOIA requests. The first (No. 2007-000943GL) was for NTAP primary and secondary radar data at O'Hare for the time period 2225 to 2240 UTC and all tower voice communications tape recordings related to United flight 446. He received this information on February 2, 2007 but the radar data extended only from 2225 to 2226 UTC for some reason. The more crucial fourteen minutes of data around the time of the sighting was missing. He subsequently learned that the FAA computer used to search and copy the requested data had not been allocated enough memory. He received the entire data set on February 2, 2007. His second request was for all inbound and outbound ground controller tapes for the period 2255 and 2355 UTC which he received in early May 2007.

