

FRENCH SCIENTIFIC INVESTIGATIONS
on U.A.P.

CNES / GEIPAN

3AF / SIGMA 2

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The French Space Agency

CNES / GEIPAN

History of GEPAN/SEPRA (1977-2005)

The creation of GEPAN

GEPAN (The Study Group for Unidentified Aerospace Phenomena) was created on May 1st 1977 (*decision n° 135/CNES/DG - April 20, 1977*) by the Director General (Yves Sillard) of the French Space Agency (CNES).

The situation was rather auspicious at that time, thanks to a statement made in 1974 by the Minister of Defense about the need for a serious study of UFOs, a report issued by former Defense officers with similar conclusions, and mainly the practical work already undertaken, on a private basis, by a very active CNES engineer (Claude Poher).

The basic mission assigned to GEPAN consisted in working out, in connection with various scientific institutions, appropriate methods for a scientific analysis of collected and selected UFO observation reports.

GEPAN was provided with the necessary staff and budget to satisfy the requirements of its Scientific Board, in terms of data collection methodology and data processing, as well as for specific studies to be initiated.

GEPAN's Scientific Board

In order to fix orientations and to supervise the activities of GEPAN, a Scientific Board was set up right from the beginning, under the authority of the Chairman of CNES. It was made up of eminent specialists in astronomy, meteorology, physics, human sciences, etc., appointed by the Chairman.

This Scientific Board met about once a year at the beginning, supervising in effect the establishment of GEPAN's methodology and specifying concrete areas of research (in particular towards an instrumental approach to sky survey). After a break of eight years, it held a closing meeting (n° 7) in April 1992, the minutes of which (n° 57.92/DG/IG) were published together with a final report (*Report 1977-1988*).

GEPAN's downsizing and creation of SEPRA

After a fruitful expansion phase, with a permanent staff of up to 7 full-time persons, including a researcher, GEPAN was brought down to more modest size and functions (3 persons, no more research) by decision (n° 19/CNES/DG – February 11, 1983) of a new Director General of CNES.

Five and a half years later, GEPAN was closed (*decision n° 104/CNES/DG – November 25, 1988*) and the Director of the CNES Toulouse Center replaced it immediately (*decision n° 388/CST/D*) with SEPRA (The Department for Expertise of Atmospheric Re-entry Phenomena), in charge of following up atmospheric re-entries as well as of collecting and preprocessing data related to UAPs (Unexplained Aerospace Phenomena). At this occasion, available resources were reduced again (2.5 persons).

In February 2000, the decision was taken in Toulouse to remove from SEPRA's missions the follow-up of atmospheric re-entries (changing at this occasion the meaning of the acronym SEPRA into The Department for Expertise of Rare Aerospace Phenomena). The new mission was to concentrate again on data collection related to UAP observations and on the setting-up of a database for testimonies.

Historical summary

The early history of GEPAN and SEPRA may be presented as a succession of 3 qualitative phases, independent from the quantitative variations of its resources:

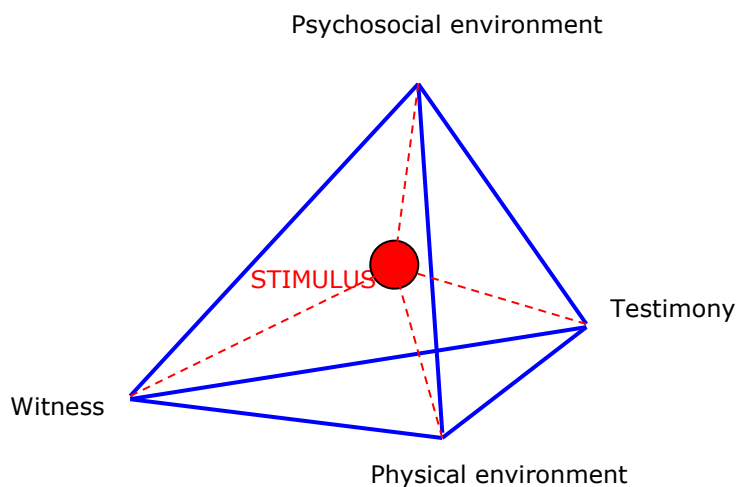
- Initialization phase, headed by Claude Poher from May 1977 until June 1979, with part-time involvement of more than 40 staff members of CNES, plus many external contributors. This phase was mainly devoted to communication.
- Methodological phase, headed by Alain Esterle from July 1979 until February 1983, with the setting-up of theoretical and technical tools allowing a rational and structured approach to UAPs. This phase was mainly scientific, and more discreet towards the media.
- Operational phase, headed by Jean-Jacques Vélasco from March 1983 until June 2005, putting into practice the principles and instructions issued by the Scientific Board and tuned by his two predecessors.

Consequently, the experience acquired by CNES about UAPs since 1977, as well as the archives it has accumulated, are unique.

Results obtained

GEPAN essentially worked along the following lines: collection of information, methodology, investigations on significant cases and thorough studies on particular subjects.

In order to collect information, GEPAN established a number of official agreements with administrations likely to provide data on UAP observations or recordings. These included the National *Gendarmerie*, Police Force, Civil Aviation and the Air Force. These agreements remain in force today. During that period, only observations reported through institutional channels were taken into account by GEPAN/SEPRA.



The methodology for information collection developed by GEPAN, symbolized by a tetrahedron (*above*) enabled the approach to the search for identification of the stimulus (real origin of the observation) to take simultaneously into account: the semantic content of the testimony, the witness himself (physiological and psychological aspects), the physical environment (records, traces, meteorological and astronomical data) and the psychosocial environment (social and cultural context including possible action from the media).

Cases simple to explain, or lacking usable information (the majority) were processed through "mini-investigations" conducted from the office, while the most significant cases were the subject of thorough on-site investigations, followed by technical analyses. In order to conduct, along professional standards, such in-depth studies, which are varied and multidisciplinary by nature, GEPAN had to set up links with various laboratories and external consultants, so as to cover all fields of skills involved (soil physics, ultra-high frequency analysis, biochemistry, photography and image processing, radar, astronomy, etc.).

Some investigations, particularly rich in quantified information, were the subject of technical publications.

The Scientific Board also initiated the launch of a few R&D studies, which GEPAN sometimes subcontracted to external participants. Examples included: MHD propulsion modeling, review of state-of-the-art systems and technologies existing in the world and likely to provide relevant data for sky survey, summary of methods for the analysis of photographic documents, etc.

Database

An undisputable accomplishment of GEPAN/SEPRA is the set of data collected through institutional channels, which goes back not only to the creation of GEPAN in 1977, but to the fifties, including in particular all reports from the *Gendarmerie* during 1954 (the year of the biggest French wave of UAP observations ever).

During this period, data were organized in two parts: on one hand, "terrestrial" cases, provided by the *Gendarmerie* and the Police, and on the other hand "aeronautical" cases, provided by the Civil Aviation Authority and the Air Force. The encoding process always preserved the actual wording of witnesses, in order to allow a psychosocial approach.

Cases were classified into 4 categories:

Class A	:	perfectly identified phenomena
Class B	:	probably identified phenomena
Class C	:	unidentifiable phenomena (lack of data)
Class D	:	unidentified phenomena.

Many charts were produced to display statistical distributions according to various parameters (distance, velocity, type of trajectory, shape, color, number of objects, radar echoes, etc.)

However, the lack of means (both staff and budget) during most of that period resulted in a limited reliability for those results, which explains (as will be seen later) why some old cases are currently being revisited in the frame of the new GEIPAN.

Audit of SEPRA (2000-2001)

The need for an audit

In 2000, the Director General of CNES was under pressure about the SEPRA department, which obviously did not give satisfaction any longer to anybody. Most of the persons wanted to remove once and for all this "borderline" activity from CNES. Some others, on the contrary, wanted the department to be resized and reorganized, so as to produce useful results which could be made available to the public. In order to back his final decision for one solution or the other, the Director commissioned the Fleximage company to conduct an audit.

Besides a review of the current situation about UAPs in the world, the main goal of this audit was to present to CNES the synthesis of a number of representative opinions from all parties concerned in the country (Science, Police, Forces, Politics and Media) about the interest in carrying on the study of UAP sightings, as well as about the appropriateness of entrusting CNES for this activity.

This review of arguments, either in favor of continuing SEPRA's activity with a possible reorientation, or against it, was essentially based on a series of interviews with French personalities, representing all opinions. The minutes of all interviews were first submitted to the interviewed persons for approval or correction, then forwarded to CNES as an annex to the audit's report.

Interviews

Around 30 high-level personalities were contacted in France, with the agreement of CNES, in various institutions:

- Scientific research in general (atmosphere, nuclear)
- Space research (CNES, ESA)
- Astronomy
- Defense (General staff, Air Force)
- *Gendarmerie* and Police
- Department of the Interior
- Civil Defense
- Politics (Prime Minister's departmental staff)
- Media (television, newspapers)
- Specialist of space ethics

The aim was to collect, through a neutral approach, the opinion of each personality, about both the core of the problem (i.e. interest in the study of UAPs), and the way to organize the job (within CNES or elsewhere).

If, as foreseen, the collected opinions proved to be very diverse, a number of majority converging points did emerge. It was then possible to sum up the prevailing leanings, through the series of questions used as a guideline for all interviews, and to derive recommendations that reflected a real consensus.

Recommendations from the audit

Why should GEPAN/SEPRA's activity be carried on (in CNES)?

The two fundamental reasons to continue the work of GEPAN/SEPRA, put forward during each interview, are independent, non-exclusive and very different in nature.

Scientific reason

The first – and simplest – reason results from a basic scientific approach, which consists, when unknown or unusual phenomena are observed in nature, in trying to explain them rationally, either through their reproduction, or, failing that, through repeated and refined observations, in view of their characterization and possible modeling.

UAP observation reports have been numerous over more than half a century, all across our planet, even after elimination of those (the majority) which receive a simple and final explanation, as well as those for which we have too little information at our disposal. The small subset on which GEPAN/SEPRA is working, made up of cases exclusively collected in France through institutional channels (*Gendarmerie*, Police, Aviation), already represents hundreds of cases.

SEPRA's putting together of a specific database for aeronautical cases, for which a very significant number worldwide concern observations made by pilots and confirmed in a quite independent way by radar records (commonly called « radar-visual » cases), reflects a progress towards instrumental evidence of the physical aspect of certain classes of UAPs.

Even though the UAP problem is not regarded as a priority for scientific research, it seems logical not to ignore it completely but rather to devote a certain effort to it, modest but sufficient to hope for some real progress in its understanding.

On top of this purely scientific justification comes a more pragmatic dimension, which cannot leave the Departments of the Interior and of Defense indifferent. Most of the phenomena reported by witnesses or recorded, seem to move in the low atmosphere, in national airspace, and thus could constitute a potential risk for flight safety and, in the extreme, a threat to national territory.

Civic reason

The existence of a real demand from the public and from the media, as well as from certain state institutions directly concerned (*Gendarmerie*, Civil Aviation, Air Force, Civil Defense), for explanations about UAPs, is undisputable, even if this demand largely fluctuates according to the ongoing situation at the time. Consequently, the state must have available an expertise and an ability to answer questions in this domain, which is obviously in the national interest.

This civic reason, taken individually and carried to the furthest point, arguably still justifies technical work even if the subject of UAP proves to be empty and only resting on a collective fantasy. There would remain the necessity, in such an extreme case, to perform a useful pedagogic work for the edification and instruction of the public (directly or through the media). Not to do it would inevitably result in leaving the field entirely free for irrationalists, quacks or sectarians from all origins to take control, with all the risks involved.

Adequacy of CNES

The above-mentioned double justification implies that the institution in charge of the study of UAPs be public and civilian.

On the one hand, the overriding nature of the mission requires a public organization. On the other hand, the strong need for public communication disqualifies the choice of a Defense-related organization, although Defense must obviously take a part of the work and the thinking. However, because of the incompatibility between the required transparency and the culture (real or publicly imagined) of management of military secrets, it should not be Defense led.

Among the French civilian organizations that could, in theory, take over SEPRA's mission, CNES is the best choice for several reasons.

From a technical point of view, CNES has unique skills available for the calculation of orbits and atmospheric re-entries, which are often required to explain the numerous testimonies caused by certain space debris falling into the low atmosphere.

From the citizens' point of view, the excellent image of CNES, both serious and open, explains why CNES is frequently contacted by the public or the media for any question related to space, even indirectly. This is naturally also the case for UAPs.

The last reason, down-to-earth but strong, to keep inside CNES the continuation of GEPAN/SEPRA's work is that this department has already functioned, even though with a fluctuating level of efficiency, for a quarter of a century, and that it is practically unique worldwide. Its suppression would therefore be difficult to explain to the greater community.

Practical recommendations

The audit made a number of practical recommendations concerning:

- the internal organization inside CNES
- the control by an external Steering Committee
- the exact definition of the missions
- the set-up of a real communication strategy, using the Internet
- the transfer of archives into a database
- the required means (staff and budget)
- the desirable future extension to European level
- the return to the original acronym GEPAN (in fact, an "I" was added, standing for "Information", leading to the final acronym: GEIPAN)

End result of the audit

The audit's conclusions were officially presented, and fully approved, on November 30, 2001.

However, due to serious domestic difficulties the French Space Agency experienced at that time (nothing to do with the topic of UAPs), the audit's recommendations only came into force in mid-2005: SEPRA was closed and GEIPAN was created.

The new GEIPAN (2005-...)

Up to now (2005-2015)

GEIPAN took many initiatives right from the beginning, in particular in terms of information, with the setting-up of a dedicated website, the reassessment of archived cases and the open publication of results.

Reports were effectively published on the Internet for the first time in 2007.

The new GEIPAN department in Toulouse was successively headed by CNES engineers having both a long professional experience in space systems and a real knowledge of the UAP issue:

- Jacques Patenet (July 2005 to December 2008)
- Yvan Blanc (January 2009 to June 2011)
- Xavier Passot (July 2011 to December 2015)
- ...

Among many other activities (*see next paragraph*), they undertook and supervised, over several years, external contractual activities in the field of UAP photo/video analysis. These included the setting-up of a specific Methodology, followed by the development of a dedicated software tool (IPACO), derived from an existing operational intelligence tool.

Today

The following paragraph is made up of extracts from official GEIPAN documents (with due authorization).

Goals of GEIPAN

3 goals:

1. Scientific attempt to explain strange reported phenomena
2. Response of the French state to questions from the public
3. Analysis of possible risks for Defense

What GEIPAN is not

- A worldwide specialist of UFOs
- A research institute on extraterrestrial life
- A research institute on advanced or futuristic technologies

GEIPAN's missions

- Collect UFO sighting reports **in France**
- Analyze collected data to possibly explain them
- Archive the sighting reports
- Inform the public
- Analyze the global results through statistics

GEIPAN's staff

- 2 CNES permanent staff members:
 - the head of GEIPAN
 - an assistant
- 2 contractors in charge of:
 - the sighting reports
 - the archive
 - the website
 - the statistics
- 15 volunteer experts:
 - on-call analyses
- around 20 selected volunteer on-site investigators:
 - on-call investigations
 - ca. 20 on-site investigations per year

- An independent Steering Committee, made up of 14 high-level personalities (*Gendarmerie*, Police, Defense, meteorology, Civil Aviation, researchers), which:
 - meets twice a year (May and November)
 - analyses the results from GEIPAN
 - works out recommendations to CNES on GEIPAN's orientation and organization

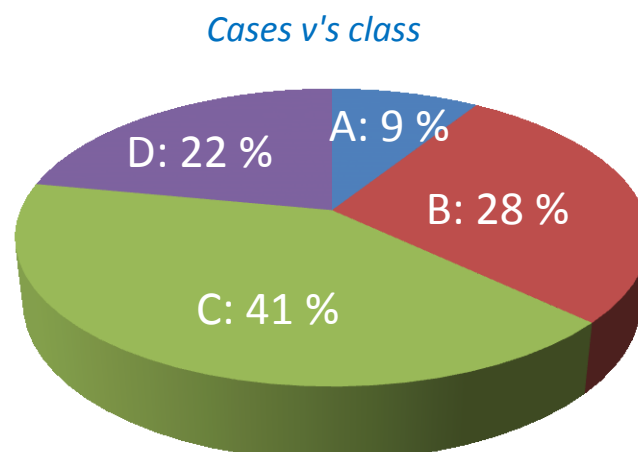
Classification of sightings

4 classes:

- A** : Fully explained, with proof of evidence
- B** : Probably explained, with no formal proof
- C** : Insufficient information available
- D** : **Unidentified phenomena**, divided into 2 sub-classes:
 - D1** : strange, with medium consistency, i.e.:
 - only 1 witness
 - no evidence (photo/video/radar/soil traces)
 - D2** : very strange, with high consistency, i.e.:
 - several independent witnesses
 - physical evidence (photo/video/radar/soil traces)

Statistics over 30 years

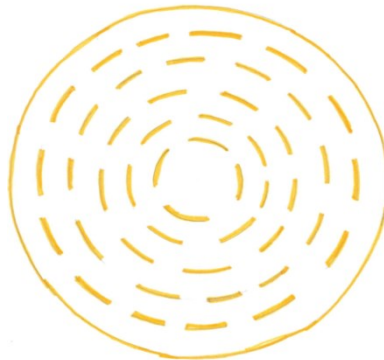
- 2200 cases were processed, out of 6500 reported sightings
- 10 % of sightings came from pilots during flights
- 10 % of cases led to on-site investigation



Documented very strange reports are very rare (cf. J. Allen Hynek)

Recent strange French reports

- Cosne-sur Loire (November 2010): a luminous wheel in the sky.



- Ledringhem (April 2011):

A cylindrical 80 cm x 20 cm object passed at high velocity just above the house's ridge tile, with a noise like a turbine.

- Toulouse (August 2011): sketch of the UAP and its path, superimposed on a photo of the area of the sky taken from the point of observation.



GEIPAN's daily work

GEIPAN receives, on average, **15 new reports per month**.
Around 900 reports are still pending today.



GEIPAN's website (in French): <http://www.cnes-geipan.fr>

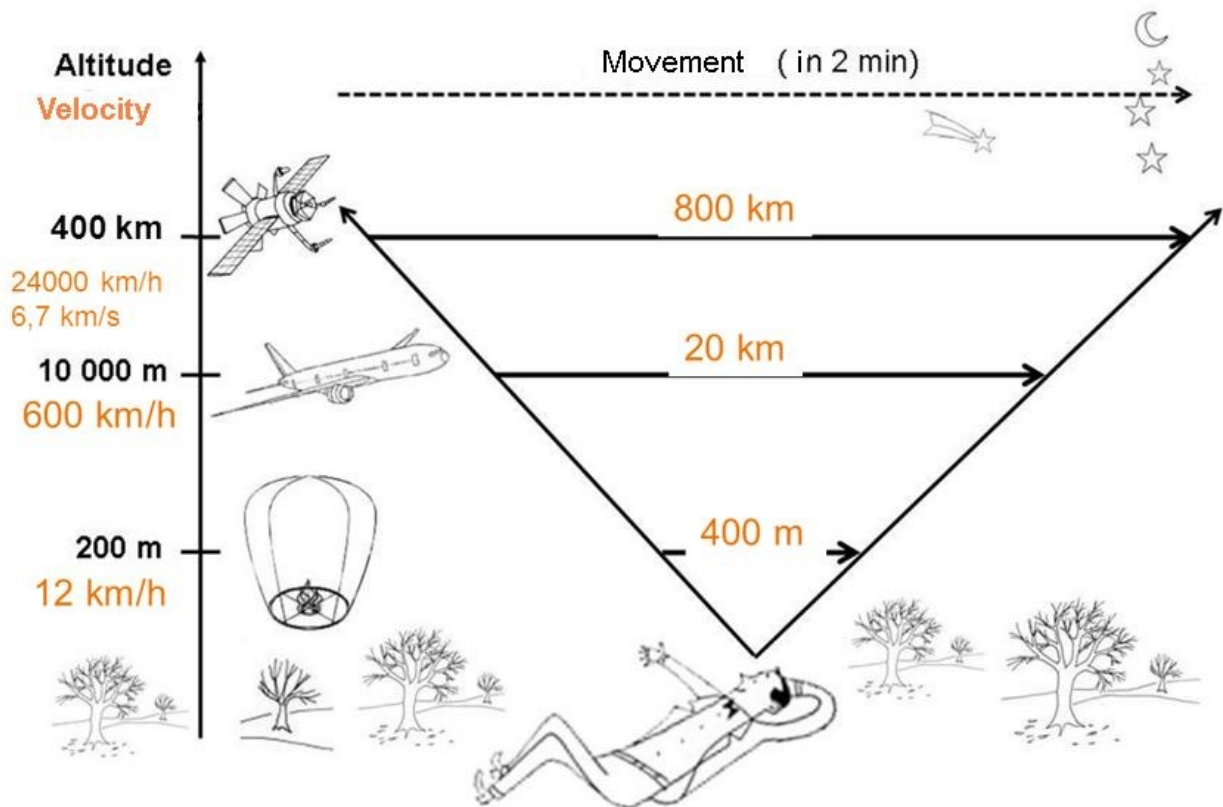
This dedicated website by itself records as many visitors as the general website of the French Space Agency does...

It provides free access to a lot of useful information concerning UAPs:

- Published reports (today 1734 cases over the period 1973-2012)
- Statistics
- Guidelines to recognize frequent sources of confusion, such as: Planes, satellites, Chinese lanterns, bolides, Laser beams, lightning
- Guidelines on how to report a sighting
- Various technical documents issued by GEPAN/SEPRA/GEIPAN (including a summary of SEPRA's audit)
- Agenda of planned conferences, TV/radio interviews, documentaries

"What did I see?"

Misperception of distance and size is the main cause of misinterpretation.



For the same angular velocity, a given phenomenon may be interpreted in very different ways, and the strangeness felt by the witness often stems from a wrong assessment of the distance, thus of the size.

Since it is brighter than usual satellites, the ISS is interpreted as flying at an altitude of 1000 or 2000 m. No known object flying at such an altitude looks like that, therefore it is strange!

A Chinese lantern, which is not very bright, is interpreted as flying at an altitude of 500 to 1000 m, thus as being a disk with a diameter of several meters, flying faster than an aircraft.

Bolides and atmospheric reentries of space debris are ALWAYS interpreted as flying at a very low altitude (sometimes 100 m).

GEIPAN's links with specialized laboratories

Depending on the needs, GEIPAN has an easy access (including through the Steering Committee) to various official laboratories. In particular:

- Celestial mechanics laboratory (bolides)
- Natural History Museum (meteorites)
- Lightning laboratory
- Materials analysis laboratory (traces/debris)
- Biology laboratory (traces)
-

GEIPAN's links with the speaker for photo/video analysis

Methodology + IPACO software development

GEIPAN's link with the 3AF/Sigma 2 Commission

Scientific exchanges on selected "D-class" cases

GEIPAN's innovating activities

- Method to conduct investigations (cognitive interviews): thesis in the University of Toulouse
- Installation of a dedicated wide-angle camera pointed towards zenith (bolides)
- Technical support for the Hessdalen project (Norway)



Association Aéronautique
et Astronautique
de France

*The French scientific Society of
Aeronautics and Astronautics*

3AF / SIGMA 2

SIGMA 1 Commission (2008-2013)

The Sigma 1 Commission (initially named "PAN Commission") was created in 2008 within the 3AF Association, under the chairmanship of Alain Boudier.

This initial phase was mainly dedicated to documentary research on the PAN issue in general.

SIGMA 2 Commission (2013-...)

The Sigma 2 Commission was created in 2013, under the chairmanship of Luc Dini, to succeed Sigma 1.

This operational phase is dedicated to the scientific/technical analysis of PAN reports belonging to "class D", for which usable technical data have been recorded (radar signatures, infrared records, photos/videos...)

The Sigma 2 Commission:

- works in close cooperation with CNES/GEIPAN for the selection of significant D-class cases which deserve in-depth investigations.
- also takes into account data from other reliable sources, with no limitation in terms of countries.
- establishes international contacts with organizations having a scientific approach of the PAN issue (e.g.: CEFAA in Chile, NARCAP in USA).

The following slides illustrate the various ongoing activities of 3AF, and those of the Sigma 2 Commission.

Sigma 2 Commission's activity reports will be published later.

WHO IS 3AF

HISTORY

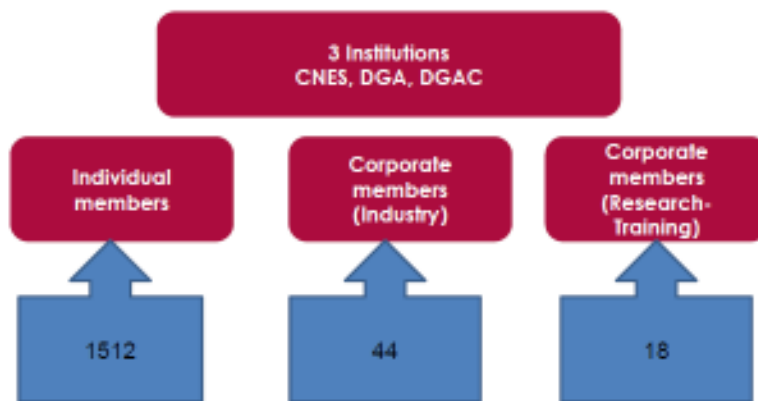
3AF is the result of the merger, in 1971, of:

- **AFITAE**, Association Française des Ingénieurs et Techniciens de l'Aéronautique et de l'Espace, established 1945
- **SFA**, Société Française d'Aéronautique, established 1955

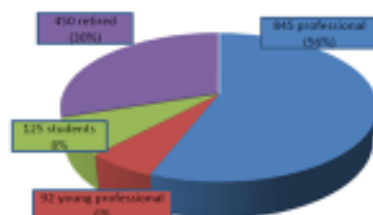


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WHO IS 3AF



A network of 1500 individual members



3

WHO IS 3AF

Our Activities and our Customers

Activities

- **Intellectual production and symposiums**, in line with industrial and political current events
- Targetted **Meetings**
- Informative and convivial **events**
- Degree courses **Support** and integration of young people into the world of work
- **Expertise**

Customers

- **Prime constructors**, Institutional Decision Makers, Research establishments, Universities, and their Collaborators
- **SMB** and their Collaborators
- **Retired people**
- **Students**
- **3AF members and others**



4

2016 conferences:

Conference	Leader	Location, date	Pax
Emdedded Real Time Software and Systems - ERTS2016	3AF GR MP	Toulouse 27-29 January	430
7th International Symposium on Optronics in Defence and Security - OPTRO2016	CT Optronic Systems	Paris 02-04 February	270
51th Symposium of Applied Aerodynamics - AERO2016	3AF	Strasbourg March	100
Advanced Efficiency - AEGATS 2016	3AF	Paris 12-14 April	200
Space Propulsion 2016	3AF	Rome 2 -5 May	500
Aeroacoutics AIAA/CEAS	3AF	Lyon 30 May-01 June	450
ERF 2016	3AF	Lille 6-10 September	300
13th Forum of Economic and strategic Intelligence - IES2016	ClpE	Rouen 7-9 Octobre	200
Greener Aviation 2016	3AF	Bruxelles 11-13 October	200

FRENCH UAP ENVIRONMENT

3AF



1977: IHEDN study
 1999: COMETA
 1977/ 2007 to today : GEPAN/ GE PAN= UAP investigation (gendarmerie investigation- French CNOA reports)+ case publication
 Others: UAP associations, MUFON, etc : investigations...

2008: PAN commission then SIGMA: 3AF commission starts investigation and analysis
 2013: SIGMA2: centered on **technical and scientific study** of "D" cases



6

SIGMA2 COMPLEMENTARY TO GEIPAN

3AF



7

HOW SIGMA2 WORKS



5 Tasks to try to IMPROVE UAP UNDERSTANDING
in France and in cooperation out of France

SIGMA2 DATABASE METHODOLOGY

Two objectives

- Tracing of documents
- Assessment of document quality (not of the technical content)

Σ^2 DB is intended to provide a quality assessment tool for the collected documents before their analysis.

Physical or electronic documents are assessed using different criteria with related quotations showing a first degree of reliability

Σ^2 DB does not replace other DB, in particular the GEIPAN DB which provides a ranking based on the technical content.

Σ^2 DB provides an initial assessment tool on the raw material
(either paper documents or other formats)

Personal introduction

François Louange is a French engineer, with a PhD in signal processing.

From 1968 to 1980 he worked for the European Space Agency, first in Darmstadt (Germany), then near Madrid (Spain), as Computer Manager.

In 1980, he set up in Paris as an independent consultant for French Defense, for a reconnaissance satellites program. There, he developed the new CAPI (Computer-Aided Photo-Interpretation) technique, materialized through the OCAPI operational software, and founded in 1989 the FLEXIMAGE company, specializing in the analysis of space imagery. Later on, he sold this company to the EADS Group, which finally integrated it into its defence subsidiary Cassidian, at the end of 2006. Today, after the latest reorganization, it is part of AIRBUS Space & Defence.

Since 2007, François Louange has returned to the status of being an independent consultant, and he collaborates, mainly with CNES/GEIPAN, on the analysis of alleged UFO photos/videos.

Since 2013, he has been a member of the 3AF/Sigma 2 Commission.

With regard to the « UFO phenomenon », François Louange got seriously interested in 1975 and tried – without success – to create an official department within ESA. As soon as he returned to France in 1980 he collaborated as a consultant on photo analysis, as well as on detection projects, with the GEPAN/SEPRA/GEIPAN department of CNES.

François Louange has contractually produced a dozen technical reports for CNES. He took part of the Pocantico workshop on 1997, and he was in charge of conducting SEPRA's audit in 2000-2001.

Currently, he continues to develop and to promote the IPACO specialized software (derived from OCAPI) through his www.ipaco.fr dedicated website, in collaboration with two highly skilled partners:

- Antoine Cousyn, very active image analyst in the field of UAPs, well-known on the *UFOweb* under his pseudonym *elevenaugust*. He already worked with MUFON on photo analysis.
- Geoff Quick (UK), former intelligence officer in the RAF and head of a large European center, with a sound international experience of operational image analysis, and experience in UFO photo analysis.

(More details may be found on the [ipaco](http://www.ipaco.fr) website)

The UFO problem: personal views

Definition of the UFO problem

The undisputable initial UFO fact is that there do exist, after elimination of errors and hoaxes, thousands of (so far) unexplained testimonies and records worldwide, each of which must have an explanation in the end (even if today's science is not able to understand it yet, in some cases).

In this sense, the practical UFO problem differs from the SETI problem, which originates from a theoretical question: does there exist – or not - an intelligent extraterrestrial life-form able to transmit messages through electromagnetic waves? Here, the final answer might be “yes” or “no”.

The need for an official work

“Official researcher” does not necessarily imply “more intelligent than private researcher”. However, the UFO problem is so complex (to be honest, no significant progress has been accomplished over the past 60 years) that it requires a lot of continuity, which can only be provided by an official institution, not subject to the ups and downs of private life.

In addition, the necessary collection of data from state entities such as the Police or the Air Force requires specific official agreements and security conditions which are out-of-reach for any private initiative.

From “passive” to “active” investigations

Nearly all UFO investigations, so far, have exclusively been based on a purely “passive” approach:

- Testimonies from unexpected witnesses, who decided to talk about their experience to somebody (media, ufologists, Police, etc)
- Records obtained by chance (photo, video, radar echo)

An “active” approach (as advised personally by J. Allen Hynek, and already tried out successfully), could open the door to far richer data:

- Testimonies triggered by targeted invitations (e.g. through want ads in serious newspapers)
- Records obtained through dedicated detection systems (e.g. wide-angle cameras in the visible or infrared range, diffraction gratings to obtain valuable spectral information)

Scientific logic

The progression of investigations on a UFO report may be broken down into the four following main steps:

Identification (explanation)

Attempt to find a conventional explanation (atmospheric or astronomical phenomenon, re-entry of space debris, scientific or military machine, flare, hoax, etc.)

Characterization (quantization)

Attempt to characterize and quantify the observed or recorded unexplained phenomenon (size, distance, velocity, color, etc.)

Classification (statistics)

Attempt to compare cases and establish statistics in order to identify classes of unexplained phenomena (basic science of observation).

Modeling (R&D)

If sufficiently accurate information has been gathered, attempt to model a class of phenomena, or a type of propulsion.

