

**Presentation of the**  
**Wafer level packaging-**  
**Advanced packaging action**

**General proposal**  
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# Organization of WLP-Advanced packaging action

- **Bring together several non competing companies interested to analyze :**
  - **Devices and technology markets**
  - **Equipment markets**
  - **Materials markets**
- **Linked to advances packaging, including :**
  - **Wafer level packaging**
  - **Chip size package**
  - **System in package**
  - **3D chip stacking**
- **Make a complete and in-depth description of the 3 areas and provide specific answers to the participants of this action**
- **Schedule :**
  - **Starting point : at the signature of the contract**
  - **Duration : 6 months**
- **Have 4 to 7 companies involved, suppliers of this industry**
- **Share the cost between the different companies : budget per company of 25 kEuro.**

# 3 fields under analysis

- **Wafer level packaging, Chip size package :**
  - IC business : memory, DSP, RF devices ...
  - Sensor business : CMOS image sensor (high end and low end), IR image sensor, MEMS devices ...
- **System in package :**
  - Integration of passives on a silicon mother board
  - Chip on wafer
  - Applications : RF module, memory drivers ...
- **3D chip stacking :**
  - Memory stacking
  - Staking of DSP plus memory, sensing capabilities ...

# For each field, analysis to be done

## General objectives

- Understand and describe the applications and device markets for the period 2004-2010
- Analyze and describe the technologies and the process steps for the manufacturing of advanced packaging (major bottlenecks, major achievements ...) :
  - Process steps for each of the 3 areas under analysis
  - Highlight the new processes under development or implementation for the manufacturing of devices
  - New needs linked to equipment and materials : deep RIE, Laser, CVD, PVD, specific wafer needs (Si and glass) ...
- Analyze the industrial food chain of this fields :
  - Devices manufacturers
  - Packaging services suppliers
  - Technology providers
  - Capital equipment and materials suppliers
- Describe the technology, materials and equipment markets 2004-2010
- Analysis of the competitive landscape
- Description of the major companies and major research labs involved in this field

# Specific objectives for each company

- **Specific objectives for each company :**
  - **Answer specific technical, marketing and commercial questions linked to the development of the power devices business**

# Identification and understanding of the applications and technologies involved

- **Identification and analysis of the applications of the 3 fields under analysis :**
  - Determination of the range of applications
  - Who is doing what ?
- **Analyze and describe the specific technologies involved in advanced packaging :**
  - Process steps for the manufacturing of each of the different fields
  - Major bottlenecks
  - Major achievements
  - Major R&D organizations on a world basis
  - Technology roadmap for the different products and process
  - Who is developing what ?
  - Competing technologies and organizations per application

# Description of the industrial food chain

- **Components manufacturers :**
- **Packaging services providers :**
- **Technology providers :**
  - Who is developing/producing what
  - Type of products for which applications
  - Development stage, production level today and in the future
  - Major characteristics of the process (technology, cost, yield ... if available)
- **Materials and capital equipment manufacturers :**
  - Description of the developments, products and involvement of the major suppliers worldwide

# Companies targeted

- **Components manufacturers :**
  - IC business : STM, Infineon, Philips, NEC, Fujitsu, TDK, Samsung, Intel, Oki ...
  - Image sensor and MEMS businesses : HP, STM, Bosch, Tower, Sony, Micron, Avago, Kodak, Omnivision, Toshiba, Magnachip and Cypress ...
- **Packaging services providers and technology providers :**
  - Packaging service providers : ASE, Amkor,
  - Technology providers : Shellcase ...

# Segmentation of advanced packaging applications

- **Define the market segmentation**
- **Analyze and describe the technology and device markets, using WLP, CSP, system in package and 3D chip stacking**
- **Specific analysis per segment/application :**
  - **Market size in volume (number of pieces) and value (M\$) for 2004 and projection for 2010**
  - **Specificities of the segment in term of technology (process steps, materials ...)**
  - **Competing situation**
  - **Roadmap of products**
  - **Price roadmap for the devices**
  - **Description of industrial players in each segment**

# Equipment and materials markets

- **Analyze et describe the equipment and materials markets for the manufacturing of advanced packaging (per segment and in general) :**
  - **Specific equipment markets linked to the manufacturing of power devices :**
    - Deep RIE
    - Laser
    - CVD and PVD
    - Wafer bonders
    - ...
  - **Materials and chemicals markets :**
    - Silicon, glass
    - Chemicals

# Description of the industrial companies involved on a world basis

- **Company name and address**
- **Key managers and/or contacts**
- **Company Overview, market and customers, agreements and Alliances**
- **Financial data**
  - **Investors**
  - **Sales and benefit 2004**
  - **Capital investment 2004 and 2005**
  - **Number of employees**
- **Main Products, main Technologies**
- **Manufacturing Facilities:**
  - **Activity of the plant**
  - **Status of the plant**
  - **Total Investment**
  - **Type of material**
  - **Wafer size (mm)**
  - **Clean room size (m<sup>2</sup>), clean room class**
  - **Production capacity (wpw)**
  - **Staff involved in production**

# Specific work for each company involved

- **To be defined for each company**
- **Can include :**
  - **Specific market analysis for a specific material, equipment, service ...**
  - **Specific analysis of a company (customer or competitor) with an enhanced profile**
  - **...**

# Schedule

- **Starting point : at the signature of the contract**
  - Analysis of the company offers (for each company involved in this action)
  - Definition of the different review meetings
  - Specific objectives, timing ...
  - Definition of the companies to be met and why
  - Definition of the information gathering tools : presentation of your company, interview guide
- **Final synthesis : after 6 months**
- **Several meetings will be set-up, approximately every 7 weeks, with each company in order to make the status of the search of information, get feed back on the results ...**
- **Final synthesis in 2 rounds in order to take care of important new questions.**

# Methodology

- **Direct contact with each targeted company (face-to-face meeting) with the different persons important for our analysis :**
  - R&D manager, purchasing manager, fab manager, marketing manager ...
  - Several contact per company is feasible due to the different companies involved in this action
  - Several meetings in a company is feasible in order to analyze different points
  - Contacts with key technical and marketing experts
- **Approximately 70 companies will be met, chosen at the beginning of the action and regularly updated**
- **Presence at the main conferences and exhibitions**
- **More generally analysis of the literature, web, scientific publications ...**

# Methodology (2)

- **Strong interaction with each company is key to the success (meeting every 7 weeks)**
- **Synthesis made in common (general segmentation of the power devices market)**
- **Specific analysis made for each company with the team of Yole and the team of the company :**
  - **Marketing analysis**
  - **Synthesis of the action for the company**
  - **Proposal of actions**
- **Key persons of YOLE Développement :**
  - **P. Roussel, responsible of the semiconductor equipment markets**
  - **E. Mounier, responsible for MEMS and optics market analysis**
  - **JC Eloy, director**

# Budget

- **Budget per company : 25.000,00 Euro**
- **This budget includes :**
  - **Time spend on the global and specific analysis**
  - **Travel expenses and cost linked to the gathering of the information**
- **Yole Développement will be able to reuse part of the information for communication purpose**
- **This information will be validated by the participant before publication**

# Other possible actions

- **Specific actions could be planned, depending of the willingness of each organization involved :**
  - **Common meetings in order to exchange information between the companies involved in the Advanced Packaging action**
  - **Specific customer focus meeting with different companies involved in the Advanced Packaging action**
  - **...**
- **This will be determined during the action**

# General conditions

- **Term of payment (to be defined with each company) :**
  - **30% at the beginning of the action**
  - **40% after 2 months**
  - **30% at the end of the action**
- **An NDA agreement will be signed between Yole Développement and each customer in order to keep the confidentiality of the exchanges**

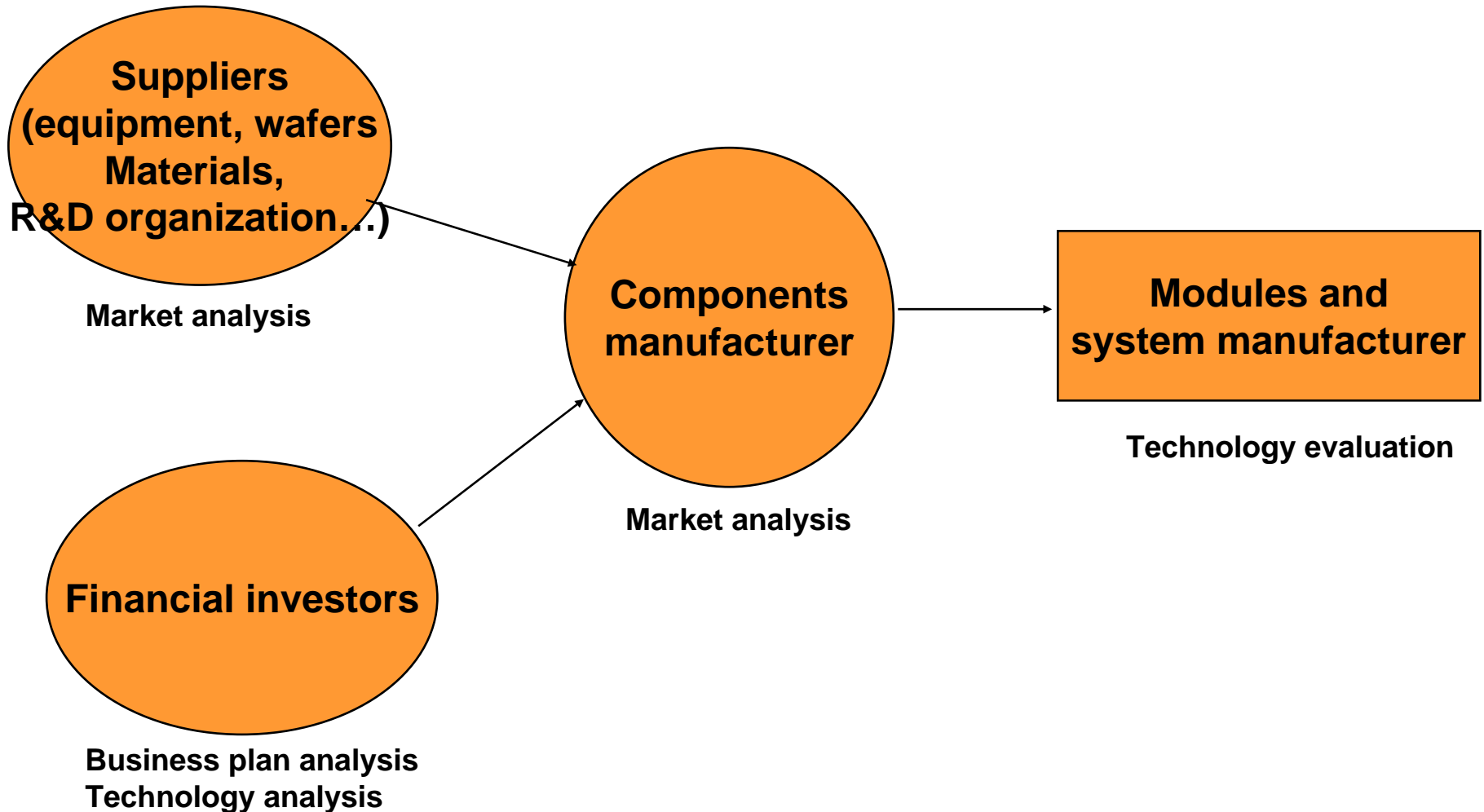
# Presentation of Yole Développement

# Presentation of Yole Développement

- Yole Développement is a market research and strategy consulting company, created in 1998.
- We are involved in the following fields:
  - MEMS fields, strategy and market research, **World leader**
  - Compound semiconductor business (SiC, GaN and thick SOI), **First European marketing consulting company**
  - Optics and optoelectronics
  - Instrumentation for life science
  - Nanomaterials and linked equipment
  - Energy related areas
- Yole Développement has 18 consultants, with both technical and marketing/management background, working worldwide
- We have different activities :
  - **Custom strategic and market research analysis**
  - **Edition of reports**
  - **Edition of a monthly newsletter :**



# Typology of our customers



# Lines of services for custom analysis

- **Strategic and marketing analysis :**
  - Strategic analysis
  - Identification of new applications and markets, set-up of market segmentation
  - Proposal of actions and marketing plan
  - Scenario analysis
- **Technology strategies**
  - Analysis of technical areas and definition of technology strategy
  - Define and find the right partners
  - Scenario analysis
- **Specific services for investors :**
  - Evaluation and analysis of business plan
  - Evaluation of production infrastructure
  - Expertise and due diligence before M&A
    - Company, market and technology expertise
    - Strategy, marketing and technical due diligence
- **Realisation of multi-customer analysis**

# Added value of Yole Développement

- **Development of specific methodologies in order to analyse and evaluate markets linked to new technologies**
- **In-depth industrial and technical knowledge of the different fields of specialties of Yole Développement**
- **Global contact network:**
  - **Participation to all major events**
  - **Contact data base of 45,000+ names**

# A specific offer : multi-customer actions

- **Bring together 5 to 7 companies interested to analyze a specific field :**
  - **Materials manufacturers**
  - **Equipment manufacturers**
  - **Device manufacturers**
  - **R&D organizations**
- **Make a complete and in-depth description of this area and provide specific answers to the participants of this action :**
  - **General analysis common to each partner**
  - **Key specific questions defined by each partner**
- **Schedule :**
  - **Starting point : at the signature of the contract**
  - **Final synthesis : after 5/6 months**
- **Share the cost between the different companies : budget per company 25 kEuros.**

# New multi-customer analysis on the way

- **World MEMS equipment markets 2005**
- **Microreaction technologies**
- **Nano imprint lithography**
- **New technologies for power devices**
- **3rd generation photovoltaic solar cells**
- **Advanced packaging**
  
- **Compound semiconductor fields :**
  - **Thick SOI : status of the markets and new developments**
  - **GaN : from devices to equipment and material markets**
  - **InP : from devices to equipment and material markets**
  - **AlN : from devices to equipment and material markets**
  - **SiC : from devices to equipment and material markets**

# Major device manufacturers customer of Yole Développement

- **Europe** : Sensoror, QinetiQ, Bosch, Unaxis, Thalès, SMB, AMIC, Infineon, Colibrys, Tronic's, Silex, STM, Philips, Varioptic, Modulight, VTI ...
- **North America** : Micralyne, Honeywell, Endevco, Freescale, HP, TI, Qualcomm, Knowles, Microfabrica ...
- **Asia** : Denso, Samsung, DNS, Canon, Panasonic, Nozomi Photonics, Sony, Sharp, Toshiba ...
- **R&D organizations** : CEA/Leti, CNRS, FhG, INSERM, IMEC, Université de Franche Comté, University of Strathclyde, INEX, IEMN, Sandia, Itri ...

# Major customers in the equipment and material fields

- **Equipment** : AMAT, ASML, Steag Hamatech, Jenoptik, EVGroup, STS, Sysmelec, Isméca, Mirae, Datacon, Mesatronic, Ebara, Applied MST, Xsil, Altatech, Riber, Ebara, TEL, Ultratech, Lam research ...
- **Wafer manufacturers** : Soitec, Umicore, Lumilog, Tracit Technologies, Okmetic, Tocera, Sixon, InPact, Bridgestone ...
- **Materials and chemical materials producers** : Schott, Ablestik, Dow Corning, Honeywell, Xenocs ...

# Other Yole Développement offers

- **Edition of reports describing specific markets and technologies :**
  - MEMS reports
  - Compound semiconductor reports
  - Microfluidics and biochip reports
- **Edition of a monthly newsletter, Micronews**
  - 10 000 subscribers, 30 000 readers
  - More than 3% growth per month
  - Worldwide coverage
  - Key magazine of the industry
- **Edition of a MEMS executive newsletter :**
  - 18 issues per year
  - Analysis of what is happening behind the scene
  - Comments on the major MEMS industry events every 3 weeks

**For more information ...**

**Take a look at our web site**

**[www.yole.fr](http://www.yole.fr)**

**You can register on line for free issues of Micronews**

**Save the date :**

**Yole Développement is part of the organisation of  
Transducers 2007 in Lyon (10th to 14th of June 2007)**

