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✓ **ORGANIZATION COMMITTEE 2008**

✓ **PARTNERS 2008**

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“Invest in Photonics”: A second edition in Bordeaux in 2010

With over a hundred of the world’s leading photonics specialists and 16 projects presented for a potential EUR 100 million, Invest in Photonics was a definite success in light of the current economic climate. The second edition will be held in 2010. Initiated by the Bordeaux Chamber of Commerce, the event was co-organized with ALPhA (Aquitaine Laser Photonics and Applications) and the CEA (French Atomic Energy Commission).

"This first edition really was a great success, and it shows that photonics have entered into our daily lives," explained Guy-Georges Legrand, Invest in Photonics chairman. "Thanks to an effective partnership with all public and private players as well as those of the sector, we were able to show that, over two days, Bordeaux can become the world capital of Photonics," he added.

50 international applications were received, 16 were presented

Out of the 16 applications to be presented, it is worth noting that 30% were from outside France (Canada, Poland, Germany, etc). French applications show a balanced geographic breakdown, with a majority coming from the Ile de France region, which includes Paris. Among the applications presented, there are some exploring medical imaging, semiconductor materials for photovoltaic energy, and liquid lens technology for cameras and mobile phones.

High-level speakers to better approach the market

As far as the conferences were concerned, the world’s leading specialists in photonics have demonstrated the interest they had in this event through the presence of Dr. Bernard Couillaud, Bookham; Stephen G. Anderson, Laser Focus World, Professor Dennis Matthews, Lawrence Livermore National Laboratory; Thomas Kallstenius, Alcatel-Lucent; and Alain Rodermann, Sofinnova Partners; and others.

France's Aquitaine region is thus asserting its ambition to become one of the European regions with the highest scientific potential in the optics sector: an innovative industrial fabric, an efficient R&D cluster supported by universities, CEA, CNRS (French National Scientific Research Center), INSERM (French National Health and Medical Research Institute) and INRA (French National Agronomic Research Institute), as well as acknowledged names in advanced teaching and ongoing training: for example, the School for Advanced Optics in Talence will open in the near future.

ORGANIZATION:

ALPhA (Aquitaine Laser Photonics and Applications), French Atomic Energy Commission (CEA) and Bordeaux Chamber of Commerce and Industry

With financial support from: the European Union, the French Government, Aquitaine Regional Council, the General Council for Gironde, the Greater Bordeaux Urban Community and Bordeaux Town Hall

In partnership with: the National Optics and Photonics Committee (CNOP, representing all French Optics and Photonics centres), the European Photonic Industry Consortium (EPIC), the Optics/Photonics Professional Association (AFOP) and the Finance&Technologie association.

The Technical Committee includes in particular representatives from:

SOFINNOVA PARTNERS, BOOKHAM, Canadian Photonics Consortium, Quebec Photonics Network, CNOP (Comité National d’Optique et Photonique), EPIC (European Photonic Industry Consortium), ZHO (Zentrum für Optoelektronik), CEA/ALPhA, and others.

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KEY FIGURES 2008

- ✓ **115 Participants**
 - 30% SME
 - 18% Investors
 - 14% Industrial partners

- ✓ **Visitor profile**
 - 44% CEO/CTO/CSO Director

- ✓ **By country**
 - 75% France
 - 25% others – 11 countries (United Kingdom, Germany, Spain, Canada, United States, Japan, India, Belgium, Poland, the Netherlands, Switzerland)

- ✓ **Within France, by region**
 - 46% Aquitaine
 - 26% Ile de France

- ✓ **41 submitted projects** from Europe and North America, **16 selected**
 1. ROWIAK GmbH (Germany)
 2. MICROOLED (France)
 3. FORCE A (France)
 4. OPTINVENT (France)
 5. AMPLITUDE SYSTEMES (France)
 6. PHOTON ETC (Canada)
 7. VARIOPTIC (France)
 8. VI SYSTEMS GmbH (Germany)
 9. GENEWAVE (France)
 10. LYRACOM (France)
 11. SMARTQUANTUM (France)
 12. ONELIGHT (Canada)
 13. S'TILE (France)
 14. VIGO SYSTEM S.A. (Poland)
 15. LASTER TECHNOLOGIES (France)
 16. LL TECH (France)

- ✓ Funding between **1 and 10 million Euros**

- ✓ The **projects were evaluated** according to the following criteria: size of target market, product innovation and growth potential

- ✓ **Geographical distribution of the 16 projects :**
 - Germany (2)
 - France (11) – regions: *Ile de France, Rhône Alpes, Aquitaine, Bretagne, PACA, Poitou Charentes*
 - Poland (1)
 - Canada (2)

- ✓ **Subjects of selected projects**
 - MEDICAL TECHNOLOGY AND LIFE SCI (5)
 - OPTICAL SYSTEMS AND COMPONENTS (4)
 - FLAT PANEL AND DISPLAYS (2)
 - OPTICAL COMMUNICATIONS (2)
 - OPTICAL MEASUREMENT AND MACHINE VISION (2)
 - PRODUCTION TECHNOLOGY (2)

- LIGHTING (1)
- SOLAR ENERGY (1)

- « **Innovation Time** » Report

- Two sites in the Bordeaux area were visited by about 20 participants:
 - 1/ **EXOSUN**, created in 2007, designs, develops and builds solar power plants equipped with its patented devices increasing solar energy performances. Convinced that tomorrow's energy lies within the sun, we design complete solutions which lower the cost of solar kilowatt-hour, dedicated to large scale, ground mounted and grid-connected plants.

2/ **ALPhANOV**: Boosts innovation by collaboration between research and industry. ALPhANOV is the Technology Resource Center for the Route des Lasers competitiveness cluster. It provides the technology to support innovative R&D projects bringing growth and employment to the aerospace, medical, and micro-electronics markets. It employs a dozen engineers and technology-transfer specialists. It has a very diversified laser park with dedicated imaging and metrology capabilities. ALPhANOV is supported by the European Union, the French government and the Regional Council of Aquitaine.

- ✓ « **Market Time** » Report

- **PHOTONICS MARKETS** by *Stephen G. Anderson, Associate Publisher/Editor-in-Chief (Laser Focus World, USA).*

In the almost 50 years since the laser's invention, the global market for photonic components and enabled technologies has grown to exceed \$600 billion (in 2007) according to the Optoelectronics Industry Development Association. In this presentation Anderson provides an overview of the photonics markets and applications segments that have driven this growth, highlighting trends in key areas and noting which market segments are likely to present opportunities for driving the future growth of photonics.

- **INTELLIGENT LED LIGHTING - HOW TO GET MORE RETURN ON YOUR INVESTMENTS!** by *Bruno Smets, Director External Relations, CTO Office (Philips Lighting, the Netherlands)*

Energy-saving lamps have become the icon of our struggle against global warming and the drive to become less dependent on fossil fuels. Even if we would replace all outdated light points by the most advanced technology of today, we would not be able to counteract the increasing global hunger for lighting. With the advent of LED lighting technology, which is more efficient and next to that is highly suited for creating intelligent lighting systems, we however will be able to cope with the threefold increase in lighting demand by 2050 without increasing its energy consumption. Two factors are key in order to realize this goal. The interaction of the user with the intelligent LED system should be intuitive, which definitely does not hold for the existing lighting control systems. Next to that the market acceptance of this new technology should be addressed effectively. In the Recovery Plan recently disclosed by the European Commission they call upon Member States and industry urgently to develop innovative financing models, for example, where refurbishments are financed through repayments, based on savings made on energy bills, over several years.

- **MARKET OPPORTUNITIES IN BIOPHOTONICS** by *Dennis Matthews, Professor and Director (Univ. of California and NSF Center for Biophotonics, USA)*

Biophotonics is a worldwide industry that encompasses many different market sectors including biometrics, bio- and medical imaging, bioassays/sensors, medical diagnostics, drug discovery tools and therapeutic devices. The worldwide market is currently about \$50 billion per year with some sectors growing as much as 30% per year. I will use this talk to briefly describe the field of biophotonics, discuss the market potential for it various sectors and describe some new technologies it is producing that radically change the growth in some sectors such as point-of-care technology and digital medicine.

- **IS PHOTONICS MARKET SO DIFFERENT?** by *Philippe Crochet, Director R Capital - Rothschild & Cie Gestion, France; Dr. Christian Nagel, Managing Partner, EarlyBird –*

Germany; Alain Rodermann, Partner, Sofinnova Partners, France; Bill Magill, Professor and Managing Director, INSEAD and TeleSoft Partners, United States

Why invest in Photonics?

How investors deal with Photonics markets?

Latest news in Photonics business

Recent (and future) venture capital successes in Photonics business

Impact of the global financial and economic crisis on the photonics market?

Advice for entrepreneurs

- **SURVEY OF INITIAL PUBLIC OFFERINGS (IPOS) AND MERGERS & ACQUISITIONS (M&AS) IN PHOTONICS** by Bill Magill, Professor and Managing Director, INSEAD and TeleSoft Partners, United States

For optical technology companies in late 2008 the IPO window has closed and the path to acquisition is challenging. How should CEOs and their investors consider exit plans in the current difficult environment? Is this 2001 revisited, or something much worse? Bill will provide a review of exit markets in 2008 and examine the factors that will shape markets in 2009.

- **FROM CHILE TO CAJUN COUNTRY, FIBER NATIONS ARE TAKING ROOTS** by Thomas Kallstenius, Director Fixed Access Marketing, Alcatel-Lucent, Belgium

There is no longer any debate about if or why fiber ought to be deployed in the access network; rather, the issue is now focused on “how” and “when”. Indeed, fiber — a transformational technology whose impact today is equivalent to fixed-line telephony in the 1880s and mobile telephony in the 1990s — is being rolled out at some level in all major economies. Even so, focused rollouts to rich, densely populated cities are only one step on the road to the Fiber Nation. Moreover, as this rollout occurs, the digital divide resulting from city-only investments poses a significant challenge to all stakeholders. This presentation discusses these challenges and how they impact FTTH technologies.

- **ANALYSIS OF A SOLAR BOOM: PHOTOVOLTAIC VENTURE CAPITAL AND PRIVATE EQUITY TRENDS IN THE PAST TWO YEARS, AND WHERE WE STAND NOW?** by Francesco d’Avack, Analyst, New Energy Finance, United Kingdom

Introduction to PV (historical installations, module prices)

Investment into the solar sector, the past two years (the value chain, investment by type, sector and technology)

Value chain analysis: Where do we stand now?

- **PHOTONICS, INNOVATION AND THE EUROPEAN DIMENSION** by Christoph Helmuth, Principal Scientific Officer Photonics, European Commission, Belgium

Photonics has an enormous competitive potential. It is driving innovation in Europe and its markets are growing worldwide. The talk will provide an overview of funding and financing possibilities on a European level for activities ranging from research and development to deployment.

- **CLOSING REMARKS** by Thomas Pearsall, General Secretary, EPIC (European Photonics Industry Consortium), France

PHOTONICS: KEY FIGURES

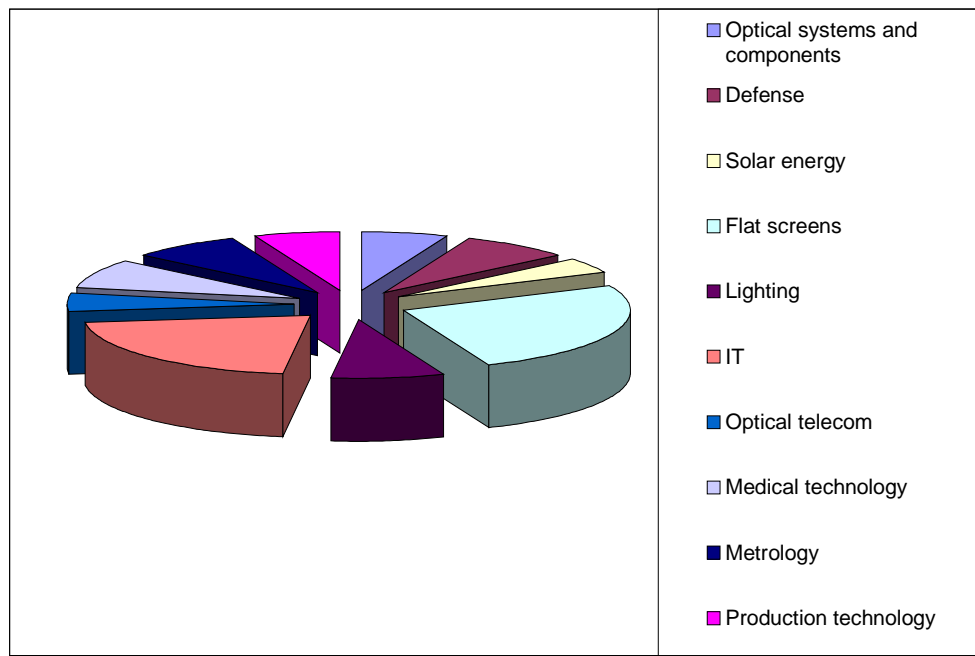
1/ The Origins of Photonics

Photonics is **the science that deals with photons**, the elementary particles that make up light. Accordingly, photonic systems are devices used in generating, conducting, processing and detecting light.

A **key 21st-century technology**, photonics stimulates **scientific research** and opens up fields of **application** in numerous industrial sectors. We are talking about a set of critical technological tools, the subject of true scientific, technological and industrial revolutions relating to **significantly booming** markets. As a **cross-disciplinary technology**, it has multiple applications in **Information Technology**, and also fosters growth in many other business sectors, revolutionizing technology in **transport, health, the environment, energy, security** and consumer **electronics**.

The worldwide photonics industry is structured around clusters and includes 10 sectors that boasted a €228 billion turnover in 2005, with two sectors (flat screens and IT) representing 47% of total production.

Fig.1 Worldwide photonics broken down by sector (2005)

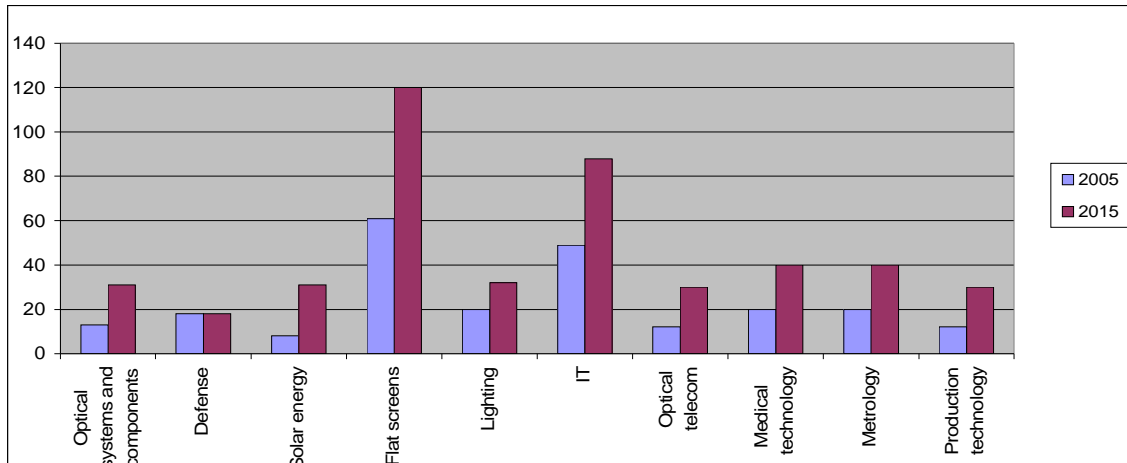


Source: Optech Consulting

2/ The Forecasts

A **7.6% average yearly growth rate** is expected for the photonics industry worldwide from 2005 to 2015, making it one of the most dynamic industries. The strongest growth in the photonics market should be seen in the **solar energy** sector, with a 13.2% average yearly growth driven by legal incentives and raised civic awareness about the need for favoring renewable energy. A 10% yearly growth is expected for the production technology, optical systems and components, and optical telecom equipment sectors. Metrology, medical technology, IT and flat screens will grow by 6 to 7% per annum; lastly, the lighting sector expects a 5.5% yearly growth rate.

Fig. 2 The photonics market - Forecasts (Billion Euros)

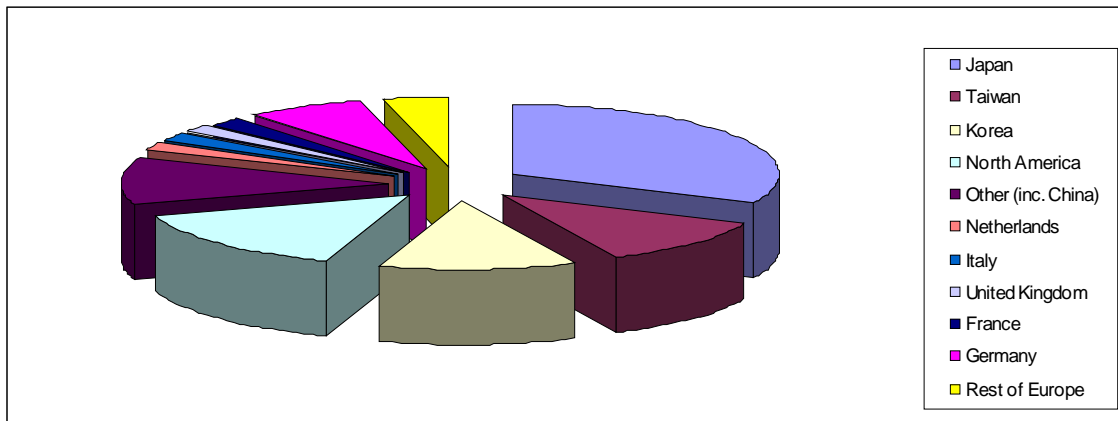


Source: Optech Consulting

3/ Photonics in Europe

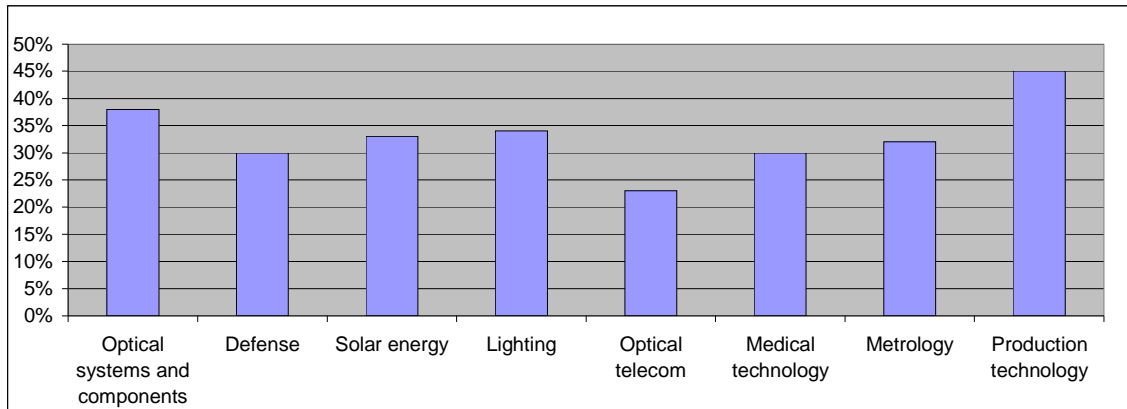
Europe boasts 19% of the world's photonics production with very poor market share (under 10%) in the IT and flat screens sectors due to its lagging in investment, specialized as it is in high value-added sectors. Photonics world production is **dominated by Asia**, mostly Japan, Korea and Taiwan. North America's market share is estimated at 15%.

Fig. 3 The photonics world market in 2005



Source: Optech Consulting

Fig. 4 European market share: breakdown by sector, 2005



Source: Optech Consulting

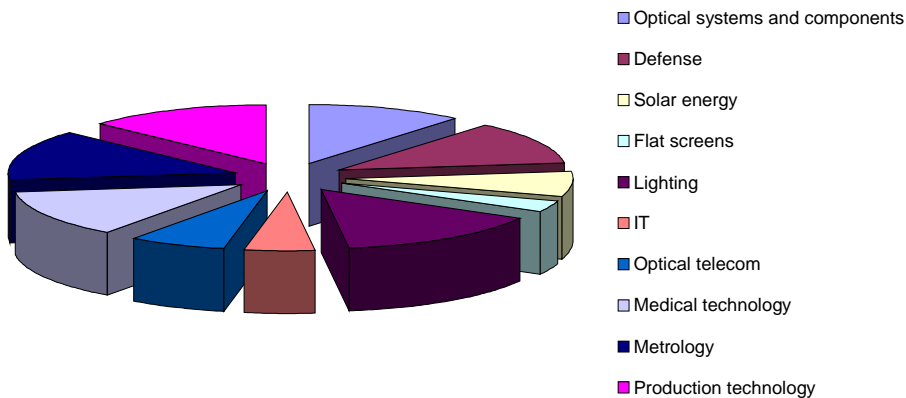
The European photonics industry is structured around 26 clusters, and it showed a €43.5 billion turnover in 2005, directly employing 246,000 people. With an increase approaching 13% in 2006, the European photonics market hit the €50b billion mark, representing 19% of the world market.

Germany has 39% of the European photonics production. France and England have 12% each, followed by the Netherlands and Italy, with 8% and 7% respectively. It should be noted that the various countries' market share varies according to the sector under consideration.

There are **5,000 companies involved in photonics production in Europe**. Some sectors are dominated by a **small number of major companies**, it being the case for the defense, lighting and telecom equipment sectors. In other sectors, **major companies and SMEs** coexist, such as medical technology, solar energy and optical components. Market share in the metrology sector is shared between various **SMEs**.

EPIC (European Photonics Industry Consortium), headquartered in Paris, works with universities, enterprises and the European Commission in order to make the European photonics industry the most competitive in the world by focusing on **high value-added systems**. The issue on a European level consists in having a photonics industry whose clout should reflect the high level of research it enjoys.

Fig. 5 Photonics in Europe broken down by sector



Source: Optech Consulting (2005)

4/ Photonics in France

In terms of value, the French photonics industry represents **12% of the European market** with some 20,000 jobs. **70% of the companies** involved in photonics in France are located in **Ile de France, Provence Alpes Côte d’Azur (PACA), and Rhône Alpes regions**. There are 7 optics/photonics clusters in France, including **3 competitive clusters**, namely **Route des Lasers in Aquitaine, Systèmes Complexes d’Optique et d’Imagerie in PACA, and Micro-onde, Photonique, Réseaux Sécurisés in Limousin/Midi Pyrénées**. The **CNOP** (National Optics and Photonics Committee) groups all of the French photonics academic and industrial players: regional clusters, trade associations and scholarly societies. **Defense, medical technology and optical telecom equipment** are the 3 sectors that in France attract the most **prime activities** in optics/photonics, with **leading companies** like **Thales and Safran** in defense, **Alcatel Lucent** in telecom equipment and **Essilor** in medical technology.

Table 1: Optics/Photonics in France

Region	Governing entity	Date founded	Relative weight	Themes	Competitive cluster
ILE DE FRANCE	Optics Valley	1999	50%	Defense, Instrumentation, Biotechnology	
RHÔNE ALPES	Pôle Optique et Vision	1996	20%	Vision, Nanotechnology, Microelectronics	
PACA	Pop Sud	2000	20%	Space sciences, Instrumentation	Systèmes complexes d’optique et d’imagerie
BRITTANY	Anticipa	1985	10%	Optics and Telecom	
AQUITAINE	ALPhA	2004		Laser	Route des Lasers
ALSACE	Rhénaphotonics Alsace	2004		Biotechnology	
LIMOUSIN/MIDI PYRÉNÉES	Elopsys	Nov. 2005			Micro-onde, Photonique, Réseaux Sécurisés

Source: “Optics, Photonics, Optronics” in Bouches-du-Rhône, Marseille Provence Chamber of Commerce

5/ Photonics in Aquitaine

Training in this particular field goes back a long way in Aquitaine:

- **Initial laser research in Bordeaux began in 1968**
- **The first national training program on laser operation was launched in 1975**

The French government’s decision in 1995 to install the **Megajoule Laser** at Le Barp near Bordeaux marked a turning point. As François Salin points out, “Without that major laser project in Gironde, there would be no industrial activity.”

On the strength of such an exceptional tool, the Land Settlement Inter-ministerial Committee (CIAT) officiated at the birth of **Route des Lasers in 2002**. In 2004, the “Route des Lasers” SEML (Local Mixed Economy Company) was founded, to conduct any acquisitions, settlement or building needed to bring in enterprises involved in the fields of optics, lasers and plasma.

Once sufficient training, research and infrastructures were assembled, the French Government granted “Route des Lasers” the **competitive cluster label in 2005**. **Aquitaine Lasers Photonique et Application (ALPhA) is the driving force and governing entity** for the Route des Lasers competitive cluster and includes all players in the field in Aquitaine.

Thus Aquitaine is mostly committed to the laser market. This market is estimated at €6 billion worldwide (10% of the photonics market) and is broken down into 4 categories, according to the type of active material involved: gas laser, liquid laser, solid laser and semiconductor laser.

The region, enjoying as it does major strategic assets, **has the ambition** to become **Europe’s leading cluster in the field of power lasers and their applications** and **one of the major clusters worldwide**.

6/ Three Optics / Photonics Competitive Clusters in France

AQUITAINE: ROUTE DES LASERS® (THE LASER ROUTE)

The “Route des Lasers” competitive cluster, whose governing entity is **ALPhA**, possesses a major standout ingredient on site: the world’s most “energetic” laser, the Megajoule Laser. The cluster’s development is structured around 3 priority themes:

1. Laser systems and applications
2. Metrology and imaging
3. Innovative physics

ALPhA in figures

- 44 member companies
- 14 research centers
- 12 training centers
- 519 direct industrial jobs
- 600 researchers
- 1,000 publications in 4 years
- 200 graduates every year, specializing in optics/lasers
- 20 certified projects in 2005
- 36 certified projects in 2006
- 26 certified projects in 2007
- 1 technological transfer center: Alphanov

PROVENCE ALPES COTE D’AZUR: SYSTEMES COMPLEXES D’OPTIQUE ET D’IMAGERIE (OPTITEC) (COMPLEX OPTICS AND IMAGING SYSTEMS)

PACA is **France’s second “photonics” region**, tied with Rhône Alpes after Île de France. The PACA region has **20% of the optics/photonics sector business in France**, representing a €1 billion turnover. The PACA region enjoys the support of an area rich in industries that utilize optics and imaging technology. Eight major user industrial sectors are on the leading edge:

1. Space
2. Energy
3. Sea (underwater imaging and sight)
4. Health (medical imaging)
5. Microelectronics (photolithography, ellipsometry)
6. Telecom (MOEMS micro-components for broadband networks)
7. Industrial process (metrology and detection through optics)
8. Environment (observation instrumentation)

OPTITEC in figures

- 75 active member companies
- 27 research centers
- 6 training centers
- 150 engineers and PhD students trained every year

LIMOUSIN: MICRO-ONDE, PHOTONIQUE, RESEAUX SECURISES **(MICROWAVE, PHOTONICS, SECURE NETWORKS)**

Elophys, a high-tech competitive cluster in Limousin, gathers microwave, photonics and secure networks players, and was **founded in November 2005**. Applications developed by Elophys companies are positioned on 6 major markets:

1. Communications (processing and security, network archiving, optical networks)
2. Health-related technology (nuclear medical imaging, analysis software)
3. Measurement and control (sensors, instrumentation)
4. Defense (Imaging, detection)
5. Transport (onboard equipment, electronic equipment)
6. Home automation (Comfort, security of people and goods)

ELOPSYS in figures

- 18% of regional employment
- 25% of regional export
- 70% of regional patents
- 2,500 students trained every year in Elophys technology
- 20 certified and funded projects in both 2006 and 2007

ORGANIZING COMMITTEE 2008

President:

Guy Georges Legrand

TECHNICAL COMMITTEE

Chair:

Dr. Thierry Thevenin

Members

Dr. Bernard Couillaud, Philippe Crochet, Frédéric Devaivre, Dieter Jager, Jacques Daniel Labelle, Sébastien Magnaval, Tom Pearsall, Alain Rodermann, Costel Subran

PARTNERS

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Event partners:

CILAS, UBIFRANCE, EUROPEAN VENTURE MARKET, LASER FOCUS WORLD