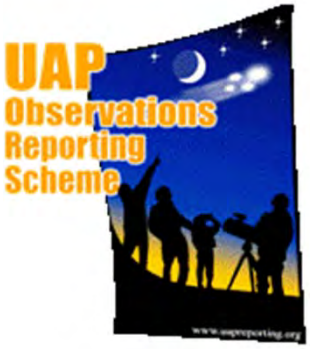

The Relationship Between Atmospheric Science, Unexplained Aerial Phenomena and Public Accountability:

A lecture on GEIPAN/CNES

(Groupe d' Etude et d'Information des Phénomènes Aérospatiaux Non Identifiés)

Philippe Ailleris, July 2012

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1. BACKGROUND

> *"…There is there a set of relatively disturbing phenomena which can one day receives an explanation which is not the one of a specific object, which could be some magnetic phenomena. But, at the moment, we are forced to recognize that there is something that we do not understand. There is also the multiplication, quite impressive, of visual observations of luminous phenomena sometimes spherical, sometimes ovoid and which produce extraordinarily fast movements. All these phenomena are phenomena to which we have to pay a certain attention.."* ***1974, Mr Robert Galley, French Defence Minister (France-Inter broadcast)***

Over the last 60 years, alleged observations of unidentified aerial phenomena (popularly called Unidentified Flying Objects, UFO) have generated intense interest and invaded the modern consciousness on a worldwide scale. Many thousands of people, from all walks of life and including numerous civilian, governmental and military credible witnesses, have reported UFO sightings. Although embedded in everyone's psychology and having gained the status of a modern myth, it is still necessary to give a definition of what the term, generally speaking, refers to:
"A UFO is the reported sighting of an object or light seen in the sky or on land, whose appearance, trajectory, actions, motions, lights, and colours do not have a logical, conventional, or natural explanation, and which cannot be explained, not only by the original witness, but by scientists or technical experts who try to make a common sense identification after examining the evidence."

Despite the fact that the majority of sightings can be attributed to the misidentification of natural or man-made objects (e.g. meteors, planets, rockets, space debris, satellites, weather balloons, illuminated party balloons) and a continuing lack of any scientifically acceptable evidence, the continuance of UFO reports, the apparent existence of a small residue of cases remaining unexplained after analysis and the direct association with extra-terrestrial probes, gives the subject a strong aura of mystery, fascination, popularity and controversy.

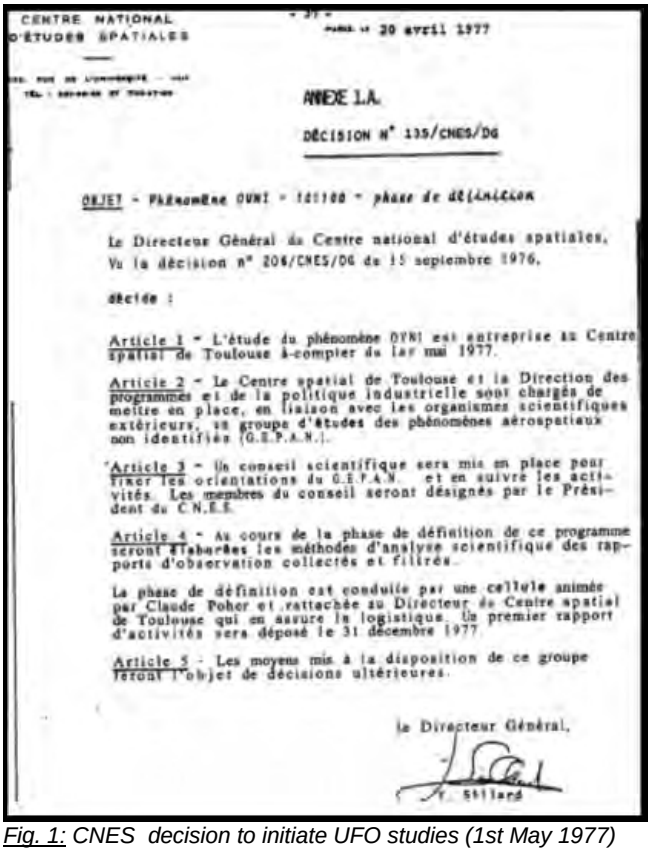
The need for legitimacy of the UFO phenomenon was stressed in March 2007 when France, via its space agency (Centre National d'Etudes Spatiales, CNES), became the first country to officially open its Unidentified Aerospace Phenomena (UAP) files to the public and announced that 14% of the total cases remained unexplained. The strong public interest was highlighted when the CNES web server crashed, overwhelmed by the flood of viewers around the world attempting to access the information.

Since many decades France has kept a close relationship with the UFO topic. As early as 1951 and the first sighting to be officially recorded by the French Air force and categorized as unexplained, the scientific offices of the Air Force headquarters were following the topic. The national French Gendarmerie had been tasked as early as 1974 to systematically gather the testimonies at national level, and three years later, the French government requested the CNES to set up a permanent group for the study of Unidentified Aerospace Phenomena. This was made official in May 1977 with the creation of the GEPAN (Groupement d'Etude des Phenomenes Aerospatiaux Non-identifies). This group had three main objectives:

- Social: the motivation to adequately reply to the public curiosity (population, political, scientific);
- Scientific: the possibility by studying UFO reports to increase the knowledge of our aerospace's environment;
- Security: the necessity to evaluate any eventual threat, natural or artificial.

As a matter of fact, many countries during the last 60 years have set up departments that collected, if not analysed UFO reports, such as the United States Air Force, the MoD in the UK, the RAAFF in Australia, and nowadays some South American nations, including Chile, Brazil and Uruguay. Similarly to the GEIPAN, all these departments systematically faced two major problems in their research:

- A strong culture of belief: The general public associates any strange aerial sighting to something exotic, unknown and to the possibility of extra-terrestrial visitors. Irrational thinking surrounds the topic (hoaxes, pseudo-science, conspiracy theories), hindering a rational and serious approach;
- The existence of a significant ''signal-to-noise'' ratio: The majority of reported UFO sightings are due to the misidentification of natural and man-made phenomena, caused by inexperience or misperception.



CENTRE NATIONAL D'ETUDES SPATIALES

Paris le 20 avril 1977

ANNEXE I.A.

DÉCISION N° 135/CNES/DG

OBJET - Phénomène OVNI - création - phase de définition

Le Directeur Général du Centre national d'études spatiales,
Vu la décision n° 206/CNES/DG du 15 septembre 1976,

décide :

Article 1 - L'étude du phénomène OVNI est entreprise au Centre spatial de Toulouse à compter du 1er mai 1977.

Article 2 - Le Centre spatial de Toulouse et la Direction des programmes et de la politique industrielle sont chargés de mettre en place, en liaison avec les organismes scientifiques extérieurs, un groupe d'études des phénomènes aérospatiaux non identifiés (G.E.P.A.N.).

Article 3 - Un conseil scientifique sera mis en place pour fixer les orientations du G.E.P.A.N. et en suivre les activités. Les membres du conseil seront désignés par le Président du C.N.E.S.

Article 4 - Au cours de la phase de définition de ce programme seront étudiées les méthodes d'analyse scientifique des rapports d'observation collectés et filtrés.

La phase de définition est conduite par une cellule animée par Claude Poher et rattachée au Directeur du Centre spatial de Toulouse qui en assure la logistique. Un premier rapport d'activités sera déposé le 31 décembre 1977.

Article 5 - Les moyens mis à la disposition de ce groupe feront l'objet de décisions ultérieures.

Le Directeur Général,

H. Stillard

Fig. 1: CNES decision to initiate UFO studies (1st May 1977)

The existence of GEPAN has always been somewhat of an anomaly among Western nations. Compared to the others countries' UFO projects that were all located in the military (and none were really given many resources for investigation), GEPAN was the only true civilian project. This is undoubtedly a very unique situation. Despite the strong controversy associated to the UFO topic, the fact that GEIPAN is still active 35 years after its inception constitutes a significant achievement.

Above all, it demonstrates that it remains possible to approach the UFO topic from a rigorous and rational angle, to develop relevant methodologies for studying unusual transient atmospheric phenomena, and to follow a long term and unbiased research.

2. GEIPAN : GROUPE D' ETUDE ET D'INFORMATION DES PHENOMENES AEROSPATIAUX NON IDENTIFIES

2.1 History of CNES' UAP research: From GEPAN to GEIPAN

Fig. 2: CNES entrance (Toulouse, France)

In 1977, the CNES Director General set up the GEPAN research group to pursue UAP studies initiated by a CNES engineer as a personal project. Its mandate was simple: conduct research into UFOs (as they are commonly called). The group's work was overseen by a scientific advisory board.

GEPAN continued its research until 1988, when it was superseded by SEPRA (Service d'etudes des Phénomènes de rentrées atmosphériques). As well as UAPs, the new unit also monitored artificial atmospheric re-entries, i.e. debris from space missions falling back to Earth.

In 2000, SEPRA refocused on the original mission of UAP research, albeit with limited resources. In 2001, the Director General requested an audit to help decide on the future of this CNES office. In 2005 and following this audit, the President of CNES decided to restructure this office. GEIPAN (Group of Studies and Information on Unidentified Aerospace Phenomena) replaced the SEPRA, with a key recommendation of informing the public in a transparent manner. This recommendation was reflected by a change of acronym (the supplementary 'I' corresponding to Information) and by initiating in 2007 the publication of the office's archives on a dedicated website.

Since 1977, GEIPAN has collected close to 6,000 reports from eyewitnesses, mostly on the ground but about 6% who observed phenomena from aircrafts. Once reported events have been grouped into different observation categories (see 4. Methodology), about 22% remain unexplained after investigation and analysis.

2.2 Objectives

GEIPAN is an integral part of the Centre National d'Etudes Spatiales (CNES)' missions and is responsible for:

- The collection of evidence of observations of PAN on the French territory;
- The analysis of the evidence to try to explain the observed phenomena (surveys);
- The testimonies' archiving. One important goal of this activity is to eventually allow the future study of the unexplained cases by the scientific community;
- The information and communication to the public. As such, GEIPAN has committed itself in 2007 to the publication on-line of all its archives.

Some might think that GEIPAN is a research organization dedicated to research of the existence of extra-terrestrial life or advanced alien technology. This is not the case, as this is neither part of its objectives nor falling under its competencies. This is consistent with the CNES activities, which is not a research organization.

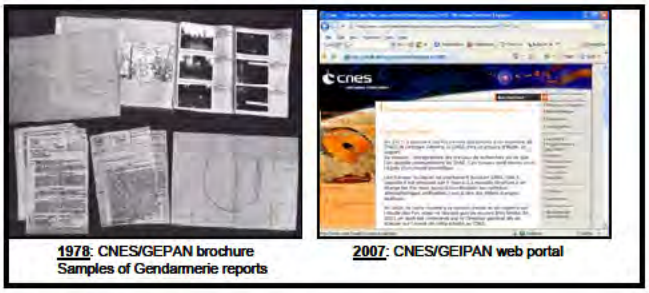
2.3 Working methods

GEIPAN is attached to the Directorate's Assistant Toulouse Space Centre. It is supervised by a Steering Committee, composed of representatives of civilian and military authorities of the country (National Gendarmerie, Civil Aviation, Weather, Air Force, Scientific Research), and of CNES representatives. This committee is tasked with analysing the GEIPAN results and make recommendations on future directions.

Firstly, GEIPAN relies on a panel of experts, which includes some thirty volunteers from multidisciplinary sciences, who are tasked to examine the most complex UAP sighting cases submitted to them. These experts provide a real scientific backing to the cases analysis.

Secondly, there are also the First Level Speakers (Intervenants Premier Niveau, IPN), geographically distributed across the whole French territory and who are volunteers participating in the evaluation of the UAP sightings. They are mandated by the GEIPAN for a specific mission and a limited duration, for going to the sightings' locations and make additional interviews with

the witnesses, if deemed required. These IPN must respect the survey methods that are defined in the GEIPAN investigating guidelines.



1978: CNES/GEPAN brochure
Samples of Gendarmerie reports

2007: CNES/GEIPAN web portal

Fig. 3: From paper files to the Internet

Thirdly, GEIPAN also relies on external parties to undertake UAP investigations:
- The agencies with which the GEIPAN has developed conventions, allowing a quick access to tangible information: National Gendarmerie, the Air Force, Civil Aviation, Maritime services, Meteo France.
- The scientific community: the CNRS (IMCEE among others), CEA (French Alternative Energies and Atomic Energy Commission).

The GEIPAN team consists of two GEIPAN CNES staff full-time: the manager and an assistant, who rely on external services and tools for:
- The study and expertise in information processing (monitoring and review of cases, statistical);
- The information management, formatting, making the information "anonymous", archiving of UAP sightings and other UAP related information.

The budgetary resources of GEIPAN come from the public service grant received overall by CNES to carry out its activities.

Period	Service	Responsible
1977-1979	GEPAN	Claude Poher
1979-1983	GEPAN	Alain Esterle
1983-1988	GEPAN	Jean-Jacques Velasco
1988-2005	SEPRA	Jean-Jacques Velasco
2005-2008	GEIPAN	Jacques Patenet
2008-2011	GEIPAN	Yvan Blanc
Since 2011	GEIPAN	Xavier Passot

Fig. 4: Heads of GEIPAN

2.4 Methodology

During its first five years, GEPAN developed scientific methods for collecting and analysing interdependent data. Since the 1980s, a rigorous scientific approach has also been applied to UAP-related investigations. This approach is still used today. Through agreements and conventions between GEIPAN and its partners (authorities, researchers, etc.), the unit has access to the information sources and observable data that it needs for conducting proper investigations.

These data come from:
- Eyewitnesses interviewed to ascertain their physiological and psychological profiles;
- Eyewitness accounts in the form of verbal and written reports to the authorities;
- Psychosocial factors assessed by looking at the influence of social environments, i.e. what eyewitnesses read, their education, media influences, as all these factors affecting the way people perceive and interpret phenomena
- The physical environment in which the phenomenon occurred, including the analysis of evidence on the ground, camcorder footage, photographs, atmospheric and astronomical conditions, etc…
- GEIPAN also relies on partner research bodies and experts to perform analysis in different fields.

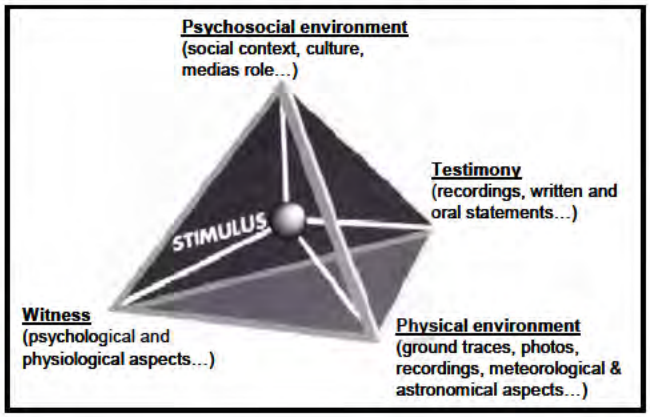


Fig. 5: The GEIPAN's tetrahedral approach for apprehending an UAP observation. Four aspects are systematically studied: the witness, the testimony and the physical and psycho sociological environments.

After analysis of all observable data, researchers attempt to determine the origin of the stimulus, i.e. the actual event the eyewitness saw and reported.

Afterwards, each UAP sighting case phenomenon is classified into one of the following four categories:
Cat. A: conclusively identified
Cat. B: probably identified
Cat. C: unidentified (due to insufficient data)
Cat. D: unidentified (after study)

In July 2012, The GEIPAN online statistics reflect the following percentages: Cat. A: 9%, Cat. B: 28%, Cat. C: 41% and Cat. D: 22%.
(basis of 1150 cases,
http://www.cnes-geipan.fr/index.php?id=196)

En cas d'observation

de bons réflexes pour témoigner

Vous observez un phénomène que vous ne pouvez expliquer, vous devez vous efforcer de retranscrire aussi fidèlement que possible :

1. La date, l'heure et la durée de l'observation.
2. Un schéma de l'observation.
3. La position du phénomène et sa hauteur dans le ciel avec un repère naturel ou humain, sa trajectoire à l'aide d'une carte détaillée.
4. Les formes, dimensions, couleurs, les mouvements particuliers et la disparition du PAN.
5. La présence ou non de bruit, d'odeurs et tout autre élément.

Si vous vous trouvez en zone de gendarmerie, vous ferez établir un procès verbal qui nous sera rentransmis.

- **L'anonymat des témoins est scrupuleusement respecté par le GEIPAN.**
- **Si vous souhaitez témoigner d'observations anciennes, un formulaire de témoignage est à votre disposition sur le site du Geipan.**

Pour envoyer votre témoignage :

>> par **e-mail** : geipan@cnes.fr

>> par **courrier** :
DCT/DA/GEIPAN
Centre National d'Etudes Spatiales
18 av, Edouard Belin, 31401 TOULOUSE Cedex 9

>> par **téléphone** : 05 61 27 48 01

cnes
De l'espace pour la Terre

http://www.geipan.fr

DCT/DA/GEIPAN
Centre National d'Etudes Spatiales
18, avenue Edouard Belin
31401 TOULOUSE Cedex 9

Tél. 05 61 27 48 01 - Fax 05 61 28 31 82

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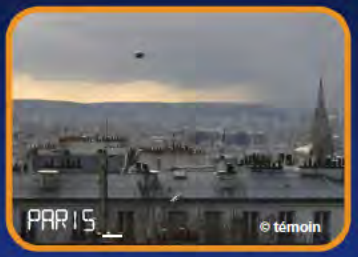
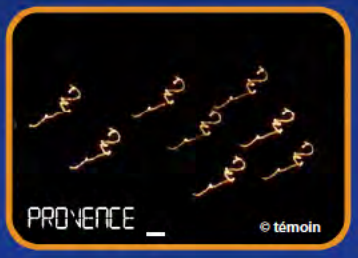
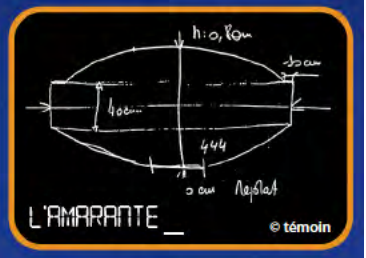
CENTRE NATIONAL D'ÉTUDES SPATIALES

geipan

Les Phénomènes Aérospatiaux Non Identifiés







Qu'est-ce que c'est ?

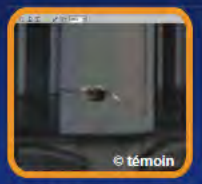
Voir page suivante >>

Qu'est ce qu'un PAN ?

Un PAN est un Phénomène Aérospatial Non identifié, inconnu des observateurs.

L'examen des témoignages et le résultat des enquêtes menées décrivent des phénomènes souvent lumineux, sans preuve de la présence d'un objet matériel et sans caractéristiques de vol.

L'acronyme **OVNI** (Objet Volant Non Identifié), largement utilisé par le public, désigne un cas de PAN où la présence d'un objet physique, pouvant avoir des caractéristiques de vol, a été avérée.



PARIS _

L'accroissement du nombre de photos reçues multiplie le nombre de méprises avec des oiseaux, comme ici un pigeon dans le ciel parisien.

BRETAGNE _

Observations de plus en plus nombreuses de lanternes volantes.

PROVENCE _

Vol de nuit en formation de la patrouille de France.

L'AMARANTE _

Croquis par le témoin (enquête d'un phénomène restant inexpliqué).

NORVEGE _

Cette photo montre un des phénomènes inexpliqués se produisant dans la région d'Hessdalen en Norvège.

BORDEAUX _

Pas un atterrissage, mais un rond de sorcière de myxomycètes.

Le GEIPAN

Groupe d'Etudes et d'Information sur les Phénomènes Aérospatiaux Non identifiés

Structure publique unique en son genre, le GEIPAN est rattaché à la Direction du Centre National d'Etudes Spatiales. Ses principales missions sont de collecter, d'analyser, d'archiver et de mettre à la disposition du public les témoignages d'observations de PANs sur le territoire français.

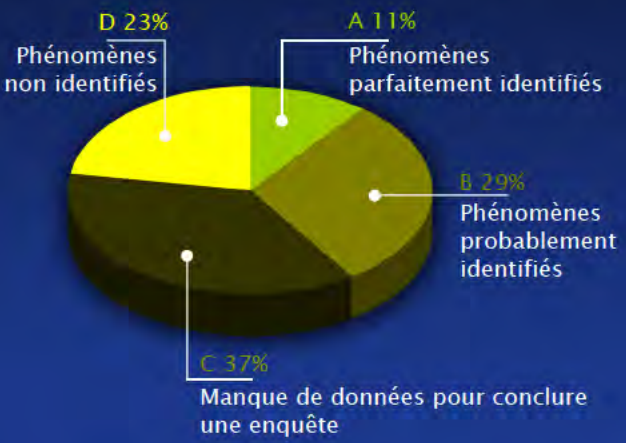
A ce titre il a engagé dès 2005 la mise en ligne de l'ensemble de ses archives sur http://www.geipan.fr

Le GEIPAN est encadré par un Comité de Pilotage composé des représentants des autorités civiles et militaires du pays et de tous les acteurs de l'activité au plan national (gendarmerie, police, sécurité civile, aviation civile, armées, météo, chercheurs). Il s'appuie également sur un collège d'experts multidisciplinaires et scientifiques pour les cas les plus difficiles et sur des intervenants de premier niveau pour l'aider dans ses investigations.

Un défi pour la science ?

Depuis 1977, le CNES a reçu plus de **6500 témoignages**, (actuellement deux par jour en moyenne), représentant près de **2200 cas d'observation** de PAN qui alimentent le fonds d'archive du GEIPAN.

Dès réception d'un témoignage, le GEIPAN procède à des vérifications préliminaires et décide de l'opportunité d'une enquête sur le terrain. A la fin de l'étude, le cas est classé, archivé et publié en conservant l'anonymat des témoins. Le classement des phénomènes est réparti en quatre classes*, suivant les catégories ci-dessous :



** ne tient pas encore compte de 1000 cas restant à traiter (dont 700 antérieurs à 1979)*

Les cas D

Ces cas correspondent à des enquêtes qui n'ont pas permis d'avancer une explication aux observations rapportées, malgré la qualité et la consistance des données et des témoignages. Ce sont, au vrai sens du terme, des "phénomènes aérospatiaux non identifiés".

3. Lecture (10 May 2012)

Abstract

On Thursday 10 May, the Head of GEIPAN Mr Xavier Passot, will present a lecture on GEIPAN. GEIPAN is the official French bureau, part of the CNES, in charge of investigating UFO sightings on the French territory (since 1977).

GEIPAN receives every day some strange sighting reports from the French population. Its mission is to analyze these reports, to find possible rational explanations or classify it as "unidentified". The results of the investigations are published on their web site. The lecture will explain the organization and the methods used for these tasks.

The most common explanations of strange sightings will be explained, from the frequent Chinese lanterns, satellite or planes to some rare atmospherical phenomena. Some recent unidentified sightings will also be presented, with their possible assumptions. Mr Passot will give a statistical view of the large data-base of 2200 reports will be addressed. Some recommendations for the observers or ufologists will close the lecture and open the discussion.

Speaker

Xavier Passot is a computer scientist engineer by training (1976). He joined the CNES (French Space Agency) in 1983. He has been in charge of several satellite monitoring and control subsystems and has been responsible for the development of the VEGETATION image processing centre (VEGETATION is a wide field earth observation instrument on board SPOT4 and SPOT5).

In February 2007, Xavier joined the Gaia astrometry satellite project as manager of the CNES Data Processing Centre.

Xavier left Gaia in mid-2011 to be the head of the GEIPAN. He is an amateur astronomer in the modest CNES amateur astronomers club and has been practicing digital photography since 1999.

Groupe d'Etudes et d'Information des Phénomènes Aérospatiaux Non identifiés

Unidentified Aerospace Phenomena Study Group

Xavier PASSOT
Head of GEIPAN

Summary

Introduction : Terminology, CNES & GEIPAN
Sightings sampling : some strange phenomena
Mission, Organization, Methods of GEIPAN
Some unidentified sightings
How to study the UFO's phenomenon ?
How to observe ?

(un)identified phenomena or objects

CNES & Unidenfified Aerial Phenomena

- CNES created GEPAN (Groupe d 'Etude des Phénomènes Aérospatiaux Non identifiés) in 1977.
  - Heads : C.Poher then A. Esterle
- 1988 : GEPAN is replaced by SEPRA (Service d 'Etudes des Phénomènes de Rentrées Atmosphériques).
  - Heads : J.J. Velasco
- 2005 : after an audit, GEIPAN (Groupe d 'Etudes et d 'Information sur les Phénomènes Aérospatiaux Non identifiés) replaces SEPRA.
  - Heads :J. Patenet,Y. Blanc, X.Passot
  - *2007 : GEIPAN sightings reports in line on Internet.*

Why a structure as GEIPAN ?

Scopes :

- Scientific scope to try to explain strange phenomena
- A response of the French state to the people questions
- Analysis of possible risks for the Defense

What GEIPAN is NOT

It's not :

- A worldwide specialist of UFOs
- A research institute
  neither on extraterrestrial life
- Nor on advanced or futuristic technologies

GEIPAN missions

- The GEIPAN missions :
  - To Collect UFOs sightings reports in France
  - To Analyze the sightings to possibly explain them
  - To archive the sightings reports
  - To inform the public
  - To analyze the global results for statistics
- GEIPAN is a part of CNES, is also under the control of a steering committe of independant members (Air traffic control, Air Army, Meteorological services, research institutes).

GEIPAN in the UFOlogists world

GEIPAN and the french ufologist associations

GEIPAN and the foreign ufologist associations

GEIPAN and the official foreign institutes

GEIPAN « How many divisions ? »

- 2 CNES people : The head, and the assistant
- 2 contractors : reports management, archive, web site, statistics
- 15 volunteer experts : on call expertises
- 99 volunteer investigators : on call investigations : 20/Years
- The steering committe : Twice a year meetings

Classification of the sightings

A : Fully explained, with proofs

B : Probably explained, but no solid proof

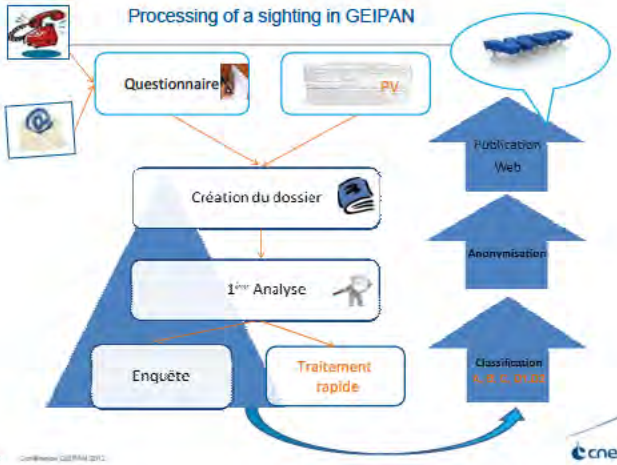
C : Not enough information to decide

D : Unidentified phenomenon

D1 : strange, but medium consistency

D2 : Very strange, high consistency : several independant witnesses, proofs or traces (photos, videos, ground traces).

Processing of a sighting in GEIPAN



The preliminary analysis of a case

- Strange photo, but no direct testimony
  - » *Not really strange : optical effects, artefacts…*
- Static, or quasi static lights in the sky
- Lights moving Straight during several minutes
- Lights moving Straight during several seconds
  - » *Not so strange, probably easy to identify*
- Other cases : nearby phenomena, erratic moving
  - » *Strange : will be investigated*

How to learn to identify a strange phenomena

See on the GEIPAN Website

« Qu'ai-je vu ? »

cnes

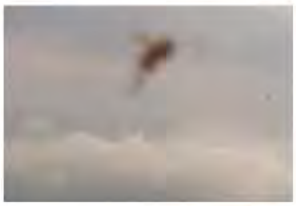
Mysterious snapshots, *but no direct sighting*

cnes

Mysterious video, *but no direct sighting*

cnes

Video / next

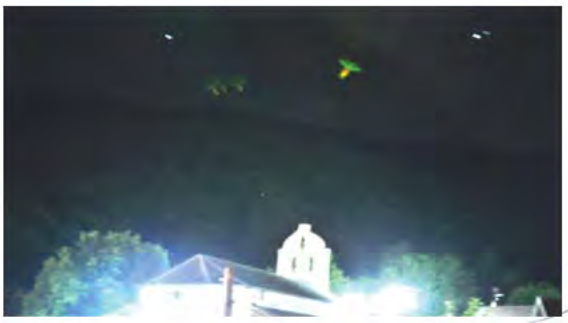


cnes

Mysterious snapshots, *but no direct sighting*

cnes

Mysterious snapshots, *but no direct sighting*

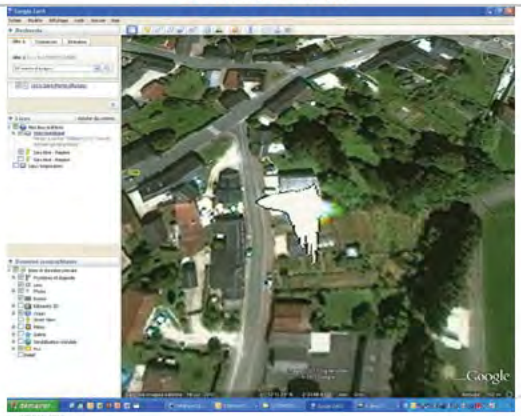


cnes

Rome, November 2011

cnes

GOOGLE EARTH



cnes

NANTES – TRENTEMOULT: real object

cnes

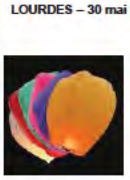
A real flying saucer above Paris in April 2009

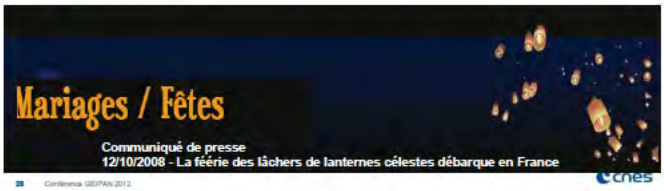
cnes

Solar Balloon

The most common phenomena

LOURDES – 30 mai 2009 – © témoin Geipan





Launching chinese lanterns

Lights in the night …

EASY JET LONDON – NICE, 21th MAy 2011

cnes

UFOs in formation in VAUCLUSE JULY 2008 (1)

laProvence.com

Publié le dimanche 13 juillet 2008 à 09H50.
Des habitants d'Apt et ses alentours n'en ont pas cru leurs yeux
R. montre l'Ovni qu'il a filmé de chez lui dans le ciel d'Apt. "Ces lumières, à l'horizontal pendant quelques secondes, n'émettent aucun bruit. C'est le silence complet. Elles se démultiplient, puis deux paraissent se détacher..."

Les 2 et 4 juillet 2008 entre 22h15 et 22h45 plusieurs témoins dans la région d'Apt dans le Vaucluse observent des déplacements particuliers de phénomènes lumineux non identifiés. Des lueurs évoluent en formation apparaissant ou disparaissant durant 20 minutes. Aucun bruit n'est entendu lors des observations. Un témoin filme le phénomène le 4 juillet *(voir la vidéo)*

cnes

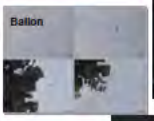
UFOs in formation in VAUCLUSE JULY 2008 (2)

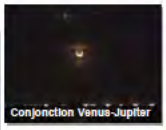
The « Patrouille de France » (Elite pilots) trained for their yearly festival, every first Friday of July

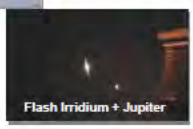
Vol de nuit de la Patrouille de France !

cnes

EXAMPLES - A class sightings







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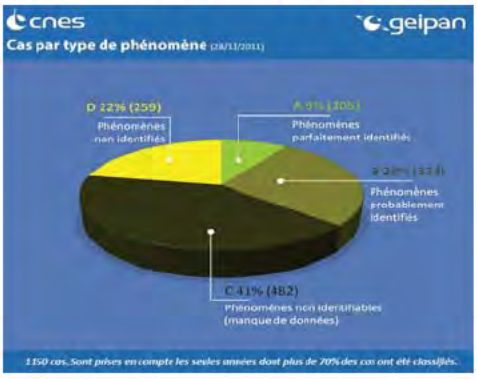
Some statistics

- 2200 cases, from 6500 sightings in 30 years
- 10 % from pilots; during flights
- 10 % cases led to investigation on site

Cases on classes A,B,C,D



Geographical distribution

High correlation with the population density

From the fact to the sighting report

Condition	Variable
A witness is there	Population density
The witness is looking outside	Farmers, dog walkers smokers, sportsmen, astronomers amateurs,
Sky is clear	Weather
The witness needs to speak about	Some like to speak, other are afraid of
The witness know that he may deposit a report to the police	Some know, some not !
The witness is welcome in the police office	Some officers welcome the UFO witness correctly, some not …
The witness knows GEIPAN	Some know, some not !
The witness trusts in GEIPAN	Some ufologist groups are suspicious
The witness is motivated to write the long report, and/or go to the police	Some are too busy, or not motivated enough to do that

Some recent unidentified cases

Very strange and solid cases are very rare

Josef Allen Hynek (1910-1986) astronomer, ufologist

studied more than 10000 cases, but noticed only several tens as really consistant and strange

AIRPANC catalogue : 600 cases reported by pilots since 1947, worldwide.

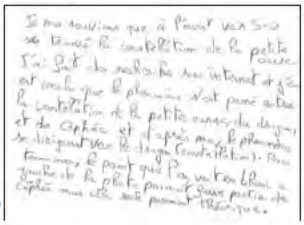
LEDRINGHEM (59) – 17 APRIL 2011

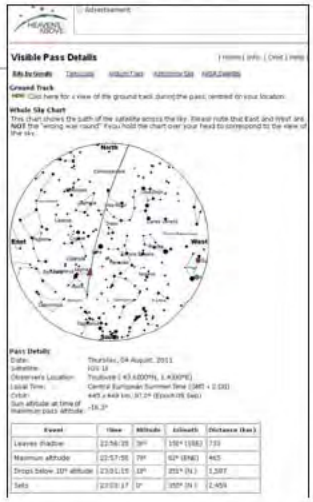
« A black cylinder 80 x 20 cm flying above his house's roof, with a turbine noise ».

Several similar cases

Triangle of lights, flying slowly and silently

CUGNAUX, 4 AOUT
UFO or autocinétic effect





TOULOUSE August 2011, 3H30
photocomposition made by the witness

cnes

Nearby Cosne sur Loire november 2011

cnes

What to think about the UFOs phenomenon ?

Who to believe ?

- To read more about science and reality than fiction
- Search the original information, avoid reports of reports of
- Select the authors

What to believe ?

- In front of an enigma, the belief is a personal choice

cnes

How to observe ?

- A light in the night : steady or moving ? Straight ? Which angular speed ?
- Which distance ?
- Train to recognize
  - A plane
  - A satellite
  - Chinese lanterns
  - Fireballs (meteorites)
  - laser
- Night photography : very difficult, almost with a phone ! Let it on a support in wide angle position, instead of zooming handheld
- Write your sighting report ASAP, with many details, without interpretation.

To continue … while reading french

www.cnes-geipan.fr Guide d'identification, questionnaire, cas d'observation

4. INTERVIEW OF MR PASSOT (MAY 2012)

4.1 Organisation

Philippe Ailleris: ***What are the advantages and disadvantages of GEIPAN activities falling under the CNES framework? What other organisation could eventually be in charge of it?***

Xavier Passot: To get the trust from the public, an organization has to be public, and civil: public, not to be suspected to make money or to manipulate opinions as sects, and civil not to be suspected to hide the truth. Some scientific institutes (e.g. CNRS in France) could do the job, but the UFO subject has such a bad reputation for scientists, and CNRS is so short of funding that they don't want to cope with the UFO topic. Moreover, because of the frequent link with spacecrafts (satellites passing by, debris re-entries), the CNES knowledge is particularly useful for some investigations.

PA: ***Does GEIPAN have any working relations with other organisations in charge of collecting UAP information, in France or in foreign countries?***

XP: In France, GEIPAN processes the UAP sighting reports collected by the Gendarmerie, Air traffic control, and Air Army. We work with some volunteers who are often active members of some ufologists associations: they investigate some cases on GEIPAN requests. With foreign countries, we have no formal collaboration; I'm sometimes invited by some ufological associations, but I generally declined, because it's not my priority and it would be very time consuming.

PA: ***Would you consider an European centre for UAP investigations? Is there any interest in doing this work wider in Europe, as opposed to amateurs/voluntary groups or in establishing for example a pan-European institute?***

XP: I think that the collection of the sighting reports, the investigations with the witnesses have to be national, because it has a strong socio-cultural aspects. It could be profitable that the investigation methods, the list of frequent misinterpretations, the investigation of the most strange cases could be done at the European level.

PA: ***What would you propose for further studies? Should it be structured as a large scale government project, international, based on public involvement?***

XP: It is mandatory that such an entity be public because the independence is a major issue. When I see the large number of misinterpretations, I believe that it is more important to spend public funds on scientific education than on UAP investigation. It would not be reasonable to have a very large GEIPAN group. The investigation's activity of a group like GEIPAN has to be national, working with the same language and culture. However there would be a great profit to compare and exchange information with similar foreign groups, to check similarities and differences between the sighting reports, and to compare investigation methods and tools.

PA: ***Does GEIPAN coordinate its activities outside France?***

XP: We sometimes exchange information with COBEPS in Belgium about sightings nearby the border.

PA: ***When an UAP is observed near the French border and investigated by you, do you cooperate with other countries and share information with them in order to find an explanation?***

XP: We would like to, but we have no agreement with foreign armies or others air control centers.

PA: ***Have you ever shared radar information across the border?***

XP: Not recently. In fact I don't know if it previously happened, before I joined GEIPAN.

PA: ***If an European astronaut observes an UAP in low orbit, would GEIPAN be the legitimate interface to collect his testimony?***

XP: I think that it is not in the strict mission of GEIPAN, who works only on the French territory. However, nobody is really in charge of the low orbit space, like for the oceans. Should this occur, GEIPAN should be happy to investigate !

PA: ***An audit of GEIPAN was conducted in the past. Will this report be made available and what were its main conclusions?***

XP: This report will be published in a near future (< 1 year). The conclusions are that an entity like GEIPAN is a real need for the society, and that an institute like CNES (i.e. public, civil, scientific, specialized in aerospace) is the best place to host such a group.

PA: ***Why aren't GEIPAN scientific committee annual's minutes of meetings made available on line? This would show the progression of research activities on the UAP topic since 1977.***

XP: There is not any more a scientific committee. There is now a steering committee and an experts panel. They meet twice a year : in the steering committee, we report the GEIPAN activities, the main new cases, the communication events, and validate some decisions on GEIPAN functioning. In the experts group, we report the main new cases, some news in our activity (i.e. the on-going statistical studies), and we work on some current doubtful cases (which will be published some months later).

PA: ***Mr Patenet had published the 2006-2007 GEIPAN steering committee's report. Has there been any meeting since then and can the more recent minutes of meetings be made available on the website?***

XP: This report was more an activity report than minutes of meeting. There has been several meetings since 2007, however the minutes of meetings are frankly quite boring for an ufologist.

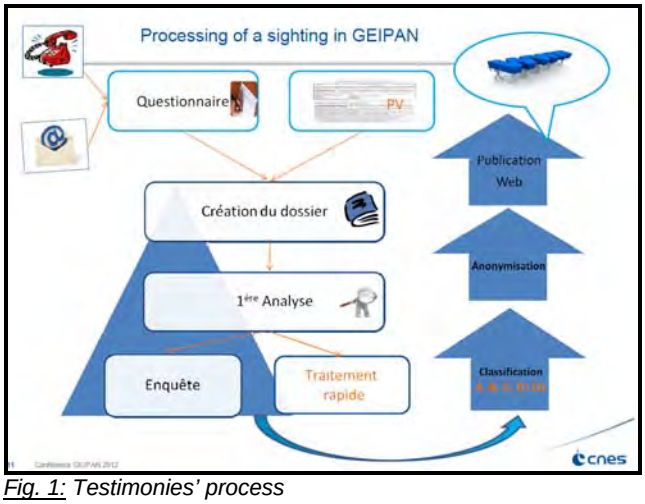


Fig. 1: Testimonies' process

PA: ***Is Mr Sillard still the GEIPAN steering committee's president and can we know who are its members?***

XP: Yes, he is. Other members are representatives of Gendarmerie Nationale, Police, Civil Air Control, Air army, National research center, Meteo-France, a psychologist scientist, and some CNES members : the communication director, Mr "Ethics" (J. Arnould), the head of the deputy directorate of the CNES Toulouse space centre, and the head of GEIPAN.

PA: ***Do you think that GEIPAN answers a general public's need of being reassured?***

XP: Some witnesses expect from the GEIPAN a scientific reply to the strange sighting they experienced : those persons are generally very satisfied with our service. Some others hope that GEIPAN confirms their beliefs in extra-terrestrials, and are often disillusioned. I think that the general public need is to have a reliable and scientific point of view on the strange phenomena, more than to be reassured.

4.2 UAP and Science

PA: ***Is GEIPAN interested in participating in any research project, and how important could such involvement be?***

XP: GEIPAN is participating or even leading some (modest!) research projects (Hessdalen[1], statistics, Psychology). These activities have to be done with quite low human and financial resources, and should not slow the main activity of processing of the cases.

PA: ***How does GEIPAN intend to facilitate and participate to the scientific progress regarding UAP (although it was stated in your presentation that it is not a research institute)?***

XP: I believe that the quality of the reports published on the web, from reliable investigation, is the best we have to do.

PA: ***Do instrumental observational projects fall under potential future activities or will GEIPAN tasks just be limited to the a posteriori collection of testimonies?***

XP: We are preparing this year a set of 2 "All-sky"[2] camera to track any strong transient light. It's focused to track the fireballs.

PA: ***What is the role of GEIPAN in the Hessdalen research project?***

XP: We have participated to the funding of the French scientific mission[1].

PA: ***Is GEIPAN attempting to use existing scientific databases (e.g., geomagnetic) to search for a signature of a UFO event? If so, what have been the results?***

XP: Not yet. good idea !

PA: ***What has been the impact of publishing on-line the GEIPAN archives? Has there been any interest shown by the scientific community? Any innovative approach? If not, what do you think is missing? How can scientists start any serious critical study of the files?***

XP: The impact of putting on line the GEIPAN archives was enormous on the public, and has made less dramatic the UFOs subject. The scientific community is still considering the UFO subject as not serious ; but I believe that our work permits that this opinion is very slowly moving positively. Let's assume that a scientist should be interested in working on UFOs, should he find some funding to do that? However, we have a counter-example: we have a current research study for a PhD in cognitive psychology funded by the Region Midi-Pyrénées and CNES. The results will be published this year, by GEIPAN, and I hope in a scientific publication.

PA: ***Can any interested scientists obtain information from GEIPAN? Can any outside scientist or researcher visit and use the GEIPAN case archives?***

XP: Definitely YES for professional scientists (i.e. working for a scientific lab)! The reply is not the same for private researchers.

PA: ***Is there a production of scientific/university papers "peer reviewed'' foreseen, by GEIPAN or its partners?***

XP: yes, and this has already been answered before.

PA: ***During the last 35 years, has the GEIPAN research in UAP lead to some specific research in some domains? in what fields do you think that it could have some impact?***

XP: No clear idea !

PA: ***What is your advice on making sure that the scientific investigations do not get mixed up with the more crackpot UFO conspiracy type of theories?***

[1] See Annex 1 (Note PA)

[2] GEIPAN will be associated to the French astronomical project ''FRIPON''(Fireball Recovery and Inter Planetary Observation Network, http://www.fripon.org/index.html), aiming of setting up a network of 100 all-sky cameras across the French territory (Note PA)

XP: This is a complex question, that should require a book to reply to.

PA: ***Is GEIPAN aware of any UAP scientific instrumentation project on going somewhere else in another country?***

XP: I know the Hessdalen project, and the rapidly growing network of All-sky cameras. This last devices should definitely solve the problems of fireballs and re-entries debris (this should avoid the famous nov,5 1990 French UAP affair [3]!)

PA: ***Has there been or is there a thinking in GEIPAN about the extra-terrestrial hypothesis, and in terms of science and technologies how could the manifestation of an ET intelligence be envisaged?***

XP: As we consider that there is no physical evidence of alien visit, GEIPAN considers the extra-terrestrial hypothesis in the class of the belief, i.e. it is a personal decision in front of a proof less problem. Within the GEIPAN team, everybody has its own opinion.

PA: ***How do GEIPAN's activities overlap with other initiatives such as Space Strategic Awareness? and if the whole sky is being radar mapped down to objects of 10 cm in size, can there really be any truly unexplained sightings?***

XP: As there are stealth aircrafts, why not stealth spacecrafts?

PA: ***What role will GEIPAN have in the future? Will it only collect reports, or will it put some effort finding possible solutions? Also how much investigation does GEIPAN want to dedicate to each case ?***

XP: The main issue of our activity is that we have not yet solid cases nor measures to start any scientific work. That's why we are mostly collecting reports.

PA: ***Does GEIPAN systematically collect data on fireballs (meteoroids and re-entering debris) or do they know about such a database (within SSA-NEO it is planned to establish a fireball database)?***

XP: I recently created a special simplified questionnaire to report on fireballs[4]. We transmit them to IMCCE, the French astronomy laboratory in charge of studying asteroids, and to the National Museum.

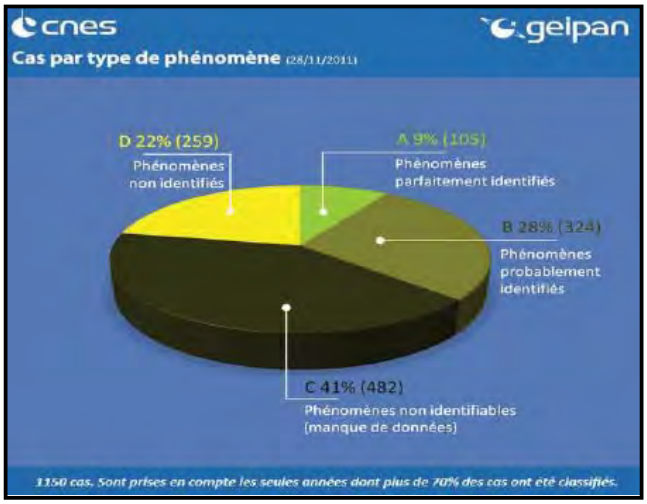


Fig. 2: GEIPAN statistics (basis:1150 cases published, status 28/11/2011)

4.3 UAP sightings

PA: How many sighting reports are received each year by GEIPAN? How many are investigated in the field? How many cases with physical traces are received?

XP: In 2011, GEIPAN has open 163 folders vs. 191 in 2010. This decrease does not mean that there is a real decrease in sightings : in one hand, we don't open any more folders for "photo only" cases (strange photos, but nothing observed with the eyes), and we have added on the GEIPAN web site many information for the witnesses to make their own investigation (i.e. Chinese lanterns, satellites ..). Moreover, when a witness call and when the explanation seems obvious (stars, planets, ISS, Chinese lanterns), we often propose immediately an explanation ; if it is accepted by the witness, the case is closed, and we don't open a folder. About 10% of the cases (formal ones) lead to investigation in the field. It's a long time since we didn't have any unidentified physical traces. In 2011, we can mention 2 cases with physical traces: a meteorite[5], and a home-made firework.

PA: What is the status of photo cases with GEIPAN? Have any recent photos been investigated that seem to show something unexplained?

XP: We often receive "photo only" cases (strange photos, but nothing observed with the eyes) that we investigate generally easily ; when a photo is available, the sighting is mostly identified. In the recent "D" cases, we have no photos.

PA: ***Why is there such a large number of misidentified natural or man-made phenomena?***

XP: Because people are not trained nor used to stare at the sky, and identify planets, satellites, planes, Chinese lanterns, balloons and that some love the idea to see a very strange phenomenon. I believe that humankind has an intrinsic drive to see signs in the sky.

[3] Observation by thousands of persons (including the astronaut J.P. Haignere) of the spectacular space re-entry of the "20925/1990 – 94C/GORIZONT 21 PLATFORM/USSR''. Case: http://www.geipan.fr/index.php?id=202&cas=1990-11-01225 (Note PA)

[4] Available on the GEIPAN website: http://www.geipan.fr/index.php?id=204&no_cache=1&tx_damfrontend_pi1[showUid]=9622 (Note PA)

[5] See Annex 2 (Note PA)

PA: ***Has there been any increased number of observations after the release of major SCIFI movies or series (ET, X files, MIB, Taken, etc…)?***

XP: Some worldwide statistics can be interpreted in this way. About GEIPAN, we always receive a bunch of sighting reports, mostly old ones, after the broadcast of a TV program about UFOs.

PA: ***What is the most important tool to identify a UAP reported to you? what kind experts are called in?***

XP: The most used tools are geographic maps (Google earth), a sky map, the weather reports (for the wind). The most demanded experts are the aeronautics experts.

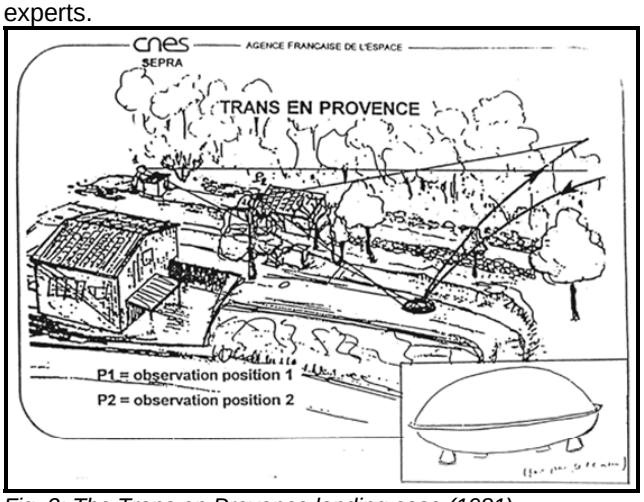


Fig. 3: The Trans en Provence landing case (1981)

PA: ***Have you seen any change in the quality of the reports during the recent years?***

XP: As we improved our UAP questionnaires, the sighting reports significantly improved. When we read the old reports, some of them were very poor.

PA: ***Do you think that there exists a reticence from plane pilots to report UAP cases?***

XP: Sure, there is !

PA: ***What physical evidence do you believe is most important to collect about a sighting? How successful has GEIPAN been at collecting such evidence. What plans exist to collect such evidence on new cases?***

XP: A good photo should be a very good evidence, if associated to an observation. But in most cases, we have only photo made with a handheld phone ! Some ufologists suggest to use diffraction gratings, and to distribute massively in case of UAP. But the first goal is to have a good photo, which requires at least a SLR camera on a tripod ; should you have it, you don't have it ready in several seconds!

PA: ***When a sighting cannot be explained, what is done with it? (archived, discussed with scientists, re-looked a posteriori for finding an explanation ?)***

XP: Right ! archived, discussed with scientists, published on the web and re-looked a posteriori for finding an explanation.

PA: ***Can some of these cases relate to foreign military activities?***

XP: Some sightings were probably related to foreign military aircrafts flying over France, but their behaviours were very common.

PA: ***A scope of GEIPAN is the potential analysis of possible risks for the defense. Has there been any case falling into this category, or analysis done?***

XP: Not yet !

PA: ***Is there any military files (Air force, Navy…) in the GEIPAN archives?***

XP: We have several cases of sightings from military pilots, but from conventional cases : fireballs, debris re-entries.

PA: ***Are there reports of close encounters to be uploaded? Besides the GEIPAN categorization, do you use the Hynek's classification database?***

XP: GEIPAN has only several cases of close encounters. The most recent are not very solid cases. We don't use the Hynek classification, because we don't have enough cases.

4.4 GEIPAN website and statistics

PA: ***A Total of 2200 cases are mentioned. Until now and after 5 years of inception of the GEIPAN website, only 1100 cases have been uploaded. Does this mean that it will take another 5-6 years for completing this task?***

XP: I'm afraid that it will need several years. However, today, we are able to process more cases than we receive, and I'm preparing a temporary technical assistance to process several hundred of cases within the next year.

PA: ***Why doesn't GEIPAN make the category D cases available first on the website, in order to stimulate the curiosity and interest of the scientific community ?***

XP: We know that the D cases are more interesting than others. However, we want to show the result of our work and to show that there are many misinterpretations. We process in priority the apparently strange cases, then the very simple ones which are quickly closed ; the latest, i.e. those which are waiting, are "medium" cases which will go probably in class C or B.

PA: ***Along the same line: You indicated on one slide that 10% of the 2200 cases originate from pilots or relate to plane observations. However under the statistics, it is mentioned that only 10 cases have been published until now. Why has there been little interest in uploading these files, especially in light of the potential defence, safety dimensions?***

XP: I'm surprised of the low figure (10) you refer about the pilot reports. I'll check.

PA: ***One of the first analysis of GEPAN was done based on 678 reports, for the period 1974-1978 (5 years). The year 1981 was also high (100 in terms of reports), how do you explain the sudden decrease of sightings? Do you have an annual split of all 2200***

cases?

XP: These figures have to be commented, you should not link these figures to the real number of sightings in France. It depends much more on the current reputation of GEIPAN, on the interest of the population about UFOs, than on the real number of sightings. As an extra example of a bias on statistics : actually, I try to lower the number of cases to be processed in GEIPAN by giving to the witnesses the tools and methods to make their own investigation; moreover, we don't process anymore the strange photos without sighting : this decision will impact the statistics, it should lower A and B cases number.

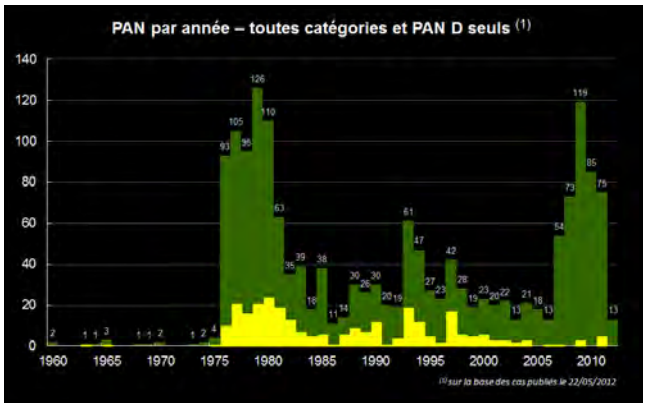


Fig.4: GEIPAN total cases published 22/05/2012 (green) vs. category D cases (yellow)

PA: ***What tool do you use for the sightings database? How many parameters do you introduce for each case?***

XP: We have today an MS-ACCESS database, but we prepare a migration on a web-interface database. Several tens parameters are used, but many are for the internal management of the case.

PA: ***Has GEIPAN used its database, which must be quite extensive, to search for any patterns in the UFO data (along the lines of what Poher did in the mid-1970s)? If so, can you discuss any findings? Does GEIPAN observe any pattern in the remaining unidentified sightings (GH D, such as that they are from a certain area, seen by pilots, or with a typical shape, colour…etc…)?***

XP: We have not recently made statistics study on patterns. I believe that there are not enough D cases suitable for this kind of studies.

PA: ***When other official institutions investigating UAP consider the percentage of the unexplained to be a 3%, how is it possible that GEIPAN still has a percentage of 22%, like in the 1940's in the USA? Is that percentage a reflection of the reality of what is going on, or is it a reflection of the lack of resources (human and financial) to develop a thorough investigation as it should be done?***

XP: The main question is "what is really an unidentified sighting"? and what is the border between a "C" case and a "D" case? the border is fuzzy, and depends on the man who sets the classification. E.g. on doubtful cases, my predecessor was preferring "C" class than "D"; I'm personally more ready to class doubtful cases as D1. If we consider that "unidentified" is equivalent as our new D2 class, I think that the 3% ratio will not be far.

PA: ***Some interested parties might be interested to perform statistical analysis on the GEIPAN database. Could they obtain an Excel file in a simplified format (case, place, year, category, explanation)?***

XP: Yes, we forecast to put that available on our web site within the next month. A summary of the GEIPAN's database content under an EXCEL table will soon be published.

PA: ***In conclusion, What are GEIPAN views after 35 years of data collection and analysis?***

XP: Many misinterpretations and several strange sightings.

PA: ***Many thanks Mr Passot for your time and all the best luck for your future GEIPAN activities.***

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Existence of electric/magnetic signals related to unknown luminous lights observed in Hessdalen valley (Norway)?

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Hessdalen valley, in Norway, is a north-south elongated basin of about 20 km by 10 km (latitude: 62°50'N, longitude: 11°12'E) in which few inhabitants are permanently living. Since several decades, scarce observations made mainly during night time have point out transient luminous lights, called Hessdalen phenomena ('HP'). Østfold University College was the first pioneer research centre which started to install visual and geophysical monitoring systems able to track the unknown lights (http://www.hessdalen.org/). The characteristics of the HP can be summarized as followed. They can appear in the low atmosphere, remain quite fixed and suddenly move up at a speed of several hundreds of km/s, for disappearing on the ground or in one the numerous lakes located in the area. The duration can be of a very seconds to a tens of minutes or more. The HP can be white, blue-white flashing lights, yellows or white lights and have different shapes with sizes up to some cubic metres. From 80 observations per month in the 1980's, the number has sharply decreased to about 20 per year nowadays. In 2010, French Research Centres started cooperation with Østfold University College and the Istituto di Radio Astronomia of Bologna (http://www.ira.inaf.it/). The objectives are to study radio emission in the frequency band 1 kHz to 5 MHz (see Farges et al., EGU 2012) and the possible disturbances of the electromagnetic (EM) field recorded at two remote stations located in the valley. The two EM stations are located a tens of kilometres apart along the valley axis. In the northern FIN station, a fluxgate magnetometer (resolution of 1/100 nT), two orthogonal induction coils (frequency band: 7 Hz - 8 kHz, resolution 1/100,000 nT), and two horizontal electric lines (few mV resolution) record the magnetic and electric fields, respectively. In addition, a vertical seismometer is linked to the multi-parameter FIN station. At the south OYU station, two induction coils and horizontal electric lines are set. All data are recorded at 40 Hz.
We present the morphology of the EM field in the area which can define the background noise and the morphological evolution of the EM field along the axis of the valley. Some of the EM variations appear to be phase-delay of several minutes between the two stations which lead to suspect important distortions brought by superficial geological structures (mineral deposits?), some electrical current channelling and the local tectonics. During the last 2010-2011 winter campaign, only few observations by eyes were reported. During these periods, no large magnetic or electric signal was clearly identified.

ANNEX 1 (Page 2/2)

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Existence of electric/magnetic signals related to unknown luminous lights observed in Hessdalen valley (Norway)?

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Background

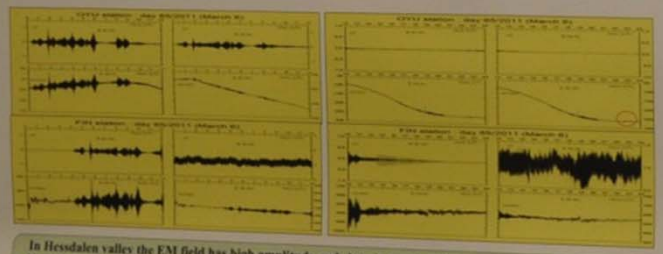
Hessdalen valley, in Norway, is a north-south elongated basin of about 20 km by 10 km (lt 62°50'N, lg 11°12'E) in which few inhabitants are permanently living. Since several decades, scarce observations made mainly during night time have point out transient luminous lights, called Hessdalen phenomena ('HP'). Ostfold University College was the first pioneer research centre which started to install visual and geophysical monitoring systems able to track the unknown lights (ttp://www.hessdalen.org).
The characteristics of the HP can be summarized as followed.
They can appear in the low atmosphere, remain quite fixed and suddenly move up at a speed of several hundreds of km/s, for disappearing on the ground or in one the numerous lakes located in the area. The duration can be of a very seconds to a tens of minutes or more. The HP can be white, blue-white flashing lights, yellows or white lights and have different shapes with sizes up to some cubic metres. From 80 observations per month in the 1980's, the number has sharply decreased to about 20 per year nowadays.

Objectives

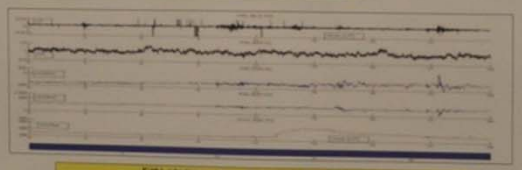
In 2010, French Research Centres (CNRS and CEA) started cooperation with Ostfold University College and the Istituto di Radio Astronomia of Bologna (http://www.ira.inaf.it/).
The objectives are to study radio emission in the frequency band 1 kHz to 5 MHz (see Farges et al., EGU 2012) and the possible disturbances of the electromagnetic (EM) field recorded at two remote stations located in the valley.

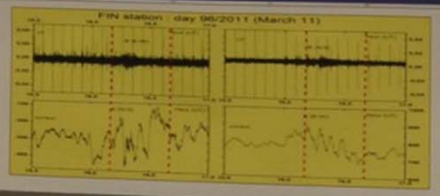
Instrumentation

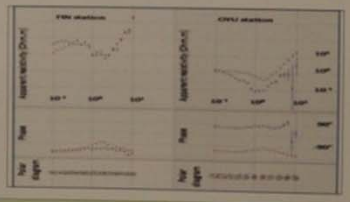
The two EM stations are located a tens of kilometres apart along the valley axis. In the northern FIN station, a fluxgate magnetometer (resolution of 1/100 nT), two orthogonal induction coils (frequency band: 7 Hz - 8 kHz, resolution 1/100,000 nT), and two horizontal electric lines (few mV resolution) record the magnetic and electric fields, respectively. In addition, a vertical seismometer is linked to the multi-parameter FIN station. At the south OYU station, two induction coils and horizontal electric lines are set. All data are recorded at 40 Hz.



In Hessdalen valley the EM field has high amplitude and sharply varies with time.
Number of pulses are observed. But the records highlight different amplitudes and morphologies between FIN and OYU stations. Moreover, a time delay between variations exist in spite of the short distance between the 2 stations (~15 km).







On April 11, 2011, 2 Luminous phenomena (LP) have appeared between 1610UT and 1640UT. The large EM field variations are due to external ionospheric sources on which abnormal transient effects are superimposed No evident signal is correlated with the LP.
MT soundings show large changes in the crustal resistivity distribution which could induce abnormal time changes.

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Possible interaction of meteor explosion with stratospheric aerosols on cloud nucleation based on 2011 observations.

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The lack of knowledge on the nature and the variability through time of stratospheric aerosols strongly constrains the understanding of precipitation events at local to regional scales. Along other causes, meteoroid ablation is assumed to creating significant disturbances on the upper stratosphere layers, particularly by debris production and flash heating. Due to the lack of observations, the impact on cloud and precipitation processes of cosmic debris that are annually delivered to Earth is not taken into account in climate modeling. Here we report on the data collected from 2011 cosmic events that occurred on the Angles village in Pyrenees Orientales (France). The trajectory of a meteor was traced by the CNES from Toulouse (France) to the Pyrenees boarder with Spain where it exploded at high altitude on August 2. 30 hours later, a detonation with debris pulverization at the ground was recorded at the same location across a restricted area. In the following days, unusual heavy rainstorms and violent fall of hailstones were locally recorded from the Pyrenees to the coastal plain. Meticulous sampling of the 2011 August 3rd debris fall and of the soils affected by the subsequent precipitation events has been performed. A similar assemblage of organic and mineral components of stratospheric origin was revealed. It is formed of aliphatic carbonaceous polymorphs of terrestrial origin, volcanic dust, charred and fresh organic grains, fine grained sandstones with native metals and micrometeorite spherules. Microscopic assemblage, isotopes and geochemical data show composite materials formed of imbricated terrestrial and extra-terrestrial components. Based on their C14 and C13 values the terrestrial carbonaceous polymorphs appear to derive from fossil combustible. The fine imbrication of all the other terrestrial components with the carbonaceous polymorphs indicates a common origin from the upper stratosphere. The mixing of the extraterrestrial debris with the stratosphere aerosols is suggested to resulting from the energy released by the meteor explosion. A direct link between the meteor explosion and the subsequent hailstones and heavy precipitation is clearly established by their similar range of composite debris. The meteor explosion is suggested to have initiated phase transformation of the stratospheric aerosols and their agglutination by complex mechanisms that remain to be further elucidated. The agglutinated particles with carbonaceous components have probably initiated condensation processes thus resulting into cloud formation. This was accomplished within a few days as shown by the time lag between the initial meteor explosion and the following precipitation events. The occurrence of the later across approximately the same region as the one of the debris pulverization from the meteor explosion suggests that the trajectory of the meteor would strongly constrain the agglutination processes. This data reveals the occurrence of solid aerosols with carbonaceous components in the stratosphere, most probably loaded by former volcanic events. In the case of serial meteor explosion the agglutination processes could significantly increase the agglutination process of stratospheric aerosols with resulting cloud formation and thus change of radiative forcing. Further research should reveal the role of meteor explosion on climate through cloud-aerosol precipitation interactions.

Possible interaction of meteor explosion with stratospheric aerosols on cloud nucleation based on 2011 observations.
Part 1 - Research Questions
Goal: Role of meteor explosion on atmospheric dust loading and cloud-condensation nuclei effects
What is delivered by meteor explosion ?
How was it formed ?
What is the link with atmospheric disturbances?
How will I answer these:
Data from a present-day situation
Meteor explosion on 2011 August 2nd, followed by heavy rainfall and hailstorms At the Angles village and on the Roussillon coastal plain , Pyrenees Orientales (France)
Photo of the meteor at 3h 34/2011 August 2nd
Projected trajectory fron testimonies
Probablility densities of fallen debris
Trajectory of fallen debris based on testimonies and collect
Fall point at Angles village
Dispersion ellipse of the fallen debris
Impact on the wall
Cottage 34: detonation, explosion, maximum debris
Incrustations at the ground
Following events from August 7th to 10th: devastating hailstorms in the Roussillon plain and in the Cerdagne, collect of debris after the rains and from the hailstones
Exotic breccia
Collected debris: coloured polymers, metals, rock clasts
Polymer
Metal ribbon-shaped filaments
Fine debris collected at the ground
Fine debris collected at the ground
Polymer
Black vesicular carbon
Polymer
Polymer

n cloud

fects

the link with disturbances?

d hailstorms entales (France)

len debris based on s and collect

Polymer

Polymer

Marie-Agnès Courty[1,2]
Roland Benoît[3]
Michaël Vaillant[4]

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Background in atmospheric science on ablation of meteors

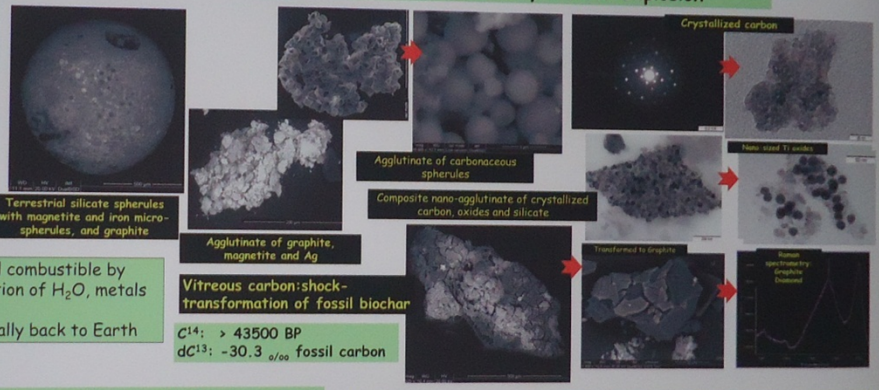
Leads to the formation of smoke particles
Smoke and dust particles of meteoric origin have direct effects on atmospheric processes:
- nucleation of noctilucent clouds (NLCs)
- condensation of stratospheric sulphate aerosols
- production of nitric acid (HNO_3) from nitrogen pentoxide (N_2O_5) in the upper stratosphere
- conversion of H_2SO_4 to SO_2 in the upper stratosphere in the mesosphere and stratosphere:

Insufficient knowledge on the exact composition of meteoric smoke particles

Unique situation on 2011 August 2nd :

direct data on what is delivered by meteor explosion

Aliphatic carbonaceous polymorphs : filaments, agglutinates, spherules; aromatic ones : vitreous char, graphite; carbon cenospheres; associated with fine grained sandstones and rock clasts ; finely imbricated with phosphides, phosphates, sulphides, sulphates and native metals (Fe-Cr-Ni and Fe-Cr alloys, Ni, Al, Cu, Zn, Pb, As, Sn, Ag, Au, Bi).



C^{14}: > 43500 BP
dC^{13}: -30.3 ‰ fossil carbon

How was it formed ?

Carbonaceous polymorphs formed from fossil combustible by Fisher Tropsh reaction (H_2O/CH_4) : dissociation of H_2O, metals and graphite during oceanic impacts
Launched to space million years ago; periodically back to Earth

Linking cosmic events and atmospheric disturbances

Effects

- Production of fine solid aerosols with a carbonaceous component derived from fossil combustible
- Violent turbulence
- Air heating
- Concentration of aerosol-loaded air masses in the area of meteor explosion

Direct effects of the meteoroid ablation on the upper stratosphere layers

- Nano-sized carbonaceous agglutinates
- Cloud condensation nucleation
- Hail and cloud formation

Hailstorms and heavy rainfall in the area of meteor explosion

Working hypothesis

Major cosmic events of the past (Tunguska-type air blast to large-scale impacts) → Massive production of fine aerosols, violent turbulence, sudden air heating → Hailstorms, heavy rainfall « Deluge-like » situations Positive feed-back effect : short-term « nuclear-like » winter

END OF DOCUMENT