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## SETI Translated into French

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### Abstract

The Search for Extraterrestrial Intelligence (SETI) has been popularized in France by Jean Heidman and François Biraud since 1980. To increase public interest in SETI, a French version of the SETI League website has been created in 1995. In 1999 the SETI@Home website was the second one in French. Amateurs need help in their native language to build antennas, use software or access open data. Web2.0 technologies and social networking have changed the way people find information about SETI. Ten years of statistics of a blog in French about SETI, Space and education have been analysed. Even if translation tools are widely used, some journalists or students won't read a scientific paper, a web page or even a tweet in English. Statistics show the need for translation and adaptation with the appropriate vocabulary. Outreach public events, popular books or scientific workshops about the search for biological or technological signatures have been organized in France during last decade. None of them use the SETI acronym even if the main question remains "Are we alone?". The French vocabulary used in the titles of those events shows that translating SETI into French presents a social aspect.

**Keywords:** internationalization, SETI, web technologies

### Acronyms/Abbreviations

Communication with Extraterrestrial Intelligence (CETI)

Internet Protocol (IP)

Nançay Radio Telescope (NRT)

Search for Extraterrestrial Intelligence (SETI).

Virtual Private Network (VPN)

### 1. Introduction

The recent discoveries of exoplanets have increased the public interest about life in the universe. A lot of academics find it difficult to keep a scientific approach when answering questions such as "are we alone?" [1]. According to Tarter [2], the search for extraterrestrial intelligence (SETI) is in fact a search for technology, as a proxy for intelligence. The words chosen are important when translating information in other languages or speaking about life in the universe to general public from an other cultural environment. A great effort of internationalization has been done by the IAA. The multilingual space dictionary [3] has entries such as "CETI" (p104), "radio astronomy" (p380) or "SETI" (p412).

Such a dictionary is useful to translate or adapt technical and scientific information in diverse languages being as accurate as possible. With 77 millions native speakers [4], French language is spoken by 2.8% of internet users [5]. They are located in Europe (52% are in France), Africa (Cote d'Ivoire 5,8%, Cameroon 5,7%, Congo 4,7%, etc...) or America (Canada 4,7%) as shown in Fig 1.

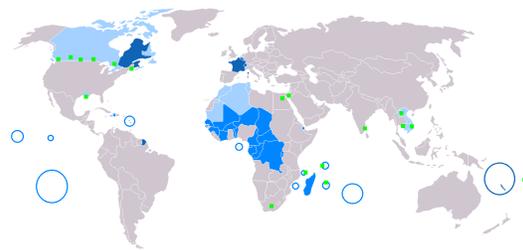


Fig 1 : map of French speaking countries

This paper focuses on two websites dealing with SETI in French. The first one [6] is only a translation of some of the pages of the SETI League website [7]. It has been created in 1995 and uses web1.0 technology. The second one [8] is a blog created in 2007 entitled "Life, the universe and everything" after Douglas Adams science-fiction novel [9]. At 2018/09/01, 987 posts are published, 153 are labelled *SETI* (see Table 2). The other available labels are:

- *education*: posts regarding museum visits or debates about French educative politics.
- *space*: videos about rocket launches or pictures of ISS passing over my home.
- *science-fiction*: book or film reviews.
- *science*: astronomy, physics, biology, etc...
- *everything*: pictures about travels or local events, social movements, personal thoughts, etc...

The blog uses web 2.0 technology. People can post comments, but most of them do it on social network rather than on the website. The traffic comes mainly from Google and Facebook. The pages are visited by

computers with IP address located in French speaking countries (France, Canada, Belgium, Switzerland) but also USA, Germany, Ukraine, etc... (see Table 7)

### 1.1 SETI public research in France 1970-1996

The cultural, historical and sociological context matters. The Nançay Radio Telescope (NRT) will be the host of a SETI survey at the end of 2018. The announcement [10] of the pilot program entitled “A Search for Technosignatures from Nearby Stars and Galaxies” by the Breakthrough Listen Team has not yet been shared by Paris Observatory on official websites or social networks.

The NRT was inaugurated the 17<sup>th</sup> of May 1965 by the French president Charles De Gaulle. The country was rather proud to have one of the best instrument in the world. During the cold war, new maths had been taught to pupils in order to increase the number of researchers and engineers. Every children born in the 60's has watched the Kraus antenna on one of the three official TV channel.

The first popular book dealing with SETI in French was written by two astronomers, François Biraud and Jean-Claude Ribes in 1970 [11]. From 1970 to 1972, the first search for extraterrestrial intelligence at NRT targeted 5 OH Masers sources. [12, 13].

The second popular book in French about SETI was published in 1979 [14]. The author, Albert Ducrocq, was a pioneer in cybernetics. He created a society called “SETI-France”, changing the acronym's definition for “Société d'Etude pour une Télédétection de l'Intelligence” (see appendix A for translation). A first meeting was organised during the 33<sup>st</sup> Paris Air Show in Le Bourget the 11<sup>th</sup> of Juny 1979 and a conference took place at UNESCO in November 1979. [15]

The next SETI observations in Nançay began in 1981 [16]. François Biraud and Jill Tarter targeted 344 stars of type F,G,K. The runs were in June 1981, August 1984, April 1987, October 1987, January and April 1988. [17].

Some technical improvements of the NRT were required in order to use the NASA megachannel spectrum analyser [18].

François Biraud and Sabine Airieau conducted a survey of 4 stars with giant planets in 1996 at NRT, using the same protocol than the 1981-1988 observations [19,13].

The new focal and receiver system project for the NRT ended in 2000. [20] Even if Nançay is mentioned in the list of places for the HRMS project, no target search took place. [21]

### 1.2 Amateurs 1994-now

Tim Berners Lee invented the World Wide Web in 1989 [22]. The first website appeared in 1993 [23]. The total number of websites now is around 1900 millions,

but in 1994 there was only 2,738 online websites. [24]. The idea of using web technologies to share data with citizen and ask them to be active in scientific projects came very early.

#### 1.2.1 SETI League

The SETI League [7] was founded in 1994 in response to Congress terminating all NASA SETI funding in October of 1993. The setileague.org domain has been registered this same year. For the first time, people all around the world could be member of a SETI organization, and later participate in the Argus project.

The French version of the SETI League website was created in 1995 [6]. At a time where Google didn't exist, requests about SETI usually came by email or written letters. Inviting people or journalists to look at a web page written in English didn't work. Translating the technical manual or press releases was the only way to make it accessible to non English readers. For several years it has been the only website in French dealing with SETI.

#### 1.2.2 SETI@HOME

The second website about SETI in French is also a translation written by an amateur wishing to promote the SETI@HOME software developed by the Berkeley University [25].

The software did get a lot of media interest in France when it was released in 1999. A strong community of French speaking users shared there results using mailing lists. The BOINC software enable the creation of teams. One of them is called “Alliance Francophone” and has a very active forum.

## 2. Material and methods

The data can be downloaded for further studies [26]. The files will be updated after the IAC2018 conference. The following figures are those till end of august 2018.

### 2.1 Classification.

If all the posts of the Setileague website deal with SETI, it's not the case for the blog [8]. Each post has been manually checked to fit into 1 to 3 labels described in introduction.

It was difficult to use algorithms that look for the word “SETI” in order to put the corresponding label. For instance only 20 titles among 153 contain the 4 letters of SETI. Some texts labelled SETI don't use the acronym. That's the case for the “Challenge Yourself” blog post relating one of the presentations of the workshop : “What's life? An extraterrestrial perspective” organized by METI international in March 2017 in Paris. The same text in an other context could have the label “science”.

The classification of all texts can be found for each year in the *statisticblog.ods* file [26].

## 2.2 Statistics

### 2.2.1 Country

The Webalizer software gives 12 months of statistics for the French version of the Setileague website [6]. The number of access by country has been reported in the *setileague.ods* file. Some data about language and internet access from [3,5] have been added in the file [26], as well as country participation for the SETI WOW event organized each year in Germany [27].

The blogger software gives only the 10 top countries by day, week, month and year. It has not been taken into account. [28]

### 2.2.2 Tools for statistics

According to Webalizer man page [29], the definition of a “hit” is the following : “This number represents the total number of requests that were made to the server during the specified report period.”. It represents the number of requests done by the user, no matter if it's for a picture, a style sheet or a file that doesn't exist on the server.

A bot, a spider or a spammer will generate a great number of hits. This could explain the high number of hits from Russia for instance. Webalizer can answer questions such as “from which country do visitor come” but not “how many real humans visited this website”.

As the blogger tool is not a third party visitors meter depending on browser configuration, it's not filtered by readers. [30] It gives the number of access to each page. This will be use only for comparison between SETI labelled pages and the others since an automatic tool such as spider or bot will visit all the pages.

A python script is used to compute statistics.

### 2.3 Hypertext

The French version of the setileague website [6] is a bridge to the official website [7]. Each translated page has a link to the original version.

The blog [8] is a kind of gate to some 1119 different other websites. More than 10% of the SETI related texts have links to scientific publications. There's also several posts to report or announce workshops or conferences.

There's also some links to major organizations contributing to the search for technosignatures.

### 2.4 Vocabulary

“SETI” is something not really clear for most people. It's not only a screen saver, it's not just an institute in the USA or a NASA programme ended in 1993. In France, journalists or translators often put an article before the acronym “Le” SETI. This expression “The SETI” shows that most people misunderstand the search for extraterrestrial life.

Things could change with a survey conducted in France.

As noted by J.M. Contant. the work of the IAA and the International Institute of Space Law about SETI has been formally and definitely recognized by the United Nations on December 8, 2000 and the the personal contribution of Jean Heidmann was essential [31]

In popular books written before the use of the term astrobiology, J. Heidmann uses SETI to speak about all the surveys from Ozma to HRMS [32], but introduced bioastronomy defined by IAU few years before [33].

A popular book about Fermi paradox has been recently published by CNRS editions. Chapter 3 has for title “Short story of the radio survey of the galaxy”. If we except the references to SETI Institute (3), SETI League (3), SETI@HOME and SETI Hacker, the “SETI” acronym appears only 13 times within the 200 pages. [34] The June 2017 discussion about WOW signal is mentioned but there is not a single word about Breakthrough Listen.

To include interdisciplinary contributions, the IAA workshops organized since 2008 had for title “Search for life signatures” (see table 1). There have been a lot of email debate about the title. The SETI acronym was removed in order to increase the participation of biologists and astrophysicists. An analysis of the words used in IAA workshops titles according to first speaker nationality is done.

Table 1 : Search for Life Signature workshops

Year	City, country	Talks	Local speakers
2008	Paris, FR	59	25%
2010	London, UK	32	28%
2011	St Petersburg, RU	21	71%
2012	San Marino, IT	37	29%
2014	Paris, FR	16	12%
2015	Paris, FR	16	13%

## 3. Calculation

### 3.1 Analysis of blog visits

A python program called *lecturecsv.py* reads the *staticsblog.ods* file and computes the number of blog posts for each combination of items. [35]

Table 2. Number of posts for each label

	SETI	Space	Science	Education	SF
SETI	127				
Space	2	27			
Science	-	1	91		
Education	6	3	10	129	
SF	13	1	8	4	50

The blog contains a page with for each topic (SETI, Space, Science, Education, SF) listing the titles of the posts. The “everything” label has been given to 478 texts.

The *stat.py* program compares the number of visits for the 154 posts about SETI and the 824 others (see Fig 2)

### 3.2 Links in the blog

Every post labelled SETI has been saved into a text file named Year\_Month\_abc.txt

Links appear like that :

<<https://breakthroughinitiatives.org/initiative/1>>  
 <<https://www.seti.org/seti-institute/carl-sagan-1934-1996>>

The links are gathered in a links.txt file by using the following bash command :

```
grep http 20* | cut -d'/' -f3 | sort > links.txt
```

### 3.3 Word used by professional to speak about SETI

All the presentations of the six search for life symposiums have been gathered in a bibtex file. [36] . The php bibtexbrowser tool is used to look for particular words or authors. [37]

The bibtexreader.py program looks for words used in the title of the presentations of the IAA search for life signature and counts the number of occurrences of each

term. It has also been used with the list of paper of the first symposium published in Acta Astronautica [38]

## 4. Results

### 4.1 Analysis of blog visits

Table 3 represents the number of posts, the mean and the median values of the number of visits per topic.

The median and means value are similar for texts labelled SETI or not.

There's not enough texts with two labels (for instance SETI+ EDU) to conclude that it's better to mix topics and deals with SETI and education than just for writing about SETI.

Table 3. Statistical values for the blog [8]

label	posts	means	medians
SETI	154	162	136
Non SETI	826	214	124
SETI + Edu	6	358	305
SETI + Space	2	149	212
SETI + SF	13	162	148
Only SETI	132	152	81

The median value is more significant than the mean value. The most successful post is about the Lego version of Margaret Hamilton and has more than 15000 visits. [26]

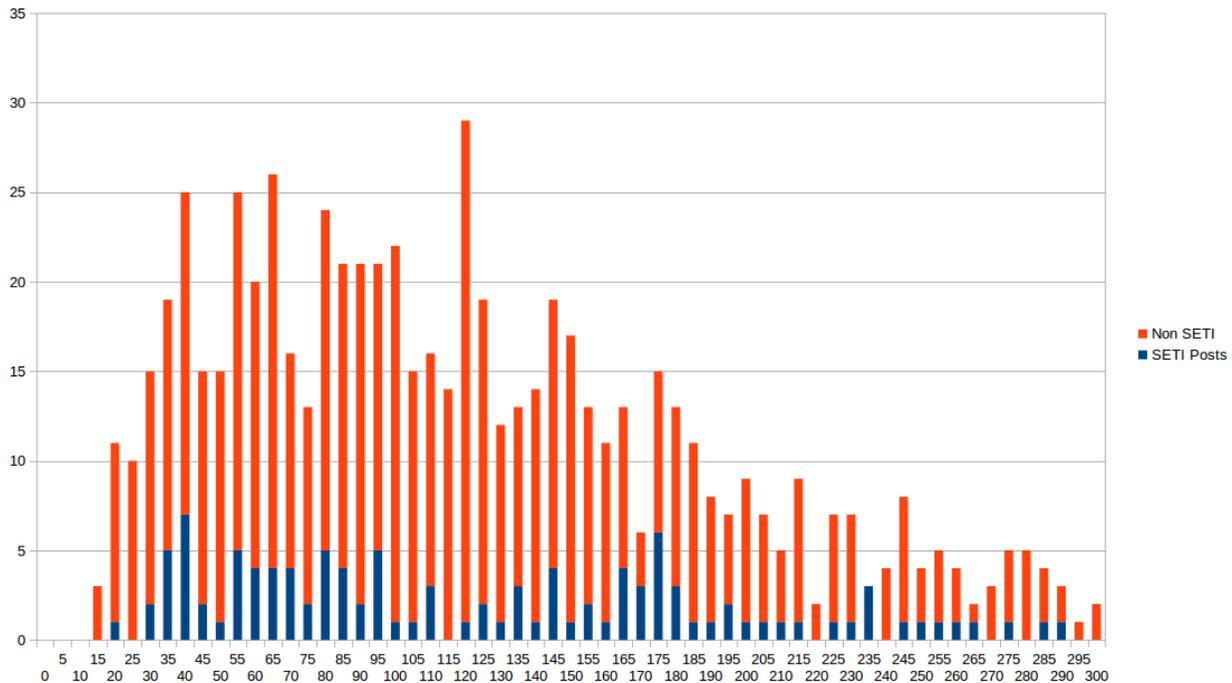


Figure 2 : number of posts regarding SETI and not according to the number of visits (0-5, 5-10, etc...)

The distribution of posts doesn't show differences between texts about SETI and not. A quarter of posts of both categories has between 50 and 100 visits.

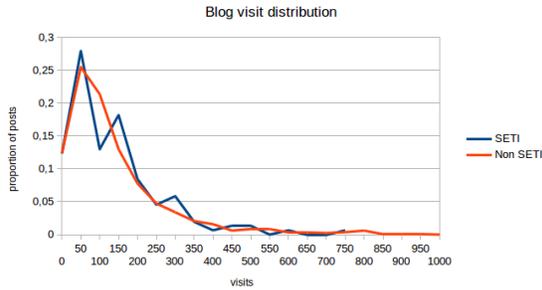


Fig 3: distribution of visits

#### 4.2 Links in the blog

The blog has 24 SETI related posts with references to scientific publications and 31 about conferences starting with the 2008 UNESCO search for life signature symposium and ending with Breakthrough Discuss 2018.

Table 4. Statistical values for the blog [8]

label	posts	means	medians
SETI	154	162	136
Scholar	24	168	194
Conf	31	120	248

The most scholar websites linked are represented in table 5. Table 6 shows the number of links to main SETI and research organizations or institutes.

Table 5. scholar websites

domain	links
arxiv.org	23
Doi.org	7
Nature.com	5

Table 6. SETI and research domains

domain	links
Setileague.free.fr	21
Setileague.org	10
Seti.org	16
Berkeley.edu	15
Nasa.gov	9
laaweb.org	8
Esa.int	8
nrao.edu	6
laaseti.org	5

#### 4.3 French speaking amateur activity

The French BOINC users are gathered in a team called “Alliance Francophone”. There's 21729 users listed in this team. 9893 of them participate in the SETI@HOME project and 529 are active [39].

The French version of the SETI League website is accessed by main French speaking countries (see fig 4). Visitors mainly come from France, Belgium, Canada and Switzerland.

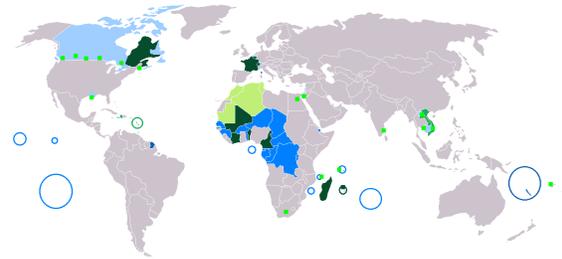


Fig 4: Word map of French speaking countries (in blue). The countries in green visited the setileague.free.fr website during last 12 months.

There's also very active SETI amateurs in these countries according to the SETI League roster [8] or to the participation of the 2018 latest WOW event [27].

Table 7. SETI activity of amateurs.

Country	WOW 2018	SETI League members	Visits during last 12 months
France	30	7	10055
Belgium	1	4	509
Canada	14	43	467
Switzerland	3	5	122

It's impossible to know if visitors of Belgium, Canada or Switzerland speak French, Flemish, English, Italian or German.

Few visits come from countries with very low internet penetration [5]. There's no SETI League members or WOW 2018 participation.

Table 8. Countries with L1 French speakers and low internet penetration visiting [6].

Country	L1 speakers	Internet access
Madagascar	120000	5%
Mali	15000	12%
Benin	16700	12%
Haiti	600	12%
Burkina-Faso	170000	14%
Senegal	47000	25%
Côte d'Ivoire	45000	26%
Guadeloupe	7300	46%

#### 4.4 Words used by French scientists

Figure 5 shows the words used in the title of the six Search for Life Signatures symposiums (see Table 1). The 180 titles represent 1533 words. The titles with first author from France represent 190 words (12,39%). The SETI acronym appear 65 times. If we only took titles from France we count 14 times “SETI” (21,54%).

Very common words such as “life” (20 times), “extraterrestrial” (12), “interstellar” (11), “radio” (9), “signal” (7) are used once or not by authors from France.



Fig 5: words in symposium titles.

The yellow disks represent words used by French authors with a rate up to 12,39%

A selection of papers from the first symposium at UNESCO in 2008 have been published in Acta Astronautica [38]. Among the 18 published papers only 2 (11%) are from France [40,41], whereas 25% of the Unesco talks have been presented by local speakers.

The bibtexreader.py programm has been used to analysed the 3452 words present in the titles, keywords and abstracts of the acta2010.bib file. [35] Among these, the citation from [40,41] represent 533 words (15,44%). SETI appears 33 times but only 3 times in French papers.

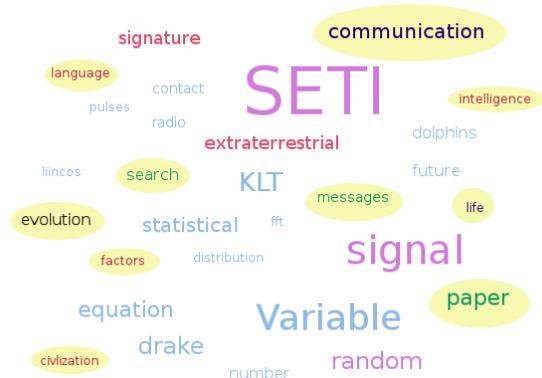


Fig 6 : words used in title, keywords and abstract of Acta Astronautica special issue [38]

## 5. Discussion

### 5.1 Classification.

The search for extraterrestrial intelligence is an interdisciplinary research. The classification of SETI related papers or blog posts would be different when made by people of different background. A further study could consist in presenting texts to citizens or scientists and asking if this has to do with search for technological signatures, biological signature, extraterrestrial life, science, space, science-fiction or something else.

### 5.2 Culture or vocabulary translation.

The word “alien” has been popularized in France by the film directed by Ridley Scott in 1979. For most people in France, it’s a synonym of “extraterrestrial”. It doesn’t represent something else, the foreigner.

Steven Spielberg film “E.T. the extraterrestrial” is also very famous. When we ask to French people “If I say extraterrestrial, what picture do you see ?”, the answer is not the same for several groups. On the “Alliance Francophone” BOINC forum users, 26% see a bacteria and 20% a little grey or green entity. On a Facebook group for gifted people, 79% choose “a planet, a star, everything beyond the Earth”. This kind of survey should be done on a wider scale.

When asking young children “can you give me the name of a cartoon with an extraterrestrial ?” they hesitate. Most of them never saw “E.T.” or the 1977 Steven Spielberg film “Close Encounters of the Third Kind”.

François Biraud, Albert Ducrocq and Jean Heidmann have popularized SETI in France between 1970 and 1996. Even the Nançay radiotelescope is the place for regular SETI surveys [10] it may be harder to speak about a candidate signal to scientists, journalists or citizen without knowing what they imagine when reading word the extraterrestrial.

### 5.2 What is a country?

The webalizer software use the IP address to locate the visitors. Technologies such as proxy and virtual private network (VPN) could hide the real position of the user.

The SETI League roster uses postal address to find the country. The BOINC users have to choose a country . They can also prefer to stay “international user”. The country could be different of the nationality and the links between countries and language spoken should be more accurate if done by sociologists or linguists.

## 6. Conclusion

Translating SETI into French means choosing the vocabulary and taking into account societal and cultural aspects.

The statistics show a need for pages in French and of bridges between scholars and citizens. Popularizing the words such as “bioastronomy” or “technosignature” is important to clarify what SETI people really do. It could also help scientists looking for biological signatures to explain their research goal in outreach events or to talk in SETI workshops.

Amateur activities worldwide have to be promoted. The communities such as “Alliance Francophone” play an important role to maintain interest about BOINC and SETI@HOME. More than 20 years after the creation of the French version of the Setileague website, educative documents such as the technical manual is still downloaded.

Websites without advertisement, blogs and open forums enable the share of knowledge as dreamed by Tim Berners-Lee. The professional and amateurs working for SETI have to enhance internationalization.

#### Appendix A (French words used in the paper)

La vie, l'univers et le reste : Life, universe and everything. [8]

Le dossier des civilisations extraterrestres : The files of extraterrestrial civilisations. [11]

La chaîne bleue : The blue channel [14]

Société d'Etude pour une Télédétection de l'Intelligence: Society for the studies for a remote sensing of intelligence.

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