

ERNAGE 1989: The Facts and their Analysis

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Abstract. *A remarkable UAP (Unidentified Aerial Phenomenon¹) has been observed by Lt Col André AMOND and his wife Chantal on December 11, 1989 at ERNAGE near GEMBLoux in Belgium. We provide first-hand data about all phases of this event and describe the behavior of the observed lights. These belonged to an object that was invisible to the witnesses and flying very slowly at low altitude without making any noise. It surprised the witnesses, since it approached closely, turned very sharply and departed at high velocity. During the new inquiry, we found a related observation made by another witness, also in ERNAGE. The facts are analyzed in a rational way and the hypothesis that it could have been a helicopter or any other conventional aircraft is carefully checked, but refuted. Two other cases that so-called skeptics attributed to helicopters are also studied.*

Introduction

The events that are analyzed and discussed in this study occurred in the central part of Belgium, during the evening of Monday **December 11, 1989**. This was less than two weeks after the beginning of the so-called “Belgian wave”. Indeed, an exceptionally great number of Unidentified Aerial Phenomena (UAP) had been observed during the evening of Wednesday **November 29, 1989**, near the Belgian-German frontier. Only a few of these observations were immediately known and reported by journalists but later on, for this single evening, a total of 143 observations of this type were progressively collected. Since it has sometimes been claimed that later observations were simply triggered by the first reports, assumed to result from perceptual errors or hallucinations, it is worthwhile to mention that **André AMOND and his wife** made their observation without knowing anything about the first media accounts. They had not even read a book or any article about UFOs or similar phenomena. They were thus very surprised by what they saw. On **Thursday December 14**, two national television stations (RTBF and RTL) tried to present an overview of the strange events. The witnesses saw the second broadcasting and realized only at that moment that similar phenomena had been observed.

1. The Authors of this Study

The first author is the principal witness, who happened to be a high ranking Staff officer of the Belgian Army. **Colonel André AMOND** (AA) is civil engineer and *Breveté d'État Major*. He has also acquired a degree in applied natural sciences. He is now retired, but in 1989, he was in charge of management and planning of the infrastructure resources of the Army. After much hesitation and consultation of some colleagues, he wrote an account of his observation for the Ministry of Defense (MOD), in French: *Ministère de la Défense Nationale* (figure 1).

Figure 1: Lt Col André Amond sent a letter to the Belgian Ministry of Defense, the Air Staff and SOBEPS.

The same day, the Colonel also sent a copy to SOBEPS (*Société Belge d'Étude des Phénomènes Spatiaux*). This non-profit "Society for the Study of Space Phenomena" had been founded in 1971. Its aim has always been the "rational and objective study of space phenomena and related problems, as well as the unprejudiced diffusion of collected data". It started immediately after the first media reports of unusual events in 1989 to collect first-hand accounts and to check the trustworthiness of the witnesses. It became then progressively clear that a "wave" of exceptional magnitude had come over Belgium. Similar sightings occurred in adjacent countries, but these were not so numerous and SOBEPS was not in charge of their collection. During the following days and months, observations of UAPs continued at a lower rate, but with transitory peaks. This happened in particular during the evening of *December 11*. The collection of as much reliable data as possible was a great challenge for SOBEPS, functioning only with voluntary collaborators, but the essential results were summarized in two books² that will be called VOB1 and VOB2.

The second author is **Major General Wilfried DE BROUWER** (WDB). In 1989, he was Colonel and is now retired. Between 1989 and 1991, exactly at the time when so many UAP observations were made over Belgium, he was "*Chief Operations of the Belgian Air Staff*". In this capacity he was in charge of establishing the policy for managing and employing military air assets, including airspace surveillance and control. In 2007, he was invited by the Coalition for Freedom of Information (CFI) to report about the Belgian wave in the National Press Club, Washington DC³. It should be mentioned that he is himself an experienced pilot. His insights and technical competence are thus very important for the present study.

Patrick FERRY (PF) was a founding member of SOBEPS. Because of his professional expertise in photography, he was in charge of the examination of all photos and videos of UAPs that SOBEPS got. This resulted in contributions to VOB1 and VOB2. He also wrote articles for *Inforespace*, the regular publication issued by SOBEPS and for *Kadath*, a magazine that he co-directs and that is dedicated to an objective study of past civilizations. He is leading a company dealing with videoconferences, documentary and training films, and remains an active researcher. When SOBEPS ended all its activities in 2007, he created COBEPS (*Comité Belge d'Étude des Phénomènes Spatiaux*), which continues to collect data on UAP observations made in Belgium, but publishes only through electronic channels⁴.

Auguste MEESSEN (AM) is professor emeritus of the Faculty of Science of the Catholic University of Louvain. As a physicist, he was teaching quantum mechanics, theoretical physics and solid state physics. Being particularly interested in basic, unsolved problems, he developed a theory of *Space-Time Quantization* that generalizes relativity and quantum mechanics. It accounts for all possible elementary particles. In 1971, he got interested in the scientific and technical aspects of *Unconventional Flying Objects* of unidentified origin and became a member of SOBEPS. Occasionally, for important cases, he made investigations, but his main objective is to *understand the propulsion system* of these crafts, often observed throughout the world and documented in the course of human history.

2. Sources of Information

The observations of AA have already been documented in several complementary ways. These accounts will be used and completed in this study.

- As we previously mentioned, colonel André AMOND described himself what he and his wife had observed and he sent this text *on December 19, 1989* to his superior level: the Ministry of Defense. SOBEPS was allowed to publish the full text and the accompanying figure in VOB1 (p. 90-92). A translation of this *letter* is provided in appendix 1.
- The Colonel and his wife were interviewed *on January 3, 1990* by a SOBEPS investigator. His *report* was written on January 9, 1990. It contained important first-hand information, but also some personal interpretations. This applies in particular to the “probable trajectory” that he drew on a copied map of the observation site. This drawing was reproduced at a smaller scale in VOB1 (p. 92, figure 2.21), with emphasis on the hypothetical trajectory. One of the purposes of the present investigation was to check the validity of this data. We provide a translation of essential contents of this report, published in VOB1 (appendix 2). The colonel and his wife have also separately filled out the standard SOBEPS questionnaire.
- AA has been interviewed for *several TV programs*. The RTBF broadcasted in 1992 a program that presented various opinions⁵, but included also an account of the observations made in ERNAGE, with a corresponding *computer simulation*⁶. ARTE realized in 1996 a much more complete document, where AA appeared as a witness⁷. In November 2007, the RTBF showed a document that had the form of an investigation⁸. The colonel was interviewed on the observation site and the whole process was documented on video by PF. The previously realized computer simulation was shown again in 1996 and 2007.
- A *new investigation* started on August 23, 2008 at the observation site. Both witnesses were independently interviewed by AM, but WDB was also present and asked questions concerning the behavior of the UAP, while PF recorded the whole interview on video. This investigation was actively pursued during several months through electronic and direct contacts, as well as further field investigations and the collection of additional data. We even discovered and interviewed **another witness** who made related observations in ERNAGE.

3. Motivation

When a discussion concerning the Belgian observations started during the spring of 2008 on EuroUfoNet, we had at first to answer some questions about the observations that were made near EUPEN on November 29, 1989. AM, who had conducted these investigations, was obliged to discard erroneous claims, but subsequently the discussion focused on the case of ERNAGE. This part was summarized by Wim VAN UTRECHT¹⁰ (WVU), who believes - like other *so-called skeptics* - that the Belgian wave of UAP observations only resulted from misperceptions of activities involving conventional aircraft and amplified by psychosocial effects. This thesis has been advocated in particular by the late Renaud LECLET¹¹(RL), who claims or suggests with great insistence that Colonel AMOND and most other witnesses of UAP observations during the Belgian wave, simply saw *helicopters*.

RL and his collaborators - who amended and expanded the document after his death - don't prove their statements but blame SOBEPS for not having proven the contrary. In addition, they blame SOBEPS for not investigating the helicopter option, but they neglect the fact that SOBEPS had frequent contacts with the Belgian Air Force, which formally rejected this option. Moreover, it is absolutely essential for every investigator to eliminate the possibility of confusions or misinterpretations. Nevertheless, we will seize this opportunity to show that the helicopter hypothesis is inadequate

It is noteworthy that we only had access to LECLET's document on October 26, 2008. It would be unnecessarily tedious to discuss the latter paper in detail. It accumulates numerous speculative assumptions, but indirectly, it raises a basic question: *Are the observed UAPs real signs of something that calls for specific scientific attention or are they simply illusions?* We will answer this question by considering three cases, mentioned by RL and his collaborators. This will allow any impartial reader to compare the methodology applied in of RL's paper and the present study.

4. Scope, Methodology and Objectives

The scope of this study consists of:

- ***The detailed analysis of the observations in ERNAGE on December 11, 1989.*** This was the second case in LECLET's paper, claiming that "more than probably", which means with certainty, the witnesses simply saw "the SA-330 Puma (helicopter) of the BAF (Belgian Air Force)". The central subject of this study will be a thorough reinvestigation of this case, to verify whether this is true or not. We will complete and eventually correct what was known until now, but this provides also an opportunity to learn more about investigating UAP observations.

- ***The discussion of two other observations.*** These are the first and last ones discussed in LECLET's paper. The first was injected by one of RL's collaborators (WVU) and occurred on October 4, 1992 at PLANCENOIT (and not MARANSART) near WATERLOO. It will be presented and discussed in Chapter IV of this study, together with the last case, concerning the observations made near EUPEN on November 29, 1989. Both cases are very instructive to realize how skeptics tried to suggest that the "helicopter hypothesis" could be viable.

- ***The encouragement of scientific research*** on issues that are related to observations like those that are discussed in this article. They raise challenging questions that cannot be solved by simply denying or distorting the observed facts. How they can perhaps be solved will not be discussed in this article, but the reported facts should stimulate normal scientific curiosity.

The methodology is defined by the outline of this study.

First of all, we consider the ***facts*** on a purely phenomenological basis (Chapter I). Then, we proceed to a rigorous ***analysis*** of the available data, without ideological preconceptions (Chapter II). We also verify whether it is possible or not to explain these facts in terms of a ***Puma helicopter*** - as suggested by LECLET- or by means of some other conventional aircraft (Chapter III). We complement the ERNAGE investigation with a detailed analysis of the sighting in ***PLANCENOIT*** and supplementary comments on the observations of November 29, 1989 in the region of ***EUPEN*** (Chapter IV). This will allow us to scrutinize the arguments and techniques that were used by skeptics to undermine the credibility of the witnesses. Finally, we summarize our findings and draw some general ***conclusions***. We add translations of original documents, as well as a technical justification of an essential argument.

The basic objectives follow from the need to find the truth.

- ***We have to reinvestigate*** in a careful and unprejudiced way the observations which were made at ERNAGE, on December 11, 1989 and to come to factual conclusions.

- ***We should also shed light*** on the methods used by skeptics and show that UAP sightings deserve more attention and methodical research by qualified experts and scientists.

Chapter I. Observations at ERNAGE

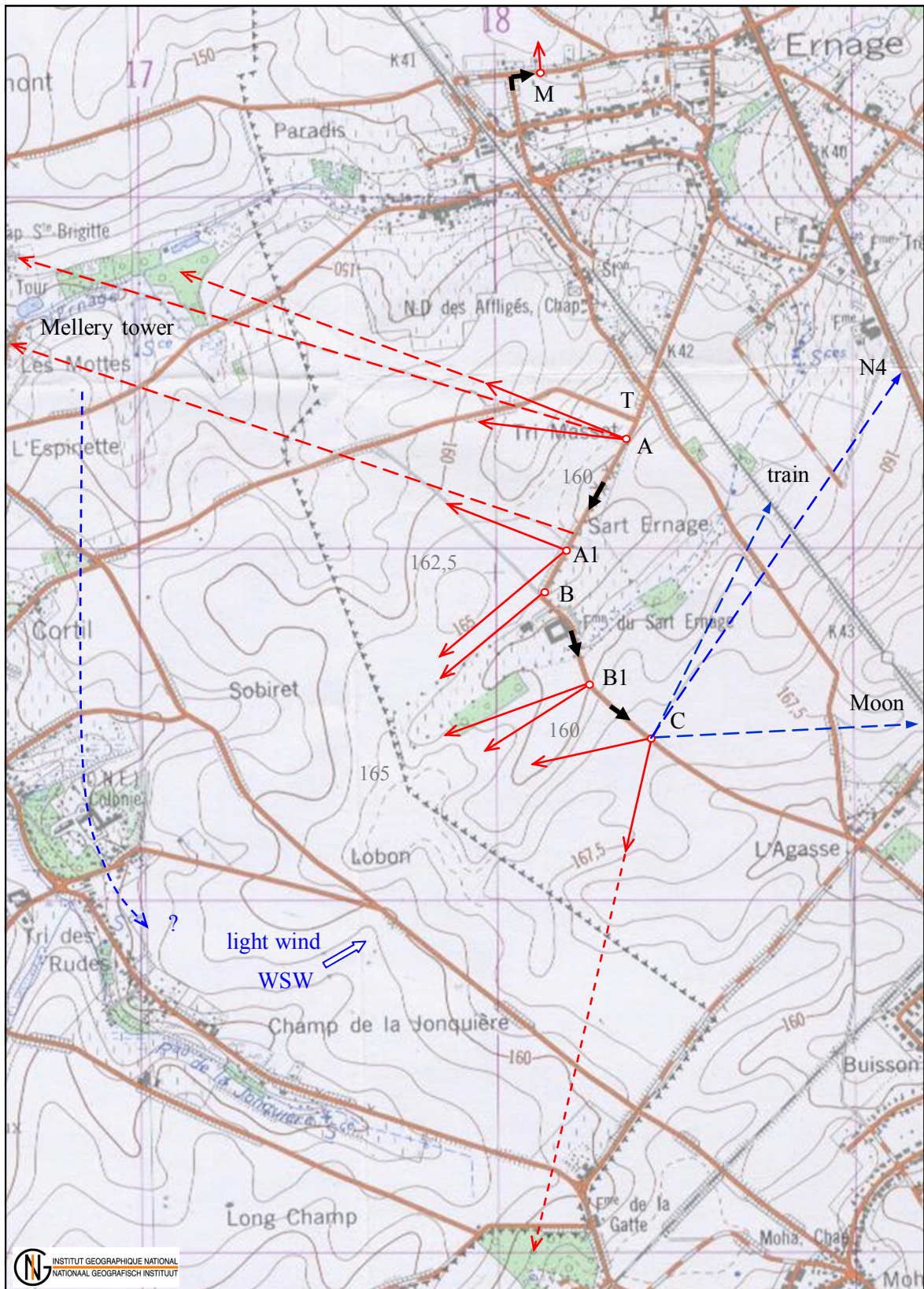


Figure 2: *Map of the observation site* (© NGI, 1:25000, 1981). The red lines define directions of observation for the events of December 11, 1989. Colonel AMOND stops at A and A1, but drives slowly at B and B1. Then he stops again at C, where both witnesses leave the car. The initially proposed “probable trajectory” is accompanied by a question mark and will actually be modified. M specifies the site of another observation. The sides of the square grid correspond to 1000 m.

1. Becoming aware of the UAP

In the evening of December 11, 1989, colonel André AMOND is driving on a quiet country road, called the *Sart Ernage Street*. He comes from the village of Ernage, where he is residing, and is accompanied by his wife, sitting on the right front seat. They are going to pick up their son at the railway station of Gembloux. At **18:45**, local time, they arrive at *Tri Masset* (T on figure 2). It is dark but the sky is clear, the moon is shining and stars are visible. The temperature is close to 0° C.

When AA is about to arrive at the sideway of Tri Masset, he looks out for possible traffic and thus for car lights. At this moment, he spots a group of strange lights in the sky on his right side. He stops then at the point A, to look more carefully. There are **three or four luminous panels** of white-yellow color, with an orange tint “like the setting sun in winter”. These lights are peculiar, since their shape is trapezoidal. Their luminosity is steady, but below this ensemble, practically in the middle, there is **a red pulsating light**. Its upper part is flat and close to the yellow lights, while the lower boundary forms a circular arc (figure 3a and 3b). All separations between the lights are clearly recognizable, but AA doesn't see any supporting mass.

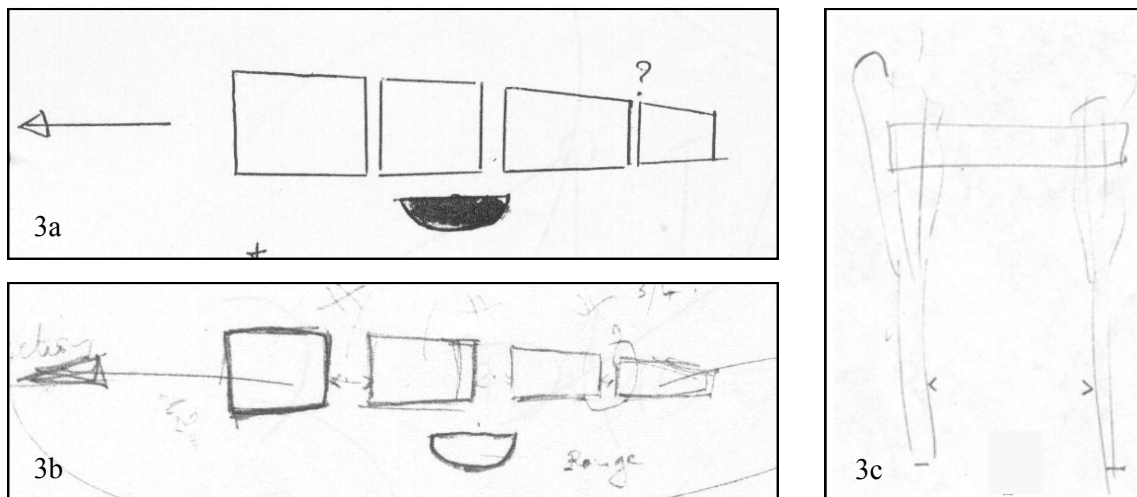


Figure 3: Sketches made by Col Amond of the luminous panels and the pulsating red light for his letter to the Ministry (3a) and the report (3b). At B, the luminous phenomenon is seen behind two poplars (3c).

The group of lights is situated in the sky, in the direction of the small wood at *Les Mottes*. Much further away and closer to the horizon, is the *Mellery tower*, which is illuminated when it is dark. It is a radar and communication tower for SHAPE in CASTEAU (MONS) and NATO in EVERE (BRUSSELS). AA knows this tower very well, since he had verified the calculations for its stability when it was installed during the seventies. The visibility is excellent. Although this tower is situated at 7 km from the witness, it is clearly perceptible on the horizon, while the strange lights are higher in the sky. The Colonel thinks at first that the lights could come from this direction, but having stopped, he observes a lateral displacement with respect to the tower. **The motion is horizontal and very slow.** Since all these unexpected lights remain in a constant relative position, they should belong to a solid object, but AA doesn't perceive any structure supporting the lights. Afterwards, he can't remember whether there were three or four panels, as indicated by the question mark in the figures 3a and 3b. However, he is sure about the **trapezoidal** outline.

Then he drives from A to A1, but never faster than 50 or 60 km/h. On the contrary, he slows down several times when he looks towards the lights. The velocity is then reduced to 30 km/h and some-

times to 10 km/h. The lights are advancing in the same direction, but more slowly, since they only catch up when he slows down. The elevation seems to remain constant with respect to the easily discernable horizon. Moreover, AA doesn't notice any change of the apparent size of the yellow panels and the red pulsating light. Thus, he gets the impression that between A and A1, the motion of the UAP is *horizontal and nearly parallel* to the Sart Ernage Street, but he couldn't observe the lights without interruption. It is impossible to evaluate the distance, especially at night. Knowing that the Mellery tower is higher than 100 m, he has the feeling that the UAP could be progressing at an altitude of 200 to 300 meters (letter and report).

The Colonel sees the horizon with the Mellery tower at about the middle of the right front window, but to see the group of lights, he has to incline his head somewhat towards that window. He informs his wife about the lights, but she is sitting higher and couldn't see them without putting her head closer to the window. She doesn't care, since even without looking, she is convinced that it has to be an airplane. They ignore, indeed, that some people had recently spoken about strange things that appeared in the sky, but AA is intrigued. *He doesn't understand what's happening*, since the moonlight is not reflected by the surface of this object and there is no noise, as expected for normal aircraft.

Colonel AMOND is so amazed that he doesn't think about evaluating the angular length of the row of panels, but it was *several times longer than the apparent diameter of the moon*. Moreover, the lights had to be close or large enough, to allow for an easy recognition of the dark separations. AA stops the car at A1, where he stays until the mysterious phenomenon is nearly disappearing behind the trees at the farm of Sart Ernage (report). At that moment, the lights are seen through the windshield, but the car could have been slightly oblique to the street. Anticipating the disappearance of the UAP, AA decides to drive to the other side of the farm, to see if it will reappear.

2. Reality of the Phenomenon

At the point B, just before the left turn, AA slows down and incidentally sees that the lights are passing "*behind the two first poplars*" (report). In December, these poplars have no leaves and the luminous panels are visible through the branches. AA is sharply observing the UAP, since he told the first investigator: "*I evaluated its apparent height to 2/3 of the height of the trees and its apparent length did correspond to the distance that separated these trees.*" This is schematically indicated on his sketch (figure 3c) and is practically equivalent to a measurement. It results from a fortunate coincidence, but also from the curiosity and presence of mind of the observer.

Subsequently, AA accelerates and drives as rapidly as possible to the other side of the farm, but the darkness and the turning street don't allow for fast driving. It takes thus some time before he reaches B1, where he slows down. The road goes uphill and makes a slight turn towards his left. He looks then towards the right, but the group of lights advanced more slowly than he did. Being just beyond the bend, he rediscovers the lights in the rear right window. They are emerging approximately at the top of the wooded area. Figure 4a is extracted from the computer simulation (VOB2, photo 2.15) and figure 4.b is the drawing that AA made during the new investigation, when we were standing at B1. He represented only three panels, as in the computer simulation, but he started to draw the general outline and then the separations. Finally, he added the red light and some poplars.

In his letter, the Colonel reported only what happened after he saw the lights at B1. He stated that they appeared at the height of *the last third of the trees* behind the farm (appendix 1). He meant the

poplars. He didn't mention what happened before he arrived at B1, because he wanted to be concise and considered this as irrelevant in comparison with the more important events which followed. Now, the strange phenomenon *couldn't be imaginary anymore*. It had to be physically real, since it disappeared behind obstacles and reappeared like something of material consistency. The report of the first investigator clearly stated, however, that the observations had begun before AA arrived at the farm, although it was not recorded that this happened already at point A.



Figure 4: Computer simulation (4a) and Amond's sketch (4b) of the trees and lights seen at B1.

The new investigation started with an interview of *Mrs. AMOND*. Together with her husband they took the same route as in 1989 and she was invited to say "stop" when the car arrived at the place where she saw the lights for the first time. This happened at B1. She described then what she saw: *a row of luminous panels*, emerging at about the top of the trees of the small wood, which, 19 years later, is still there. The lights were of yellow-orange color and the panels were trapezoidal with a progressively decreasing height. Below this row of panels, there was in the middle *a red pulsating light*. Its intensity changed over the whole surface at the same rhythm. When asked to show how fast, by closing and opening her hand, she indicated that two peaks were separated by approximately one second. All these lights were moving together, as if they belonged to a solid object, but being asked if she had seen it, she said: *"no, I assumed that there had to be something to carry the lights. I couldn't see it."* How many luminous panels did you see? She answered: *"three"*

In this regard, AM wants to stress the fact that initially, AA wasn't sure if there were 3 or 4 luminous panels (letter and report) and Mrs. AMOND had only told the first investigator on January 3, 1990, that she saw *"several lights"*. The number of panels seemed less important to both witnesses than their general appearance and their behavior. The graphical artist who realized the computer simulation had necessarily to choose between 3 or 4 moving panels. He opted for three, since that was easier for him and the spectators. This process influenced, the memory of the witnesses, but all other details provided by both of them remained consistent. When AM asked Mrs. AMOND at B1 what she had thought when she discovered this phenomenon, she said: *"nothing"*. Having no preconception, she presumed, of course, that it had to be something normal, although she heard no noise coming from that direction.

3. The Great Surprise

Let's return to the initial events. Having seen the reappearance at B1, Col. AMOND drives towards the highest part of the street, to have a better view of what might happen. He stops at C (figure 2), and shuts down the engine, while his wife opens her window. They prick their ears, but *can't hear any sound* coming from there. They do only perceive a weak traffic noise from the N4 Road (Namur-Wavre). The lights continue their silent, very slow horizontal motion. AA steps out of the car, leaves the left door open but keeps the lights on to warn possible traffic. While he goes to the front of the car,

AA looks at the full moon and takes then a stand just before the left front light of the car. Mrs. AMOND leaves the car as well, goes to the right front corner and observes from there, but without standing in the beam of the right head light. When AA looks again towards the UAP, there is a change! According to the first investigator, this happened when the phenomenon reached the direction of the small wood behind the farm of *la Gatte* (figure 2). The UAP is now higher than the wood, but instead of the yellow panels and the pulsating red light, there is only *one round white light* (figure 5).

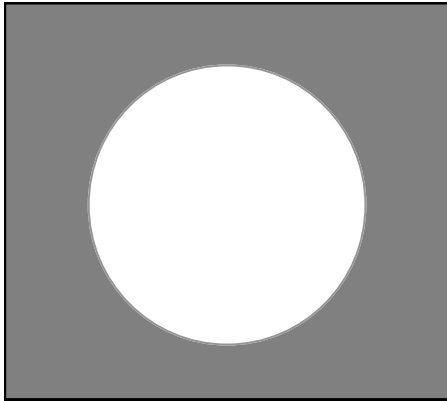


Figure 5: The approaching white light.

It is directed towards the witnesses and closing in. Its luminosity is constant, uniform and very intense, but not blinding. The boundaries are sharp. The altitude decreases. It seems to be a head-light, pointed towards the witnesses, but its *apparent diameter is "two times that of the moon"* (appendix 2) and there is no beam that illuminates the ground. AA saw the full moon just before, but we don't know whether this comparison corresponds to the closest distance or not. The Colonel spontaneously said during the new investigation that the distance of closest approach may have been less than 100 m and that the apparent diameter of the circular light could then have been larger than two times the size of the moon.

AA had told the first inquirer: *"I can't remember how the object changed its heading. It came in our direction (lower than the top of the trees behind it) and the intensity increased. My wife got frightened and told me: "start-up". I also felt a certain apprehension, since I considered this behavior as being aggressive."* Mrs. AMOND's testimony is very important in this regard. She saw the change: *"When it reached the wood, the object seemed to stand still and a very luminous white light was directed towards us. I got frightened and said to my husband "start-up". I didn't dare to look at it any more"* (report). She must have been extremely frightened, since she didn't want to see anymore what might happen. During the new investigation, she described the white round light, while we were standing at C, and AM asked her if she had seen something around it. She answered: *"no"*. There was **no visible mass**, supporting this light and no sound. When asked, how close it came, she said: *"twenty meters, at eye level"*. Of course, this was not based on any measurement, but a spontaneous expression of the **intense fear** that she had experienced. She was terrorized and reacted in panic. This doesn't happen when a light is at a distance of about 1 kilometer, for instance.

When she filled out the questionnaire, she had to describe the brilliance of the light, by choosing between: dazzling (éblouissant), strong, average, low and very low. Conform to her frightening experience, she wrote: *"dazzling"*, while AA drew a circle around *"strong"*. He mentioned in his note to the MOD that *"only an enormous white light was visible"* during this phase. *"It was larger than the head-light of a big transport aircraft... The object with this enormous, anomalous luminous mass showed itself somewhat aggressive. We heard no engine noise... This object was silent!"* At this instant, he also felt insecure and responded to the frightened call of his wife by rapidly returning to his seat. When he was still upright between the door and the body of the car, he looked again towards the phenomenon. He didn't see how this happened, but it is now obvious that *"the object is engaged in a maneuver. It is nose up."* This is an essential part of the observation.

The object is banking towards its left side and climbing in an acrobatic way. It displays its ventral side, which is oriented towards the witness at a very steep angle. This is shown in figure 6, taken from the letter. The report contains a very similar sketch and specifies that there are *"three white lights,*

forming a triangle... The red light is situated in the middle. Its diameter is 2 to 3 times larger than the white lights. These are separated by 6 to 10 meters, but the top light is 3 to 4 times more intense than the other white lights". Imagine, the moon illuminating the fields and seeing these lights without any supporting mass. AA is flabbergasted: **no surface reflection** and not even a perceptible contour!

It's weird. AA sits down behind the steering wheel, but continues to observe the maneuver of the object. In his letter he describes it as follows: "Three white lights that are smaller than the previous one have appeared. They form more or less an equilateral triangle... The distance between these white luminous spots is estimated at about 10 meters." He calls it "paradoxical" that he can't see the mass that surrounds the triangle formed by the white lights. He notes in his letter to the MOD that "**The UAP's maneuver is majestic and slow. The turn is tight**, so tight that it is not necessary to move the head or the eyes to observe the UAP making its turn, like one does to follow the displacement of a Boeing or similar aircraft."

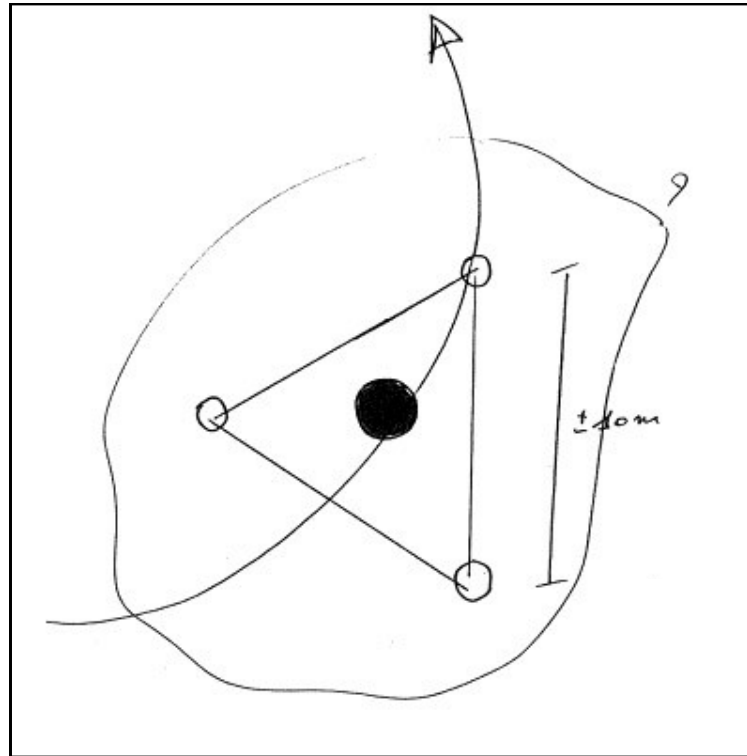


Figure 6: The ventral side of the UAP.

4. Rapid Departure

To observe the rising motion of the object, AA is obliged to lower his head somewhat towards the steering wheel and to look through the upper part of the windshield. The object restores its horizontal attitude and darts away, so that AA can now only see the protruding and pulsating red light. He starts the engine. The accelerating object disappears "*rapidly out of sight in the darkness of the night, towards the SSW*". The whole observation lasted 5 to 8 minutes (letter) or even 10 minutes (report).

After the rapid departure of the flying object, AA closes the window, but while he is doing this, he hears a train that is passing at his left side (figure 2). The noise is easily detectable at about 750 m, even with running engine, while previously, he heard no sound at all coming from the much closer flying object. The illuminated windows of the train remind him of the row of panels. After these events, he picks up his son at the railways station of GEMBLoux and is back home at 19:05.

5. Another Witness at ERNAGE

When we analyzed these observations, it became very soon clear that the first investigator had simply *assumed* that at the moment that the object was spotted it was *at the horizon*, above the trees near *Les Mottes* (figure 2). He thought that the flying object then moved along a linear trajectory in the North-South direction. As such, it could then pass between two groups of trees at the ONE colony (*Office de la Naissance et de l'Enfance*). However, it is clear from figure 2 that this passage would not

have been visible from B and B1. On site, this is even more evident. Furthermore, figure 4 shows that the object passed close to the trees at the farm of Sart Ernage. Unfortunately, we can't ask the first investigator anymore why he made this choice, since he deceased, but we know that this was his first case, right after the beginning of the wave. Probably, he didn't realize that other flying platforms came rather close to the witnesses. His prudence is understandable, but requires reconsideration.

Actually, it was only possible to assume that the trajectory was *nearly parallel* to the Sart Ernage Street between A and A1. The distance was unknown. The resulting problem reminded AA of what a neighbor had told him in 1992, after his first appearance on television⁵. Mrs. **Huguette MARITS** (HM) was convinced that she had seen the same UAP. According to the memory of AA, this happened also on December 11, 1989. He went thus to her home (on October 3, 2008) and collected enough information to justify a meeting (on October 5) for further investigation. The interview was conducted by AM, in the presence of AA and PF, who documented it on video.

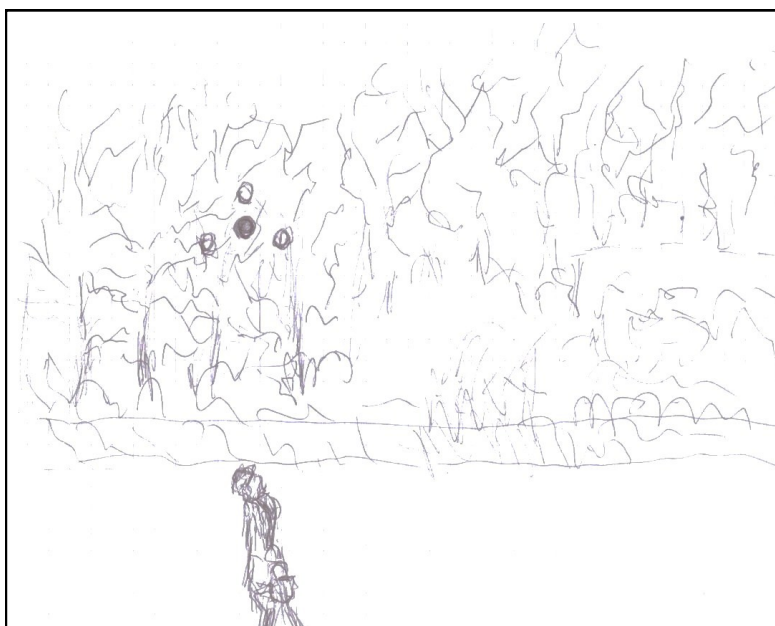


Figure 7: Mrs. Marits discovers four lights in the village of Ernage.

It turned out that in December 1989, HM did work in Brussels. She always arrived by train. It was dark and while she was walking home on the silent village street she became suddenly aware of the presence of **a group of lights** at her left side. It was between 18:30 and 18:45. Later on, we could ascertain that her train arrived at 18:25 and that it takes about 13 minutes to walk from the station to the observation site, which is close to her home. It was thus about **18:38**, local time. During the morning of our meeting, she made a drawing of her sighting (figure 7) .

Here is the account of her remarkable observation. She is walking on the right side of the street, when she realizes that there are lights behind the trees on the other side of the street. She distinctly sees three round lights, forming *an equilateral triangle*. A larger red light is *pulsating* in the middle. The other lights are yellow and steady. All lights remain in fixed relative positions with respect to the leafless trees, but **no supporting mass is visible**. Moreover, HM doesn't hear any sound and notices no movement. Being alone, she feels insecure and hastens her pace, to reach her home as fast as possible. She takes her heels and doesn't even look anymore whether the lights are still there. Her home and shelter are nearby. Once at home, she immediately tells her husband and asks him to have a look. Nothing special can now be seen, but her husband doesn't doubt her words and understands her attitude. Indeed, it couldn't be a plane or a helicopter, since they knew their position lights and the noise that such aircraft make. They had recently heard on television that some persons reported to have seen strange things, but this did neither favor confabulation, nor procure a sense of security. It simply meant: *"I am not the only one who is seeing strange things."* Nevertheless, like many other witnesses, she only spoke about her experience to close relatives and some colleagues at work. She is not at all what some skeptics like to call a "fantasy prone personality".

Mrs MARITS saw the lights during a short time only, but she observed them with utmost attention. Since she didn't notice any motion. The object was thus either at rest or moving very slowly, but she saw *the ventral side* of an object, where the lights had the same disposition as in figure 6. Like the Colonel, she saw only the lights and *not the object* itself. It is not very reasonable to assume that the platform was engaged in a banking maneuver at the very moment when she happened to look at it, but it could have *stayed at rest in a vertical position*. During the Belgian wave, there was indeed an independent observation where a triangular platform was seen to remain suspended in air, while rotating around its longitudinal axis, which happened to be vertical. This object was thus alternatively showing its ventral and dorsal side (VOB1, 206-8, VOB2, 262-8) and it demonstrated that a triangular platform can develop adequate "lift" to compensate its weight in such a position. It could thus also remain motionless in a vertical attitude. Similarly, the photo of PETIT-RECHAIN shows the ventral part of a platform with a very steep inclination (VOB1). Although the exposure time of this photo was one or two seconds, only a very slight rotation was detected by means of the analysis¹².

6. Characteristic Features

When colonel AMOND wrote to the Ministry of Defense, he called special attention on four astonishing characteristics. Recently, he made them more explicit, by adding some comments.

1. *"The slowness of the movements of the flying object, in contrast to its final rapid motion."* When I was driving, I had to wait until it caught up, but at the end, it displayed a tremendous acceleration and flew off at very high velocity.
2. *"The mass, which should necessarily have carried the lights, did not reflect the moonlight and was not visible."* The full moon was positioned, behind the witness. Could its rays have been deviated towards the rear-side of the object?
3. *"The lack of engine noise."* No sound was heard, not even when the car engine was shut off on the country road, at that time, devoid of traffic. Slightly later, it was possible to hear there the noise made by a train that was passing much farther away.
4. *"For me, it is clear: it was neither an AWACS, ULM or helicopter, nor a hologram"*. The Colonel discards thus any conventional explanation, but he insists that *"some kind of intelligence was involved"*, since the flying object deviated from its course with a specific purpose. He doesn't know whether this "visit" did result from curiosity or aggressiveness, but it was not accidental. The motions of the group of lights were always coherent and attributable to a flying object, although the maneuver was amazingly slow. The approaching light was very intense, but had a sharply defined boundary and didn't illuminate the ground.

When we met Mrs. MARITS, she didn't remember the day of her observation. That was less important for her than what she saw. AM contacted thus her son, who had been one of his students. He confirmed that his parents spoke about that event, but he had also forgotten when this happened. We know, however, that there was a marked peak of observations on December 11. Even for this particular evening, all of them could not be attributed to one single object, while the description of Mrs. MARITS fits in with the observation of AA (figures 7 and 6), as well in regard to the appearance of the UAP (underside of the object) as for the known time sequence (18:38 and 18:45). We can thus conclude that it is at least *very probable that they saw the same object*.

The only difference relates to the color of the 3 lights that formed the equilateral triangle. Instead of the usual white color, she mentioned a *yellow* color, but this could eventually result from the computer simulation that she had seen on television. Some secondary elements could get mixed up in her memory. Mrs. Marits doesn't know anymore whether the moon was shining, but she clearly remembers that it wasn't raining, since she had no umbrella, and that *the contour of each light was sharply defined*. Moreover, there were no light beams that illuminated the surroundings or plants. The observed lights were not dazzling. Actually, she compared their intensity to that of the white light tube in her kitchen.

Figure 7 can be used to draw some conclusions. Since HM is accustomed to paint by copying post cards, for instance, with a change of scale, she has a sense of proportions. The apparent height of the center of the lights can thus be determined by means of the trees. Measurements, performed afterwards on the terrain, where there is still an oak and a cherry tree, allowed us to assume that the line of sight did probably pass at a height of about 8 m above the ground, at a distance of about 40 m with respect to the witness. The actual height H and the actual distance D of the lights behind the trees remain unknown, but the ratio $H/D = 1/5$. This corresponds to an angle of about 11° . When $D = 150$ m, for instance, $H = 30$ m. It follows from figure 7 that the distance between the lights, which formed an equilateral triangle, was then of the order of $H/2.7 = 11$ m.

The witness was looking from M towards free fields at the northern border of the village of Ernage (figure 2). We don't know in what direction the object departed, but it is probable that it moved towards the right, since one of the white lights would then have been at the front edge as it was the case with numerous other observations (figure 7).

We will now proceed with the detailed analysis of the observations at ERNAGE on 11 December 1989.

Chapter II. Analysis of the Observations

1. Astronomical and Meteorological Data

On December 11, 1989, the sun was setting for ERNAGE/GEMBLoux at 16:36 local time. At 18:45, the full moon (99%) was standing in the East (azimuth 85°) at an elevation of 31° . These data are derived from an astronomical computer program (Tellstar). They confirm that the fields were illuminated by the moon and that the object should have been visible.

Renaud LEcLET tried to make the helicopter hypothesis more plausible for the Ernage case, by stating¹¹ (p.5) that the Royal Meteorological Institute (RMI) at Uccle/Brussels provided the following information for December 11-12, 1989: *“there was fog at Bierset, Gosselies and Chièvres on December 11 (horizontal visibility lower than 200 meters at the time of maximum opacity).”* He adds that *“the presence of local veils of fog above the fields around Ernage at the sighting time cannot be excluded. Light sources that show through a fog layer can appear larger than they actually are. The fog can also explain why the object itself remained invisible”*.

The real facts are not taken into account, since AA had clearly mentioned in his letter, published in VOB1 and thus known by RL and his collaborators, that *“the sky was clear. There was full moon.”*

Since the Mellery tower was visible at a distance of 6.95 kilometers, we can add that the atmosphere at ERNAGE was even very transparent close to the ground.

The data sheets of the RMI are available at Belgian Universities and surely at the RMI, at least on demand, although the contrary has been suggested¹⁰ (p.4). They prove that it had been freezing on December 10, 1989. At GEMBLOUX, the temperature fell to -4.5° during the night and reached only 5° during the day, since the weather over Central Europe was “determined by a high pressure zone.” The air was dry, but the RMI predicted for Monday 11: “*Locally persistent mist, elsewhere the sky is clear. Maximum temperatures of $+1^{\circ}$ to 5° , Minima of -2° at the coast and -8° in high-Belgium.*” At 08:00, local time in the morning of December 11, 1989, the temperature was still -1.5° in GEMBLOUX. Atlantic perturbations were only predicted for the following day.

To allow for the helicopter hypothesis, it has also been suggested¹⁰ that sound coming from the object could perhaps not have been heard by the witnesses at Sart Ernage, if a sufficiently strong wind was blowing in the opposite direction. This assumption could have been verified, at least from the meteorological point of view. In reality, according to the RMI data sheets, the wind was so weak on December 11, 1989 that its direction could not be recorded in GEMBLOUX. At BEAUVECHAIN, which is situated at 23 km from ERNAGE, a weak wind was blowing from WSW (figure 2). That’s exactly the opposite of what the so-called “skeptics” tried to insinuate.

2. The Flying Object

The first important feature that had to be clarified concerns the coherence of the successive appearances of the lights observed by Mr. and Mrs. AMOND. This was possible by taking into account the general characteristics of the objects that were so often observed during the Belgian wave. Witnesses reported various forms and light sources, but most frequently, they mentioned triangular platforms. Usually, people saw only the ventral side, carrying lights that were similar to those in figure 6. Sometimes they saw a *superstructure, with luminous panels* that could be windows or have some other function. In the Ernage case, the object itself was not visible to the witnesses. Nevertheless, the luminous panels could have been situated at the lateral side of a superstructure, as suggested by figure 8.

The object should also carry a round source of white light at its front side, so that this light was directed towards the witnesses when the object approached them in a descending motion. Although at this very moment it was a source of visible light, it could be a detector system, using other EM radiations (for instance in the terahertz region) and was not necessarily in use, when the object was observed from the side or at some small angle. Only the yellow panels would then appear as well as the protruding red pulsating light.

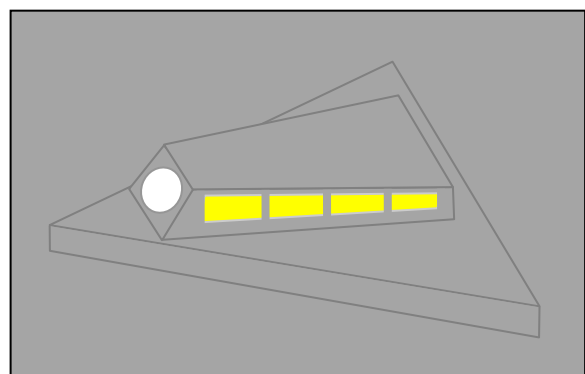


Figure 8: Probable form of the flying object.

Superstructures with luminous panels were often observed during the Belgian wave, while the three round white lights on the ventral surface were always imbedded near the edges of the triangle. At the start of the Belgian wave, the public ignored that UFOs could have such a form. If they had simply invented their stories, they would have described classical “flying saucers”. That was the image they

had in their minds. It is thus very remarkable that suddenly, so many persons started to say that they had seen *triangular or quadrilateral platforms* with round white lights near the corners of their ventral side and a red blinking or pulsating light at its center. The description of the details varied, which implies that more than one object or a single type of objects were observed, but it consistently defined a *particular class of flying objects of unconventional appearance and behavior*.

These platforms were usually operating silently or at a very low noise level, meaning that they were not powered by a combustion engine. However in the Ernage case, the fact that the witnesses *didn't see the supporting mass* was not customary at all. It happened sometimes during the Belgian wave that the surface was fuzzy (VOB2, p.194-204), but the combination of an apparently invisible surface with visible light sources was odd. We would not be aware, of course, of objects that have the capacity to be or to become invisible, if there was not something that betrayed their presence, but why should we be confronted with such a paradox? There may have been some intention. Perhaps, we should be invited to be more curious, but we want to stick here only to actually observed facts.

To summarize what happened when the astonishing flying object was observed from B1 and C, we present a panoramic view (figure 9). It is based on real photos of the landscape and the statements of the witnesses. The second part of the observations begins at the upper right corner of this drawing. The motion was horizontal, until the white light was directed towards the witnesses. It approached then in a descending motion. During the maneuver at close range, AA saw only the three white and the pulsating red light on the ventral side of the flying object. We indicate these lights, as if the object had been transparent, but the witnesses asserted only that he didn't see its surface by means of diffused light and that he couldn't perceive any contours. He didn't understand these effects, but was well aware of their paradoxical nature. Then the object darted away.



Figure 9: Panoramic view of the motions of the lights seen at B1 and C.

The graphical artist who realized the computer simulation tried to represent an invisible object that carried lights and to suggest the continuity of its motions, by showing progressive transformations of the frontal white light (VOB2, figure 2.16 and 2.17). These transformations have not been observed by AA. Although he was present when the computer simulation was realized, he didn't protest, since computer simulations were still very tedious at the beginning of the nineties and he was aware of the difficult problem that the graphist tried to solve. His aim was surely not to create some fake reality. He simply tried to make apparent magic more comprehensible.

There has been discussion about the real size of the approaching white circular light, since the first investigator had proposed a probable trajectory that seemed to imply that this light was at a distance of about 1 km when it had an apparent diameter of 1° . This is two times the apparent diameter of the Moon, but the real diameter of the white circular light would then be $\text{tg}1^\circ$ times 1000 m, which yields 17.5 m and is too large with respect to the ventral side (figure 6). However, this critique is not valid. At a distance of 1000 meters, the object would not have been as frightening as indicated by AA in his letter to the Ministry of Defense. Figure 2.21 of VOB1 was actually based on the drawing of the inves-

tigator, who had added the inscription “Ann A” . This meant “Annexe A”, but was misinterpreted by one of the skeptics as being the signature of André Amond. He had *not* drawn this map and didn’t even know the content of the report. When he was asked, he answered that the distance of closest approach was of the order of 100 - 200 m. At the observation site, he mentioned that 50 m would also be possible. Let’s assume **100 m**. The diameter of the great white light would then be **1.8 m**. This is consistent with the range of sizes that have been reported during the Belgian wave.

3. Two Critical Lines of Sight

Since the lines of sight at B and B1 are converging, *the trajectory has to be closer* than the point where they meet one another. The line of sight at B1 is defined by the edge of the wood, which is still there today, but the line of sight at B was difficult to establish. Of course, the UAP passed behind two poplars, as indicated in figure 3c, but where were they situated? At the outset of the new investigation, we knew only that there had been *two rows* of poplars in 1981, indicated by dots in figure 2. Moreover, poplars are fast growing trees that could have been cut and replanted. Our field investigation disclosed that high poplars at the north side had been cut some time ago. AA and AM tried to locate the stumps of the generation that would have been there in 1989, but no trace was left. We thank the game-keeper and his son for their help, but our problem couldn’t be solved that way.



Figure 10: Aerial Photography taken in 1985 (© NGI)

We bought then from the National Geographic Institute an aerial photography that had been taken in 1985. It proved that the meadow behind the farm was then *totally* surrounded by poplars, forming the contour 1 to 7 in figure 10. The length of the shadows indicated that this were high poplars. The owner of the farm, *Count Le Hardy de Beau-lieu*, told us that these poplars had been planted in 1960, but that those of the rows 1-4 had been cut in 1988. New ones have been planted in the spring of 1989 between 3 and 4.

We see also that in 1985, there existed already a row of smaller poplars between the edge E and the street S. They would remain after the row of poplars 1-4 had disappeared, and could thus be important. We thank the Count for his kindness. He showed us also another aerial photography that had been taken at oblique incidence in the spring of 1983 and gave us the permission to include it in this text (figure 11). It shows that the farm of Sart Ernage is surrounded by cultivated fields and that the region where the observations took place is very flat. We indicate the observation points A, B and B1. The row of young poplars is already present and clearly discernable.



Figure 11: Aerial photograph of the farm of Sart Ernage, taken from the south in 1983.

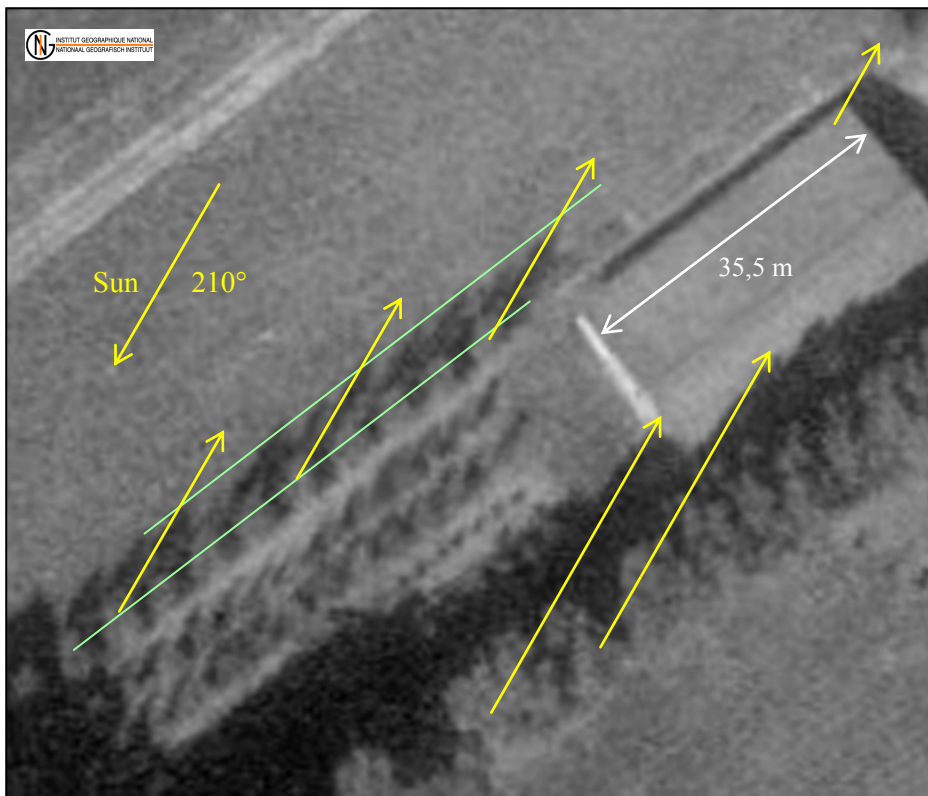


Figure 12: Indirect measurement of the height of the poplars in 1985 (© NGI)

Figure 12 shows a magnified part of figure 10. The direction of the shadows allows us to determine the direction of the Sun: 210° . This picture had been taken on 1 October 1985. We could thus establish with Tellstar that the Sun was at the measured heading at 14:11, local time, and that its elevation was then 32° . This allowed us to calculate the average height of the young and older poplars in 1985

It is sufficient to determine the average length of the shadows. This was done by comparing it with the measured length of the roof of the hangar. We got 14.8 m for the young poplars. Their average height in 1985 was thus equal 9.2 m . The shadows of the older poplars were 2.7 times longer than those of the young poplars in 1985, so that their height was then 24.8 m .

We acquired then an aerial photography, taken on May 3, 1990. The rows 2-3-4 of figure 10 had been completely cut, but the rows 5-6-7 were still there. The row 1-2 had only partially vanished. This defined *the real situation* that existed in December 1989. The line of sight at B1 was quite obvious, but we were not yet sure whether we had to consider the line of sight BE or BF. Moreover, the resolution was not sufficient to determine the height of the poplars in the spring of 1990.



Figure 13: Aerial photography of 1990 (© NGI)



Figure 14: Aerial photography of 1997 (© RW)

We did this by means of another aerial picture, provided by the *Région Wallonne* (figure 14). It solved also a puzzle, since it proved that two poplars had not been cut near E. We had tried to locate the stumps for the row EF and didn't understand why they had different sizes. They had not been cut at the same time. With the kind aid of M. Ferrier, we could also establish that this picture had been taken on August 11, 1997. As for figure 12, we calculated the average height: 22.7 m. They had thus grown about 1.1 m/year. When we assume for the *high* poplars a growth of about 1 m/year, they had in December 1989 an average height of **29 m**.

Initially, we were unaware of the existence of a transverse row of poplars, but even when we knew that the row 4-5 was there in December 1989 (figure 13), we had still to prove that the two poplars of figure 3c were situated at F and not at E. We tried both possibilities and found that the trajectory that would result from E was unacceptable. The localization F was also justified by the qualitative drawing of the first investigator (figure 15). Seen from B, it would correspond to the “two first poplars” the UAP could reach, and they were “clearly outlined on the horizon” (report).

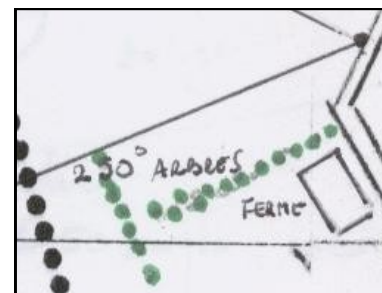


Figure 15: From the report.

4. Trajectory and Velocity of the Flying Object

We are now ready to start the mathematical analysis of the observations, to find out if all available data can be combined in a logical and consistent way, taking into account qualitative as well as quantitative information. For instance, when the object was observed between A and A1, its motion seemed to be *uniform, horizontal and parallel to the Sart Ernage Street*. On November 29, 1989, two gen-

The trajectory cuts the line of sight BP at the point X. The length $x = BX$ is unknown, but such that $d < x < p$, where $d = BF$ and $p = BP$. The inclination of the trajectory is also unknown, but can be defined by the angle θ it forms with the line of sight BP. Since the trajectory didn't cut the Sart Ernage Street, we can assert that $\theta \geq \sigma$, where σ is the angle between the line of sight and a trajectory that would be parallel to the Sart Ernage Street. The computer gives us the length of the vertical and horizontal components of any line segment. This allows us to calculate its length and its inclination. The lines of sight form an angle $\alpha = 21.5^\circ$. The angle between the line of sight BP and the row FG is $\beta = 62.4^\circ$, while $\sigma = 21.8^\circ$. The distance $d = 574$ m and $p = 862$ m. The distance BB1 that AA had to drive along the road while the flying object passed behind the farm is $Z = 330$ m.

It becomes now possible to calculate *the velocity v of the flying object*, since it traveled the distance $z = XY$ during the time t that AA needed to drive from B to B1 at an average velocity V . Thus $z = vt$ and $Z = Vt$, where Z is the curvilinear distance BB1. It follows that $t = z/v = Z/V$. The value of V is not exactly known, but it was dark and the sight was limited by the building, so that AA couldn't drive very fast, although he was in a hurry to see what happened on the other side. Moreover, he had to accelerate at B and to brake near B1. It is therefore very probable that the average velocity was close to $V = 10 \text{ m/s} = 36 \text{ km/h}$. The time $t = Z/V$ would then be of the order of 33 s. This value is reasonable, since AA performed tests to evaluate the time interval, while his wife told him whether he was driving too fast or too slow.

It is now only necessary to determine the value of z , to get the velocity $v = zV/Z$. Figure 16 shows that the length $z = XY$ depends on the distance $x = BX$ and the inclination θ of the trajectory with respect to the line of sight. These values are still unknown, but it is obvious that the highest possible value of v is determined by the highest possible value of z , which would be reached if the trajectory were very close to F and if it had the largest possible inclination. This would correspond to $x = BF = d$ and a trajectory that is parallel to the Sart Ernage Street ($\theta = \sigma$). The corresponding value of z can be determined in a graphical way by means figure 16. This means that the object flew at most a distance of 160 m in 33 seconds, so that the velocity $v < 4.8 \text{ m/s} = 17 \text{ km/h}$. It is thus certain that the flying object was advancing at *a remarkably low velocity*. Its actual value depends on the yet unknown values of x and θ , but we will show in the following section that we can justify values that correspond to the trajectory of figure 16, so that $z = 126$ m and $v = 3.8 \text{ m/s} = 13.7 \text{ km/h}$.

Those who are not so familiar with the powerful mathematical language can jump to section 6, but they should realize that these conclusions were drawn in a strictly logical way.

5. The Length and Altitude of the Luminous Panels

The essential point is that the passage of the object behind the farm of Sart Ernage allows for *triangulations that lead to a set of equations*. They can be solved in a coherent way, so that implicit information will finally appear in explicit form. First of all, we note that the length $z = XY$ can be calculated by considering the triangle XYP in figure 16. This allows us to say that $\sin \alpha / XY = \sin \gamma / XP$, where the angle γ is opposed to $XP = p - x$. Since the sum of the angles $\gamma + \alpha + \theta = 180^\circ$, it follows that we get a general expression for *the velocity v* of the flying object:

$$v = V \frac{z}{Z} \quad \text{where} \quad z = (p - x) \frac{\sin \alpha}{\sin(\alpha + \theta)}$$

As indicated in figure 3c, the extremities of the panels nearly coincided with the trunks of the two first poplars that the UAP encountered for the observer situated at B. These poplars were situated at F and their separation along the row FG was close to the average value $s = 6.5$ m. Assuming that the luminous panels were nearly parallel to the trajectory, we get then a relation between the total length L of these panels and the separation s , viewed from the point B. This idea is graphically expressed in figure 17, where we take only into account the linearity of the lines of sight. Indeed, we exaggerate the values of s and L with respect to $d = BF$ and $x = BX$ for the sake of clarity. The distance d and the angle β are known, while x and the angle θ are unknown.

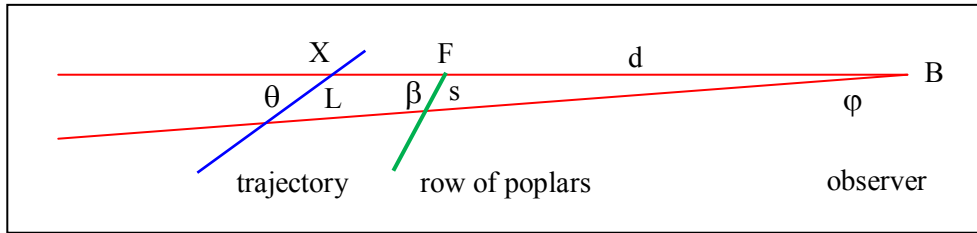


Figure 17: Geometrical factors that determine the total length of the light panels.

Assuming that the luminous panels are parallel to the trajectory, we get the relation

$$\frac{L \sin \theta}{s \sin \beta} = \frac{x + L \cos \theta}{d + s \cos \beta} \quad \text{or} \quad L = \frac{s x \sin \beta}{d \sin \theta}$$

since L and s are very small compared to x and d . The lowest value of L would thus be obtained if X were close to F and if the trajectory were perpendicular to the direction of observation ($x = d$ and $\theta = 90^\circ$). This yields $L > 5.8$ m, but the value of L increases with the distance x and it depends on the inclination of the trajectory (angle θ). At B, the *angular length* φ of the luminous panels was equal to the apparent angular separation of the two poplars. This value is independent of the position and inclination of the trajectory. Since $d \tan \varphi = (s \cos \beta)/d$, we get $\varphi = 0.3^\circ$, while the angular diameter of the Moon is 0.5° . We conclude that figure 3c represents *a really discernable coincidence*.

When the luminous panels were *seen from A*, their apparent angular length φ was greater, since the row of panels was less oblique for the observer and since they were passing at a smaller distance (figure 16). At the beginning of the new investigation, it was only stated that the angular length was equivalent to *several times the apparent diameter of the Moon*. AM asked again somewhat later. The answer was then 3 to 4 times, which would yield an angular size φ of 1.5° to 2.0° . At the present stage, he asked AA to increase the precision, since that would allow us to determine other parameters. The Colonel provided then *three different estimations* of the angular length of the luminous panels, made at the initial observation site A.

1. The apparent angular length was about $\frac{3}{4}$ of the thumb at arm's length or $1.9/65$ (in centimeters), which means that $\varphi = 1.7^\circ$.
2. It was smaller than about $1/5$ of the width of the group of trees, which emerges above the horizon near Les Mottes (figure 2). This yields a ratio of about $50/1280$ (in meters) or $\varphi < 2.2^\circ$.
3. The ensemble of luminous panels was at least 5 times longer than the second lowest transverse tie of the Mellery tower. Knowing that the tower has a height of 160 m, this value (15 to 20 m) could be determined by photography. This amounts to 75 to $100/7000$ (in meters). It follows that $\varphi > 0.6^\circ$ to 0.8° , but this value is the least certain.

Taking into account all these values with some estimated weighting factors, we can adopt the value $\varphi = 1.7^\circ \pm 0.3^\circ$. Actually, we had started with the assumption that the trajectory was simply parallel to the Sart Ernage Street between A and B, so that $\theta = \sigma$, but it turned out that the results did not correspond to the impressions of the Colonel. That's why we left the value of θ undetermined and did only use the estimated value of φ at the observation point A. This value depends on *the real length* L of the luminous panels, which for a rigid flying object, should be the same at A and B, but also on parameters that depend on the trajectory of the UAP.

It follows from figure 16 that the distance D between the object and the Sart Ernage Street is a linearly increasing function of the distance y between the observer and the point B. The distance between B and the crossroad at Tri Masset is 588 m (figure 2). Since the point A corresponds to an electrical appliance at the side of the road and since the measured distance $AT = 58$ m, we get for the point A the value $y = 530$ m. The apparent angular length φ depends then on *the apparent length* L' of the panels and their distance D by means of the following relations:

$$\text{tg } \varphi = \frac{L'}{D}$$

$$L' = L \cos(\theta - \sigma)$$

$$D = (y + x \cos \sigma) \text{tg}((\theta - \sigma) + x \sin \sigma$$

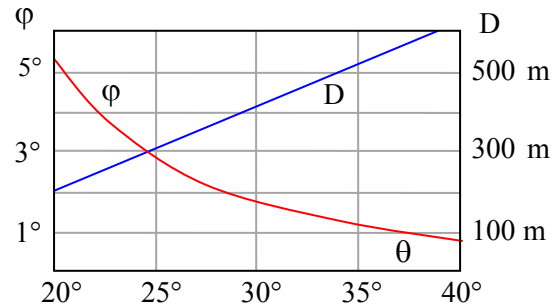


Figure 18: The angular length φ and the distance D of the panels at A *versus* inclination of the trajectory.

The graph corresponds to $x = d + 20$ m, and thus to a trajectory that passes close to the poplars at F, as indicated in figure 16. Numerical calculations reveal that ***the most probable angular length $\varphi = 1.7^\circ$ corresponds then to $\theta = 30.6^\circ$ and $D = 430$ m.*** When $x = BX$ is increased up to $x = d + 100$ m, the distance D increases, but the angular length φ is nearly not affected. The graph shows however that the value of φ is very sensitive to a decrease of the value of θ . For the observed value $\varphi = 1.7^\circ \pm 0.3^\circ$, the angle θ could be situated between 28.7° and 33.0° , while D would vary between 390 m and 480 m when $x = d + 20$ m. For the particular case where the trajectory is assumed to be parallel to the Sart Ernage street ($\theta = \sigma = 21.8^\circ$), we would get $D = 250$ m and $\varphi = 4.2^\circ$. AA told us that this distance was too small and the angle φ was obviously too large. We could thus demonstrate that ***the trajectory was not strictly parallel to the Street*** between A and B, although this was difficult to appreciate by means of separated, successive observations.

The advantage of a set of equations is that many parameters or variables are related to one another, so that initially hidden information can be made apparent. This is comparable to an iceberg, where the submerged and visible parts are interconnected. We will now use *the most probable value for θ* to find out how the distance x between the trajectory and the observer at B would affect the values of the velocity v of the flying object, the length L of the panels and their height H above the ground. We established already general formulas for v and L . The height H follows from the fact that the line of sight passed at $2/3$ of the height of the poplars situated at F. Since their average height was about 29 m, the line of sight passed at about the height $h = 19.3$ m, seen at the distance $d = 574$ m. This means that $H/x = h/d$. Since v , L and H are linear functions of x , we consider only two particular cases:

Distance BX	Velocity v	Height H	Length L
$x = d + 20 \text{ m}$	13.6 km/h	22.6 m	11.7 m
$x = d + 100 \text{ m}$	9.5 km/h	25.6 m	13.3 m

The luminous panels reappeared behind the farm of Sart Ernage “at the height of the last third of the row of trees” (appendix 1). This means that the line of sight passed at about the height h , seen at a distance $g = B1G = 582 \text{ m}$. Since the distance $u = B1Y = 660 \text{ m}$ for the trajectory of figure 16, we would get $H/u = h/g$ or $H = 21.8 \text{ m}$. This is sufficiently close to 22.6 m, to confirm the hypothesis of a horizontal motion. If the object turned toward the street behind the farm, the value of u would be smaller and the agreement would be improved, but the estimation of the angular height at B1 was probably not precise enough to make such an inference, reducing the value of v . In the following section we will only consider such a turn after reappearing at Y.

We also tried to estimate the height of the object at A or some other point between A and A1. To do that, we have to remember that when the UAP was seen from inside the car, AA had to incline his head towards the right front window to see the lights at its upper boundary. We can assume that the eyes were then approximately at a distance $d' = 99 \text{ cm}$ from the window and at an altitude $a' = 104 \text{ cm}$ above the street, while the upper side of the right window was situated at an altitude $h' = 120 \text{ cm}$ above the same level. The last value takes into account the measured inclination of the street. The UAP was flying at a height H' with respect to the same reference level and at a distance D . We get then the relation $(h'-a')/d' = (H'-a')/D$. When D is of the order of 320 m (figure 16), we get $H' = 53 \text{ m}$, but the uncertainty is rather high, since estimated small distances are used to calculate larger distances.

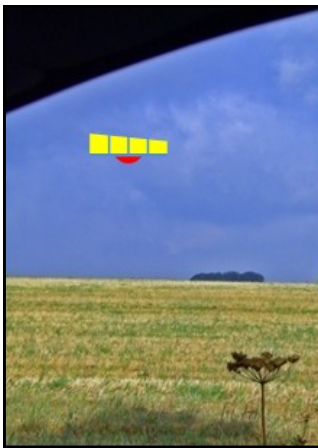


Fig. 19: Lower elevation.

Maybe, the height H of the luminous panels was progressively decreasing when they were seen between A and A1, but even at the beginning of the observation, the object was flying at a much lower altitude than 200 to 300 m. To evaluate the angular height of the UAP when it was approaching the poplars, AA took a picture from inside the car and a second picture, after indicating by means of yellow scotch tape the place where the UAP had appeared on the front right window. Then he reconstructed the probable view (figure 19). Even if the UAP was advancing at a constant height H , its angular elevation H/D had to decrease, since the distance D was increasing. We also know that the apparent angular length ϕ was reduced between A and B from about 1.7° to 0.3° . Although some evaluations remain somewhat imprecise, we are pleased that so much could be brought to light by indirect methods.

6. Conclusions and Overview of the Events at ERNAGE

Let's now put together the results of our analysis, which was strictly limited to phenomenological aspects. No preconceptions and no speculations concerning the nature or origin of the UAP have been used in the course of this analysis. We simply took into account what the witnesses observed and told us, without claiming *a priori* that they are *not* trustworthy. Actually, there is no objective reason for rejecting or modifying their testimony, although the reported facts are unusual. They boil down to the ***observation of a flying object that had very peculiar properties.***

There were *three witnesses* who saw lights that seemed to belong to a rigid structure, but, for them ***the object itself was optically invisible and it made no audible noise***, although it was observed at relatively close distances, in general less than 500 meters. This was even the case at a distance of about 100 m, when the object performed its highly remarkable maneuver. For any familiar motorized flying object, it would certainly have been accompanied by very intense noise. The circumstances for hearing sound were excellent, since both witnesses were standing outside the car, while its engine was shut down. There was no traffic on this isolated country road. Even the wind was blowing in a favorable direction (figure 2). Moreover, the moon was illuminating the landscape, but the surface of the object did not reflect or scatter this light. Even the outlines of the object could not be discerned, while trees at the horizon were clearly visible. It is also very astonishing that Mrs. MARITS saw the ventral side of the motionless or nearly motionless object in a practically ***vertical position***.

We could prove in a rigorous mathematical way, by analyzing the passage of the object behind the poplars at the farm of Sart Ernage, that it was ***flying at very low altitude and very low speed***. It appeared with certainty that the speed was lower than 17 km/h. For the trajectory of figure 16, it was 13.6 km/h. It would even be lower if the object passed more than 20 meters behind the rear row of poplars. Thus, we can say that the speed was only of the order of ***13 km/h***. This value is based on different evaluations of the angular length of the ensemble of luminous panels when they were seen from the point A. We could also ***determine the orientation of the trajectory*** with respect to the Sart Ernage Street between A and B. The observation of the passage behind the two poplars of figure 3c led even to a determination of ***the total length L of the ensemble of luminous panels***. For a trajectory that passed about 20 meters behind these poplars, we get a length L of the order of ***12 meters*** and it appeared that the craft was ***flying a height of only 23 meters above the ground***. At the beginning of the observations made by the Colonel, the UAP passed at a distance of about 430 meters.

The mathematical analysis shows that various declarations of the principal witness are logically consistent and that initially unknown parameters can be determined by an optimization process that takes simultaneously into account several restrictions. Even if the trajectory were not linear, the conclusions in regard to the upper limit of the velocity v and the length L of the ensemble of luminous panels would be identical. The height H would increase for increasing distances from B, but this distance can't be too high, to avoid unreasonably low velocities. Our initial aim was to verify whether ***the trajectory***, which had been proposed by the first investigator, was realistic or not. We proved that it was notably closer to the witnesses and discovered several other, initially not apparent facts.

We propose now the ***probable trajectory*** of figure 20. It includes the observation made by Mrs. MARITS (at M), although the object she saw was motionless or slowly moving. Indeed, figure 7 suggests, that it departed towards the East, since triangular platforms of the Belgian wave did usually move with one white light at their front edge. The time sequence seems to be consistent, but since we are not absolutely sure of the day, we represent this part of the probable trajectory by an interrupted line. Then the trajectory becomes nearly parallel to the Sart Ernage Street between A and B.

Although this could not be directly observed, we feel obliged to accept that the flying object ***changed its heading*** after its passage behind the poplars at the farm of Sart Ernage. Otherwise it would have been too far out before it turned towards the witnesses, standing at C. We indicate this part by an interrupted line and - in agreement with the report of the first investigator - we consider that the object turned towards the witnesses when it was seen in the direction of the farm of *La Gatte*. (figure 2). Unfortunately, we cannot ask the first investigator any more or rely on his notes, since he deceased. The ***interrupted line*** means also that the exact distance of approach is not known, but this sequence

didn't seem to last very long. The UAP had to close in along a linear course, since they only saw the circular front light. We assume that it turned at about 100 m from C and so sharply, that AA could follow this maneuver without moving his head or eyes, which implies an angle of about 30°. It is particularly astonishing that the object was even *flying very slowly and close to the ground during its very tight and climbing turn.*

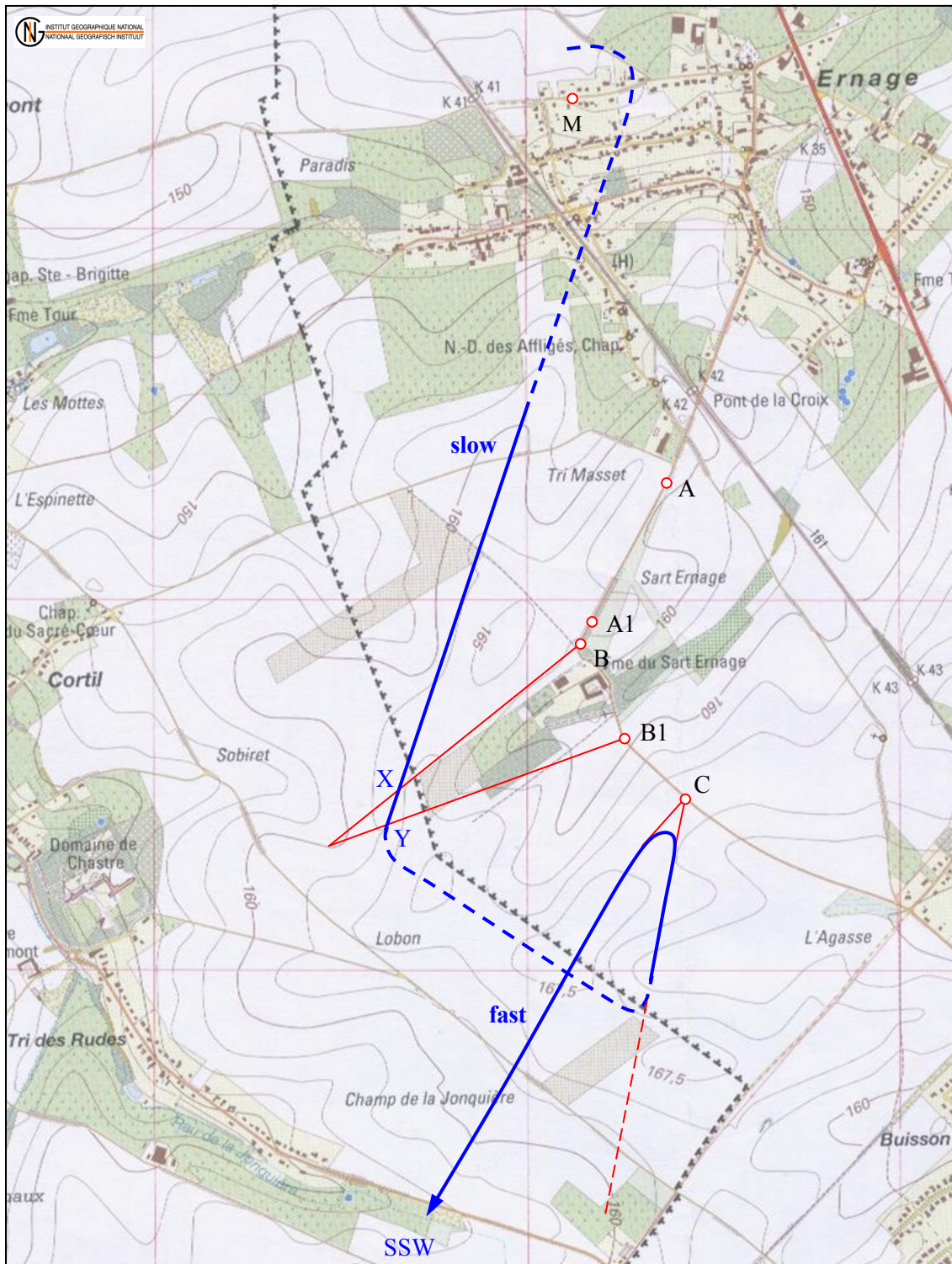


Figure 20: Probable trajectory of the UAP resulting from the observed facts and our analysis.
Topographic map 40, 5-6 (© NGI, 1:20 000, 2002).

Since the approaching object descended from an altitude of about 23 meters and seemed to arrive at “eyes level”, according to Mrs. AMOND, the U turn would be executed at *an altitude of only 3 meters*, if it occurred at a distance of 100 m. This turn was even more remarkable, since the object was flying at a *very low velocity*. This will require special consideration (chapter III). After the U turn, the craft departed towards the SSW in “about the time it takes for one breath”. We went as far as possible in our rational analysis of the observed facts and not further than that.

Summary of most probable numerical results

Distance from A when first detected: 430 m.

Distance from B when passing behind the poplars: 600 m.

Closest distance between trajectory and the poplars at F: 20 m

Altitude above the ground behind the farm: 23 m.

Estimated distance from C at closest approach: 100 m.

Resulting altitude at closest approach: 3 m.

Speed of the flying object before its rapid departure: 13 km/h, surely less than 17 km/h.

Length of the ensemble of luminous panels: 12 m.

Estimated distance between white lights on the ventral surface: 10 m.

Diameter of the approaching white light: 1.8 m.

Some significant events of the Belgian wave will now be analyzed from a technical point of view.

Chapter III: Analysis of Aeronautical Characteristics

1. Verifications made by the Belgian Air Force

Maj Gen Rtd Wilfried DE BROUWER reacted already in June 2008 to allegations that had been diffused on Internet for the EuroUfoNet list. Indeed, it had been claimed or at least insinuated that the Belgian Air Force never verified the possibility that the UAPs of the Belgian wave could simply be helicopters or some other conventional aircraft. The General considered that the initially published information (appendix 1 and 2) should have been sufficient to exclude the helicopter hypothesis, in particular for ERNAGE. Nevertheless, *he wanted to verify whether there was a solid basis for this hypothesis* and visited this observation site before the new investigation began. He contributed to the present study and after we had access to the text of RL and his collaborators¹¹, it is adequate to quote the personality, who was in charge and surely more involved than so-called skeptics want to believe.

“Between 1989 and 1991, when the extraordinary UFO wave took place over Belgium, I was *Chief Operations of the Belgian Air Staff*. One of my responsibilities was the security of the Belgian airspace, which implies a continuous surveillance in cooperation with the National Civil Aviation Authorities (CAA). This surveillance is done by *four very powerful radar stations*, two civilian and two military, which are interlinked, so the on duty civilian and military controllers can call up at any time the registrations of any of the four radars. All radar registrations are recorded and these recordings are kept for a well determined period. The CAA is in charge of overall airspace management but, if any intruders would be reported, it has no means to intervene. Such intervention can be done by the Air

Force which has permanently two F-16 on a 5-minute Quick Reaction Alert (QRA) status. These F-16 are integrated in the NATO Defense system, but can also be used for national defense purposes.”

“The sighting of *Lt Col ir André AMOND (AA)* occurred less than two weeks after the events of 29 November 1989. The latter observations had been amply covered in the media and at the air staff we had received numerous questions on the origin and nature of these phenomena. Our first reaction was to verify with the CAA whether air activities had taken place during the evening of 29 November which could have explained the numerous sightings. The CAA replied that ***no flight plans*** had been introduced to operate in that area. Normally flight plans are mandatory for flights between sunset and sunrise, but in cases of military exercises and emergencies (ambulance or police), exceptions can be made for helicopters.”

“If an ***ambulance helicopter*** had been operating, the pilot should have contacted the relevant air-space surveillance authority and communicate the point of departure, point of arrival, intentions, etc. Furthermore, these pilots have to display a well specified transponder code, which makes them visible and easily identifiable on secondary radar.”

“Furthermore, that evening, no military exercises had taken place over Belgium. Also, the Light Aviation which operated three Puma helicopters on behalf of the gendarmerie confirmed that they had not been active in that region. It is worth noting that ***foreign nations***, even NATO partners are not authorized to operate over Belgium without previous approval. Such approval consists of a diplomatic clearance and a flight plan. A diplomatic clearance can be granted in a ‘package’ i.e. allowing a number of flights within a well defined framework and profile. But even if such diplomatic clearance has been granted, pilots have to file a flight plan before each flight, mentioning the flight profile, timing and relevant diplomatic clearance number. This is also valid for NATO exercises which have to be announced and authorized months in advance. They also have to follow the very strict national rules and regulations which apply during night flying. I would like to emphasize that NATO is not a supra-national body; member nations maintain their full autonomy and NATO, or any of its member nations, have no right to use airspace or territory of NATO Partners without prior authorization. Can one imagine, for example, that Turkey would conduct an exercise on one of the Greek islands without prior Greek authorization? Or that Canada would conduct a low flying exercise in the USA without prior American authorization? Certainly not!!! ... and Belgium has the same rights and privileges as any other NATO partner. Infringements would lead to serious diplomatic incidents”.

“In other words, depending on the case, the military and/or national aviation authorities are always informed of any aerial activities in night flying conditions. During the night of ***29 November 1989***, no such flights had occurred in the area where the sightings had been reported. Furthermore, a thorough investigation of the tapes of the Belgian radars revealed that no air activities had taken place which could have caused the reported phenomena.”

“Yet, the media were putting the defense authorities under pressure to give an acceptable answer to the numerous questions and in the air staff, we were desperate to find the nature and origin of these phenomena. Indeed, we found it very annoying that multiple witnesses reported air activities, which ***remained unobserved by our radars and had not been authorized***. We ordered the radar controllers to pay special attention to aircraft flying at slow speed and low altitude. In addition, if further sightings would take place, the Master Controller of GLONS - the radar station that is integrated in the NATO Air Defense system - received the authorization to scramble the two F 16 on QRA for on-site investigation.”

“During the week of **11 December 1989**, the secretary of Lt Col André Amond, who worked in the same building as the undersigned [WDB], informed my staff that his boss had made an observation of an unusual phenomenon in the area of ERNAGE. I asked for Lt Col AMOND to make a report and meanwhile verified whether this observation could have been caused by any fixed or rotary wing aircraft. The answer was that no flight plans had been introduced and that none of the four Belgian radar stations had registered any traffic that could have caused this phenomenon. Also, no exercises had taken place. Our conclusion was similar to the 29 November case: *we could not determine the nature or origin of this sighting*. Lt Col Amond sent his report to the MOD, but it remained unanswered.”

“At that time, I didn’t make an analysis of the different options which could have caused this sighting, which was one of the many reported that evening. Indeed, for the Air Force it was clear that there was no air traffic in the vicinity of Ernage at the time of the observation and the Air Force was not supposed to make any official inquiries such as interrogation of witnesses. The policy of the Minister of Defense was that, as long as there were no incidents, we had to limit our role to providing information on air activities to SOBEPS for supporting their investigations.”

2. ERNAGE revisited

“Nevertheless, some discussions started afterwards and it appeared that the map that was made by the SOBEPS investigator early 1990 and published in the first book of SOBEPS² was not fully correct. Still interested in this case and reacting to a rumor that the Ernage sighting was caused by a helicopter, I went to talk to AA, earlier this year [in 2008]. It should be said that I was convinced that his sighting was not caused by a helicopter, because I fully trust the Belgian airspace surveillance system and helicopters cannot remain unobserved by *radar*. In particular, the area where the sighting took place is flat and it is impossible to fly in a valley for avoiding radar detection. Nevertheless, I wanted to verify *technical evidence*, whether the helicopter option was a valid assumption.”

“We visited the place of the sighting and - in my opinion - AA’s story in 2008 was consistent with his declarations of 1989. He had drawn a more accurate map with the estimated track of the UAP and he gave me complementary details of his experience. I wanted to verify, however, whether *the data provided in VOB1* (appendix 1 and 2) contained evidence to conclude that the Ernage case was possibly caused by a helicopter or whether it excluded this hypothesis.”

“In his letter to the Ministry of National Defense (appendix 1), AA had been very brief. He didn’t mention what happened before he passed the farm of Sart Ernage, but he reported that he saw “*three to four light panels at the height of the last third of the row of trees behind the farm of Sart Ernage*.” These trees are much closer than those near the ONE colony (figure 2). At the observation site, it was obvious that the witnesses couldn’t have seen the passage of the UAP behind the much more distant trees at the horizon, but this was already apparent through the computer simulation (VOB2 and figure 4). The details reported by AA called for a good angular resolution, which is incompatible with a distance of about 1.5 km, while the fir-trees at W are situated at less than 400 m from B1 (figure 2). Since VOB1 reproduced the “probable trajectory” that the first investigator had drawn, it was also known that some observations took place already before AA passed the farm of Sart Ernage”.

“AA explicitly stated (Appendix 1) that while he was driving (from B1 to C) at a speed of 50-60 km/h, “the light panels drop behind”. If the UAP had been far away, AA would normally have had the impression that it followed him at the same virtual velocity, but at point C he had to wait for the UAP

to catch up with him “The UAP, which *moves slowly* at my right, overtakes me and continues in the same direction.” Clearly, the UAP’s velocity was lower than 50 km/h. VOB1 suggests 30 km/h. This already *excludes that the UAP was a fixed-wing aircraft*, which cannot operate at such slow speeds. Nevertheless, it could still have been a helicopter, dirigible, blimp, RPV (remotely piloted vehicle), or ULM (Ultra Light Motorized). We will thus consider these hypotheses.”

“Regarding the option that the UAP would have been a *helicopter*, it should be recalled that *the normal cruising speed of a helicopter is approximately 180 km/h*. While AA was driving 330 m (from B1 to C) at an average velocity of less than 50 km/h, a helicopter would normally have flown during the same time interval, a distance that is at least $(180/50) \cdot 330 \text{ m} = 1188 \text{ m}$. The car would have stayed behind and not the UAP. The thesis that a helicopter is able to move very slowly is not convincing. *Helicopters and VSTOL* (Vertical/Short Take off and Landing) aircraft such as the Harrier can fly at very slow speeds, but flying at less than 30 km/h would be *a nearly hovering condition*. They never do this without any obvious purpose i.e. for landing, rescue operations, etc. The reason is that *they have then to fly with high power settings*, implying very high fuel consumption per NM and generating a lot of noise. In addition, they would barely cover any distance and would permanently be in a critical flying envelop, where engine failure can be fatal. Furthermore, no helicopters were stationed nearby, while the Harriers were operating from the eastern part of West Germany. For them, ER-NAGE was obviously out of range.”

“Another important point is that AA mentions twice his estimation of the duration of the sighting. The first time, he declares that “this part of the observation took approximately *2 to 4 minutes*”. This relates to the initial part of his observation. The second time, he states that “the duration of the (whole) observation is estimated at *5 to 8 minutes*”. The initial investigator measured during his first reconstitution a total time of *10 minutes*. According to figure 20, the length of the trajectory followed by the UAP from the instant where AA discovered the lights at A until the object performed its maneuver at C is of the order of 2.3 km. At cruising speed, a helicopter would have traveled between 15 and 24 km during this period. In other words, the distances would not coincide with the timing. Even if the whole observation lasted only 5 minutes, the velocity of the UAP should have been less than 30 km/h. This also means that the helicopter hypothesis is not realistic. Nevertheless, RL and his collaborators prefer to believe that AA simply saw the ‘*SAE-330 Puma of the BAF*’. Let’s examine this assumption.”

3. Contours, Lights and Sounds

Belgium bought 3 Pumas (SE-330C) in 1973. In 1989, they were still in the hands of the “Light Aviation” of the Belgian Army, but the operational flights were for the benefit of and funded by the Gendarmerie. They were stationed in BRASSCHAAT near ANTWERP at 80 km from GEMBLoux. These Pumas had no infrared or laser equipment and were rarely used for night flights, since they had no sophisticated equipment for this purpose. This happened only for special missions of the gendarmerie or pilot training in the vicinity of Brasschaat. The gendarmerie took over these 3 Pumas in 1990.

When we have a closer look at the SAE-330 Puma helicopter (figure 21), we notice that its external features are significantly different from those of the UAP that the Colonel and his wife described. There is nothing that could be similar to *the striking protruding and pulsating red light*, underneath the large yellow panels. The mass and at least the contour of the helicopter should have been visible, especially in moon light. Although the SE-330 Puma has four windows on each side, they are *small, rectangular and not equally spaced*. The separations are not conform (figure 3a and 3b) and AA explicitly stated that “the panels were of *trapezoidal* form.” Moreover, we can deduce from profile draw-

ings and the known length of these helicopters that these windows have a length of about 35 cm. At 430 m, they would simply be similar to an ordinary light bulb (6 cm) seen at a distance of 75 meters. AA **would have seen light spots**, instead of homogeneously illuminated panels and this only on condition that the cargo space was lit with sufficient intensity. Helicopters don't fly in the dark with an illuminated cockpit or cargo space.



Figure 21: The SAE-330 Puma.

This **would blind the pilots** and cause reflections in the windshield, which is extremely dangerous at low altitude. The pilots dim the instrument lights and the cargo lighting as much as possible. Could the cockpit be dark, while the cargo space was illuminated? No, since several mechanics and members of the personnel who knew the AE-330 Puma very well confirmed that the cabin was not separated from the cargo by a fixed partition. There was a curtain that was very rarely used because it was a hindrance to the flight engineer, positioned behind the pilots. Consequently, the cargo lights were only turned on to high intensity in case of extreme emergency.

The main propeller of the SE-330 Puma had 4 blades and was powered by two *Turbomeca* engines, each one of 1330 HP. Lateral control was maintained by a tail rotor. The system was known to be **very noisy**. The Gendarmerie had so many complaints in this regard, that it decided to replace the Pumas; first by *Alouette II* helicopters and later, by three *MD Explorer 900* (2 engines) and two *520 N* (1 engine). These MD helicopters are equipped with the NOTAR (no tail rotor) technology which reduces the noise to 60%. That was the main reason why they were selected. Members of the EuroUfoNet who observed rather silent helicopters did probably see this kind of technology, produced as from 1990. The Belgian Gendarmerie didn't use it before 1996. The Pumas, still used in 1989, were particularly noisy when hovering, landing or taking off. When flying a low speed, the measured sound level at 150 m was 85 to 90 dB, depending on wind direction. However, AA and his wife heard nothing, even when the object executed its maneuver at close distance.

4. The Head Light and the Turning Maneuver



Figure 22: Landing lights of a SAE-330 Puma.

The head light of the SAE-330 Puma has only a diameter of approximately **25 cm** and a power of 250 Watts. However, the light that approached the witnesses was totally different from the head light of a Puma landing in darkness (figure 22). It was bigger, white and had a sharply defined boundary, instead of being surrounded by a halo. The Puma has red lateral position lights and a blinking anti-collision tail light, which produces reflections on the main and tail rotor blades. It should also be noted that the landing Puma in figure 22 has no illuminated windows and that its outlines are clearly visible.

AA stressed the fact that the approaching white light (figure 5) was “enormous” and surely larger than those of transport aircraft. Moreover, aircraft and helicopters don’t fly over the countryside with their landing lights on. This light is normally used for landing when the gear is down. It can be switched on in flight with the gear retracted but it is fixed on the gear and it beams *downward*, not forward. The Belgian Puma helicopter had no search light to be oriented. No white lights, forming a large triangle and no great pulsating red light were present on its ventral side.

It should be reminded that Lt Col AA is a civil engineer and an experienced Army officer who was very familiar with helicopters. When he states that the red light was different from “the blinking red lights that are placed on normal aircraft”, *he knows what he is talking about*. The protruding, pulsating red light has been observed on three occasions: when AA saw the object from the side, when it turned away from him and when it departed from the scene. On all these occasions, his observations were consistent; he described the red pulsating light as unusual and unfamiliar.

The white head light had two times the diameter of the moon when approaching the witnesses. Since the diameter of the headlight of a Puma SE-330 is approximately 25 cm, it would have to be at a distance of *14 m* to reach the same angular diameter of 1° . At this distance the Puma is extremely noisy and the witnesses would certainly have felt the propeller wash.

AA wrote in his letter to the Ministry of Defense that the maneuver was “*majestic, slow*”. Is it realistic to assume that a helicopter could perform a very tight turn at very low speed, while climbing at a very steep angle? Since AA could follow this motion from the inside of his car, the UAP must have been less than 30 degrees above the horizon. Consequently, since the three spotlights appeared in an equilateral triangular disposition (figure 6), the angle of bank of the UAP must have been **60 degrees or more**. From an aeronautical point of view, *such a maneuver is very special*. Helicopters, in particular combat helicopters, are capable of making a turn with considerable bank, but only when they have sufficient altitude and are flying at higher speeds. Such flight conditions allow the pilot to use both kinetic energy (speed) and potential energy (altitude) to perform the maneuver. A Puma flying at very low speed (about 13 km/h) would have to dive steeply for making a turn with 60 degrees of bank.

When hovering or flying *at very slow speed* (here approximately 13 km/h), a helicopter has to keep its main propeller practically in the horizontal plane, so that the lift vector is opposite to the gravity vector. A helicopter pilot will then simply use the rudder (tail rotor or NOTAR system) to make a turn. ***A banking maneuver is not necessary and would be extremely dangerous at slow speed and low altitude***. The same principles apply to VSTOL aircraft, such as the Harrier. They can fly at relatively low speeds, but are excluded for several reasons such as noise, general appearance, lights and steep turns at low speed

5. Other Aerial Vehicles

Depending on their size, ***RPVs or Drones*** can fly at relatively slow speed, but not at the speed that was observed by AA. RPVs or Drones are noisy, small, have different lights and cannot turn and accelerate such as described by AA.

Although some ULM pilots may claim that they have been operating at night, normally they should be on the ground “before last night” (30 minutes after sunset). Nevertheless, several other factors such as the very low speed, great angular size of the head light, overall size, invisibility, absence

of noise, disposition and separation between the lights on the ventral side, acrobatic banking maneuver and the extraordinary acceleration from very low to a very high speed exclude ULMs.

Regarding the Dirigible or blimp option, these are not authorized to operate in the dark, except with a special permission. Such a permission was neither requested nor granted. In addition, a number of other arguments exclude this option. Only recently a British company reconstructed a Zeppelin type of craft that is of a reasonable size. In 1089, no large dirigibles were operating in Belgium. The size of the UAP was much larger than any blimp. The latter have totally different lights, would not pass unobserved, cannot make steep banking turns and can certainly not accelerate such as described by AA.

Also the option that the UAP was a hologram is excluded because there was no surface (clouds) to reflect images. In addition the UAP had clearly its own energy source such as for the headlight, beaming towards the car of the witnesses.

6. Summary and Conclusions of the Aeronautical Analysis

The following table presents an overview of different reasons that exclude various types of conventional hypotheses that might be proposed to explain the observations made at ERNAGE on December 11, 1989. A cross means exclusion. It is worth noting that the helicopter hypothesis is excluded for eight different reasons, which correspond to actually observed facts.

<i>Hypotheses and Reasons</i>	<i>Fixed Wings & NAEW</i>	<i>Stealth</i>	<i>Helicopter & V/STOL</i>	<i>Dirigible & blimp</i>	<i>RPV& Drone</i>	<i>ULM</i>
<i>No authorization</i>	x	x	x	x		x
<i>No radar detection</i>	x		x		x	x
<i>Very low speed</i>	x	x			x	x
<i>No noise</i>	x	x	x		x	x
<i>Grand maneuver</i>	x	x	x	x	x	x
<i>Size</i>		x	x	x	x	x
<i>Different lights</i>	x	x	x	x	x	x
<i>Acceleration</i>	x	x	x	x	x	x
<i>Witness perception</i>	x	x	x	x	x	x

Although Lt Col Amond and his wife didn't see the object itself, its behavior and the disposition of the lights were typical of the flying platforms of the Belgian wave. They had ***highly remarkable mechanical and aerodynamic properties***, since they could² remain stationary with very great inclination (as at Petit-Rechain) or even in a vertical position, with a simultaneous rotation around a vertical axis (as at Pont-de-Loup). These observations imply that the propulsion system of these objects allows them to ***develop a force that can be oriented to any direction with respect to the platform***.

Such platforms must have an unconventional propulsion system that can be vectored in any direction to compensate for gravity and other forces. More technical information on aerodynamic laws, turning performances and vectored propulsion is provided in appendix 3, but General De Brouwer concludes from his personal experience, professional expertise and consultation of other experts that *“at low altitude (about 23 m) and very low speed (about 13 km/h), medium size helicopters such as SE-330 Pumas cannot perform climbing turns with a considerable bank (60° or more), such as described by Lt Col ir AMOND.”*

We will now analyze and discuss two more events, presented in RL’s report as possible helicopter cases. They show how skeptics create confusion by means of unverified and unrealistic assumptions.

Chapter IV: Other Presumed Helicopter Cases and Skeptics’ Methods

1. PLANCENOIT, October 4, 1992

Lecler’s text was introduced (after his death) by a case that seemed to justify the helicopter hypothesis. **It concerns the observations made at PLANCENOIT, on October 4, 1992.** Let’s start with the facts. They were presented in Inforespace and VOB2, but these accounts¹⁴ were themselves based on a 21 page report, including a 2 page letter of the principal witness. He wrote it already on October 9, 1992, to inform SOBEPS, and both witnesses were interviewed on February 3, 1993. We integrate all available information, but give priority to the initial letter of the principal witness (PC). Here are the facts, as they were reported.

On Sunday October 4, at about **18:45** local time, Mr. and Mrs. C are in their car on the N271, leading from LASNE to PLANCENOIT, near WATERLOO. They have passed MARANSART. The Sun has set, but it is still light and the sky has a beautiful color. The Moon is visible as a crescent, but slightly veiled. The main witness (PC) is driving at 40-50 km/h and admires with his wife the beautiful scene. He also notices a plane, well identifiable, because of sharp outlines and clearly visible blinking position lights. Then, when he arrives at A on figure 24, his attention is caught by **a big luminous spot** in the sky, just in front of him. It is rather yellow, very brilliant and sharply defined. It has no apparent motion, but can’t be a star, since it is far too big for that and stars are not yet visible.

PC asks himself if this could be an aircraft that is approaching along the axis of the street, but he doesn’t see any position lights. Then he thinks *“I will see what it is, when I get closer.”* Thus, when he arrives at the point B, he decides not to follow his usual route on his right side. He continues straight ahead and tells his wife, who had been looking elsewhere, why he does this.

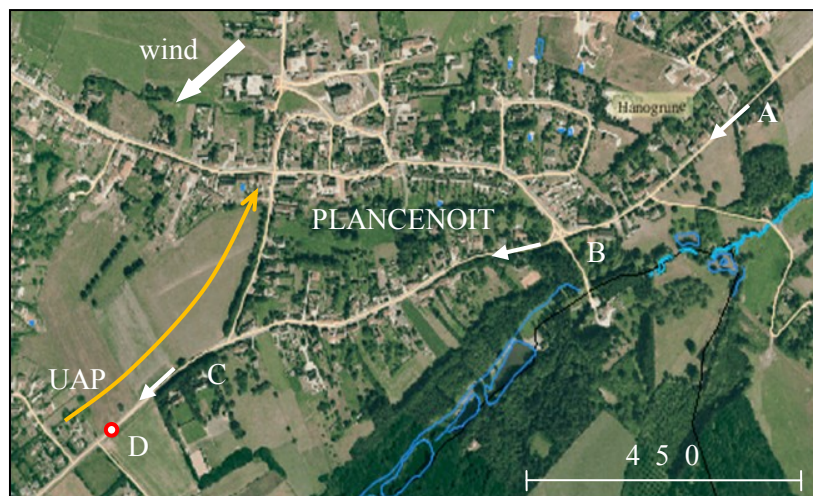


Figure 24: Observation site at Plancenoit near Waterloo.

If it was an aircraft, it had to fly at low altitude, since now they can't see it anymore from the mounting street. When they arrive at the top of the hill, it reappears as *a very brilliant and sharply defined light*, but it is now seen from the side. The light belongs to a larger, elongated structure. PC writes: "at first sight, I thought it was a plane. It had the same general form, and with some imagination *one might guess* the presence of a tail and wing-flaps, but *the form was fuzzy* and rather gray".

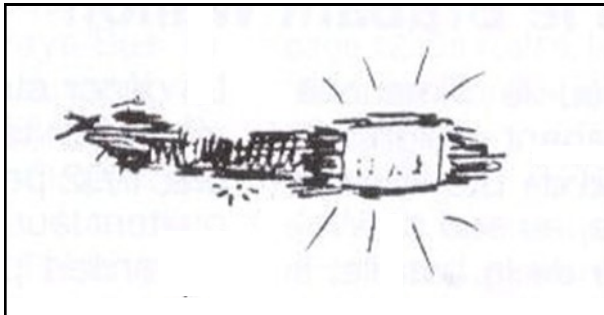


Figure 25: Drawing of the fuzzy flying object.

PC, who is a painter, made a drawing (figure 25). It can suggest that he and his wife simply saw a helicopter, but Mrs. C compared the structure to the arm of a crane. According to PC's letter, "the object was flying at our right, parallel to the street where we were on. The *slowness of its motion* did immediately strike me. Its size is significant, but I can't evaluate the distance". PC is also intrigued by the appearance of the flying object.

His wife asks him to *stop the car*. They are now at D (figure 24) and trying to find out what it could be. She opens the window, but they *don't hear any sound*. PC is astonished by the fact that "the light is coming from a large bay-window that occupies the largest part of the side of the body of this object. *This light is yellow and vivid.*" He adds in his letter: "I tried to distinguish position lights, but I saw nothing that could resemble the classical position lights of a plane. I vaguely saw *a weak, slowly blinking red light* under the machine."

After about 30 seconds, the object disappears behind trees and houses. PC doesn't follow it, since they are expected at the home of friends. The whole observation (from A to the departure of the object, observed at D) lasted about 3 minutes. PC notes that while driving to Waterloo, "we had the opportunity to compare what we saw with every day's banalities. The planes were moving at a higher velocity. Their outlines were sharp and the position lights were clearly defined." This is not the behavior of fantasy prone personalities, such as postulated by some skeptics to "explain" the Belgian wave. It is the rational procedure of people who are self-critical and eager to verify their observation.

The interview of both witnesses, conducted by Claire HAUZEUR, disclosed additional information. The apparent size of *the initially seen light* was comparable to the full moon: 0.5° . When he saw the light again, PC slowed down and inclined his body towards the right window to catch every detail. His wife was also observing the object now, but for their safety, she asked to stop at the side of the road and lowered her window. The object was slowly moving at an angular elevation of about 30° . The *angular length* of the object is *now* 7 - 10 cm at arm's length, or *5 to 8* $^\circ$. The large luminous "bay-window" is a rectangle with a curved lower boundary.

PC is not only painter. He studied biology and is accustomed to careful observations. When Mrs. HAUZEUR asks him, if he could draw the outlines more clearly than he did in his letter for SOBEPS, he says no, he couldn't, since only the "bay-window" was sharply defined. The contours were not clearly recognizable, *as if surrounded by some kind of mist*. Both witnesses are unanimous in this regard, which reminds us of the unanimity of Mr and Mrs AMOND in regard to the Ernage case.

Mrs. C is slightly shortsighted and didn't wear her spectacles, but she saw very well what she described as a "hole" in a grayish and not sharply outlined structure. To avoid misunderstandings, we

repeat that the outlines of the normal planes that they had seen were not blurred by some hypothetical local mist. PC tried to suggest in his drawing that he had the impression that he could perceive a “presence”. He confides to the investigator that he felt at first somewhat *uneasy or even anxious*. The point is that he had now abandoned the idea of a conventional aircraft. Being an artist, he had previously been preoccupied in his dreams by the UFO phenomenon and eventual visits of aliens. He felt now reassured: “*it’s only that*”. He didn’t even turn back to continue his observations, although that would have been possible. They were expected by friends, but later on, he regretted that he did not follow this flying object. It continued to move very slowly on a curved path, until it disappeared behind houses. The trajectory of figure 24 corresponds to the drawing of PC.



Figure 26: The US “Black Hawk” transport helicopter.

Wim VAN UTRECHT (WVU) did introduce Lecllet’s text, by comparing the drawing 25 with pictures of the *Black Hawk helicopter*. Its form is roughly similar, but closer inspection reveals significant differences. The door (added frame in figure 26) doesn’t have the same shape and relative size. The general outline and the rotor blades are clearly visible.

At dusk, the obligatory position lights would also be perceptible. If the UAP had been this type of helicopter, its length would be close to 20 m (actually 19.76 m). An apparent length of 5 to 8° would thus imply *a distance between 230 and 140 m*. Nevertheless, WVU seems to believe that it is possible that the witnesses didn’t hear any noise coming from the assumed transport helicopter. It is very noisy when flying at low altitude and low velocity, since it has two TE-700 GE turbines, each one of 1580 HP. WVU tries to explain that the witnesses didn’t hear any sound (p.2): “Every one of us has had the opportunity, during his life, to realize that *a weak wind blowing in the opposite direction* is sometimes enough for weakening or even masking completely a loud noise. Now, on that day, there was *a violent wind*, clearly specified at the very beginning of the (SOBEPS) report”.

We consulted the data sheets of the RMI in Uccle. The prevision for October 4, 1992 was: “Sunny but windy weather... Moderate or rather strong wind, but very strong at the coast from the NE.” The wind was also blowing from the NE at UCCLE (only about 18 km from PLANCENOIT), as well in the evening than in the morning of October 4. This is precisely *the opposite* of WVU’s expectations. Figure 24 shows even that the UAP passed at less than 100 m from the witnesses when their car was parked at D with an open window. The actual direction of the wind would have been favorable to **better noise propagation in the direction of the witnesses**.

It should be noted that WVU accuses SOBEPS¹¹ (p.2-3), since “*without the least hesitation*, the investigator and the editors built a beautiful UFO case. We however have only to look at the picture [figure 25] with some hindsight to realize that it obviously represents a helicopter.” The whole text of RL aims at showing that the observations of the Belgian wave could be explained in a conventional way. LECLLET proclaims (p.1): “*I shall show that most of them probably are only mistakes generated by military helicopters.*” WVU adds (p.2): “This happens since SOBEPS people are deeply convinced, from the beginning, that they are faced with UFOs and because they examine and process the facts one-sidedly.” He thinks that this “*witness probably saw a Black Hawk helicopter*” (p.3).

Indeed, this American Utility Tactical Transport Aircraft System (UTTAS) UH-60 has a very large door to jump rapidly to the ground, but why would this door be open in flight? Why should the cargo room be brightly illuminated? Why was the UH-60 not carrying any position lights? Why did PC draw a proportionately greater door, having a different shape? Why did he not even perceive the regular anti-collision and position lights? Why should such an American helicopter be flying at very low altitude at PLANCENOIT on a curved path? Why should it fly so slowly, with increased gasoline consumption? All these questions have not been answered and were not even raised, but WVU tried to explain why a large US military helicopter might have been present. His attempt merits further examination, since it sheds light on “skeptic’s methodology”.

In a Flemish journal, WVU found the following article: “End of September - beginning October 1992, **important military maneuvers** took place in the Belgian Ardennes. It was a joint German, Belgian, British and French operation called *Autumn Leave*. It required the deployment of 6000 men and a *multinational airborne division using big helicopters for quickly carrying units from one place to another.*” We verified, of course. Another newspaper¹⁵ also announced that maneuvers would take place **from September 17 to October 2**, but besides Belgian troops, there would only be 400 English, 80 French and 500 German soldiers. That’s very modest for an ‘important military maneuver’. Colonel AMOND had the best possible contacts for further verification.

We obtained access to the whole dossier (figure 27). The essential point is that it was only a **CPX** (Commando Post Exercise). Such a CPX exercise only involves “the commander, his staff and communications within and between participating headquarters.” In contrast to an *FTX* (Field Training Exercise), **it involves no troops and no heavy material**. In other words, it is a *maneuver on paper*, a simulation, although it requires a sufficiently large area, at the level of the Headquarter of the 1 BE Army Corps. This area is graphically defined in figure 27. PLANCENOIT and ELSENBORN were not included.

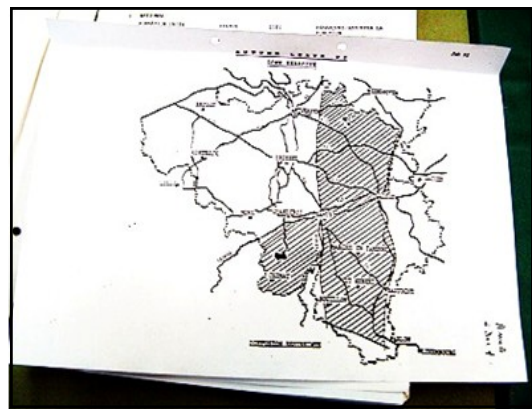


Figure 27: Region covered by the CPX

The only foreign participation was in the form of response cells representing Command Posts of the 24 (UK) Amob Bde and the 32 (GE) PzGrBde (Panzergrenadierbrigade). No deployment of troops, no Americans and no US Black Hawk Helicopters! The exercise finished on October 2. After this CPX, on October 4, 1992, there surely was no international maneuver in Elsenborn, since this camp has other functions and couldn’t accommodate an international maneuver.

2. EUPEN, November 29, 1989

The case, discussed under paragraph 6 in RL’s paper concerns the observations near EUPEN on November 29, 1989. For that day, a total of 143 independent reports have been collected (see VOB2, illustrations). 70 of them were investigated. Even today, there are still people who are willing to provide additional testimonies. In most cases, witnesses saw an immobile or slowly moving triangular platform, equipped with very large spotlights at the 3 corners and with a pulsating red light in the middle. Some witnesses, when they first saw the phenomenon, thought that they were dealing with a helicopter. This is a natural reaction; it is normal that people first revert to something they know as opposed to a mysterious craft. However, after observing these phenomena more thoroughly, they came to

the conclusion that they were not seeing helicopters or any other known aerial vehicle; they were very astonished by what they were seeing.

Nevertheless, by means of an amalgam of secondary, rumor like and sometimes false stories, RL and his collaborators associate most of these observations with helicopters of different types, without interviewing witnesses or taking all aspects of their reports into account. The observations of the gendarmes Hubert von MONTIGNY and Heinrich NICOLL were investigated and described by AM and the result of a very extensive complementary investigation is available on Internet¹⁶. It contains the literal transcription of a detailed interview of the gendarmes and the account of a long lasting discussion with Belgian skeptics. Actually, it is sufficient to take a look at *figure 1* of AM's article, to become aware of the basic problem: LECLET's suggestion that the gendarmes must have seen a helicopter results from ***not respecting the observed facts***. The color slide of a UAP, taken at PETIT-RECHAIN (near VERVIERS) in April 1990, shows an object that had the same shape and disposition of lights as this triangular platform. This photograph was subjected to intense scrutiny by highly qualified experts and scientist¹², but it was totally neglected in RL's paper.

Did the people around EUPEN and VERVIERS live in full isolation of civilization? Had they ever seen helicopters before? Did the Armed Forces – having helicopters themselves - ever consider the helicopters option? Not according to RL and his collaborators. According to them, during the evening of November 29, the area of EUPEN was invaded by silent helicopters of different nationalities and origin and the Belgian authorities, including the military didn't know anything about it. The first conclusion is that, Renaud LECLET took a very dim view of the intellect of the witnesses and the proficiency of the authorities concerned.

The reality is different. Such as explained in Chapter III, paragraph 1, the military and civil aviation authorities *must* be informed of all aerial activities in night flying and they have excellent capabilities to discover and track these activities. The military capabilities are integrated into the NATO air defense system and there is no way that individual nations which are linked into this system, can hide information from each other. It may be a problem indeed to detect very slow moving helicopters, but these are easily detectable at their normal cruising speed. Also, if necessary, ground radars can be tuned to detect targets flying at very slow speeds. In addition, aerial vehicles fly from A to B and back to A. They can be tracked in a logical way. When flying at 20 km/h, the radius of action of a helicopter would be limited to 20 or 30 km, depending on the type. Why would they be doing this; consuming high quantities of fuel for performing a task at 20-30 km from their place of departure while the same job could be done by a truck or a van in a shorter timeframe? Why would helicopters fly continuously at such slow speeds which would keep them permanently in a dangerous operating envelope? Does this make any sense? May we invite RL's collaborators to consult with helicopter managers and pilots before putting such assumptions on paper?

It is also suggested in RL's document that the military authorities wanted to hide these activities. In reality, it was just the opposite: the Air Force would have been more than happy to confirm helicopter or any other aerial activities to explain the phenomenon. It would have saved them a lot of trouble and they wouldn't have been obliged to send F 16s in the air at 3 occasions in an attempt to identify Unidentified Aerial Phenomena.

Such as mentioned in the introduction of this study, it would be too tedious to discuss all the assumptions which are discussed in RL's paper – the vast majority of these assumptions can be easily refuted – but let's concentrate on a few obvious cases related to the November 29 events.

Page 12: “At 5.20 p.m., on the N68 road, Hubert von MONTIGNY and Heinrich NICOLL were in their patrol vehicle near KETTENIS, when they were surprised to see a craft with three lights... Let us notice that several vehicles overtook the gendarmes and that the noise they made would already have been enough to mask that of a helicopter”. It is important to note that the N68 is not a highway and that the traffic is not continuous. The noise of a medium size helicopter at a distance of 150 meters is 85 db. It is impossible that a few passing cars would have masked the noise of such helicopter. Also, there is not one single type of helicopter which has the shape and the lights as described by the gendarmes¹⁵. The illustrations of helicopter spotlights in RL’s document are computer generated.

In the next paragraph, the helicopter option changes into a motorized hang glider! A hang glider with three enormous lights exceeding a capacity of 140,000 Watts! No doubt that this was a new design, which today, 20 years later, is not on the market yet.

A few paragraphs further on, we read: “It therefore seems that we have here an exaggeration in a testimony given a long time after the facts, which is rather frequent”. One of the two gendarmes gave his testimony at a press conference in Brussels on December 18, 1989. His statement was in line with his first report and that of his colleague and he clearly mentioned the three very strong lights. Is 3 weeks after the observation considered as a long time after the facts”?

RL even found out that the exercise area of ELSENBORN was surrounded by four different areas. Very good, but he forgets to mention that these areas were controlled by... ELSENBORN. He suggests that military people in ELSENBORN would not have known about a maneuver in Area 4. It is worth noting that the Camp of Elsenborn is at a distance of only 12 km in straight line from the town of EUPEN. Were they that stupid in ELSENBORN that they wouldn’t have known about a military exercise on their doorsteps? In addition, none of the Belgian authorities knew about it. This all was discovered many years later by so-called researchers, sitting behind their computer and surfing on the internet, even without consulting the people concerned. Is there any logic in this approach?

RL claimed that during the last part of their observations, Hubert von MONTIGNY and Heinrich NICOLL simply saw *Venus*. In his studies, AM provides scientific evidence that this planet did not appear and stay at the position where the gendarmes saw the UAP during approximately one hour¹⁶. Moreover, he provided evidence that it is not possible to explain the observed effects by means of natural atmospheric processes.

Then we read on page 14: “Dieter PLUMMANS says to have distinctly seen a red ball leaving the triangular craft and going down before rushing horizontally at a right angle”. It is suggested that it was merely a rather faithful description of **a flare dropped from a helicopter**. We can only advise the authors of this report to consult with people who know more about flares. We assume that they talk about *infrared countermeasure flares*, since illumination flares would light up the area. Normally, these countermeasure flares are fired sideways. The **burning time is 3.5 to 5 seconds** at very high temperature to attract and decoy heat-seeking weapons homing in on the aircraft. This burning time has to be limited because the flares could inflict fire on the ground. The flares have no sustaining propulsion system i.e. once burned out, they fall to the surface. When helicopters or propeller aircraft fire such flares, the initial pattern may be influenced by the propeller wash, but this is only a matter of 1 to 2 seconds. Has anybody ever seen such a flare descending vertically and making a 90° turn into the horizontal plane? No, because it is technically impossible!

Page 14, second paragraph: “Mr D... declared that the craft had strongly impressed him. What he saw was massive and powerful. The American or German Sikorsky **CH-53 Super Stallion** is very mas-

sive.”. This was a CH-53; what is next? Next is a **Super Puma & Cougar** (same paragraph), which is somewhat different from the CH 53. What is next? Next is an **ambulance helicopter**, which is certainly not a CH 53 or Puma! It is rather surprising that so many people in EUPEN would have confused their observation with an ambulance helicopter. An ambulance helicopter orbiting during more than 30 minutes over the town? This was certainly not an urgent case that required the intervention of an helicopter. EUPEN is a small town and people talked about their experience. Did anybody see an ambulance helicopter that evening? No. Did the people in EUPEN ever see an ambulance helicopter before? Or course, they did. Had they ever such an experience before? No. Did it happen again? No.

Next is a **CH 47 Chinook** (page 15). It should be noted that the witness was an *aeronautical construction engineer* who had been very surprised by the bright lights and the size of the UAP (larger than the width of the highway). The observation occurred in the vicinity of the airport of LIEGE BIERSET. The witness was so surprised that, once back at home, he phoned the airport. The controller assured him that no such craft had landed at the airfield, but according to RL, who was much less qualified than the witness, he didn't ask the right question. Next are (US) **Bell helicopters** (page 22), accompanying one F 117 Stealth! It was to be expected that the Stealth would come into the game! Knowing that the maximum speed of any type of Bell helicopter is lower than the minimum speed of the Stealth, it is totally absurd to make such assumption!

Next is the **AWACS**; this must have been the culprit. Page 14, last paragraph: “*Later on, around 7.20 p.m., two other gendarmes, Peter NICOLL and Dieter PLUMMANS, saw a craft that they took for the AWACS*”. None of these two gendarmes mentioned an AWACS. Peter NICOLL initially thought that he saw a dirigible. Page 14, last paragraph: “*The AWACS plane is used as cover for fighters, bombers and... helicopters during maneuvers or in war time. AWACS generally guides the other craft towards targets like sites to be bombed or enemy planes.*”

The Belgian Air Force repeatedly stated that the sightings of 29 November could not be related to air traffic over the relevant area. First of all, AWACS is not the correct acronym for the NATO E 3A fleet, which is stationed in GEILENKIRCHEN, Germany. The **E 3A** is basically the same aircraft as the Boeing 707, but with an air/air search antenna on top of the fuselage. This antenna is lit during training missions which distinguishes it from normal passengers or transport aircraft. It flies like any normal fixed wing aircraft and needs speed to stay in air (a minimum of 320 km/h). Practically all witnesses of the November 29 sightings saw a craft hovering or flying at **very slow speed** which could possibly have been an E 3A.

Initially, the E 3A function was called NAEW (NATO Airborne Early Warning). At a later stage it became **NAEW & C**. The C stands for Control, but this function was still under discussion in 1989. The Control function was to guide friendly fighters to intercept enemy aircraft. The NAEW had no function to guide offensive aircraft or... *helicopters* to their target, simply because the radar had no ground mapping option that was designed for that purpose. Only the US Air Force has aircraft (E 8) which have the Joint Surveillance and Target Attack Radar System (JSTARS). These aircraft have the air/ground radar in a pod underneath the fuselage but they are only used for supporting US operations. The JSTARS E 8 aircraft were used in Gulf War One and were not deployed in Western Europe.

When NAEW & C or JSTAR aircraft are operating, they are flying at approximately 30,000 Feet, **NOT at low altitude**, because this would reduce their detection range and make them vulnerable to enemy ground fire. The E 3A aircraft didn't have any function in Belgium; the only missions were training flights for pilots to learn how to handle and land the aircraft. Normally, the *Trainer Cargo Aircraft*

(TCA) version was used for this purpose, but since the unit in GEILENKIRCHEN had only one TCA, the normal E 3A was also employed for pilots' training. These aircraft used often the airfields of CHARLEROI and LIÈGE-BIERSET for training, mainly because these were equipped with the Instrument Landing System (ILS), a system that was not available at other Belgian military airfields. Also, several instructor pilots were Belgian and they were familiar with the environment. The NAEW aircraft which were often seen in the region of LIÈGE and CHARLEROI were making training circuits under control of the air traffic directors at these airfields.

The authors of RL's report expressed also another idea: "*It would be interesting to know whether the Geilenkirchen base staff warns BAF about each flight of its AWACS above Belgium...*" The answer is straight forward: such as any other aircraft, the TCA or E 3A's have to file a flight plan to enter into Belgian airspace. Also, the air defense and civil aviation radars would pick them up as soon as they go airborne and cross the border, and, on top of that, Belgian crews were fully integrated into the system. These would have been sacked immediately if conducting unauthorized flights.

The authors add: "*There is a great confusion on this subject*". Why is there such a great confusion on this E 3A topic? Simply because the skeptics promulgate wrong information.

When reading the RL paper on the 29 November sightings, we discovered multiple types of *silent helicopters*, belonging to different nationalities: the Germans with CH 53, the Dutch with Puma, The French with Super Frelon, the Americans with CH 47 Chinook, Black Hawks and Bell, ambulance helicopters. Some of these would have been firing flares. Even *a motorized hang glider* could have been operating! This all was complemented by the NAEW and F 117. Can one imagine the heavy air traffic in the Eupen area during the evening of November 29, 1989, and this all at low altitude at night without any air traffic control system and without authorization and the knowledge of the Belgians? Even more, besides the military airfields of Liege BIERSET and BEAUVECHAIN, the grass strips of SPA and JALHAY (military) would have been active (sic) but ... without knowledge of the military!

RL's document is full of contradiction, not only on the origin of the sightings, but also on the authority of NATO, the relationship between NATO partners and the attitude of the Belgian Military Authorities. At one place, the authorities knew, but they didn't declare it. At another place, it was NATO conducting exercises without informing the innocent Belgians (even while using their airfields). At another place, it were the Americans doing tests in preparation of Gulf War One, and finally the fall of the Berlin Wall would have caused agitation in NATO etc, etc. *An amalgamation of absurd arguments*. The reader can choose any option, since RL and his collaborators consider that they don't have to prove any of their arguments.

3. Skeptics' Methods

The above cases prove - in an exemplary way - that those who are attacking other persons, by accusing them to *believe without verification*, act themselves exactly in the way they detest so much. They neglect several aspects of individual testimonies, don't speak to the witnesses, disregard official declarations and draw conclusions based on unrealistic assumptions. The major part of RL's paper is based on pure fantasy. Helicopters that were flown into Belgium from all over the world, flying in formation with F 117 Stealth, operating below 20 km/h and remaining, in most cases, totally silent is a scenario that even Ian Fleming wouldn't have thought of for a James Bond novel. The fact that a ground inversion layer (RL's paper, page 18) would have masked the noise will come as a big surprise

to those who live in the vicinity of major airports. After so many years of complaints they didn't even know that, some days, thanks to a ground inversion layer, they are not supposed to hear the air traffic.

Is it the deliberate intention of skeptics to mislead people or is it innocence? In our view it's a combination of both. Skeptics are desperate to find an explanation for bizarre and unexplainable aerial phenomena and in their attempt to prove their theory that we are dealing with conventional technology, they inject unverified and even false background information. Here are some examples:

Page 18, third paragraph. Talking about colonel (not lieutenant colonel) De Brouwer, it is asserted that "*he acknowledges in an interview, he could not obtain information from NATO neither during nor after the wave*". This is a (deliberate?) misinterpretation of De Brouwer's statement that "there were no formal contacts between NATO and Belgium on UFO issues". The interpretation in RL's paper is absurd. Belgium has two permanent delegations in NATO and a few hundred Belgian officers and NCOs (Non Commissioned Officers) are fully integrated into NATO headquarters and staffs. The head of NATO's Plans & Policy Division was a Belgian Major General. The second in command of the Air Defense Sector 2 in UEDEM, Germany, was a Belgian Colonel. This Sector covers Belgium, the Netherlands and a major part of Northern Germany. It is an important link of NADGE (NATO Air Defense Ground Environment). Belgium was talking and still ***talks to NATO on a permanent basis, every single minute of the day***, and was fully informed and involved in military air activities and exercises, which took place in Central Europe.

Same paragraph: "*... the Defense Minister Guy Coëme ... in September 1990, forbid foreign aircraft to fly at an altitude of less than 150 meters above the Ardennes area, Belgian pilots remaining allowed to go down to 80 meters. This decision is officially made to prevent German pilots from coming over Belgium for training.*" The decision to raise the minimum altitude from 250 to 500 feet in the "Low Level Flying Area" - Eupen and Verviers are not in this area - was based on ***numerous noise complaints by the inhabitants***. This decision reduced the noise level by almost 50 %. German pilots, such as other NATO partners, were allowed to use this area¹⁷, on condition that they received proper authorization and didn't fly lower than 500 feet. The Minister's decision was not related to UAPs which... barely made any noise at all.

Next paragraph: "*To make a penetration test in an assumed enemy territory ...*" This would be rather difficult. At a speed of 20 km/h the penetration would be a local excursion.

At the bottom of page 18 "*that military helicopters often used special noise reducing devices*". Reference is made to a website that links to ear protection systems. These are passive, and it's not the noise that is reduced, but the effect of the noise! Could RL's collaborators be more specific on helicopter noise reducing devices? The military which have been consulted are unaware of their existence and are anxious to learn more about these gadgets.

There are many other examples of disinformation such as claiming that the wind was preventing the witnesses from hearing the sound while, in reality, in the ERNAGE and PLANCENOIT cases, the wind direction was favorable to propagate the sound in the direction of the witnesses. Furthermore, computer images were generated based on non-existing configurations without verifying the real configuration of the helicopters which were operating at that time.

Based on their artificially constructed platform, skeptics saturate readers by injecting multiple, imaginary and sometimes contradictory assumptions and hope that these readers will conclude that there are reasons to mistrust the declarations of the authorities and the testimonies of the witnesses.

Many of these witnesses feel betrayed, since they spontaneously reported their experience which, for them, was totally aberrant. Today, 20 years after the event, they are still hounded by doubtfully qualified skeptics who are broadcasting all over the world that they simply saw helicopters.

The problem is that a significant part of the population is prepared to accept the arguments of the skeptics. Indeed, it is an important mental step to admit that events are happening in our airspace which remain unexplained. For them, it is easier to believe superficial assumptions than worrying about unexplainable events. Apparently, this seems to be the problem with the skeptics; they are paranoid about the fact that many observations are unexplainable by means of existing technology.

Renaud LECLET and his collaborators overlook the fact that the Belgian Air Force and SOBEPS had enough arguments to conclude that the flying objects of the Belgian wave couldn't be helicopters or some other conventional aircraft. They judge the SOBEPS efforts as "insufficient", but forget that it was an amateur organization that had to rely on volunteers. Taking this into consideration, SOBEPS did a marvelous job. They conducted over 600 inquiries and compiled 20,000 pages of witness reports. Of course, mistakes were made, such as the drawing of the UAP track in the Ernage case. But who can blame them; it was merely impossible to conduct more than 600 full-fledged investigations with their limited human resources.

Nevertheless, the authors of the present study fully accept and support a critical approach in the analysis of UAP testimonies. This, of course, on condition that the analysis is objective and based on *real facts and data* and not on imaginary and unrealistic assumptions. Thus, it seemed useful to respond to the challenge of the skeptics to help them and others to realize that the real problem is more serious and profound than they perceived, so far. Their methods and strategy strongly contribute to the difficult process of recognizing the basic problem and investigating it in a normal rational way. Scientists are dissuaded to become involved in this topic and even the witnesses shy away from reporting what they saw.

This constitutes in itself a scientific problem. *Socio-psychologists, as well as philosophers and historians of science* should try to unravel the underlying motivations. They are related to the fact that some individuals and human groups tend to strongly resist changes of their basic ideas. Galileo was not simply condemned for religious reasons. The dominant ideas at that time were those of Aristotelian physics, where the center of the Earth was assumed to be the centre of the Universe, which seemed to be a finite, spherical one. That was assumed to be the only possible theory. Newton, Einstein and many others, who introduced fundamental changes in our way to view reality, encountered great difficulties, but resistance to changes of paradigm is only justified up to a certain point.

The following paragraphs summarize our findings and draw conclusions out of this study.

Summary and Conclusions

1. Summary

The most important elements of the testimony of Lt Col André AMOND have been reported in his *letter to the Ministry of Defense (MOD)*. This letter states that, together with his wife, they spotted

and observed an Unidentified Aerial Phenomenon (UAP) while driving during the evening of December 11, 1989, on a country road in ERNAGE, near the town of GEMBLoux in Belgium. The characteristics of this UAP were so unusual that it incited them to stop and observe its movements and behavior while standing outside, next to their car. At a certain moment, the UAP turned into their direction and came so close that it frightened them and made them decide to return into the car to leave the scene. When they were back in the car, the flying object turned sharply to the left, accelerated and darted away at very high speed. In his letter to the MOD, Lt Col André AMOND reported a number of *very special characteristics*:

- At the initial observation point, he saw three to four unusual trapezoidal “luminous panels”, with underneath a pulsating red light that was totally different from the blinking red lights of normal aircraft.
- Then he observed a steady and very slow movement of the light panels. The witnesses overtook them when driving at 50-60 km/h.
- When they observed the flying object, while standing outside the car, it suddenly approaches in a descending motion. They see then only an enormous white headlight that is larger than the light of big transport aircraft.
- The craft comes nearer, without any engine noise. This creates apprehension and fear, since it seems to be an aggressive behavior.
- Mrs. Amond asks to leave the place, but the Colonel sees that the object is making a sharp 180° turn to its left. Moreover, it is climbing, so that its underside is visible with three large white lights in triangular disposition and a pulsating red light in the middle. The white lights form an equilateral triangle and are separated by an estimated distance of 10 meters.
- The maneuver is majestic and slow, but after the very narrow turn and rising motion, the object accelerates and darts away at great velocity towards the SSW.
- The lights were always moving as if they were supported by a rigid structure, but the Colonel is very astonished that its surface “was not visible”. It didn’t reflect the light of the full moon.

During an interview a few weeks later, Lt Col AMOND added that the size of the white headlight that approached them was twice the size of the moon. It was then lower than the trees in the background and the intensity of the light increased. The whole observation lasted about 10 minutes. It was clear for the Colonel, that *this was not an AWACS, ULM, helicopter or hologram*.

It took until spring 2008 before a discussion started on EuroUfonet on the possible reasons for AMOND’s observation. This discussion was based on Renaud LECLET’s assumption, supported by a number of skeptics, that the UAP was a *“Puma” helicopter*. They backed their theory with computer generated images. Incited by their statements, the authors of this study decided to revisit ERNAGE and to undertake *a detailed analysis*. Besides the two witnesses, they also interviewed Mrs MARITS, who lives in ERNAGE and had reported a similar observation. The interview revealed that she had most likely seen the same UAP, a few minutes before Mr and Mrs AMOND. She described her sighting as three yellow/white lights in a triangular disposition with a pulsating red light in the middle, but she was too frightened to stay in place to see what might happen next.

The authors conducted a rational analysis, based on a careful gathering of observed facts, as well as field investigations and the acquisition of all the necessary maps and photographs to reconstruct the

events as they occurred 1989. One of the first conclusions of the investigators was that the drawing of the trajectory published in VOB 1, page 92, figure 2.21 was incorrect. The track followed by the UAP was much closer to the witnesses than depicted in this book. It was established by means of a purely logical analysis, using all the available data (figure 20).

The most probable numerical values of the speed, size and height of the UAP could be determined by solving a set of equations, relating previously unknown parameters to known ones. They were mainly determined by direct measurements and a combination of several angular estimations, made by the principal witness. This data was established shortly after the observations or in one instance (for ϕ at A) more recently, but in a very careful way.

When first spotted, the UAP was about 430 m from the witnesses. It passed at a distance of 20 meters and a height of 20 meters behind the poplars at the rear of the SART ERNAGE farm. By triangulation, it could be established that the object was flying there at a speed of about 13 km/h. The distance of closest approach, when the UAP was executing its climbing maneuver is not exactly known, but is very probably close to 100 meters, which implies that the object descended to a height of about 3 meters before it turned away. The length of the ensemble of luminous panels was estimated at 12 meters, while the diameter of the front light during its approach was approximately 1.7 meters.

The aeronautical analysis revealed that the UAP could surely not be confused with a helicopter or any other conventional aerial vehicle, in particular for the following reasons:

- No detection on surveillance radars, no authorization, no military exercises.
- No evidence at all for ambulance helicopters.
- Very slow operating speed and absence of noise.
- Unusual lights and no position or navigation lights.
- The carrying mass was not visible to the witnesses.
- Very high maneuverability at very slow speed and exceptional acceleration capacity.

Additional inquiry involving former Puma pilots of the Belgian armed forces revealed that *the Belgian Puma helicopters were not active that evening* and that the computer generated images in LECLET's report were unrealistic and based on incorrect assumptions.

This report was introduced with another observation that, according the co-authors should also be associated with a helicopter, this time a "Black Hawk" of the US Army. This sighting made by Mr and Mrs C at PLANCENOIT, near WATERLOO, occurred during the evening of **October 4, 1992 in twilight conditions**. They saw a very brilliant and sharply defined light that belonged to a larger, elongated, rather fuzzy structure. The light moved very slowly and the witnesses didn't hear any noise. Mr C made a drawing of this structure which was difficult to define. His drawing resembled a helicopter, but he was sure that this was not the case, because he couldn't see any rotors and didn't hear any sound. Mrs C thought that the form of the structure looked like a crane. Both witnesses were astonished by the brightness and sharpness of the light as opposed to the fuzziess of the structure, especially somewhat later, when they saw very clearly the outlines of normal aircraft in the approach of Brussels airport.

So-called skeptics associate this sighting with a **Black Hawk helicopter** because it has a wide cargo door, but their assumption is contradicted by a number of arguments. They also refer to a NATO

exercise that took place in the same timeframe. However, further investigation revealed that this exercise was a Command Post Exercise (CPX), which involves headquarters, but no deployment of troops. A CPX is an exercise on paper. Furthermore, PLANCENOIT was not in the simulated exercise area, the US Armed Forces were not involved in the exercise and no Black Hawk helicopters were deployed.

The last case in the LECLET Report discusses the observations of 29 November 1989 in the vicinity of EUPEN. Out of the 143 reported observations, 70 were investigated and the vast majority remains totally unexplainable. Most of the witnesses reported to have seen a triangular shaped object with large spotlights at the corners and a pulsating red light in the middle. The objects were capable of remaining immobile or moving slowly without making any significant noise. RL pretends that most observations could have been caused by up to six types of helicopters, operated by four different nations. These would have been complemented, possibly by a motorized hang glider, one F 117 and, eventually, the NATO NAEW. All these activities would have occurred during the evening of November 29, without the authorization of the Belgian authorities who didn't even observe any of these flights on their nearby early warning radars.

It was re-iterated that NATO is not a supranational body and cannot decide on any activities without prior approval of the member states concerned. All air activities albeit from NATO, its members or other nations have to be authorized by the national authorities of those countries which manage the relevant airspace. In addition, NATO headquarters consists of fully integrated structures which are staffed by officers and NCOs of member states; no activities can be planned without involvement of this international staff.

Another assumption in RL's Report was that the Belgian military would have known about the activities of November 29, but concealed them for unknown reasons. At a later stage, the same authorities would set-up procedures, have meetings with the different departments who were in charge of airspace management and security and send F 16 fighter aircraft in the air for identifying the UAP. Would they do that, while knowing what it was all about?

These assumptions are based on imaginary, totally unrealistic scenarios made up by unqualified skeptics. Declarations of witnesses and statements of authorities are disregarded, modified or misinterpreted in such a way that they bolster their assumptions. They omit to mention one assumption and that is that the authorities and also SOBEPS were right; the phenomenon could not be identified and the performances could not be linked to existing technology. Even today, 20 years after the events, the technology to perform as demonstrated by these UAP is not yet available.

Three witnesses saw sharply outlined lights, but not the supporting mass. Although there had to be a flying object, the light of the full moon was not reflected by its surface. Even its outlines were not detected by contrast with scattered skylight. This is also incompatible with the helicopter hypothesis and *calls for more profound scientific explanations*. Some well-observed but highly remarkable mechanical capabilities of the flying object indicate that its propulsion system is different from the usual aerodynamic ones. Should we simply deny the possible existence of such a technology? Shouldn't we try to understand what has been observed here and in so many other cases?"

2. Conclusions

The UAPs, so frequently observed during the Belgian wave *can't be explained in terms of helicopters or other conventional aircraft*. The so-called skeptics who propose this kind of hypotheses and propagate the rumor of simple perceptual errors or misinterpretations are not skeptical enough to be self-critical. Their incentives are ideological, they yearn after conventional explanations, but their arguments are not rational.

Our conclusion is straight forward. The sighting at **ERNAGE** on December 11, 1989 of Lt Col André AMOND and his wife cannot be related to any known aerial vehicle. In addition, the observations made at **EUPEN** on 29 November 1989 and at **PLANCENOIT** on October 4, 1992, provide further evidence for the occasional appearance of *unconventional flying objects* of unknown origin.

Our investigation was, through its inner dynamics, very interesting and surprising. The greatest difficulty resulted from the fact that much time had passed since these observations were made. Another difficulty was that sometimes, it was necessary to *combine various parameters through a set of relations*, but this allowed us to test the logical consistency of the data and to make apparent what was initially hidden. Basically, we learned more about *characteristic properties* of the observed unconventional flying objects.

At PLANCENOIT, the flying object displayed a great yellow light with sharply defined boundaries, while the structure of the object was *fuzzy*. At ERNAGE, there appeared several well-defined lights, but the surface and outlines of the object were *invisible to the witnesses, even at close range*. To our knowledge this is a feature that has not yet attracted sufficient attention. The *paradox*, which results from the fact that some aspects were easily observable, while other aspects were more or less hidden, can also be considered as an invitation to more curiosity and thoughtfulness.

We have to face the possibility that *some kind of intelligence* is directly and indirectly involved. This was the spontaneous impression of colonel AMOND, although he had no preliminary knowledge about UFOs and their manifestations. His impression resulted from the very peculiar behavior of the observed object. A closer analysis of technical details confirmed this perception. These objects have to be constructed and piloted or remotely controlled in such a way that adaptive and immediate actions and reactions are possible

The most important conclusion, in our view, is that a rational analysis of the problem of Unidentified Aerial Phenomena is necessary and potentially useful. *A scientific study of the observed facts and the propulsion system is recommended*. The only real "risk" is that we might learn something new. Curiosity constituted always the internal spring that led to the development of civilization. We should thus rather concentrate on the really observed properties and search for fitting explanations, instead of simply denying or misrepresenting what has been observed.

One of the possible very important implications is that there has to exist *an energy source that is unknown to us*. This is an absolutely requirement when considering interstellar voyages but it is already obvious when we reflect on what has been observed near the surface of the Earth. Why should it be uninteresting to try to find out what kind of scientific principles and new technology might generate this energy? Every human being who is ready to use his potential of curiosity and rational thinking should be challenged by these facts and has the responsibility to encourage this kind of research. It is true that *extraordinary claims require extraordinary evidence*, but the assertion that nothing special

did ever happen is also becoming an extraordinary claim that requires more convincing evidence than the superficial and speculative assumptions that we found in the report of Renaud LECLET.

Appendix 1: Letter of Lt Col Amond to the MOD

“This statement is based on a number of observations made on 11 December 1989 at approximately 18 h 45, while I was driving to the railway station of Gembloux, coming from Ernage where I reside. My spouse Chantal was with me and made the same observations. It was dark, the sky was full of stars and there was full moon.

Close to the Sart Ernage farm, I saw in the sky at my right three to four light panels at the height of the last third of the row of trees behind the farm of Sart Ernage, moving more or less in a North-South direction, coming from the radar tower of Mellery, overhead the villages of Cortil or Saint-Géry, proceeding towards Corroy. The panels are of trapezoidal form [figure 3a]. The size of these light panels does not vary and they are not at all dancing around. Under this series of panels, more or less in the centre, a kind of blinking red light is installed, but it is absolutely not similar to the blinking red lights that are placed on normal aircraft, which flicker like stars. The estimated altitude of this series of light panels is 200 to 300 meters.

The road where I am driving turns to the left at the Sart Ernage farm and leads to Gembloux. The light panels of the object follow this general direction. Driving at a speed of 50-60 km/h, the light panels drop behind. To continue my observation, I stop at the highest point of this country road, situated directly beyond the Sart Ernage farm. My spouse lowers the car window. The UAP, which moves slowly at my right, overtakes me and continues in the same direction. This part of the observation took approximately 2 to 4 minutes

Then the UAP suddenly turned into our direction. Only one enormous white headlight, much larger than any light of a large transport aircraft, is visible. I feel now a certain apprehension. My wife is scared and asks me to leave, because of the new direction taken by the object, which shows itself, with its enormous luminous mass, as being somewhat aggressive, especially since we didn't hear any engine noise... This craft was silent!

At the moment that the car was about to leave, the large headlight disappears and three white spot lights appear. They are smaller than the previous light and they form a more or less equilateral triangle. In the centre of gravity of this triangle, there is again the red revolving [actually pulsating] light, now seen in front view [figure 6]. Obviously, the object makes a left turn of 180° . The distance between the white light spots is estimated at approximately 10 meters. It seems paradoxical to me at this moment, that in spite of the moonlight, which makes it possible to see the landscape, we don't see any mass around the lights that constitute the triangle.

The UAP's maneuver is majestic and slow. The turn is tight, so tight that it is not necessary to move the head or the eyes to observe the UAP making its turn, like one does to follow the displacement of a Boeing or similar aircraft. Subsequently, the light spots disappear, only the revolving red light is still visible from the side. Very quickly, this light disappears in the darkness of the night in a SSW direction. The duration of the observation is estimated at 5 to 8 minutes.

Four characteristics impressed me: (1) the slow movement of the object as opposed to its speed at the end of the observation; (2) the mass, which had necessarily to exist around the lights, did not reflect the moonlight at all and was not visible; (3) the absence of any engine noise, it was too silent; and finally (4) the creation of apprehension and fear, in particular with my wife, because of this silence and the enormous headlight, situated in the front of the object that was aiming towards us.”

Appendix 2: Published Oral Statements of Colonel Amond

“The observation lasted several minutes during which I couldn’t hear any noise, even when paying special attention. The moon was at the other side of the observation and should have lit the object; yet I didn’t perceive any reflection and I didn’t get any impression of a [supporting] mass.

When the UAP passed in front of the wood, it changed its course - I don’t remember how- and a very bright headlight (2 x the diameter of the moon) was then directed towards us. Its intensity increased and the light was [now] lower than the tops of the trees [in the background]. My wife was scared and begged me to start the car. I felt myself a certain anxiety because, in my judgment, I was confronted with a rather aggressive behavior.

The car started without any problem. It was then that the UAP made a banking maneuver and that I saw three white lights in a triangular disposition, in an oblique climb to the right, the strongest light being directed towards the sky.

The [pulsating] red light was in the middle of the triangle [formed by the white lights]. Its apparent [angular] diameter was two to three times larger than that of the two lights at the base of the triangle, while the upper light was three to four times more intense than the two other lights. Dimensions: between 6 and 10 meters between the spotlights [forming a triangle].

The UAP settled with the red light underneath and disappeared quickly (10 sec) in a southern direction. I went to pick up my son at the railway station; we were back home at 19 h 05. The next day, I filmed the moon with my video camera to verify its functioning in the dark and I went the following evenings to the same place. In vain, [since the phenomenon, I never heard of, didn’t reappear]. After some hesitation - fear of the ridicule - I sent a letter to the Cabinet of the Minister of National Defense to report the events. For me, it was clear; this was no AWACS, no ULM, no helicopter and no hologram.”

Appendix 3: Turning and Vectored Thrust

Aerodynamic forces in a turn

At very slow speed, helicopters turn by using the tail rotor or NOTAR system while keeping the main rotor horizontally. Pushing one of the rudder pedals will result in a yawing motion that will turn the helicopter into the direction of the relevant pedal. At normal speeds, the rudder is not used for turning because, such as with other aircraft, the yawing maneuver would cause structural damage. Consequently, at cruising speed, helicopters, such as fixed wing aircraft, take bank to make a turn.

But *why is banking necessary* when aircraft have to perform a circular turn of radius r at a given velocity v . When this turn is horizontal, there are two conditions that have to be fulfilled (figure 23).

The weight W has to be compensated by a vertical force and one has to apply a force F that is oriented towards the center of the circular path, to draw the object again and again in this direction. There has also to exist a propulsive force along the direction of motion, to compensate the unavoidable effects of air friction, called aerodynamically drag, but in figure 23, we consider only the forces that are acting in the transverse plane, perpendicular to the axis of the aircraft.

When m is the mass of the object, the weight $W = mg$, where g is the gravitational acceleration. The force $F = ma$, where $a = v^2/r$ is the centripetal acceleration. **Both forces have to result from the aerodynamic lift L** , which is always perpendicular to the direction of the wings or the main helicopter rotor. For an inclination i , the vertical and horizontal components of the vector L are respectively equal to $W = L \cos i$ and $F = L \sin i$. By eliminating L , we get $a = v^2/r = g \tan i$. This means that **the radius of curvature r is determined by the velocity v and the banking angle i** .

This relation is represented by the blue curve in the graph of figure 23, for the particular case where $v = 13 \text{ km/h}$ and various values of the angle i between 20° and 80° . The red curve shows the variation of the required lift L , compared to the weight W . **A large inclination i** would allow for a small radius of curvature, but it **requires a very powerful engine or a higher speed** to produce the necessary lift. An additional climbing motion would even call for a greater vertical component of the lift than W and thus more power.

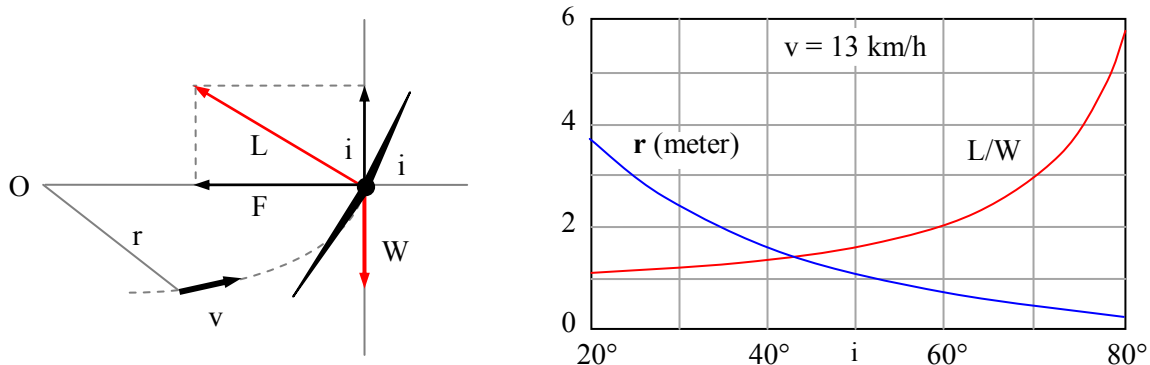


Figure 23: Banking conditions in terms of forces and resulting variations of r and L .

Application to a Flying Platform

The platforms of the Belgian wave were usually horizontal when they remained stationary or flew around at low velocities. This means that they produced somehow, but without wings, a lift force that was then perpendicular to the platforms. If the lift vector had also been perpendicular to the platform that AA saw at ERNAGE, a velocity $v = 13 \text{ km/h}$ and a horizontal turn with a banking angle of 60° would imply a radius of curvature $r = 0.77 \text{ m}$. This follows from the previous, unavoidable relations. We know that AA didn't have to move his head to observe the ongoing maneuver, but an angular width of 30° for the semi-circular U-turn implies a distance $r/\tan(15^\circ) = 2.9 \text{ m}$ between the center of rotation and the observer situated at C. That's too short and means therefore that the lift force was not perpendicular to the platform. It was closer to the vertical.

This conclusion has to be related to other observations made during the Belgian wave. The flying platforms had **highly remarkable mechanical properties**. There were cases² where they remained stationary at some very great inclination (as at Petit-Rechain) or even in a vertical position, with a

simultaneous rotation around the longitudinal axis (as at Pont-de-Loup). These observations imply that the propulsion system of these objects allows them to **develop a force that can have any direction with respect to the platform**. It doesn't require wings and the usual aerodynamic lift, which results only from different speeds of the air flow above and below the wings. Unconventional Flying Objects produce lift in a completely different way, and this fact is *a sufficient reason* to gather as much information as possible about this kind of phenomena and to try to understand what is happening, instead of obstinately denying its possibility.

When a platform remains (nearly) stationary above the ground in a vertical position, as for the observation of Mrs. MARITS at ERNAGE, the force developed by this system has to be (nearly) parallel to the platform, to compensate for gravitation. The maneuver of the UAP observed by AA and his wife at point C is compatible with the usual laws of physics, but **requires an unconventional method to develop the propulsion force**. It has to account for the centripetal acceleration (v^2/r) and for the over-compensation of gravity, which is necessary to allow for a rising motion. The analogy with a helicopter fails, since this object had no upper and tail rotors, but the great banking angle was not strictly necessary if the propulsion force could be vectored to any direction with respect to the platform. This means that **the banking could have been chosen to impress the witnesses**, as this was also the case for Mrs. MARITS. It is worth mentioning in this context that the two gendarmes of Eupen saw a rotation of 180° without any curve and without banking.

Skeptics defending the helicopter hypothesis¹¹, are unable to explain or prove that helicopters could physically perform the maneuver observed at ERNAGE. They simply provide pictures, extracted from a movie that was realized by computer animations, but *fiction shouldn't be confused with reality*. Today, we can also find, even on Internet, some videos of very astonishing helicopter acrobatics, but this doesn't change the fact that physical laws will impose limitations. Certain maneuvers require sufficient velocity and altitude to produce the required lift. Reduced mass and powerful engines will help. Since 2006, it is possible to produce mechanically resistant and yet very light and powerful helicopters. This is true for the EC145 *Eurocopter*, equipped with the 5-bladed **Advanced Technology Rotor** (ATR), without hinges or bearings. Like the NOTAR system, the ATR leads to a lower noise level, since the transmission of vibrations to the airframe are reduced. Nevertheless, the Unconventional Flying Objects that we studied have much more astonishing properties than that.

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[Complementary information will separately be provided in the form of video extracts.](#)