

SEAL Integrated Project IST-257379	<b>SEAL Deliverable 1.5.1</b>
	Sub-project SP1, work package 5.1

EUROPEAN COMMISSION - Seventh FRAMEWORK PROGRAMME



Semiconductor  
Equipment  
Assessment  
Leveraging Innovation

Deliverable 1.5.2, Report  
SP1 Sustainable R&D Activities

Organization and execution of at least three training events and workshops

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When	Who	Comments
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### Project Management Board and/or Steering Committee Review

Reviewer 1: Wolfgang Arden			Reviewer 2:		
Answer	Comments	Type*	Answer	Comments	Type*

#### 1. Is the deliverable in accordance with

(i) the Description of Work?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> M <input type="checkbox"/> m <input type="checkbox"/> a	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> M <input type="checkbox"/> m <input type="checkbox"/> a
(ii) the international State of the Art?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> M <input type="checkbox"/> m <input type="checkbox"/> a	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> M <input type="checkbox"/> m <input type="checkbox"/> a

#### 2. Is the quality of the deliverable in a status

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(ii) that needs improvement of the writing by the originator of the deliverable?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<input type="checkbox"/> M <input type="checkbox"/> m <input type="checkbox"/> a	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> M <input type="checkbox"/> m <input type="checkbox"/> a
(iii) that needs further work by the partners responsible for the deliverable?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		<input type="checkbox"/> M <input type="checkbox"/> m <input type="checkbox"/> a	<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> M <input type="checkbox"/> m <input type="checkbox"/> a

\* Type of comments: M = Major comment; m = minor comment; a = advice

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### **Abstract**

This deliverable describes the activities performed for the organization and execution of training events and workshop events in the framework of the SEAL project.

In total three public workshops during SEMICON Europe shows, one training event to make a set of recordings of lectures provided by SEAL experts, one virtual FMEA workshop and several project internal technical workshops joint with General Assembly meetings have been organized and executed.

The workshops have been executed in cooperation with SP19 IP management and covered both the dissemination aspect and also the training aspect.

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## 1. Introduction

Training events and workshops support the knowledge transfer within the framework of the project and also provide a forum for comprehensive information exchange with interested parties. To organize events and workshops as well as to establish discussion forums for fostering the exchange of information and gaining experience was one of the major objectives of the WP1.5 and covers the main part of training and workshop activities.

## 2. State of the Art

Imec and Fraunhofer IISB are using state-of-the art technology to archive lectures and to make them available as virtual learning content: i.e. webcasts with parallel video of lecturer, with audio track, and with a synchronized recording with high-resolution JPEGs of the screens presented by the lecturer. For the real training events the conjunction to public events, e. g. SEMICON Europa, were used in order to attract people.

## 3. Activities for organization of events and workshops

At the beginning of the project the partners of WP1.5 (IMEC, FH-WN, and Fraunhofer IISB) implemented a plan and time schedule for training events and workshops. In total three, one per period, public workshops were planned to be held during SEMICON shows. Additionally a recording of 5 technical sessions and of a virtual FMEA workshop were planned. These activities were supplemented by internal technical workshops in conjunction with General Assembly meetings.

Figure 1 summarizes the training activities of the four (last SEMICON Europa took place after the official end of SEAL) project periods.

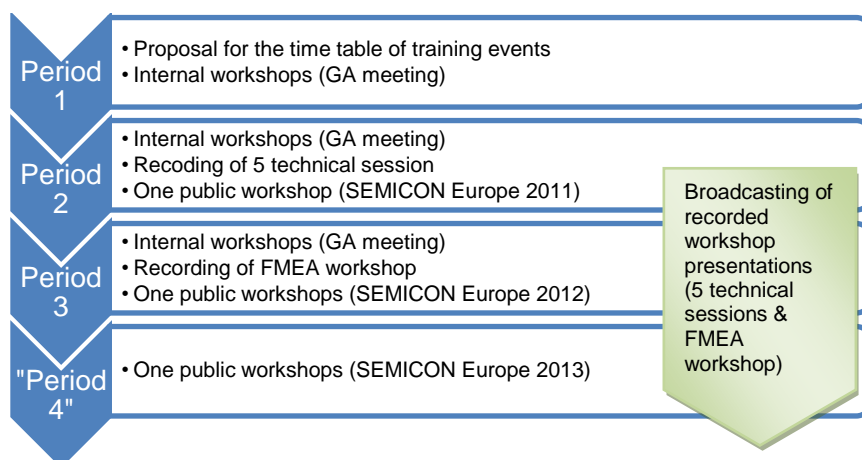
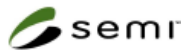


Fig. 1 Training activities of SEAL

### 3.1 Public workshops

The public workshops were executed during the SEMICON Europe Shows in the years 2011, 2012 and finally 2013. The workshops were announced in the official SEMICON program. All workshops were moderated by members of the management board of the SEAL project. The first one was organized together with other talks regarding equipment assessment und performance optimization in the conference program of the exhibition. See figure 2 for the official program. An overview of SEAL was given by the project coordinator and several sub-projects were presented by SEAL partners. Due to the conference fee required to participate in the conference program of SEMI the second and third public workshop were organized in the open TechArena program of the SEMICON shows in order to allow more people to attend in the SEAL workshops.

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## Workshop on Equipment Assessment & Equipment Performance Improvements

Date: 12 October  
Room: Ballroom

### SESSION 1: Equipment Assessment

- 08:30 **Welcome Coffee (Hall 2)**  
Session chair: Richard Oechsner, Deputy head of department, Fraunhofer IISB
- 09:00 **Objectives and status of the EC-funded project on Semiconductor Equipment Assessment SEAL**  
Lothar Pfitzner, Fraunhofer IISB
- 09:20 **Equipment Assessment Example I from SEAL: White-light Interferometer System for the Development of 300mm Wafer Mechanical Processes on the Nanometer Scale**  
Thomas Fries, Managing Director, FRT
- 09:40 **Equipment Assessment Example II from SEAL: More Mass Metrology for Monitoring**  
Mark Berry, US and Europe business Director, Metyx
- 10:10 **Automation Capabilities Management Program**  
Ralf Georgi, GLOBALFOUNDRIES

### SESSION 2: Equipment Performance Improvements

- Session Chair: Michael Arnold, PEER Group
- 10:30 **Standards for Equipment Performance Measurement**  
Jan Rothe, Member of Technical Staff, GLOBALFOUNDRIES
- 10:50 **Overall Equipment Effectiveness and Intrinsic Equipment Efficiency**  
Thomas Band, Manager Industrial Engineering, Infineon
- 11:10 **More Than Moore Semiconductor Production: Challenges by purchasing and operating Equipment**  
Raif Montino, Managing Director, Elmos
- 11:30 **Predictive Sampling Approach to Dynamically Optimize Defect Density Control Operations**  
Markus Pfeffer, Fraunhofer IISB

Fig. 2 Agenda of the public workshop @ SEMICON Europe 2011

In 2012 the focus was more on general equipment assessment and improvement topics, figure 3 shows the corresponding agenda. In the TechArena more people could be attracted to join the presentations.

<b>Workshop on Equipment Assessment&amp;Equipment Performance Improvements</b>  <b>New Activities in Equipment Assessment &amp; Equipment Performance Improvements</b> Date: 10 October, 2012 Time: 10:30 - 13:30 Location: TechArena 2, Messe Dresden  This workshop covers results on activities in the area of equipment assessment and equipment performance improvement. It includes presentations of examples for accelerating the maturity of prototype equipment but also the performance improvement of used and refurbished equipment.	<b>TechARENA 2</b>  Sponsored by: 
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**AGENDA**

Chairman: [Richard Oechsner](#), Deputy Head of Department, Fraunhofer IISB

10:30 **How to Improve Equipments Productivity with a Better Equipments Utilization and Reliability Variability Reduction on the Bottlenecks Reducing by such Approach the Running Cost**  
Keynote: [Christian Clerc](#), VWV Engineering Program Director, STMicroelectronics

11:00 **Advanced Single Wafer Wet Etch Process**  
[Anja Gissibl](#), Development Engineer Wet Processes, Infineon

11:20 **A Fab-Wide Chamber Matching Solution for High-Mix Semiconductor Manufacturing Based on Equipment Fingerprinting**  
[Rick Good](#), Principal Member of the Technical Staff, GLOBALFOUNDRIES

11:40 **Analysis Methods of Tool Performance and Tool Failure**  
[Jörg Reckliss](#), Director Maintenance Engineering, Infineon Dresden

Fig. 3 Agenda of the public workshop @ SEMICON Europe 2012

The last public workshop was again related to SEAL sub-project presentations. See figure 4 for the agenda of the workshop of 2013.

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**Workshop on Equipment Assessment & Equipment Performance Improvements**      **TechARENA 2**

Date: 10 October 2013  
Time: 10:15 - 11:40  
Location: TechArena 2, Messe Dresden



This workshop covers results on activities in the area of equipment assessment and equipment performance improvement. Equipment assessment and performance improvements are in the focus of several European research activities in order to accelerate development of innovative equipment and equipment maturity for production readiness. The session includes presentations of examples for accelerating the maturity of prototype equipment but also the performance improvement of used and refurbished equipment.

**AGENDA**

Chairman: Markus Pfeffer, Group Manager, Fraunhofer IISB

- 10:15    **Welcome**  
Markus Pfeffer, Group Manager, Fraunhofer IISB
- 10:20    **Nanotopography Measurement of Non-Polished Wafers**  
Stefan Bauer, Manager Metrology, Siltronic AG
- 10:40    **SWAT – A new CU WET Etch Approach**  
Stephan Henneck, Unit Process Development - WET, Infineon
- 11:00    **Joint Assessment of Novel Multi Column eBeam Inspection System**  
Leo Holcman, Head of eBeam System & Technology / Product Development Division / PDC, Applied Materials
- 11:20    **High-temp plasma doping using PULSION tool: A development allowed by SEAL European project**  
Frédéric Milesi, Ion Implantation Manager, CEA/LETI
- 11:40    **End**

*Fig. 4 Agenda of the public workshop @ SEMICON Europe 2013*

**3.2 Recording of scientific sessions**

During the SEAL project a workshop with 5 scientific sessions has been organized and recorded. 20 lectures in total have been archived. All of these sessions are hosted on the imec-academy streaming video server (details were available in D1.5.1).

**3.3 FMEA workshop**

In collaboration with the FH-WN a virtual workshop on Failure Mode and Effect Analysis (FMEA) were organized and the 45 minutes talk given by the FH-WN was recorded. The material was distributed within the SEAL project on request. Figure 5 shows the starting page of the recorded training on FMEA.



*Fig. 5 Starting page of the virtual FMEA workshop*

**3.4 Internal workshops**

For an information exchange within the SEAL consortium several technical workshops were organized and executed along the regular General Assembly meetings. Within these workshops

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synergies and collaboration across the individual sub-projects were fostered by the exchange of technical content. During the runtime of the project 5 internal technical workshops took place.

#### **4. Summary and Conclusion**

Several workshops and events for training in the framework of SEAL have been organized and executed. The public workshops have been combined with SEMICON shows in order to attract more people to participate and to reduce traveling efforts. Technical sessions and a virtual workshop were recorded and are available. The internal workshops were executed in combination with regular project meetings to reduce the traveling efforts. They offered a broader insight into other sub-projects and stimulated cross-cut activities as well as cooperation between sub-projects. This was very important because of the structure of the project emphasized the concentration to one equipment and topic within one sub-project. It showed that approaches and problems are comparable and, therefore, excited discussion in a broader scale.

A lot of positive feedback concerning content, organization, execution and quality of the training events has been received. Also the possibility to virtually repeat the presentations of the training events was appreciated by partners and external visitors.