### What Was That "UFO" Jimmy Carter Saw?

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#### **1. Introduction**

In January, 1969, Jimmy Carter saw a "UFO". It happened almost exactly two years before he would become Governor of the State of Georgia, and seven years before he became the 39<sup>th</sup> President of the United States.

It wasn't until 1973 that Carter made any public mention of the "UFO" incident. As described by Don Rhodes in reference [1], Carter was at a press conference in Statesboro, Georgia in September 1973, when he was asked about several recent "UFO" sightings in Georgia. Rhodes says Carter "surprised those present by contending that he himself had a similar experience" and then told of his "UFO" sighting.

<u>Carter's "UFO" Report</u> - As described by Robert Sheaffer in reference [2], Carter's announcement prompted Hayden Hewes, Director of the International UFO Bureau (IUFOB) to send a letter to Carter, dated September 14, 1973 (Appendix A) with a request to fill out an official IUFOB sighting report form, which accompanied the letter. Carter quickly completed the form, signed and dated it September 18, 1973, and it was sent back to the IUFOB on September 20, 1973 (Appendix B). A PDF copy of this letter and sighting report can be found at the link given in reference [3]. A more readable text version of Carter's report is provided by Don Rhodes in reference [1]. Carter's IUFOB report may have been based on a tape-recorded description which he made shortly after the incident (reference [1], page 59, and reference [2], page 22). However, the speed with which he filled out and returned the form, as well as other clues discussed later, likely rule out his use of this recording.

<u>Was it an Alien Spacecraft?</u> - Although it's clear that Carter believed he had seen a "UFO", he never took this to mean that he might have seen an alien spacecraft. In reference [1], Rhodes states "in his capacity as President of the United States, he would also say that he knew of no government cover-up regarding UFOs and that he himself did not believe extraterrestrials had ever visited Earth". As described by Carter's grandson Josh in Podcast 561 of the Skeptics Guide to the Universe (reference [4]) Carter told his grandsons "oh, it wasn't an alien, it was a UFO". He then went on to explain "that it was Unidentified, it was Flying, and it was an Object. A UFO. He told us he suspected it was a rocket or something from Warner Robbins or Eglin, but he didn't know."

<u>Was it a Barium Tracer Cloud?</u> - Carter's suspected explanation was in fact quite a good one. In 2016, upon reading Carter's UFO report in the Rhodes book [1], I realized Carter's description fit very well with the characteristics of a high altitude, rocket-released barium cloud. This perception was based on my work during the 1960s on US Air Force and NASA research programs that launched various chemical tracers into the upper atmosphere by rockets. In the course of this work, I had personally observed releases of barium or other tracers at high altitudes (up to about 250 km). My observation locations had ranged over various distances from the lunch site, in one case as much as about 1000 km (a high-altitude chemical release launched from Wallops Island, VA, observed from Sandy Springs, GA).

A brief search and some analysis led me to conclude that a highaltitude barium cloud, produced by a rocket launched from Eglin AFB on the evening of January 6, 1969, was indeed the explanation for Carter's "UFO" sighting. A letter explaining my conclusions was sent to the Carter Library and was subsequently forwarded to President Carter and his family. Grandson Josh Carter forwarded that letter to The Skeptics Guide to the Universe [4], from which it found its way to the Wikipedia article on the "Jimmy Carter UFO Incident" (reference [5]).

The following writeup describes extended analysis that provides more compelling evidence that is was a high-altitude barium cloud that Carter saw in his "UFO Incident". Some analysis and discussion is also given here explaining why it was not the planet Venus that Carter saw, as was suggested by Sheaffer (reference [6] and reference [2], page 25).

#### 2. Date of the Sighting

In Carter's IUFOB report (Appendix B), he estimated the "UFO" sighting to have occurred on an unspecified day in October, 1969, at 7:15 pm Eastern Standard Time, while he was waiting for a Lions Club meeting to start at 7:30 pm in Leary, GA. In reference [2], Sheaffer describes early (1970s) media reports that gave incorrect information about the date (and/or the location) of the sighting. He then describes in compelling detail his investigations, concluding that the incident occurred on January 6, 1969, rather than the October date given in Carter's report.

Sheaffer's investigation [2] determined several facts that refute the October date estimate, and confirm the January 6 date. Carter visited the Leary Lions Club in his capacity as District Governor of the Lions, but his term in that position ended in June, 1969 (reference [2], page 24). The Leary Lions Club had disbanded "a few weeks" after mid-February, 1969 (reference [2], page 23). Al Webb, of the Lions Club International, provided Sheaffer with information from Carter's official District Governor visitation report for his trip to Leary, dated Monday, January 6, 1969 (reference [2], page 24). Charles Mask, secretary of the Edison, GA Lions Club, confirmed that the Leary club met on the first and third

Mondays of every month at 7:30 pm (reference [2], page 24), consistent with the time estimate of 7:15 pm given in Carter's IUFOB report.

#### 3. Was it Venus That Carter Saw?

In 1977, Sheaffer (reference [6]) made the case that the "UFO" which Carter saw was in fact the planet Venus. He also discussed this conclusion in his 1998 book (reference [2]). Several of Carter's answers in his IUFOB report (Appendix B and reference [1]) make this identification problematic. In response to question 11 about a comparison to the object's brightness, he said "At one time, as bright as the moon". For question 17 about a description for the object, he checked "Sharply outlined", but left "Like a bright star" blank. Although in question 18, he described the object as "Self luminous", in question 20 concerning the object's apparent size, he wrote "About same as moon, maybe a little smaller. Varied from brighter/larger than planet to apparent size of moon".

In IUFOB report question 29, Carter described the direction of the object's appearance as "appeared from west about 30 degrees up". As computed by the iOS app "Planets" (developed by Q Continuum), the position of Venus at 7:15 pm EST, January 6, 1969, as viewed from the latitude-longitude of Leary, GA (31.5N, 84.5W) would be an elevation of 25°, and an azimuth of 237° (roughly WSW). Thus, Venus would have appeared in the sky at a position very close to that described for the object seen by Carter. However, as an Annapolis-trained US Naval officer, Carter would have been well aware of the techniques of celestial navigation, whereby sextant observations of the Sun, Moon, planets, or stars are used to compute geographical location (reference [7]). In reference [1] (page 58), in response to a question about his possible confusion of the "UFO" with the planet Venus, Carter is quoted as saying that "he was an amateur astronomer and definitely knew the

difference". To anyone familiar with the evening sky, the presence of Venus as the "evening star" would not have been especially remarkable. In fact, from Leary, GA at 7:15 pm, Venus would have appeared in the western sky, at an elevation above 10°, every clear night from late November, 1968 through late March, 1969.

In a 2017 blog post (reference [8]), after seeing the material presented in reference [4], Shaeffer discussed the possibility of Carter's "UFO" having been the January 6, 1969 barium cloud. He concluded that this was an "intriguing possibility", and noted that the barium cloud would have been very close in the sky to "the brilliant Venus". Shaeffer has also recently conceded that Carter's UFO "description fits the barium cloud better than does Venus" (Shaeffer, private communication).

#### 4. Sounding Rockets and Chemical Tracers

Since the 1950s, sounding rockets have been used to release various chemical tracers to study winds and other properties of the upper atmosphere (references [9] and [10]). During the 1960s, I worked on US Air Force and NASA-sponsored sounding rocket projects, both as a graduate student and early in my faculty career at Georgia Tech. I participated in projects that released sodium, tri-methyl aluminum (TMA), and barium tracer clouds [10], as well as other tracer chemicals.

<u>TMA Clouds</u> - Tracers such as sodium and TMA are usually released continuously in a trail, to facilitate measurement of upper atmosphere wind profiles over a range of altitudes. Barium is released at one or more "point" locations along the rocket trajectory. Sodium and barium produce no glow on their own and require resonant scattering of sunlight to be visible. These tracers can be used only early in post-sunset or late in pre-dawn time periods, when the cloud is sunlit at its high altitude but it is sufficiently dark at ground level for the cloud to be visible against the dark sky above. TMA reacts with atmospheric oxygen to produce a chemiluminescent glow. This produces TMA clouds that are visible at night as well as under twilight conditions (Figure 1).

**Barium Clouds** - Barium clouds are used to study both neutral and ionized constituents of the high atmosphere. Neutral (non-ionized) barium is released at a "point" and produces a cloud that rapidly expands in a spherical shape and is visible by a greenish or bluish glow. A portion of the neutral barium quickly becomes ionized (electrically charged) by exposure to the intense sunlight in the high atmosphere. The ionized portion of the barium is visible by a reddish glow, as it expands in an elongated, roughly linear shape, oriented along the local field lines of the Earth's magnetic field. Characteristics and appearance of a typical barium point release cloud and TMA trail are well illustrated in Figure 1. The white portions (lower part) of the TMA trail are in darkness, while the light blue (high altitude) portion of the trail is visible by resonant scattering associated with aluminum (reference [11]). The barium cloud is fully illuminated by sunlight and is also visible by resonant scattering.

<u>Analysis of Figure 1</u> - The star background in Figure 1 can be used to get an idea of the size of the barium cloud (as viewed from an optical triangulation site which is probably about 100 km ground distance or about 230 km slant range distance from the cloud). The star at the center-left of the reddish edge of the ionized barium is Delta Hercules. The star near the center-right edge of the blue neutral barium is Mu Hercules. The angular separation between these two stars is about 5° (and the width of the neutral barium cloud is about 7°, or 28 km if the slant range is 230 km). Thus, in the minutes since its initial "point" release, the blue, neutral barium cloud has expanded to a sphere of about 28 km diameter. At this time, the reddish cloud of ionized barium, having restrained expansion across the Earth's magnetic field lines, and accelerated expansion along the field lines, has reached dimensions of roughly 10 km by 32 km.



**Figure 1** – A barium "point" release cloud (upper left) and TMA trail, launched near sunset, Sep 23-24, 1994, from Alcântara Launch Center, Brazil (latitude 23.4S, longitude 44.4W). The neutral barium (dark blue) was released at 207 km altitude. The ionized portion of the barium glows reddish. The TMA trail varies from white at low altitudes (lower right) to light blue at high altitudes (center). [Details - Rebecca Roth, NASA Goddard Space Flight Center, private communication].

The star background in Figure 1 can also be used to gauge the appearance that the planet Venus would have presented to an observer, when viewing it in proximity to the barium cloud of January 6, 1969. The bright star about 5° to the right of the upper end of the light blue part of the TMA trail in Figure 1 is Vega (alpha Lyra), which has an apparent brightness described by a visual magnitude of 0.0. The two fairly bright stars about 3° below the lower end of the light blue part of the TMA trail are Beta and Gamma Draco. These stars have an average visual magnitude of about 2.6, meaning that they are about 11 times fainter than Vega. On the night of January 6, 1969, Venus had a visual magnitude of -4.3, meaning that it was about 50 times brighter than Vega. So, Venus in the night sky in close proximity to the barium cloud would have presented a spectacular visage. However, it should be noted that the visual magnitude of the waning gibbous Moon, had it been in the sky at that time, would have been about -12, or roughly 1200 times brighter than Venus! In his IUFOB report, Carter correctly indicated that while stars were visible (question 7), that the Moon was not (question 6), since moonrise that night was not until about an hour after the start of the Lions Club meeting he attended.

#### 5. The Barium and TMA Clouds of January 6, 1969

Subsequent to the 2016 letter in which I first identified a barium chemical release as the likely source of what Carter reported as a "UFO" (references [3] and [4]), I uncovered an Air Force Cambridge Research Laboratory (AFCRL) report that gives much more detail about this barium release experiment launched on January 6, 1969 at 6:41 pm EST (reference [12]). Barium release experiment "KAY" (AG 7.671) actually consisted of three separate point releases of barium at heights, ground ranges, times, and positions shown in Figures 2 and 3. The AFCRL report

also gives details about a TMA release (AG 7.626 "LILI") launched the same evening at 7:35 pm EST.

<u>The January, 1969 TMA Cloud</u> - It definitely appears that Carter did not see the TMA trail on January 6. The TMA was released as a more-orless continuous trail along the rocket trajectory, as it ascended between about 85 and 150 km altitude. This trail was released between about one and two minutes after the rocket launch at 7:35 pm (reference [12]). If the Lions Club meeting started on time at 7:30 pm, Carter would have been inside before the TMA cloud launch time. Also, the appearance of the TMA trail would be totally inconsistent with the description that Carter gave in his IUFOB report. In the few minutes after its release, the TMA trail would have been significantly distorted by the high-altitude winds, much as exhibited by the TMA trail photo in Figure 1.

Details of the KAY Barium Release - Data from the AFCRL report (reference [12]), for altitude, latitude, and longitude for the three KAY barium release clouds, and shown in Figures 2 and 3, can be used to compute characteristics of the barium clouds as they would have been seen by an observer in Leary, GA. Table 1 gives computed elevation, azimuth and slant range for the three KAY barium releases, as seen from Leary. Table 1 also gives computed angular separations between the three barium releases, and angular separations from each barium release to Venus. The angular separation from the bright star Vega to the center of the barium cloud In Figure 1 is about 13°. Thus, the angular separation between Vega and the Alcântara barium cloud shown in Figure 1 is comparable to the angular separations between Venus and the KAY barium clouds released on January 6, 1969. Somewhat like Vega in Figure 1, Venus would also have been to the right of and below the center of the KAY barium clouds. As noted in the previous section, Venus would be considerably brighter than Vega.



**Figure 2** – Summary of predicted and actual trajectory for barium release KAY, launched from Eglin AFB, January 6, 1969, at 1741 CST (6:41 pm EST). Barium point release I occurred at 6:44 pm EST at 202 km altitude and ground range 70 km. Release II was at 6:45 pm EST at 208 km altitude and ground range 94 km. Release III was at 6:46 pm EST at 166 km altitude and 111 km ground range (reference [12]).



**Figure 3** – Predicted and actual positions for barium release KAY (launched from Eglin AFB on January 6, 1969 at 6:41 pm EST) and two other barium experiments (MAE on January 7 and ODET on January 13). Positions of optical triangulation sites, from which photography of the barium releases was conducted, are indicated (reference [12]).

**Table 1** - Sky position of the KAY barium clouds (reference [12]), as seen from Leary, GA, (latitude 31.5N, longitude 84.5W). The table also gives angular separations between the barium releases, and the angular separations from the barium releases to Venus (elevation 25°, azimuth 237° at 7:15 pm EST).

	Position, Se	en From Lea	ary, GA	Angular Se	parations
Release	Elevation (degrees)	Azimuth (degrees)	Slant Range (km)	Release to Release (degrees)	Release to Venus (degrees)
 КАҮ I	32.4	231.4	363 379	l to II=2.8	9 10
KAY III	23.9	222.8	386	l to III=11.4	13

#### 6. How the KAY Barium Clouds Would Have Looked

Reference [13] describes the observational goals and some results from the January, 1969 barium releases at Eglin AFB. That report says these studies were "designed to find the chemical composition and release altitude that would maximize the yield of free barium". One conclusion noted in the report was an improved barium yield achieved with one of the chemical mixtures used, and that "there was also an increase in yield with altitude". However, there is very little in this report that allows us to determine what these barium clouds looked like. We therefore turn to reports of similar barium releases at other locations for descriptions of barium cloud behavior and appearance.

**The Algeria and Fairbanks Releases** - Reference [14] describes results of a series of barium releases from Colomb Bechar, Algeria (release latitude 31.1N, longitude 3.1W) in November, 1966. Figure 4 shows imagery of the barium cloud of November 19. Images are shown from 10 sec to 1000 sec (16.7 minutes) after cloud release. Figure 4 clearly depicts the separation and growth patterns of both neutral and ionized barium clouds, from an initial nearly spherical (and very bright) "point" release cloud. Figure 6 in reference [14] shows that the Algeria neutral barium cloud reached a maximum effective radius of about 12 km (24 km diameter) by about 8 minutes after release. The ionized barium cloud reached a maximum effective longitudinal radius (along Earth's magnetic field lines) of about 22 km (44 km diameter) by about 13 minutes after release, while reaching no more than about 5 km effective radius (10 km diameter) in the transverse direction (across the field lines). These size dimensions indicate that the barium cloud depicted in Figure 1, above, is about at its fully-developed dimensions, and that the January 6, 1969 release at Eglin would likely reach comparable size, with the separation and growth of the neutral and ionized barium clouds developing similarly to those of the Algeria release.

Launch of the Algeria cloud was designed to occur when the Earth's shadow height was at 90 km, which would occur at a solar depression angle of about 9°. Figures 7 and 8 in reference [14] show that observations of the Algeria neutral cloud continued for about 11½ minutes, while ion cloud observations continued until about 20 minutes after release (i.e. until about 3½ minutes after the last image in Figure 4). At this time the Earth's shadow reached the cloud altitude and, now being in shadow, the cloud could no longer be seen by resonant scattering of sunlight (reference [14], page 7). Figure 8 in reference [14] shows that during their observation periods, both the neutral and ion

clouds descended about 8 km in altitude from an initial release at about 198 km. Figure 9 in reference [14] shows that, during their respective observation periods, the neutral cloud drifted about 45 km ENE, while the ion cloud separated and drifted about 45 km NE.



**Figure 4** – Photo montage and isodensitometer traces from the Algeria barium release, launched November 19, 1966, 5:44 pm local time. Photo exposure times increase between second and third pictures.

A series of barium releases during Project Secede III were conducted in February 1969 near Fairbanks, AK. Results from these tests are given in reference [15]. High speed photography results given in Table 1 of that report show initial radius values ranging from 0.18 to 0.74 km at 0.1 sec after release, with the clouds growing to radius values of 0.89 to 3.69 km by 4.9 sec after release. Table 2 in reference [15] shows

that the Fairbanks clouds provided continuous photographic coverage for durations of from 33 to 55 minutes after launch.

<u>Effects of Earth's Shadow</u> - The differences in duration of cloud observations from the Algeria cloud (about 20 minutes) and the Fairbanks clouds (33 to 55 minutes) can be explained in terms of the time variation of the height of Earth's shadow. As the Sun sinks below the horizon after sunset, it proceeds through larger values of solar depression angle  $\delta$ , and the height of the Earth's shadow increases. H<sub>geo</sub>, the geometric height of Earth's shadow (i.e. not accounting for effects of atmospheric absorption or refraction) is computed from solar depression angle  $\delta$  by the relation

$$H_{geo} = R[Sec(\delta) - 1] , \qquad (1)$$

where R is the local radius of the Earth. Values for  $H_{geo}$  as a function of  $\delta$  are given in Table 2. This table also gives Earth's shadow height, corrected for atmospheric absorption and refraction by a wavelength-dependent process given in reference [16]. The two wavelengths represented in this table are 450 nm and 650 nm, two wavelengths relevant for ionized barium. Neutral barium would have Earth shadow heights represented by 550 nm, halfway between these wavelengths. Local times when the given values of solar depression angle would occur are also given in Table 2 for Algeria and Fairbanks. For Eglin, which is in the Central Standard time zone, Eastern Standard times are given, relevant for an observer viewing the Eglin cloud from Leary, GA.

Optimum observation begins at about  $\delta = 9^{\circ}$ , when the Earth's shadow height is about 90 km, and the sky background is sufficiently dark for good photography of the cloud. This is halfway between civil twilight ( $\delta = 6^{\circ}$ ) and nautical twilight ( $\delta = 12^{\circ}$ ). Optimal observing ends at about  $\delta = 14^{\circ}$ , for a cloud at 200 km altitude. This agrees fairly well with the duration of observations for the Algeria and Fairbanks clouds.

**Table 2** – Earth shadow heights  $H_{geo}$ , H450, and H650, versus solar depression angle  $\delta$ . Times at which given  $\delta$  values occur are also given for Algeria, Fairbanks, and Eglin barium release conditions, discussed above. H450 and H650 values are from reference [16].

δ (deg)	H <sub>geo</sub> (km)	H450 (km)	H650 (km)	Algeria LST(pm)	Fairbanks LST(pm)	Eglin EST(pm)
6	35	49.5	42.5	5:39	6:16	6:30
7	48	63	55	5:44	6:26	6:35
8	63	77.5	69.5	5:49	6:35	6:40
9	79	94	86	5:53	6:45	6:45
10	98	111.5	103.5	5:58	6:54	6:50
11	119	132	124	6:03	7:04	6:55
12	142	155	146.5	6:08	7:13	7:00
13	168	180	171	6:13	7:22	7:04
14	195	206	197.5	6:18	7:32	7:09
15	225	235	226	6:22	7:41	7:14
16	257	265	256	6:27	7:51	7:19

For Algeria, the time difference for  $\delta = 9^{\circ}$  to  $14^{\circ}$  is 25 minutes, consistent with the observed duration of about 20 minutes. For Fairbanks, the optimum  $\delta$  difference is 47 minutes, consistent with the observed durations of continuous photographic coverage of 33 to 55 minutes. From this we conclude that, given clear weather, the Eglin barium cloud KAY I would have been visible from Leary, GA from release at 6:44 pm to about 7:09 pm EST. This estimate is close but not totally consistent with Carter's estimate in his IUFOB report that the time of his observation was 7:15 pm EST (question 2), and that he saw the "object" for 10-12 minutes (question 4). Carter's time estimate is more consistent

with the one here if we interpret 7:15 pm as the end time for his observations, rather than the beginning. By 7:15 the cloud would have diminished in brightness and angular size and, having lost its solar illumination, would have appeared to have "Moved to distance then disappeared" (Carter's answer to question 23).

**Observability from Leary, GA** - To an observer in Leary, GA, the KAY barium releases would have been easily observable, given the slant ranges in Table 1, provided clear conditions prevailed over the intervening distance. Indeed, as noted in the Introduction, I have personally observed a high-altitude chemical cloud release from a distance of about 1000 km. For the barium launches to proceed, the weather near Eglin AFB had to be clear, to avoid weather cloud interference with photography from the optical triangulation sites noted in Figure 3. From weather records at the nearby Albany, GA, airfield, Sheaffer concluded that in Leary, GA on the night of January 6, 1969 it was "cold and clear, although a few scattered clouds were present that evening" (reference [2], page 25). Carter's response to question 7 in his IUFOB report, that stars were visible, is further confirmation of clear skies in Leary at the time of his "UFO" sighting.

<u>Plausible Time Line</u> - Based on this information and that in the previous sections, we can now present a plausible timeline of what an observer in Leary could have seen between 6:44 and 7:09 pm EST on the evening of January 6, 1969, as the three KAY barium clouds appeared and developed, and disappeared. Here we assume an unobstructed view of the southwestern-to-western sky.

**6:44-6:46 pm EST** – As the three barium clouds are released, each of them would initially appear as a bright "point", slightly larger than (and probably brighter than) Venus. Each would initially be bright enough to have a whitish color. Within a few seconds of release, each

cloud would grow rapidly to appear about the angular size of the Moon (0.5° diameter), and would begin to take on a greenish, then bluish color.

**6:46-6:50 pm EST** – The neutral barium portion of each cloud would continue growing, taking on a darker blue color. At its lower altitude (with higher air density), release III would grow less than half as fast as releases I and II. Ionized barium would start to form in all three clouds, taking on a reddish color (see Figure 1). The ionized clouds would start to separate from the neutral cloud for releases I and II (see Figure 4), but the ion cloud for release III, at its lower altitude, probably would not separate significantly from the neutral cloud.

**6:50-6:56 pm EST** – The ion clouds would continue growing, especially along the Earth's magnetic field lines. The neutral clouds would reach their maximum brightness and maximum angular diameter of 4-5°, as seen from Leary. Neutral clouds I and II (with centers separated by only 2.8°) would appear to become considerably overlapped, likely appearing to be one cloud, as viewed from Leary.

**6:56-7:02 pm EST** – The ion clouds would reach their maximum brightness and angular size  $(6-7^{\circ} \times 1-2^{\circ})$ , length x width, as seen from Leary). The neutral clouds diminish in apparent angular size and brightness, finally becoming invisible from Leary. Separation between the neutral and ion clouds from releases I and II could have reached a few degrees if their motion was primarily across the line-of-sight from Leary. This ion-neutral separation is uncertain, however, since wind and field conditions at their altitudes are not known. The altitude of neutral clouds I and II would have likely descended about 8 km since their release, or about  $1.2^{\circ}$  of elevation as seen from Leary. Release III clouds (both neutral and ion) disappear into the Earth's shadow.

**7:02-7:09 pm EST** – The apparent angular size and brightness of release I and II ion clouds diminish and finally disappear into Earth's shadow.

Why Did Carter Report Only One UFO? - Since there were three barium cloud releases, why did Carter report only one "UFO"? In a 2005 article in GQ magazine (reference [17]), Carter is quoted as saying: "And there was a bright light in the sky. We all saw it. And then the light, it got closer and closer to us. And then it stopped, I don't know how far away, but it stopped beyond the pine trees. And all of a sudden it changed color to blue, and then it changed to red ... and then it receded into the distance". This description is a perfect synopsis of the appearance and development of KAY releases I and II, as they rapidly developed and appeared as one "object", as described above. The rapid growth in apparent cloud size and brightness, followed by the subsequent diminishment in both size and brightness, could easily be interpreted by an observer as an "object" first approaching and then receding. Carter's reference to the "UFO" stopping "beyond the pine trees" is an indication that the sky in the direction of the "UFO" may have been obscured by pine trees below an elevation of about 25°, rendering the release III cloud invisible (see Table 1). Such an obscuration might also explain Carter's lack of mention of the planet Venus in the sky at 25° elevation. It is also not impossible that the western sky may have been partly obscured by clouds below 25° elevation, since Sheaffer (reference [2], page 25) noted that the weather report for that evening indicated "a few scattered clouds were present".

#### 7. The Case for the KAY Barium Cloud(s) as Carter's "UFO"

We now examine details of Carter's 1973 IUFOB report (Appendix B and reference [1] in text form), to make the case that, beyond a reasonable doubt, it was the KAY barium release clouds I and II (perceived as one "object") that Jimmy Carter saw and reported as the "UFO". In the following, questions in Carter's report are paraphrased, and his responses are shown in bold italics.

1. Name, occupation, etc.: - Jimmy Carter, Governor, etc.

#### 2. Date: *October, 1969* Time: *7:15 p.m. E.S.T.*

Sheaffer's research (reference [2]) unequivocally documents that the correct date was January 6, 1969. If Carter used his 1969 tape recording as the basis for his report, the tape must not have had a time tag. More likely, due to the speed with which he responded to the request for the report (Appendix A), he did not make use of this tape, and consequently his recollection of the date and time information was faulty.

#### 3. Locality: Leary, Georgia

4. Duration of observations: 10-12 minutes

Analysis in section 6 suggests that 7:15 pm is the end, rather than the beginning of Carter's observations, and the duration was somewhat longer than 12 minutes. Carter's description of his early observations matches closely with the cloud development shortly after initial release at 6:44 pm EST, so perhaps he observed for as long as 25 minutes.

- 5. Weather and lighting conditions: *Shortly after dark*
- 6. Position of Sun or Moon: Not Visible
- 7. Stars or Moon visible? Stars
- 8. Multiple Objects? No

Analysis in sections 1-6 justifies why KAY releases I and II would have quickly appeared to be one "object", and section 6 presents the likely explanation for Carter not seeing release III.

9. Describe object(s): Left Blank

- 10. Object brighter than sky? **Yes**
- 11. Compare brightness with Sun, Moon, etc. At one time as bright as moon.
- 12. Did object(s):
- A. Appear to stand still? Yes
- B. Speed up and rush away? Left Blank
- C. Break apart or explode? *Left Blank*
- D. Give off smoke? Left Blank
- E. Leave any visible trail? *Left Blank*
- F. Drop anything? *Left Blank*
- G. Change brightness? Yes
- H. Change shape? Size

In reference [1], this answer was incorrectly reported as **Yes**.

# I. Change color? Yes, seemed to move toward us from a distance, stop, move partially away, return, then depart, bluish at first, then reddish, luminous, not solid.

Analysis in sections 1-6 justifies why KAY releases I and II (perceived as one "object"), would have appeared to exhibit this motion behavior and color development

- 13. Did object(s) pass in front or behind anything? No
- 14. Was there any wind? No
- 15. Did you observe with any optical equipment (binoculars etc.)? No
- 16. Did object(s) make any sound? No

17. Tell if objects were:

- A. Fuzzy or blurred. Left Blank
- B. Like a bright star. Left Blank

C. Sharply outlined.  $\sqrt{(Carter made a check mark)}$ 

Although the barium releases would have been sharply outlined at first (see left image in Figure 4), they would have later become fuzzy.

18. Was the object:

- A. Self luminous?  $\sqrt{}$
- B. Dull finish? *Left Blank*
- C. Reflecting? Left Blank
- D. Transparent? Left Blank

Sketch the object(s): Left Blank

19. Did the object(s) rise or fall? *Came close, moved away, came close, then moved away.* 

Analysis in sections 1-6 justifies why KAY releases I and II (perceived as one "object"), would have appeared to exhibit this motion behavior

## 20. Apparent size of the object: *About same as moon, maybe a little smaller. Varied from brighter/larger than planet to apparent size of moon*

Analysis in sections 1-6 justifies why KAY releases I and II (perceived as one "object"), would have exhibited this size change behavior.

21. How did you notice the object(s)? **10-12 men all watched it. Brightness attracted us.** 

Sheaffer's research (refence [2]) found that the memories of the "UFO" event were much more vivid for Carter than they were for his fellow Lions Club members who saw it.

## 22. Where were you and what were you doing? *Outdoors waiting for a meeting to begin at 7:30 p.m.*

### 23. How did the object(s) disappear? *Moved to distance then disappeared.*

Analysis in sections 1-6 justifies why KAY releases I and II (perceived as one "object"), would have appeared to exhibit this motion behavior.

24. Compare speed to aircraft. Not pertinent

25. Conventional aircraft nearby? No

#### 26. Estimate distance to object(s): Difficult. Maybe 300-1,000 yards.

This indicates the "pine trees" discussed in section 6 were less than 300 yards away. Being unfamiliar with the appearance and behavior of upper atmosphere barium releases, Carter could understandably have misjudged the distance by this much. An example of how easy it is to misperceive such distances is provided by an incident I remember from one Autumn in the early 1960s. An Atlanta woman saw a sodium vapor trail, launched one evening from Eglin AFB, about 600 km distant. She viewed the cloud through the bare branches of a deciduous tree, then called a local Atlanta TV station to report that a "UFO had landed in a tree at the end of her street"!

#### 27. Elevation of the object(s)? *About 30 degrees above the horizon.*

This estimate is in excellent agreement with the actual elevations of KAY releases I and II in Table 1.

28. Names and addresses of witnesses. *10 members of Leary, GA, Lions Club.* 

29. Describe locality and direction from which object(s) appeared and disappeared. *Appeared from west about 30 degrees up.* 

This estimate is in excellent agreement with the actual direction and elevation of KAY releases I and II in Table 1.

30. Any nearby airport, military, or research facility? No

31. Ever seen any other unidentified objects? No

32. Enclose photographs, news clippings, etc.: *Carter drew line to indicate not applicable.* 

33. Were you interrogated by Air Force investigators? No

Were you asked to not discuss the incident? No

34. In response to the request to quote his name, Carter placed a check mark after "You may use my name."

Date of filling out report: 9/18/73

Signature: Jimmy Carter

Answers above to questions with no accompanying comments are totally consistent with Carter's "UFO" being the KAY barium release clouds I and II (perceived as one "object").

#### 8. Conclusion

With the date as corrected by Sheaffer's research (reference [2]) and the time of day slightly adjusted by the analysis presented in section 6, along with the other factors discussed above, we can safely conclude that Carter's "UFO" observations are totally consistent with the KAY barium release clouds I and II (perceived as one "object"). Aspects of consistency include:

- (1) Date and time
- (2) Direction
- (3) Elevation angle
- (4) Development of cloud appearance and color changes
- (5) Development of cloud size and brightness, perceived as apparent motion
- (6) Duration of cloud observation consistent with Earth shadow height variation

#### Appendix A – Letter from IUFOB, Requesting Report

Willer Sarah Send "Man fears what he does not understand A C. HEWES EL GARCIA -IC RELATIONS DIRECTOR L CRAWFORD HOCIATE DIRECTOR International UFO Bureau, Inc. FOMMY BLANN DEPUTY DIRECTOR In Congunction With Canadian UFO Report Magazine HETHA HEWES 1. INTERNATIONAL HEADQUARTERS OKLAHOMA CITY. OKLAHOMA 73101 P. O. BOX 1281 en and 11 A REPLY REFER TO. UPO September 14, 1973 -t.1 E 311 Honorable Jimmy Carter Governor of Georgia Altanta, GA Dear Governor Carter: For the past 17 years the International UFO Bureau, Inc. has researched the subject of unidentified flying objects, commonly called and known the world over as 'flying saucers'. Needless to say we are deeply interested in the re-cent sightings in and around Georgia and for this reason have several 'field investigators' in the area at this time. Reports have reached our office that you have observed the objects and I am wondering if you would te kind enought to supply us with the details of your experience ? I have enclosed one of our sighting forms and will welcome any additional statements or illustrations that you care to offer. Feel free to ask any questions you may have and if the Bureau can be of service to you or your office feel free to contact us. Until then, I remain .... Yours In Research, INTERNATIONAL/UFO BUREAU, Inc. Hayden C. Hewes Pirector/IUFOB

RESEARCHING THE FACTS ON THE FLYING SAUCER CONTROVERSY SINCE 1957

International UFO Bureau SIGHTING In Conjunction With Constan UFO Report Measurer Form P. O. Box 1281 A -UNO REPORTS OKLAHOMA CITY, OKLAHOMA 73103 1. Nove Frommy Cartin PLACE OF EMPLOWENT ADDACSE OCCUPATION Generation Stute, Capital EQUELTION CONT deca Co. SPECIAL TRAINING STULLION Physics Attante TELEPHONE Yor - 656 - 1776 MILITARY SERVICE US NAVY 2. DATE OF DESERVATION OLF 1969 TIME Ale PM TIME ZONE 1:15 EST 3. LOCALITY OF OBSCRIVATION Leavy GROUSIN 4. HOW CONS OID YOU BEE THE DEJECT? HOURS /0-/ MINUTES SECONDE 5. PLEASE DESCRIBE WEATHER CONDITIONS AND THE TYPE OF SKYL I.E., BRIGHT DAVLIGHT, HIGHTTINE, DUSK, ETC. Shorthy often dank . 6. POSITION OF THE SUN OR MOON IN RELATION TO THE OBJECT AND TO YOU. HUT IN Sight 7. IF SEEN AT NIGHT, TWILIGHT, OR DAWN, WERE THE STARS OR MOON VIRIALE? Stars 8. WERE THERE NORE THAN ONE DEJECT? IF BO, PLEASE TELL HOW MANY, AND ORAW & SKETCH OF WHAT YOU DAW, INDICATING DIRECTION OF MOVEMENT, IF ANY. 9. PLEASE DESCRIBE THE OBJECT(S) IN DETAIL. FOR INSTANCE, DID IT (THEY) APPEAR SOLID, OR ONLY AS & SOURCE OF LIGHT; MAS IT REVOLVING, ETC? PLEASE USE ADDITIONAL SHEETS OF PAPER, IF NECESSARY. LO. WAS THE OBJECT (S) BRICHTER THAN THE BACKGROUND OF THE SKY? - 1/2- at one have 11. IF SO, COMPARE THE BRICHTNESS WITH THE SUN, MOON, HEADLIGHTS, ETC. Gright to man 12. DIO THE ODJECT(8) --(PLCASE BLABORATE, IF YOU CAN GIVE OCTAILS.) Seemed to moved here A. APPEAR TO STAND BTILL AT ANY TIMET PAR us from a distance she SUDDENLY SPEED UP AND RUSH AWAY AT ANY TIME? C. BRCAN UP INTO PARTS OR ENPLOOET move prelietly desay D. GIVE OFF SMOKE? E. LEAVE ANY VISIBLE TRAILT Bursh at first . The wedder he wedder not sild . 13. DID THE DOJECT (#) AT ANY TIME PASE IN FRONT OF, OR BEHIND OF, ANYTHING? IF SO PLEASE ELABORATE GIVING DISTANCE, SILE, ETC, IF POADIOLE. 200 14. WAS THERE ANY WIND? YO IF SO, PLEASE GIVE DIRECTION AND SPECO. 15. DIO YOU DOSERVE THE DEJECT(S) THROUGH AN OFTICAL INSTRUMENT OR OTHER AID. WINDSHIELD, WINDOWPANE, STORM WINDOW, SCREENING, ETC? SLO WHAT? 16. DIO THE DEJECT(S) HAVE ANY SOUND? ILD WHAT HINDT HON LOUD? 17. FLEASE TELL IF THE DOVENT(S) WAS (WERE) --A. FULLY OR, BLURACO. B. LINC & BRIGHT STAR. O. SHAAPLY OUTLINED.

Appendix B – International UFO Bureau Report

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