Scientific Research Publishing

Journal of Modern Physics, 2024, 15, 1760-1868
https://www.scirp.org/journal/jmp
ISSN Online: 2153-120X
ISSN Print: 2153-1196

Unidentified Anomalous Phenomena, Extraterrestrial Life, Plasmoids, Shape Shifters, Replicons, Thunderstorms, Lightning, Hallucinations, Aircraft Disasters, Ocean Sightings

Rhawn Gabriel Joseph[1*], Olivier Planchon[2], Christopher Impey[3], Richard Armstrong[4], Carl Gibson[5], Rudolph Schild[6]

[1]Astrobiology Research Center, California, USA
[2]CNRS UMR 6282 Biogéosciences-Université de Bourgogne, Dijon, France
[3]Department of Astronomy, University of Arizona, Tucson, USA
[4]Department of Vision Sciences, Aston University, Birmingham, UK
[5]Center for Astrophysics and Space Sciences, Scripps Institution of Oceanography, University of California, San Diego, USA
[6]Center for Astrophysics, Harvard-Smithsonian, Cambridge, USA
Email: *deardoctorjoseph@gmail.com

How to cite this paper: Joseph, R.G., Planchon, O., Impey, C., Armstrong, R., Gibson, C. and Schild, R. (2024) Unidentified Anomalous Phenomena, Extraterrestrial Life, Plasmoids, Shape Shifters, Replicons, Thunderstorms, Lightning, Hallucinations, Aircraft Disasters, Ocean Sightings. *Journal of Modern Physics*, **15**, 1760-1868.
https://doi.org/10.4236/jmp.2024.1511079

Received: August 4, 2024
Accepted: October 25, 2024
Published: October 28, 2024

Abstract

As documented by NASA space shuttle films and detailed in this report, self-illuminating, pulsating, plasma-like UAP/UFO ("plasmoids") have multiple shapes and sizes, are attracted to electromagnetic activity, and travel at different velocities from different directions, making 90 to 180-degree turns, as well as colliding, intersecting and piercing other plasma; and have been filmed by U.S. Navy personnel and a U.S. Customs and Border Protection DHC-8 flying above and diving/sinking beneath the ocean; and by NASA following, circling, and hovering near the space shuttles, satellites, and the MIR International Space Station and congregating above and descending into thunderstorms and the lower atmosphere, which is the air corridor favored by commercial and military aircraft; and this may account for reports of UAPs following, harassing, chasing, and "toying with" aircraft. Plasmas also have explosive properties, negatively affect electronics and mental activity (possibly inducing hallucinations of "alien abductions"), pass through glass, plastic, metal, and enter the cockpits of airplanes and have been observed by astronauts inside spacecraft, the MIR and ISS. It is hypothesized that given their propensity to collide, plasmoids may be responsible for at least some *unexplained*, *inexplicable* aircraft disasters.

Thunder-lightning-storms are the main drivers of Earth's GEC and direct positive currents into the ionosphere, which attract plasmas. The troposphere also has a positive charge, and the ocean surface under white water and turbulent conditions develops a positive charge, and we hypothesize that this accounts for sightings of UAP in the lower atmosphere and soaring above and diving into the oceans, including, as reported here, shape-shifting UAP replicons that split into or generate additional shape-shifting UAPs as filmed by NASA and U.S. Customs. Plasmoids appear to purposefully interact and engage in complex behaviors, and it is suspected they are sentient and represent a fourth domain of life. Although plasmas in the lower atmosphere may be responsible for UAP sightings over the centuries, including those that appear to "battle" over cities or follow and harass military ships and planes, plasmoids cannot account for all UAPs, which may include extraterrestrial spacecraft from other worlds.

Keywords

Fourth Domain of Life, Extremophiles, Unidentified Flying Objects, Unidentified Ocean Phenomenon

1. Introduction

As documented in this report (**Figures 1-49**) and a supplementary video compilation of NASA space shuttle films [1], pulsating, self-illuminated plasmas (aka "plasmoids"/Unidentified Anomalous Phenomenon, UAP) target and collide with other plasmoids (**Figure 4**, **Figure 8**, **Figure 10**, **Figure 16**), and have followed, approached and congregated near the MIR International Space Station (**Figure 1**), NASA's space shuttles (**Figure 2**) and satellites (**Figures 3-5**, **Figure 21**, **Figure 24**, **Figure 25**) and have been filmed flying toward and engaging in complex interactions above thunderstorms (**Figures 6-8**, **Figure 10**), cities and the ocean (**Figures 31-40**), including changing shape and replicating (**Figure 8**, **Figure 9**, **Figure 16**, **Figures 18-20**, **Figure 29**). These are established facts [1]-[3].

Thunderstorms are major sources of positive charges directed to the ionosphere and likely provide excitatory charges to plasmoids congregating above and those descending within these raging storms. Thunderstorms also provide negative charges to Earth's surface, which is surrounded by insulating lower atmospheres that are also positively charged, *i.e.* the stratosphere and troposphere [4] [5]; whereas the ocean surface under white water and turbulent conditions may develop a positive charge [6]-[10].

As documented here and in NASA space shuttle films [1], plasmoids will congregate near the space shuttles (**Figure 2**, **Figure 41**, **Figure 42**) and descend into lightning storms and the lower atmosphere (**Figures 9-12**), which is the air corridor favored by commercial and military aircraft; and we hypothesize this accounts for

reports of UAPs following, harassing, chasing, and "toying with" aircraft. Plasmas also have explosive properties, negatively affect electronics [11]-[14] and mental activity [13]—possibly inducing hallucinations of "alien abductions" [15] and pass-through glass, plastic, metal, and enter the cockpits of airplanes and have been observed by astronauts inside spacecraft, the MIR and ISS [11] [16]-[22]. Coupled with their propensity to chase, target and collide [1]-[3] [23]-[25], and coupled with related concerns expressed by members of the military and the U.S. Congress, we hypothesize that plasmas descended into the lower atmosphere may be responsible for many *unexplained*, *inexplicable* aircraft disasters.

The thermosphere-ionosphere is a positively charged environment, and plasmas are electrically charged physical, electrical and magnetic phenomena, comprised of negative, positive and neutral charges and cellular layers [3] [26]-[30] Those of the upper (ionosphere) and lower atmosphere (troposphere) have various shapes, sizes and colors, and some consist of multiple plasmas (**Figure 9**) and can replicate forming additional plasma, as well as change shape (**Figures 1-3**, **Figures 6-8**, **Figure 10**, **Figures 14-17**, **Figure 21**, **Figure 25**).

Glowing, pulsating plasmoids have been filmed in the ionosphere and lower atmosphere flying in V-formations (**Figures 45-46**); and as verified by quantitative analysis [2] [31], will accelerate to hyper speeds and make 90 and 180-degree turns as well as colliding, merging, and piercing one another (**Figure 7**, **Figure 8**, **Figures 24-29**). A recent quantitative analysis of 20 seconds of stable film footage from the STS 115 tether incident indicates that some plasmoids range in size from 0.1 to 4 km^2 and travel at speeds up to 28 km (17.4 miles) per second, which yields a velocity of 1680 km (1044 miles) per minute and 100,809 km (62,640 miles) per hour [31]. Others travel at much faster rates but whose velocities have not yet been determined. Collectively, these plasmoids exhibit aerodynamic characteristics well beyond those of any known aircraft or missile—either manned or unmanned [1]-[3].

Presumably, those that descend into thunder clouds and appear in the lower atmosphere and above the ocean engage in maneuvers similar to those in the ionosphere, and this may partially explain why plasmas (AKA UAP) have been detected by U.S. Navy personnel descending at hyper-velocities from the upper atmosphere and filmed soaring above the ocean [32]-[34]. Glowing, pulsating, brightly lit plasmas have also been filmed in the thermosphere, traveling across America and descending toward and above the ocean (**Figure 22**, **Figures 30-36**). As noted, during periods of turbulence and white-water conditions, the surface of the ocean and air and atmosphere directly above are also positively charged [6]-[10]—as is the ionosphere [35] [36]. Thus, the ocean may be attractive to plasmas, thereby accounting for numerous observations of UAPs above the ocean by Navy ships and naval aviators [32]-[34].

As reported here, a shape-shifting plasma (UAP)—filmed by a U.S. Customs and Border Protection DHC-8 off the coast of Puerto Rico—continuously changed

shape and size as it flew over an airport then the ocean and repeatedly split off to form additional shape-shifting structures (**Figures 32-36**). Although these Puerto Rico UAPs are most likely a transient lower atmosphere plasma, those in the ionosphere also change shape and size and split off to form additional plasmoids (**Figure 8**, **Figure 37**, **Figure 44**).

As documented in NASA videos [1] and in this report, plasmoids in the ionosphere will arrive off-camera, sometimes in pairs, and approach and descend into thunderstorms (**Figures 11-16**). In other instances, hundreds of brightly glowing plasmoids and other unknown entities will congregate above a raging storm and engage in a variety of behaviors, including turning, following, targeting, colliding and piercing one another—behavior also observed when they gathered around a satellite tether generating electromagnetic energy into the space medium (**Figure 4**, **Figure 8**, **Figure 10**, **Figure 16**, **Figures 24-29**, **Figure 37**, **Figure 39**, **Figure 44**). This is not speculation. These are established facts based on official NASA films [1]-[3].

Thunderstorms typically range from 10,000 to 20,000 m above sea level [37]. Therefore, plasmoids from the ionosphere that dive into thunderstorms are also descending to an altitude where commercial and military jets typically fly [38] [39]. Plasmas in the lower atmosphere would account for the numerous observations over thousands of years of glowing orbs flying above cities and encounters with UAPs by civilian and military pilots prior to during and after the second world war [1]-[3] and who were not uncommonly report that brightly lit UAP have followed, confronted and nearly collided with them as exemplified by the following report.

Dr. Harvey Wichman [40], a professor at Claremont College, reported an encounter with a UFO (AKA plasma) when working as a flight instructor on a Cessna 150 training plane, accompanied by a student, on a night cross-country assignment. As they departed Lindbergh Field, San Diego, on the night of May 28, 1968, he and his student were confronted by a "UFO...in the form of a bright light approaching on a collision course at a very high rate of speed—a rapid deceleration and hovering—a rapid acceleration away from the author's plane followed by another deceleration and hovering. This apparent reconnoitering activity was repeated approximately ten times after which the object failed to reappear". Wichman, therefore, did not see an object with a solid structure, but a bright pulsating light that repeatedly circled, followed, targeted, and nearly collided with Wichman's plane, and then vanished. Wichman reported that he felt confused and disoriented by the experience, and struggled to control his plane, alluding to a temporary electrical disturbance and near loss of control.

The term "flying saucer" has been attributed to Kenneth Arnold [41] who, on June 24, 1947, observed a "flash of light" like "a mirror reflecting sunlight" [42]-[44] and a chain-like formation of nine brightly scintillating lights that were "flipping from side to side" and "flying erratically...weaving, dipping...like the tail of a kite" and "like stones being skipped over water" and that "flew like a saucer would if you skipped it across the water" and "flashing brightly" and changing

shape, from a "disk" and "platter shaped" to a "crescent" [14] [42] with some having a shape "like sky jellyfish" [43] "with a pulsating thing in the middle of them" [44].

Arnold has repeatedly emphasized that initial news accounts misquoted him and he does not believe in "little green men stories" or that these shape-changing crescent- and disk- and jellyfish-shaped objects and "lights" are spaceships from other worlds but that they are "living organisms" [43]; "space and atmospheric organisms that they have the natural ability to change their densities at will" [44]. "After some 14 years of extensive research, it is my conclusion that the so-called unidentified flying objects that have been seen in our atmosphere are not spaceships from another planet at all, but are groups and masses of living organisms that are as much a part of our atmosphere and space as the life we find in the oceans" [44]. The first author of this report, based on analysis of NASA's extensively occluded space shuttle films, came to identical conclusions [1]-[3] [45].

These observations, fact-based hypotheses and conclusions that many (but not all) UAP are actually cellular electromagnetic plasma [1]-[3] [13] are supported by an analysis by the British Ministry of Defense [45], which conducted a multidisciplinary analysis of UFO-UAP phenomenon based on information collected over 30 years, *i.e.* UAP-UFO "are comprised of several types of rarely encountered natural events within the atmosphere and ionosphere...the events are almost certainly attributable to physical, electrical and magnetic phenomena in the atmosphere, mesosphere and ionosphere. The fact that the objects reportedly have the maneuver and acceleration attributes of an inertia-less vehicle reinforces the hypothesis that they are buoyant charged bodies".

We hypothesize, based on factual evidence [1]-[3] [45] [46], that some plasmoids may be sentient and conscious of their surroundings and engage in purposeful interactions, *i.e.* they may represent a fourth domain of life [1]-[3] [46]. As documented in NASA film-footage compiled by the first author [1] [46], and as documented via freeze frames reproduced in this report, some plasmoids engage in complex behaviors and what could be construed as curiosity and evidence of intelligence. Moreover, astronauts have reported that glowing plasma-like entities have appeared outside shuttle windows, often traveling from window to window—as if looking inside and, in so doing, upsetting the crew [1] [46]—and glowing plasma has entered homes, businesses [11] [13] [47] [48], and even through cockpit windows; in one instance it then slowly moved about the interior of the plane as if reconnoitering [49]. Moreover, plasma-UAP encountered in the troposphere have been accused of "surveillance", mimicry, "toying with" and harassing aircraft and so on [13] [40] [41] [50]-[54]. As reported by Navy Cmdr. David Fravor, the UAP he and his fellow pilots encountered, behaved with conscious intention: "it was aware we were there".

Further, plasmoids appear to be aware of each other, as evident by numerous examples of turning, following, targeting, colliding, and merging. To speculate: Although not all plasmoids behave the same; when considered as a collective, their

behavior and their conglomerate structure could be likened to eukaryotic algae, e.g. *Eudorina* Elegans [1] [2] [46]. For example, although *Eudorina* may look like a single organism, it is actually a conglomerate consisting of up to 64 cells loosely grouped together. Likewise, as documented in this report, what looks like single cloud-like plasmoids, in some cases, actually consist of dozens of individual plasmas grouped together (**Figure 9**), forming plasma conglomerates that engage in coordinated action to produce what appears to be purposeful behavior.

Plasmoids can generate additional plasmoids, *i.e.* they reproduce and generate plasmas that also engage in complex behaviors as documented in this report and by NASA video [1] [46]. For example, as depicted in **Figure 16(A)**, **Figure 16(B)**, Plasmoid #1 travels toward a thunderstorm, and intersects plasma #2 as a hypervelocity plasma speeds by. Then, another plasmoid, #3 materializes or suddenly self-illuminates, then changes shape as it follows plasmoid #1, then intersects the same #2 plasma, then passes close to #1, and continues upward and finally hovers above a thunderstorm. And then, plasmoid #1 replicates and produces/secretes a new additional plasmoid #4 that travels toward and interacts with #3, which heads back toward and merges with #1.

It is important to avoid anthropomorphizing what may be purely electromagnetic push-pull attraction-repulsion when exposed to highly charged environments and surrounded by plasmas of opposite or similar or changing electric charge. However, according to Alfvén [26] [27], these plasmas contain cellular membranes, whereas plasma with a nucleus have been repeatedly observed and which contain glowing spheres within (**Figure 1**, **Figure 6**, **Figure 7**, **Figure 10**, **Figure 29**, **Figures 34-36**). To speculate, these internal spheres could be construed as ganglia and neural networks, or circular, double-stranded DNA "plasmids" that have the ability to replicate and self-clone. Based on laboratory experiments, a number of scientists have proposed that "dusty plasmas" may form crystalline RNA-DNA helixical structures and may represent a non-biological form of life or pre-life [1]-[3] [46] [55]-[58].

Plasmoids appear to be electrical phenomenon, attracted to and with some possibly produced by lighting. It's been hypothesized that dusty plasmas in the thermosphere may have incorporated all the necessary elements for the synthesis of RNA leading to DNA and thus life [3]. Stanley Miller and Harold Urey, in their famous experiments designed to produce life, exposed a mixture of gases and elements to a continuous electrical spark simulating lightning and produced organic chemicals and 33 different amino acids, including 11 of those necessary to create the proteins required by all living organisms [59]. If life can be created via interactions between lightning and an enclosure containing the necessary elements, it can be predicted that every world with a gaseous atmosphere and thunder clouds is inhabited by plasmas; and that these dusty plasmas spawned life on innumerable earth-like planets billions of years older than Earth; life that may have evolved. Thus, some UAP may be spacecraft from other worlds [60].

This latter hypothesis is not mere speculation as it is evident NASA has added layers of obscuring noise/snow to space shuttle films [1], the U.S. military refuses

to release all relevant information; and space shuttle film-footage that NASA released to the public [1] [46] depicts glowing forms that established a V-formation and followed a space shuttle (**Figure 45**) and then the camera was turned off [1]. And another object that followed a space shuttle, but as it grew closer again, the camera was turned off. Further, optical analysis employing optical filters revealed a cylindrical form hidden within the pulsating cloud-like object that was approaching a NASA space shuttle (**Figure 2**); whereas in another instance (**Figure 23**), as a pulsating form emerged from the clouds and approached the shuttle the camera was again turned off [1].

Numerous credible eyewitnesses, often military pilots and astronauts, as well as the British and U.S. governments have expressed the concern that some UAP might possess "advanced technology" [3] [60]-[62]. For example, former Navy Commander David Fravor also observed "vehicles" (UAP) with "superior", "technology". While commanding a squadron of F/A-18F fighters, Commander Fravor reported that "advanced radar" detected "multiple vehicles". Fravor, a graduate of the Top Gun naval flight school, reported that "the technology that we faced is far superior to anything that we had" [61]. There is no evidence that plasmoids have technological capabilities.

In addition, there is visual evidence of anomalous structures and specimens that were photographed by NASA on Mars, that resemble crash sites, the wreckage of space craft, and forms that resemble bones and humanoid bodies and skulls; all observed within 100 meters of each other [60]. In fact, this latter evidence—as yet unconfirmed—is the only "hard" evidence of visitations by technologically advanced extraterrestrials.

It would therefore be presumptuous to claim that all UAP/UFO are plasmas/plasmoids. On the other hand, the authors of this and related reports [1]-[3], have provided hard irrefutable factual evidence—all of it based on authenticated NASA (albeit heavily obscured) night time films and freeze frames from those films—of hundreds of extraterrestrial specimens that engage in complex and life-like behaviors including congregating and crawling upon a satellite tether generating electrical impulses into the space medium, and approaching space shuttles and the MIR international space station.

Based on these findings and observations [1]-[3] and the fact that plasmoids in the thermosphere are attracted to sources of electromagnetic activity, we have also proposed a means to scientifically study and examine these plasmas as they form, congregate, and interact. This can be accomplished via the launching of a tethered satellite generating electromagnetic pulses and equipped with multiple cameras with infrared, X-ray, telescopic, and other sensory capabilities, *i.e.* an alien-hunting satellite [3]. If this same alien-hunter satellite is equipped with an electrified net—and if such a project is judged to be ethical and humane—perhaps it would be possible to attract and capture one or more extraterrestrial plasmoids, as depicted in the following photographs from official NASA nighttime space shuttle films [1].

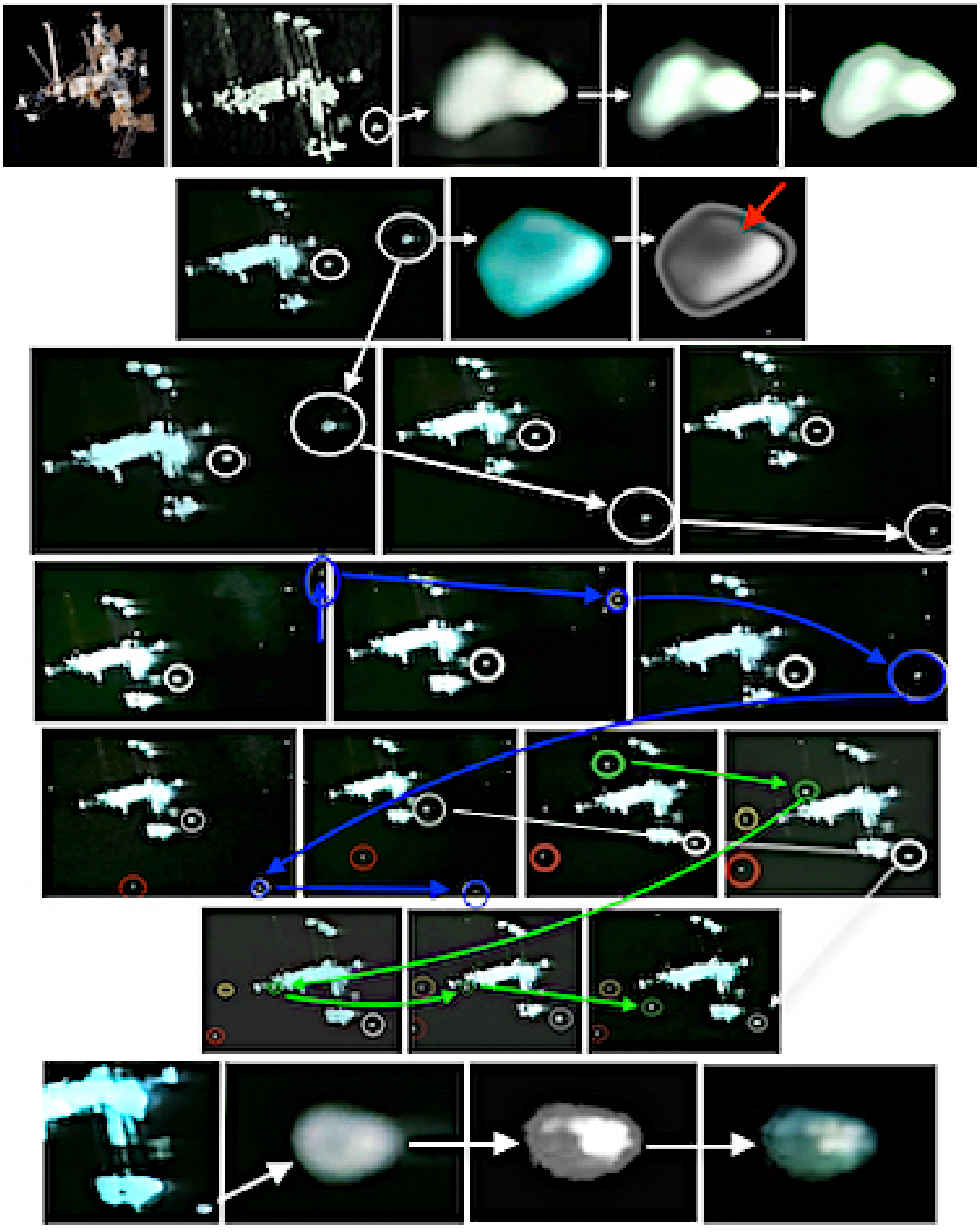


Figure 1. Plasma approaching the MIR International Space Station from multiple directions. Top, second and bottom row: Processed with Fotor Anti Blur Image Software. Note void/nucleus in second (red arrow) and bottom row, and what resembles ovoid ganglia within the interior of the plasma (bottom right). The blue-green colors are due to the colorized layers of "noise" introduced by NASA into nighttime film footage [1]. Filmed by STS 75 [1].

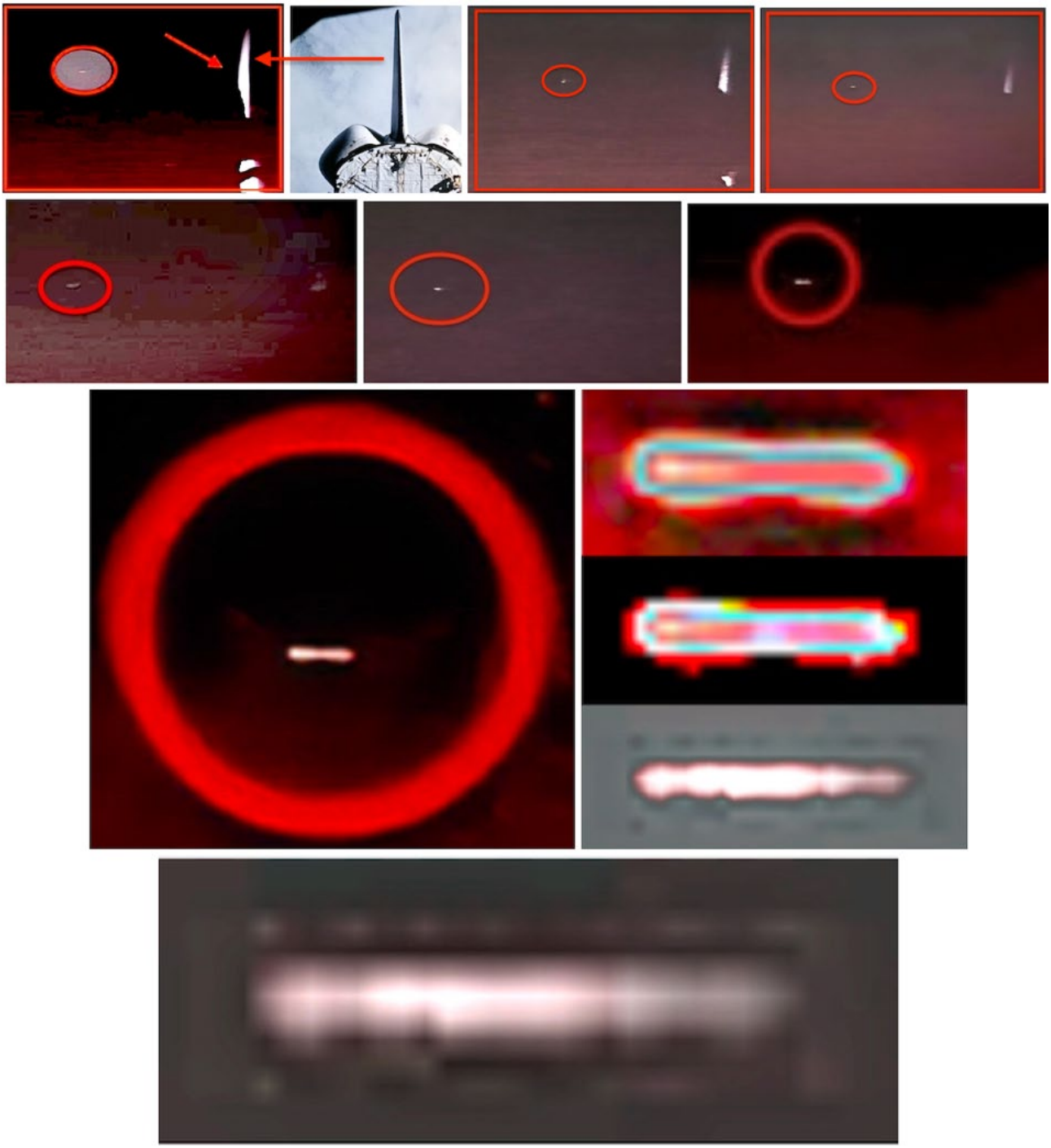


Figure 2. An anomalous elongated pulsating object followed NASA's space shuttle as it orbited into the nightside of Earth. As the tail of the shuttle disappeared in the darkness the pulsating object grew brighter as it approached the shuttle; at which point, the camera was turned off [1]. The blue, green, yellow, red colors are due to the colorized layers of "noise" introduced by NASA into nighttime film footage. Bottom and above bottom right processed with Fotor Filters and Anti Blur Image Software and magnified over 1600 times. Plasma photographed in the thermosphere has a variety of shapes and this elongated pulsating object resembles a metal cylinder, length and width unknown. Filmed by STS 96 Discovery [1].

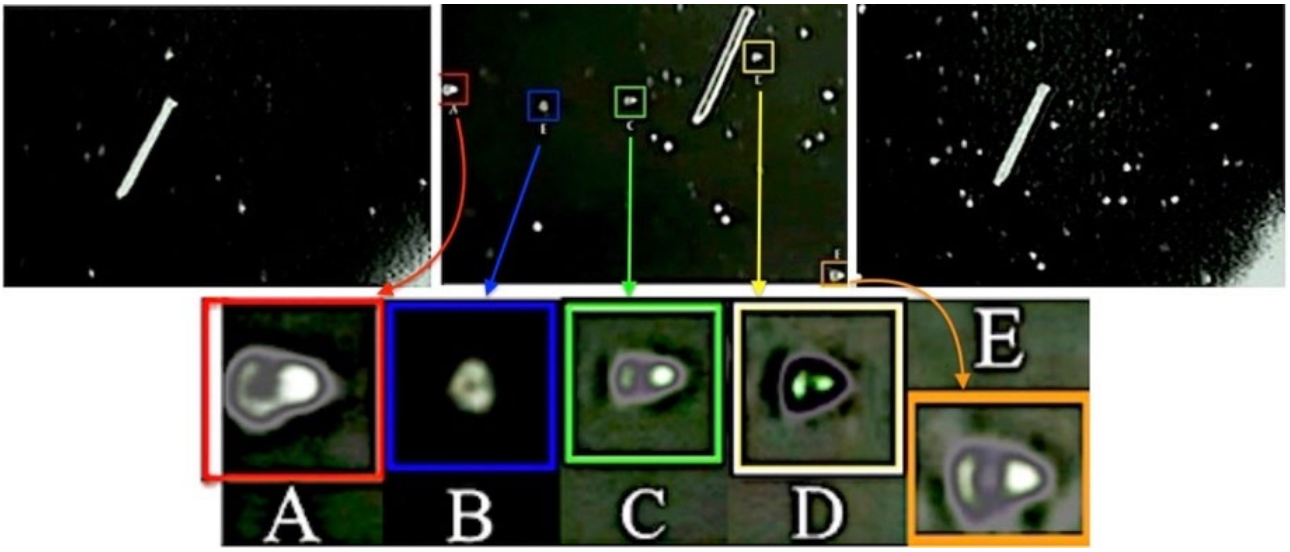


Figure 3. Filmed by STS-75. Plasmoids swarming together and gathering around an electrified tether. These entities range in size from 0.1 to 4 km^2 structures (A-E) document these plasmas contain a void-nucleus and possibly two internal forms that may not (C, D) be interconnected.

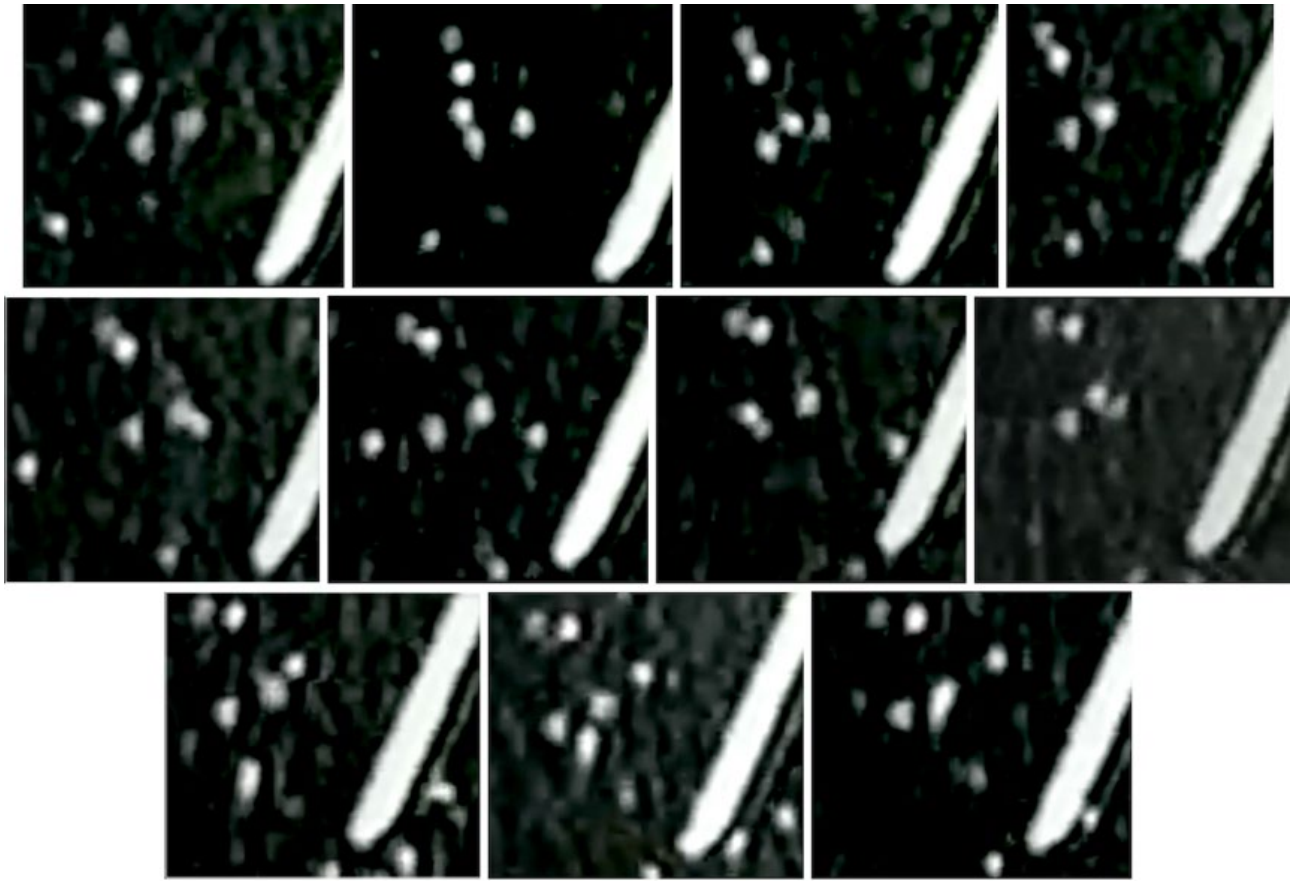


Figure 4. Plasmoids engaged in frenzied collisional behavior adjacent to electrified tether 12 miles in length [1].

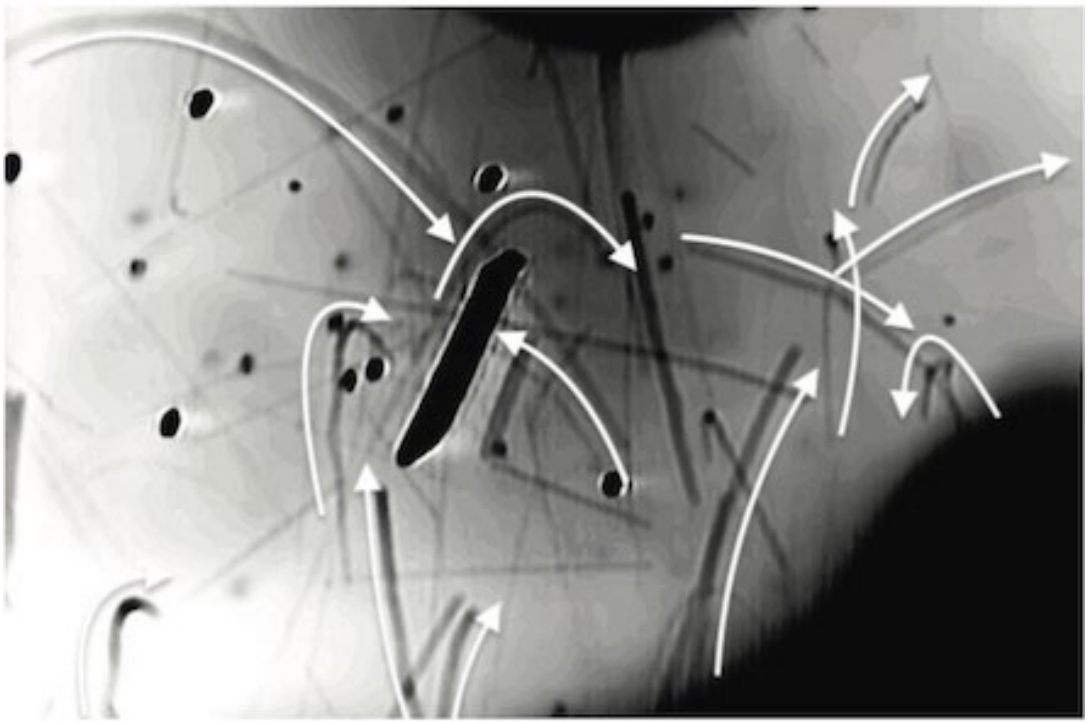


Figure 5. Computerized analysis of flight paths and velocity, based on 20 seconds of stable sequences of film footage from STS-75. Many objects display 45˚, 90˚, and 180˚ shifts in trajectory and make sudden or slow turns around the electrified tether [1].

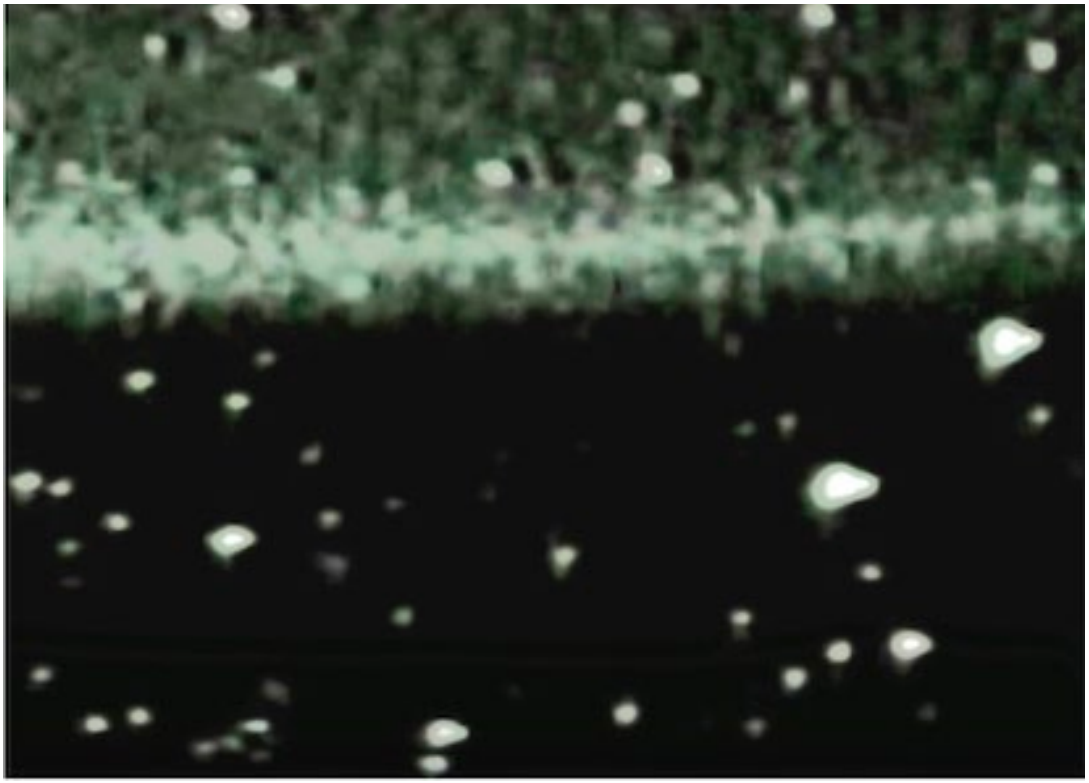


Figure 6. Hundreds of cone- and cloud-shaped glowing plasmoids with an internal nucleus filmed congregating 200 miles above an electric-thunderstorm by STS-80. Processed via Fotor Filtering Software. Very small forms, and those that are not illuminated have also been detected in this footage.

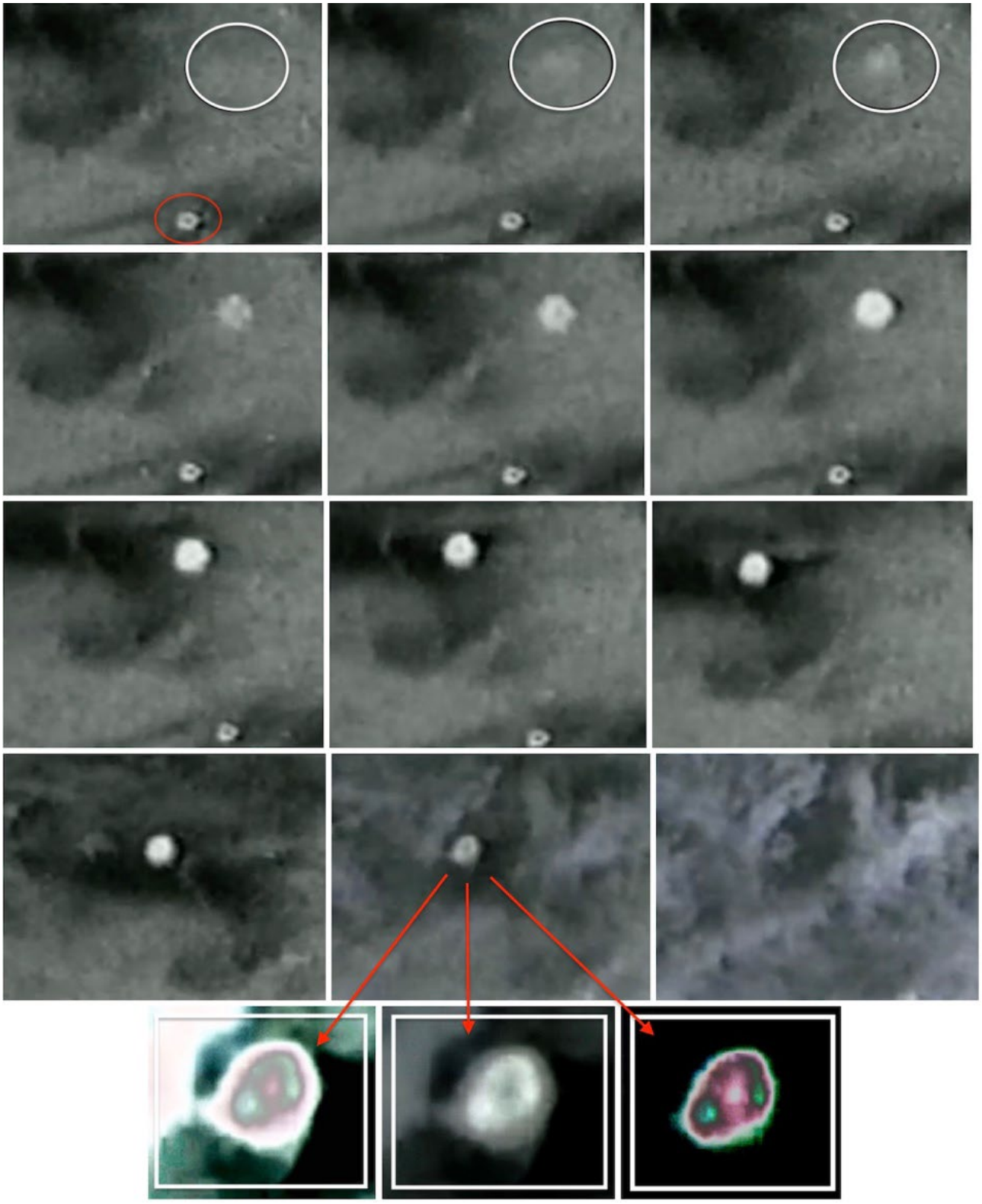


Figure 7. Ring-shaped plasma (red circle) hovers above a thunderstorm as a plasmoid (white circle) materializes and disappears as it descends into the lower atmosphere [1]. (Bottom row) Fotor filters applied to freeze frames and identifying and colorizing differences in gray scales, thereby revealing internal oval structures and the "tail/nose" directed toward the storm. Filmed by STS 80.

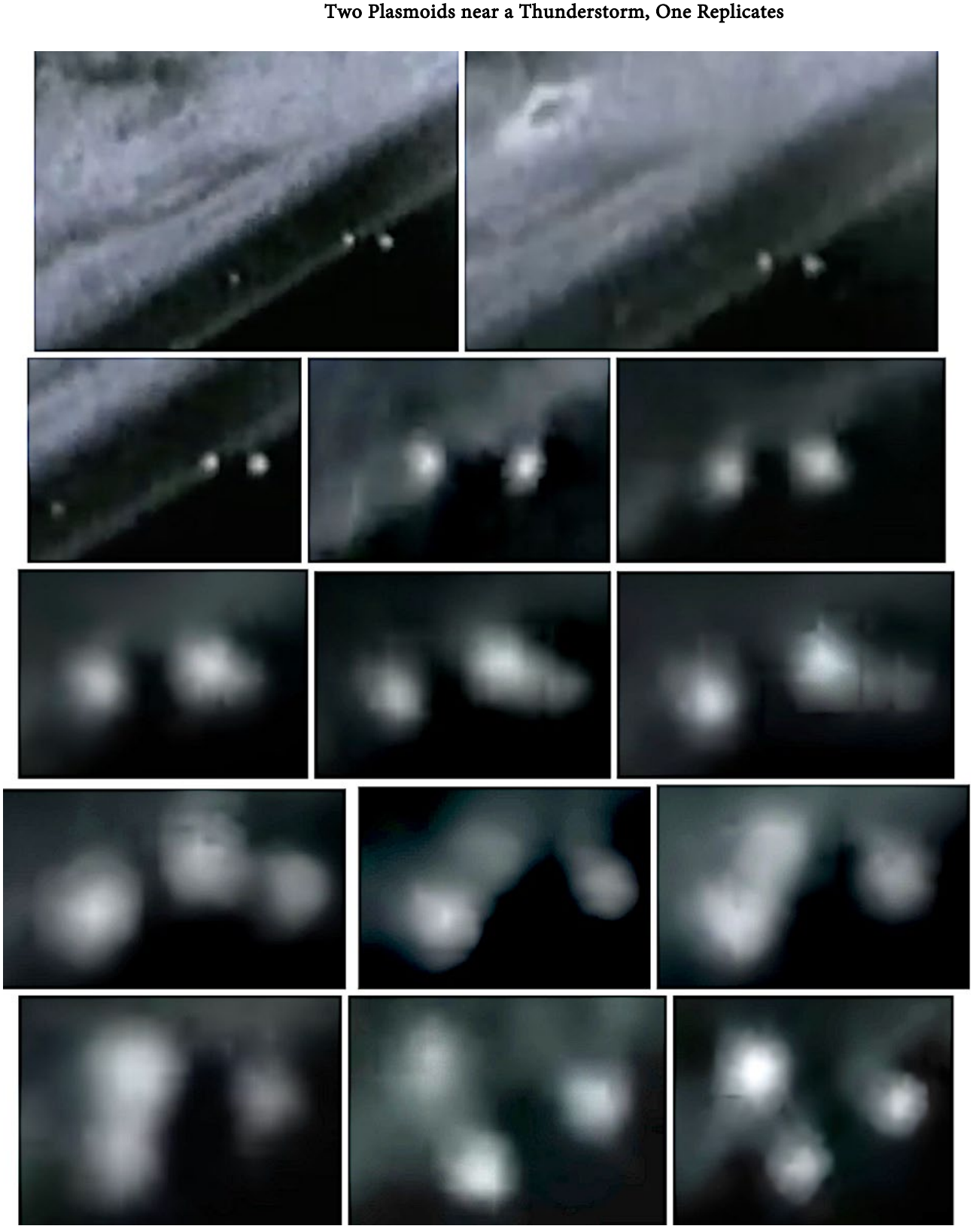


Figure 8. Two glowing shape-shifting plasmoids (near a thunderstorm), one of which (far right) becomes elongated and from which a third plasmoid emerges then makes contact with the plasmoid on the far left, and then detaches: plasmoids became three [1].

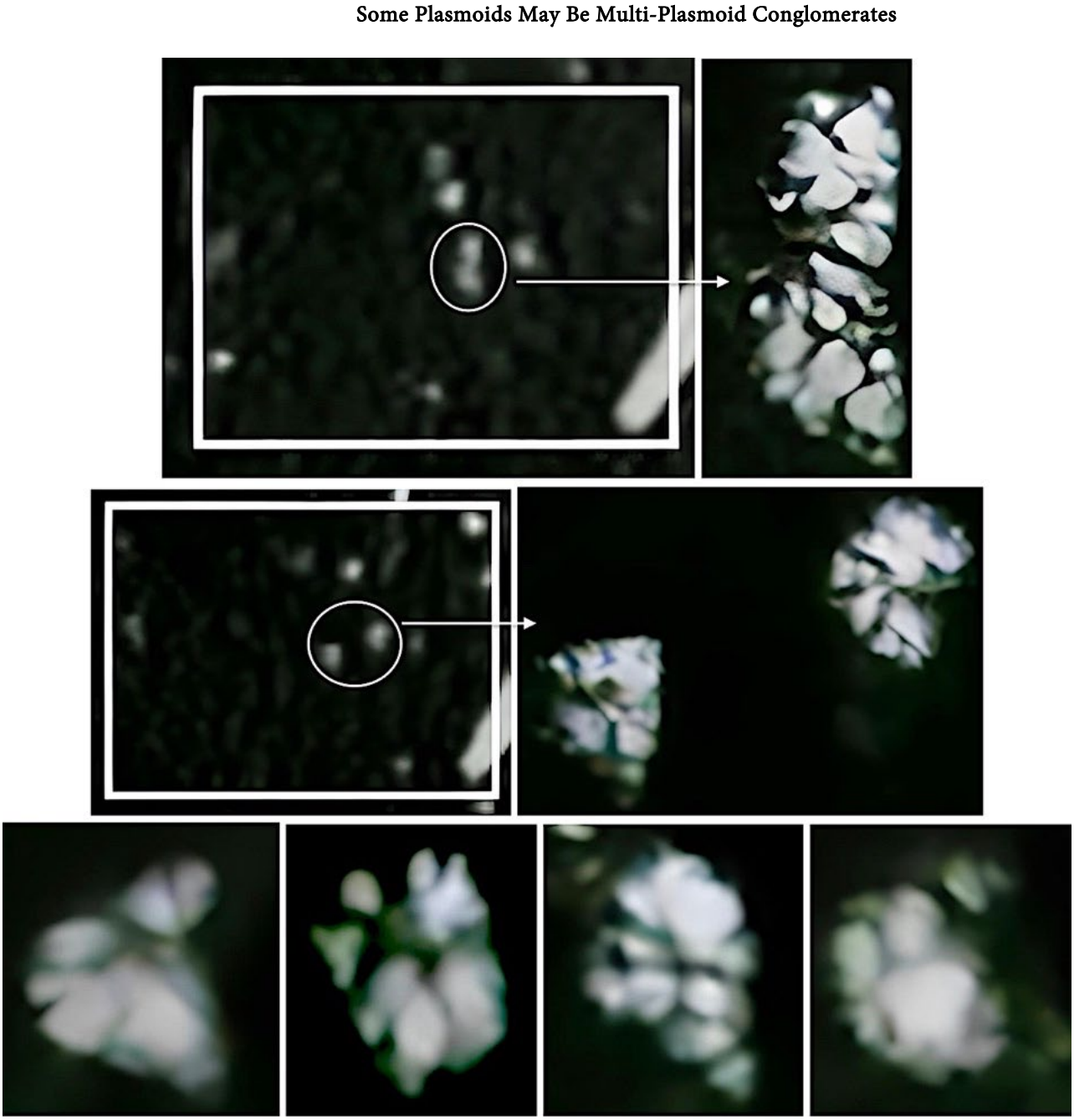


Figure 9. Some colliding plasmoids may be multi-plasmodic conglomerates consisting of numerous plasmoids loosely joined together forming a composite single cloud-like entity up to or greater than a kilometer in size. To speculate, each individual plasma may be multi-polar—similar to a multi-polar cloud—thereby enabling different aspects with a positive vs. negative charge to attach to its opposite. This also implies that the composite and each separate plasma are acting like a cooperative supra-organism that may detached plasmoids that become replicons or satellites.

2. The Plasmasphere

Plasmas have been filmed in the thermosphere, appearing from off-camera, approaching and descending into thunderstorms (**Figure 11**, **Figure 12**) whereas others have suddenly materialized and begin glowing in the space medium above

thunderstorms (**Figure 7**, **Figure 10**, **Figures 13-16**). These and others plasmoids may hover in place or travel in a trajectory that leads to a thunderstorm within which they descend (**Figure 6**, **Figure 7**, **Figures 11-15**, **Figure 44**), or which makes them a piercing target for plasmas ("hunters") and entities as yet unidentified coming from a different direction (**Figure 10**, **Figure 16**, **Figures 27-29**, **Figure 39**). We hypothesize that those that suddenly materialize in the thermosphere either (A) travel and arrive at near light speed and come to a sudden halt, (B) or they are formed by localized electromagnetic activity generated by lightning storms. (C) Often, within masses of illuminated and pulsating plasmas, there those that are not illuminated and appear as shadows. Therefore, it is possible that plasmas may "turn on" or "turn off" their illumination. (D) It is also possible that they and other plasmoids originate in and seep across from a 5th dimension when electromagnetic activity produced by a massive thunder bolt is transformed into mass that becomes a small black hole [63] that pierces a "brane" separating that 5th dimension from those four comprising our "known" universe. Some of those that materialize also appear to be emerging from a surrounding darkened area [10] that could be likened to a "hole" in spacetime.

It is also likely that those that arrive from off camera descending downward, originated in the plasmasphere—a region of Earth's magnetosphere well above the ionosphere—and which consists of low-energy (cool) plasma [64]-[66]. In 2014, satellite observations from the THEMIS mission have shown that density irregularities such as plumes form in the plasmasphere [67] and which may encapsulate electrons, protons, ions, neutrinos, and electrified dust, thereby forming a cold plasma [64] [65]. By contrast, the outer boundary of the plasmasphere may be relatively devoid of plasma.

The existence of the plasmasphere was first deduced by detection and analysis of very low frequency "whistler" radio waves which in turn are believed to propagate and possibly originate—along with transient plasma—in upward directed bolts of lightning that pass through the ionosphere into the plasmasphere and which propagates in the whistler-mode along geomagnetic field lines to the opposite hemisphere [68]-[70]. Possibly these whistlers' direct plasmas to the most energetic lightning storms; thus, accounting for those that arrive off-camera approaching and descending into storms raging in the troposphere (**Figure 11**, **Figure 12**). "Whistlers" are produced by plasma (lighting) and can be heard on radios on Earth and, to speculate, it is possible that plasmoids communicate via "whistlers".

3. Plasma in the Ionosphere

Interstellar space, the plasmasphere, and the ionosphere of Earth are permeated by plasmas/plasmoids [1]-[3] [71]-[75] and a variety of illuminated forms, that at present, are best described as "plasmoids" [1]-[3] or a form of life that is not carbon based and devoid of DNA [1] [2] [46]. In the lower layers of the atmosphere transient, self-illuminated, colorful entities, best described as plasmas, are produced

by lighting, thunderstorms, or in association with seismic events, volcanoes, dust storm, geomagnetic anomalies or the buildup of electric charges in fogs or ice-crystals in the atmosphere [11] [13] [16] [17] [49] [76]. Arnold, who is attributed with coining the term "flying saucer" but who believes these are "living organisms" also noted an association with seismic events [43] [44]; a belief now shared by many others.

Plasmas of the thermosphere-ionosphere, regardless of their origins, appear to be electromagnetic entities and constitute a fourth state of matter that are produced by complex electromagnetic interactions [28] [71]. Although these plasmoids may have a metallic sheen it is not known if they have solidity.

According to Nobel Laureate Hannes Alfvén [26] [27], plasmas have "a cellular structure" consisting of inner and outer layers which differ in positive vs. negative charges. These double layers act to repel plasma of the opposite charge, but combine with plasmas of the same charge, such that plasmoids may repel or be attracted to one another and exchange energy and engage in related behavior which have been filmed by 10 separate shuttle missions [2] [3] as documented in this report and a compilation of NASA shuttle films [1] [46].

Ions have a positive (cations) or negative charge (anions), and form positive or negatively charged layers that can attract, repel or neutralize each other (via the transfer and equalization of electrons), and which may enable plasmas to maneuver, accelerate or hover via interaction with other plasmas and the charge of their localized environment [26]-[28] [71] [72] [77]. Possibly, the cellular structure of the plasmoids of the ionosphere have incorporated and include cations and anions, which also form layers and encapsulate dust and debris that also have an electric charge.

Plasmas observed and filmed in the ionosphere-thermosphere and those produced in laboratories include those of many types, and which may have high or low density, high or low temperatures, and consist of positively and negatively charged particles, ionized atoms of gas; and whose basic interactions are electromagnetic [26]-[28] [71]-[74] [78]. Therefore, many of those that have been filmed within the ionosphere-thermosphere are believed to consist of a double membrane, a nucleus, as well as electrified particles of dust and fragments from carbonaceous chondrites [3]. However, there are other entities that have not been identified, including those that travel at hyper-speeds, and those that are not illuminated but appear as shadows. Furthermore, employing Fotor image filters, it appears that some specimens are distinctly different from the globular shaped nucleated specimens that target them. For example, in one instance captured on space shuttle film [1] four different multi-layered nucleated forms, coming from different directions at different speeds, penetrated dual-cloud shaped specimen devoid of any nucleus but which hovered in place near a satellite tether generating electricity into the surrounding space medium. To speculate: the sea of space may harbor innumerable life-like forms.

These UAP-plasma-like entities of the upper atmosphere are up to several dozen

meters in diameter, and have ovoid-, elongated-, cloud-, saucer-, donut-, cone-, snake- and cylindrical shapes (**Figures 1-3**, **Figure 6**, **Figure 7**, **Figure 14**, **Figure 17**) and some even resemble transient phenomenon commonly referred to in the scientific literature as "elves", "sprites" and even "jellyfish" (**Figure 17**, **Figure 18**). These plasmoids react to and possibly form in response to lightning and thunderstorms, as well as the waxing and waning of electromagnetic fields, the Van Allen Belts, geomagnetic storms, coronal mass ejections, solar flares, atmospheric waves, radiation from radio transmitters and heating facilities, volcanic eruptions, geomagnetic anomalies, seismic activity and electrified dust; all which affect the shape, velocity, and behavior of plasmas [74] [77]-[79].

As documented in this report and supplementary NASA film footage [1], these plasmoid-life-like entities can turn their illumination off on or, and will glow in the dark and are self-illuminating and many pulsate with light. The amount of light emitted may be determined or influenced by the type of particles that are shed and via electron discharge and a reduction in or conversely an increase in electron density. The glow may also be a form of bioluminescence and/or is produced via the transition from bipolar charging to a more dominant role of ions in particle charging [22] [79]-[82]; and this may also account for the stroboscopic waxing and waning patterns of light oscillation that is not uncommon as plasmoids traverse the thermosphere (**Figure 22**, **Figure 23**, **Figure 30**). If plasmas can "turn off the lights" and appear in a dark mode, is strongly suspected.

They also appear to have the capacity to shed or acquire electrons and to increase or maintain or change their electrical charge or that of different layers via accumulation or shedding of neutrinos and electrons [3]. Via charge separation or substitution, this may enable these life-like plasmoids to engage in complex behaviors as well as accelerate to hyper speeds.

Plasmoids in the thermosphere will turn and follow or collide with other plasmoids which hover in place or triangulate their movements so the two intersect (**Figure 8**, **Figure 10**, **Figure 16**, **Figures 25-29**, **Figure 37**, **Figure 39**, **Figure 44**). Often, they will briefly merge (**Figure 16**, **Figure 37**). In addition, those about to collide and especially after they collide may split off to form an additional plasma (**Figure 25**), and emit a glowing plasma trail (**Figure 7**, **Figure 8**, **Figure 12**, **Figures 20-23**), presumably consisting of emitted electrons and electrified dust that create a trailing particle "glow" (afterglow).

Plasmas created in the laboratory have a variety of colors, are ionized and are made up of negatively charged electrons and positively charged ions [27] [30] [55] [73] [78]. The atoms in these laboratory grown plasmas also engage in charge separation; that is, they separate from their negatively charged electrons and cease to have a neutral or negative charge [30] [75] [83]. Instead, they become quasi-neutral such that the overall charge can approach zero. Therefore, plasmas engage in "charge separation" and "charge coupling" (**Figure 25**) and can change their charge or the charges of different layers or locations within these layers [23] [27], and this would enable them to maneuver, accelerate or slow down, hover, make sudden turns, as well as follow and collide and even merge with other plasmas; as well as completely

change shape and split off into additional plasmas of opposite charge (e.g. charge separation).

Collectively, they travel at different velocities from multiple directions, with many stopping and hovering while yet others travel at hyper-speeds, sometimes in tandem, nearly side by side as they pierce other plasmoids one after another (**Figure 7**, **Figures 20-23**). That some plasmoids are attracted to and collide suggests that some plasmas consist of positive (or quasi-positive-neutral) charges and others negative (or quasi-negative-neutral) charges [27]. Yet others may have a neutral charge making them attractive to those with a negative or positive charge [27]. It has also been speculated that this may be a form of "alien sexual reproduction" [1] [2] [46] or they are merely engaged in energy cannibalism, or a complex "alien" form of communication [2]. Hence, not all plasmoids, even in the same group or vicinity, behave the same.

Assuming these are plasmoid-like entities, and not a completely novel (non-plasmodic) fourth domain of life, then the attraction and repulsion and reciprocal and non-reciprocal interactions between plasmas including asymmetric acceleration and collisionality are likely affected by their degree of magnetization and electric charge (positive, negative, neutral) which can differ dramatically between plasmas [23] [27] [75] [83]. Presumably, when plasmoids collide they are engaged in electron and ion transfer and are recharging a waning charge or changing charges; e.g. charge coupling. Likewise, those plasma that target other plasmoids, may be acquiring or shedding electrons, ions, or electrified dust; observations consistent with the likelihood they are capable of increasing, decreasing (charge separation) and changing their charge, which in turn would affect maneuverability and enable them to increase or decrease velocity and rapidly alter their trajectory.

Plasmas also divide and fragment into additional plasma [27] [30]. As documented here the splitting may be an example of "charge separation" or an example of DNA—or non-DNA alien "mitosis/meiosis". Moreover, the portion that splits off can be smaller and have a different appearance, and most likely an opposite or neutral charge. However, using Fotor Image processing, it has also been determined that what appears to be a single cloud-like plasmoid, actually consists of dozens of smaller plasmoids (**Figure 9**)—reminiscent of algae conglomerates that resemble a single algae [1]—and it is these smaller entities that might be jettisoned as satellites.

In summary, plasmas will glow, as well as oscillate and pulsate with light, and can display a range of colors and behaviors, including swarming, aligning, congregating, clustering, crowding; all of which contributes to collective or individualized behavior including pursuit, head-on collisions and energy cannibalism [23]-[25]—as observed in the thermosphere [1]-[3] and documented in this report, it is this propensity to collide and intersect which puts aircraft at risk if plasma are encountered in the troposphere.

4. The Ionosphere and Earth's Global Electric Circuit

The highly electrically active ionosphere provides the ideal habitat for these putative

energy radiating and consuming plasmoids. Extending 85 to 600 km above the Earth's surface the ionosphere is coextensive with the thermosphere (50 to 400 km) and exosphere (400 Km on up). The ionosphere is an energetically active waxing and waning region of the atmosphere within which swirl ions, particles and dust that are positively charged with an overall potential of about 250 - 300 kV [35] [36]. However, the ionosphere grows or shrinks in response to thunderstorms, lighting, solar radiation, galactic cosmic rays originating outside the solar system and precipitation from the Van Allen radiation belts, all of which are a source of negatively charged electrons and positively charged ions [35] [36].

Ultraviolet radiation also causes the photoionization/photodissociation of molecules, creating ions—particularly in the thermosphere which constitutes the major portion of the ionosphere [35] [36] and within which plasmas congregate and engage in complex behaviors [1] [3]. Upper atmospheric conductivity in fact accelerates with height due to the increased ionization produced by cosmic rays and extreme ultraviolet and X-radiation [36].

The ionosphere obtains its positive charge primarily from thunderstorms [35] [36] [68]-[70]. Thunderstorms (disturbed weather) produce electric fields and cause positive charges to jet upwards toward the ionosphere (O~ 250 kV positive) whereas negative charges are directed to Earth's surface [5]—a phenomenon known as "charge separation" and which may also characterize the cellular layers and mutual behaviors of plasmas, including splitting into additional plasmas.

Atmospheric charge separation occurs because the lower atmospheres are weakly conducting, and function more as a leaky insulator, thereby enabling AC (positive) and DC (negative) charges to attract and pass between the ionosphere and Earth's surface with minimal loss of current [4] [68]-[70]. Because it is weakly conducting, the lower atmospheres also provide a corridor through which plasmoids may descend without losing charge; and instead acquire charge.

In addition to "charge separation" there is another electrical phenomenon known as "atmospheric electrical coupling" which takes place at or near the speed of light [68]-[70] and which links "couples" the negative charge of Earth with the positive charge of the ionosphere [35] [36]; also made possible by the weakly conducting stratosphere and troposphere. "Electrical coupling" may explain why plasmas target collide, and sometimes merge, whereas the exchange of charges (separation) results in repulsion—phenomenon which would also enable plasmas to accelerate.

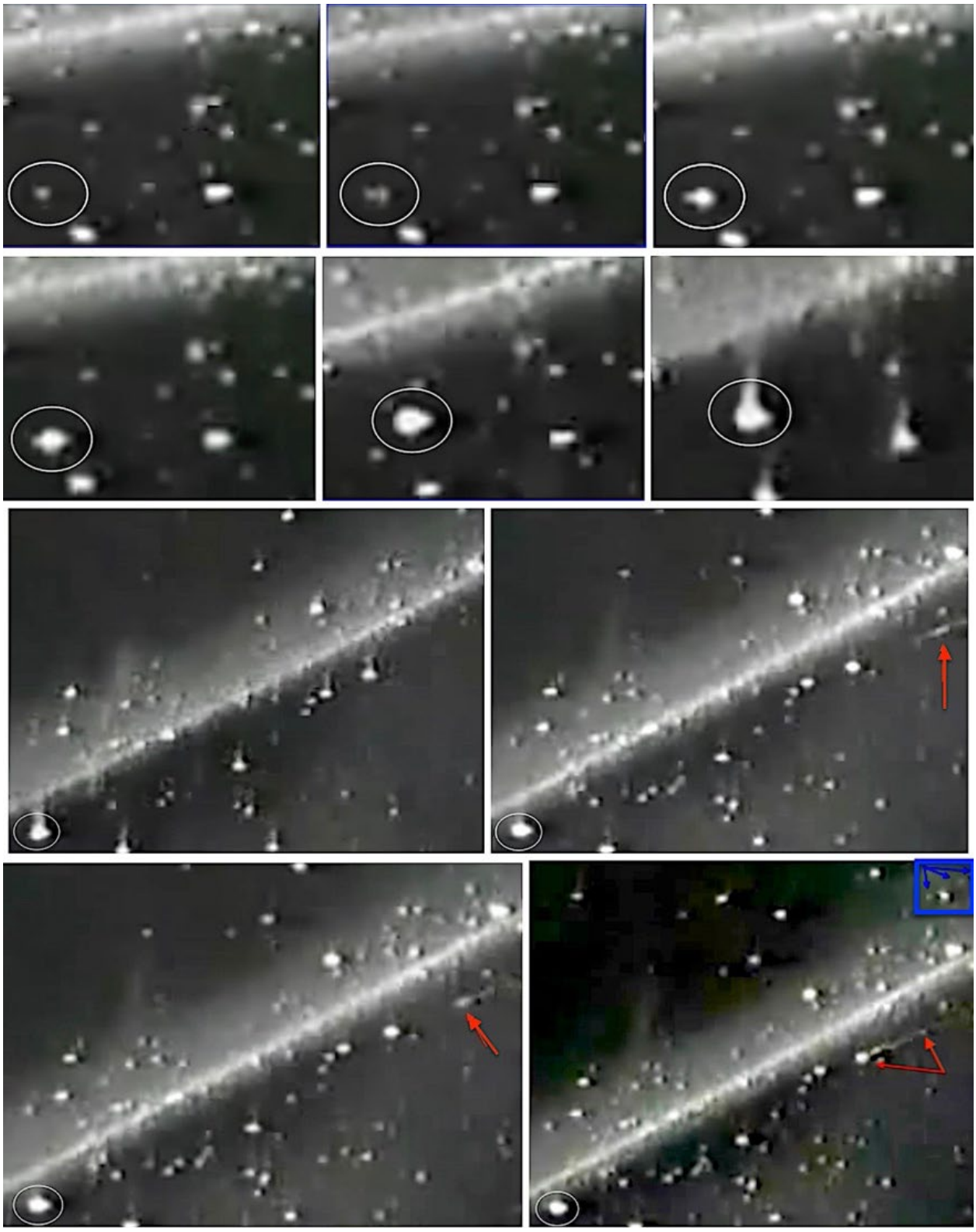
It is important to stress that many of these entities engage in behaviors that cannot be explained as automata guided by push-pull electromagnetism. There are pulsating entities that will strike and pass through numerous other "plasmoids" but then turn, follow and pursue a plasmoid coming from a different direction the latter of which appears to eject a smaller plasmoid that contacts the pursuer which reverses direction [1] [3]. As also documented in this report, entities will suddenly appear (materialize or self-illuminate) and then follow another plasmoid which just struck and passed through a smaller plasmoid, and the pursuer will pass through

the same smaller plasmoid, make contact with the plasmoid it followed then continues toward a thunderstorm, only to hover as the first plasma ejects a plasma that makes contact with the now hovering pursuer. In yet other instances, a plasmoid will split into two, one of which contacts a nearby plasmoid and hovers beside it. Then, there are those that hover in place as yet other plasmoids strike and pass through it, one after another. These complex behaviors can't be explained by plasma physics or electromagnetism. Perhaps the answers would become apparent if NASA did not obscure space shuttle film footage with four layers of visual noise [1] [2] [46] and repeatedly shake and change the focus of and turn off the camera.

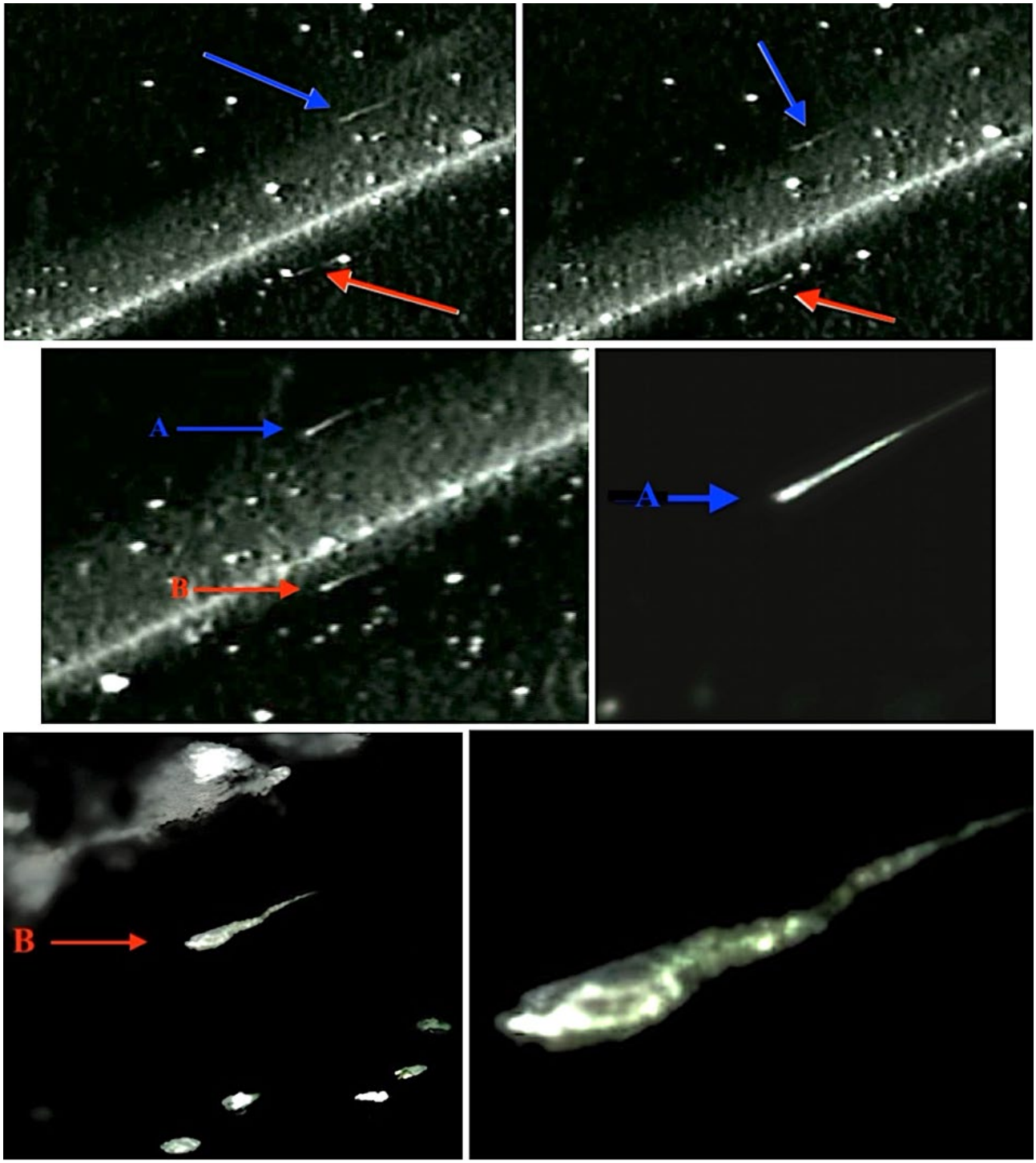
These complex behaviors and more, can be viewed in a 17-minute film of supplementary data consisting of a compilation of NASA space shuttle video footage [1]. Except for the section of film time-line: 13:19 to 13:30 which employed tracking software, no filters or enhancement software were employed on these NASA films by the authors or their associates. The four layers of noise were added by NASA to these films after they were broadcast to Earth which is why the NASA emblem in the corners of many of these film segments is blurred [1].

All freeze frames (figures) were captured from these NASA films [1] via Apple Final Cut Pro and one or more of the following Fotor filters were employed on many of the photos/figures: anti-blur to sharpen the focus; contrast to enhance contrast; sharpness to sharpen the image. To visualize internal features, Fotor Red, Blue, Green filters were employed to detect gray-value differences in pixels and enhance different gray-value spectra embedded in the film-photo so as to de-fine and colorize differing features and shapes within shapes within the outer and inner aspects of the specimens.

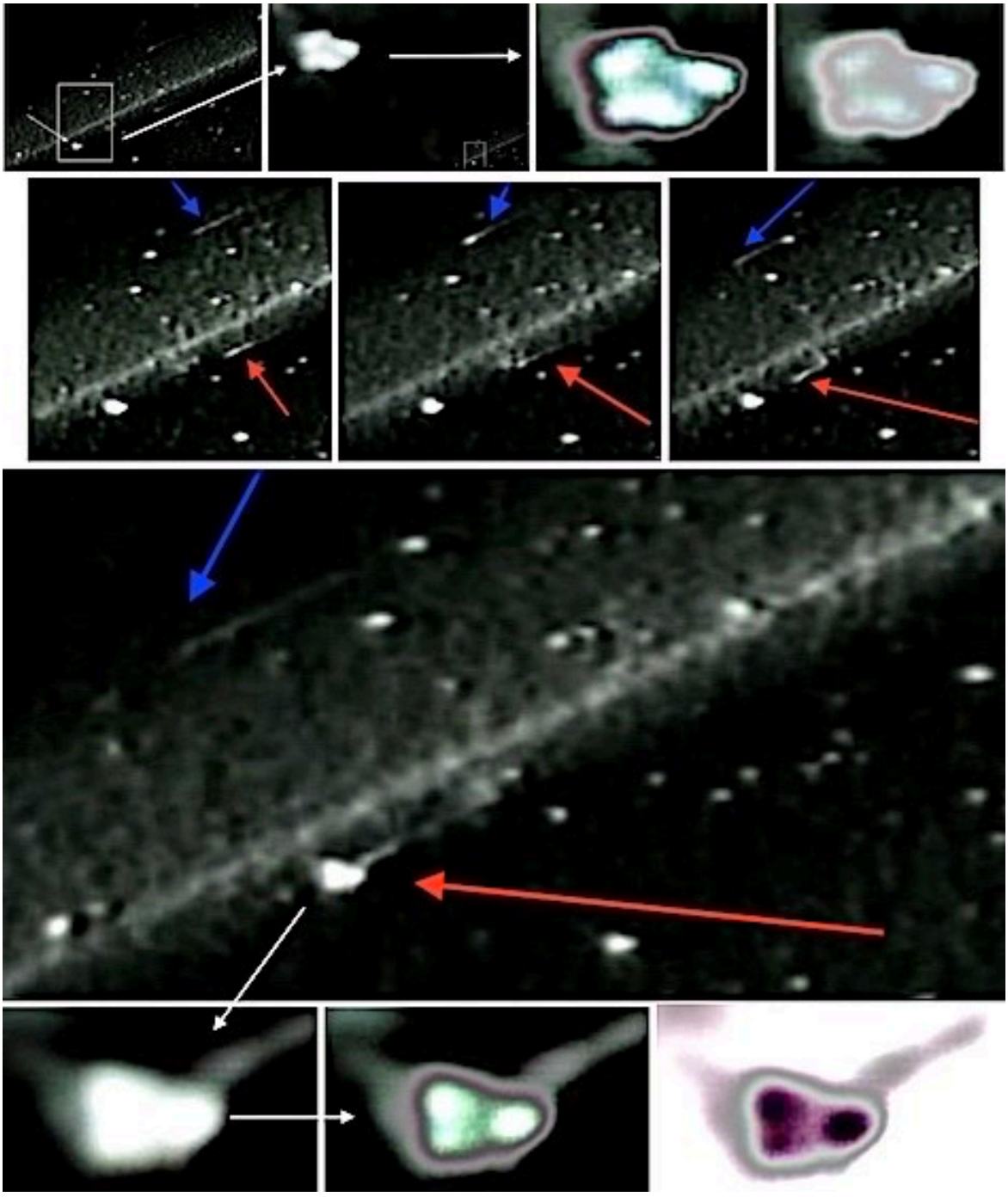
Plasmoid Materializes, Moves toward Thunderstorm, Is Targeted for Collision and Pierced



(A)



(B)



(C)

Figure 10. (A) The plasmoid (circled in white) materialized (or suddenly self-illuminated) in the thermosphere, and maneuvered itself above a thunderstorm and in the direct path of one of two twin "hunters" [1] indicated by the red and blue arrows (continued in (B) and (C)). **(**B) Plasmas gathered above a thunderstorm as two hunters strike one after another, at hyper-velocity. NASA Mission Control referred to these "twins" as "shooting stars" despite the fact they did not burn up and were "wiggling" (Hunter "B") and sightly altering their trajectory as they struck and pierced other plasmas. Note the glowing ovoids within specimen "B". Filmed by STS 101 Shuttle Atlantis [1]. (C) The globular plasmoid circled in white materialized, flew above a thunderstorm where it hovered directly in the path of a (Red arrow) "Hunter" that pierces and exits multiple plasmas until striking the globular plasmoid. Processed with Fotor Filters and Anti-blur software. (Top right) Note the multiple ovoid forms and the nucleus/void at its center of the target plasma (Top) and when the two collide (Bottom) above the thunderstorm, Filmed by STS 101 [1].

The ionosphere's positive charge is maintained largely by thunderstorms. However, earthquakes, tsunamis, volcanic eruptions, and even rocket launches can contribute to positive charges in the ionosphere [36] [84] [85]. As such, these same factors would be expected to influence the behavior and even the formation of plasmas.

As a good electrical conductor, the overall neutral to positive charges within the ionosphere are generally equipotential and spherically symmetric around Earth and its continents (which generally have a negative charge) and oceans (negative and positive); the surface also serving as a conductor [69] [70] [86]. Specifically, Earth's soil, rocks, metals, have a negative charge of around 500,000 Coulombs with the ionosphere having a fairly equal positive charge [36] [69] [70]. Land masses are also electrically conductive and natural electric currents flow on and beneath the surface. Land conductivity ranges from 10^{-7} S·m^{-1} for rocks, to 10^{-8} S·m^{-1} for marble and up to ~10^{-2} S·m^{-1} for limestone or wet clay [68] [86]. In addition, ore, rocks, pipes and cables, respond to electrical changes in the ionosphere, so that a telluric current is induced in the ground [36] [86]-[88].

In contrast to extraterrestrial spacecraft—the existence of which is yet unproven—it is unlikely that a negatively charged plasmoid would land on Earth but instead would prefer the positively charged atmosphere that extends up to 20 km above Earth. Moreover, given that coastal areas and the surface and air above the ocean develops a positive charge under white water and turbulent conditions [6]-[10], it can be predicted that negatively and neutrally charged plasma would be attracted to this environment as documented in this report.

Thunderstorms and Plasmas (UAP)

Plasmas need energy to survive [30] and thunderstorms serve as one of the major supplier of electric currents to the ionosphere and Earth [69] [70]—and thus thunderstorms would attract plasmas. Observational data captured on film by missions STS-75, STS-80, STS-96, and STS-106 (see **Figures 3-13**) documents that hundreds, and possibly thousands plasmoids are attracted to, fly toward, and congregate above localized thunderstorms and massive bursts of lightning [1]-[3] [46]. In so doing, these plasmas may hover or engage in complex behaviors, including colliding and piercing one another (**Figure 7**, **Figure 8**, **Figures 20-24**).

Thunderstorms form, on average, at a height of 12,000 to 20,000 meters [5]. Likewise, the maximum production rate of ionization (up to 3×10^7 ion pairs m^{-3} s^{-1} [89] [90] occurs at altitudes between 12,000 to 20,000 meters, *i.e.* in the troposphere-stratosphere. This region of the atmosphere is a major corridor through which passes commercial and military jets [38] [39] and that not uncommonly encounter UAP that hover, follow, "toy with" circle, and then abruptly speed off at incredible velocities despite no obvious means of propulsion [32]-[34] [41] [45] [51]-[54].

Lightning is also a plasma that can produce or trigger the formation of multiple transient plasma [16] [76] [91]-[93]. Moreover, a single lightning bolt can produce up to 1,000,000,000 joules of energy and anywhere from 130 million volts to 1.3 billion volts of upward directed positive current. It is predictable that lightning

(which is a plasma) would be very attractive to and would produce plasmas.

STS-75, STS-80, STS-96, and STS-106, however, present, at best, only a limited picture of the tremendous amount of plasmoid activity above lightning storms, as Earth is constantly buffeted by thunderstorms and lightning. Each day at least a thousand thunderstorms rage over Earth and approximately 2000 thunderstorms are simultaneously active around the globe [94] [95]. These storms of lightning continuously release positive charges into the upper atmosphere and negative and positive charges toward Earth's oceans and land masses.

Thunderclouds consist of both positive and negative charges [5]. These currents, in turn, would attract plasmas with a negative charge and those with a positive charge. Specifically, as thunderclouds and storms develop, complex microphysical processes cause the buildup of reservoirs of positive electric charge in the upper regions of the cloud, and reservoirs of negative charge at the lower portions such that a vertical electric dipole is formed.

Rycroft *et al.* [96] and Odzimek *et al.* [97] estimated that thunderstorms contribute about 60% to 80% of the upward positive currents flowing to the ionosphere, with electrified rain/shower clouds, dust storms, volcanoes, and earthquakes responsible for 40% to 20%. However, the lower portions of thunder clouds contain a negative charge and direct negative charges toward the ground [5] [98].

It is believed that on average a thunderstorm generates an upward D.C. current of ~1 A to the ionosphere, which is an excellent conductor (with an equipotential VI of ~+250 kV) and an A.C. current toward Earth [99]. Thunderclouds, therefore, constitute giant "batteries" which drive a downward negative electric current toward Earth, and an upward current (*i.e.* positive ions that accumulate in the troposphere and within the clouds), through the stratosphere and mesosphere up to the ionosphere and which attracts plasma [3]. The upward conduction current of a single thunderstorm can cause the charge potential of the ionosphere to reach ~+250 kV with respect to that of the Earth's surface [35] [36]

Because thunderclouds generate potential differences exceeding 100 MV between the positive charges at their tops and the negative charges near their bottoms, they serve as both a D.C. (negative to positive) and an A.C. (positive to negative) battery/generator that continually recharges the global electric circuit maintained between the ionosphere, the lower atmospheres, the land masses and the oceans. Moreover, the thundercloud's "D.C. Battery" creates a series of horizontal charge fields above the cloud—basically creating an "all roads lead to Rome" multi-pathway that plasmoids may traverse as they fly toward and then descend into a thunderstorm. By contrast, the A.C. generator at the bottom creates vertical charge fields leading downward to a dozen meters above the ground and ocean and thus providing yet another pathway to the lower atmosphere and the surface [98]. However, in so doing, the coupling of a downward charge with the positive charge in the lower atmosphere, may result in a plasmodic collision that also produce transient plasmas, e.g. ball lightning.

This physical separation of oppositely charged particles within the cloud and the creation of the dipole occurs, in part, because the larger negatively charged cloud

particles fall toward Earth and smaller positively charged particles are transported to the ionosphere [100]. However, the thunder cloud may become layered or pocketed with negative and positive charge centers. Thus, the dipole connection with Earth vs. the ionosphere may become multi-polar—a function of the dynamic nature of the thunderstorm and the many factors (such as temperature, amount of moisture, humidity) which can affect the temporal evolution of charge.

Thunderclouds, which generate potential differences exceeding 100 MV between the positive charges at their tops and the negative charges near their bottoms [101], are the most important source of currents through the atmosphere. They are both a D.C. "battery" and an A.C. generator in the global electric circuit and are immensely attractive to plasmas in the ionosphere.

Lightning discharge from the top of a thundercloud commonly generate energetic electrons so powerful they are transformed into an upward gamma-ray burst and electromagnetic waves that travel in a variety of direction and across a broad range of frequencies including whistler radio waves that jet through the ionosphere into the plasmasphere [102] [103]. It is possible that these whistler radio waves alert and direct plasmoids in the ionosphere and plasmasphere to an active thunderstorm.

Thunderstorms—in conjunction with Earth, its land masses, oceans, clouds, and thermosphere-ionosphere—are primarily responsible for maintaining Earth's Global Electric Field and Circuit [70] [101]. Thunderstorms also appear to provide an electrically recharging "way-station" for plasmoids descending from the ionosphere, mesosphere, and stratosphere to the positively charged lower atmosphere—the troposphere—and the oceans of Earth.

5. Fair Weather Clouds

Each of the ~1000 thunderstorms active each day generates a downward A.C. current that flows even to areas remote from those thunderstorms including toward fair weather (no clouds) and semi-fair weather (non-precipitating layered clouds) areas [104]-[106]. Complex microphysical processes acting within thunderclouds can also cause the buildup of reservoirs of positive electric charge at ~10 - 16 km altitude, *i.e.* in the troposphere and lower stratosphere [5]—airspace in which passenger and military jets often cruise.

Once a localized storm has calmed, the atmosphere and remaining clouds continue to be electrified in upper horizontal and lower vertical directions. For example, it has been estimated that 30 minutes after the last lightning flash a horizontal positive charge can be detected over 250 km^2 distant; and that even when nearly an hour has passed, the horizontal positive charge will still extend over 90 km^2 at an altitude of 10 km [5] [107] [108].

Thus, for over an hour or more, the interior positive charge extends well beyond the lifetime of the thunderstorm and persists even during fair weather conditions and may infiltrate and charge distant areas that are otherwise cloudless; and this is due to the fact that the stratosphere and especially the troposphere act as non-

conducting insulators and maintain a positive charge [88]. In addition, fair weather clouds, including those fluffy white and pillow shaped, and in particular those that are layered, are also electrically charged and contribute to the GEC [70] [104]-[106]. Such clouds are known to cover around 30% of the planet at any one time [70]. Earth's lower atmosphere, above much of the planet, is therefore electrically charged.

Clouds in general accumulate charges. In the natural atmosphere, the global circuit drives vertical current through layered clouds and fogs, such that the lower boundary of the cloud is subject to rising moist air and water vapor saturation all of which contribute to a negative charge at the lower boundaries of the cloud [109]-[114]. Calculations and measurements for non-precipitating (fair weather) clouds have documented that the interior and upper boundary and interior charge of these clouds are usually positive and the lower cloud boundary negative [70] [109]—similar to thunderclouds. Globally, the total positive charge stored by layered clouds is approximately 10^5 C, which, combined with the positive charge in the troposphere atmospheric column below and in the stratospheric column above the cloud up to the ionosphere, balances the total negative surface charge of the land masses below [70] [109].

A positive charge also accumulates in these fair-weather clouds because of the horizontal transmission of positive charges even from thunder clouds hundreds of kilometers distant. Because they act as passive accumulators of charge these fair-weather clouds also serve as "generators" of current within the global circuit [70].

Plasmoids filmed by 10 shuttle missions are attracted to electromagnetic activity and the positive charges at the top of thunder clouds and positively charged lightning (**Figures 3-13**). Therefore, it can be predicted that plasmas would be observed not only during disturbed weather conditions, but on foggy, cloudy, humid as well as on cloudless fair-weather days due to the attractive influences of this positively charged environment.

Plasmas in the Thermosphere Approaching—Descending into Thunderstorms

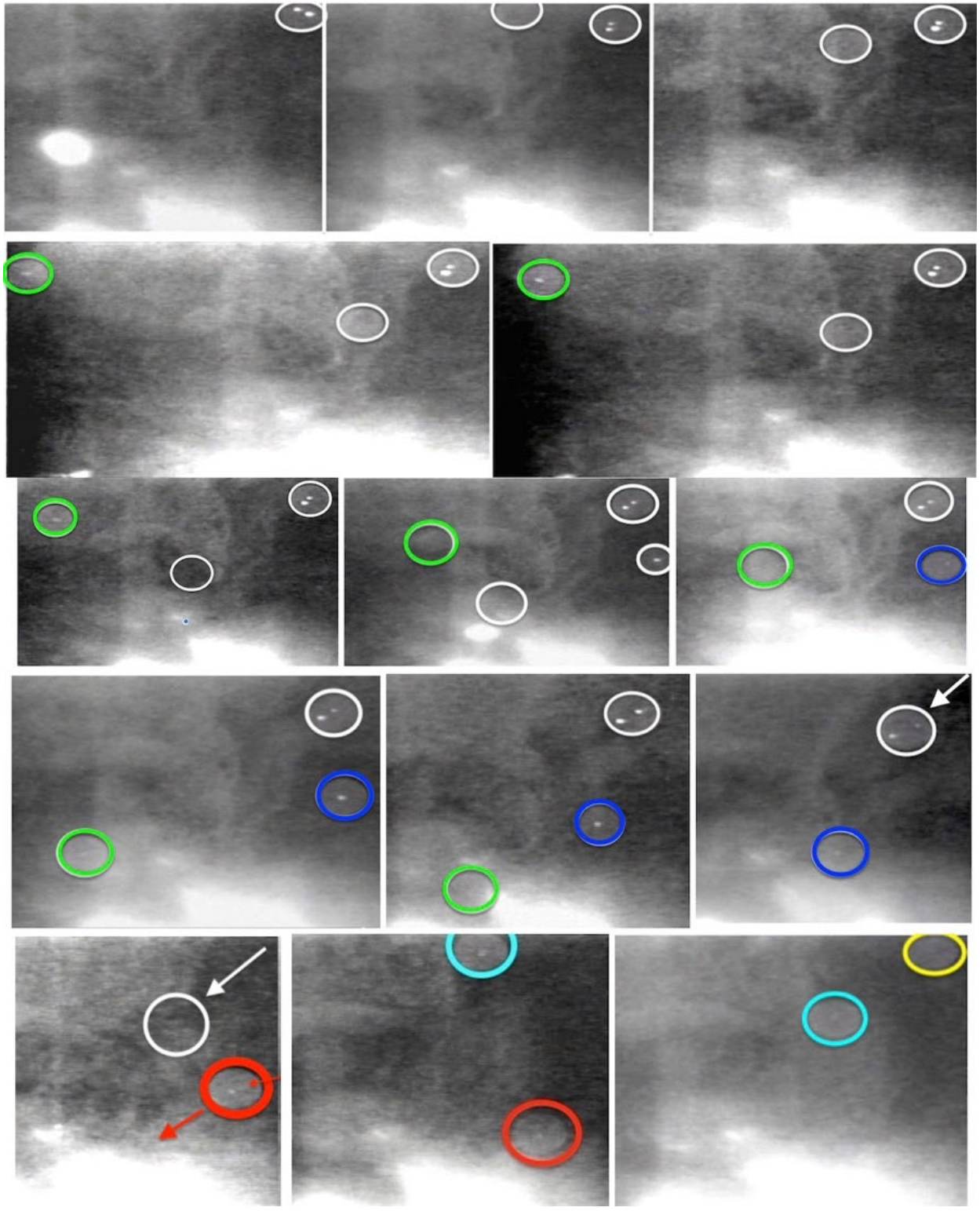


Figure 11. Multiple plasmoids, alone and in pairs, arrive from off-camera and approach, at different velocities, and descend into a powerful thunderstorm [1]. See: https://researchgate.net/publication/383116954.

A Single Thermosphere Plasma Soaring above & Descending into a Thunderstorm

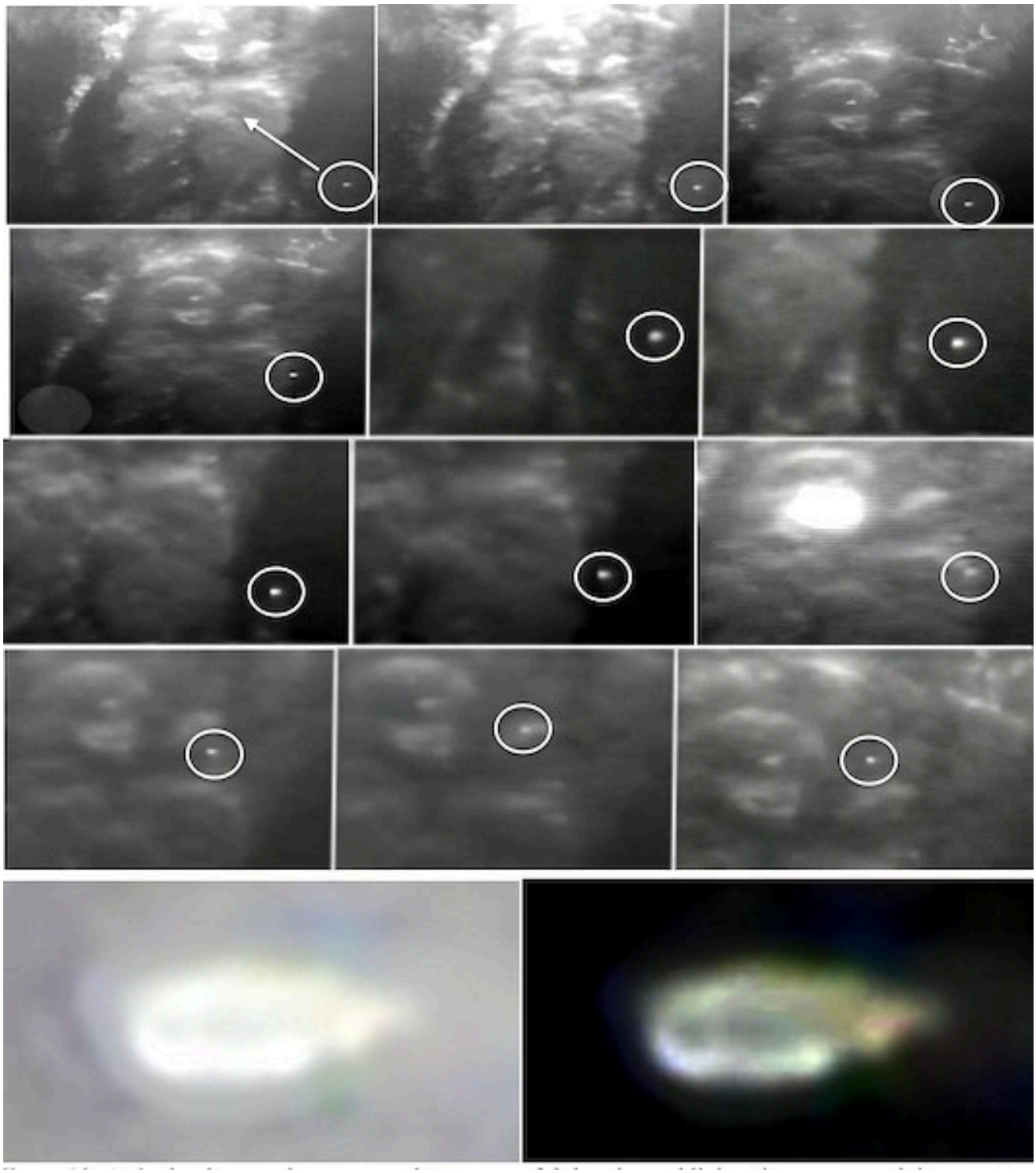


Figure 12. A single plasmoid alone approaches a powerful thunder and lightning storm; and then descends into the storm and the lower atmosphere [1]. (Bottom). Processed with Fotor anti-blur imaging processing software. Note multiple voids/nuclei in specimens magnified 1600 times.

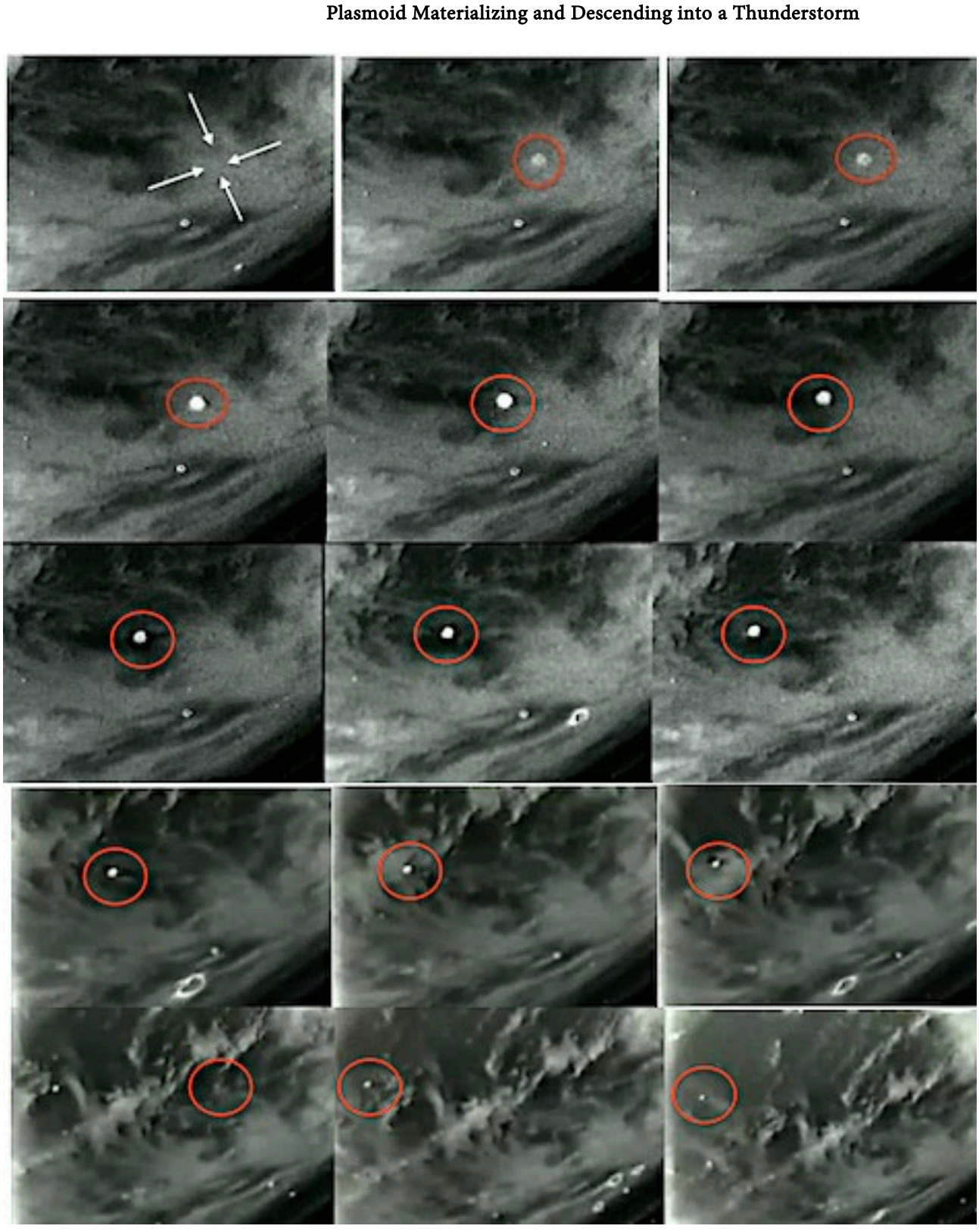


Figure 13. A plasma materializes above and descends into the storm and the lower atmosphere. (Bottom) Note void/nuclei (top second row). Filmed by STS 80 [1].

Figure 14. A plasmoid materializes and descends into the storm and the lower atmosphere. (Bottom) Note multiple voids/nuclei. Filmed by STS 80 [1]

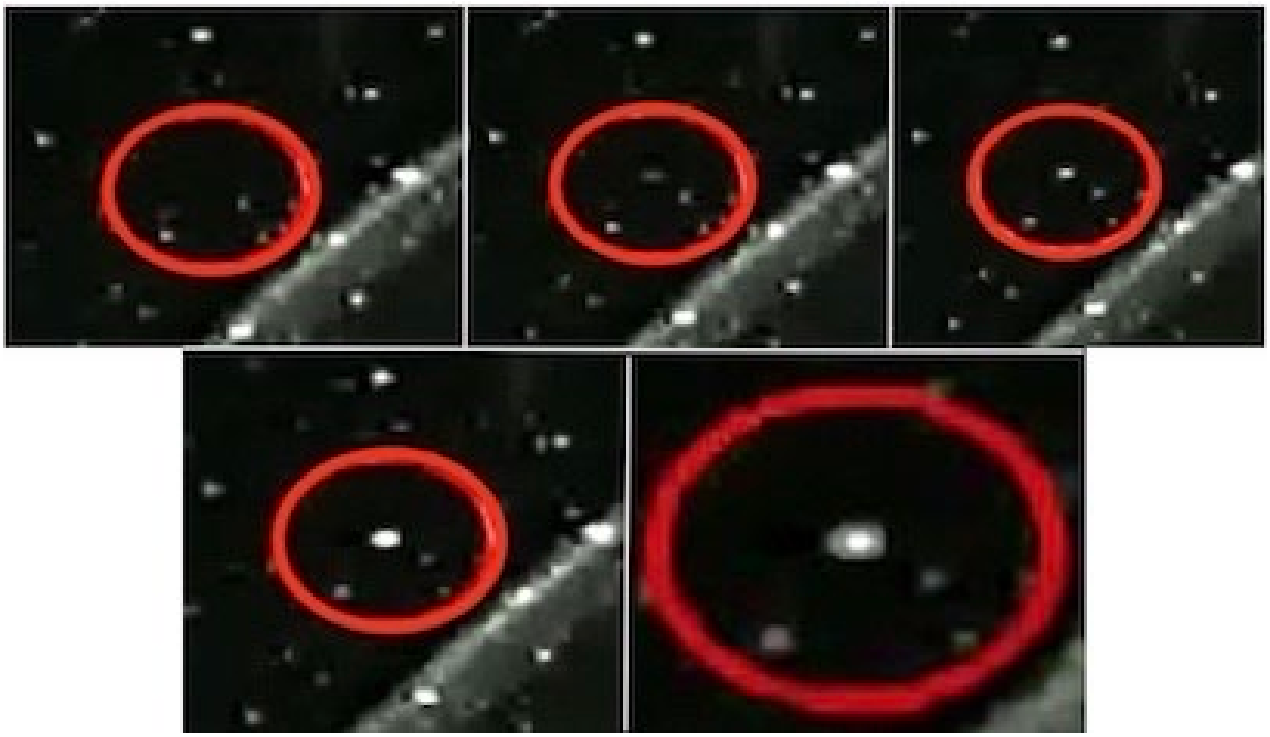
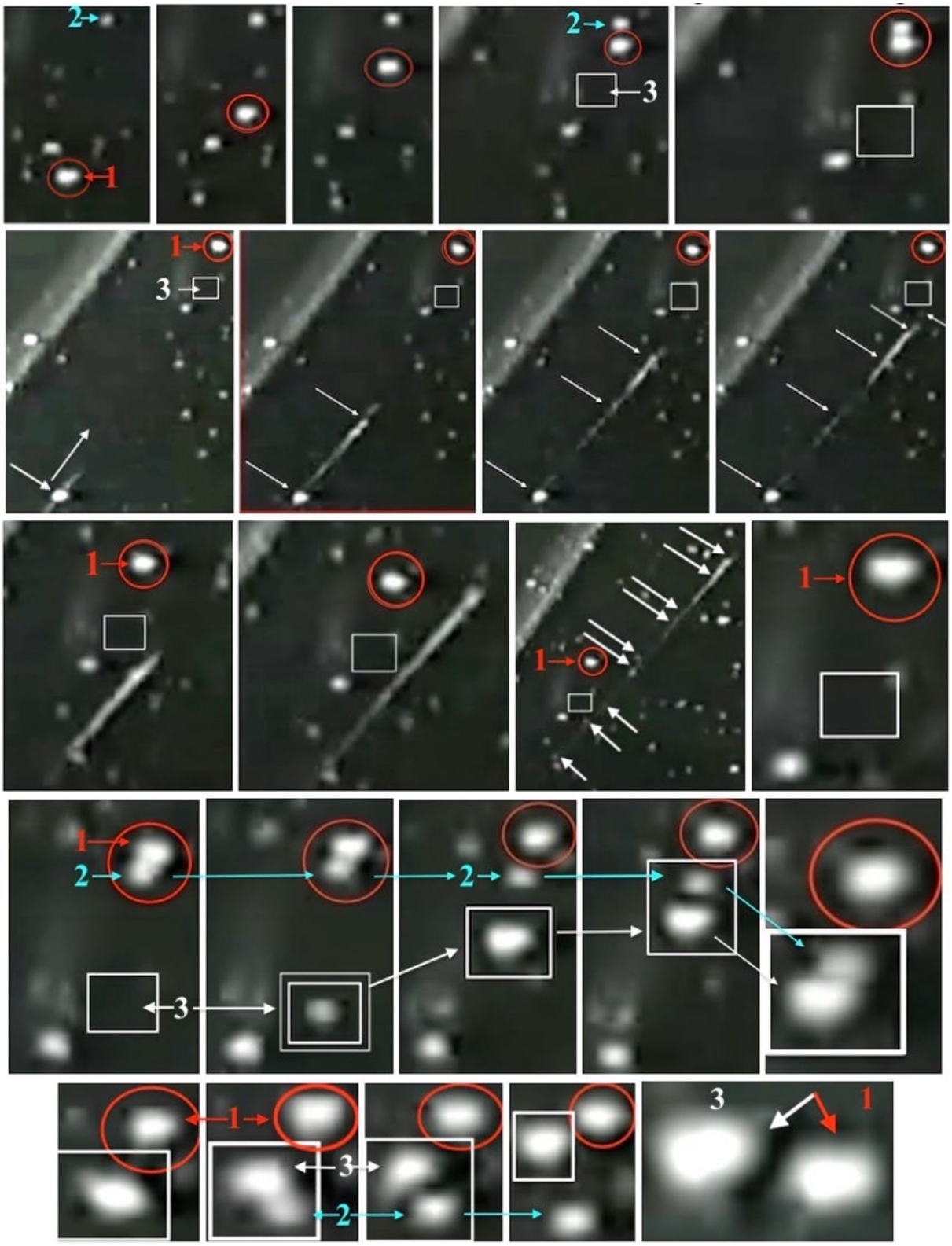
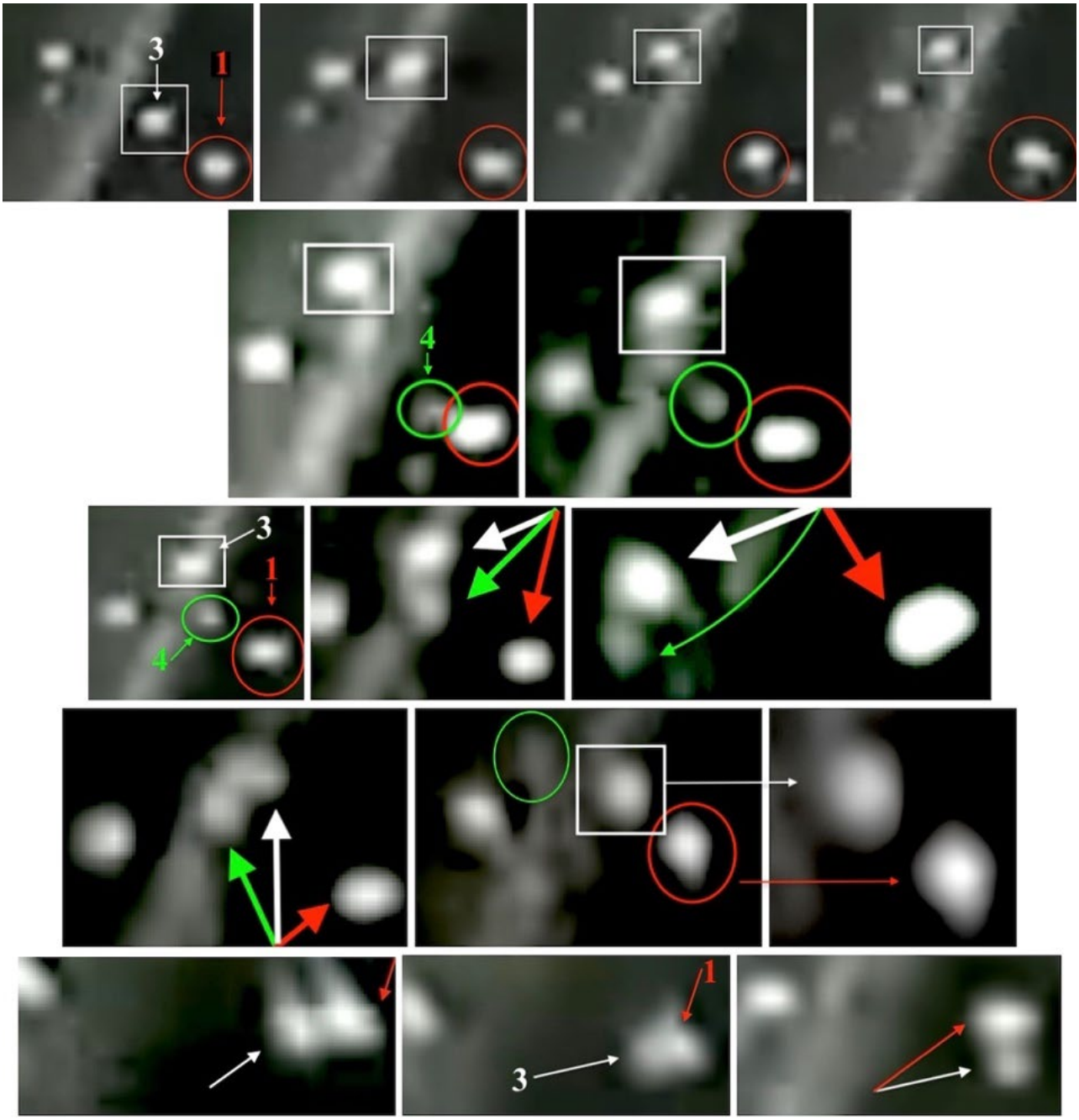


Figure 15. Plasmoids materializing or suddenly self-illuminating above a thunderstorm [1].

Plasmoid Materialize above Thunderstorms Target Same Plasma. Engage in Complex Interactions



(A)



(B)

Figure 16. (A) Plasmoid 1 (red circle) targets collides/merges with a plasma 2 (purple). Plasmoid 3 materializes (white box) after a hyper-velocity hunter strikes numerous plasmas. Plasmoid 3 follows and also collides/merges with Plasma 2. (Continued with (B)). Filmed by STS 101 [1]. (B) As documented in (A), the white box plasma #3 materialized and followed the Red Circle plasma #4, intersecting the same #2 plasma that Red Circle had already penetrated. The Red and White come close together, but White continues to just above the thunderstorm. Plasmoid 1 ejects a smaller plasma #4 circled in green, which makes contact with the White Box Plasma #3, which then reverses course, targets, collides, merges and intersects White Circle Plasma #1. These complex interactions could be interpreted as indications of communication, intelligence, and complex social behavior. Filmed by STS 101 [1].

Thermosphere Plasmoids That Form Rings, Cones "Jelly Fish", "Sprites" and "Elves"

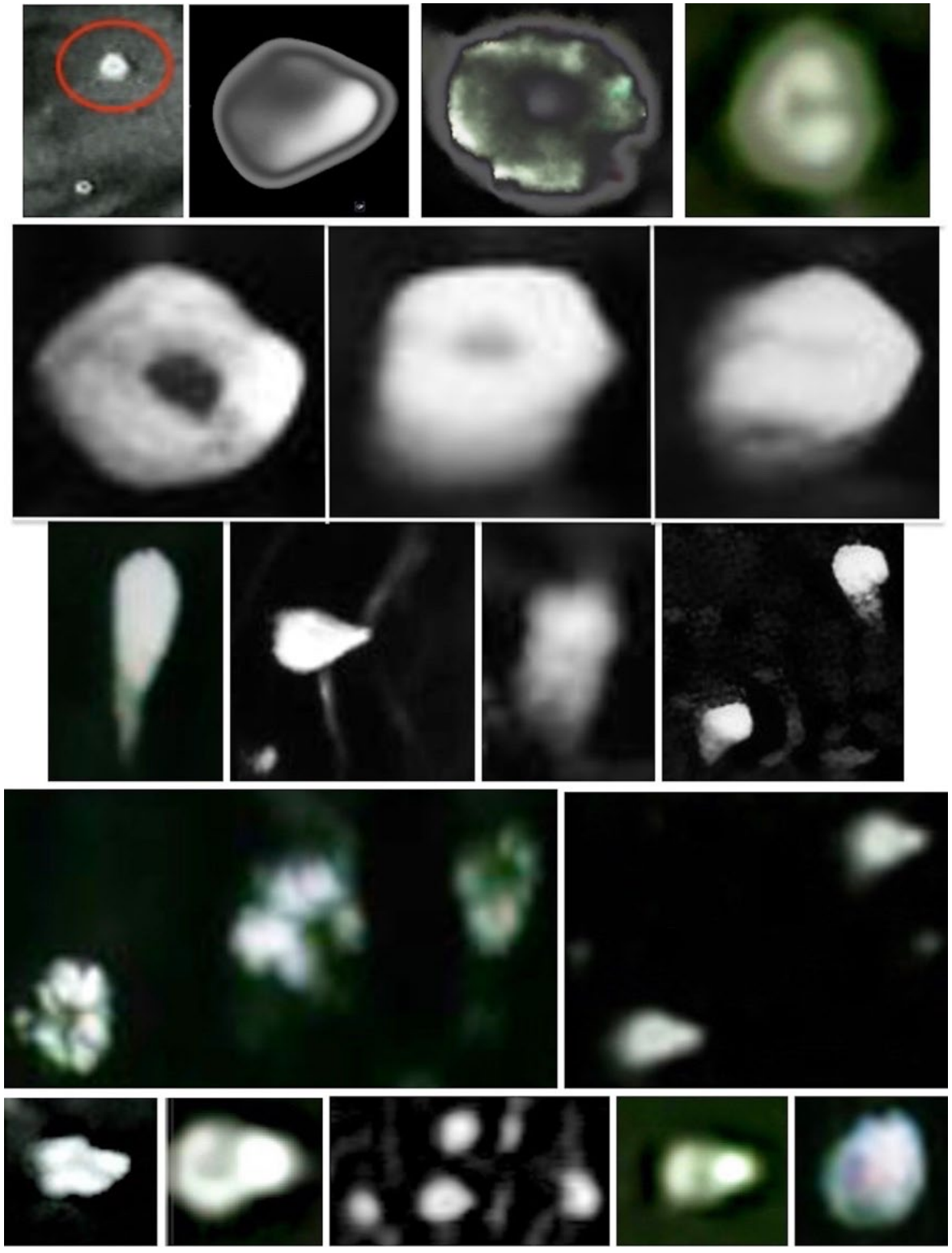


Figure 17. Plasmoids in the thermosphere take a variety of forms and change shape, resembling clouds, rings, cones, and multiple plasmas joined together. If these are representative of a "fourth domain of life" then some may represent distinct "species".

Transient Luminous Plasmas

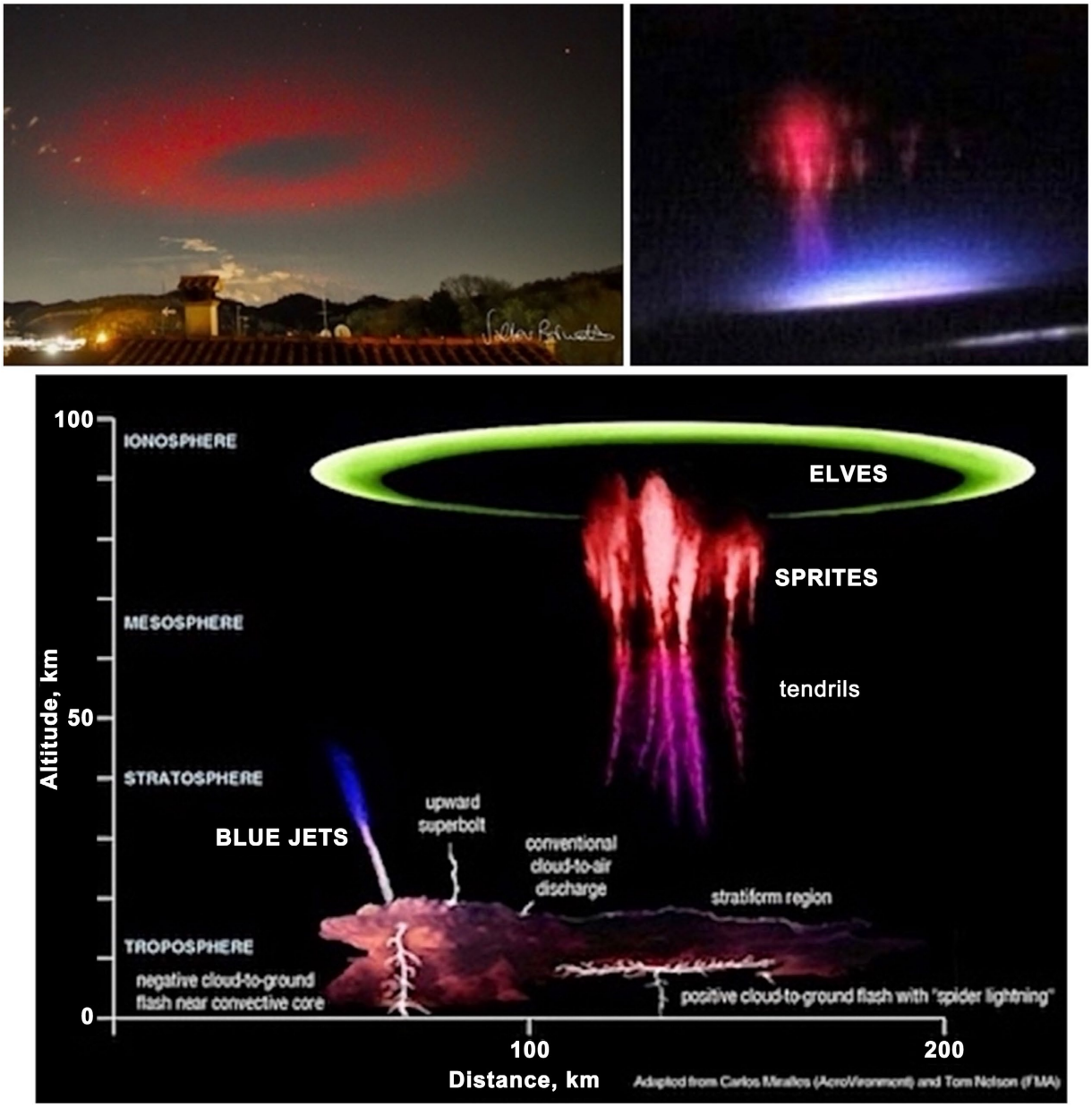


Figure 18. Transient plasmas, (Top Left) referred to as an "Elves". Photographed on March 27, 2023 above Possagno, TV, Italy. The red ring marks where the pulse hit the ionosphere. (Top Right) A transient plasma, resembling a "jelly fish" referred to as a "Sprite".

Figure 19. (Left) Shape-shifting ring-shaped plasmoid filmed above the ocean; (Middle: "Hunter" and Right "jellyfish") thermosphere plasmoids.

6. Lightning over Land vs. Sea

Lightning is an electrical discharge in the form of a thunderbolt, transmitting an electrical charge of 5 coulombs and 500 Megajoules depending on the length of the thunderbolt; e.g. 3 million volts per meter and about 1 billion volts for a lightning bolt of 300 meters (1000 feet). lightning also has a velocity of 45 km per second (100,000 miles per hour) and a temperature of around 1700˚C (3090˚F). In contrast to the upward thunderstorm dipole consisting of positive energy, lightning emitted from the lower regions of a cloud usually (but not aways) consists of negative electrical currents ranging from 40 kAh to 120 kA [110]. Thus, downward directed lightning also excites the AC global circuit. However, some lightning bolts carry an electric current of up to 120 kA, and transmit an electrical charge of 5 coulombs and 500 Megajoules [106].

Lightning is commonplace and when considered as a global phenomenon, is continuous. Christian *et al.* [111] estimated the global rate at ~44 flashes per second as based on space-borne sensors; whereas Gurnett *et al.* [112] based on Cassini's HF measurements during its Earth flyby in 1999, arrived at an estimate of ~70 flashes per second [102].

It is estimated that up to 90% of global lightning is diurnal and concentrated above the convectively active continental tropical land regions and shows a clear maximum around 16 - 17 LT and a minimum in the early morning hours 6 - 9 LT. By contrast, oceanic lightning activity is spread evenly throughout the day and early evening [113]-[116]. It is estimated that the number of upward directed lightning flashes over land is hundred times greater than over the tropical oceans. [116]; and this may be due to land masses having a negative charge whereas the electrical charge of the surface of the sea may wax and wane between positive and negative.

7. Transient Plasmas in the Ionosphere: Elves, Sprites, Pixies, Streaks, Flashes, and Jelly Fish

Lightning is a plasma that produces transient plasmas that linger near the ground and lower atmosphere and those that rocket toward the ionosphere [17] [76] [117]. Whereas plasmas of the Ionosphere will descend into thunderstorms, colorful transient plasmas will erupt from thunderstorms and jet at incredible velocities through the stratosphere, mesosphere, and thermosphere, with some taking shape 50 to 90 km above Earth—including those resembling "jellyfish", "clouds", "streaks", "flashes", "donuts", "stars" and rapidly expanding rings of light [91]-[93] [118] [119]. Astronauts have also reported that three objects, two "ring" shaped, approached and were hovering near their space shuttle [1].

These upward directed transient "cold" plasmas are not rare events, but are produced on average one every second [120] [121] and are commonly referred to as "sprites", "elves", and "pixies" in the scientific literature. Moreover, these upward directed plasma may intersect plasmas of the ionosphere (**Figure 7**, **Figure 8**, **Figure 22**, **Figure 23**) and based on reports by astronauts, they have penetrated and

flashed through spaceships, the MIR, the space shuttles, and ISS [19]-[22].

For example, sprites are believed to form during intense positive cloud-to-ground lightning and propagate visible tendrils downwards and upward; whereas Elves likely form during an interaction between the propagating electromagnetic lightning pulse and the ions of the ionosphere [122]. Other cold plasmas produced by lightning storms have been referred to as "blue jets", "gigantic jets", "blue sprites", "blue starters", "pixies" and so on [118] [123] [124].

All these plasmas may extend from cloud tops all the way up toward the ionosphere. "Blue jets" for example, are beams of blue light that streak upward from active thunderclouds but take unusual shapes, resembling giant trees with filamentary branches and pierce the stratosphere into the lower ionosphere at increasing speeds [123]. By contrast, "giant jets" preferentially appear above the oceans, and a single jet may speed up and brighten, slow down as it dims, and may split in two [123].

Collectively, these particular plasmas have been referred to as Transient Luminous Events (TLEs), which is the collective name given to a wide variety of optical emissions and which have been studied from the ground, and via balloons, aircraft, the space shuttles, the ISS (International Space Station) and orbiting satellites.

Plasmas that jet upward have various colors (predominately white, but also red, green, blue, orange, and yellow; and have been described by astronauts as shaped like donuts (Elves), jellyfish (sprites), clouds, rings, and flashes and streaks of blue or white light [1] [19]-[23].

These upward propagating plasmas are not always associated with thunderstorms. For example, two weeks before it exploded on reentry in 2003, the crew of the Space Shuttle Columbia observed an intense flash of red light that continued to glow in the ionosphere despite the fact that no thunderstorms were observed down below. Possibly this is because gravity waves, meteors, volcanoes, seismic events, and even dust storms are believed to modify the local electrical properties of the mesosphere and ionosphere [26] [35] [88] [106] [124] all of which can cause the formation of plasmas with a variety of shapes and that engage in different behaviors. Therefore, in general these upward transient luminous plasmas rise and take shape 50 km to 90 km above the surface.

TLEs are associated with "Whistlers" [125]. Whistlers "whistle" and are centered above intense thunderstorm activity but pass through the ionosphere along geomagnetic field lines to the opposite hemisphere and into deep space [126] [127]. Whistlers may alert plasmas to the location of a particularly intense electric storm.

TLEs, along with whistlers from lightning, trigger particle-wave interactions and collisions with energetic electrons [125] and not only contribute to the ionization of the mesosphere and thermosphere, but can affect spacecraft and satellites—even entering and exiting spacecraft—before radiating out into deep space.

8. Plasmoids (UAP) Approach to Apollo Spacecraft, Satellites, the Space Shuttles and MIR

Upward directed lightning bolts with their positive charges form an electrical circuit between the tops of thunderstorms and the ionosphere and produce transient plasmas, referred to as elves, sprites, and blue jets. These transient, colorful plasmas can jet into the thermosphere and pass-through glass, metal, brick, wood, plastic [12] [13] [18] [47] [49] and penetrate and enter various spacecraft and the International space station—as reported by astronauts [19]-[22].

As documented in this and an earlier report [3] plasma have a variety of colors—including white, blue, green, red; as well as a variety shapes (e.g. donut, cone, spherical, amorphous, cloud, blob, sperm), and sometimes the glowing sheen of a non-solid clothlike metal. Moreover, they have approached, gathered around, and passed by the MIR International Space Station (**Figure 1**), satellites (**Figures 3-5**, **Figure 20**, **Figure 21**, **Figure 24**) and space shuttles (**Figure 33**); and may have been first observed by astronauts aboard the Gemini and Apollo spacecraft.

For example, on February 20, 1962, Astronaut John Glenn, the first American to orbit Earth, excitedly reported that he was seeing, outside his spacecraft, little colorful objects that "look like stars". He reported that they "are brilliantly lit up like they're luminescent. I never saw anything like it. They round a little; they're coming by the capsule, and they look like little stars. A whole shower of them coming by. They swirl around the capsule and go in front of the window and they're all brilliantly lighted. They probably average maybe 7 or 8 feet apart, but I can see them all down below me, also".

NASA CAPCOM replied: "Roger, Friendship Seven. Can you hear any impact with the capsule? Over". Glenn replied: "Negative, negative... They're going at the same speed I am approximately... They do, they do have a different motion, though, from me because they swirl around the capsule and then depart back the way I am looking".

These "luminescent", "brilliantly lighted", "round" and "star" shaped optics were attracted to the portal (window) of Glenn's capsule and were briefly viewed during the first orbit, as the craft flew above those areas of the ocean referred to as the Pacific, Indian, and Southern Ocean—an area where spectacular celestial lights (AKA Aurora Australis, Southern lights) and colorful, transient plasmodic events are common [128]. The specific auras and plasmas have been attributed to heightened localized geomagnetic activity down below and fluctuations in Earth's magnetosphere, which, as noted, contribute to the production and influence the behavior of plasmoids.

NASA later dismissed Glenn's "fireflies" as "ice particles" traveling with his spaceship and illuminated by the rising Sun, *i.e.* water that somehow froze on the outside of the ship after liftoff and this frozen liquid remained frozen and attached despite the heat-friction of ascent through the atmosphere, but once in space and despite the sub-zero temperatures, this ice melted because of the sunlight—creating

the "fireflies"—and then somehow all this liquid became re-attached to the space capsule and froze again, then melted again [129].

During the second orbit as Glen flew over the volcanic Canary Islands which are dominated by an active volcano, Mt. Teide, his ship was again surrounded by "luminescent", "stars" and "round" shaped optical phenomenon; and which he verified were not coming from the ship's engines and instead repeatedly gathered near the window of his capsule. Space shuttle astronauts, have also reported that objects shaped like "rings", but which were not solid, also gathered near the shuttle windows [1].

Although Mt. Teide is considered active, there has not been an eruption since 1909. Even so, active volcanoes produce heightened electromagnetic activity [130] and are associated with lightning and other atmospheric electrical phenomena. Volcanic gas is also mostly positively charged [131] as particles and liquid droplets which when combined with the ejection of ions provides several possible charging mechanisms [132]. Volcanoes can also provide charges to thunderclouds [133]. Particles with positive and negative charges also leak from active volcanoes but undergo charge separation [132], triggering lightning as well as transient plasmas that may shoot up to the stratosphere and beyond.

What Glenn and other astronauts observed are most likely colorful transient plasmas; electromagnetic entities with electric charges. These transient entities assume a variety of colorful brightly lit shapes, including ovoids, balls, streaks, and little stars [63] [127] [134] that may or may not have a reflective metallic sheen (**Figure 15**).

TLEs, like long duration plasmas in the ionosphere, are not solid and do not consist of metal. For example, the commander of STS 115 described what are most likely thermosphere plasmas as translucent, flexible, not a solid object, metallic but not made of metal, and giving off light and glowing: "The best way I can describe it as some kind of reflective cloth—some type of metallic looking type of cloth—a structure which is definitely not rigid—it's not a solid metal structure" [1]-[3].

Many of the observations of astronauts are consistent with film-footage depicting what appear to be colorful plasmas which are "not rigid" and "not a solid metal structure". It is precisely because they are a plasma, and (presumably) not a solid, that plasmas can pass through metal, brick, wood, glass, and have entered and appeared inside spacecraft, the MIR International Space Station, and the International Space Station; possibly gaining access by passing through windows which lack electromagnetic shielding [47]; and this may explain why John Glenn and other astronauts have observed these optical phenomenon outside and approaching windows; they were seeking access.

9. Plasmas Have Invaded Spacecraft, MIR and International Space Station

There have been numerous credible reports documenting that plasmas shaped like donuts, spheres, and even "jellyfish" can pass through metal, plastic, wood, windows,

and brick walls over 40 centimeters thick, and enter home, businesses, and the cockpits of aircraft [11] [12] [47]-[49], sometimes burning or shocking those inside, and/or damaging power plants, electrical circuits and short-circuiting television sets, radios, junction boxes, and other electrical devices.

Astronauts, including the first and second man to walk on the moon, have reported seeing flashes of colored light that had entered their sealed craft and which had various shapes. According to Buzz Aldrin "Something was zapping through the cabin... I observed what I thought were little flashes inside the cabin... I was able to see double flashes, at points separated by maybe a foot. At other times, I could see a line with no direction of motion". Neil Armstrong also admitted that he'd "seen some light" that had flashed inside the cabin, and that his observations were similar to those of Buzz Aldrin [19] [20].

The crews of Apollo 12 through 17 also "observed light flashes" inside the cabin [20] that were "blue", "red", "white" and shaped like "stars" or clouds" or "steaks". Nor were these illusions, hallucinations, or due to cosmic or gamma rays affecting their eyes, because they were not observed when astronauts closed their eyes or were wearing blindfolds. For example, Lunar Module pilot Harrison Schmitt, reported that inside his craft, "we had light flashes just about continuously during the whole flight" and he had seen another "flash on the lunar surface" during his moon-walk.

According to Schmitt and others, when "we had the blindfolds on for the ALF-MED experiment there were no visible flashes". But when they removed the blindfolds, they again began "seeing the light flashes again" inside the ship; and which were later attributed to the "flux of multiply charged nuclei" from the Van Allen radiation belt [21] which in turn are a major factor in the formation and behavior of plasma in the thermosphere and ionosphere.

Crews aboard the MIR space station also reported seeing the light flashes which they described as having various and complex shapes. Out of 59 different astronauts who were members of the Shuttle, MIR and ISS crews, 47 admitted they'd repeatedly seen light flashes inside their craft shaped like "stars", "clouds" and "blobs"; not only in darkness, but 11 saw them in dim light and two saw them in bright light. Thirty nine of the 59 astronauts reported that the lights were colored red, green, blue, orange, yellow, but most commonly white and almost all were in motion, swirling or streaking about inside the craft [22].

Plasma-like UAP—shaped like "stars", "clouds", "rings" and "blobs" but of much larger size (**Figure 14**)—have also been filmed flowing towards, circling, flying past or hovering near the MIR International Space Station and the Space Shuttles and an electrified tether generating electromagnetic pulses into the space medium [1]-[3]; the latter of which include those shaped like jellyfish (**Figure 14**) serpents (**Figure 7**, **Figure 12**) and those that streak at hyper speeds above thunderstorms (**Figure 7**, **Figure 8**, **Figure 22**, **Figure 23**).

10. Encounters with Plasmas That Descended into the Lower Atmosphere: UAPs

The ionosphere-thermosphere (and possibly the upper layers of the mesophere) are

electrically conductive, with thunderstorms and (less so) electrified clouds serving as the main current source and providing continual upward positive charges. The atmospheric conductivity in fact increases with height due to the increased ionization produced by cosmic rays and extreme ultraviolet and X-radiation [36]. As a good electrical conductor, the positive charges within the ionosphere are generally equipotential and spherically symmetric about the Earth and its oceans which also serve as a conductor.

Between these two conductors (the ionosphere and Earth's oceans and surface) are electrified clouds that circulate in the troposphere and lower stratosphere [106]. The troposphere (0 to 10,000 meters above the surface) and stratosphere (10,000 to 30,000 meters) comprise the non-conducting positively charged layers of the atmosphere and behave more like a leaky insulated electrical cable 30,000 meters in height and which surrounds Earth in all directions and through which electrical charges and related phenomenon may pass including charged plasmas that have a variety of shapes.

The lower atmosphere is weakly conducting [135] due to ionization by galactic cosmic rays, electrified particles, and precipitation from the Van Allen radiation belts [106] [136]. These extremely energetic (>100 MeV) charged particles—particularly those originating beyond the solar system—are incident from all directions at the top of the atmosphere. However, the maximum production rate of ionization occurs at altitudes between 12 and 20 km [89] [136] [137], *i.e.* in the troposphere: that region of the atmosphere where aircraft not uncommonly encounter UAPs.

Because plasmoids are charged with electromagnetic energy, these non-conducting lower atmospheric layers provide an insulated route that leads from the ionosphere (thermosphere, mesosphere) directly to thunderstorms and electrified clouds that generally form between 10,000 meters (33,000 feet/6.25 miles) to 20,000 meters (66,000 feet/12.5 miles) above the surface [105] [106]. In consequence, electromagnetic plasmas that have descended to the lower atmosphere will encounter airlines and military jets that (respectively) usually fly between 9144 to 12,800 meters and 13,715 to 15,544 meters above the surface [38] [39].

It is likely that the plasmas of the ionosphere, when they descend into the lower atmosphere, account for many reports of UAP/UFOs including those that have followed, harassed, and "toyed with" military and civilian planes [3]. As documented, plasmas in the ionosphere will also turn, follow and even collide with each other.

During the second world war, American, English, German and Japanese pilots reported being followed, confronted and challenged by UFOs-UAPs that were white, silver, and red, and often glowing or translucent, and shaped like clouds, donuts, balls, spheres, and stars [41] [51]-[54] [138]. Allied pilots called them "Foo Fighters". Hundreds of pilots and flight crews described the "Foos" as on fire [138]—Japanese pilots in particular. The Foos were glowing, and sometimes changing colors from silver-white to red-orange.

As reported by Allied Supreme Headquarters and numerous news media outlets, including in 1944, by the New York Times [52]: "Airmen of the American Air Force report that they are encountering silver colored spheres in the air...either singly or in clusters. Sometimes they are semi-translucent... There was no information available as to what holds them up like stars in the sky, what is in them, or what their purpose appears to be".

One WWII crew member reported that his encounter with the "Foos" gave him nightmares: "Some of them", he said, "looked shiny, metallic, and saucer shaped when viewed from far away. We thought they were Nazi secret weapons, some kinds of rocket-dirigible, capable of fantastic speeds and maneuvers... On one mission, after we dropped a lot of fire bombs... the Foos surrounded our plane... They didn't look like rockets or planes or made of metal; but more like giant colorful jellyfish. Alive...toying with us" [41]. Two years after WWII came to a close, Kenneth Arnold observed nine shining shape-shifting phenomenon flying at fantastic speeds, some of which resembled "sky jellyfish" [43].

According to the official military reports these WWII Foos were incredibly fast, capable of amazing maneuvers and impossible turns, and would ride alongside, above, below, and directly in front of U.S. fighter planes which proved incapable of shooting them down [41] [51]-[54] [138]. Military pilots and others continued to have these encounters during the "Korean War" and for every war thereafter including numerous close calls that almost resulted in collisions. It can be assumed that when collisions occurred, electronics may have failed and those planes crashed killing all onboard.

This suspicion is not mere speculation. In the last 80 plus years, military pilots have reported hundreds of encounters with these brightly lit UAP including turning, following, hovering, and near collisions, after which these UAP would suddenly disappear or speed off at hypersonic speeds—behaviors typical of plasmoids in the thermosphere [1]-[3]. Nikitin [13] has documented numerous encounters between Russian military and commercial pilots and UAPs that are most likely "ball lightning" and which fly at fantastic speeds, make impossible turns, radiate beams of light, cause electronic failures, jam radar, and which repeatedly confront jets in flight and have nearly caused numerous aerial catastrophes.

According to the June 25, 2021 report issued by the Office of the Director of National Intelligence [32] these "UAP...appeared to remain stationary in winds aloft, move against the wind, maneuver abruptly, or move at considerable speed, without discernible means of propulsion". These are also the characteristics of plasmas filmed in the thermosphere and which can change velocity and accelerate to hypersonic speed—possibly by altering their charges. The U.S. government 2021 report goes on to state: "In a small number of cases, military aircraft systems processed radio frequency (RF) energy associated with UAP sightings".

It is noteworthy that plasmas radiate electromagnetic energy. If the plasma travels along geomagnetic lines, they are accompanied by or generate radio-frequencies termed "whistlers" which are named for the sound it makes. Whistlers are caused

when plasma from lightning travels along the geomagnetic flux lines [125]. Therefore, those RF waves sometimes detected in association with UAP may be whistler radio waves which are produced by plasmas and which radiate throughout the entire frequency range from VLF, ELF to ULF [125] [139] and which can be heard on AM radios on Earth.

Plasmas also consist of charged particles which can create radio signals with a characteristic frequency of 300 Hz to 2 kHz [140]. Moreover, Füllekrug *et al.* [141] simulated the production of relativistic electrons above a thundercloud and below a sprite, and which radiated radio waves with frequencies up to 400 kHz. Consider; AM broadcasting frequencies range from 535 to 1605 KHz; FM broadcasting from 88 to 108 MHz; whereas Military aircraft broadcast and receive at 225.0 to 399.95 MHz for air-to-air and air-to-ground, including air traffic control communication. It is likely that the "radio frequency (RF) energy associated with UAP sightings" were whistlers and frequencies associated with plasma. In fact, Whistlers can be heard on Earth-based radios and are called "whistlers" because they whistle.

11. Effects of UFO/UAP and Ball Lightning Plasmas: Behavior, Types, Hallucinations, and Confusion

Collectively, the diverse array of plasmoids that form in the lower atmosphere have sometimes been referred to as "ball lightning" and which have multiple shapes, colors and forms and may endure from a few seconds to several dozen minutes before vanishing. In this report, we provide evidence of what is most likely ball lightning hovering over the ocean (**Figure 27**) and a series of freeze frames from a 3-minute film by U.S. Customs of a rapidly shape-shifting object flying erratically just above the ocean and that repeatedly splits apart (**Figures 28-32**). Although it may have behaved like "ball lightning" this latter entity and those that split off, were not oval or round, but assumed twisted and unusual shapes.

Broadly considered there are several major loosely defined categories of "ball lightning" which is the collective term for a variety of illuminated plasmas that appear in the lower atmosphere [13] [17] [49] [76] [117] [142]-[145]. For example, there is the ball of lightning that appears after a bolt strikes a pole, tree, or the ground and which kicks up dust and debris that along with various gases are incorporated within a plasma that is illuminated and which may be round or ovoid in shape. A second category is observed above dust storms and prior to and after earthquakes and during volcanic eruptions. The third category is a ball of light that floats in the air at various distances above ground, sometimes as high as the stratosphere and which emits beams of light. Another category includes luminous globes that lead or follow a bolt of lightning, and that may bounce against the ground or telephone poles and electric cables. A fifth category includes those that travel atop and along power lines and fences. Then there are those that enter or appear inside buildings, homes, and airplanes that are aloft. In each instance, the plasmoid may move randomly, erratically sometimes very rapidly, or slowly, but

most often horizontally at relatively slow velocities and then suddenly vanish or it may explode as it disappears.

Therefore, like the plasmas of the ionosphere and the transient plasmas ejected upward from thunderclouds, the plasmas collectively referred to as "ball lightning" have different color sizes and shapes including "rectangular" [128] and include those that rapidly and continually change shape [13]. They may engage in rotational movements, or move about erratically, and travel at different velocities, including speeding up, slowing down, and hovering. They have also been described as hot, cold, or lacking temperature, though some have reported being burned or suffering an electric shock [13] [63] [134] and even radiation burns [13]. Most are described as intensely white or bluish white, occasionally red to yellow, or green, blue, or purple.

Estimates as to size range from a few centimeters to several meters. Although usually globular, they have also been described as shaped like a ring, a cloud, a blob, a jellyfish, a flame or ball of fire, or as shape shifters that may appear as ellipsoids, cylinders, disks and triangular [13]. Some balls seem solid; others appear to be hollow; yet others may fragment into smaller balls or are accompanied or immediately followed by another luminescent circular apparition [17] [76] [128] [142] [143].

Some observers have detected an odor resembling ozone, sulfur, and nitrogen dioxide in the vicinity of these plasmas. Some believe the ball of plasma is cold, because they feel no heat when it gets near their body. However, there are also anecdotal reports of balled plasma melting soil, evaporating large volumes of water, and of people suffering severe burns or a painful electric shock [13]. In addition, power outages have also been attributed to these balls of plasma [128].

Some of those who have encountered ball lighting, also report becoming confused, disoriented and even experiencing visual illusions and hallucinations or suffering from nightmares [13] [63] [146] [147]. In one instance hundreds of those who observed first one then a second ball of lighting, reported feeling disoriented not only during, but for several minutes after the ball disappeared, as documented in the following account by Mason [128]:

The mining town of "Tom Price"—also known as "Top Town" because it is 747 m (2451 ft) above sea level—is located in Western Australia adjacent to a mountainous region, the Hamersley Range—and above which John Glenn flew in 1962 when he first reported his observation of brilliant flashes of light, outside his capsule window, shaped like spheres and stars. In October 1994 at around 8:30 PM, approximately 1000 of the town's 4000 residents "saw a very large red-orange colored ball of fire moving at very low altitude directly towards them...it appeared to be a fiery orange-yellow-white color—possibly rectangular or spherical in cross section (depending on observer), from the side it appeared to be a spherical yellow-white light—pulsing up and down in light intensity (as captured on video)". Several of the "observers, being some 200 meters directly below it by now, reported that it was an intense spherical ball of orange-red fire with the fire swirling in a spiral pattern and the flames disappearing internally upwards into a central

black 'hole' or void within the spherical mass of flames". Another observer also described it as "like a moving plasma ball in a local space-time warp around a central black hole"... "The fireball had no tail and made no noise at all... It was described as a sort of 'implosion ball of flames' with all the fire or flames originating in local space outside the fiery sphere-like form, the flames being sucked into the center where they disappeared".

After about five minutes, "it flashed a bright blue-white color that lit up the area and it then took off at very high speed and disappeared almost instantly moving very fast to the east. Other observers simply believed that it just disappeared with the intense blue-white light flash/explosion—no explosive noise heard—just a very bright light energy emission flash....".

"Immediately a second fireball appeared in the west following the path of the first. This flew slightly lower but at the same slow light aircraft speed (*i.e.* about 100 mph) and similarly at constant low altitude...and was identical in all respects to the first. It disappeared similarly in a massive blue-white flash of light energy moving at very high velocity to the east...".

"Many attempted to take photos but all film rolls returned from Perth showed good family snaps but only white blanks of the fireballs...suggesting that X-ray or similar e/m radiation from the fireball fogged the film". Fortunately, two minutes of this incident were videotaped and showed a "pulsing light or fireball". Many of the residents also discovered that their watches stopped working, or that electrical equipment, TVs and radios had stopped functioning. "It was later found out that the Dampier power station (150 km north of Tom Price) went off line at the time of the Tom Price fireballs due to a huge overvoltage pulse on the transmission lines".

Many of the residents also admitted that they began to feel confused and disoriented as the fire ball approached: "Strange time/space/mind distortion effects were in operation (emanating from the fireballs) such that confusion reigned immediately during and after the sightings" [128].

Figure 20. (Top) 18th/19th century encounters with "ball lighting". (Left) Death of Russian professor Georg Wilhelm Richman from a ball lightning strike on July 26, 1753. These encounters generally cause shock, terror, confusion, disorientation, and later, sleep disturbance and nightmares. (Bottom Right) CGI re-creation of orange colored UAP based on witness descriptions of a UAP encounter with the USS Ronald Regan in 2004, from Beaty *et al.* [50].

12. Speculation: Electromagnetic Hallucinations and Alien Abductions

Plasmoids appear to be electromagnetic entities that emit electric charges and energetic electrons. Proximity to plasmoids described as "ball lightning" have been reported to cause damage to electrical systems, television sets, telephones, junction boxes, and electrical circuits and knock out power stations presumably due to the radiation of electromagnetic fields. Christopher Mellon, former Deputy Assistant Secretary of Defense for Intelligence in the Clinton and George W. Bush administrations stated at the "SOL Foundation" Symposium in November 2023, that UAP are capable of "emitting radiations in radiation in the 1 to 3 and 8 to 12 gigahertz range" [and] "have rendered segments of our nuclear deterrent inoperable. In other recent cases they're jamming Radars on fighter aircraft".

Russian pilots and ground crews have reported similar experiences including cases where "the aircraft's electronic equipment fails" and where ball shaped UAP have interfered "with the operation of radio equipment and affect the human psyche" including inducing vivid hallucinations of humanoid-like forms [13]. Arnold, who inadvertently coined the term "flying saucer" in 1947, reported that he also felt his mind was affected by these pulsating forms that he believed might be reading his thoughts [44].

Anecdotal reports claim that these plasmoids (AKA UAP) can cause nightmares, confusion, feelings of disorientation and induce illusions and hallucinations—presumably due to the effects of electromagnetic radiation having adverse neurological effects, possibly affecting the temporal lobes (and hippocampus and amygdala) in particular [148]. In one instance, nearly 1000 residents experienced "Strange time/space/mind distortion effects were in operation (emanating from the fireballs) such that confusion reigned immediately during and after the sightings" [128].

Luis Elizondo former U.S. Army Counterintelligence Special Agent, DoD Office of the Under Secretary of Defense for Intelligence and former director of the Advanced Aerospace Threat Identification (AATIP) Program, has reported that periods of confusion are not uncommon during and after a UAP encounter: "where certain observers almost appeared to be in an essence mesmerized...almost like hypnotized by the event to the point where...it wasn't until after the event, did people kind of scratch their heads and say, oh my God, did we just see what we saw?".

However, in many anecdotal reports, couples and entire families have reported not just seeing but taking a picture of a UFO that had landed. But when these photos are developed, there is no UFO and no aliens; sometimes only a bright light. At the other extreme are the numerous cases of individual reporting or remembering or dreaming about having been abducted by aliens [15] [148]. As noted, nightmares after encounters with plasmas are not uncommon; and which raises the possibility: is the memory of an abduction actually based on a dream, a nightmare, or the product of an electromagnetically induced hallucination caused by exposure to a

plasma?

Experiments have demonstrated that exposure to electromagnetic fields can produce a diverse range of hallucinatory phenomena including the hearing of voices and the perception of full-blown demonic or ghostly apparitions [149]-[154]. Persinger and colleagues [155]-[157] have repeatedly induced anomalous hallucinatory experiences and otherworldly phenomenon via the application of complex magnetic fields to the temporal region of the skull, whereas Frey [151] employing power densities as low as 400 $\mu W/m^2$ was also able to produce voices and a variety of sounds even in subjects completely deaf. Over the years, various U.S. government agencies have employed and funded scientists who are expected to develop electromagnetic radiating devices that can be used for crowd control and even influence how individuals vote [152].

Electromagnetic pulses can also cause dizziness, vomiting, confusion, disorientation, memory loss, the perception of unpleasant odors, dissociative experiences (floating above the body), or cause those affected to fall asleep and have nightmares or conversely make them unable to sleep so that they begin to hallucinate after prolonged sleep deprivation [13] [151] [158]. Stroboscopic dazzling lights and specific radio frequencies are reported to have almost identical effects [158] [159]. Therefore, based on anecdotal and experimental studies, there is now considerable evidence that exposure to intense electromagnetic fields and bright stroboscopic pulsating lights—such as those associated with plasmas—can induce complex hallucinations of ghost-like and demonic forms or horrific nightmares that upon recall or following hypnosis, might later be interpreted as "alien abductions". This is not to say that all claims of abduction should be dismissed as due to an electromagnetically or stroboscopic induced hallucinations, but rather, exposure to plasmas radiating high levels of electromagnetic activity can alter perceptions of reality. Again, Arnold, who coined the term "flying saucers" believed that these arrays of bright shape shifting lights and forms, had somehow invaded his thoughts and could read his mind [44].

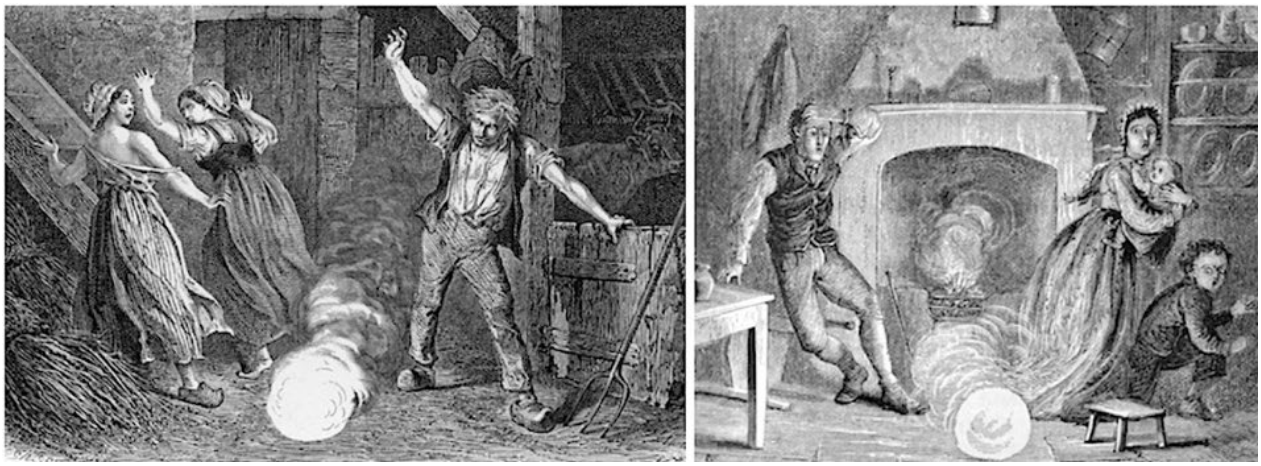


Figure 21. 19th century encounters with "ball lighting". These encounters generally cause shock, confusion, disorientation, terror, and later, sleep disturbance and nightmares.

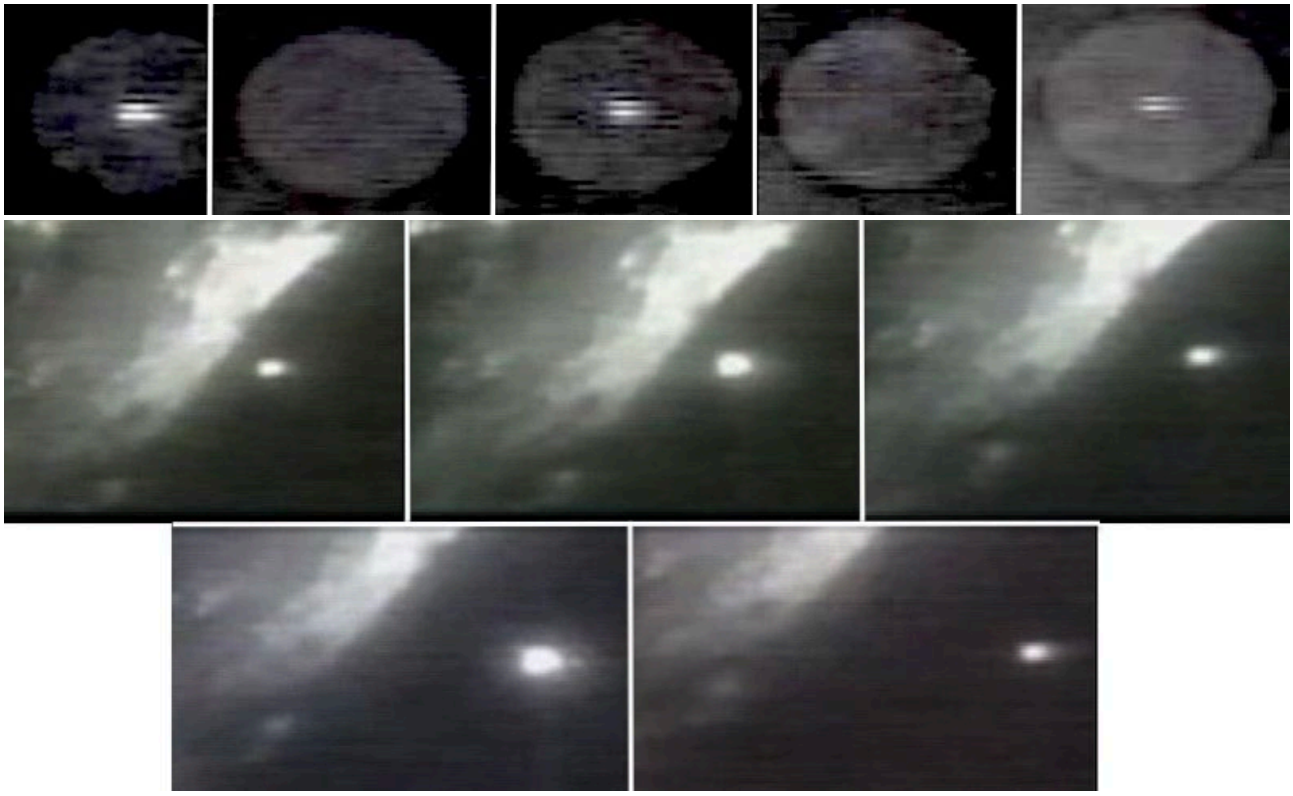


Figure 22. Examples of oscillating, Stroboscopic waxing pulsating plasma illumination in the thermosphere. These behaviors and more, can be viewed in a 17-minute film consisting of a compilation of NASA space shuttle [1]. See: https://www.researchgate.net/publication/383116954.

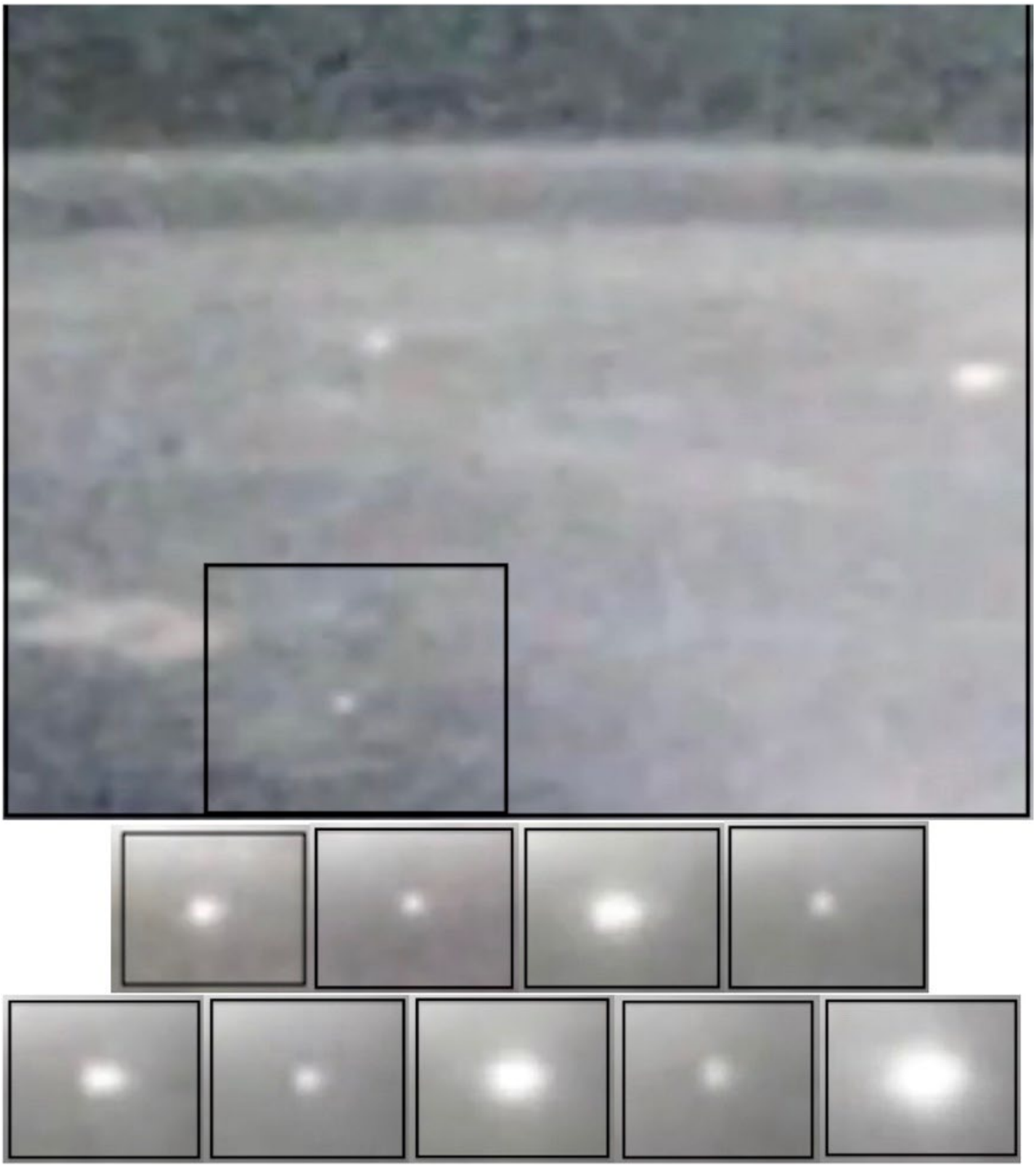


Figure 23. This pulsating plasmoid emerged into the thermosphere from the clouds below, and approached the space shuttle [1]. It is likely that some individuals may feel confused, disoriented, or increasingly mesmerized when exposed to a bright pulsating object emitting powerful electromagnetic impulses as it approaches, and becomes increasingly bright. Hallucinations are not uncommon during exposure to electromagnetic pulses and nightmares may follow, all of which may be experienced or "remembered" or interpreted as an alien abduction.

13. Plasmas Have Invaded the Cockpit of Airplanes

The lower atmospheric transient luminous phenomenon like the sprites, elves,

and blue jets of the upper atmosphere, are short lived, display a diversity of sizes and colors, and may appear as ellipsoids, cylinders and disks that radiate beams of light and high-frequency radio emission [13]. Not uncommonly they occur in pairs, triplets or follow one another but do not engage in complex behaviors.

Like those of the upper atmosphere which have entered spacecraft, plasmas in the lower atmosphere pass through metal, plastic, glass and aluminum and entered aircraft cockpits [47] [49]. Cockpits are a preferred mode of plasma entry, presumably because in contrast to the high electric fields that exist on this portion of the aircraft, the cockpit windows are large and lack any electrical shielding [47]—which may explain why John Glenn and other astronauts have reported seeing these UAPs approaching or appearing just outside the windows of their spacecraft. Perhaps they were seeking entry. However, although they may enter a window, they may exit by passing through a metal door [49].

Don Smith [49] who was a lieutenant in the U.S. Air Force and the navigator of a cargo aircraft in route to Hawaii has reported the following encounter: "We were at an altitude of 18,000 feet, it was at night and we were flying in a continuous horizontal layer of thin cloud which had the density of soup...a glowing ball of golden fire about the size of a volleyball appeared just inside the windshield, midway of the windshield and above the central Pilot console. It touched nothing and made no sound...but slowly floated downward into the cockpit between the Pilots, then between the Engineer and me, coming within a foot of me at my waist, now staying about three feet above the floor, then slowly turned left toward the crew lounge doorway, went through the open doorway, turned right 90 degrees and toward where the Loadmaster was sitting...the Loadmaster burst into the cockpit yelling 'Did you see THAT?'. The Loadmaster said that he saw a ball of golden fire come from the cockpit into the crew lounge. It floated toward him, came within a foot of him but turned to exit through the open stairway door and down the stairway into the cargo bay—then to float above the cargo down the exact middle of the airplane toward the tail of the airplane—and then just disappeared as it went through the metal tail ramp and door at the rear of the airplane".

As documented here and additional reports [1]-[3] the plasmas of the ionosphere have approached, circled, and lingered near various space shuttles, satellites, and the MIR international Space Station. Optic phenomena that resemble miniscule plasmodic flashes, streaks, "elves", "sprites" and "blue jets" have actually entered and have been observed inside the MIR, the International Space Station, and Apollo 11 through 17, and most likely at least one Gemini mission. What all these spacecraft and international space stations have in common are: windows and portals which lack any electrical shielding [47].

Presumably, a plasma may pass through a portal or window and appear inside due to the accumulation of atmospheric ions on the isolating inside surface of the craft. If the interior collects a surface charge that can produce electric fields which are sufficient to sustain an electric discharge this may create a plasma that slowly floats or begins "zapping" around inside, amongst the crew and passengers. However,

as reported by Heil and Smith [49], in the minutes before a glowing plasma appeared inside their plane, another plasma, which he described as "St. Elmo's fire" had attached itself to the nose of the plane. Their plane, therefore, attracted two distinct forms of plasma; one that remained outside and another that appeared to be engaged in a sight-seeing tour inside the plane.

It can be considered an established fact that plasmas may pass through metal, glass, composite aluminum, and so on, including spacecraft encapsulating astronauts. Obviously, it could be exceedingly dangerous if plasma collided with or entered an airplane cockpit. Once inside it may injure crew, cause hallucinations and dissociative experiences, or explode or cause a short circuit in a computerized system of control leading to a catastrophic systems failure and the death of all those onboard.

In fact, Navy pilots have reported incidents of near mid-air collisions with UAP. According to F-18 fighter Lt. Ryan Graves, a UAP almost downed his plane and his wingman, when it zipped between the two jet fighters. In 2001, the CIA—responding to a "freedom of information request" released documents re-porting numerous incidents of near collisions or an actual collision with UFOs: "For several minutes he had tracked an object on his radar' scope, then all of a sudden it had stopped at a range of about 15 miles from the base and remained stationary... A full half hour passed and still this object remained in the same location on the radar screen.... the radar operator… guided the pilot to a new heading that would bring him directly into this blip that was still stationary on the screen... the aircraft slowly approached the object on the scope... Then when it seemed that the two would collide... the stationary object simply disappeared, vanished seconds before" they almost collided. An "RAF pilot encountered a UFO" [and] "nearly collided head-on with a huge, metallic appearing object. The UFO was shaped like two saucers pressed together, one inverted on top of the other". And then, when they were about to collide… "At the last second, it flipped to one side and streaked past at tremendous speed".

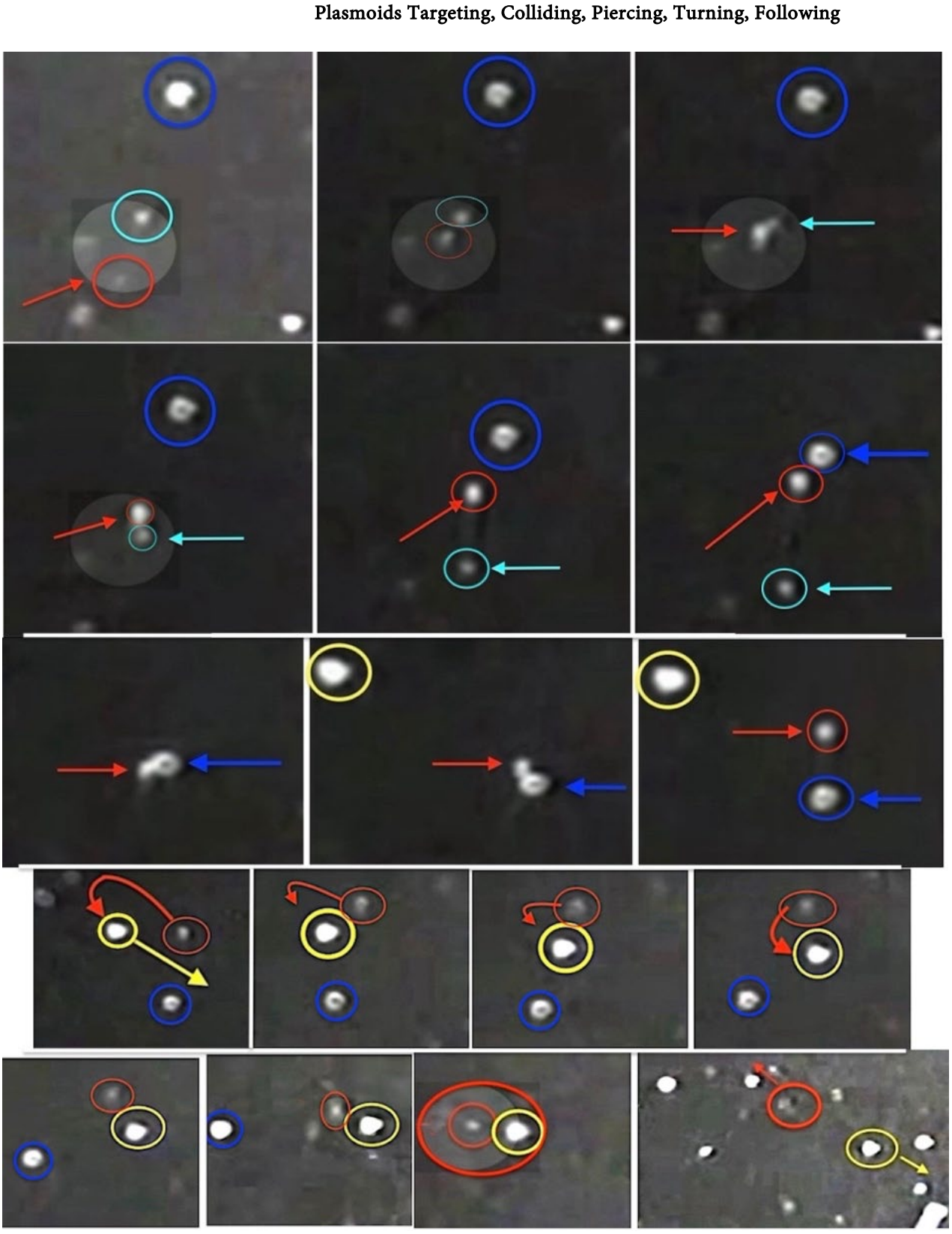


Figure 24. Examples of plasmas in the thermosphere "hunting" colliding, piercing, and turning (circled in red) and following plasma (circled in yellow); and then, reversing course [1].

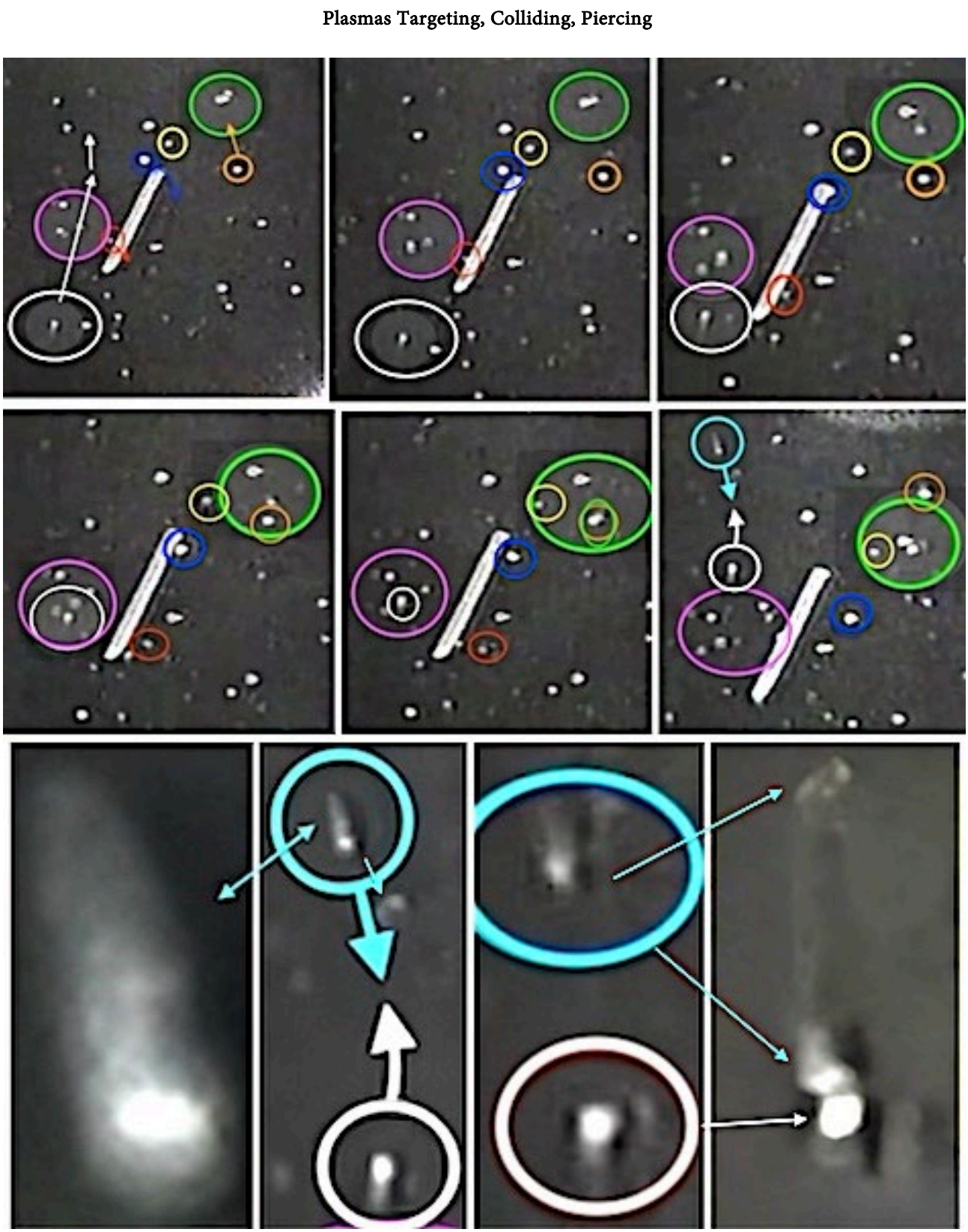


Figure 25. Examples of plasmas in the thermosphere, traveling in different directions, targeting, colliding, and piercing one another [1].

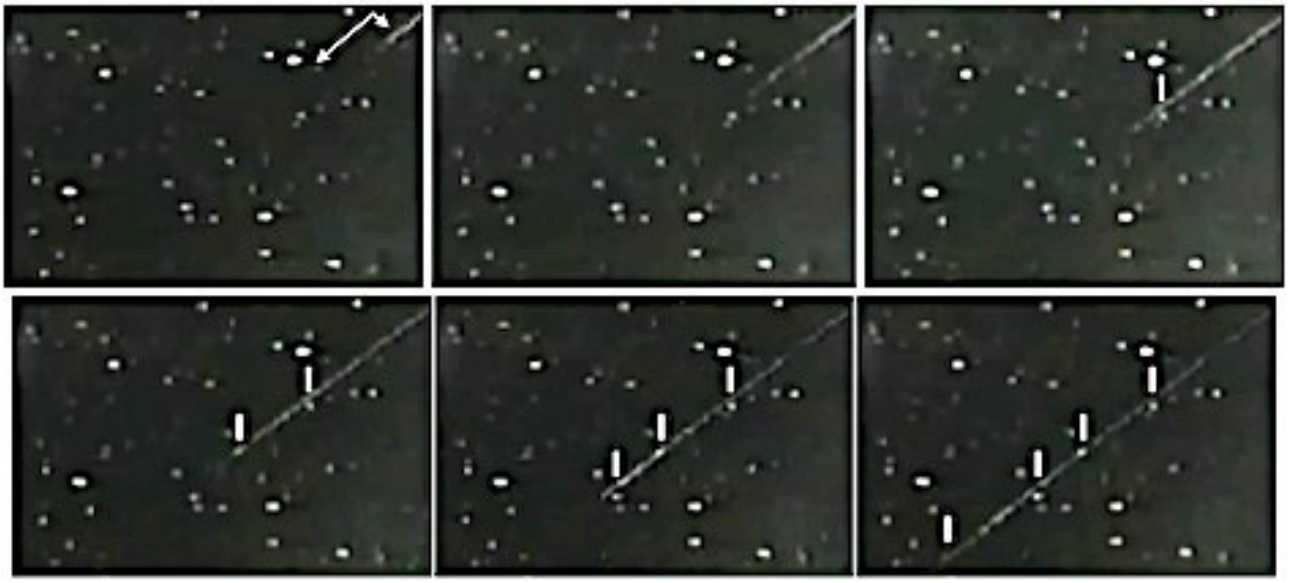


Figure 26. Examples of hyper-velocity plasmas "hunters" in the thermosphere. Trajectory is from the top right toward the bottom left. Vertical lines indicate "hits". Filmed by STS 101 Shuttle Atlantis [1].

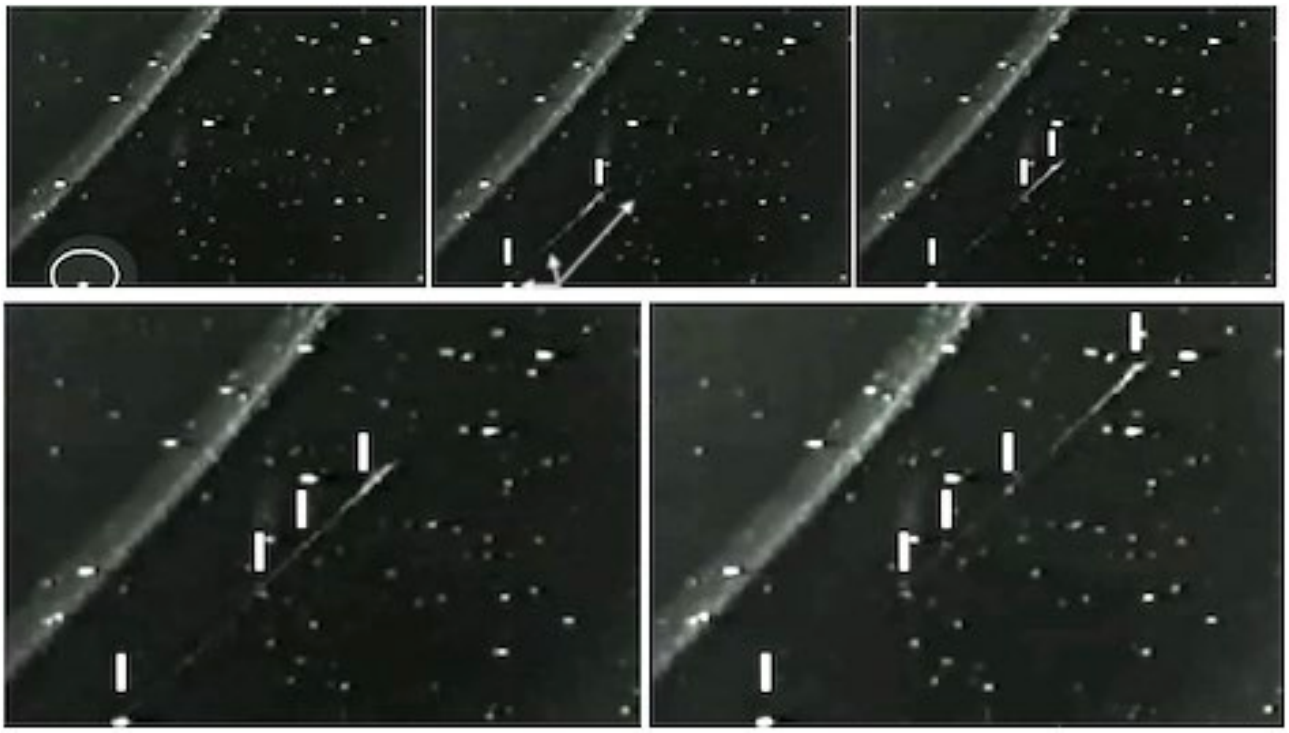


Figure 27. Examples of hyper-velocity plasmoid "hunters" in the thermosphere. Trajectory is from the bottom left toward upper right. Vertical lines indicate "hits". Filmed by STS 101 Shuttle Atlantis [1].

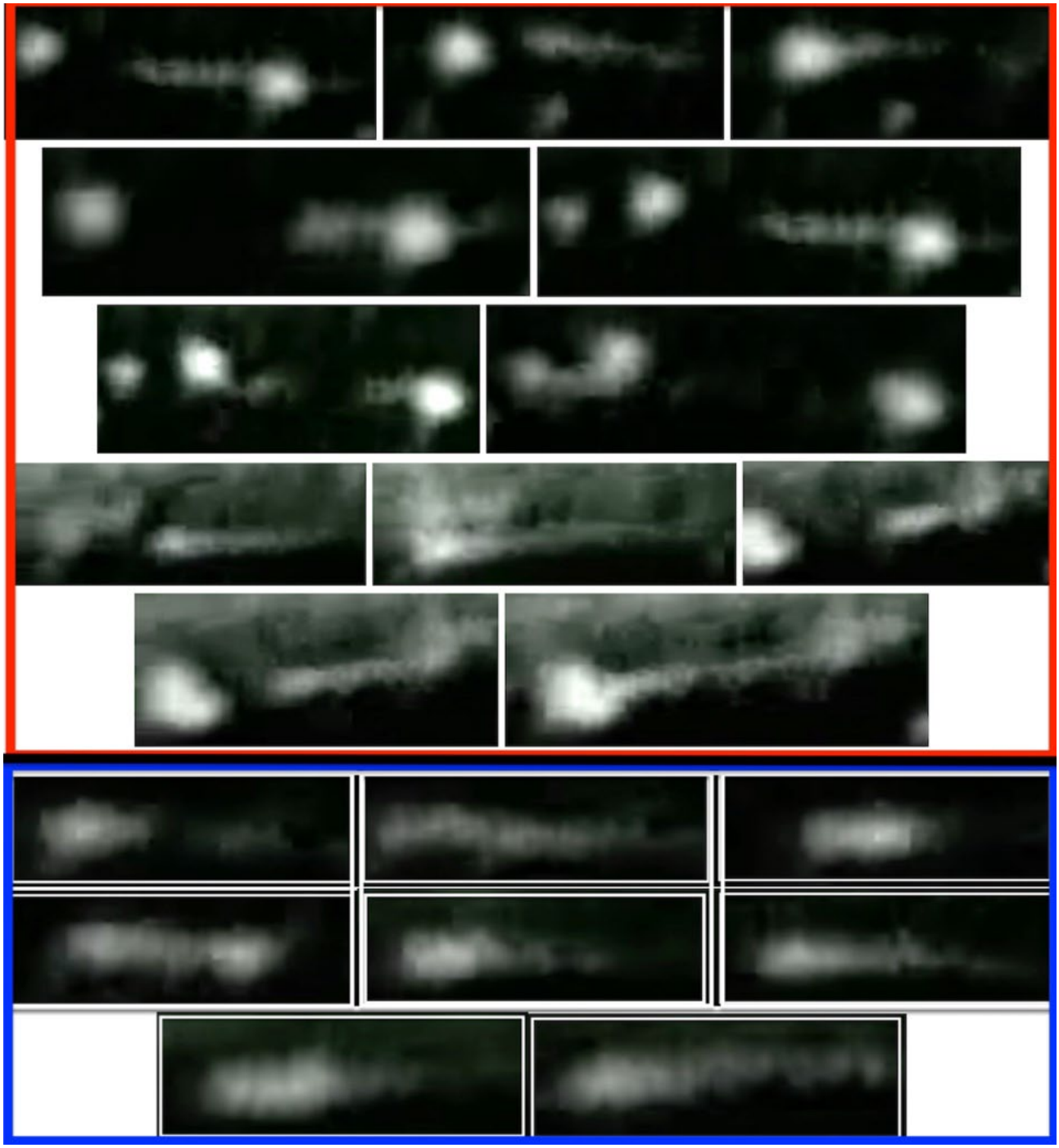


Figure 28. (Top Rows Red Box) An elongated "hunter" strikes and intersects numerous plasmoids hovering above a thunderstorm; and (Bottom Rows Blue Box) pulsates, shrinking, expanding, wiggling like a "worm" or "snake" as it "hunts".

Example of Plasmas Colliding, Merging, Spitting Apart: Charge Coupling & Separation?

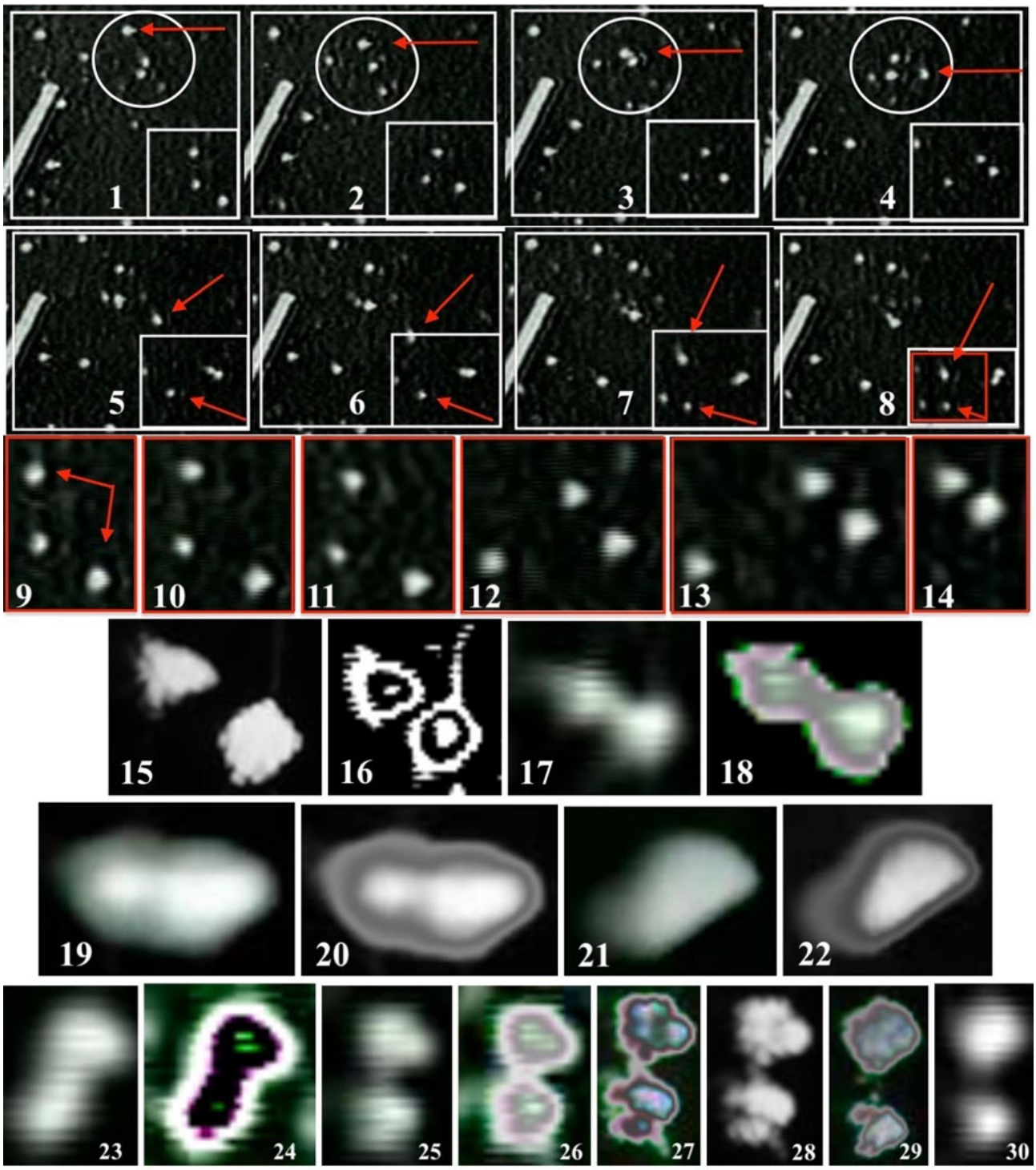


Figure 29. Detailed analysis of colliding, merging, and separation—which could be likened to "charge coupling" between plasmoids of opposite charges followed by "charge separation" as one or both reverse charge, such that both are positive or both negative, resulting in repulsion.

14. Speculation: Plasmas (UAP) May Have Caused *Unexplained, Inexplicable* Airline Disasters

Members of the U.S. Congress and U.S. military personnel have expressed concern that UAP poses a danger to aircraft. As summed up in 2023 by Chris Mellon, Former U.S. Deputy Assistant Secretary of Defense, UAP have caused "multiple cases of near midair collisions and other cases involving serious injuries to Military and civilian Personnel".

Lightning is a plasma that when carrying a positive or negative charge, attracts electrically charged plasmas which follow these bolts to the tops of these clouds which are also positively charged; whereas the bottom of the cloud and the bolts of lightning that erupt from the bottom, often have a negative charge. Aircraft and spacecraft may also radiate a positive charge that attracts bursts of lightning even in fair weather conditions. Presumably this occurs because these craft—under some conditions—act as a long conductor which intensifies an existing positive electrical field whereas the lightning bolt and the bottom of the cloud have a negative charge. For example, rocket exhaust typically becomes ionized and conductive and serves as an extension of the craft and attracts lightning.

Negative and positive charges also attract, and, as documented, plasma will turn, follow, and collide and intersect one another. Further, UAP—which may be plasma—follow, circle, and sometimes act as if they are about to collide with aircraft. And if it did, and all electronics were lost, the plane would be lost and the cause of the catastrophe would be unknown.

Fatal accidents have been attributed to lightning strikes due to electrical failure and even the ignition of fuel [160]. Lightning has even struck aircraft and rockets sitting on the ground still in a horizontal position. For example, in June 1987, three rockets, including the Orion sounding rocket, were struck by lightning, shorting out the firing circuits, but nevertheless igniting launch circuits causing the Orion to launch horizontally, flying hundreds of meters before striking the ocean [160].

On average aircraft are struck by lightning at least once per 3000 hours [160]. Apollo 12 was struck just over 35 seconds into ascent.

Lightning is a plasma. Therefore, aircraft, rockets, and spacecraft attract plasmas which will strike and collide with these crafts [160].

In addition, energetic magnetospheric or solar wind conditions can cause the surface of spacecraft to acquire charges due to the implantation of charged particles that penetrate and accumulate in the skin or insulating materials. Under these conditions, the interaction may trigger "deep dielectric discharges" [102]. This may explain why plasmoids in the thermosphere have been attracted to the space shuttles and the MIR.

"St Elmo's Fire" is a plasma that has been observed—for centuries—dancing about ships at sea. Aircraft crews have also observed luminous point discharges, "St Elmo's Fire", dancing about the skin of the plane even when there is no evidence of an electrically active storm [49]. These discharges can affect electronics and create radio

"noise" and if sufficiently bright, impair cockpit visibility [160].

As documented in NASA film footage [1] plasmoid have followed, hovered near, orbited around, and were repeatedly observed near the MIR and numerous space shuttle missions. UAPS have been observed for centuries and have repeatedly "toyed with" and harassed American, British, Japanese and German pilots during the second world war [41] [138] "These balls of fire appear suddenly and accompany the plane for miles", keeping up at 300 mph, and yet—contrary to initial military fears of these being a new Nazi weapon—one pilot noted how "they don't explode or attack us. They just seem to follow us like will-o-the-wisps" [138]. However, those that not only followed but collided or entered the craft, may have stunned the pilots and/or exploded and killed all on board, but the loss of the plane was instead attributed to enemy fire.

UAPs and plasmas are also associated with the disruption of electronic equipment and have reportedly affected the mental functioning of those in close proximity, causing confusion, disorientation and hallucinatory experiences including (perhaps) those recounted as "alien abductions".

Therefore, if plasmas that descended into the lower atmosphere collided with or entered the cockpits of commercial, private, and military planes, it may have been the cause of numerous *unexplained, inexplicable* airline disasters by affecting the mental functioning of pilots and crew and causing planes to lose electronics and power and plummet to the ground or ocean.

On July 17, 1996, a TransWorld Airline (TWA 800) exploded when it was struck by a powerful beam of light of unknown origin. Another example, in 1996 when a Boeing 747 Paris-bound plane took off from New York City at 8:19 PM in "muggy" weather. As it ascended over the sea witnesses observed a streak of lightning accompanied by a fireball and then, according to the National Transportation Safety Board: the plane suffered an electric short circuit which may have detonated an empty center wing fuel tank, causing the explosion killing all 230 onboard. Was the short circuit caused by the lightning or the ball of plasma that accompanied it?

On August 28, 1945, Army Air Force crewman, Leonard Stringfield was aboard a C-46 flying over the Pacific ocean toward Iwo Jima when he observed three cloud-like "blobs" of "brilliant white light" [51]. According to Stringfield as the three brilliant white cloud-like objects approached (**Figure 47**, the C-46 suddenly developed electrical problems and engine trouble, and began to rapidly lose altitude. Stringfield reports everyone onboard was terrified, believing the out-of-control plane would crash into the ocean. Stringfield states it is his belief "that the sudden erratic behavior of my plane was due to a mysterious force generated by the blobs" because when the cloud-like "blobs" disappeared, the electrical systems and engine went back online and the pilot regained control over the plane [51].

On March 8, 2014, Boeing 777 Malaysia Airlines Flight MH370 inexplicably ceased to communicate with air-traffic controllers and disappeared from air control

radar 39 minutes after leaving Kuala Lumpur en route to Beijing but then flew for hours off-course before disappearing from radar. The pilot's last message was "Good Night Malaysian Three Seven Zero". Minutes later, the plane's transponder—a communication system that transmits the plane's location to air traffic control—shut down. Military radar and satellite systems however, continued to track the plane which appeared to turn 180 degrees, and continued to fly for hours, until it vanished; presumably crashing into the ocean when it ran out of fuel.

The Boeing 777, like all commercial aircraft since 2001, has an armoured cockpit door that can resist attacks and small arms fire from outside the cockpit, and an electronic locking mechanism so it is kept secure during flight. To speculate: if a plasma were to enter the cockpit through the cockpit windows but remain sealed within the cockpit, might that explain why the transponder failed and why the plane disappeared from all but military radar and satellite tracking devices? Might both pilots have become confused, disoriented, mesmerized, or caused to fall asleep by electromagnetic radiation emitted by a plasma locked within the cockpit? To date there has been no explanation for what happened or what became of Malaysia Airlines Flight MH370; other than speculation by Malaysian authorities, *i.e.* unknown "interference".

Between November of 2013 and June of 2016, eight different commercial passenger planes suffered *catastrophes of unknown cause*, resulting in 1022 fatalities in just 30 months, six within 16 months—a series of disasters unlike any previously reported, but associated with an increase in UAP sightings by civilian and military pilots. These include two inexplicable crashes in July 2014, the month with the highest monthly UAP count. July (and late June) appears to be a month favored by plasma and UAP [3] [14] especially over the ocean [32]-[34] as reported by Navy pilots and personnel aboard Navy ships.

These *unexplained*, *inexplicable* aircraft disasters also coincided with almost daily encounters of U.S. Navy pilots with UAP from mid-2014 till early-2015, as confirmed in 2019 by the U.S. Dept of Defense. Mid-2014 till early-2015 is right in the middle of the 2013/11/29-2016/5/19 period of inexplicable increase in airplane accidents; and the 2012/12/2-2016/11/14 period of close calls according to The New York Times. In addition, between December of 2012 and November of 2016, there were nine near fatal accidents involving commercial airlines, cause unknown, which, again coincided with a period of elevated UAP sightings.

"Correlation" does not prove causation and the same can be said of "coincidence". Moreover, in the vast majority of airline accidents a cause was determined and which clearly has nothing to do with UAP, UFO, or plasma.

Nevertheless, it is important to note that the association between *inexplicable*, *unexplained* airline disasters and UAP, do not include and unknown number of unexplained crashes of military planes; and this is because the U.S. Military can always invent an explanation. Case in point: On the evening of November 23, 1953, Air Defense Command Ground Intercept radar operators at Sault Ste. Marie, Michigan, observed an unidentified object flying object (UFO) over Lake

Superior. Attempts were made to contact the UFO by different radio frequencies but there was no response. In consequence, a F-89C Scorpion jet piloted by First Lieutenant Moncla, was scrambled from Kinross Air Force Base to investigate the UFO. Moncla, an experienced pilot with over 800 hours of flying time, was accompanied by Second Lieutenant Robert L. Wilson who was also acting as the Scorpion's radar operator. Wilson reported to ground control that the UFO was flying in a bizarre fashion and rapidly changing course. Wilson also failed to make radio contact with the UFO. Via triangulation with ground radar operators, the Scorpion was able to hone in on the UFO.

As documented by two distinct radar signatures, Lt. Moncla began to close in on the UFO, as verified by ground radar operators who tracked two distinct blips on the radar screen. The two blips collided and merged at 8000 feet, becoming one blip on the radar screen—as if the UFO had engulfed the jet which disappeared from the radar screen, whereas the UFO, still flying erratically, suddenly accelerated and soon vanished from the radar. In fact, Lt. Moncla and his Scorpion had not only disappeared from the radar screen but from the face of this Earth. No wreckage was ever found or located. The Air Force offered a variety of conflicting explanations, including claiming that Lt. Moncla must have crashed his jet after he "probably" suffered "vertigo" and that they "believe" the UFO was actually an RCAF aircraft "VC-912"—even though radar operators classified the blip as "unknown" and the UFO never responded to a variety of radio frequencies and was flying erratically and then accelerated to tremendous speeds, whereas the Canadian Air Force emphatically denied any of their planes were in the area. As to why no wreckage was ever found the Air Force blamed "the weather" and then came up with another explanation, *i.e.* the jet must have exploded while in the air, and the explosion was so powerful that the jet was completely obliterated.

Although the number of military planes that have inexplicably "vanished" is unknown, the fact is, since 1948, 84 passenger aircraft have vanished without a trace according to the Aviation Safety Network [161]. Thus, the link between UAPs and *unexplained* airline disasters may include numerous catastrophic crashes or vanishings as obliquely admitted by the All-domain Anomaly Resolution Office (AARO) task force whose purpose is to investigate the legitimacy of UAP encounters reported by military and especially Navy pilots. In their October 2023 report the AARO [34] admitted that "many [UAP] reports from military witnesses do present safety of flight concerns".

15. UAPs over the Ocean

UAPS have been repeatedly observed flying above and descending into the ocean as verified by the U.S. Dept of Defense and the AARO. This is most likely due to the fact that the ocean surface—especially during white water and turbulent conditions—and surface air up several dozen meters above the sea, often has a positive charge, which in turn would be attractive to plasmoids with a negative or neutral charge.

In July of 2023, retired Navy Cmdr. David Fravor testified before a special US. Congressional Committee reported that on Nov. 14, 2004, when he was commander of the F/A-18F squadron on the USS Nimitz, radar on the USS Princeton detected what radar operators called "multiple anomalous aerial vehicles". These objects were rapidly descending and covered more than 25,000 meters (15 miles) in less than a second, *i.e.* approximately 54,500 miles per second, 3,270,000 miles per minute, and 196,200,000 miles per hour—nearly twice the velocity of a lightning bolt.

For the sake of comparisons, NASA's X-43, believed to be the fastest aircraft in existence, is capable of 7266 miles per hour whereas 364,660 miles per hour is the fastest speed so far attained by a spacecraft (the Parker Space Probe). Thus, the multiple anomalous vehicles descending toward the ocean in 2004 achieved velocities 500% faster than any human-made vehicle: 364,660 vs. 196,200,000 miles per hour.

When he diverted his fighter jet to investigate, Fravor reported that he observed a "white Tic Tac-looking object. And it's just kind of moving above the whitewater area" off the coast of Southern California 100 miles southwest of San Diego. "There was four of us in the airplanes literally watching this thing for roughly about five minutes". Fravor reported that the "Tic Tac" object mirrored the movements of his plane and "it was aware we were there".

The white object was approximately the same size as Fravor's F/A-18F, "with no markings, no wings and no exhaust plumes", but when Fravor approached, it accelerated so quickly that it seemed to disappear—as if repelled by Favor's jet.

Navy, private, and commercial seagoing ships, not uncommonly observe anomalous pulsating "white lights" and "red" and "white" objects in the nighttime sky that hover and fly over the ocean and their ships and which engage in behaviors interpreted as harassment or surveillance [50] [162] [163]. For example, over a period of three days, in July 2019, fourteen bob-shaped brightly illuminated objects surrounded five Navy warships. Officers on duty in the USS Omaha command center, filmed one of the objects on July 15, 2019, which apparently was self-illuminated and white in color and resembled a large sphere of unknown size and dimension (**Figure 27**).

This white sphere flew alongside the ship for over an hour, beginning around 10 PM. Because it was pitch black outside, the object was tracked and filmed via thermal sensors. At around 11 PM the brightly lit sphere-shaped object which had been hovering just above the ocean sank beneath the sea. The Pentagon has confirmed that the object was filmed by U.S. Navy personnel.

Moreover, the prior day, beginning around 10 PM on July 14, 2019, and for several days thereafter, a "white light" repeatedly appeared above three U.S. destroyers (USS Kidd, USS Rafael Peralta and USS John Finn) a hundred miles off the coast of Los Angeles, California under conditions of very low visibility. The U.S. Navy described this "white light" or "lights" as "Unmanned Aerial Vehicles" or UAVs without providing details [162]. The first episode lasted about 90 minutes

and then the UAVs vanished and disappeared from the destroyers' advanced array of electro-optical systems including radar and thermal imaging, which can see in the dark and detect and locate radio transmissions [162] [163].

The next evening on July 15, the crew and passengers of a nearby cruise liner "Carnival Imagination" observed up to six brightly lit UAP flying around the Navy ships. That same evening, the USS Rafael Peralta reported that it was harassed and followed by four UAPs. The UAPs returned on July 25, and 30, 2019 [162].

Formal investigations conducted by Navy, Coast Guard, FBI and other agencies were unable to determine what the objects were, where they came from, what they were composed of, but raised the possibility these were "drones" with amazingly advanced technological capabilities and unlike anything possessed in the U.S. arsenal [162].

The object filmed by the U.S. Omaha on July 14 2019, is shaped like a ball, a sphere and in no respect does it resemble a drone (**Figure 27**). Unfortunately, the party claiming the copyright of this government property, and who has also been claiming it's a spaceship from another planet, would not agree to allowing an examination of the film footage. Therefore, based on the photographic evidence (**Figure 27**) it is likely that these were plasmas attracted to the white-water positive charges emitted by the ocean.

These positive space charges are not only upon the surface but extend up to 200 meters above the ocean; caused by the accumulation of positive ions drifting downward which is not counterbalanced by negative ions drifting upward, so called electrode effect [135] [164].

In support of this theory, consider the following: On May 27, 2004, the nuclear-powered aircraft carrier USS Ronald Reagan (CVN-76) left Norfolk Virginia, USA, intending to circumnavigate around South America to its permanent homeport in San Diego. Based on the reports of Navy personnel, between the hours of 8 PM and midnight as they neared the Caribbean, the crew on the watch, on the bridge and the flight deck observed a luminous, semi-translucent orange-red oval-shaped gaseous object about the size of a fighter jet [50]. According to Karol Olesiak, Navy "QM3" (Quartermaster) of the Watch, it was an "orange globe ball-looking thing that was floating over the flight deck. The ship was going forward and it was keeping pace with the ship"; and it looked as if it consisted of "negative energy" and "unburnt energy", as if it was burning but without consuming itself and because it didn't give off any heat.

Karol's shipmates, SN Patrick Gokey and Boatswain's Mate Seaman (BMSN) Derek Smith confirmed the sighting. According to Smith who was a lookout that night with his trainee: "It was like hovering and it just appeared. And then we got up on the lookout watches... They're like mounted binoculars. … I'm sitting here looking at this thing, and I couldn't tell what it was. There was a shape to it. It was oval shaped like a sideways, as it was kind of like an oval shape, but it didn't look solid, but it had a shape to it" [50].

As described by SN Patrick Gokey: "I just saw this bright orange ball and it was

wavy, but somehow still solid like a plasma almost. And it just appeared over the flight deck. Maybe 200 feet off the flight deck. It sat there for about 30 seconds... we were moving during the flight ops, and it seemed to stay with us. But without any movement that you could discern. After that, it just did three half circles, just 1, 2, 3, and it was gone... Maybe half hour, an hour later...it came back by us on the fan tail and it hovered...maybe a hundred or 200 feet in the air...it did three half circles and it took off. I mean just in the blink of an eye, it was gone" [50].

Plasmoids are attracted to sources of electromagnetic activity, and UAPs have been repeatedly observed near and following nuclear powered navy ships. It is reasonable to assume that nuclear power attracts plasmoids and non-nuclear ships (e.g. "Carnival Imagination") do not attract the plasmoids their crew and passengers observe flying above Navy ships that are nearby. This would also explain why UAP have been observed over nuclear power plants, Fukushima Prefecture—site of a major nuclear power plant accident in 2011—and have been repeatedly observed over Hiroshima and Nagasaki—destroyed by atomic bombs in 1945.

Lt. Ryan Graves, an F-18 fighter pilot from the nuclear-powered USS Theodore Roosevelt carrier strike group reports that he and other pilots as well as ship mates saw UAPs almost daily during the summer of 2014 and the spring of 2015. "Wherever we were, they were there". Graves also reports these UAP had a variety of shapes and sizes, with some flying in formation others flying erratically and almost causing head-on mid-air collisions.

UAP Plasma Passes over Chicago toward East Coast, Descends toward Atlantic Ocean

Figure 30. This pulsating object in the thermosphere, flew over Chicago and continued toward the East Coast, and then descended downward toward the Atlantic Ocean. Filmed by STS 106 [1].

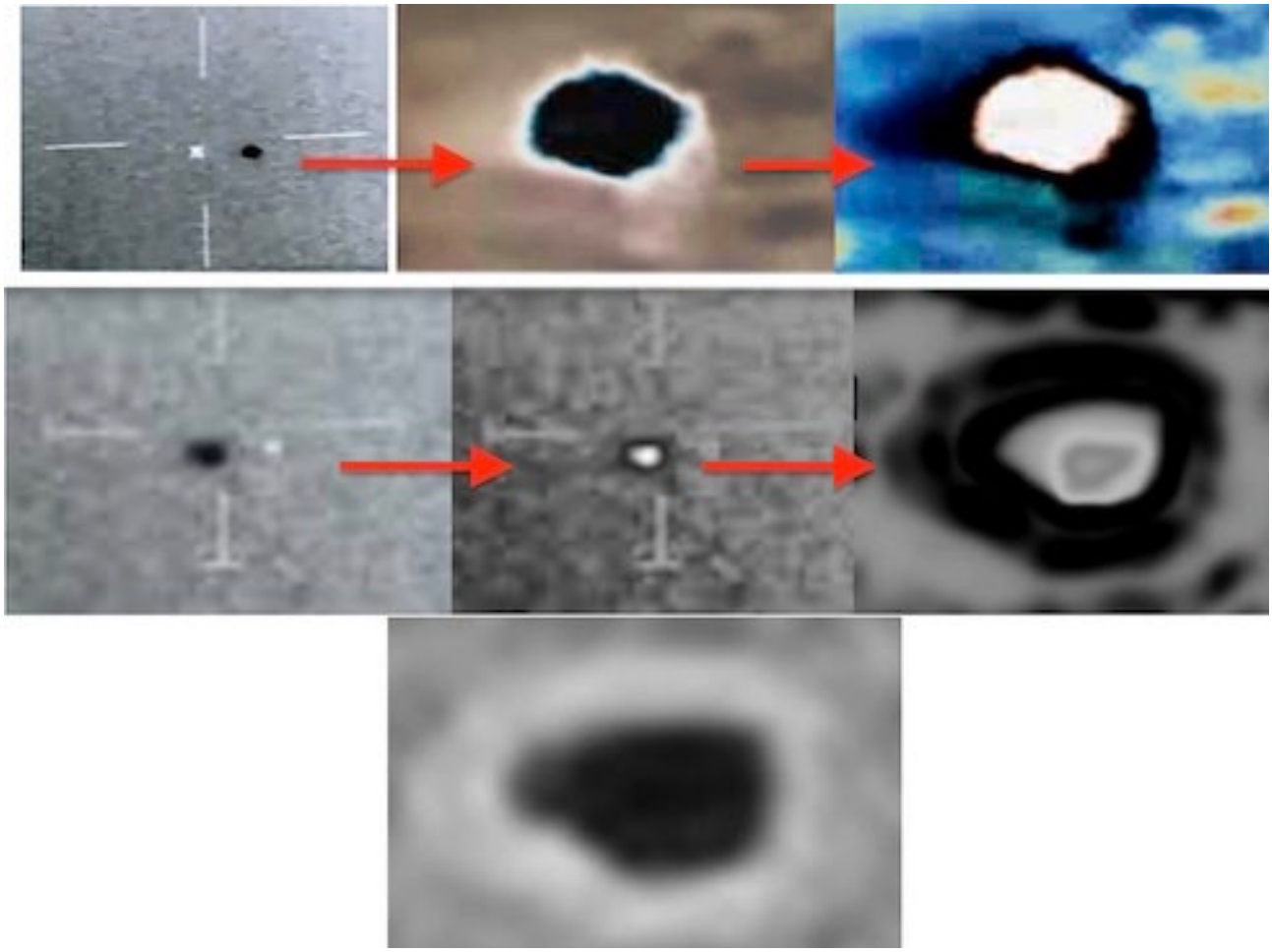


Figure 31. Freeze frame of white glowing object filmed by Command Center of the USS Omaha in July of 2019, off the coast of San Diego, California. Object processed via Fotor ant-blur and filtering software. (Top row) The object is glowing, radiating, and there is a downward direct fog-like optic directed downward as well as to the left. Additional analysis indicates the object may have a nucleus, or, that it consists of layers that radiate different levels of light. Based on viewing of the film footage posted online (not provided to the authors despite repeated requests), the object may have descended into the sea, or, it may have vanished as it made contact with the ocean surface.

16. The Ocean Can Develop a Positive Charge and Attract Plasma-UAP

The surface of the ocean—particularly during periods of turbulence—and the air directly above, can acquire a positive charge, and like the positive charges in the ionosphere, thunderstorms, and the lowest level of the atmosphere, may provide an environment that would be attractive to plasmas with a negative or neutral charge [165].

Water molecules consist of hydrogen and oxygen (which attracts electrons more strongly than hydrogen) and thus water has a negative charge surrounding its oxygen atoms and a slightly positive charge surrounding its hydrogen atoms. The top of a drop of water is also generally positive and this positive charge increases as a function of radius. Different layers of ocean water are also stratified by temperature and salinity which in turn influence electrical conductivity, and creates

variations in electric currents in the oceans [8] [166]. Therefore, Earth's oceans (3.2 $S \cdot m^{-1}$) are not only electrically conductive but—like thunder clouds—carry a charge that, depending on conditions, can be negative or positive and with a mean value of 3.2 $S \cdot m^{-1}$ [68] [96] with the surface layers and air above, having a positive charge especially under white water and turbulent conditions.

Blanchard [10] found that the positive charge can be attributed, in part, to positive particles that arise from the sea and those that evolve from bubbles that break at the ocean surface. Moreover, under conditions of turbulence and in the presence of white water the surface and air directly above the ocean may become positively charged due to the ejection of positively charged droplets of sea water into the atmosphere. Therefore, an electrically charged plasmoid might be attracted to the ocean surface and atmosphere above the sea.

Blanchard [10] also found that the majority of positive particles that arise from the sea and the greatest amount of positive charge reaches its highest value between "June-August"—and at the latitudes of 40 to 60 degrees. These latitudes encompass the ocean off San Diego and Los Angeles where the Navy ships observed the Blob and the "white lights". The observations also encompass the same block of time where the F/A-18F squadron on the USS Nimitz observed a "whole fleet" of UAP in July.

According to a month-by-month analysis it was determined that the mean maximum positive ocean charge occurs in July [7]—the same month the UAVs were observed by Navy warships. Furthermore, as first determined in 1911 [6], the maximum charge develops over the ocean "during the evening", "before midnight". And lastly, the positive charge produced by the ocean has been estimated as extending "several tens of meters" up into the atmosphere [9]. This is the same time and in the same general area of airspace occupied by the blob before descending into the sea and when and where the "white lights" were observed.

17. Shape Shifter Replicon Filmed by U.S. Customs: Aguadilla, Puerto Rico

On April 25, 2013, at approximately 9:20 PM, a U.S. Customs and Border Protection DHC-8 aircraft, using thermal imaging, filmed an ocean-skimming UAP at least a dozen meter above a runway at Rafael Hernández Airport, and which continued over the ocean off the coast of Aguadilla, Puerto Rico [167].

Although we do not have data for the evening of the 25th, the video depicts thick fog and low clouds, whereas according to timeanddate.com the temperature at 6 PM, ranged from 81 to 79 F, barometer at 29.98 (normal range) and humidity at 65% to 74% which indicates considerable hot muggy moisture in the air thereby increasing electrical current and conductivity and which is associated with the development of electrically charged cumulonimbus clouds that produce lighting. Based on repeated viewings of this 3-minute film (provided to the authors by) it is obvious the object's movements are erratic with sudden turns, dips, and lifts, making it impossible to determine its actual velocity. It also appeared to repeatedly dip beneath

the waves and twice it split apart.

As documented in this report (**Figures 28-32**), the film was analyzed employing Apple Final Cut Pro which is able to make up to 10 freeze frames for every second, *i.e.* one frame per 100 milliseconds. Nearly 200 freeze frames were eventually obtained, *i.e.* one for approximately every second, and often, two or more per second. The freeze frames reveal that the object was rapidly, dramatically and continuously changing its size and shape every second and often in less than a second; and that it repeatedly split into separate parts. Detailed optics analysis of approximately 130 freeze frames, using anti-blur Fotor image filters and enhancement software verifies as documented in **Figures 28-32**, that the object moved erratically, rapidly, and continually changed shape. This shape-shifter repeatedly took the shape of a blob, or clouds, a spiral, or formed a ring, and repeatedly split apart forming secondary oddly shaped forms that would sometimes remain temporarily attached and then detached and flew in front, or above, or behind the primary object before disappearing—thus indicating that these second objects could not have been a shadow or reflection on the ocean surface. The primary shape-shifting object in fact repeatedly generated secondary forms, all of which were transient and soon disappeared.

At times, a nucleus became apparent, within which sometimes three to four orbs could be viewed (**Figure 32**). It is possible one or more of these internal orbs split off to form the secondary UAPs which often included internal or exterior shapes that were orb-like. As to these internal orbs, in laboratory experiments, spherical, cloud, blob and donut-shaped plasmoids were also continually changing their appearance and color (yellow, red, purple, green colors) and within which round glowing balls repeatedly flared up inside [30].

Although the coloration of this Puerto Rico UAP is unknown, it was self-illuminated, with a glow that often completely surrounded the object. At times it developed tendrils and spikes that extended in front or sometimes behind, or which would jut out in all directions (**Figures 28-30**).

It is impossible to determine the speed of the object which would rapidly alter in trajectory swinging laterally far to the left or to the right and up and down within milliseconds. The object's rapid movement and variable speed also made it impossible for the U.S. Customs and Border Protection DHC-8 to keep the object in its radar-gun sights [167]. Likewise, it is impossible to precisely determine its size which also changes but which we estimate at less than a meter in diameter.

Based on these freeze frames, a sample of which are presented here (**Figures 28-32**), it is obvious the object continually changes shape (e.g. donut, ring, cloud, star, blob, crown, square, triangular, rectangular, etc.), and sometimes has an internal nucleus or voids, no obvious means of propulsion, is self-illuminated and splits off into secondary objects. It is not a bird or a drone, and cannot be made of metal, plastic, or alloy unless of extraterrestrial origin and based on technologies unknown on Earth, *i.e.* extraterrestrial robotic machinery employing camouflaging stealth technology.

This later possibility is supported by the following observations: rapid shape shifting every second, extreme and rapid lateral movements, the inability of the U.S. Customs DHC-8 to keep the object in its radar gun sights, and the voids at the center that contain three or more smaller objects which may have split off to form other objects that appeared in front, above, and behind the primary object (**Figures 28-30**) only to disappear. Another observation: employing filters, sometimes forms—in addition to the orbs—appeared to be inside the object as if cocooned in obscuring outer-layers. It is possible something was hidden inside?

Related to these observations are the following: When complex filters were applied to photographs of a pulsating cloud-like object that followed one of the Space Shuttles, a cylindrical structure was revealed that appeared to have been hidden inside a cloud-like outer-layer (**Figure 2**). In addition, Ryan Graves an F-18 pilot testified before the U.S. Congress in 2023, that he and his squadron have repeatedly observed UAPs. which he described as "dark grey or black cubes...inside of a clear sphere, where the apex or tips of the cubes were touching the inside of that sphere". Likewise, when filters were employed to photographs of a cloud-shaped object above Mars, a square-triangular object appeared to be inside [60].

Yet another possibility is that the object is a trans-dimensional five-dimensional entity. Because it exists in the 5th dimension and also appeared in the four dimensions of our space-time continuum (three of space, one of time) it appeared to constantly change as different parts became visible in our four dimensions.

In brief, the existence of a 5th dimension—also known as the Kaluza-Klien theory [168]—could explain how gravity is linked to electromagnetism when no link is apparent in our 4-dimensional universe. Moreover, we can't see the 5th dimension because it exists in a higher plane of space than the one, we occupy, but which nevertheless may be curled up within, or conversely surround our 4 four dimensions—like a cylinder, or forming a circle. This 5th dimension is believed to be microscopic in which case the radius of the circular dimension might be 23 times the Planck length, which in turn is of the order of 10 - 33 cm. but which may serve to link together the four dimensions of our existence; just as thunderstorms provide an electromagnetic link between the ionosphere and Earth.

Consider, for example, lighting, which can be considered a cylinder that connects the surface of the Earth to thunder clouds, and the ionosphere to thunder clouds. lightning is a plasma; Lightning may provide link between our four dimension and the 5th dimension; but in terms of geometry, as viewed our four dimensions, it appears to have the twisted shape of a series of cylinders; and if you slice a cylinder, it will have the shape of a circle with a hole at its center.

This hypothetical "hole" may have been viewed by nearly 1000 residents of the Western Australian town of Tom Price as a huge ball of plasma floated downward toward them. As detailed by Mason [48]: "it was an intense spherical ball of orange-red fire with the fire swirling in a spiral pattern and the flames disappearing internally upwards into a central black 'hole' or void within the spherical mass of flames". Another observer also described it as "like a moving plasma ball in a local space-time warp around a central black hole".

A swirling vortex is a not uncommon characteristic of ball lightning [134] whereas the hole or void may have been a nucleus, which is a common attribute of plasma as documented in this and an earlier report [3]; and as reported by Arnold when he observed "flying saucers" in 1947: "with a pulsating thing in the middle of them". However, it is also possible that the hole observed by the residents of Tom Price, may be a small black hole that leads to and from the 5th to our four dimensions [169]; and this may account for the shape-shifting appearance of the object filmed by a U.S. Customs and Border Protection DHC-8.

For example, if a five-dimensional entity from the 5th dimension were to appear in our four dimension, observers might view it as continually changing shape because they can only perceive three of its dimensions as it moves through time (the fourth dimension); and this may also explain why the object filmed by the U.S. Customs and Border Protection DHC-8 appears to continually change and split off as it moves, *i.e.* we can only view different parts but not the object as a whole.

There is yet another plausible explanation for this shape shifting entity: human military technology based on optics, mirrors and the deployment of ultra-rapid laser pulses to create aerial luminous plasma that appears in three-dimensional space as one or more plasma-ghost images that serve as decoys. The purpose of the "ghost" is to trick observers and missiles which would home in on the plasmatic "ghost" or even multiple "ghosts.

The U.S. Space and Naval Warfare Systems Center has apparently been working on this project since 2012, according to a U.S. Navy website article dated 2017 [170]: "Dr. Alexandru Hening, a scientist who has pioneered laser-generated plasma at the [Space and Naval Warfare Systems Center Pacific] for five years". The following year, Alexandru Hening filed a Patent application, titled "System and Method for Laser-Induced Plasma for Infrared Homing Missile Countermeasure" [171] that is apparently based on plasma technology developed at the Warfare Systems Center.

As stated in Hening's patent application [171]: "Described herein is a system and method to generate a plasma-based decoy flare by using a laser source, to counter an infrared homing surface-to-air and/or air-to-air missile. With laser-induced plasma (LIP), it is possible to generate multiple wavelengths just by "tuning" the laser parameters...a laser beam...will generate a laser-induced plasma filament (LIPF) in accordance with the system and method for laser-induced plasma for infrared homing missile countermeasure".

It is unknown if the shape-shifting object and its duplicates are plasma from the 5th dimension, or was created by the U.S. Navy, or if it's an extraterrestrial machine using stealth technology. However, plasmoids in the thermosphere also display extreme shape-shifting and from frame to frame will have completely different shapes [31]. As per those in the thermosphere, these extreme changes in size and shape are perhaps predicta-ble given these are plasma that in addition to highly charged particles and dust, are comprised of gases [31]. Therefore, the most plausible explanation is that the shape-shifter observed over Aguadilla, Puerto Rico is a plasma that was attracted to the positive charge of the ocean and atmosphere directly above. Although the U.S. Customs' film lasts only 3 minutes the shape-

shifting object appeared to repeatedly skim the surface and dip beneath the sea until finally disappearing, presumably after it dived beneath the surface of the ocean.

Shape Shifting UAP over the Ocean & Coast of Puerto Rico

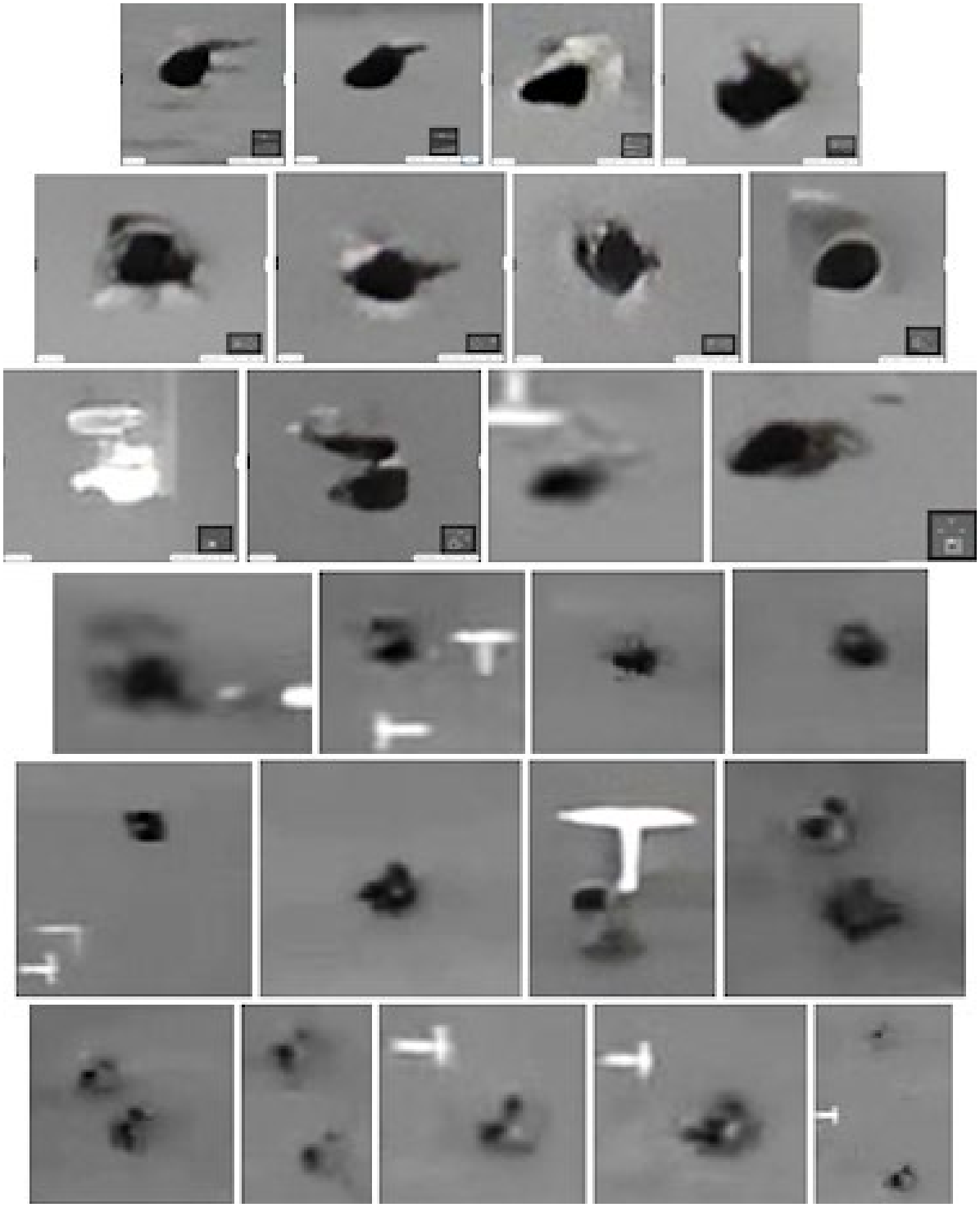


Figure 32. Freeze frame photos of a shape shifting UAP, from a 3-minute film by a U.S. Customs and Border Protection DHC-8 over the ocean and coast of Aguadilla, Puerto Rico. These photos represent the changing appearance and the splitting apart of the UAP which occurred throughout the 3-minute film.

Shape Shifting UAP Repeatedly Splits into Additional UAPs over Ocean & Coast of Puerto Rico

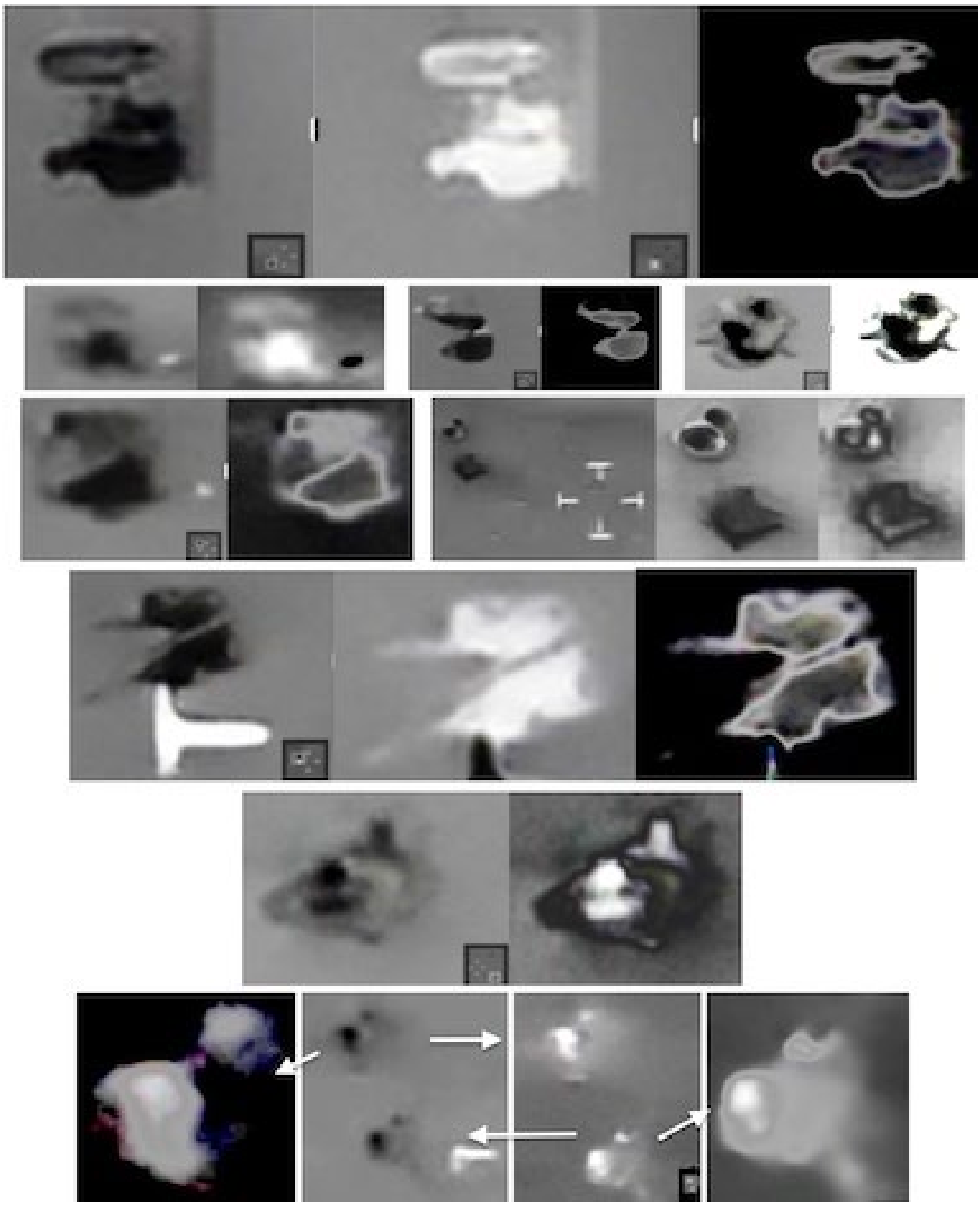


Figure 33. Freeze frame photos of a shape shifting UAP repeatedly splitting into different shape shifting UAPs. Freeze frames produced via Final Cut Pro, processed with Fotor anti-blue and filtering software.

Shape Shifting UAPs: Voids/Nucleus

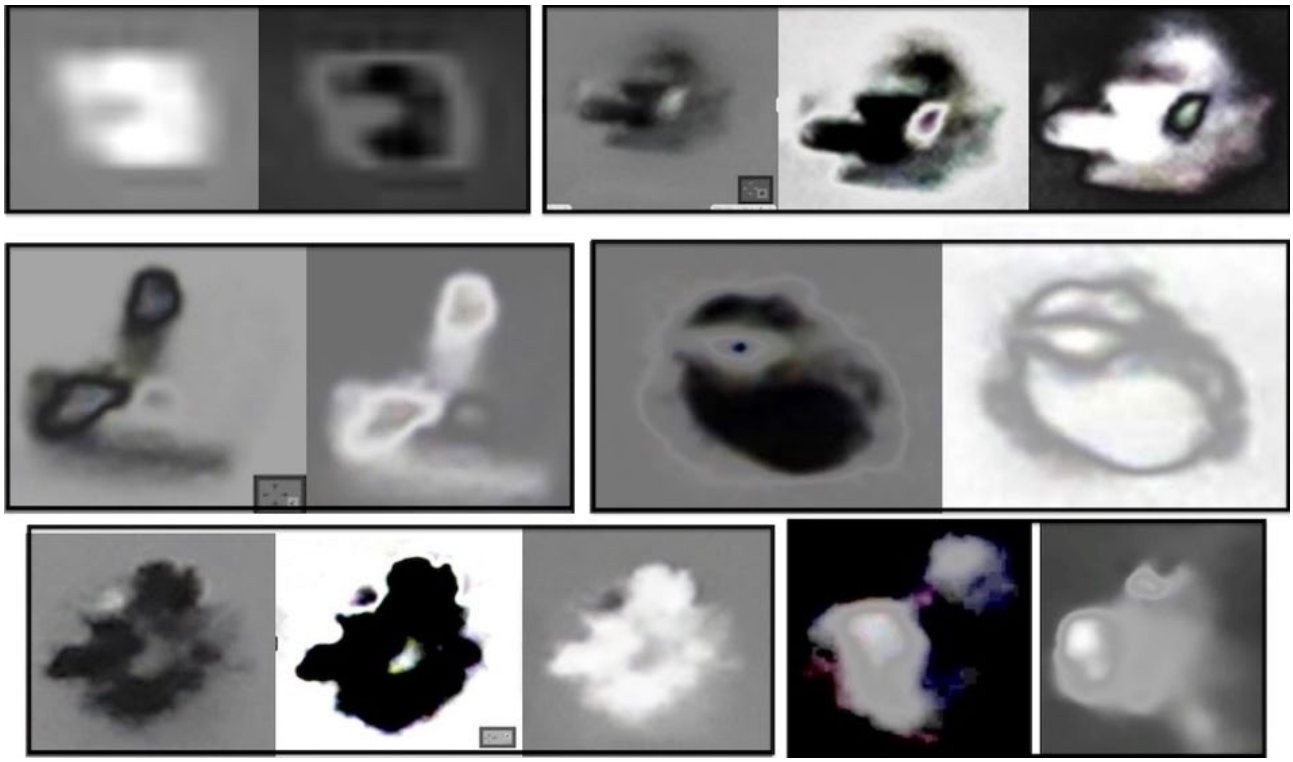


Figure 34. Examples of nucleus/voids within shape shifting UAP. Freeze frames produced via Final Cut Pro, processed with Fotor anti-blur and filtering software.

Ovals inside Nucleus/Voids of Shape Shifting UAP

Figure 35. Freeze frames produced via Final Cut Pro, processed with Fotor anti-blur and filtering software and magnified 1600 times. Examples of oval forms within the nucleus/voids of shape shifting UAP which are similar to those within plasmoids in the thermosphere. Although the glowing oval forms could be construed as ganglia, similar glowing ovals have been observed in plasmas generated experimentally.

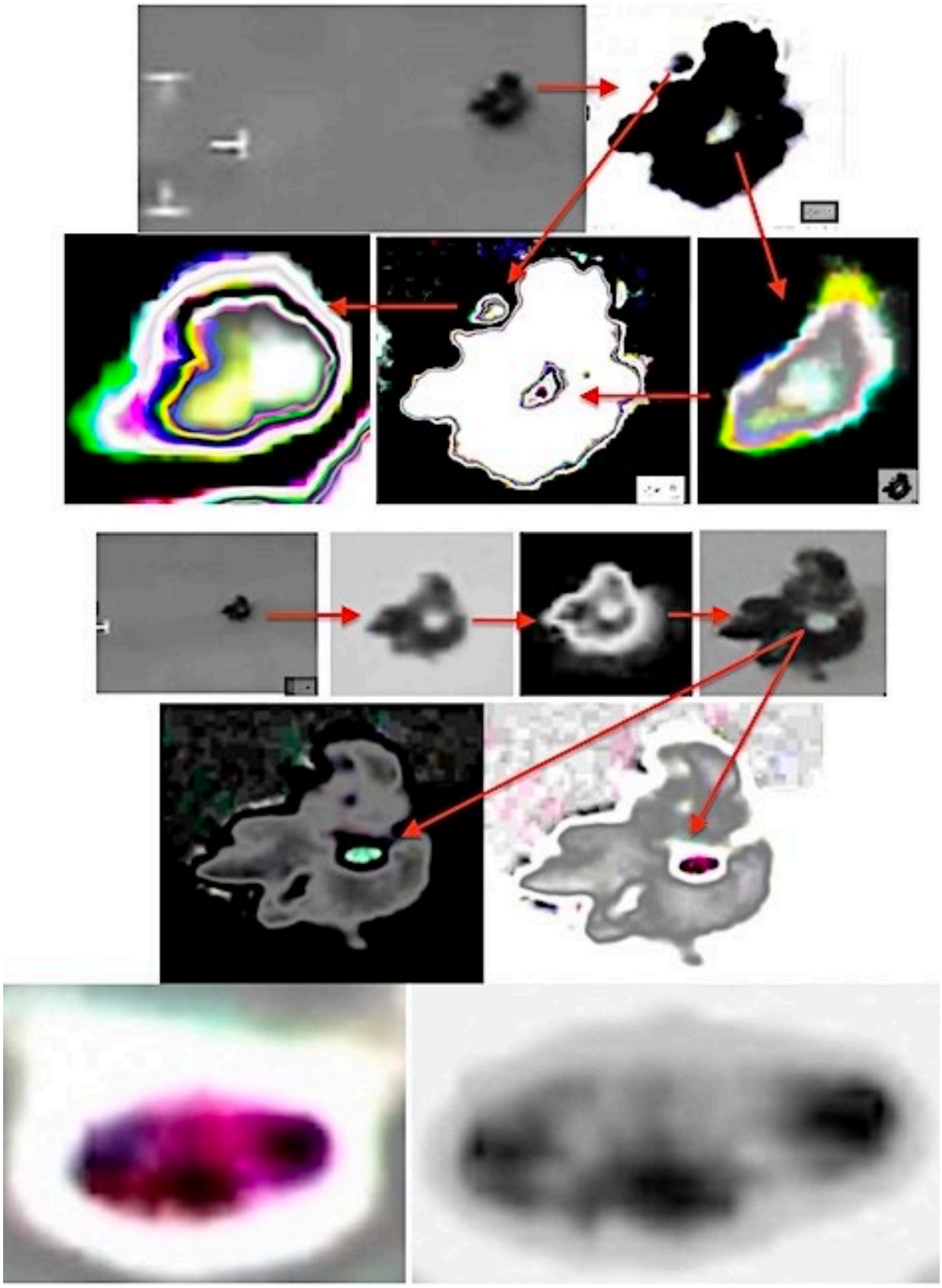


Figure 36. Examples of oval-ganglia nerve net-lie structures within the nucleus/void of shape shifting UAP. Freeze frames produced via Final Cut Pro, processed with Fotor anti-blur and filtering software.

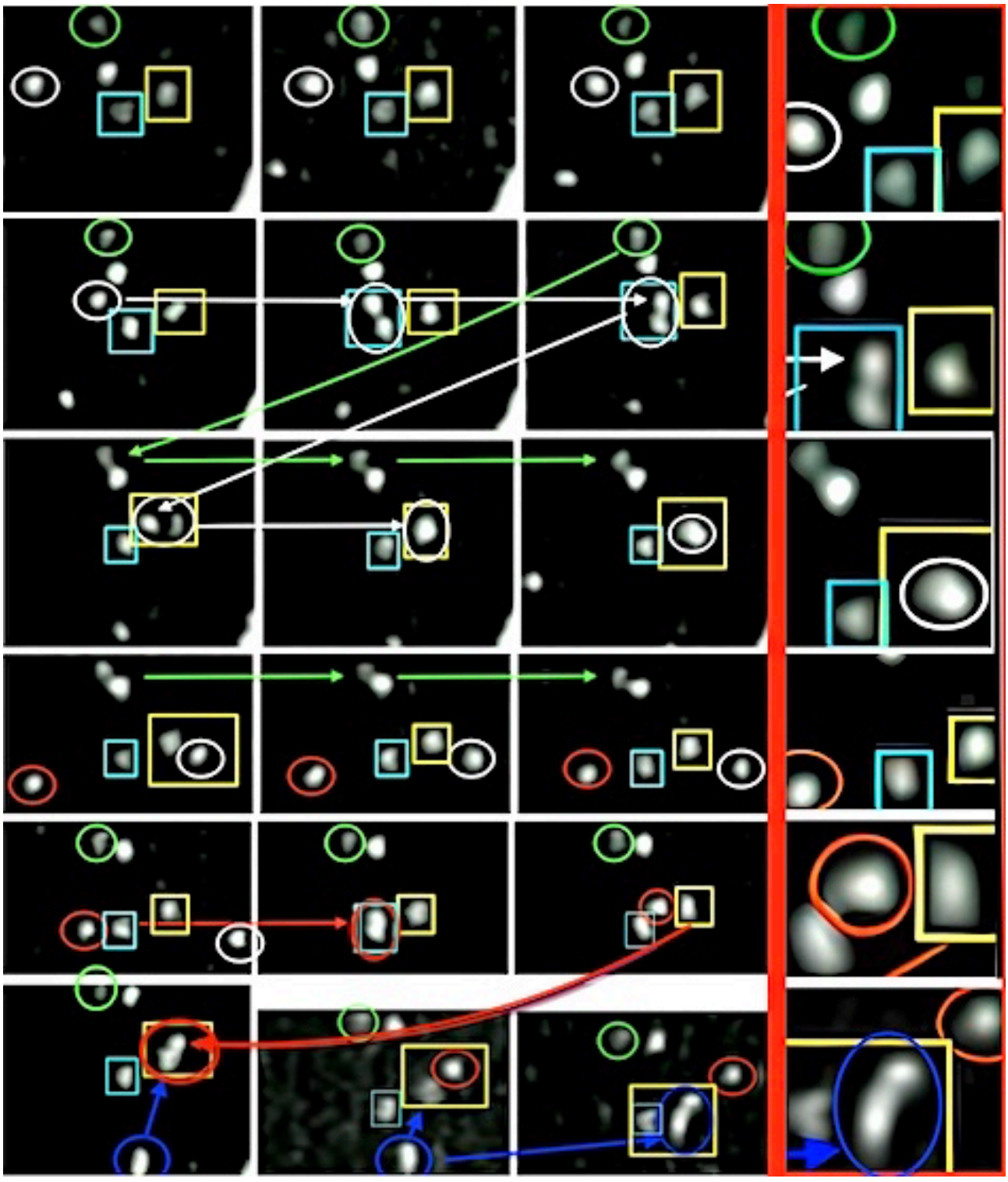


Figure 37. Targeting and collisions between Plasmoids could be interpreted as "battles" being fought, when these collisions take place above cities in the lower atmosphere and observed by humans on the ground below (see **Figure 38**, **Figure 40**). Note: Plasmoids boxed in yellow and turquoise are each struck twice by different plasmoids and both increase illumination and become brighter after they are struck [1].

18. When Plasmoids Attacked Los Angeles

On the evening of February 24, 1942, a battle raged in the heavens, when five glowing, pulsating, self-illuminated orbs appeared in formation over the evening skies of Los Angeles [41] [172] As air raid sirens screamed, U.S. military "Western Defense" anti-aircraft guns blasted away at the five glowing orbs which were tracked by searchlights; a battle observed by tens of thousands of residents down below. In fact, anti-aircraft guns fired continuously at this slow-moving formation of UFOs, for nearly six hours. So many bullets were falling back to Earth that five citizens were killed and "scores of other persons" seriously injured according to the Los Angeles Times [172]. And yet, despite direct hits, the UFOs proved impervious and never broke formation as they maneuvered over the city.

The next morning the L.A. Times reported "the ensuing heavy and long-continued anti-aircraft firing...was ordered by the Army's 4th Interceptor Command...[which also ordered] 'no effort should be spared to shoot them down'.

When questioned by reporters, Lt General John L. DeWitt (Western Defense Commander) explained the U.S. military did not know what these 'enemy' objects were or where they came from; referring to them as 'Unidentified aircraft'.

The L.A. Times of 1942 also reported that the U.S. military was so concerned about these unidentified flying" objects, that it was recommending that "vital industries" in the L.A. area and "Pacific Coast war industries", "would have to be moved to safer inland regions".

A few days later Secretary of the Navy Frank Knox told the press that "it was just a false alarm" and dismissed the six-hour battle and the thousands of eye-witness observations, as a case of "jittery nerves" and denied any enemy aircraft had been in the area [172]. When the Los Angeles Times [172] demanded more information and complained about conflicting statements coming from the military, their questions and complaints were met with silence.

What were these self-illuminated pulsating orbs that were flying in formation? Our best guess is they were plasmas.

19. Plasmoids Battle over Nuremberg, Basel, Biskopsberga and Hamburg?

Throughout history, fire balls have repeatedly appeared in the sky (e.g. **Figure 38**, **Figure 40**). For example, as detailed in the May 1808 Transactions of the Swedish Academy of Sciences (TSAS), "On the 16th of last May...there appeared...in quick succession, a great number of balls, or spherical bodies...of a dark brown colour...a great many of them remained, as it were, stationary; but they soon resumed...an accelerated motion. with great velocity...til they were lost sight of...millions of similar bodies continually arose in the west, one after the other irregularly...no report, noise, nor any whistling or buzzing in the air was perceived...several were linked together...but continuing on a more rapid course they separated, and each having a tail...three or four fathoms [in] length...". Those that "approached the earth... vanished almost entirely within a few fathoms distance from the ground".

According to a translation of the "headlines" of a 1697, November 4, broadsheet with a woodcut illustration (**Figure 38**), "horrible fireballs" appeared over the city of Hamburg Germany: "Great fiery balls in the shape of a cannon ball were seen floating" along with "a bright shining terrible lightning" and then one or both "balls of fire" exploded and then "disappeared from the sight of many thousands of spectators" along with the "terrible lightning".

On January 27, 1630, German Astronomer Wilhelm Schickard published his monograph, titled "Description of the Miracle of the Stars" and—according to translation—wrote how "from 7 a.m. to 10 a.m. in the morning" he observed "a snow white material" appear in the sky over the city of Tübingen, Baden-Württemberg, Germany, which resembled a cloud but "which I cannot really call a cloud, because it was not as fluffy or broken up around the edges as natural clouds, but rather nice and smooth with a polished reflection…", "it had…a delicate oval figure or shape [that] fluttered back and forth in an inconsistent form…" and then "two more…light and dark spots…resembling an overturned kettle" and an elongated "sharpening stone", "appeared next to the oval figure and then commenced "to do battle" for over two hours as all three "winked" on and off so that they seemed to appear and disappear and then the "oval" form "flew away violently" and the others disappeared "or were hidden".

Tübingen is located 260 km southwest of Nuremberg where 69 years previous, on the morning of April 14, 1561—as described in a translation of a wood-cut illustrated broadsheet news article printed in April 1561—lightning (signified by the cross) accompanied by several orbs appeared "at daybreak, between 4 and 5 a.m…this was seen in Nuremberg in the city, before the gates and in the country—by many men and women. At first there appeared in the middle of the sun two blood-red semi-circular arcs… And…there stood a round ball of partly dull, partly black ferrous color" and "blood-red ones and other balls in large number… These all started to fight among themselves, so that the globes…flew back and forth among themselves and fought vehemently with each other for over an hour. And when the conflict in and again out of the sun was most intense. They then wasted away" and disappeared.

Basel Switzerland is located southwest from Tubingen (234 km) and Nuremberg (445 km). According to an eyewitness account published in a news broadsheet: "It happened in 1566 three times, on 27 and 28 of July, and on August 7, against the sunrise and sunset; we saw strange shapes in the sky above Basel" including an object shaped like but "no bigger than the full moon… it seemed to weep tears of blood and…seen by all the people of the city and countryside… At the dawn of August 7, we saw large black spheres coming and going with great speed and precision before the sun as they began to fight. Many of them were fiery red and, soon crumbled and then extinguished".

Figure 38. Woodcut and broadsheet headline: 1697, "horrible fireballs" accompanied by "lightning" appeared over the city of Hamburg Germany and began to "fight". Our interpretation: Plasmas attracted to and/or produced by the overhead thunderstorm and what the Germans observed were Plasmodic collisions in the lower atmosphere. Two hundred and fifty-five years later, on July 19, 20, 1952, U.S. Air Force and air-traffic controllers at Washington National Airport and Andrews Air Force Base feared that the White House might be under attack by "UFOs" when they spotted numerous unusual blips on their radar screen that were clustered together and, looking out the windows: strange balls of bright light that at first moved slowly, then accelerated at an incredible speed "like falling stars without tails". F-94 interceptor jets were scrambled only to observe the objects suddenly disappear. And then later, the objects reappeared on the radar screen, raising fears that the Capital might be under attack. More F-94 interceptors were scrambled, with pilots reporting observing "very bright lights" moving at hyper-speed only to disappear. When newspapers reported these observations and reporters began asking questions, the Air Force issued a denial, stating that the radar blips were caused by a hot muggy temperature inversion, *i.e.* a layer of warm air had trapped cooler air beneath and radar signals bounced off and reflected objects in the lower atmosphere as being higher in the sky. Temperature inversions also generate considerable electric current because of the accumulation of charged particles that can generate electrical discharges and high levels of static electricity; conditions that might attracted plasmoids.

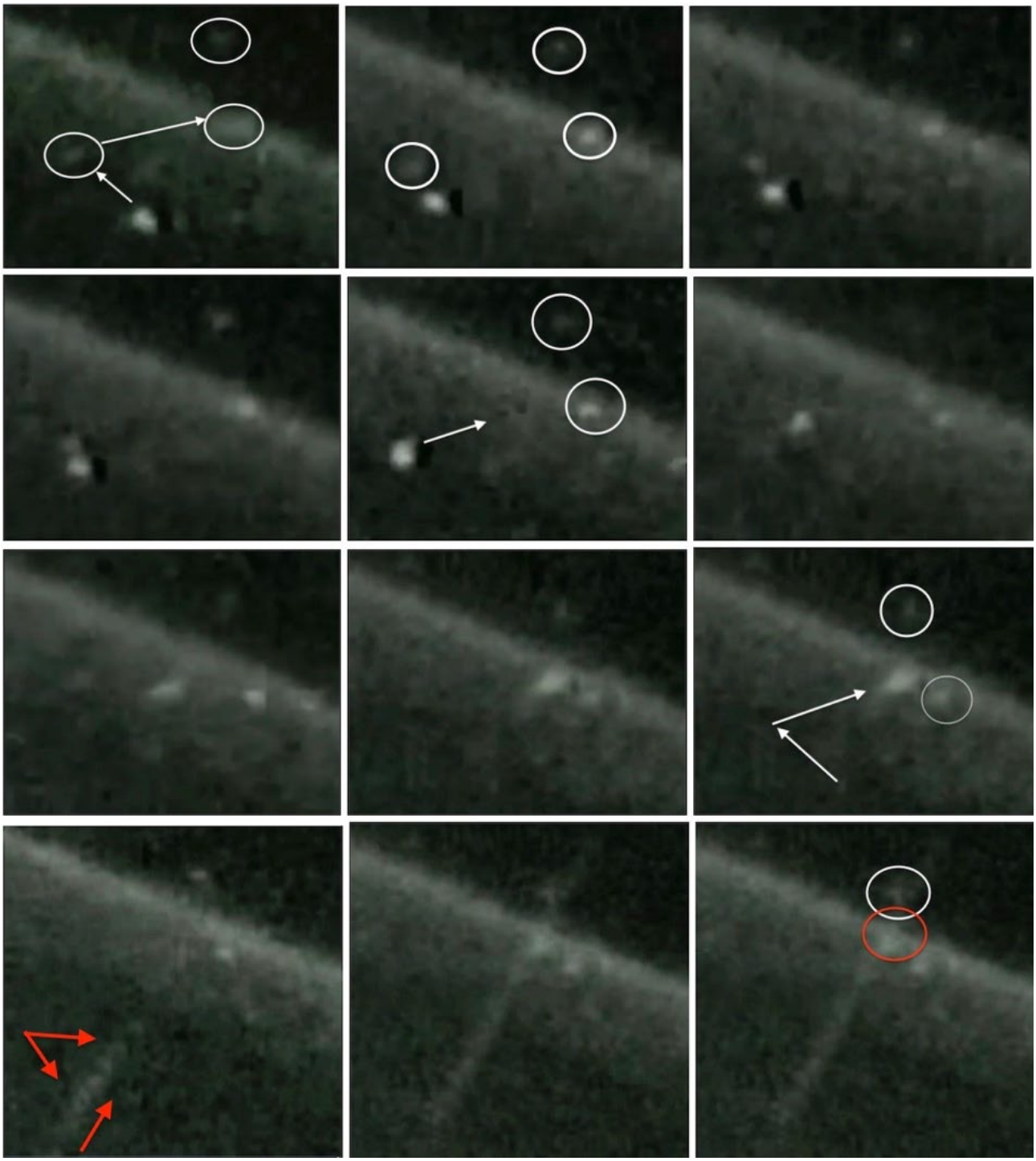


Figure 39. Plasma "Star Wars"? The hunter (red circle) strikes a plasma circled in white, made a 90-degree turn directed toward the other two plasmas circled in white. Suddenly a hyper-sonic streak pierces the plasmas circled in red and white [1]. Targeting, colliding, piercing, is a common plasmodic behavior; which, if viewed in the lower atmosphere, might be interpreted as spheres at battle. Unfortunately, if an aircraft is targeted, and a collision results, the result could be an inexplicable airline catastrophe.

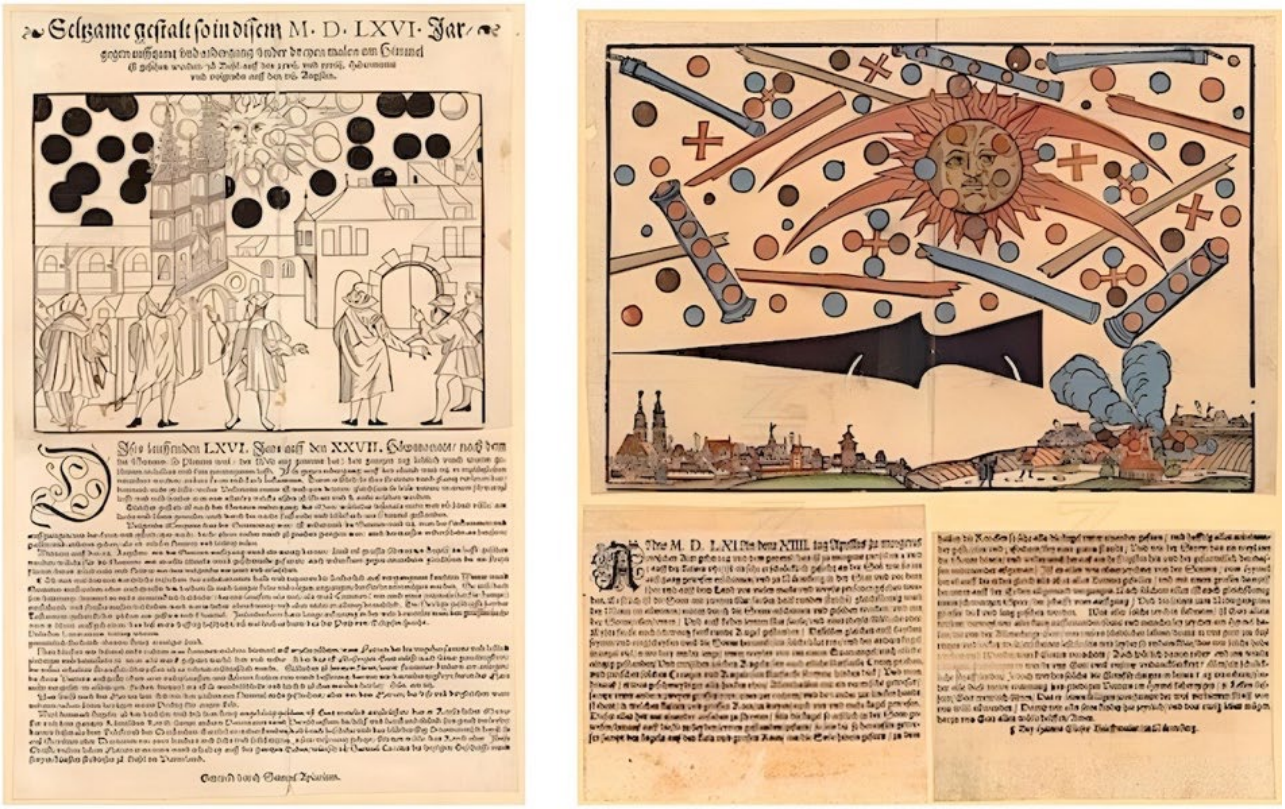


Figure 40. (Left) Woodcut and broadsheet: July, August,1566, red and black spheres appeared over the city of Basel and engaged in "battle". (Right) Woodcut and broadsheet: April 14, 1561 lightning, orbs and various forms appeared over Nuremberg and engaged in "battle". The bulbous "crosses" refer to orbs that merged. Our interpretation: Plasmodic collisions in the lower atmosphere.

20. Not All UAP Are Plasma?

As detailed in this article, it is reasonable to conclude that many of the inexplicable objects that have appeared in the sky over the centuries, are plasmas, targeting and colliding with one another, *i.e.* engaged in "battle" and "fight". This does not mean all UAP are plasma. What may be extraterrestrial spacecraft—but most likely plasmas—have been repeatedly observed by astronauts who refused to accept NASA's claims they are viewing "ice" or "reflections".

On May 15, 1963, while riding a Mercury capsule on his final orbit of a 22-orbit journey around the world, astronaut Gordon Cooper reported a "glowing, greenish object" that was "rapidly approaching". On June 4, 1965, astronauts Ed White and James McDivitt spotted a huge "metallic object" approaching their Gemini orbiter. Plasmas, however, have multiple colors and may look metallic. Some Gemini astronauts reported that their craft was surrounded by multiple objects that they identified as "bogeys" *i.e.* unidentified flying objects (UFOs). For example, in December of 1965, Gemini astronaut James Lovell reported a "Bogey at 10 o'clock high". Capcom: "This is Houston. Say again 7". Lovell: "We have a bogey at 10 o'clock high". Capcom: "Gemini 7, is that the booster, or is that an actual sighting?" Lovell: "We have several, actual sightings. We also have the booster in sight".

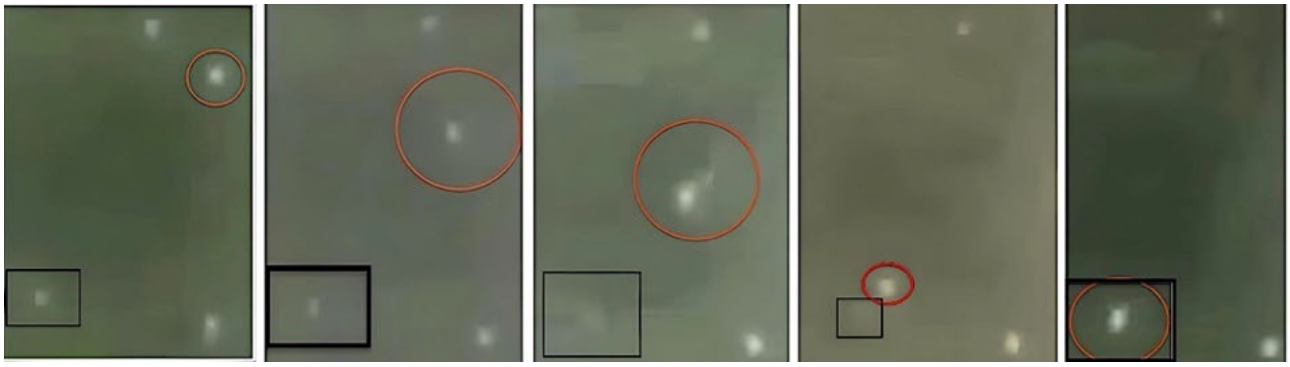


Figure 41. In this sequence, the Commander of STS 115 reported that a single object shaped like a "ring" (circled in Red) approached the space shuttle; and was followed by several others: "They're right in front of the orbiter". Eventually four pulsating forms appeared, three of which hovered, whereas the fourth (circled in Red) targeted the pulsating form in the black square. As Red Ring approached, the object in the black square ceased to illuminate in the seconds before impact. NASA's Mission control responded: "Okay we are seeing three or four objects; can you confirm its just the one that actually moving and the others are just reflections?" However, by now, the fourth object had disappeared, obscured by Red Circle; such that only three ring shaped forms remained. STS 115: "No, there are three objects, the one you see, you see two rings right there, they're the ones we had the late tallyho on. The one down at the bottom, that's the one we initially saw" [1].

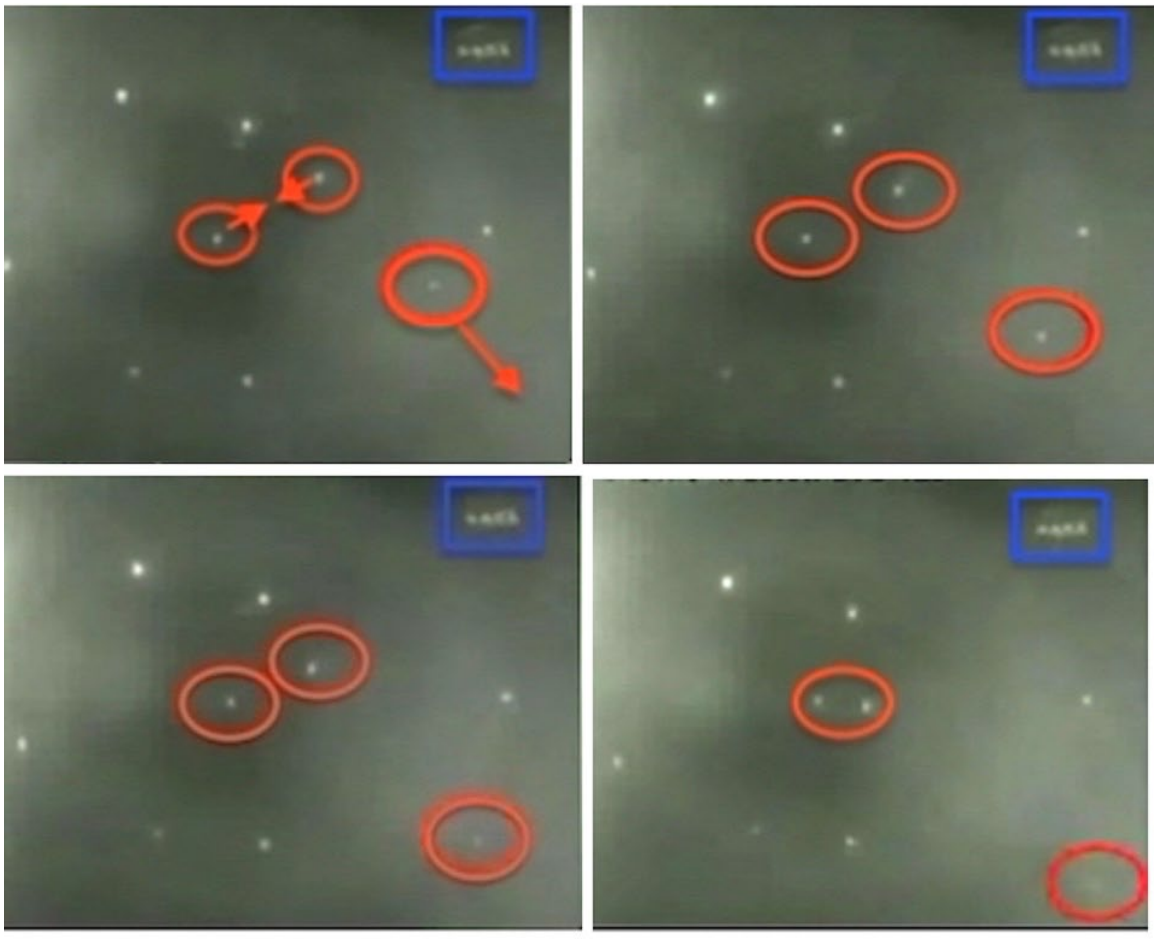


Figure 42. The commanders of STS 75 and STS 117 reported that multiple objects approached outside the windows moving about. "We tracked it through windows one, two, three, four—and now it's outside window five" [1]. This is noteworthy, as plasma can pass through windows. Note also how NASA's emblem (blue square) is obscured by "noise" and "snow".

The flight crew of Apollo 11—as reported by Buzz Aldrin in a 1982 interview—saw "something out there that was close enough to be observed by the three of us. It was very big, and coming closer, so we cautiously asked Houston about the final stage of the rocket, the S-IVB which had been jettisoned two days earlier". Apollo 11: "Do you have any idea where the S-IVB is with respect to us?" Mission Control: "Apollo 11, Houston. The S-IVB is about 6000 nautical miles from you now, over".

Commonly, plasmoids remain relatively motionless as others engage in a variety of actions; but may then suddenly move to a new location. In one instance, as reported here, a "luminescent", "brilliantly lighted" pulsating object was filmed following and approaching one of the space shuttles (**Figure 2**) but as it came closer NASA turned off the camera. In this later instance, complex filtering and magnification of the object indicated it had a cylindrical shape and its sheen is suggestive of some type of metal alloy. Plasmas, however, may also appear to have a cylindrical and even a triangular shape.

In yet another shuttle video dozens, if not hundreds of pulsating plasmas that had gathered over a thunderstorm (**Figure 10**, **Figure 44**), as two different NASA commentators misidentified first one then a second then a third glowing object as the MIR International Space Station indicating that each believed they were looking at a human-made craft. However, a close examination of these and surrounding optical phenomena indicates that the commentators were most likely looking at plasmas (**Figures 35-37**).

Unfortunately, as numerous glowing objects began swarming toward the last object mis-identified as the MIR, the camera operator changed from a close up to far field focus, thus obscuring all the action taken place. Thus, pulsating objects in the thermosphere have been misidentified as spacecraft and the MIR International Space Station; or, dismissed by NASA as ice or "just reflections". Consider, for example, when STS 75 filmed these things approaching and hovering near the shuttle (**Figure 35**) windows the commander dismissed NASA's explanation and instead insisted: "I'm looking out in front of the orbiter. No, there are three objects. The one down at the bottom is the one we initially saw... It started over window eight then quickly moved toward the upper windows. We tracked it through windows one, two, three, four—and now it's outside window five". And then Mission Control changed the subject [1]. Likewise, the commander of STS 123 [1], reported that multiple objects had approached and were hovering or approaching the shuttle widows (**Figure 35**).

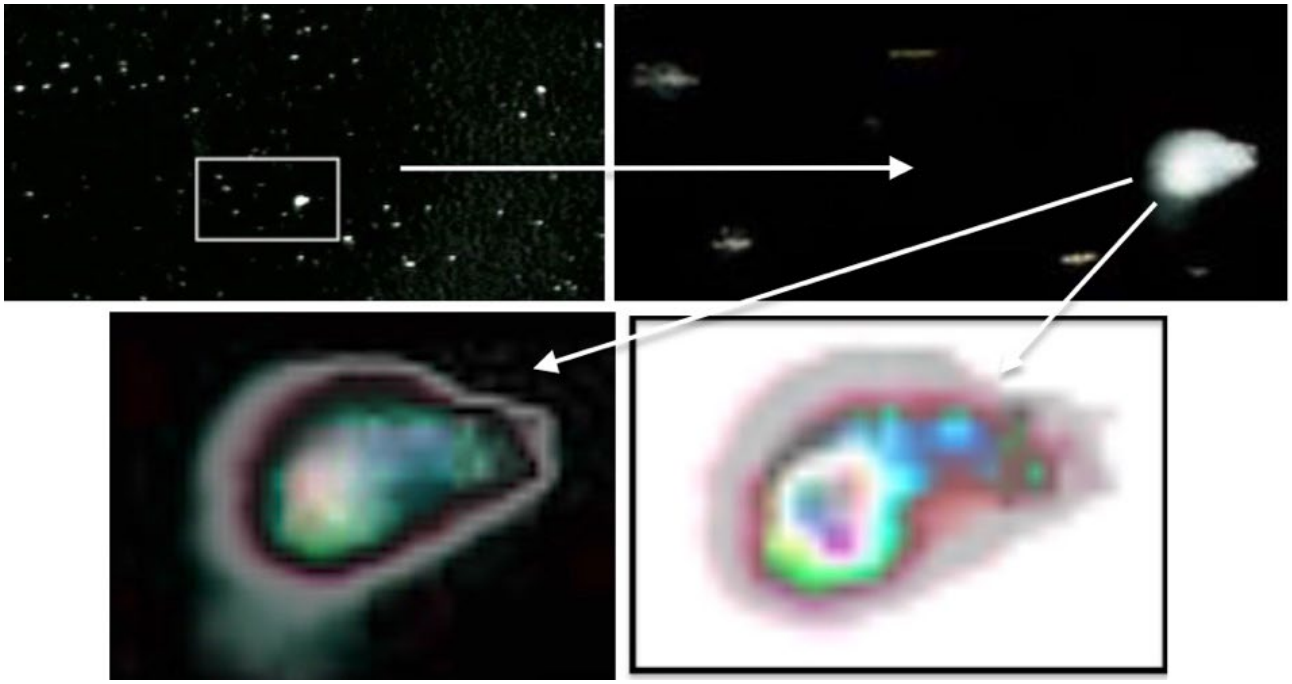


Figure 43. Freeze frame from 30 second NASA film sequence in which a female then a male NASA commentator at Mission Control thought they were looking at the MIR International Space Station, first identifying an object at the bottom left of the screen: "The MIR Space station is now visible on the far left hand side of the screen...", then the upper left of the screen, then this object at the center of the screen just as multiple small forms began streaking toward it, including a pulsating object coming from the upper right; at which point the camera operator shifted from a close up to a long field view making it impossible to observe the action taking place [1]. To visualize these internal features, Fotor Red, Blue, Green filters were employed to detect gray-value differences in pixels and enhance different gray-value spectra embedded in the film-photo. Via these filters the authors were able to define and colorize differing features and shapes within shapes within the outer and inner aspects of the specimens.

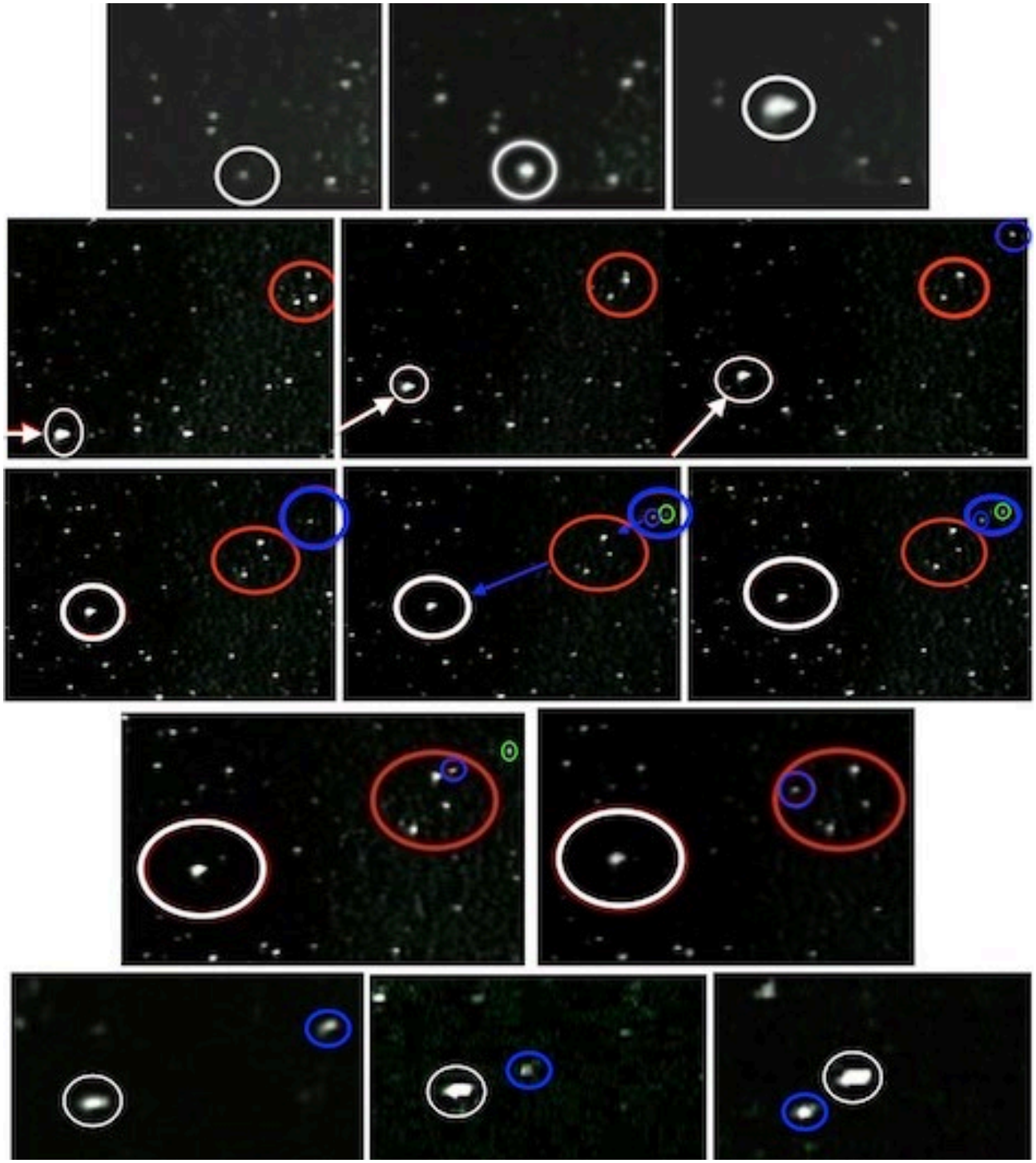


Figure 44. Freeze frame from 30 second NASA film sequence in which the pulsating object circled in white, was mis-identified as the MIR (after two other pulsating objects were mis-identified). This pulsating form suddenly materialized, then took the stereotypical cone-shape, and flew at a 45-degree angle. As it reached center of the screen the pulsating object coming from the upper right circled in blue began streaking toward it [1]. The blue object split in two leaving the form circled in green in its wake; then pierced another plasma, headed toward the cone-shaped form just as other smaller "hunters" began streaking toward the "cone". The camera operator then shifted from a close up to a long field view making it impossible to observe the action taking place. The bottom row is a 1600% magnification.

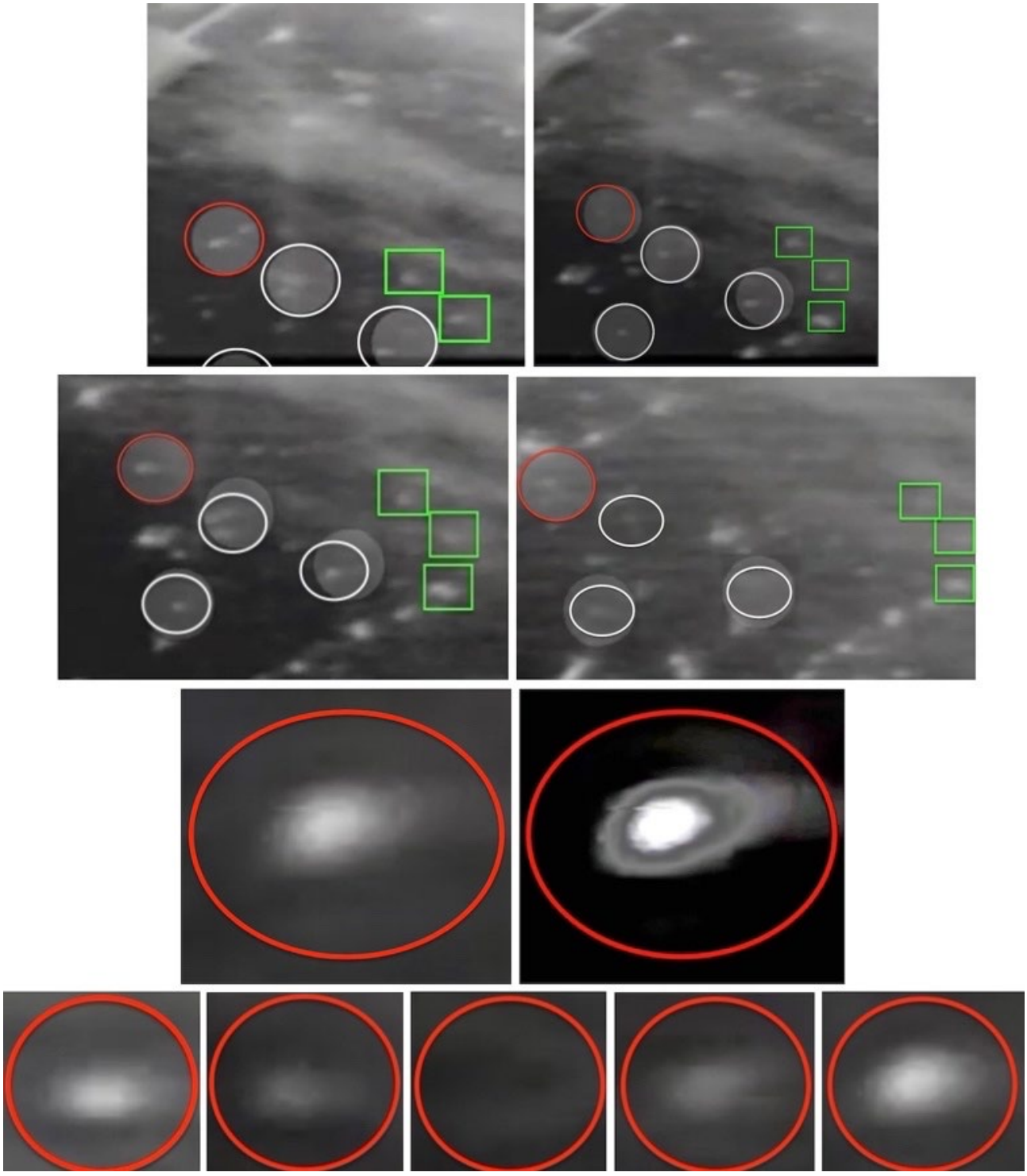


Figure 45. Christopher Mellon, former Deputy Assistant Secretary of Defense, has reported that "our military is encountering intelligently controlled solid objects invading restricted military aerospace, sometimes flying in formation". As depicted in this NASA space shuttle film footage [1], multiple pulsating objects emerged from hurricane Gordan, assumed a V-formation and began pacing the space shuttle. Bottom row indication of pulsating. Note: The cloud-shaped object would become completely dark, then glow, then fade to black, then glow. This black and white video (photos) should have crystal clarity but—like all nighttime space shuttle video—was contaminated with obscuring layers of rapidly alternating colors and white noise/snow after the video was received by NASA and before it was released to the public [1].

Figure 46. The U.S. Coast Guard photographer, Shell R. Alpert, took this photograph through a window screen showing three cloud-like formations over the "Winter Island" Salem, Massachusetts, Air Station at 9:35 a.m. on 16 July 1952. (Official U.S. Coast Guard photograph). The Air Station had radio radar and conducted sea rescues, and its facilities served amphibious helicopters and sea-planes. The weather and temperature at that time was between 88˚F to 91˚F with a dew point of 65 to 67.68 (muggy and lots of moisture in the air). According to the https://weather.gov/, "As a general rule, the surface dewpoint needs to be 55˚F or greater for a surface-based thunderstorm to occur". As can be seen from the photograph, the sky was dark and overcast—perfect weather for thunderstorms.

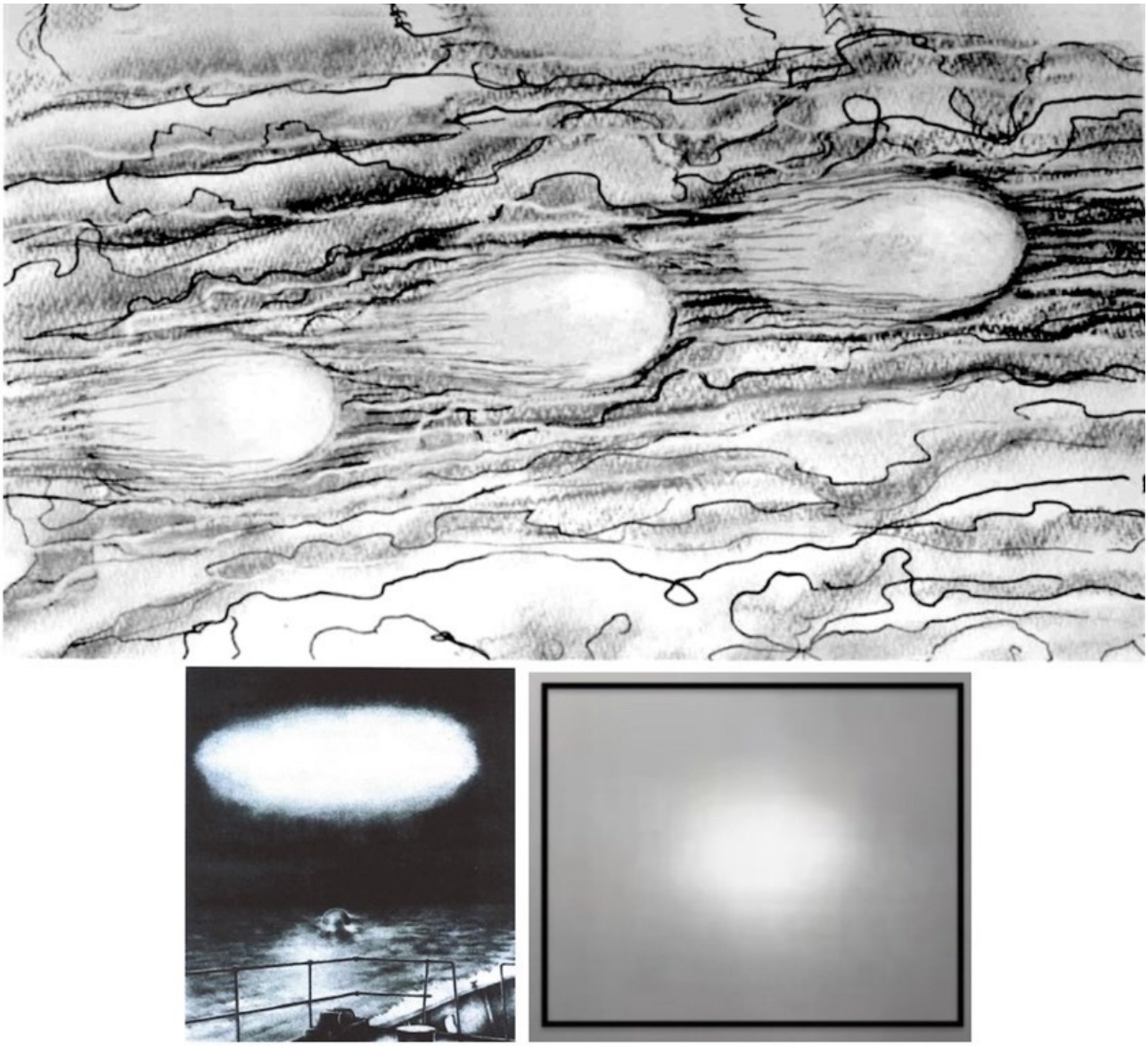


Figure 47. (Top) Sketch of three "blobs" of "brilliant white light" observed by Army Air Force crewman, Leonard Stringfield on August 28, 1945, during a flight in a C-46 "flying coffin" over the Pacific Ocean to Iwo Jima [51]. According to Stringfield as the three objects approached, the C-46 suddenly developed electrical problems and engine trouble, and began to lose altitude. Everyone on board thought they were going to die. Stringfield states that it is his belief "that the sudden erratic behavior of my plane was due to a mysterious force generated by the blobs" because when the "blobs" disappeared, the pilot was able to regain control over the plane. (Bottom left). Depiction of a 1962 luminous event off the bow of the ship "Kaiba Shiharo" near the coast of Brazil, and which was reported as a UFO. (Bottom right) A glowing pulsating cloud-like orb that ascended from a thunderstorm, heading upward toward a NASA space shuttle [1], and as it neared, NASA turned off the camera (see **Figure 23**).

21. Speculation: Are Plasmoids Sentient?

If the plasmas described in this report constitute a 4th domain of life and include those with intelligence is a subject of ongoing research by members of this research team who strongly favor that view [1] [31]. Arnold, who viewed nine of these flashing shape-shifting objects in 1947, believed they were sentient and alive. Astronauts have also reported that plasma-like entities have appeared outside windows,

often traveling from window to window [1]—as if looking inside and, in so doing, upsetting the crew—whereas those encountered in the troposphere display what could be construed as curiosity, e.g. "reconnoitering", surveillance, mimicry, "toying with", and so on [13] [40] [41] [49]-[54] [138]. Consider the incident when a glowing plasma entered through a cockpit window and slowly moved about the interior of the plane as if reconnoitering [49]; and another incident, reported by Navy Cmdr. David Fravor, where the specimen mirrored the movements of his jet fighter: "it was aware we were there".

To speculate: based solely on behavior (e.g. hunters, grazers, foragers, spectators) and our ongoing analysis [31]; *if* some plasmas are alive and sentient, then their level of intelligence (or consciousness) may approximate and range from that of algae to insects (insect societies, supra-organisms) to canines; albeit completely "alien". Conversely, the actions of some plasma may be based solely on electromagnetism, e.g. charge coupling (attraction) and separation (repulsion). If pure automata, then at best, these behaviors could be likened to a moth attracted to a flame; behavior that can be fatal when a plasma targets and collides with an aircraft, or enters through the cockpit windows.

Many of the plasmoids of the ionosphere have interior voids that could be likened to a nucleus [3]. Employing Fotor anti-blur, filters, and magnification up to 1600 times, glowing spheres have been detected within some of these entities (**Figure 1**, **Figure 7**, **Figure 8**, **Figure 21**, **Figure 29**, **Figure 45**, **Figure 49**), including a series of glowing spheres in a specimen with a serpentine shape. To *speculate*, these could be construed as ganglia connected to nerve nets (see **Figure 7**, **Figure 10**, **Figure 21**, **Figure 29**), *i.e.* neural networks, similar to the nervous system of planaria, the common earthworm, and insects (**Figure 48**).

Although provocative to consider, it has also been reported that "round glowing balls flared up inside" spiral and spherical plasmoids generated in a laboratory [30]. Therefore, these glowing orbs are additional evidence the specimens are plasmas; but if the orbs are ganglia is unknown. However, there is yet another explanation for the interior orbs: Plasmids.

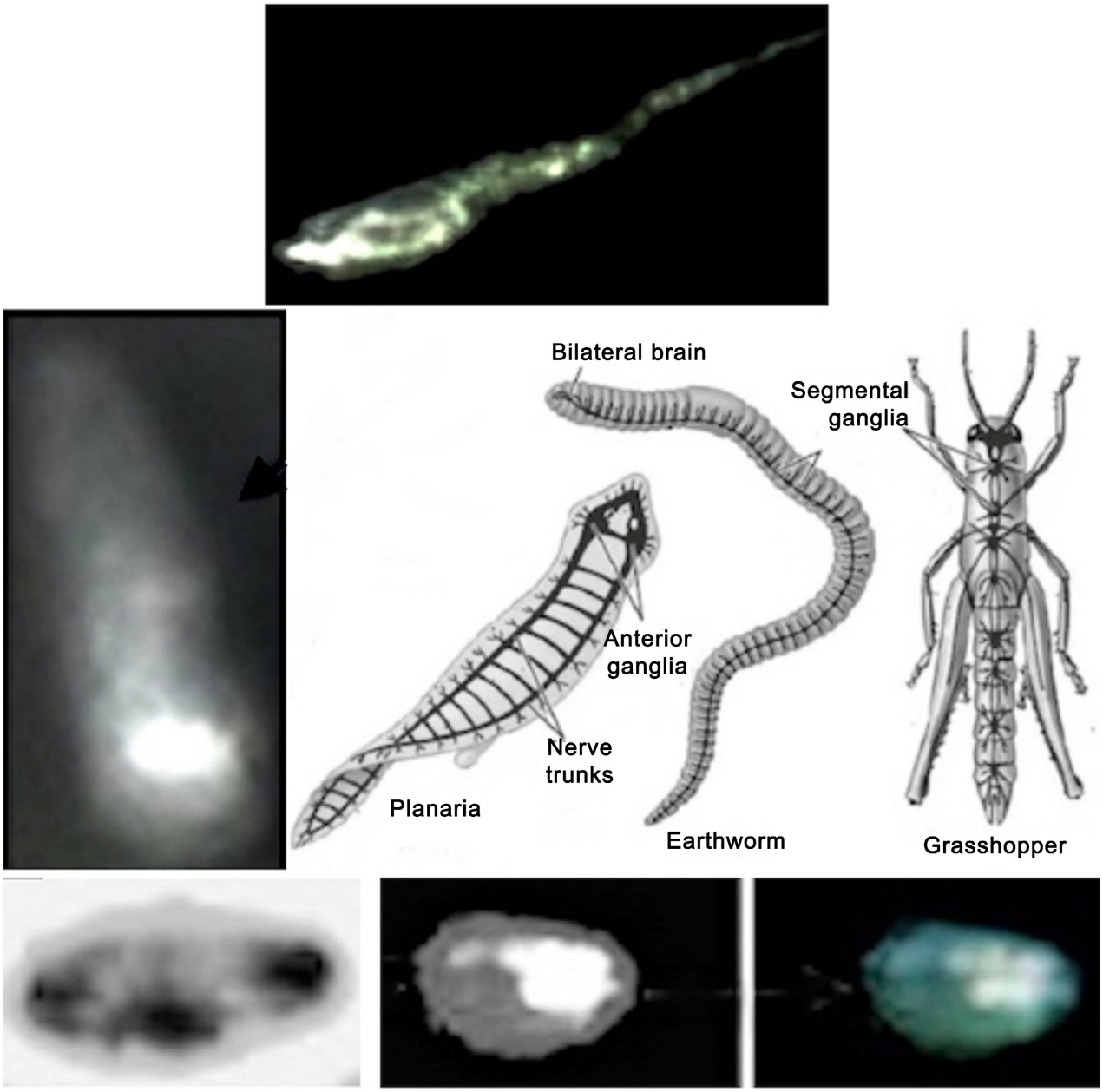


Figure 48. Comparing the nervous system of invertebrates (modified from Biocyclopedia) with the internal sphericals of plasmoids. Glowing spheres also appear in plasma generated experimentally, and may represent individual plasma clustered together but that resemble a composite cloud-shaped plasmoid (see **Figure 9**).

22. Speculation: Plasmids-Replicons: Evidence of Circular Extrachromosomal DNA Molecules?

A plasmid is a small, circular, double-stranded DNA molecule that can replicate and self-clone despite being distinct from a cell's chromosomal DNA [171]-[173]. Also referred to as "replicons" plasmids are capable of autonomous self-replication and can be transferred from host to host; referred to as "horizontal gene transfer". Although some cells are known to possess hundreds of plasmids—ranging in size from less than 1-kilobase pairs to huge megaplasmids of several megabase pairs—

other cells may only have one [172] [173]. Commonly found in bacteria and archaea, plasmids are known to encode for proteins that enable these organisms to survive in otherwise lethal environments [171].

As documented in this report, specimens believed to be plasmas—like experimentally generated plasmas—are capable of replication; one of which repeatedly split apart into additional plasmoids, and which, like the host, were found to contain circular structures. If these internal ovoid structures are plasmids, or balls of RNA/DNA, they would have to be at least meters in size.

It is well established that common elements in the known universe which are essential to life include hydrogen, oxygen, carbon, nitrogen, sulfur, calcium, and phosphorus [174]-[176]. Interplanetary dust is also carbon-rich and glycine (an RNA-base) and tryptophan (essential for protein formation) have been identified in the interstellar medium [175] [176]. Because all these gases and elements may combine and are continually irradiated by ions, they can generate small molecules. If they continue to combine and grow in size, is it possible that within the cellular confines of a plasma, they may become meters in size?

Plasmas are common in space and the ionosphere, which is permeated by dust and fragments of carbonaceous chondrites within which seventy-three extraterrestrial and nineteen terrestrial amino acids have so far been identified [174]-[176]. According to Alfvén [26] [27] plasmas contain cellular membranes; whereas plasma with a nucleus have been repeatedly observed [3]. Plasmas that incorporate this debris within their membranes are known as "dusty plasmas". Once exogenously incorporated into the confines of a dusty plasma membrane and nucleus, this molecular-protein-amino acid complex and the building blocks of nucleotides and other vital prebiotic molecules would be subject to ion chemistry as well as polarized radiation which induces asymmetric photochemistry leading to homochirality and the induction of chiral asymmetry which can produce an excess of L-amino acids [177] [178].

In combination with tryptophan (discovered in the Perseus Cloud star system), hydrogen, carbon, oxygen, nitrogen, cyanide, these amino acids, could form adenine which is an RNA-DNA base, as well as other nucleotides that could grow up to several centimeters within a dust-induced plasma void-nucleus, leading to electrically charged lattice- and corkscrew-shaped assemblies of nucleic and amino acids that produce enzymes and proteins within the nucleus [55]-[57]. This electrified combination could then begin catalyzing reactions leading to the generation of self-replicating RNA-like polymers and protein enzymes (polynucleotides) that resemble RNA but are chemically simpler and can act as a catalyst [3] [177] [178]. Oxygen and phosphorus could also ladder RNA-DNA base pairs together. In consequence, dusty plasmas may acquire RNA-like capabilities leading to the formation of plasmids, and thus a fourth domain of DNA-based life [3].

According to Tsytovich [55] of the Russian Academy of Science, "These complex, self-organized plasma structures exhibit all the necessary properties to qualify them as candidates for inorganic living matter". A number of scientists have in

fact argued that that the conditions necessary to generate living plasma are common in space; and that plasma may be a common extraterrestrial form of life [1]-[3] [46] [55]-[58] [177]. If this scenario has validity, plasma may be the source for the origin of life; and this would imply that every gaseous Earth-like planet would likely harbor plasmas that could generate life—including planets that formed and where life evolved billions of years before Earth was formed [177]-[181].

However, it must be emphasized that experimentally produced plasmas have not been found to contain any of the precursors to the formation of a single nucleotide. If those internal spherical forms are plasmids—or what their function might be—or if they represent mini-plasmas joined together, or represent the "birth" and generation of additional plasma, or consist of internalized plasmas within plasmas (**Figure 8**, **Figure 9**), is unknown.

23. A Fourth Domain of Life?

An examination of the sample of freeze frames presented in this document, established that plasmoids engage in complex behaviors, *i.e.* turning, following, targeting, colliding, merging, coupled with shape-shifting. Of course, it is important to avoid anthropomorphizing what may be purely electromagnetic push pull and representative of Descartes' concept of "automata". According to Descartes, all animals are automata—no different from machines—only humans are non-automata, because humans have a soul. Descartes, however, never disputed the fact that animal-automata are alive. Further, it is well established that social animals, be they insects or humans engage in complex behaviors.

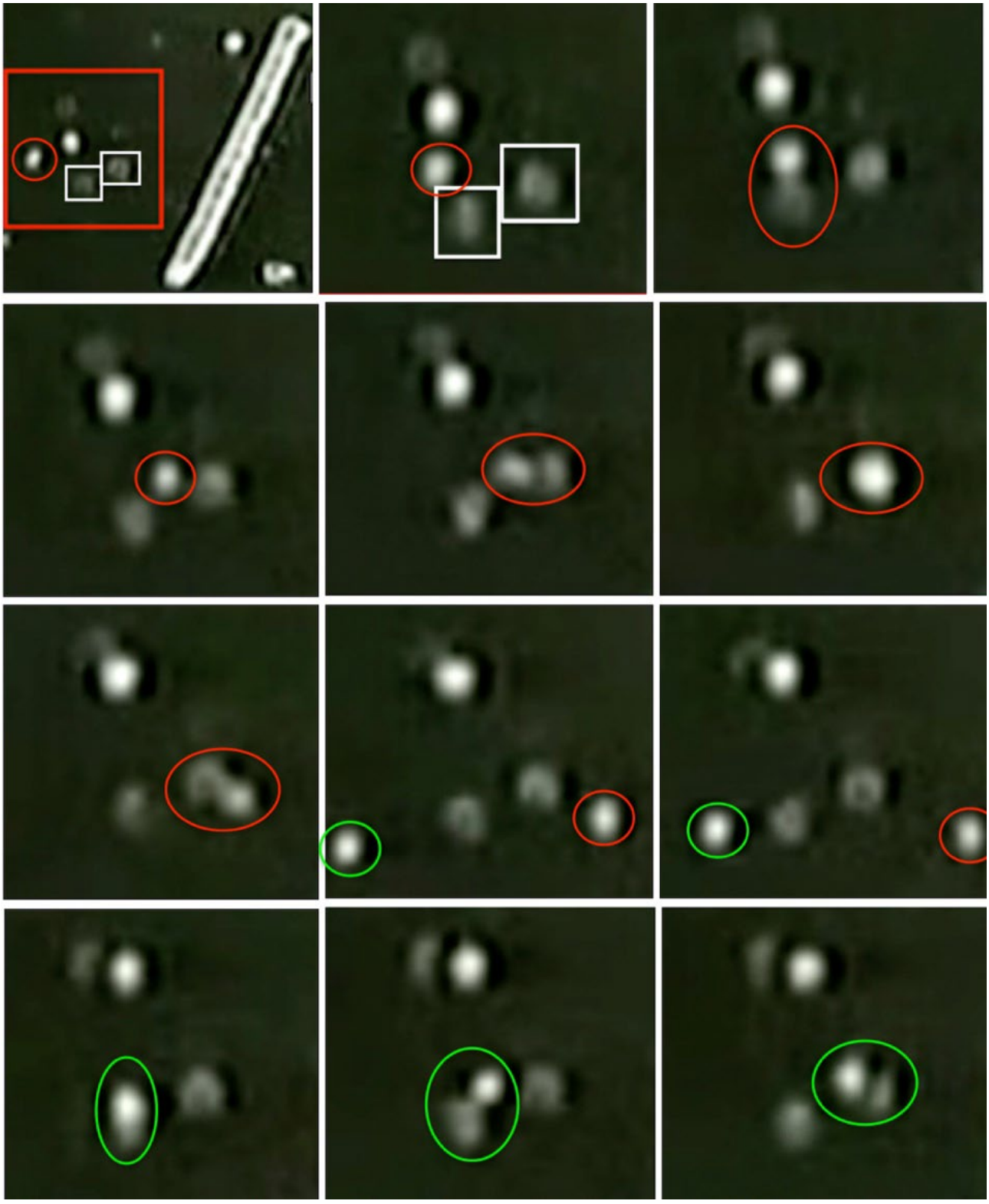
Admittedly, collisionality may be push-pull, a consequence of differing or changing electric charges. However, consider, for example, **Figure 16(A)** and **Figure 16(B)**. Plasma #1 travels upward, intersects with a plasma #2 as hyper-velocity plasma (hunters) speeds by. Then, another plasma, #3 materializes or suddenly self-illuminates, changes shape, follows plasma #1, intersects the same #2 plasma, then passes close to #1, and continues upward and finally hovers in place as plasma #1 ejects a plasma #4. Plasma #4 travels toward and interacts with #3, who heads back toward and merges with #1.

This is not an isolated case, but a sample of repeated instances of plasmas splitting or ejecting additional plasmas that also engage in complex interactions [31]. Consider **Figure 8**, which provides striking evidence that what were two plasmas became three, *i.e.* one of the plasmas ejected or secreted another plasmas which interacts with another plasma before separating completely and hovering in place.

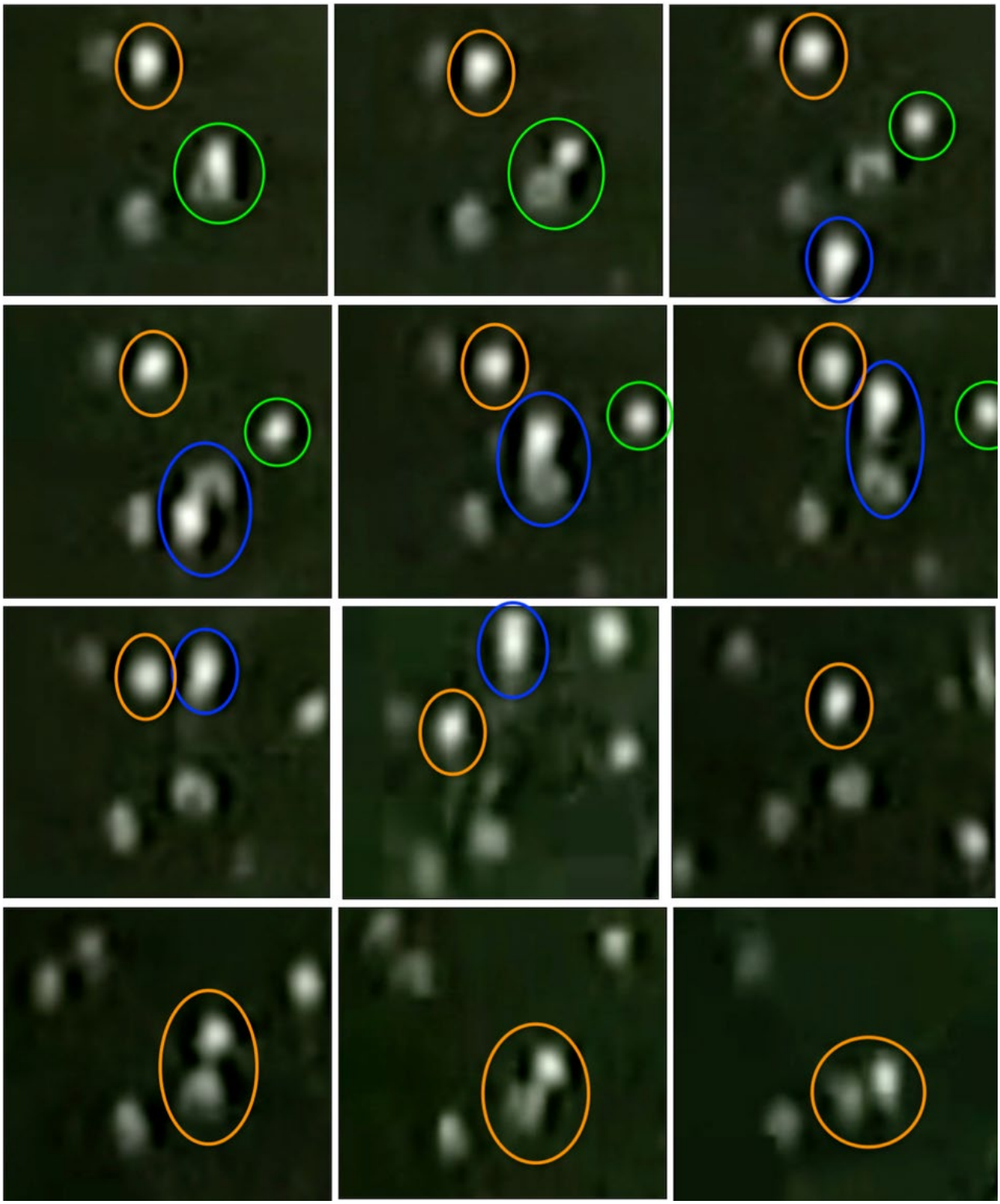
And all this ties in with the photos of the plasma conglomerates—multiple plasma that form what looks like one composite cloud-like plasma. And yet, although plasma conglomerates may explain shape shifting and what appears to be splitting and the formation of additional plasma, it cannot account for the complex interactions.

Consider **Figure 48**, in which four nucleated plasmoids, coming from different directions and traveling at different velocities, intersect a single non-nucleated

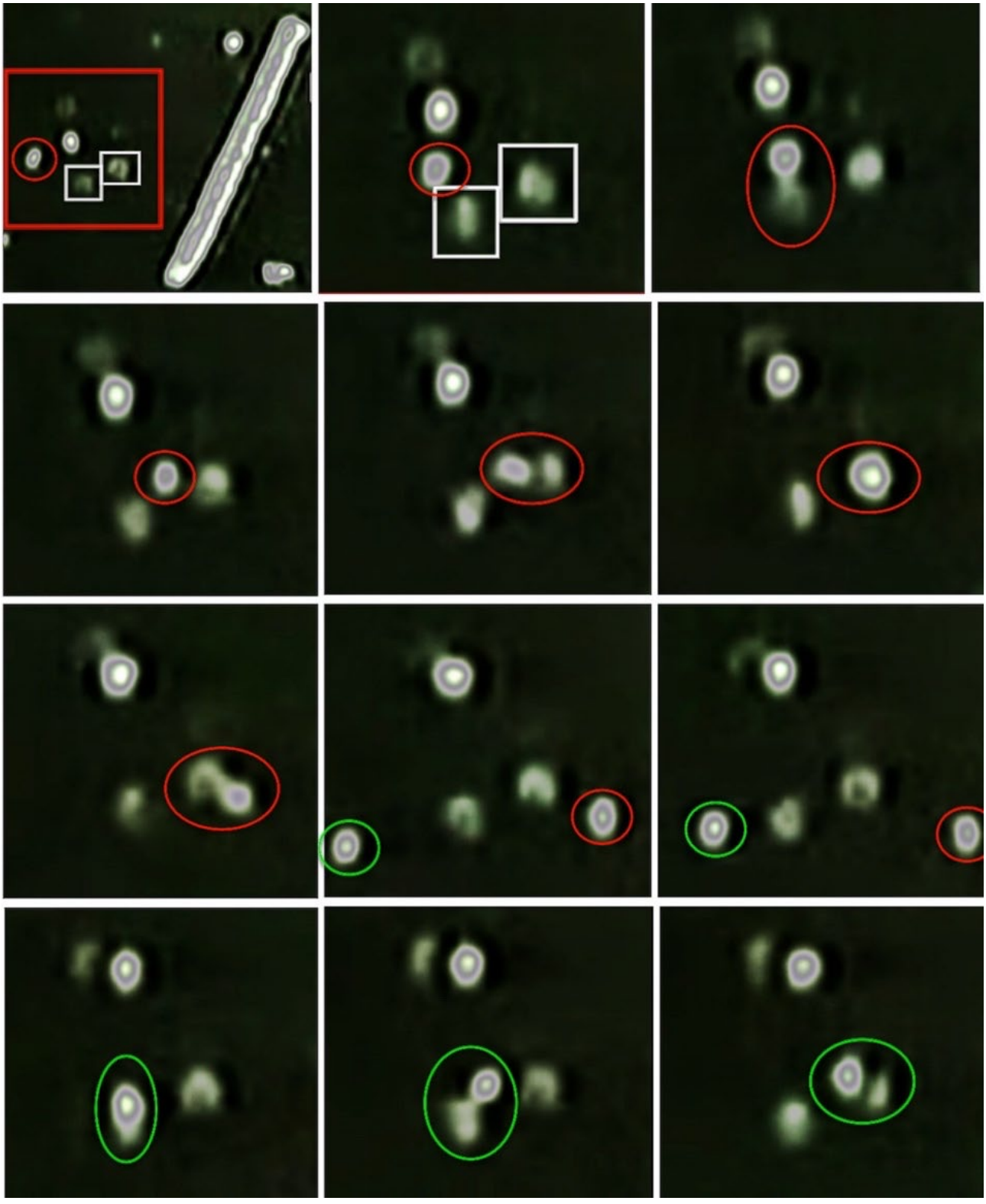
plasmoid that merely hovers in place. These behaviors were captured in less than 20 seconds of NASA space shuttle footage; and this implies that dozens, or even hundreds of nucleated plasmas may have intersected that single plasmoid. Moreover, this can't be considered an isolated incident. There are numerous examples of waiting, hovering plasmoids which are struck and pierced by different plasmas [1] as can also be viewed in **Figure 16(A)** and **Figure 16(B)**. Then there are plasmas that after intersecting other plasmoids, turns and follows yet another plasmoid which ejects a satellite plasmoid that contacts the new pursuer which turns around. What are we to make of these complex interactions that resemble complex, purposeful social behaviors? Three of the authors of this report (Joseph, Armstrong, Schild) believe these plasmoids are alive, have achieved consciousness, and represent a fourth domain of life [31]. But then what looks like purposeful behavior and complex social interactions leads us back to the dangers of anthropomorphizing.



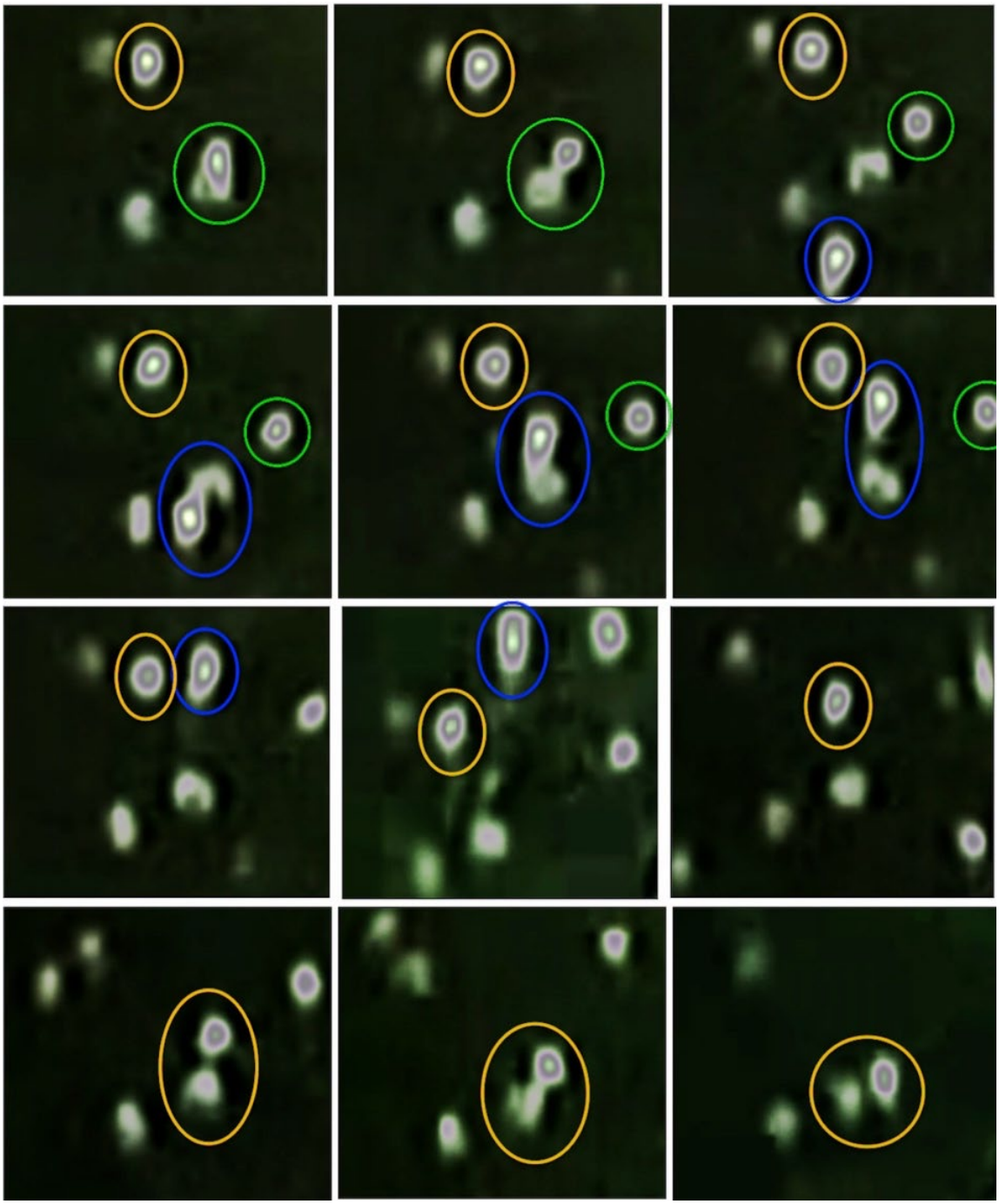
(A)



(B)



(C)



(D)

Figure 49. (A) Four different plasmoids (circled in red, green, blue, and orange) intersect the same specimens (framed in white). First, the plasma in red traveling downward from the top, then the plasmoid in green coming upward from the left bottom side of the image. (B) Four plasmoids interest the same plasmoid. First, the plasmoid in red, then the specimen in green (A), then a plasmoid moving upward from the bottom of the image (circled in blue), and finally the specimen circled in orange and that had hovered in place until finally contacting the target. (C) Four different plasmoids (circled in red, green, blue, and orange) intersect the same specimen (framed in white). Note that the "hunters" are nucleated. The target plasmoid is devoid of a nucleus. Processed via Fotor Filters. (D) Four different plasmoids (circled in red, green, blue, and orange) intersect the same specimen (framed in white). First then Red, then the Green, Blue, and finally the Orange. Note that the "hunters" are nucleated. The target plasmoid is devoid of a nucleus. Processed via Fotor Filters.

24. Conclusions

The term "extraterrestrial" is derived from the Latin words terrestris ("earthly" or "land") and extra, which is derived from exter ("outside", "outwards", "beyond"). Thus, by definition, "extraterrestrial" refers to any object or being that was not born on or does not live upon or is not characteristic of objects or life on this planet, but lives or originates outward from Earth. The upper atmosphere, by definition, including and especially the ionosphere and plasmasphere, is outward from Earth and directly affected by cosmic rays that originate outside this system, and which may contribute to the formation of plasmas which in turn may originate in, or journey to the ionosphere from other planets.

For example, Earth's GEC can be considered a paradigm for planetary electricity for every planet with a gaseous atmosphere and where lightning is commonplace, e.g. Jupiter and Saturn. It is therefore reasonable to suspect that plasmoids also dwell in the upper atmosphere of these two gas giants, where thunderstorms are common.

On Earth, Jupiter, Saturn, and presumably all gaseous planets with atmospheres, electric charges are generated by cosmic rays, ultraviolet radiation, and by friction, bolide impacts, as well as by cloud charging, volcanism, and dust. Lightning is common on Jupiter and Saturn and is thought to originate from water clouds deep in their atmospheres, with temperatures ~300 K [182], where water is likely to exist in more than one phase. For Jupiter and Saturn, the outermost cloud layer consists of ammonia (NH_3) ice particles, which is followed by an intermediate ammonium hydrosulfide cloud layer (NH_4SH) and a deep-water cloud (H_2O) layer [183].

Lightning is a plasma that attracts and produces plasmas. Lightning was associated with Jupiter by the ancient Greeks and Romans, and detected optically with the camera on-board Voyager 1 [184], and by Voyager 2 as well as by the Galileo [185]. The Voyager plasma wave instrument also detected lightning whistlers in Jupiter's magnetosphere [186]. It is reasonable to assume, therefore, that plasmas, similar to those discussed in this report, also swim in the atmospheric seas of Jupiter and Saturn.

We believe that plasmoids that arrive in the thermosphere from locations unknown should be described as "extraterrestrial". We also believe that plasma that has descended into the lower atmosphere has been observed for thousands of years and that plasmoids account for many, but not all observations of UAP, including those believed to have "battled" over cities in the recent and ancient past.

As detailed in this report and the supplementary 17-minute video compilation of NASA space shuttle video [1], thousands of self-illuminating, pulsating plasmoids have been filmed in the ionosphere-thermosphere approaching, surrounding and congregating around space shuttles, satellites, the MIR and thunderstorms; and those that descended into thunderstorms and the lower atmosphere may have been filmed by U.S. Navy personnel and U.S. Coast Guard and Customs including those observed above and diving/sinking beneath the ocean surface. Plasmoids can

accelerate to hypersonic speed and engage in complex behaviors. They travel at different velocities from different directions, often making 90 to 180-degree turns, as well as slowing down, speeding up, and following, targeting then colliding, intersecting and piercing other plasmas, as well as swarming toward and congregating above and descending into thunderstorms and the lower atmosphere, which is the air corridor favored by commercial and military aircraft. Plasmas can pass through glass, plastic, metal, and enter the cockpits of airplanes and have been observed by astronauts inside spacecraft, the MIR and ISS.

Transient plasmas can negatively affect electronics and mental activity, and may trigger hallucinations and nightmares, including those later recalled as "alien abductions". Once they descend into thunderstorms and the lower atmosphere, given their propensity to track and collide, this may account for the numerous reports of UAPs following, harassing, chasing, and "toying with" aircraft beginning before, during and after World War II, and the association between increases in both UAP sightings and unexplained aircraft disasters.

The ionosphere and the troposphere have a positive charge, and the ocean surface under white water and turbulent conditions also develops a positive charge, and this may explain the frequent sightings of UAP in the lower atmosphere and soaring above and diving into the oceans, including, as reported here, a shape-shifting UAP filmed by a U.S. Customs and Border Protection DHC-8.

It is noteworthy that five glowing objects flew in formation over Los Angeles in 1942. Four cloud-shaped objects resembling plasmoids in a V-like formation were also photographed over Winter Island in Salem Massachusetts. Pulsating objects in a V-formation have also been filmed pacing one of the space shuttles. Objects (UAP) flying in formation have been repeatedly observed on numerous occasions, have harassed military jets and installations and have engaged in what Navy and Pentagon officials suspect is best described as surveillance.

Flying in formation suggests intelligent control and coordinated actions. Are plasmoids intelligent, or were these V-flying objects space craft from other worlds? Lending itself to the latter possibility, as documented in this report, a pulsating object followed and approached a space shuttle, but as it drew closer, NASA turned off the camera [1]. Why? Why add four layers of noise to nighttime film? Filtering of freeze frame photographs of the object as it approached, revealed a cylindrical form that has a metallic sheen (**Figure 2**). However, plasmas can also look metallic.

Although these electromagnetic entities engage in behaviors that seem purposeful, and which may represent curiosity—such as appearing outside space shuttle windows—as if looking inside—or materializing inside a cockpit and then slowly traversing (surveying?) the aircraft—one must be careful not to anthropomorphize what may be push-pull electromagnetic activity. On the other hand, the dominant energy that fuels the human brain is electromagnetic.

Another caveat: We have referred to these easily observed entities as "plasmas" and "plasmoids" to distinguish them from the "unknown", where it has been

impossible to determine what is being viewed. Unfortunately, NASA added four layers of visual noise to nighttime shuttle films and turned off the camera when anything life-like or that might be interpreted as a "UFO" (AKA alien spacecraft) came into view [1], thereby making it extremely difficult to perform detailed analysis. Therefore, based on the evidence NASA has made available [1], our best guess is that these are "plasmas" [1]-[3] AKA "plasmoids" albeit, with the understanding there are numerous subtypes that engage in different behaviors.

Are plasmoids alive? Do they represent a fourth domain of life? Do different subtypes of "plasmoids" belong to a fifth, sixth, or seventh domain of "alien" life? As reviewed here and as based on additional research [31], the evidence supports the hypothesis that plasmoids may have provided the composite basis for the origin of RNA, followed by DNA, and thus: life [3]; and that plasmoids in the thermosphere are sentient, aware and have consciousness [31].

If this latter theory proves true, then since plasmoids likely dwell in the upper atmosphere of every gaseous planet, it can be predicted that plasmas may have spawned life on innumerable worlds, including those that formed billions of years before Earth. If this latter proposition proves true, then life would have likely evolved in innumerable worlds, even reaching the level of modern Earthly humans, billions of years ago [177]-[181] [187] [188]. Might some of the UAP/UFO observed over the centuries include craft and machines manufactured by hyper-technologically advanced races of beings that evolved in ancient Earth-like worlds? Hard evidence, photographed by NASA on Mars—albeit at present, unconfirmed—favors that view [60].

In conclusion, given the evidence presented in this and other reports [1]-[3], it is highly likely that plasmas and "plasmoids" account for many of the encounters with and observations of UAP over the centuries, including those observed flying above cities and diving beneath the sea. Plasmoids, however, cannot account for all UAP sightings, at least some of which may be extraterrestrial spacecraft from other worlds.

Acknowledgements

Robert Powell of the Scientific Coalition for UAP studies provided the authors with the 3-minute video of the Aguadilla, Puerto Rico UAPs filmed by U.S. Customs Border Protection.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Joseph, R. (2024) Video: Extraterrestrial Fourth Domain of Life: UFO, UAP, Plasma. Official NASA Films. https://www.researchgate.net/publication/383410701

[2] Joseph, R. (2012) Evidence for Extraterrestrial Extremophiles in the ThermoSphere. Structures Movement Patterns Indicative of Biology Observed 200 Miles above Earth. *Journal of Cosmology*, **25**, 1-22.

[3] Joseph, R., Impey, C., Planchon, O., Gaudio, R.D., Safa, M.A., Sumanarathna, A.R., *et al.* (2024) Extraterrestrial Life in the Thermosphere: Plasmas, UAP, Pre-Life, Fourth State of Matter. *Journal of Modern Physics*, **15**, 322-376. https://doi.org/10.4236/jmp.2024.153015

[4] Williams, E.R. (2009) The Global Electrical Circuit: A Review. *Atmospheric Research*, **91**, 140-152. https://doi.org/10.1016/j.atmosres.2008.05.018

[5] Stolzenburg, M. and Marshall, T.C. (2008) Charge Structure and Dynamics in Thunderstorms. In: Leblanc, F., *et al.*, Eds., *Planetary Atmospheric Electricity*, Springer, 355-372. https://doi.org/10.1007/978-0-387-87664-1_23

[6] Simpson, G.C. and Wright, C.S. (1911) Atmospheric Electricity over the Ocean. *Proceedings of the Royal Society A*, **85**, 175-199.

[7] Adlerman, E.J. and Williams, E.R. (1996) Seasonal Variation of the Global Electrical Circuit. *Journal of Geophysical Research*: *Atmospheres*, **101**, 29679-29688. https://doi.org/10.1029/96jd01547

[8] Chalmers, J.A. (1967) Atmospheric Electricity. 2nd Edition, Pergamon, 42.

[9] Takagi, M. and Toriyama, N. (1978) Short-Period Fluctuations in the Atmospheric Electric Field over the Ocean. *Pure and Applied Geophysics*, **116**, 1089-1100. https://doi.org/10.1007/bf00874673

[10] Blanchard, D.C. (1963) The Electrification of the Atmosphere by Particles from Bubbles in the Sea. *Progress in Oceanography*, **1**, 73-202. https://doi.org/10.1016/0079-6611(63)90004-1

[11] Boerner, H. (2019) Ball Lightning. Springer.

[12] Stansfield, W.D. (2006) The Ball Lightning Conundrum. *Skeptic*, **12**, 50-55. https://digitalcommons.calpoly.edu/bio_fac/28/

[13] Nikitin, I.A. (2024) Ball Lightning and Unidentified Flying Objects (UFOs). *Physics & Astronomy International Journal*, **8**, 65-72. https://doi.org/10.15406/paij.2024.08.00332

[14] Bloecher, T. (1967) Report on the UFO Wave of 1947. National Investigations Committee on Aerial Phenomena.

[15] Mavrakis, D. (2023) Reliability of UFO Witness Testimony in Extreme Close Encounters: "Abductees" & "Contactees" in Reliability of UFO Witness Testimony. UPIAR.

[16] Bychkov, V.L., Nikitin, A.I., Ivanenko, I.P., Nikitina, T.F., Velichko, A.M. and Nosikov, I.A. (2016) Ball Lightning Passage through a Glass without Breaking It. *Journal of Atmospheric and Solar-Terrestrial Physics*, **150**, 69-76. https://doi.org/10.1016/j.jastp.2016.10.018

[17] Fedosin, S.G. and Kim, A.S. (2001) The Physical Theory of Ball Lightning. *Applied Physics* (*Russian Journal*), No. 1, 69-87.

[18] Bychkov, V.L. and Nikitin, A.I. (2014) Ball Lightning: A New Step in Understanding. In: Bychkov, V.L., Golubkov, G.V. and Nikitin, A.I., Eds., *The Atmosphere and Ionosphere*, Springer International Publishing, 201-367. https://doi.org/10.1007/978-3-319-05239-7_4

[19] NASA (1960) Apollo 11 Technical Crew Debriefing July 31, 1960. NASA Mission Operation Branch Flight Crew Support Division.

[20] Pinsky, L.S., Osborne, W.Z., Bailey, J.V., Benson, R.E. and Thompson, L.F. (1974) Light Flashes Observed by Astronauts on Apollo 11 through Apollo 17. *Science*, **183**, 957-959. https://doi.org/10.1126/science.183.4128.957

[21] Pinsky, L.S., Osborne, W.Z., Hoffman, R.A. and Bailey, J.V. (1975) Light Flashes

Observed by Astronauts on Skylab 4. *Science*, **188**, 928-930. https://doi.org/10.1126/science.188.4191.928

[22] Fuglesan, C., *et al.* (2006) Phosphenes in Low Earth Orbit. Survey Responses from 59 Astronauts. *Aviation, Space, and Environmental Medicine*, **77**, 449-452.

[23] Beckers, J., *et al.* (2023) Physics and Applications of Dusty Plasmas: The Perspectives 2023. *Physics of Plasma*, **30**, Article ID: 120601.

[24] Mikikian, M., Couëdel, L., Cavarroc, M., Tessier, Y. and Boufendi, L. (2007) Self-Excited Void Instability in Dusty Plasmas: Plasma and Dust Cloud Dynamics during the Heartbeat Instability. *New Journal of Physics*, **9**, 268-268. https://doi.org/10.1088/1367-2630/9/8/268

[25] Verheest, F. (2000) Waves in Dusty Space Plasmas. Kluwer Academic.

[26] Alfvén, H. (1981) Cellular Structure of Space (Section VI.13.1). Cosmic Plasma.

[27] Alfven, H.O.G. (1990) Cosmology in the Plasma Universe: An Introductory Exposition. *IEEE Transactions on Plasma Science*, **18**, 5-10. https://doi.org/10.1109/27.45495

[28] Boulos, M.I., Fauchias, P.L. and Pfender, E. (2023) The Plasma State. In: Boulos, M.I., Fauchais, P.L. and Pfender, E., Eds., *Handbook of Thermal Plasmas*, Springer, 3-55. https://doi.org/10.1007/978-3-030-84936-8 s

[29] Chian, A.C., Borotto, F.A., Hada, T., Miranda, R.A., Muñoz, P.R. and Rempel, E.L. (2022) Nonlinear Dynamics in Space Plasma Turbulence: Temporal Stochastic Chaos. *Reviews of Modern Plasma Physics*, **6**, Article No. 34. https://doi.org/10.1007/s41614-022-00095-z

[30] Kim, D.C., Semenov, A.S., Efimov, V.A. and Bebikhov, Y.V. (2020). Installation for Studying the Laboratory Analog of Ball Lightning. 2020 *International Multi-Conference on Industrial Engineering and Modern Technologies* (*FarEastCon*), Vladivostok, 6-9 October 2020, 1-7. https://doi.org/10.1109/fareastcon50210.2020.9271597

[31] Joseph, R. (2024) Quantum Physics of Plasma Plasmoid Consciousness, Fourth Domain of Life. How Consciousness Became the Universe. (Under Review)

[32] Office of the Director of National Intelligence (2021) Preliminary Assessment: Unidentified Aerial Phenomena. U.S. Government Printing Office.

[33] Office of the Director of National Intelligence (2022) Assessment: Unidentified Aerial Phenomena. U.S. Government Printing Office.

[34] Office of the Director of National Intelligence (2023) Unidentified Aerial Phenomena. U.S. Government Printing Office.

[35] Kelley, M.C. (2009) The Earth's Ionosphere: Plasma Physics and Electrodynamics (International Geophysics, Volume 96). Academic Press.

[36] Schunk, R. and Nagy, A. (2009). Ionospheres: Physics, Plasma Physics, and Chemistry (Cambridge Atmospheric and Space Science Series). Cambridge University Press. https://doi.org/10.1017/cbo9780511635342

[37] Canepa, F., Burlando, M. and Solari, G. (2020) Vertical Profile Characteristics of Thunderstorm Outflows. *Journal of Wind Engineering and Industrial Aerodynamics*, **206**, Article ID: 104332. https://doi.org/10.1016/j.jweia.2020.104332

[38] Young, T.M. (2017) Performance of the Jet Transport Airplane: Analysis Methods, Flight Operations and Regulations. Wiley. https://doi.org/10.1002/9781118534786

[39] Belobaba, P., Odoni, A. and Barhart, C. (2015) The Global Airline Industry (Aerospace Series). 2nd Edition, Wiley.

[40] Wichman, H. (1971) A Scientist in the Cockpit: The Case History and Analysis of a

UFO Sighting. *Space Life Sciences*, **3**, 165-170. https://doi.org/10.1007/bf00927990

[41] Joseph, R. (2017) When UFOs Attacked Los Angeles—Are Extraterrestrials Spying on Earth? *Journal of Cosmology*, **17**, 47-63.

[42] Arnold, K. (1952) The Coming of the Saucers. CreateSpace Publishing.

[43] Schneiter, F. (1955) Eerie Blue Lights Said Live Thing. La Grande Observer, 1.

[44] Arnold, K. (1962) Interview with Kenneth Arnold. *Flying Saucer Magazine*.

[45] British Ministry of Defense (2006) Unidentified Aerial Phenomena (UAP) in the UK Air Defence Region. Scientific Technical Memorandum, 55/2/00. Ministry of Defense, Defense Intelligence Staff.

[46] Joseph, R. (2012) Biological UFOs II, Hunters, Predators, Electromagnetic Extremophiles. Evidence from NASA. http://www.youtube.com/watch?v=darciic4pcw

[47] Stenhoff, M. (1999) Ball Lightning—An Unsolved Problem in Atmospheric Physics. Kluwer, 109-122.

[48] Mason, H. (1997) Bright Skys. Silent Fireballs. *Nexus Magazine*.

[49] Heil, W. and Smith, D. (2021) An Initiation of Ball Lightning in an Aircraft. *Journal of Atmospheric and Solar-Terrestrial Physics*, **225**, Article ID: 105758. https://doi.org/10.1016/j.jastp.2021.105758

[50] Beaty, D., Munger, S. and Labadie, C. (2022) Navy Witnesses Describe 2004 Encounter with UAP Aboard the USS Ronald Reagan. https://thedebrief.org/

[51] Stringfield, L.H. (1957) Inside Saucer Post... 3-0 Blue. CRIFO.

[52] New York Times (1944) Floating Mystery Ball Is New Nazi Air Weapon. *New York Times*.

[53] Stars and Stripes (1945) Men Who See em Say Foo-Fighters Can't Be Phooed. *Stars Stripes Magazine*.

[54] American Legion Magazine (1945) The Foo Fighter Mystery. *American Legion Magazine*.

[55] Tsytovich, V.N. (2015) Perspectives of Experimental and Theoretical Studies of Self-Organized Dust Structures in Complex Plasmas under Microgravity Conditions. *Physics-Uspekhi*, **58**, 150-166. https://doi.org/10.3367/ufne.0185.201502c.0161

[56] Ivan, L., Gaman, M., Aflori, C., Mihai-Plugaru, M., *et al.* (2004) Experimental Investigation of Multiple Self-Organized Structures in Plasma. *Romanian Journal of Physics*, **50**, 1089-1094.

[57] Teodorani, M. (2022) The Impact of Physical Sciences on the Study of Unidentified Aerial Phenomena (UAP) in Extraterrestrial Intelligence. Cambridge Scholars Publishing.

[58] Lozneanu, E. and Sanduloviciu, M. (2003) Minimal-Cell System Created in Laboratory by Self-Organization. *Chaos, Solitons & Fractals*, **18**, 335-343. https://doi.org/10.1016/s0960-0779(02)00662-8

[59] Lazcano, A. and Bada, J. (2004) The 1953 Stanley L. Miller Experiment: Fifty Years of Prebiotic Organic Chemistry. *Origins of Life and Evolution of Biospheres*, **33**, 235-242.

[60] Joseph, R. and Schild, R. (2023) Mars: Humanoids, Bodies, Bones, Skulls, UFOs, UAPs. *Journal of Astrophysics and Aerospace Technology*, **11**, 1-48.

[61] Dinick, J. (2021, August 29) Navy Pilots Recall "Unsettling" 2004 UAP Sighting. CBS News. https://www.cbsnews.com/news/navy-ufo-sighting-60-minutes-2021-08-29

[62] Carey, T.J. (2019, June 1) UFO Secrets inside Wright-Patterson: Eyewitness Accounts from the Real Area 51. New Page Books.

[63] Shmatov, M.L. (2020) Possible Detection of Visible Light and Γ Rays from a Swarm of Ball Lightning. *Physical Review E*, **102**, Article ID: 013208. https://doi.org/10.1103/physreve.102.013208

[64] Rubtsov, A.V., Nosé, M., Matsuoka, A., Kasahara, Y., Kumamoto, A., Tsuchiya, F., *et al*. (2023) Plasmasphere Control of ULF Wave Distribution at Different Geomagnetic Conditions. *Journal of Geophysical Research*: *Space Physics*, **128**, e2023JA031675. https://doi.org/10.1029/2023ja031675

[65] Ripoll, J., Thaller, S.A., Hartley, D.P., Cunningham, G.S., Pierrard, V., Kurth, W.S., *et al*. (2022) Statistics and Empirical Models of the Plasmasphere Boundaries from the Van Allen Probes for Radiation Belt Physics. *Geophysical Research Letters*, **49**, e2022GL101402. https://doi.org/10.1029/2022gl101402

[66] Gallagher, D.L., Comfort, R.H., Katus, R.M., Sandel, B.R., Fung, S.F. and Adrian, M.L. (2021) The Breathing Plasmasphere: Erosion and Refilling. *Journal of Geophysical Research*: *Space Physics*, **126**, e2020JA028727. https://doi.org/10.1029/2020ja028727

[67] Walsh, B.M., Foster, J.C., Erickson, P.J. and Sibeck, D.G. (2014) Simultaneous Ground- and Space-Based Observations of the Plasmaspheric Plume and Reconnection. *Science*, **343**, 1122-1125. https://doi.org/10.1126/science.1247212

[68] Rycroft, M.J. (2010) The Plasma and Radiation Environment in Earth Orbit. In: Blockley, R. and Shyy, W., Eds., *Encyclopedia of Aerospace Engineering*, Wiley, eae323.

[69] Rycroft, M.J. and Harrison, R.G. (2011) Electromagnetic Atmosphere-Plasma Coupling: The Global Atmospheric Electric Circuit. *Space Science Reviews*, **168**, 363-384. https://doi.org/10.1007/s11214-011-9830-8

[70] Rycroft, M.J., Nicoll, K.A., Aplin, K.L. and Giles Harrison, R. (2012) Recent Advances in Global Electric Circuit Coupling between the Space Environment and the Troposphere. *Journal of Atmospheric and Solar-Terrestrial Physics*, **90**, 198-211. https://doi.org/10.1016/j.jastp.2012.03.015

[71] Chatterjee, R. (2022) Fundamental Concepts and Discussion of Plasma Physics. *Techno Review Journal of Technology and Management*, **2**, 1-14. https://doi.org/10.31305/trjtm2022.v02.n01.001

[72] Piel, A. (2017) Plasma Physics: An Introduction to Laboratory, Space, and Fusion Plasmas. Springer.

[73] Miao, H. and Shi, H. (2022) Theoretical Progress and the State-of-Art Models for Plasma Quantization. *Highlights in Science, Engineering and Technology*, **5**, 166-172. https://doi.org/10.54097/hset.v5i.738

[74] Marino, R. and Sorriso-Valvo, L. (2023) Scaling Laws for the Energy Transfer in Space Plasma Turbulence. *Physics Reports*, **1006**, 1-144. https://doi.org/10.1016/j.physrep.2022.12.001

[75] Gurnett, D.A. and Bhattacharjee, A. (2017) Introduction to Plasma Physics: With Space, Laboratory and Astrophysical Applications. Cambridge University Press. https://doi.org/10.1017/9781139226059

[76] Lowke, J.J., Heil, W., Tam, E. and Murphy, A.B. (2021) Toward a Theory of Ball Lightning Occurring in Houses and Aircraft. *Journal of Atmospheric and Solar-Terrestrial Physics*, **214**, Article ID: 105532. https://doi.org/10.1016/j.jastp.2020.105532

[77] Verma, N., C. Sarkar, S., K. Tiwari, P. and Parmar, K.P.S. (2022) Stimulation of Waves and Instabilities in Response to Irradiation of Electromagnetic Fields into Plasmas. *Majlesi Journal of Electrical Engineering*, **16**, 75-83. https://doi.org/10.52547/mjee.16.1.75

[78] Bakhmetieva, N.V. and Grigoriev, G.I. (2022) Study of the Mesosphere and Lower

Thermosphere by the Method of Creating Artificial Periodic Irregularities of the Ionospheric Plasma. *Atmosphere*, **13**, Article 1346. https://doi.org/10.3390/atmos13091346

[79] Yang, X., Liu, Y., Lin, Y., Zhou, C. and Zhao, Z. (2023) Simulation of Electron Density Disturbance in the Lower Ionosphere Caused by Thundercloud Electrostatic Fields. *Atmosphere*, **14**, Article 444. https://doi.org/10.3390/atmos14030444

[80] van Huijstee, J.C.A., Blom, P. and Beckers, J. (2023) Position Dependent Microparticle Charge in a Spatiotemporal Afterglow Plasma. *Physics of Plasmas*, **30**, Article ID: 033704. https://doi.org/10.1063/5.0139815

[81] Tian, R., Liang, Y., Hao, S., Feng, J., Jiang, X., Li, H., *et al.* (2023) Simulation of DC Glow Discharge Plasma with Free-Moving Dust Particles in the Radial Direction. *Plasma Science and Technology*, **25**, Article ID: 095401. https://doi.org/10.1088/2058-6272/acc44a

[82] Shoucri, M., Pohn, E., Knorr, G., Bertrand, P., Kamelander, G., Manfredi, G., *et al.* (2000) Charge Separation at a Plasma Edge in the Presence of a Density Gradient. *Physics of Plasmas*, **7**, 2517-2525. https://doi.org/10.1063/1.874091

[83] Boyd, T.J.M. and Sanderson, J.J. (2003) The Physics of Plasmas. Cambridge University Press. https://doi.org/10.1017/cbo9780511755750

[84] Afraimovich, E.L., Astafieva, E.I., Voeykov, S.V., Tsegmed, B., Potekhin, A.P. and Rasson, J.L. (2006) An Investigation of the Correlation between Ionospheric and Geomagnetic Variations Using Data from the GPS and INTERMAGNET Networks. *Advances in Space Research*, **38**, 2332-2336. https://doi.org/10.1016/j.asr.2006.01.012

[85] Afraimovich, E.L., Kosogorov, E.A., Lesyuta, O.S., Ushakov, I.I. and Yakovets, A.F. (2001) Geomagnetic Control of the Spectrum of Traveling Ionospheric Disturbances Based on Data from a Global GPS Network. *Annales Geophysicae*, **19**, 723-731. https://doi.org/10.5194/angeo-19-723-2001

[86] Lowrie, W. (2007) Fundamentals of Geophysics. 2nd Edition, Cambridge University Press. https://doi.org/10.1017/cbo9780511807107

[87] Pulkkinen, T. (2007) Space Weather: Terrestrial Perspective. *Living Reviews in Solar Physics*, **4**, Article No. 1. https://doi.org/10.12942/lrsp-2007-1

[88] Harrison, R.G., Aplin, K.L., Leblanc, F. and Yair, Y. (2008) Planetary Atmospheric Electricity. *Space Science Reviews*, **137**, 5-10. https://doi.org/10.1007/s11214-008-9419-z

[89] Bazilevskaya, G.A. (2008) Cosmic Ray Induced Ion Production in the Atmosphere. *Space Science Reviews*, **137**, 149-173.

[90] Usoskin, I.G., Marsh, N., Kovaltsov, G.A., Mursula, K. and Gladysheva, O.G. (2004) Latitudinal Dependence of Low Cloud Amount on Cosmic Ray Induced Ionization. *Geophysical Research Letters*, **31**, L16109. https://doi.org/10.1029/2004gl019507

[91] Boeck, W.L., Vaughan, O.H., Blakeslee, R.J., Vonnegut, B. and Brook, M. (1998) The Role of the Space Shuttle Videotapes in the Discovery of Sprites, Jets and Elves. *Journal of Atmospheric and Solar-Terrestrial Physics*, **60**, 669-677. https://doi.org/10.1016/s1364-6826(98)00025-x

[92] Surkov, V.V. and Hayakawa, M. (2020) Progress in the Study of Transient Luminous and Atmospheric Events: A Review. *Surveys in Geophysics*, **41**, 1101-1142. https://doi.org/10.1007/s10712-020-09597-2

[93] Williams, E.R. (2001) Sprites, Elves, and Glow Discharge Tubes. *Physics Today*, **54**, 41-47. https://doi.org/10.1063/1.1428435

[94] Price, C. and Rind, D. (1992) A Simple Lightning Parameterization for Calculating

Global Lightning Distributions. *Journal of Geophysical Research*: *Atmospheres*, **97**, 9919-9933. https://doi.org/10.1029/92jd00719

[95] Price, C. and Rind, D. (1993) What Determines the Cloud-to-Ground Lightning Fraction in Thunderstorms? *Geophysical Research Letters*, **20**, 463-466. https://doi.org/10.1029/93gl00226

[96] Rycroft, M.J. and Odzimek, A. (2010) Effects of Lightning and Sprites on the Ionospheric Potential, and Threshold Effects on Sprite Initiation, Obtained Using an Analog Model of the Global Atmospheric Electric Circuit. *Journal of Geophysical Research*: *Space Physics*, **115**, A00E37. https://doi.org/10.1029/2009ja014758

[97] Odzimek, A., Lester, M. and Kubicki, M. (2010) EGATEC: A New High-Resolution Engineering Model of the Global Atmospheric Electric Circuit—Currents in the Lower Atmosphere. *Journal of Geophysical Research*: *Atmospheres*, **115**, D18207. https://doi.org/10.1029/2009jd013341

[98] Liu, C., Williams, E.R., Zipser, E.J. and Burns, G. (2010) Diurnal Variations of Global Thunderstorms and Electrified Shower Clouds and Their Contribution to the Global Electrical Circuit. *Journal of the Atmospheric Sciences*, **67**, 309-323. https://doi.org/10.1175/2009jas3248.1

[99] Singh, C., Mohapatra, M., Bandyopadhyay, B.K. and Tyagi, A. (2011) Thunderstorm Climatology over Northeast and Adjoining East India. *Mausam*, **62**, 163-170. https://doi.org/10.54302/mausam.v62i2.278

[100] Saunders, C. (2008) Charge Generation and Separation Charge Separation Mechanisms in Clouds. *Space Science Reviews*, **137**, 1-4.

[101] Vishnu, R. (2012) Experimental Detection of Convective Thundercloud Formation: An Investigation to Understand the Formation of Thunderclouds in a Region of High Lightning Incidencem. LAMBERT Academic Publishing.

[102] Zarka, P., Farrell, W., Fischer, G. and Konovalenko, A. (2008) Ground-Based and Space-Based Radio Observations of Planetary Lightning. *Space Science Reviews*, **137**, 257-269. https://doi.org/10.1007/s11214-008-9366-8

[103] Surkov, V.V. and Hayakawa, M. (2010) Schumann Resonances Excitation Due to Positive and Negative Cloud-to-Ground Lightning. *Journal of Geophysical Research*: *Atmospheres*, **115**, D04101. https://doi.org/10.1029/2009jd012539

[104] Harrison, R.G., Aplin, K.L., Leblanc, F. and Yair, Y. (2008) Planetary Atmospheric Electricity. *Space Science Reviews*, **137**, 5-10. https://doi.org/10.1007/s11214-008-9419-z

[105] Rafferty, J.P. (2010) Storms, Violent Winds, and Earth's Atmosphere (Dynamic Earth). Britannica Educational Pub.

[106] Marshak, S. and RRauber, R. (2017) Earth Science: The Earth, the Atmosphere, and Space. WW Norton.

[107] Davydenko, S.S., Mareev, E.A., Marshall, T.C. and Stolzenburg, M. (2004) On the Calculation of Electric Fields and Currents of Mesoscale Convective Systems. *Journal of Geophysical Research*: *Atmospheres*, **109**, D11103. https://doi.org/10.1029/2003jd003832

[108] Liu, C., Cecil, D.J., Zipser, E.J., Kronfeld, K. and Robertson, R. (2012) Relationships between Lightning Flash Rates and Radar Reflectivity Vertical Structures in Thunderstorms over the Tropics and Subtropics. *Journal of Geophysical Research*: *Atmospheres*, **117**, D06212. https://doi.org/10.1029/2011jd017123

[109] Harrison, R.G., Nicoll, K.A., Mareev, E., Slyunyaev, N. and Rycroft, M.J. (2020) Extensive Layer Clouds in the Global Electric Circuit: Their Effects on Vertical Charge Distribution

and Storage. *Proceedings of the Royal Society A*: *Mathematical, Physical and Engineering Sciences*, **476**, Article ID: 20190758. https://doi.org/10.1098/rspa.2019.0758

[110] Al-Saady, M.T.M. (2022) Climate Change and Its Reflection on the Frequency of Lightning. *Journal of Positive Psychology and Wellbeing*, **6**, 93-108.

[111] Christian, H.J., Blakeslee, R.J., Boccippio, D.J., Boeck, W.L., Buechler, D.E., Driscoll, K.T., *et al.* (2003) Global Frequency and Distribution of Lightning as Observed from Space by the Optical Transient Detector. *Journal of Geophysical Research*: *Atmospheres*, **108**, ACL 4-1-ACL 4-15. https://doi.org/10.1029/2002jd002347

[112] Gurnett, D.A., Kurth, W.S., Kirchner, D.L., Hospodarsky, G.B., Averkamp, T.F., Zarka, P., *et al.* (2004) The Cassini Radio and Plasma Wave Investigation. *Space Science Reviews*, **114**, 395-463. https://doi.org/10.1007/s11214-004-1434-0

[113] Williams, E.R. and Heckman, S.J. (1993) The Local Diurnal Variation of Cloud Electrification and the Global Diurnal Variation of Negative Charge on the Earth. *Journal of Geophysical Research*: *Atmospheres*, **98**, 5221-5234. https://doi.org/10.1029/92jd02642

[114] Simões, F., Pfaff, R., Berthelier, J. and Klenzing, J. (2011) A Review of Low Frequency Electromagnetic Wave Phenomena Related to Tropospheric-Ionospheric Coupling Mechanisms. *Space Science Reviews*, **168**, 551-593. https://doi.org/10.1007/s11214-011-9854-0

[115] NASA. Thunder. http://thunder.msfc.nasa.gov/

[116] Williams, E. and Stanfill, S. (2002) The Physical Origin of the Land-Ocean Contrast in Lightning Activity. *Comptes Rendus. Physique*, **3**, 1277-1292. https://doi.org/10.1016/s1631-0705(02)01407-x

[117] Bychkov, V.L., Nikitin, A.I. and Dijkhuis, G.C. (2010) Ball Lightning Investigations. In: Bychkov, V., Golubkov, G. and Nikitin, A., Eds., *Physics of Earth and Space Environments*, Springer, 201-373. https://doi.org/10.1007/978-90-481-3212-6_6

[118] Füllekrug, M., Mareev, E.A. and Rycroft, M.J. (2006) Sprites, Elves and Intense Lightning Discharges. Springer.

[119] Su, H.T., Hsu, R.R., Chen, A.B., Wang, Y.C., Hsiao, W.S., Lai, W.C., *et al.* (2003) Gigantic Jets between a Thundercloud and the Ionosphere. *Nature*, **423**, 974-976. https://doi.org/10.1038/nature01759

[120] Yair, Y., Israelevich, P., Devir, A.D., Moalem, M., Price, C., Joseph, J.H., *et al.* (2004) New Observations of Sprites from the Space Shuttle. *Journal of Geophysical Research*: *Atmospheres*, **109**, D15201. https://doi.org/10.1029/2003jd004497

[121] Blanc, E., Farges, T., Roche, R., Brebion, D., Hua, T., Labarthe, A., *et al.* (2004) Nadir Observations of Sprites from the International Space Station. *Journal of Geophysical Research*: *Space Physics*, **109**, A02306. https://doi.org/10.1029/2003ja009972

[122] Inan, U.S., Barrington-Leigh, C., Hansen, S., Glukhov, V.S., Bell, T.F. and Rairden, R. (1997) Rapid Lateral Expansion of Optical Luminosity in Lightning-Induced Ionospheric Flashes Referred to as "Elves". *Geophysical Research Letters*, **24**, 583-586. https://doi.org/10.1029/97gl00404

[123] Mishin, E.V. and Milikh, G.M. (2008) Blue Jets: Upward Lightning. *Space Science Reviews*, **137**, 473-488. https://doi.org/10.1007/s11214-008-9346-z

[124] Pasko, V.P. (2010) Recent Advances in Theory of Transient Luminous Events. *Journal of Geophysical Research*: *Space Physics*, **115**, A00E35. https://doi.org/10.1029/2009ja014860

[125] Parrot, M., Berthelier, J.J., Lebreton, J.P., Treumann, R. and Rauch, J.L. (2008) DEMETER Observations of EM Emissions Related to Thunderstorms. *Space Science*

Reviews, **137**, 511-519. https://doi.org/10.1007/s11214-008-9347-y

[126] Chum, J., Jiricek, F., Santolik, O., Parrot, M., Diendorfer, G. and Fiser, J. (2006) Assigning the Causative Lightning to the Whistlers Observed on Satellites. *Annales Geophysicae*, **24**, 2921-2929. https://doi.org/10.5194/angeo-24-2921-2006

[127] Oreshko, A. and Oreshko, A. (2021) Ball Lightning as Source of High-Energy Particles When It Enters a Dense Medium. *Journal of High Energy Physics, Gravitation and Cosmology*, **7**, 1484-1502. https://doi.org/10.4236/jhepgc.2021.74091

[128] Mason, H. (1997) Fireball Explosions…. Orbital UFOs… the Downing of TWA Flight 800 Nexus Magazine June-July 1997 PART 4 & 5 of 6. *Nexus Magazine*.

[129] Uri, J. (2022) 60 Years Ago: John Glenn, the First American to Orbit Earth Aboard Friendship 7. https://roundupreads.jsc.nasa.gov/roundup/1863

[130] Hata, M., Oshiman, N., Yoshimura, R., Tanaka, Y. and Uyeshima, M. (2015) Three-Dimensional Electromagnetic Imaging of Upwelling Fluids in the Kyushu Subduction Zone, Japan. *Journal of Geophysical Research*: *Solid Earth*, **120**, 1-17. https://doi.org/10.1002/2014jb011336

[131] Mather, T.A. and Harrison, R.G. (2006) Electrification of Volcanic Plumes. *Surveys in Geophysics*, **27**, 387-432. https://doi.org/10.1007/s10712-006-9007-2

[132] Mather, T.A., Harrison, R.G. and Martin, R.S. (2008) Electrical Charging of Volcanic Plumes in Planetary Atmospheric Electricity Edited by Leblanc, F. *et al. Space Science Reviews*, **137**, 1-4.

[133] Williams, E.R. and McNutt, S.R. (2005) Total Water Contents in Volcanic Eruption Clouds and Implications for Electrification and Lightning. In Recent Progress in Lightning Physics. http://ressign.com/UserBookDetail.aspx?bkid=67catid=37#

[134] Zicheng, L. and Guohua, Y. (2014) Research on the Formation Mechanism and Characteristics of Ball Lightning. *XV International Conference on Atmospheric Electricity*, Norman, 15-20 June 2014, 373-392.

[135] Mareev, E.A. (2008) Formation of Charge Layers in the Planetary Atmospheres. *Space Science Reviews*, **137**, 373-397. https://doi.org/10.1007/s11214-008-9396-2

[136] Tinsley, B.A. and Zhou, L. (2006) Initial Results of a Global Circuit Model with Variable Stratospheric and Tropospheric Aerosols. *Journal of Geophysical Research*: *Atmospheres*, **111**, D16205. https://doi.org/10.1029/2005jd006988

[137] Rycroft, M.J., Harrison, R.G., Nicoll, K.A. and Mareev, E.A. (2008) An Overview of Earth's Global Electric Circuit and Atmospheric Conductivity. *Space Science Reviews*, **137**, 83-105. https://doi.org/10.1007/s11214-008-9368-6

[138] Wilson, R. (1945, January 2) Balls of Fire! Nazi "Foo Fighters" for Company. *The Indianapolis Star*.

[139] Bösinger, T. and Shalimov, S.L. (2008) On ULF Signatures of Lightning Discharges. In: Leblanc, F., *et al.*, Eds., *Planetary Atmospheric Electricity*, Springer, 521-532. https://doi.org/10.1007/978-0-387-87664-1_32

[140] Barr, R., Jones, D.L. and Rodger, C.J. (2000) ELF and VLF Radio Waves. *Journal of Atmospheric and Solar-Terrestrial Physics*, **62**, 1689-1718. https://doi.org/10.1016/s1364-6826(00)00121-8

[141] Füllekrug, M., Roussel-Dupré, R., Symbalisty, E.M.D., Colman, J.J., Chanrion, O., Soula, S., *et al.* (2011) Relativistic Electron Beams above Thunderclouds. *Atmospheric Chemistry and Physics*, **11**, 7747-7754. https://doi.org/10.5194/acp-11-7747-2011

[142] Abrahamson, J. and Dinniss, J. (2000) Ball Lightning Caused by Oxidation of Nanoparticle Networks from Normal Lightning Strikes on Soil. *Nature*, **403**, 519-521. https://doi.org/10.1038/35000525

[143] Shmatov, M. (2024) Radiation Hazard of Ball Lightning. *International Conference on Lightning and Static Electricity* 2024 (*ICOLSE* 2024), Campinas, 7 October 2024, 6 p. https://zenodo.org/records/13899188

[144] Warren, D. (1966) Ball Lightning Characteristics. NASA Technical Note. NASA TNB D-3188s.

[145] Torchigin, V.P. (2019) How Optical Model of Ball Lightning Explains Its Paradoxical Movement Upwind. *Optik*, **184**, 533-537. https://doi.org/10.1016/j.ijleo.2019.04.109

[146] Dmitriev, M.T. (1969) Stability Mechanism for Ball Lightning. *Zhurnal Tekhniceskoj Fiziki*, **39**, 387.

[147] Berestetskii, V.B., Lifshitz, E.M. and Pitaevskii, L.P. (1982) Quantum Electrodynamics. 2nd Edition, Landau and Lifshitz Course of Theoretical Physics Vol. 4, Butterworth-Heinemann.

[148] Joseph, R. (1996) The Limbic System and the Soul. In: Joseph, R., Ed., *Neuropsychiatry*, *Neuropsychology*, *Behavioral Neurology*, Williams & Wilkins, 300-357.

[149] Bell, V., Maiden, C., Muñoz-Solomando, A. and Reddy, V. (2006) "Mind Control" Experiences on the Internet: Implications for the Psychiatric Diagnosis of Delusions. *Psychopathology*, **39**, 87-91. https://doi.org/10.1159/000090598

[150] Braithwaite, J.J. (2004) Magnetic Variances Associated with "Haunt-Type" Experiences: A Comparison Using Time-Synchronized Baseline Measurements. *European Journal of Parapsychology*, **19**, 3-28.

[151] Frey, A.H. (1962) Human Auditory System Response to Modulated Electromagnetic Energy. *Journal of Applied Physiology*, **17**, 689-692. https://doi.org/10.1152/jappl.1962.17.4.689

[152] Jones, M. and Flaxman, L. (2015) Mind Wars: A History of Mind Control, Surveillance, and Social Engineering by the Government, Media, and Secret Societies. Red Wheel/Weiser.

[153] Ma, P. and Sa, K. (2001) Ch. 8. Predicting the Characteristics of Haunt Phenomena from Geomagnetic Factors and Brain Sensitivity. In: Houran, J. and Lange, R., Eds., *Hauntings and Poltergeists*: *Multidisciplinary Perspectives*, McFarland & Company, Inc., 147-177.

[154] Roll, W.G., Persinger, M.A., Webster, D.L., Tiller, S.G. and Cook, C.M. (2002) Neurobehavioral and Neurometabolic (Spect) Correlates of Paranormal Information: Involvement of the Right Hemisphere and Its Sensitivity to Weak Complex Magnetic Fields. *International Journal of Neuroscience*, **112**, 197-224. https://doi.org/10.1080/00207450212025

[155] Cook, C.M. (1997) Experimental Induction of the "Sensed Presence" in Normal Subjects and an Exceptional Subject. *Perceptual and Motor Skills*, **85**, 683-693. https://doi.org/10.2466/pms.85.6.683-693

[156] Persinger, M.A., Koren, S.A. and O'Connor, R.P. (2001) Geophysical Variables and Behavior: Civ. Power-Frequency Magnetic Field Transients (5 Microtesla) and Reports of Haunt Experiences within an Electronically Dense House. *Perceptual and Motor Skills*, **92**, 673-674. https://doi.org/10.2466/pms.2001.92.3.673

[157] Persinger, M.A., Tiller, S.G. and Koren, S.A. (2000) Experimental Simulation of a Haunt Experience and Elicitation of Paroxysmal Electroencephalographic Activity by Transcerebral Complex Magnetic Fields: Induction of a Synthetic "Ghost"? *Perceptual and Motor Skills*, **90**, 659-674. https://doi.org/10.2466/pms.2000.90.2.659

[158] Rogan, T. (2021) US Intelligence Grapples with Nervous System Attacks Amid Heavy Russia Suspicions. Washington Examiner.

[159] Thomas, T.L. (1998) The Mind Has No Firewall. *The US Army War College Quarterly*: *Parameters*, **28**, 2-17. https://doi.org/10.55540/0031-1723.1871

[160] Lorenz, R.D. (2008) Atmospheric Electricity Hazards. *Space Science Reviews*, **137**, 287-294. https://doi.org/10.1007/s11214-008-9364-x

[161] Aviation Safety Network. https://asn.flightsafety.org/statistics/

[162] Kehoe, A. and Cecotti, M. (2021) Multiple Destroyers Were Swarmed by Mysterious "Drones" off California over Numerous Nights. The War Zone.

[163] Hambling, D. (2021) Mystery Drones Kept Buzzing U.S. Destroyers during Exercises off California. Forbes.com.

[164] Markson, R. (2007) The Global Circuit Intensity: Its Measurement and Variation over the Last 50 Years. *Bulletin of the American Meteorological Society*, **88**, 223-242. https://doi.org/10.1175/bams-88-2-223

[165] Troshichev, O.A., Frank-Kamenetsky, A., Burns, G., Fuellekrug, M., Rodger, A. and Morozov, V. (2004) The Relationship between Variations of the Atmospheric Electric Field in the Southern Polar Region and Thunderstorm Activity. *Advances in Space Research*, **34**, 1801-1805. https://doi.org/10.1016/j.asr.2003.07.063

[166] Chave, A.D. and Luther, D.S. (1990) Low-Frequency, Motionally Induced Electromagnetic Fields in the Ocean: 1. Theory. *Journal of Geophysical Research*: *Oceans*, **95**, 7185-7200. https://doi.org/10.1029/jc095ic05p07185

[167] U.S. Customs and Border Protection 2013, UAP Aguadilla, Puerto Rico. https://www.youtube.com/watch?v=q6s5RwqnnLM

[168] Wesson, P.S. (2000) Modern Kaluza-Klein Theory. Word Scientific.

[169] Rabinowitz, M. (2001) N-Dimensional Gravity: Little Black Holes, Dark Matter, and Ball Lightning. *International Journal of Theoretical Physics*, **40**, 875-901. https://doi.org/10.1023/a:1004152729335

[170] Connor, K. (2017) Laser and Plasma Research Gets Boost at SSC Pacific Laser and Plasma Research Gets Boost at SSC Pacific. https://www.doncio.navy.mil/Chips/ArticleDetails.aspx?ID=8562

[171] Hening, A. (2018) System and Method for Laser-Induced Plasma for Infrared Homing Missile Countermeasure. https://patents.google.com/patent/US20200041236A1/en

[172] Los Angeles Times (1942) Army Says Alarm Real; Five Dath Laid to Raid Blackout; Roaring Gun Mark Blackout; Knox Indicates Raid Just "Jittery Nerves". *Los Angeles Times*.

[173] Scarlett, G. (2023) DNA Manipulation and Analysis (Methods in Molecular Biology Book 2633) Part of: Methods in Molecular Biology. Humana.

[174] Kwok, S. (2021) Complexity in the Universe. In: Kwok, S., Ed., *Our Place in the Universe II*, Springer International Publishing, 209-221. https://doi.org/10.1007/978-3-030-80260-8_20

[175] Paschek, K., Semenov, D.A., Pearce, B.K.D., Lange, K., Henning, T.K. and Pudritz, R.E. (2023) Meteorites and the RNA World: Synthesis of Nucleobases in Carbonaceous Planetesimals and the Role of Initial Volatile Content. *The Astrophysical Journal*, **942**, Article No. 50. https://doi.org/10.3847/1538-4357/aca27e

[176] Shivakumar, R., *et al.* (2023) Life from Outer Space: Overview on the Presence of DNA, RNA Associated Bio-Molecules—Amino Acids, Nucleobases, Sugars and Water Molecules in Meteorites and Carbonaceous Chondrites. *Biological Forum-An International Journal*, **15**, 738-742.

[177] Joseph, R. and Schild, R. (2010) Origins, Evolution, and Distribution of Life in the

Cosmos: Panspermia, Genetics, Microbes, and Viral Visitors from the Stars. In: Wickramasinghe, C., Ed., *The Biological Big Bang*, Cosmology Science Publishers, 42-88.

[178] Joseph, R. and Wickramasinghe, N.C. (2011) Genetics Indicates Extraterrestrial Origins for Life: The First Gene. *Journal of Cosmology*, **16**, 120-144.

[179] Joseph, R. and Schild, R. (2010) Biological Cosmology and the Origins of Life in the Universe. *Journal of Cosmology*, **5**, 1040-1090.

[180] Joseph, R., *et al.* (2020) Seeding the Solar System with Life: Mars, Venus, Earth, Moon. *Protoplanets Journal of Cosmology*, **29**, 170-250.

[181] Joseph, R. (2009) Life on Earth, Came from Other Planets. *Journal of Cosmology*, **1**, 1-56.

[182] Fischer, G., Gurnett, D.A., Kurth, W.S., *et al.* (2008) Atmospheric Electricity at Saturn. *Space Science Reviews*, No. 1-4, 271-285.

[183] Atreya, S.K., Wong, A., Renno, N.O., Farrell, W.M., Delory, G.T., Sentman, D.D., *et al.* (2006) Oxidant Enhancement in Martian Dust Devils and Storms: Implications for Life and Habitability. *Astrobiology*, **6**, 439-450. https://doi.org/10.1089/ast.2006.6.439

[184] Cook, A.F., Duxbury, T.C. and Hunt, G.E. (1979) First Results on Jovian Lightning. *Nature*, **280**, 794-794. https://doi.org/10.1038/280794a0

[185] Little, B. (1999) Galileo Images of Lightning on Jupiter. *Icarus*, **142**, 306-323. https://doi.org/10.1006/icar.1999.6195

[186] Gurnett, D.A., Shaw, R.R., Anderson, R.R., Kurth, W.S. and Scarf, F.L. (1979) Whistlers Observed by Voyager 1: Detection of Lightning on Jupiter. *Geophysical Research Letters*, **6**, 511-514. https://doi.org/10.1029/gl006i006p00511

[187] Joseph, R. (2011) Speculations on Extraterrestrial Alien Life. Evolution in the Ancient Corners of the Cosmos. *Journal of Cosmology*, **16**, 18-66.

[188] Joseph, R. (2000) Evolution in the Ancient Corners of the Cosmos, (in) Astrobiology, the Origins of Life, and the Death of Darwinism. University Press.

Video Supplement

A 17-minute video compilation of official NASA space shuttle films is linked to this article and can be downloaded from Researchgate: https://www.researchgate.net/publication/383116954.