## Technical Visit to MIMOS Technology Facilities

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Started operation in 1985, Malaysian Institute of Microelectronic System (MIMOS) was formed to provide critical infrastructure for the advancement of local electronic industry so that the nation can design, produce and market high quality electronic products. Since then, as a strategic agency under the Ministry of Science, Technology and Innovation (MOSTI), MIMOS has expended as Malaysia's forefront technology provider in Information and Communications Technology, Industrial Electronics Technology and Nano-Semiconductor Technology.

Interest in the research activities, facilities and solution MIMOS is able to offer to the industry players, Electrical Engineering Technical Division (EETD), IEM has organised a technical visit to MIMOS Berhad, technology facilities in Technology Park Malaysia on the 23rd August 2016.

The technical visit started off with welcoming note and then continued with the introduction of MIMOS Berhad, the history of MIMOS Berhad, current MIMOS organisation structure and finally further briefed the facilities, services and competency development training programme MIMOS Berhad can offer to its customer.

The technical visit to MIMOS Berhad technology facility started with the visit to MIMOS Wafer Fabrication Plant where MIMOS provides a wide range of services including IC design, wafer fabrication services, failure analysis, water testing and reliability testing. In the Water Fabrication plant, MIMOS engineer first explained the process of making a silicon wafer. MIMOS engineer then further presented the process of making silicon wafer into a finish wafer. Finally, MIMOS engineer explained some of the machinery the IEM participants can see inside the MIMOS Fabrication Plant clean room.

IEM participants were then taken to the MIMOS Failure Analysis Lab which is equipped with state-of-art failure analysis equipment to support the wafer fabrication activities. MIMOS engineer first explained the two types of tests performed in the lab; non-destructive test and destructive test. The non-destructive test includes among others is the electrical test performed at wafer, IC or PCB level. Some of the specialised equipment used for these tests are real-time X-ray, 3D X-ray, scanning delamination microscope, photon emission microscope and thermal emission microscope. On the other hand the destructive test includes test such as failure inspection which uses specialised equipment like ion etching and high resolution scanning electron microscope. MIMOS engineer further explained that IC manufacturers are the typical clients to the lab when they are investigating new IC design or customer return IC. Since MIMOS practices an open door concept client are encouraged to be around during the test and analysis as it will be faster and easier and at the same time be a skill development process for the client.

Next the IEM participants were taken to MIMOS Material Lab and Nanotechnology Lab. In these labs the participants were explained on some of the high technology equipment used to analyse failure at both wafer-level and package-level. MIMOS engineer among others demonstrated the X-ray Photoelectron Spectroscopy (XPS) and Energy Dispersive X-ray Spectroscopy (EDX) used in surface analysis technique. MIMOS engineer then further explained a thin film process, Plasma Enhance Chemical Vapor Deposition (PECVD) conducted in the nanotechnology lab. According the MIMOS engineer client to the lab are IC manufacturer and PCB manufacturer from the industry and university.

IEM members were than taken to the Product Quality & Reliability Engineering Lab where integrated software and hardware testing are being done. MIMOS engineer explained that in the PQRE Lab clients electronics products are strictly tested by MIMOS as an independent verification and validation party. Some of the testing strategies conducted in as part of product quality are functional testing, compatibility testing, performance testing, reliability testing, integration testing and mobile device testing. On the other hand, the reliability lab capabilities and facilities include climatic chamber, vibration chamber, thermal shock, slat spray, high temperature oven, water ingression and ESD tester. Most of the test conducted in the PQRE refers to standards from IEC and ISO and the lab has been accredited by Standards Malaysia for MS ISO/IEC 17025 Testing Lab Competency. Besides the testing facilities, MIMOS engineer also demonstrated to the IEM members the rapid prototyping facility that is able to prototype plastic, metal and even PCB components.

IEM members were finally taken to the User Experience Lab where MIMOS conduct usability and user experience testing and research. Testing services includes among others benchmarking, heuristic evaluation and user surveys. In the lab, MIMOS engineer demonstrated and IEM participant participated in a usability testing involving eye tracking on one of MIMOS's client E-Commerce website.

The technical visit ended at about 1:00 pm. Visiting and experiencing semiconductor wafer, nanotechnology, component reliability and user experience testing facilities in MIMOS was very enlightening. As industry player we were able to better understand what are the facilities and services available in Malaysia that would support us in designing, producing and marketing high quality electronic product and solutions.