

Miniaturized Gas Sensors

Patent Landscape Analysis

*Consumer applications open up new perspectives for gas sensors;
Do the key market players have the best IP positions?*

REPORT OUTLINE

- Miniaturized Gas Sensors Patent Landscape Analysis
- October 2016
- PDF (220+ slides)
- Excel file (2,400+ patents)
- €5,990 (Multi-user license)



KEY FEATURES OF THE REPORT

- **IP trends** including time evolutions and countries of patent filings
- **Current legal status** of patents
- Ranking of **main patent applicants**
- Joint developments and **IP collaboration network** of main patent applicants
- **Key patents** and granted patents near expiration
- Relative **strength** of main companies' IP portfolios
- **Matrix** showing patent applicants and their patented technologies
- **Segmentation** of patents by **gas sensor technology**: Electrical detector (FET, CMOS, MOS/MIS), chemical sensor, optical detector, acoustic detector, gas chromatography, electro-chemical gas sensor, thermal gas sensor, gas sensor with CNTs/Graphene, electro-mechanical gas sensors
- **IP position vs. market positions** for each key players
- **MEMS gas sensor IP profiles of 19 key companies**, with key patents, technological issues, partnerships, IP strength, IP strategy and latest market news
- **Excel database** with all patents analyzed in the report (2000+ patents), including technology segmentation

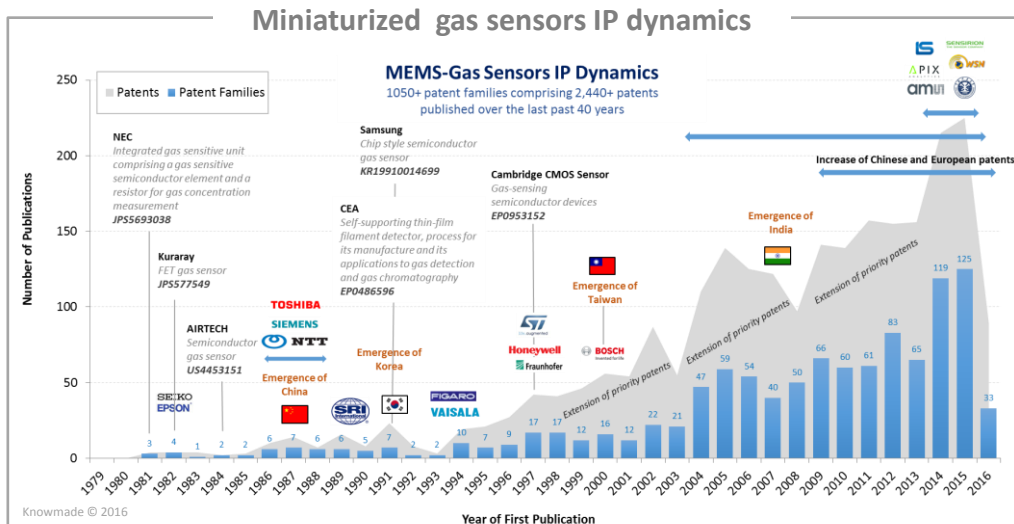
RELATED REPORTS

- Gas Sensor Technology and Market 2016 (Yole Développement)
- Cambridge CMOS Sensor CCS801 (System Plus Consulting)
- AMS AV-MLV-P2 – Gas Sensor (System Plus Consulting)

MICRO GAS SENSOR IP DYNAMICS COME ALONG WITH THE MARKET RAMP-UP

Today, mobile applications aggregate more and more sensors (pressure, inertial ...), and gas sensors could be the next sensors to be integrated in smart phones and/or wearables devices. Consumer applications are driving new gas sensors development to reduce cost, power consumption and size, especially with MEMS technologies. Such gas sensors are thus referred as "MEMS gas sensors". These technical and business requirements have opened the door to innovation and added a new dimension to the global competition between gas sensor suppliers. The recent mergers and acquisitions (AMS/Applied Sensors/NXP/CCMOS, TDK/Micronas) reflect this thriving sector in structuration. What is surprising with the gas sensor market and related patents, is the discrepancies between the market leaders (Honeywell, MSA, NGK, Figaro) and the leaders for patents related to miniaturized gas sensors (Bosch, Siemens, Micronas, CCMOS). This is highlighting the fact that the gas sensor market is about to change: the new patents and related devices are targeting new applications, which may disrupt the market.

Nowadays, the number of enforceable patents is increasing worldwide, and several companies already stand out by their strong IP position. All of these signs suggest the market start. According to the latest analysis from Yole Développement ([Gas Sensor Technology & Market](#), February 2016), the market size of gas sensors for consumer applications should grow from \$12M in 2015 to more than \$95M in 2021 (upside of \$60m if massive adoption of these technologies). With a CAGR 2014 - 2020 of 33%, this segment is poised to experienced the highest grow rate of the gas sensor market. In such emerging market, a strong intellectual property (IP) position on miniaturized gas sensors is thus essential for companies to enter in this promising business.



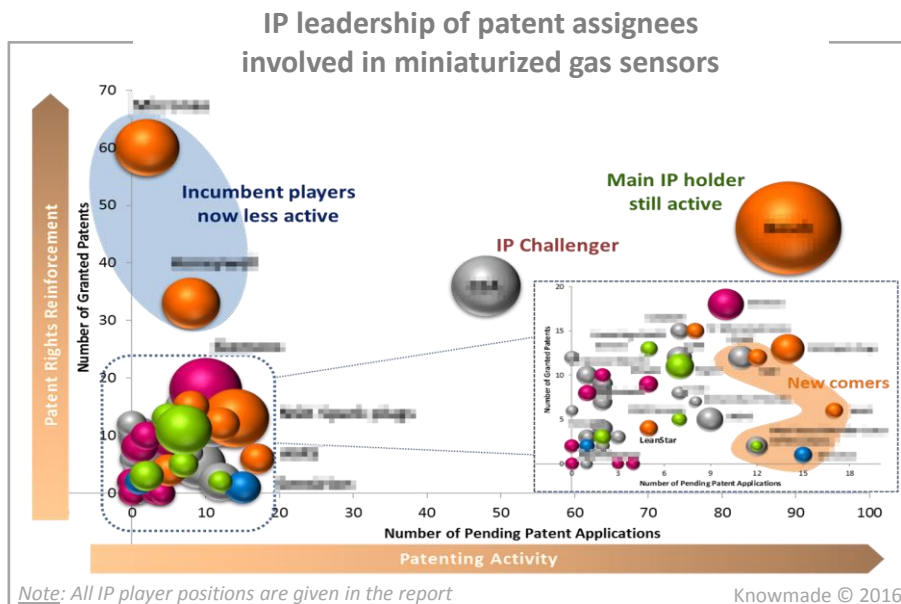
Now it is a critical time for understanding the global patent landscape of miniaturized gas sensors through in-depth patent analyses of key technologies and key players, in order to anticipate changes, harvest business opportunities, mitigate risks and make strategic decisions to strengthen one's market position and maximize return on one's IP portfolio.

In this report, we have investigated the patent landscape of miniaturized gas sensors that could be used in consumer applications, i.e. patents claiming gas sensing technologies with very innovative approaches, based on existing MEMS/Semiconductor/Optical integration platforms and manufactured by micro-fabricating processes.

More than 1,050 patented inventions have been published worldwide up to August 2016 by more than 440 patent applicants. First patents on MEMS gas sensors was filed by Japanese companies in the early 1980's (NEC), but patent activity really emerged between 1985 and 1994 with the apparition of European and American companies (Siemens, Fraunhofer, CEA, SRI, SPX ...). Multiple start-ups have been created on the basis of CEA R&D results. A first wave of patent publications occurred between 1994 and 2003 induced by the emergence of IDMs (ST Microelectronics, Micronas, Honeywell, NGK, Bosch), American R&D labs (Caltech, University of Florida) and pure play gas sensor companies (CCMOS Sensors, Applied Sensor). Since then, patent publications have increased thanks to a high patent activity of Chinese universities (mainly in China) and European players (worldwide). The last 3 years newcomers started to file patents on MEMS gas sensors (AMS, Sensirion, APIX, NXP ...). Currently, more than 760 patents are granted, mainly in China, Europe and USA, and more than 510 patent applications are pending, mainly in Europe, China and USA. We believe the significant ratio of patents in force and the high number of patent applications still in the pipeline worldwide is an indication of the technology maturity heralding a future ramp-up of the market of miniaturized gas sensors that could be used in consumer applications.

KNOW THE IP POSITION OF KEY PLAYERS

More than 440 patent applicants are involved in MEMS gas sensors patent landscape. Bosch is the main patent holder around the world and is still very active in this field. But according to our analysis, Caltech, General Electric (Amphenol), Honeywell and Siemens have the strongest patent portfolios with a real IP blocking potential. The report provides a ranking and analysis of the relative strength of the top patent holders derived from their portfolio size, patent citation networks, countries of patent filings and current legal status of patents. We reveal the IP strength of the key IP players involved in gas sensor technologies that could be used in consumer applications and we depict their competitive IP position.



In our analysis, we have identified 18 key players : AMS, APIX Analytics, Applied Sensor, Bosch, Caltech, Cambridge CMOS Sensors, CEA, ETRI, Figaro, Fraunhofer, General Electric, Honeywell, Micronas, NGK Spark Plugs, Sensirion, Siemens, SPEC Sensors, VTT. For each one, we provide a miniaturized gas sensors IP profile including dynamics and main countries of filing of their patent applications, key features of their patent portfolio, IP strength, collaboration network and key patents.

Patent differentiation of patent assignees involved in miniaturized gas sensors

Patent assignees	No Patent families	Optical	Thermal	Chromatography	Electrochemical	Acoustic	Electromechanical	Electrical	MOS/CMOS/MIS	FET	Chemical	CNTs/Graphene
TOTAL	1058	230	420	43	90	51	95	500	147	200	62	65
Bosch	18	1	1	1	1	1	1	1	1	1	1	1
Siemens	18	1	1	1	1	1	1	1	1	1	1	1
General Electric	18	1	1	1	1	1	1	1	1	1	1	1
Caltech	18	1	1	1	1	1	1	1	1	1	1	1
Applied Sensor	18	1	1	1	1	1	1	1	1	1	1	1
AMS	10	1	1	1	1	1	1	1	1	1	1	1
APIX	9	1	1	1	1	1	1	1	1	1	1	1
LEANSTAR	9	1	1	1	1	1	1	1	1	1	1	1
Cambridge CMOS	9	1	1	1	1	1	1	1	1	1	1	1
Figaro	9	1	1	1	1	1	1	1	1	1	1	1
NEC	9	1	1	1	1	1	1	1	1	1	1	1
ST Microelectronics	9	1	1	1	1	1	1	1	1	1	1	1
University of Florida	8	1	1	1	1	1	1	1	1	1	1	1
Applied Sensor	8	1	1	1	1	1	1	1	1	1	1	1
Applied Sensor	8	1	1	1	1	1	1	1	1	1	1	1
Applied Sensor	7	1	1	1	1	1	1	1	1	1	1	1
Applied Sensor	6	1	1	1	1	1	1	1	1	1	1	1
Applied Sensor	6	1	1	1	1	1	1	1	1	1	1	1
Applied Sensor	6	1	1	1	1	1	1	1	1	1	1	1
Applied Sensor	6	1	1	1	1	1	1	1	1	1	1	1
Applied Sensor	5	1	1	1	1	1	1	1	1	1	1	1
Applied Sensor	5	1	1	1	1	1	1	1	1	1	1	1
Applied Sensor	4	1	1	1	1	1	1	1	1	1	1	1
Applied Sensor	4	1	1	1	1	1	1	1	1	1	1	1
Applied Sensor	4	1	1	1	1	1	1	1	1	1	1	1

Note: All segment details and IP players are given in the report Knowmade © 2016

PATENTED TECHNOLOGY AND IP STRATEGY

The 1,050+ patented inventions selected for this study have been categorized by technology segments: electrical detection (FET, CMOS, MOS/MIS, chemical sensors, sensors with CNTs/graphene), optical detection, acoustic detection, thermal gas sensors, electro-mechanical gas sensors, electro-chemical gas sensors and gas chromatography.

For each segment, the report includes the description of the technology, its advantages and its drawbacks, the time evolution of patent applications, the main patent assignees and their filing countries, the key patents, the patents near expiration date and a comparison between main IP players and main market players.

We describe the recent patented technologies on miniaturized gas sensors and we reveal the IP strategy and the technical choices of the main patent assignees.

USEFUL PATENT DATABASE (2,400+ patents)

Our report also includes an **Excel database** containing the 2,400+ patents analyzed in the study. This useful patent database allows multi-criteria searches and includes patent publication number, hyperlinks to the original documents, priority date, title, abstract, patent assignees, technological segments and legal status for each member of the patent families.

COMPANIES MENTIONED IN THE REPORT (NON-EXHAUSTIVE)

Amphenol, AMS, APIX Analytics, Applied Sensors, Bosch, Caltech, Cambridge CMOS Sensors, CEA, Elster, ETRI, Figaro, Fraunhofer, General Electric, Hitachi, Honeywell, ITRI, KWJ Engineering, Micronas, New Cosmos Electric, NTK/NGK, NXP, Oriental Systems Technology, Sensirion, Siemens, SLS Technology, Spectral Engines, SPEC Sensors, ST Microelectronics, Suzhou LeanStar Electronic Technology, VTT ...

TABLE OF CONTENT

INTRODUCTION <u>4</u>	Most cited patents	PATENT SEGMENTATION <u>134</u>
Scope of the report	Granted patents near expiration date	Patents split by gas sensor technology
Key features of the report	IP specialization degree of key players	Time evolution of patent applications by gas sensor technology
Objectives of the reports	IP leadership of key players	Legal status of alive patents split by gas sensor technology
METHODOLOGY <u>10</u>	Prior art strength index of key players	Forward citations of MEMS gas sensor technology
Patent search, selection and analysis	IP blocking potential of key players	Matrix Main Patent Assignees vs Technical Segments
Search equations	IP PROFILE OF KEY PLAYERS <u>70</u>	Comparison of IP and market position of key players
Terminologies for patent analysis	Bosch	Focus on Technologies:
NOTEWORTHY NEWS <u>16</u>	Siemens	Technology description
EXECUTIVE SUMMARY <u>18</u>	Honeywell	Patented technologies
PATENT LANDSCAPE OVERVIEW <u>26</u>	Micronas	Mapping of main patent assignees
Time evolution of patent publications	NGK/NTK	Most cited patents
Main patent assignees	Figaro Engineering	Granted patents near expiration date
Time evolution of patent assignees	Sensirion	CONCLUSION <u>215</u>
Legal status of patents	AMS	KNOWMADE PRESENTATION <u>217</u>
IP collaboration network	Cambridge CMOS Sensors	
Mapping of patenting activity	SPEC Sensors	
Time evolution of patent applications by country	APIX Analytics	
Countries of patent filings for main patent assignees	General Electric	
Mapping of main current patent holders	Applied Sensor	
Mapping of main current patent applicants	New Cosmos Electric	
Key patent assignees	CEA	
Summary of patent portfolios of main assignees	Caltech	
IP competitors dependency by citations	ETRI	
	VTT	
	Fraunhofer	
	For each player:	
	Company presentation	
	Summary of the patent portfolio	
	Key patents	

AUTHORS

Dr Fleur Thissandier works for Knowmade in the field of Microelectronics and Chemistry. She holds a PhD in Chemistry of Materials and Electrochemistry from CEA/INAC, Grenoble, France. She also holds a Chemistry Engineering Degree from the Superior National School of Chemistry (ENSCM), Montpellier, France
fleur.thissandier@knowmade.fr



Dr Nicolas Baron is CEO and co-founder of Knowmade. He leads the Physics Department. He holds a PhD in Physics from the University of Nice Sophia-Antipolis, and a Master of Intellectual Property Strategies and Innovation from the European Institute for Enterprise and Intellectual Property (IEEPI Strasbourg), France.
nicolas.baron@knowmade.fr

ABOUT KNOWMADE

Knowmade is a Technology Intelligence and IP Strategy consulting company specialized in analysis of patents and scientific information. The company supports R&D organizations, industrial companies and investors in their business development by helping them to understand their IP environment and follow technology trends. **Knowmade** is involved in Microelectronics & Optoelectronics, Compound Semiconductors, IC Manufacturing & Advanced Packaging, Power & RF Devices, MEMS & Sensors, Photonics, Micro & Nanotechnology, Biotech/Pharma, MedTech and Agri-Food. **Knowmade** provides Prior art search, Patent Landscape Analysis, Patent Valuation, Freedom-to-Operate Analysis, Litigation/Licensing support, Scientific Literature Landscape, Technology Scouting and Technology Tracking. **Knowmade** combines information search services, technology expertise, powerful analytics tools and proprietary methodologies for analyzing patents and scientific information. Knowmade's analysts have an in-depth knowledge of scientific & patent databases and Intellectual Property.

We Know Technology, We Know Patents

ORDER FORM

Miniaturized Gas Sensors Patent Landscape Analysis

October 2016

SHIP TO

Name (Mr/Ms/Dr/Pr):

Job Title:

Company:

Address:

City:

State:

Postcode/Zip:

Country:

VAT ID Number for EU members:

Tel:

Email:

Date:

PAYMENT METHODS

Order online: [Click here](#)

Check

To pay your invoice using a check, please mail your check to the following address:

KnowMade S.A.R.L.
2405 route des Dolines, BP 65
06902 Valbonne Sophia Antipolis
FRANCE

Money Transfer

To pay your invoice using a bank money wire transfer please contact your bank to complete this process. Here is the information that you will need to submit the payment:

Payee: KnowMade S.A.R.L.
Bank: Banque populaire St Laurent du Var CAP 3000 - Quartier du lac- 06700 St Laurent du Var
IBAN: FR76 1560 7000 6360 6214 5695 126
BIC/SWIFT: CCBPFRPPNCE

Paypal

In order to pay your invoice via PAYPAL, you must first register at www.paypal.com. Then you can send money to the KnowMade S.A.R.L. by entering our E-mail address contact@knowmade.fr as the recipient and entering the invoice amount.

RETURN ORDER BY

E-mail: contact@knowmade.fr

Mail: KnowMade S.A.R.L. 2405 route des Dolines, BP 65 06902 Sophia Antipolis FRANCE

PRODUCT ORDER

- €4,990 – Single user license*
- €5,990 – Corporate license

For price in dollars, please use the day's exchange rate.
For French customer, add 20% for VAT.

All reports are delivered electronically in pdf format at payment reception.

**Single user license means only one person at the company can use the report. Please be aware that our publication will be watermarked on each page with the name of the recipient and of the organization (the name mentioned on the PO). This watermark will also mention that the report sharing is not allowed.*

I hereby accept Knowmade's Terms and Conditions of Sale

Signature:

TERMS AND CONDITIONS OF SALES

Definitions

“Acceptance”: Action by which the Buyer accepts the terms and conditions of sale in their entirety. It is done by signing the purchase order which mentions “I hereby accept Knowmade’s Terms and Conditions of Sale”.

“Buyer”: Any business user (i.e. any person acting in the course of its business activities, for its business needs) entering into the following general conditions to the exclusion of consumers acting in their personal interests.

“Contracting Parties” or “Parties”: The Seller on the one hand and the Buyer on the other hand.

“Intellectual Property Rights” (“IPR”) means any rights held by the Seller in its Products, including any patents, trademarks, registered models, designs, copyrights, inventions, commercial secrets and know-how, technical information, company or trading names and any other intellectual property rights or similar in any part of the world, notwithstanding the fact that they have been registered or not and including any pending registration of one of the above mentioned rights.

“License”: For the reports and databases, 2 different licenses are proposed. The buyer has to choose one license:

1. Single user license: a single individual at the company can use the report.
2. Corporate license: the report can be used by unlimited users within the company. Subsidiaries are not included.

“Products”: Reports are established in PowerPoint and delivered on a PDF format and the database may include Excel files.

“Seller”: Based in Sophia Antipolis (France headquarters), Knowmade is a technology intelligence company specialized in the research and analysis of scientific and technical information. We provide patent landscapes and scientific state of the art with high added value to businesses and research laboratories. Our intelligence digests play a key role to define your innovation and development strategy.

1. Scope

1.1 The Contracting Parties undertake to observe the following general conditions when agreed by the Buyer and the Seller. ANY ADDITIONAL, DIFFERENT, OR CONFLICTING TERMS AND CONDITIONS IN ANY OTHER DOCUMENTS ISSUED BY THE BUYER AT ANY TIME ARE HEREBY OBJECTED TO BY THE SELLER, SHALL BE WHOLLY INAPPLICABLE TO ANY SALE MADE HEREUNDER AND SHALL NOT BE BINDING IN ANY WAY ON THE SELLER.

1.2 This agreement becomes valid and enforceable between the Contracting Parties after clear and non-equivocal consent by any duly authorized person representing the Buyer. For these purposes, the Buyer accepts these conditions of sales when signing the purchase order which mentions “I hereby accept Knowmade’s Terms and Conditions of Sale”. This results in acceptance by the Buyer.

1.3 Orders are deemed to be accepted only upon written acceptance and confirmation by the Seller, within [7 days] from the date of order, to be sent either by email or to the Buyer’s address. In the absence of any confirmation in writing, orders shall be deemed to have been accepted.

2. Mailing of the Products

2.1 Products are sent by email to the Buyer:

- within [1] month from the order for Products already released; or
- within a reasonable time for Products ordered prior to their effective release. In this case, the Seller shall use its best endeavours to inform the Buyer of an indicative release date and the evolution of the work in progress.

2.2 Some weeks prior to the release date the Seller can propose a pre-release discount to the Buyer.

The Seller shall by no means be responsible for any delay in respect of article 2.2 above, and including in cases where a new event or access to new contradictory information would require for the analyst extra time to compute or compare the data in order to enable the Seller to deliver a high quality Products.

2.3 The mailing of the Product will occur only upon payment by the Buyer, in accordance with the conditions contained in article 3.

2.4 The mailing is operated through electronic means either by email via the sales department. If the Product’s electronic delivery format is defective, the Seller undertakes to replace it at no charge to the Buyer provided that it is informed of the defective formatting within 90 days from the date of the original download or receipt of the Product.

2.5 The person receiving the Products on behalf of the Buyer shall immediately verify the quality of the Products and their conformity to the order. Any claim for apparent defects or for non-conformity shall be sent in writing to the Seller within 8 days of receipt of the Products. For this purpose, the Buyer agrees to produce sufficient evidence of such defects.

2.6 No return of Products shall be accepted without prior information to the Seller, even in case of delayed delivery. Any Product returned to the Seller without providing prior information to the Seller as required under article 2.5 shall remain at the Buyer’s risk.

3. Price, invoicing and payment

3.1 Prices are given in the orders corresponding to each Product sold on a unit basis or corresponding to annual subscriptions. They are expressed to be inclusive of all taxes. The prices may be reevaluated from time to time. The effective price is deemed to be the one applicable at the time of the order.

3.2 Payments due by the Buyer shall be sent by cheque payable to Knowmade, PayPal or by electronic transfer to the following account:

Banque populaire St Laurent du Var CAP 3000 - Quartier du lac- 06700 St Laurent du Var

BIC or SWIFT code: CCBPFRPPNCE

IBAN: : FR76 1560 7000 6360 6214 5695 126

To ensure the payments, the Seller reserves the right to request down payments from the Buyer. In this case, the need of down payments will be mentioned on the order.

3.3 Payment is due by the Buyer to the Seller within 30 days from invoice date, except in the case of a particular written agreement. If the Buyer fails to pay within this time and fails to contact the Seller, the latter shall be entitled to invoice interest in arrears based on the annual rate Refi of the «BCE» + 7 points, in accordance with article L. 441-6 of the French Commercial Code. Our publications (report, database, tool...) are delivered only after reception of the payment.

3.4 In the event of termination of the contract, or of misconduct, during the contract, the Seller will have the right to invoice at the stage in progress, and to take legal action for damages.

4. Liabilities

4.1 The Buyer or any other individual or legal person acting on its behalf, being a business user buying the Products for its business activities, shall be solely responsible for choosing the Products and for the use and interpretations he makes of the documents it purchases, of the results he obtains, and of the advice and acts it deduces thereof.

4.2 The Seller shall only be liable for (i) direct and (ii) foreseeable pecuniary loss, caused by the Products or arising from a material breach of this agreement

4.3 In no event shall the Seller be liable for:

a) damages of any kind, including without limitation, incidental or consequential damages (including, but not limited to, damages for loss of profits, business interruption and loss of programs or information) arising out of the use of or inability to use the Seller's website or the Products, or any information provided on the website, or in the Products;

b) any claim attributable to errors, omissions or other inaccuracies in the Product or interpretations thereof.

4.4 All the information contained in the Products has been obtained from sources believed to be reliable. The Seller does not warrant the accuracy, completeness adequacy or reliability of such information, which cannot be guaranteed to be free from errors.

4.5 All the Products that the Seller sells may, upon prior notice to the Buyer from time to time be modified by or substituted with similar Products meeting the needs of the Buyer. This modification shall not lead to the liability of the Seller, provided that the Seller ensures the substituted Product is similar to the Product initially ordered.

4.6 In the case where, after inspection, it is acknowledged that the Products contain defects, the Seller undertakes to replace the defective products as far as the supplies allow and without indemnities or compensation of any kind for labor costs, delays, loss caused or any other reason. The replacement is guaranteed for a maximum of two months starting from the delivery date. Any replacement is excluded for any event as set out in article 5 below.

4.7 The deadlines that the Seller is asked to state for the mailing of the Products are given for information only and are not guaranteed. If such deadlines are not met, it shall not lead to any damages or cancellation of the orders, except for non-acceptable delays exceeding [4] months from the stated deadline, without information from the Seller. In such case only, the Buyer shall be entitled to ask for a reimbursement of its first down payment to the exclusion of any further damages.

4.8 The Seller does not make any warranties, express or implied, including, without limitation, those of saleability and fitness for a particular purpose, with respect to the Products. Although the Seller shall take reasonable steps to screen Products for infection of viruses, worms, Trojan horses or other codes containing contaminating or destructive properties before making the Products available, the Seller cannot guarantee that any Product will be free from infection.

5. Force majeure

The Seller shall not be liable for any delay in performance directly or indirectly caused by or resulting from acts of nature, fire, flood, accident, riot, war, government intervention, embargoes, strikes, labor difficulties, equipment failure, late deliveries by suppliers or other difficulties which are beyond the control, and not the fault of the Seller.

6. Protection of the Seller's IPR

6.1 All the IPR attached to the Products are and remain the property of the Seller and are protected under French and international copyright law and conventions.

6.2 The Buyer agreed not to disclose, copy, reproduce, redistribute, resell or publish the Product, or any part of it to any other party other than employees of its company. The Buyer shall have the right to use the Products solely for its own internal information purposes. In particular, the Buyer shall therefore not use the Product for purposes such as:

- Information storage and retrieval systems;
- Recordings and re-transmittals over any network (including any local area network);
- use in any timesharing, service bureau, bulletin board or similar arrangement or public display;
- Posting any Product to any other online service (including bulletin boards or the Internet);
- Licensing, leasing, selling, offering for sale or assigning the Product.

6.3 The Buyer shall be solely responsible towards the Seller of all infringements of this obligation, whether this infringement comes from its employees or any person to whom the Buyer has sent the Products and shall personally take care of any related proceedings, and the Buyer shall bear related financial consequences in their entirety.

6.4 The Buyer shall define within its company point of contact for the needs of the contract. This person will be the recipient of each new report in PDF format. This person shall also be responsible for respect of the copyrights and will guaranty that the Products are not disseminated out of the company.

7. Termination

7.1 If the Buyer cancels the order in whole or in part or postpones the date of mailing, the Buyer shall indemnify the Seller for the entire costs that have been incurred as at the date of notification by the Buyer of such delay or cancellation. This may also apply for any other direct or indirect consequential loss that may be borne by the Seller, following this decision.

7.2 In the event of breach by one Party under these conditions or the order, the non-breaching Party may send a notification to the other by recorded delivery letter upon which, after a period of thirty (30) days without solving the problem, the non-breaching Party shall be entitled to terminate all the pending orders, without being liable for any compensation.

8. Miscellaneous

All the provisions of these Terms and Conditions are for the benefit of the Seller itself, but also for its licensors, employees and agents. Each of them is entitled to assert and enforce those provisions against the Buyer.

Any notices under these Terms and Conditions shall be given in writing. They shall be effective upon receipt by the other Party.

The Seller may, from time to time, update these Terms and Conditions and the Buyer, is deemed to have accepted the latest version of these terms and conditions, provided they have been communicated to him in due time.

9. Governing law and jurisdiction

9.1 Any dispute arising out or linked to these Terms and Conditions or to any contract (orders) entered into in application of these Terms and Conditions shall be settled by the French Commercial Courts of Grasse, which shall have exclusive jurisdiction upon such issues.

9.2 French law shall govern the relation between the Buyer and the Seller, in accordance with these Terms and Conditions.