

**PATENT COOPERATION TREATY**

**TRANSLATION**

From the  
INTERNATIONAL SEARCHING AUTHORITY

**PCT**

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing (day/month/year)	See form PCT/ISA/210
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Applicant's or agent's file reference <b>BL06 SIA IRV</b>	<b>FOR FURTHER ACTION</b> See paragraph 2 below
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International application No. <b>PCT/FR2007/001603</b>	International filing date (day/month/year) <b>02.10.2007</b>	Priority date (day/month/year) <b>04.10.2006</b>
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International Patent Classification (IPC) or both national classification and IPC  
**G01N21/27**

Applicant  
**SFERIS**

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/EP	Date of completion of this opinion	Authorized officer
Facsimile No.		Telephone No.

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.

PCT/FR2007/001603

Box No. I	Basis of this opinion
1.	<p>With regard to the <b>language</b>, this opinion has been established on the basis of:</p> <p><input checked="" type="checkbox"/> the international application in the language in which it was filed</p> <p><input type="checkbox"/> the translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rule 12.3(a) and 23.1(b)).</p>
2.	<p>With regard to any <b>nucleotide and/or amino acid sequence</b> disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:</p> <p>a. type of material</p> <p><input type="checkbox"/> a sequence listing</p> <p><input type="checkbox"/> table(s) related to the sequence listing</p> <p>b. format of material</p> <p><input type="checkbox"/> on paper</p> <p><input type="checkbox"/> in electronic form</p> <p>c. time of filing/furnishing</p> <p><input type="checkbox"/> contained in the international application as filed</p> <p><input type="checkbox"/> filed together with the international application in electronic form</p> <p><input type="checkbox"/> furnished subsequently to this Authority for the purposes of search</p>
3.	<p><input type="checkbox"/> In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.</p>
4.	<p>Additional comments:</p>

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INTERNATIONAL SEARCHING AUTHORITY

International application No. PCT/FR2007/001603
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<b>Box No. V</b>	<b>Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</b>																		
1. Statement																			
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; padding: 2px;">Novelty (N)</td> <td style="padding: 2px;">Claims <u>2-12, 14-22</u></td> <td style="width: 10%; text-align: right; padding: 2px;">YES</td> </tr> <tr> <td></td> <td style="padding: 2px;">Claims <u>1, 13</u></td> <td style="width: 10%; text-align: right; padding: 2px;">NO</td> </tr> <tr> <td style="padding: 2px;">Inventive step (IS)</td> <td style="padding: 2px;">Claims _____</td> <td style="width: 10%; text-align: right; padding: 2px;">YES</td> </tr> <tr> <td></td> <td style="padding: 2px;">Claims <u>1-22</u></td> <td style="width: 10%; text-align: right; padding: 2px;">NO</td> </tr> <tr> <td style="padding: 2px;">Industrial applicability (IA)</td> <td style="padding: 2px;">Claims <u>1-22</u></td> <td style="width: 10%; text-align: right; padding: 2px;">YES</td> </tr> <tr> <td></td> <td style="padding: 2px;">Claims _____</td> <td style="width: 10%; text-align: right; padding: 2px;">NO</td> </tr> </table>	Novelty (N)	Claims <u>2-12, 14-22</u>	YES		Claims <u>1, 13</u>	NO	Inventive step (IS)	Claims _____	YES		Claims <u>1-22</u>	NO	Industrial applicability (IA)	Claims <u>1-22</u>	YES		Claims _____	NO	
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	Claims <u>1, 13</u>	NO																	
Inventive step (IS)	Claims _____	YES																	
	Claims <u>1-22</u>	NO																	
Industrial applicability (IA)	Claims <u>1-22</u>	YES																	
	Claims _____	NO																	
2. Citations and explanations:																			
<p><b>Prior art</b></p> <p>The present notification mentions the following documents cited in the search report. The order numbers that have been assigned to them hereafter will be used throughout the procedure:</p> <p style="margin-left: 40px;">D1: "A passive two-band sensor of sunlight-excited plant fluorescence", P. Keababian et al., Review of scientific instruments, November 1999</p> <p style="margin-left: 40px;">D2: "Three channels detector for remote sensing of chlorophyll fluorescence and reflectance from vegetation", S. Evain et al., 8<sup>th</sup> International Symposium: physical measurements and signatures, 2001</p> <p style="margin-left: 40px;">D3: "Detecting solar-induced chlorophyll fluorescence from field radiance spectra based on the Fraunhofer line principle", Liu, Zhang, Wang, Zhao, IEEE Transactions on geoscience and remote sensing, 2005.</p>																			

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

**1- Objections relating to the lack of clarity (PCT  
Article 6)**

**a)** It is clear from the description that the following features are essential to the definition of the invention:

- at least four signals are detected, two in each one of the at least two atmospheric absorption lines;
- the insolation index is derived from measurements carried out on a second atmospheric absorption line for which no fluorescence is available, the use of this second line enabling a reference surface not to be required;
- this insolation index measured on the second line is not directly transposable to the first absorption line: the law that enables the correct value for this index to be derived from its value for the second line has to be specified.

Since **independent claim 1** does not contain these features, it does not comply with the requirement of clarity, which states that an independent claim has to contain all the technical features essential to the definition of the invention.

In a general way, the application refers to the implementation of a formula (given on page 3). All the features of this formula must therefore be present and accurately described in claim 1.

**b) Claim 1** is not based on the description, in view of

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

the fact that its scope is broader than that justified by the description and the drawings. The reason being that the present application is limited to a method of implementation of an algorithm defined by a specific formula (given on page 3) to determine a fluorescence signal. Whereas, claim 1 refers to any measurement of a light signal additive to sunlight and at least two atmospheric absorption lines.

The observations made in point a) and b) above are also valid for independent claim 13.

Claims 1 and 13 do not therefore comply with the requirements of clarity needed (PCT Article 6).

**2- Objections relating to lack of novelty (PCT Article 33(2))**

The present application does not meet the requirements of novelty, for the following reasons:

**2-1. Independent claims 1 and 13**

**Claim 1**

D1 and D2 describe a method to determine a fluorescence signal activated by sunlight that has crossed an atmosphere, comprising a measurement, for at least a first and a second atmospheric absorption line, of a signal that depends on an intensity of the collected light at a wavelength of the line (D1: page 4387, third paragraph; D2: summary and pages 395-396), and a determination, from the signals measured, of a signal

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

that depends on an intensity of the additive signal at a wavelength of the first line (D1: page 4387, third paragraph; D2: summary and pages 395-396).

The subject matter of claim 1 is therefore already known from D1 or D2.

**Claim 13**

This claim refers to the device using the method of claim 1, and is not novel, for the same reasons.

**3- Objections relating to lack of inventive step (PCT Article 33(3))**

The present application does not comply with the requirements for inventive step, for the following reasons:

**3-1. Independent claims 1 and 13**

Even if it were specified in the independent claims that the second line is in a spectral field without fluorescence generated by vegetation and the relationship linking the insolation indices of the lines considered were given, an inventive step would still not be guaranteed.

Indeed, the problem to be solved in relation to the teaching of D2 would be that of not requiring the reference panel, a problem mentioned in the conclusion of D2, so as to increase the detection distance and the size of the surface measured.

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

In view of the fact that the reference panel is only used to produce, in a given spectral band, a reference signal for the atmospheric absorption without any fluorescence component, a person skilled in the art wishing to solve the above problem will necessarily for that purpose consider carrying out a measurement in another spectral band, since the reference panel has to be eliminated and in the first spectral band a fluorescence additive signal is necessarily present.

Only the insolation relationship (constant) between the two bands has to be taken into consideration to successfully carry out the calculations on the basis of the well-known formula given for example in D2 or D3 and on which the present application is also based.

Consequently, independent claims 1 and 13, even amended to overcome the objections of clarity made in point 1- above, cannot be considered as involving an inventive step.

### **3-2. Dependent claims**

The dependent claims do not contain any additional features that, in combination with the features of any claim to which they refer, meet the requirements of patentability in regard to novelty and/or inventive step.