



3D CAID TECHNOLOGY

A GAME CHANGER IN INDUSTRY 4.0 ERA

The rapid evolution of digitalisation, technologies and innovations has hastened the need for industries to upscale their production processes towards enhancing their competitiveness in the era of the Fourth Industrial Revolution (4IR).

 By Philip Chan

In the case of the 3D Computer-Aided Industrial Design (CAID), the fast changing technology too has grown exponentially and provided boundless revolutionary opportunities for industrial designers and engineers.

In the latest MIMOS Talk series recently, Encik Saharudin Busri, MIMOS' Head of Industrial Design, shared his expertise and experiences on the overall development of the digital design sector and also provided a live presentation of the latest tools available in his company's industrial design studio.



Saharudin Busri
MIMOS' Head of
Industrial Design

Entitled *New Evolution of 3D Digital Development in Computer-Aided Industrial Design*, Saharudin's presentation outlined the design development process in his industrial design studio, various projects using digital design process and the quick digital design techniques using Autodesk Alias from 2D concept sketch to 3D virtual reality.

Digital design development in the industry has been in use for many years now, through the early application of Computer Aided Design (CAD), Computer-Aided Engineering Analysis (CAE), Computer-Aided Manufacturing (CAM), Computer Generated Images (CGi) to modern digital design and innovative manufacturing solutions.



Digital design technologies provided a great support for product realization from 2D design concept, 3D concept modelling and mechanical engineering development to manufacturing preparations, sales and services of a product.

With the fast-changing developments and emerging technologies in the 4IR scenarios, Saharudin said CAID is bound to greatly impact and provide new challenges to design students, designers, engineers and many industries.

"The future of 3D digital development looks even brighter, with the advancement of 3D printing technologies and the enhancement of virtual reality simulation. Although virtual reality is still at its infancy, it is set to change the way we interact with 3D models forever.

"In addition, the application of 3D printing would significantly impact the acceleration on the product development process. It allows people to cut down on the resources and time required to come up with prototypes.

"In the future, designers can leverage on advances in 3D printing technology and 3D digital modelling for various design projects. However, the 2D digital design process is still very important for designers to get the concept of the initial idea before the product is developed in 3D," he emphasised.





IMPORTANCE OF CAID

Saharudin explained that CAID is simply the employment of computerized software in the industrial design process. Compared to traditional manual drafting, it is an automated process that greatly increases the efficiency of design alterations, concept testing and general optimizations.



CAID grants designers creative freedom. However, it is common to follow a simple methodology where a designer will create a sketch using a stylus, following which they will generate curves from the sketch, and in turn generate surfaces from the curves.

The main CAID main features include 2D concept design and 3D concept modelling, detailed design and surface analysis, surface modelling and Class-A surfacing, and design communication and product visualisation.

“In a nutshell, CAID offers “freedom to experiment with shape and form”, and is a software for creatives. Freeform surface modelling tools allow the designer to create organic forms on screen, rather than being confined to computer-generated limits.

“It offers extensive visualization tools such as photorealistic rendering, texture mapping, surface highlighting, and many more. Users are able to push and pull shapes to immediately visualize the effects and results. The process is much less precise and numeric than CAD,” he added.

On the superiority of CAID, Saharudin elaborated that it enables a designer to create a 3D model prior to the manufacturing of the product itself. The 3D model can be saved in a format that can be read by a rapid prototyping machine which will then create a real-life model of the product.

“These computerized steps speed up the creation process, thus enabling the designer more time to focus on the technical aspects of the design rather than sketching and modelling manually. This allows for a better product proposal in a shorter amount of time.”



DIFFERENCES BETWEEN CAID AND CAD

Computer-Aided Industrial Design (CAID) is a subset of computer-aided design (CAD) software that can assist in creating the “look-and-feel” or industrial design aspects of a product in development.



Although CAD and CAID may seem quite similar, there are some notable differences between the two. CAID is much more conceptual and artistic, whilst CAD is more technical. The latter is often a middle step between the artistic creation in CAID and the physical production of a design. The combination of these two design platforms allow for seamless movement from concept to production.

When moving from CAID to CAD, both parties are equally important in the process. The CAID designer must prepare design files which will work within the CAD system, and the engineer must understand what they are receiving and how to work with it.



SERVICES OF MIMOS ID STUDIO

As Malaysia's national applied R&D centre, MIMOS plays a strategic role in supporting the national development agenda by aligning its focus with the 4IR's nine technology pillars.

MIMOS' 4IR framework provides strategic responses for the nation with the following functions:

- > **Policy Advisory for 4IR** - advising the Government in developing policies relating to technologies that drive 4IR towards facilitating the nation's aspirations in becoming a technology producer.
- > **Strategic R&D** - carrying out government-driven R&D programmes by developing technologies in critical government sectors such as national security, public safety, healthcare, energy, finance and agriculture. R&D activities are facilitated by five national R&D facilities hosted by MIMOS.
- > **Technology Venture and Incubation** - boosting the growth of Malaysia's home-grown industry towards becoming technology producers by establishing technology ventures from MIMOS technologies.

> **Shared Services and Collaboration** - providing a shared platform for initiatives such as Advanced Electrical and Electronics (E&E), Manufacturing Centre of Excellence, Digital Government, IoT and Augmented Reality/Virtual Reality Hub for R&D projects.

> **Capacity and Capability Building** - providing facilities, resources, and expertise in supporting the Government in producing highly-skilled workforce needed to face 4IR, chiefly through the establishment of MIMOS University.

The MIMOS ID department plays an important role not only to support its internal projects, but also to provide support and services to the industry in line with the Government's initiatives.

The ID team was initiated in 2007 by Saharudin who was instrumental in creating a 7-year roadmap for the department. Since then, the studio has carved a strong reputation as among top industrial design teams in the country. It has won a total of 60 awards at both international and national level design competitions, of which 15 were international and 45 were national winnings.

By conscientiously and consistently producing creative and innovative product designs, the team has won the most prestigious design award – *Red Dot Design Concept Award* – every year since 2010.

Each year it submitted more than 10 design concepts for the Award. In 2014, it paid dividend when the design team won third placing as World's Most Innovative Design Studio in the Red Dot competition.

As Malaysia's pioneer in industrial design, the studio provides process-driven results by researching user requirements and needs, which can be tightly integrated across other disciplines.

In the design development process, the team also places great emphasis on design language research to create a brand identity and emotion for each product.

The studio is supported by state-of-the-art 2D & 3D digital software, complex surface modelling, detailed solid modelling on multiple design packages, including augmented reality (AR), virtual reality (VR) and mixed reality (MR) technologies.

The studio applies the design thinking method imbued with creative culture for the design process for more innovative and unique output.

This facility seeks to further empower and educate the industries on the design thinking process to improve their product's design and remain competitive in the marketplace.

- > For more information on MIMOS' Industrial Design capabilities and services, please contact MIMOS Berhad at **+603 – 8995 5000** or email to **info@mimos.my**.



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