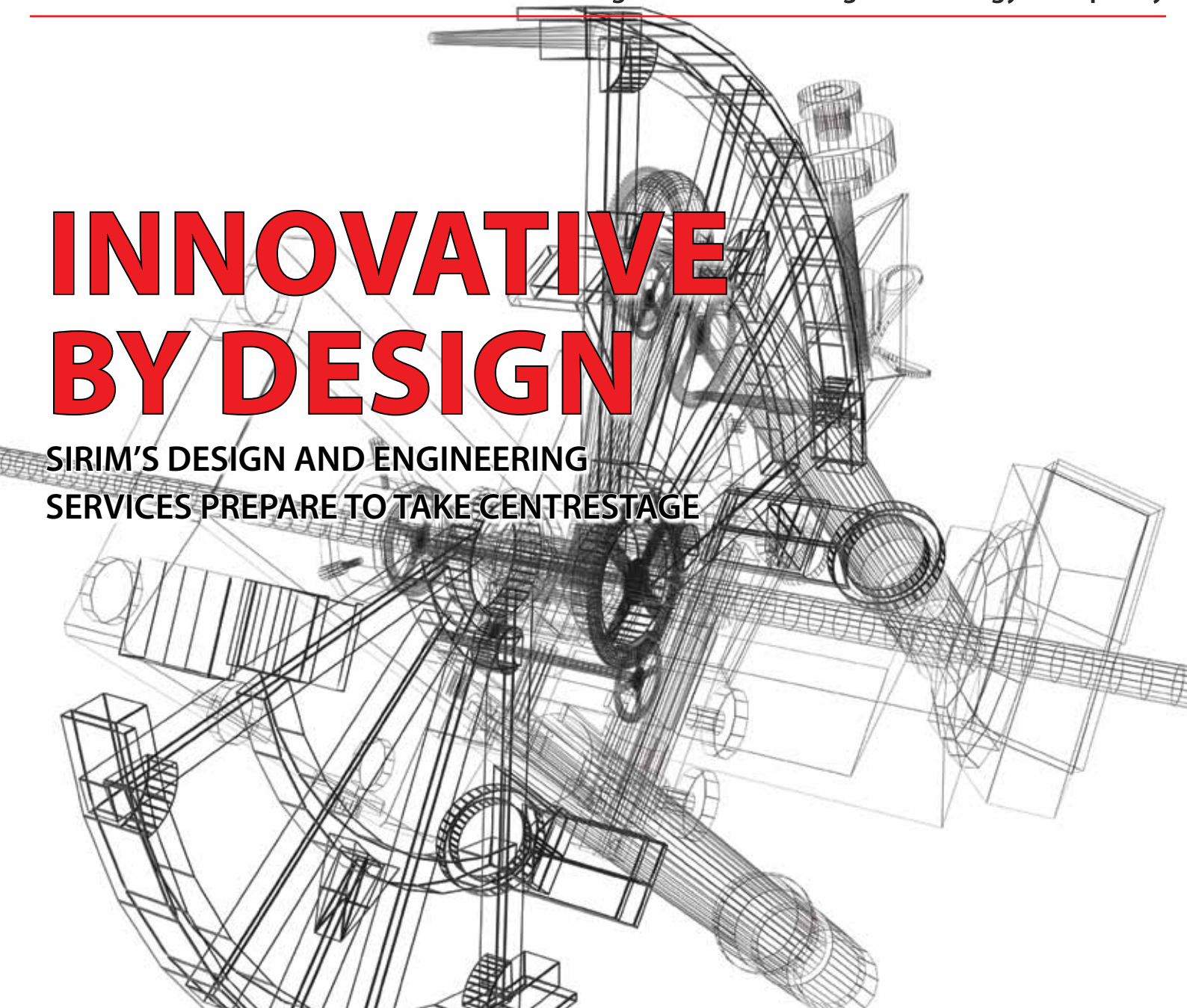


SIRIMLink

Driving innovation through technology and quality

INNOVATIVE BY DESIGN

SIRIM'S DESIGN AND ENGINEERING SERVICES PREPARE TO TAKE CENTRE STAGE



IN THIS ISSUE:

THE PRESIDENT SPEAKS



YBhg. Ir. Hj. Yahaya Ahmad on the restructuring of SIRIM Berhad

LOCAL CARS, WORLD MARKETS



How the Automotive Engineering Centre aims to take on the world

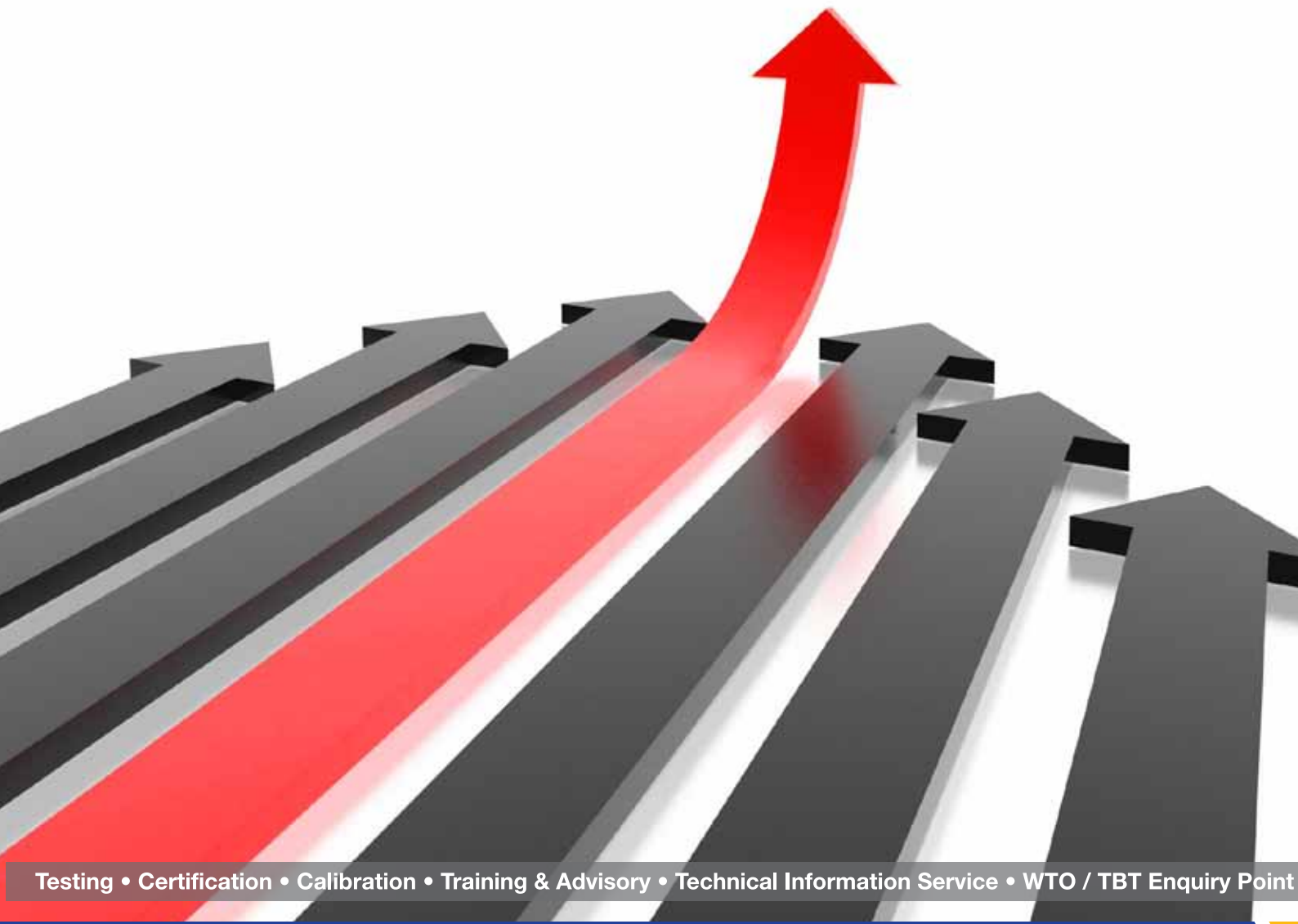
TURNING DREAMS INTO REALITY



Got an idea? Visit the Product Design and Engineering Centre

In any **business** or **trade**, **quality** sets you apart.

Quality should not be demanded, it should be expected. As the country's leading practitioner of quality, we are serious about implementing standards of excellence. At SIRIM, we provide leadership in facilitating industries to subscribe to quality management practices, adopt Malaysian and International standards, and apply good manufacturing practices to assure quality product and services.



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SIRIMLink is an official publication of SIRIM Berhad. The bulletin is published quarterly and is distributed free to our clients, associates, business and research establishments.

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CHANGE FOR THE FUTURE

THEY SAY THAT IN BUSINESS, the only constant is change. That adage has never been truer than it is today.

With every passing year, the local and global business environment grows increasingly more challenging. In order to stay ahead of these challenges, we are called upon to not only exercise caution but also anticipate future developments.



That future is in innovation.

SIRIM has long held innovation in very high regard. It is one of the primary factors driving the company's restructuring programme and a key element in the organisation's future. By enhancing our emphasis on design and innovation across all our business divisions, we are confident of seizing tomorrow's challenges today.

In this issue, we take a look at the new Design and Engineering Division at SIRIM to see how this emphasis on innovation will benefit our customers. We are particularly excited about how the new Automotive Engineering Centre is going to prepare the automotive industry for international standards and global markets.

We are also honoured that the President and Chief Executive of SIRIM YBhg. Ir. Hj. Yahaya Ahmad took time off his demanding schedule to share his vision on the company's future. I trust you will find his perspective enlightening.

Enjoy the issue.

Nor Rashid Ismail
Vice President
Corporate Division



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The new Design and Engineering Centre is a one-stop shop for SMEs



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LOCAL CARS, WORLD MARKETS

Preparing the automotive industry for global markets and challenges



Testing Engineer Hazman Mansor of the Automotive Engineering Centre making the final preparations for a temperature and vibration test on an intake manifold, the part of an engine that supplies the fuel/air mixture to the cylinders.



TURNING DREAMS INTO REALITY

Everything a business needs to turn its ideas into commercial realities



AUTOMATION AT WORK

Automation can do more for businesses than they realise



NEWS AND EVENTS AT SIRIM

The news and highlights of the past quarter at SIRIM Berhad



THE PRESIDENT SPEAKS

The recently restructured SIRIM Berhad promises to be a more market-driven organisation that will provide more professional services and a better customer experience to clients. President and Chief Executive, YBhg. Ir. Hj. Yahaya Ahmad, shares his vision on the future.

THERE HAS NEVER BEEN A better time to become an entrepreneur. A slew of technology breakthroughs coupled with government incentives have made it easy to break into today's business world. All you need to get started is a little capital and some wisely selected business partners.

SIRIM Berhad is, of course, one such partner. Already globally recognised for being a champion of quality and a leading scientific research institution, the company recently announced a restructuring exercise that will address the dynamic nature of today's business environment.

"The business environment is very competitive right now – people not only look at the quality and cost of your product, but also at how innovative it

is," explains YBhg Ir. Hj. Yahaya Ahmad, President and Chief Executive of SIRIM. "Our new structure will enable us to give our clients that innovative edge and push them to the forefront of the market."

THE INNOVATIVE EDGE

SIRIM has set itself some big goals for 2010. It aims to create 40 new products and services, be involved in 10 technology transfers and create eight new entrepreneurs. It also wants to form 25 new technology incubatees on top of the current 50 incubatees already under its umbrella, and see 11 projects through to commercialisation.

The only way SIRIM can achieve these goals is by being inherently market-driven. That's why it

organises dozens of talks and seminars each year in an effort to learn what industry players want and find ways of giving them solutions.

However, this does not mean that SIRIM does not play a role in creativity itself – the company organised over 20 brainstorming sessions last year, in which employees from all ranks and files collaborated to come up with ideas that might be researched and commercialised. The program resulted in thousands of ideas, ranging from the ridiculous to the ingenious.

“Some of those ideas are now under serious consideration in patent applications, which makes such brainstorming sessions useful for short-term commercialisation activities,” says Ir. Hj. Yahaya. “For long-term strategic projects, however, we still rely on market-driven research.”

THE FUTURE IS NOW

One of the aims of SIRIM’s restructuring exercise is to streamline its operations. This will allow the company to more efficiently play its role as champion of new technology while continuing its push to make quality a top priority among entrepreneurs. For example: the new Quality and Enterprise Management Centre offers entrepreneurship and innovation consulting services, and can help customers strategise their long-term branding goals.

“We have a long track record for helping companies implement quality management practices within their organisations,” says Ir. Hj. Yahaya. “The new Standards and Quality Division has been realigned to enable standards compliance and help businesses demonstrate their commitment to quality practices.”

SIRIM has established six Innovation Centres of Excellence under its restructuring programme which will address key national interests. These i-COEs include nanotechnology, renewable energy, green materials, industrial and environmental biotechnology, automotive components and metrology.

“SIRIM leads the country’s renewable energy taskforce and has also been asked to implement the nation’s industrial biotechnology agenda,” says Ir. Hj. Yahaya. “We are also working in collaboration with the Danish Technological Institute and Iran University of Science and Technology in nanotechnology.”

Meanwhile, the D&E Division has strengthened its service offering in product development, rapid prototyping, reliability testing and engineering consulting. Its Automotive Engineering Centre’s testing facilities will also be systematically upgraded into a National Testing Centre for automotive parts and components.

“The Ministry of International Trade and Industry has identified this as a strategy to increase the competitiveness of national car manufacturers and vendors,” Ir. Hj. Yahaya elaborates. “We want to be a one-stop Centre of Excellence and provide total solutions in automotive component technologies through R&D and testing, design and homologation.”

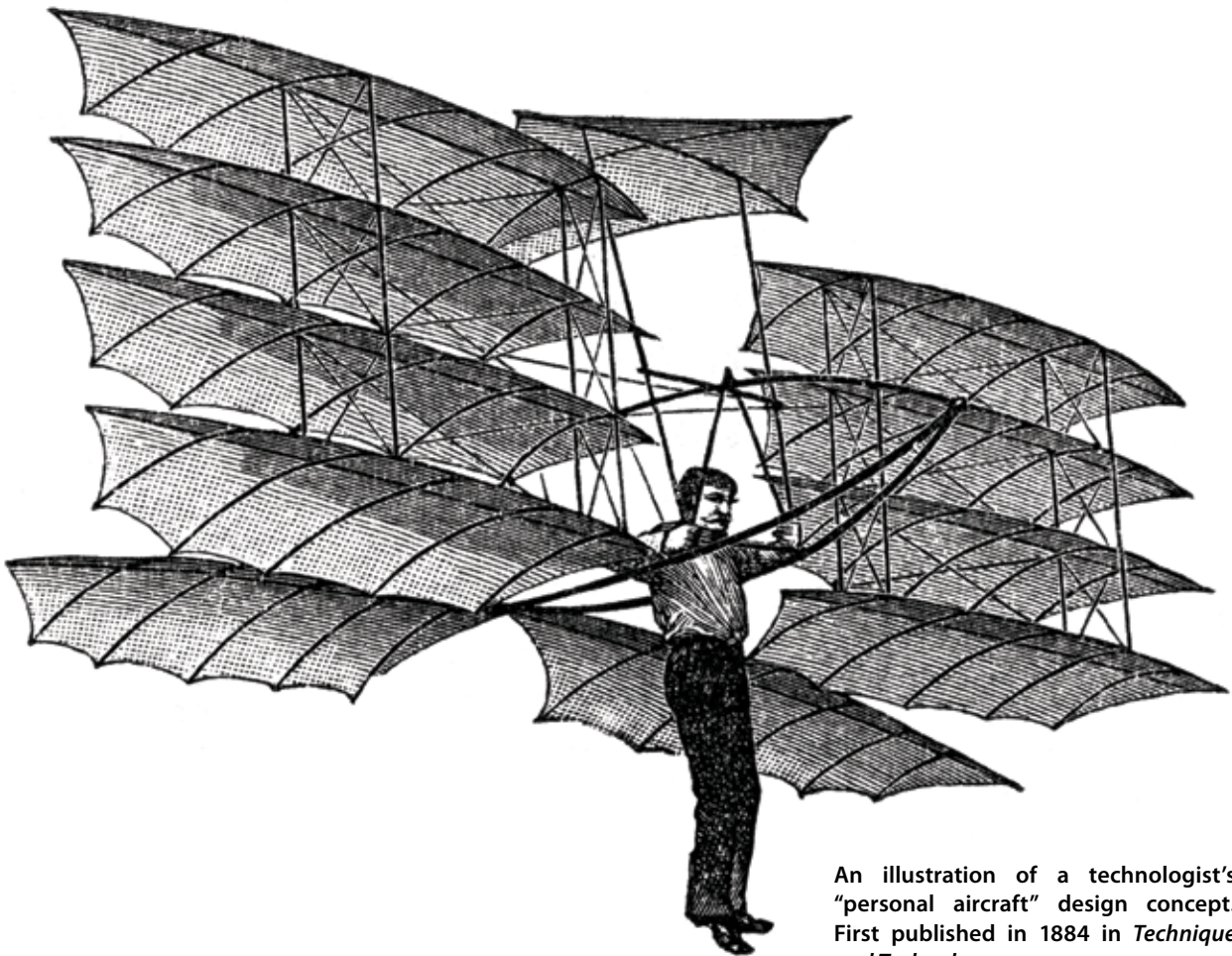
STAYING AHEAD OF THE CURVE

In order to remain the preferred business partner for industry, SIRIM also aims to further develop its pool of talent. There are already over 1,500 technical employees in SIRIM at present, giving the institution an enviable base of human capital for its customers to exploit. Nonetheless, the company aims to further increase its capacity and capabilities by hiring even more research scientists and engineers.

“By combining technical expertise and sound management practices, we will be able to deliver the results our customers have come to expect of us,” says Ir. Hj. Yahaya. “We cater to any business, from humble cottage industries to sophisticated aviation enterprises. There is very little we will not do to help our customers.”



DESIGNING THE FUTURE



An illustration of a technologist's "personal aircraft" design concept. First published in 1884 in *Technique and Technology*.

The Design and Engineering Division of SIRIM has made some visionary changes to its structure in order to transform itself into a one-stop, total solutions centre for entrepreneurs, capable of turning fantastic ideas into commercial realities.

DESIGN AND engineering were once thought to be distinctly separate disciplines when in fact, they are two sides to the same coin. A product cannot be expected to succeed based on its design alone. Similarly, unless it is at least partially attractive to current market tastes, it will not succeed based on its ingenious features and functions. A pretty can-opener with a flimsy blade will never sell well, but a tough can opener will not fare any better if it is ugly. For a product to succeed, function and form must go together.



Ir Dr Mohamad Jamil Sulaiman: “We need creative engineers and designers to produce innovative products that are easily commercialised. Both these disciplines must work together in order to achieve that synergy.”

With that philosophy in mind, SIRIM set about restructuring the new Design and Engineering Division so that it will cater to both the functional and form requirements of its customers. The idea is for both designers and engineers to work hand in hand in creating innovative products that both look good and perform well.

“The overarching principle behind the restructuring is to align SIRIM’s business processes to that of the government’s thrust for a creative economy,” explains Ir Dr Mohamad Jamil Sulaiman, Vice-President of the Design and Engineering Division.

Take a look at any developed country, Dr Jamil says, and you’ll see that one of the underlying reasons for its success is creativity.

“We need creative engineers and designers to produce innovative products that are easily commercialised,” he enthuses. “Both these disciplines must work together in order to achieve that synergy.”

By achieving that synergy, SIRIM will be able to provide its customers more creative designs and better engineered products, ultimately giving them an innovative edge against their competitors. This involves studying both the form and aesthetics of the products as well as their purported functions.

“Our design engineers must ensure that the functionality of the product will meet or exceed the target users’ expectations,” explains Dr Jamil. “The world is crowded with average products. What we need are true innovations that will break new ground and test the boundaries of creativity.”

WHEN FORM MEETS FUNCTION

The first step on any product’s road to success is in design. If you have an idea for a new product, for example, SIRIM’s designers can help you translate that idea to paper by using advanced computer-aided design tools. However, a graphical representation of a product is just the beginning.

“We don’t want to just produce another wheel; we want to produce a wheel with enhanced capabilities that will make it more attractive to the market,” explains Dr Jamil. “For that reason, our engineers spend a lot of time in prototyping, using advanced simulation tools to predict how the product will behave under different conditions or with different materials, and how changing those parameters may affect the final cost of the product.”

There are essentially two ways to approach prototyping: aesthetic prototyping and >>

DESIGNING THE FUTURE

TOTAL SOLUTIONS

AN EXAMPLE OF THE END-TO-END SOLUTIONS TO BE FOUND AT SIRIM'S DESIGN AND ENGINEERING CENTRE FROM THE VIEW OF AN AUTOMOBILE TYRE RIM.

1



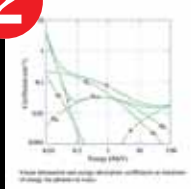
PRODUCT DESIGN

Designers create the tyre rim's aesthetic qualities.

10



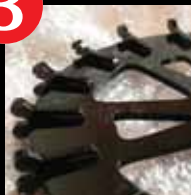
2



ENGINEERING DESIGN

Engineers calculate the mechanics of the rim's technical qualities and simulate its endurance capabilities.

3



PROTOTYPING

Engineers make basic prototypes of the rim out of resin. The prototypes are evaluated before further development.

4



FABRICATION

Functional prototypes that closely resemble the final product are fabricated with foundry and casting technologies.

5



engineering prototyping. Aesthetic prototyping will give you a physical form of the product that allows you to touch-and-feel what the final product will look like, which is useful for the imagination-impaired. However, this method of prototyping is also very time-consuming as each form study prototype can take anything from several days to several weeks to produce.

Engineering prototyping, however, concentrates on manipulating the model while it is still in the graphical representation phase of development, and can thus be accomplished much faster. By using computer-aided design and modelling tools, prototypes can be produced in a matter of hours.

This makes it possible to not only test the way a product will look and feel under different scenarios, but also how it will function when made of different materials or processes.

“We don't just study the qualities of the product's physical or safety features, but also its qualities in terms of functionality,” explains Dr Jamil. “Rapid prototyping is very useful for this sort of analysis.”

COMPLETE SOLUTIONS

One of the advantages of SIRIM Berhad is its vast expertise in almost all areas of industrial development. The Design and Engineering Division offers a whole suite of engineering services, including the design and development of machines and automation systems, foundry and tooling technology, reverse engineering, non-destructive testing and joining technology.

“With the restructuring, we hope to be able to find synergies among all these services,” explains

TO MARKET

The rim hits autoshow shelves both locally and abroad, ready for purchase.



9

**RFID ENGAGEMENT**

Engineers will integrate RFID technology into the manufacturing and packing processes as a way to manage inventory and improve traceability.

8

**PACKAGING DESIGN**

Designers create the packaging for the rims including transportation cushioning and packaging copywriting for foreign markets.

7

**HOMOLOGATION**

Once the plant is running, quality engineers will test and refine the manufacturing process to ensure that the rims meet international automotive quality standards.

6

**MACHINERY DESIGN**

Engineers design the machinery and intelligent controllers required for the robotics and automation systems that will be used in the new plant's manufacturing line.

PLANT DESIGN

Plant designers construct a blueprint for the rim manufacturing plant, taking into consideration everything from wiring to sanitation. External contractors are engaged to build the plant.

Except for e-mark (7), all photo credits due to Flickr community: grantmr (1), mitopencourseware (2), toxi (3), 5catsorg (4), bowbrick (5), Robert Stokes (6), g-a-r-n-e-t (8), timo (9), shooting brooklyn (10).

Dr Jamil. “We want to be able to offer creative designs that are based on sound engineering principles, thereby ensuring that a product meets the market’s demands in terms of being both attractive and functional. We also intend to find ways of leveraging our market leadership in failure investigation and third party inspection and verification.”

All of this will ultimately give customers a keener competitive edge in the marketplace, especially in international markets which are sensitive to manufacturing practices. However, a balance must be struck between cost and functionality – if your product is terrific for the environment but too expensive to make, no one will buy it.

For this reason, the Division collaborates with the Marketing and Business Development Division to determine the price of the product and develop

their business models. If a specific material is likely to make a product too expensive for the market, then the Design and Engineering team goes back to the drawing board to find an alternative, cheaper material to use. The solution is a viable compromise between form and function that best suits customers’ needs.

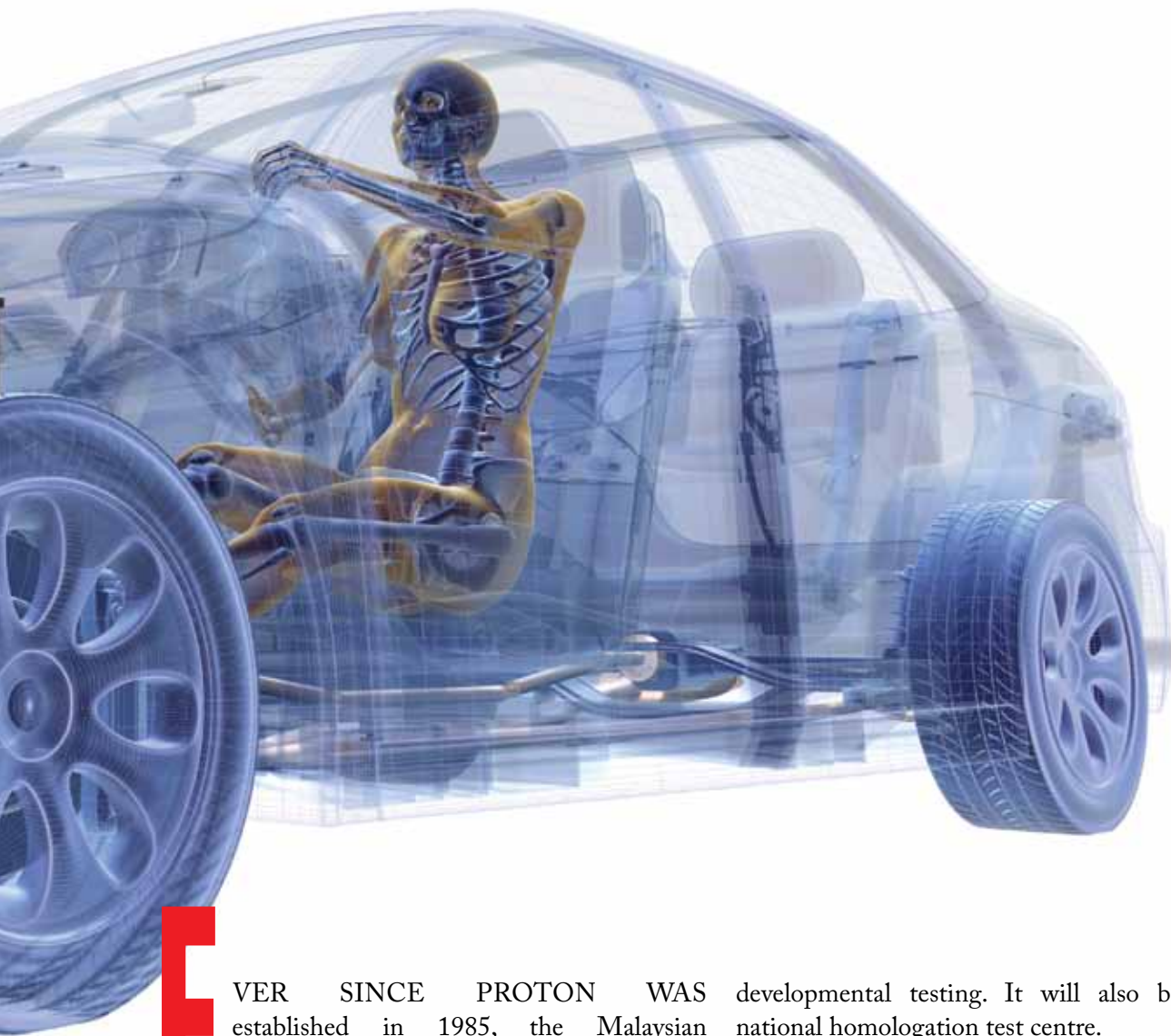
Ultimately, Dr Jamil sees the Design and Engineering Division becoming a one-stop centre for industry players to realise their visions. This means going a step further than merely simulating their concepts in three-dimensional computer drawings.

“We want to produce final proof-of-concepts that our client can truly appreciate,” says Dr Jamil. “By turning their abstract ideas into concrete plans for success, we not only serve the industry, but the country, too.”



LOCAL CARS, WORLD MARKETS

The Automotive Engineering Centre is readying itself to become a catalyst for change within the local automotive industry as it prepares its customers to become global players in the world market.



EVER SINCE PROTON WAS established in 1985, the Malaysian automotive sector has served the country as a strategic engine for economic development. It has stimulated growth across industry in both the manufacturing and services sectors and currently supports a secondary industry of over 400 components and parts manufacturers and assemblers.

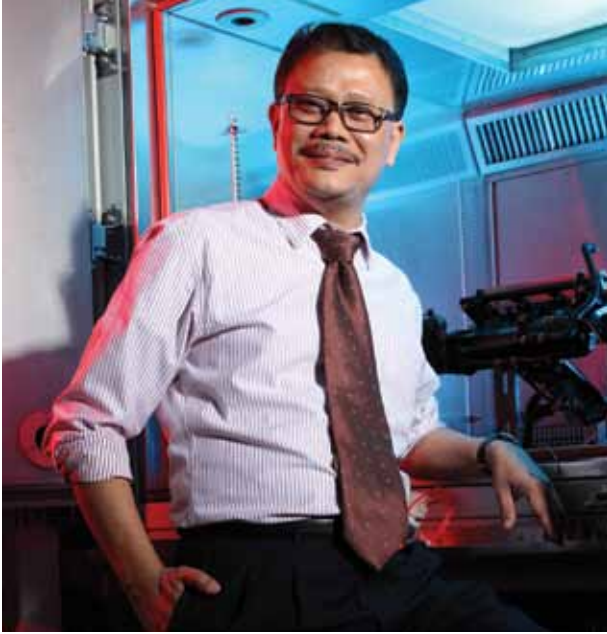
However, these secondary industry vendors cannot rely upon the local market to sustain them indefinitely – Malaysia's population is not big enough for that. One of the objectives of the National Automotive Policy Framework is to prepare these vendors for international competition. To support the government's efforts, SIRIM established the Automotive Engineering Centre (AEC) to function as a research and development centre in automotive engineering design and

developmental testing. It will also become the national homologation test centre.

“We don't want to merely be a testing and compliance centre – that's not what SIRIM is here for,” says Mohamad Shalan Hassan, Senior General Manager at the Automotive Engineering Centre. “We want to help vendors achieve the standards they need in order to compete internationally, which is one of the thrusts of the National Automotive Policy Framework.”

Products that are sent to the AEC are put through a rigorous set of tests according to stringent industry standards. If a product does fail to meet an international component standard, then SIRIM's engineers and consultants will advise the customer what must be done to meet those standards, thus preparing the customer for world markets. >>

LOCAL CARS, WORLD MARKETS



Mohamad Shalan Hassan: “At the end of the day, you want a car to be cheap and marketable all over the world. For that to happen, every vendor involved in the supply chain for that car must have achieved economies of scale, and their products must meet international standards and regulations.”

“It’s called homologation, whereby we test components and parts according to international guidelines such as those of the WP.29 (World Forum for Harmonization of Vehicle Regulations) and ECE (Economic Commission for Europe),” explains Shalan. “If a vendor can meet or exceed these stringent standards, then he is ready to compete abroad.”

THE VOLUME GAME

Let’s say a local carmaker would like to start exporting one of its sedans to Europe. Naturally, the vehicle and all its components would have to meet EEC/ ECE regulations. This means that the vendors supplying the components of that sedan – say, its headlamps or its seatbelts – are thus ready to become suppliers to other cars sold in Europe, too.

“I hope to one day see the names of Malaysian companies on the headlamps of Japanese and Continental cars, because that would be the ultimate endorsement of our capabilities and quality,” says Shalan. “The opportunity is there. The challenge is in being able to meet the volume that markets demand, which is not easy to do if you are small.”

Volume is a big deal in the automotive industry, because without it, a company cannot hope to achieve the economies of scale it needs to in order to benefit from falling unit costs. Even if a vendor meets the aforementioned international quality standards, without a critical volume, its prices will not be competitive enough to attract customers.

Shalan draws upon the example of Thailand’s automotive sector, where vendors are able to offer their products at cheap prices because they are already producing their goods in large volumes. However, Malaysia does not have enough volume to support vendors for international growth.

“At the end of the day, you want a car to be cheap and marketable all over the world,” says Shalan. “For that to happen, every vendor involved in the supply chain for that car must have achieved economies of scale, and their products must meet international standards and regulations.”

The Automotive Engineering Centre is also envisioned to become a hub for automotive testing and compliance – the automotive sector is practically crying out for an independent third-party testing facility. The reason for this is that although automotive components themselves are generally above suspicion in terms of quality, there is not much testing done with regards to the overall performance of the system. The brake system, for example, consists of up to a dozen separate parts and components, and in theory, all these parts are supposed to work well together. But do they?

“We have to test the system as a whole to ensure that all those components perform properly under real-world conditions,” says Shalan. “This will likely mean designing a series of tests for public transport vehicles to ensure their roadworthiness.”

OPPORTUNITIES ABOUND

Shalan would also like to see Malaysia move up the value chain in the automotive sector by taking a more active role in the design and engineering of higher-value parts and components such as engines and transmission systems. Currently, the only locally-developed engine Malaysia has to its

name is Proton's Campro. Yet even then, the transmission system for the engine still comes from Japan.

"Plastic parts and components are common and present no real value in terms of intellectual property," says Shalan. "If Malaysia can start developing our own capacity for engine and transmission design and development, we'll be able to stimulate a lot of job opportunities for high-income professionals in the automotive sector."

The local automotive sector also needs to move away from its current labour-intensive manufacturing environment and adopt industrial automation solutions such as robotics and intelligent systems for its production lines. Vendors that rely on foreign labour will find it hard to achieve economies of scale, even if they move their production facilities to other countries. Also, automated production systems generally meet quality standards more consistently than manual production systems.

"The market is flooded with imported sub-standard automotive components and parts," complains Shalan. "If we adopt formal regulations like Europe and force manufacturers to comply with those standards before they were allowed into our markets, then our local consumers would be protected against those sub-standard products."

In addition to protecting local consumers, such a move would also force local vendors to meet those stringent standards, which will in turn give them a significant competitive edge against those sub-standard manufacturers in world markets abroad.

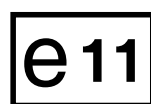
Naturally, new technology will affect any locally-developed standard, and what is an optional component today may become a mandatory requirement tomorrow. It will be SIRIM's job to keep up with these standards and the growing complexity of regulations and ensure that its customers are aware of the changes to come. ☺

"E" MARKS EXPLAINED



The uppercase "E" mark is based on regulations issued by the Economic Commission for Europe (ECE). The ECE is an organisational part of the UN and its members are EU countries and many others. Therefore, the acceptance of approved components is much broader, especially in the eastern part of Europe. Because the application is not mandatory for these countries, it is necessary to confirm whether a particular country has accepted (signed) the application of an ECE-regulation.

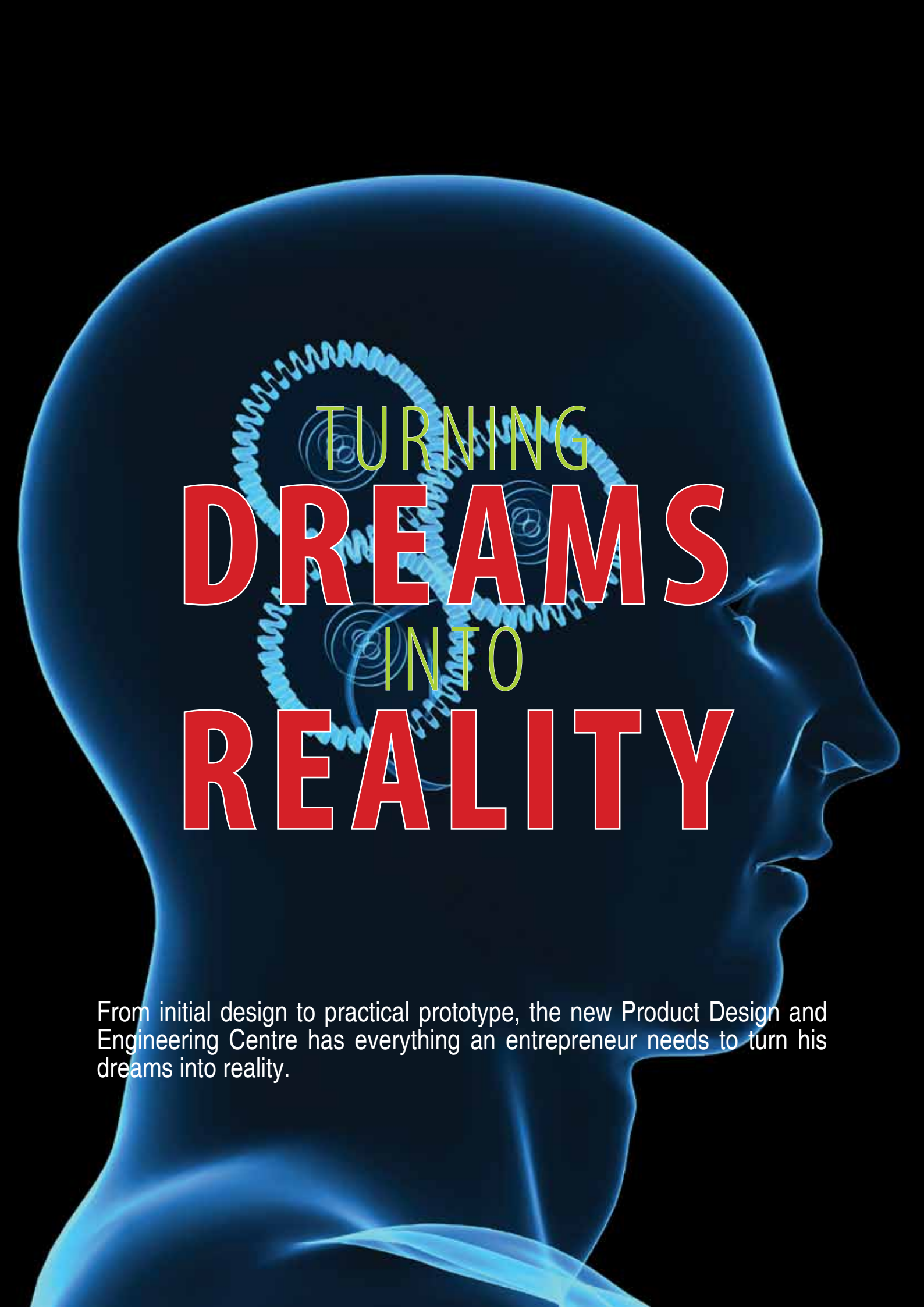
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E9 Spain	E27 Slovakia	E50 Malta
E10 Serbia	E28 Belarus	E51 Korea
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E13 Luxembourg	E32 - Latvia	E56 Montenegro
E14 Switzerland	E 34 Bulgaria	E58 Tunisia
E16 Norway	E36 Lithuania	
E17 Finland	E37 Turkey	
E18 Denmark	E39 Azerbaijan	



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The lowercase "e" mark is the proof of compliance with directives (laws) required by the European Union. The Council of European communities in Brussels issues these directives and all members must accept approved products.

e1 Germany	e9 Spain	e18 Denmark
e2 France	e11 United Kingdom	e21 Portugal
e3 Italy	e12 Austria	e23 Greece
e4 Netherlands	e13 Luxembourg	e1RL Ireland
e5 Sweden	e17 Finland	
e6 Belgium		



TURNING
DREAMS
INTO
REALITY

From initial design to practical prototype, the new Product Design and Engineering Centre has everything an entrepreneur needs to turn his dreams into reality.

TAKE A LOOK AROUND THE ROOM you are in and choose an innovative product you like. It might be an LCD picture frame or decorative ceiling fan, or even the ergonomic chair you are sitting on. Maybe it's the funky desk lamp on your table, or the thumbprint security scanner outside your door. Choose anything, and then imagine what that product looked like before it was a product. Imagine it as some vague concept in an entrepreneur's head, before it took shape and form.

How did the idea get transformed into the final product?

That, in a nutshell, is what the Product Design and Engineering Centre is all about: turning ideas and innovations into finished products. It helps SMEs in particular through all three stages of product development: product design, engineering and prototyping, before putting them on the road to commercialisation.

"Sometimes entrepreneurs have good ideas, but lack the practical know-how to translate those ideas into products," says Azim Ng Abdullah, Senior General Manager of the Product Design and Engineering (PD&E) Centre. "That's where we come in."

The PD&E Centre offers three programmes that customers will find useful, depending upon which stage of product development they are at. The first of these programmes is Product Design, in which products and innovations are first conceptualised and then 'sketched out on paper', so to speak. It also considers practical matters such as packaging and graphics communication.

"Packaging is very important in today's business environment," adds Azim. "A good product with poor packaging will not fare much better than a bad product in today's marketplace."

Once the initial product design is complete, it must be tested to ensure that it is viable from an engineering perspective. This is where the second programme in the product development lifecycle

comes in: Design Engineering, in which the product concepts are simulated and tested with advanced computer-aided design (CAD) tools. Engineers also use computer-aided manufacturing (CAM) tools to design the manufacturing processes that must be used in order to make a product on a mass scale.

Advanced CAD/CAM tools such as those used at SIRIM give entrepreneurs a three-dimensional virtual representation of the product. They also help engineers decide upon the possible materials that may be used to make the product, which in turn will help entrepreneurs estimate their production costs with different types of metals or plastic. If a product is intended for a specific high-tech application, the engineers may also consult with researchers at SIRIM's Advanced Materials Research Centre in Kulim.

"By testing the virtual product against different parameters such as stress, temperature, humidity and pressure, the engineers are given the data they need to judge whether a product design is viable or not from an engineering standpoint," explains Azim. "If a product fails the design engineering test, then it goes back to the drawing board."

RAPID PROTOTYPING

If the product concept passes the engineering test, however, then the engineers at the PD&E Centre need only feed the data into a machine and voila! – out comes a thermoplastic prototype of the product.

It's called rapid prototyping: a technology that first became available in the late 1980s and which is now used in practically every industry to quickly churn out product prototypes, often in less than twenty-four hours.

"Rapid prototyping is a very convenient technology in that sense," Azim says. "Engineers used to have to manually make prototypes from rubber, plastic and glue. These days, technology does almost everything – all you have to do is know what data to feed into the machine." >>

TURNING DREAMS INTO REALITY

Another exciting application of 3D modelling and reconstruction technology is reverse engineering, whereby products are first 'photographed' using 3D scanning technologies and then reconstructed as virtual 3D models. It is useful for entrepreneurs who want to make an innovation based on an existing product – all they have to do is bring the product to SIRIM, and the CAD/CAM engineers will do the rest.



Azim Ng: "Sometimes all an entrepreneur has for inspiration is a coffee mug. By reverse engineering that coffee mug, we can take a short-cut towards a 3D model of his vision, upon which we can build his innovative idea."

"For example: sometimes all an entrepreneur has for inspiration is a coffee mug," explains Azim. "By reverse engineering the coffee mug, we can take a short-cut towards a 3D model of his vision, upon which we can build his innovative idea. After that, it's simply a matter of prototyping."

Naturally, rapid prototyping is the busiest department in PD&E. The team's core focus, however, is biomedical devices.

"We use rapid prototyping technology to create 3D models of patients' deformations from CAT scans and MRI data," explains Azim. "The doctors and surgeons can then use these models to help plan the surgery and design the biomedical implant."

Most of the requests SIRIM receives in this area are for craniofacial reconstruction and preoperative

planning in neurosurgery. In each case, the implant produced is specific to only one patient as the model is designed to suit his or her unique shape and configuration.

Nonetheless, doctors generally agree that the three-dimensional bio-models greatly improve and simplify the entire process of designing and fabricating prosthetic implants.

"By blending rapid prototyping, CAD/CAM tools and biomedical engineering, you can produce implants that closely match patients' unique structural requirements," Azim enthuses.

PLANT DESIGN AND ENGINEERING

The third programme under the PD&E Centre is Plant Design, in which plant designers study the way a product is to be built before recommending the manufacturing processes to be used. The Plant Design team's current focus is in waste water treatment and other biotechnological processes for producing detergents,

bioplastics and bioreactors. However, Azim hopes to widen the scope of their work to other areas of industrial manufacturing.

The job of a plant design team is to first study a product's requirements and then design a plant to produce that product on a mass scale. They can tell an entrepreneur how much floor space the plant will need, what machinery to use, how much energy the plant will require, what automation options are available and other critical process parameters to be followed. The team will also recommend the quality and safety standards the entrepreneur should employ to ensure that his product meets the industry's requirements.

"Besides the usual ISO 9001 and 14001 certifications, some industries require additional special standards," Azim says. "In pharmaceuticals and cosmetics, for example, the minimum industry

INSIDE A GMP PLANT

SIRIM's GMP Plant in Shah Alam is a model of Good Manufacturing Practice and is used by several start-up companies at SIRIM to produce their goods. According to Subaham Shaik Maidin, Senior Research Assistant, the plant consists of two general areas: the White Area, and the Grey Area.

"The White Area is the sterile environment, whereas the Grey Area is on the plant perimeter and is used by other personnel," says Subaham. "The two areas are separated by a buffer space. Personnel who are entering the White Area are required to wear special attire such as masks and gloves."

Inspectors from the Ministry of Health regularly conduct surprise visits on GMP plants. They look for everything from leaky air-conditioning ducts to chipped floor paint, and are ever-ready to issue non-compliance warnings. One of the basic principles of GMP is that Batch Manufacturing Records be kept to support a system for recalling any batch of products from sale or supply.



Subaham Shaik Maidin: "If there is a defect or complaint for a product, then we can trace it back to the Batch Manufacturing Record."

"The Batch Manufacturing Record or BMR tells you what shipment of raw materials was used for which batch of products, and what processes or procedures were used to produce them," says Subaham, "Each batch is given a unique Batch Number, so that if there is a defect or complaint, then we can trace it back to the BMR and investigate the source of the problem."

standard is a GMP (Good Manufacturing Practice) quality system."

According to Azim, SIRIM has received a lot of requests from industry to provide guidance on how to set up a GMP plant. Such plants must follow stringent procedures to ensure that foreign particles do not contaminate the production process (see sidebar, Inside a GMP Plant).

"Several start-up companies are already using SIRIM's pilot GMP plant to produce their bioproducts," Azim adds. "We work very closely with them to identify potential problem areas early on and thereby improve upon the product."

SIRIM's other pilot plants are all a direct result of SIRIM's research programmes. The waste water treatment plant, for example, is a fully-automated system which sends text messages to the operator's mobile phone whenever the level of effluents rises

above a certain level. The demonstration plant in Shah Alam is fully operational, as are the other pilot plants for producing biodetergents and bioplastics.

"We think that there is a definite demand for these products on the market, and so these are our focus areas," says Azim. "We have already identified them as being commercially viable technologies. Now we need entrepreneurs to come forward and turn them into real businesses."

Ultimately, of course, that is Azim's benchmark of success: to see small businesses become stable enterprises.

"My personal vision for the Product Design and Engineering Centre is to see industry served," adds Azim. "If we can do that, then I consider it a success – after all, isn't that what SIRIM is here for, once you really come down to it?"

AUTOMATION



Although automation is a ruthlessly efficient way to leapfrog your competitors, it is also a very complex undertaking that requires both business and technical expertise to be properly implemented. Fortunately, the Advanced Automation and RFID Centre at SIRIM can provide its customers with just that.

THE MALAYSIAN GOVERNMENT has long been a keen advocate of automation, which is not surprising considering its many benefits: reduced operational costs, repeatability, flexibility, waste reduction, integration with other technical and business systems, improved product quality and higher productivity. If a machine can accomplish the same tasks that previously required six men, a business saves on wages. And since a machine does not tire easily, it can work long hours without having to be paid overtime.

Furthermore, because a machine rarely makes mistakes, the manufacturing process is generally much more efficient and produces fewer defects.

Sadly, while many manufacturers recognise the benefits of automation, they are reluctant to risk the high capital investments necessary to fully-automate their business processes.

“Many businesses already automate some part of their business or the other, which is good, but not good enough,” explains Dr Wan Abdul Rahman Jauhari, Senior General Manager of SIRIM’s Advanced Automation and RFID Centre. “In order to realise the full benefits of automation, you have to look at the whole manufacturing value chain – from product design to distribution.”

The problem, as Dr Wan sees it, is that business people often view full automation as an unnecessary

AT WORK



risk. They know that unless they take the next step and become big producers, they will find it hard to realise a return on their investment into such expensive machines and systems. Such short-sightedness often blights their chances of long-term success, as the gains from automation will translate into long term real savings for the business.

“Some businesses prefer to try and get by on cheap manual labour, because such labour can be hired and fired in response to volatile market conditions,” Dr Wan says. “Sadly, manual processes often result in high defect rates and poor quality products, which can affect the business’s long-term prospects. Automating systems greatly reduces the need for human sensory and mental requirements.”

FLEXIBLE ROBOTS

A business that fails to embrace automation will also find it hard to innovate on its product lines, because automation enables innovation in ways never before possible. A robot can be told to change what it does at any time. All you have to do is modify the set of instructions it is programmed to follow, and (in theory, at least) the same robot that puts nuts on candy today can be used to make toys tomorrow.

Take miniaturisation, for example: no human hand can solder, sew, paint or screw anything at dimensions of less than one centimetre for long, because it would simply get too tired. Such >>

AUTOMATION AT WORK

precise tasks can only be accomplished efficiently by fully-automated robotics technology, allowing you to build more features into your product in significantly less time. Manufacturers that do not implement the technology to do these things will lose their competitiveness and eventually be put out of business by competitors that do.

Unfortunately, businesses that are keen on automation are often bewildered by the sheer range of possibilities out there. There are so many machines on the market, and so many ways to put them together. Every manufacturer touts his system as being the best, and with no independent advisor to turn to, businesses often abandon the idea before they get started.

“At SIRIM, we take a more holistic view of things,” explains Dr Wan. “We look at the entire manufacturing value chain, from design to process automation to material handling, and then we tell our customers what we think is best for them.”

Yet SIRIM is not a machine manufacturer in itself. Rather, Dr Wan likes to think of the Advanced Automation and RFID Centre as a systems integrator – their task is to know what technologies are available on the market, see how they can be applied, and then put them all together. Sometimes, ready-made machines may be purchased and used in a process straightaway with little or no customisation. More often than not, however, an expert will need to assess how the

machine fits into the entire manufacturing process and whether it is suitable or not.

“Foreign machines are sometimes only suited to the environments for which they were designed for, which can make them incompatible with local industry conditions,” says Dr Wan. “Of course, no sales person is going to tell you that, which is where we come in – we can help businesses decide what machines are most likely to fit their needs without pressuring them into making a purchase decision one way or another.”

Of course, if such a machine does not exist, then SIRIM’s engineers will have to invent it themselves. One of the Centre’s recent successes is the creation of a semi-automatic loom for a community of hand-weavers in Pahang. Although the machine cannot reproduce the more intricate brocade patterns that still require the skill and art of traditional hand-loomers, it can nonetheless weave basic fabric designs. The concept was a big hit when it was launched to the community who welcomed it as a way to mass-produce some of the cheaper types of brocade cloth they sell.

“There is a common misconception that robotics technology is only useful in high-tech applications within the automotive or electronics sectors, but that is not true,” says Dr Wan. “Robotics are useful for any process in which there is a repetitive task, from placing a peanut onto a chocolate candy to sewing up a packet of crisps.”

MASTERS OF AUTOMATION

Senior Researcher Al Malek Faisal Mohd Amin (picture) and his team won a Bronze Medal for the “Generic Microcontroller Training Kit” at the recently concluded Malaysia Technology Expo (MTE) 2010. The kit offers electrical engineers a way to speed up the design and testing process when developing applications. Typically, this process would require a lot of messy wiring and cables. With the kit developed by Al Malek’s team, however, engineers need only plug the module they want to experiment with into the slots provided.

The project team members were Mohd Suhaimi Abd Wahab, Khairul Fatiah Md Yunos, Mohd Azam Shah Abd Hamin and Bolhi Bordi.



AUTOMATED FARMING

Given today's highly competitive business environment, SIRIM wants to take the initiative in automation and push industry towards the next level. One of the industries it is actively looking at helping is agriculture.

“There are many agricultural processes that can be automated,” says Dr Wan. “We can develop ways to harvest crops, process them and centrally manage a farm's irrigation requirements. We can also apply RFID technology to manage inventory, distribution and packaging.”

Radio Frequency Identification (RFID) is widely-recognised as a leading technology for tracking and identification security. But because RFID chips and readers are manufactured worldwide, there are many competing proprietary technologies, each requiring their own set of hardware.

SIRIM would like to develop a more universal infrastructure for local industry and establish a point of reference for local RFID applications. These plans include setting up an RFID testing facility, which will be used to verify RFID-based products to ensure that they meet required standards and specifications. The facility will also help exporting businesses ensure that their RFID chips meet the specifications that overseas authorities and customers require.



Dr Wan Abdul Rahman Jauhari: “Automation is useful for any process in which there is a repetitive task, from placing a peanut onto a chocolate candy to sealing up a packet of crisps.”

Engineers at the Advanced Automation and RFID Centre are also working with SIRIM's Industrial Biotechnology Centre to develop biosensors that may be used to detect water alkalinity at fish farms. SIRIM has also developed a sensor for measuring the ripeness of oil palm fruits at harvesting, thereby reducing the industry's demand for human visual inspectors – all very clever, yes. But also very efficient.

“Many people think that automation is about gadgets, but it isn't,” says Dr Wan. “Automation is about improving processes and maximising efficiency. All businesses can gain from those things.”

Noraishah Shamsudin also led her team of Nor Azlina Muslim, Rahimi Alrozi, Dzurliza Ahmad and Borhanudin Md Yusof to a bronze medal at MTE 2010. Their spiral-typed RFID antenna offers remarkable advantages over conventional antennas. It is not only smaller but can also send signals over longer distances, making it exceptionally useful for mobile applications.

The team demonstrated one such mobile application by combining their antenna with an HF reader prototype (also developed by SIRIM) to create a mobile Drug Authentication System (picture). The system can be used to scan and cross-reference RFID-tagged drugs



against the MAL database and may easily be replicated to manage assets, too.

MOVING UP

THE VALUE CHAIN

The newly-established Engineering Consulting Centre at SIRIM hopes to move up the engineering value chain by offering higher value-add services to niche industries and markets.

FROM AUTOMOBILES TO OIL pipelines to souvenirs, the applications of metal within modern industry are too numerous to count. It thus should come as no surprise to learn that nearly all the metal-working departments in SIRIM have been brought under one roof in the Engineering Consulting Centre.

“The restructuring is timely as it brings the commercial aspect of the Centre’s activities into sharp focus,” says Dr Samsudin Bani, General Manager of the Engineering Consulting Centre. “We want to revolutionise the way these departments work and turn this Centre into a viable business entity.”

The five technology areas that Dr Samsudin is talking about are Joining Technology (both metal and non-metal), Non-Destructive Testing (NDT), Failure Investigation, Foundry Technology (forging and casting) and Tooling Technology (moulds and dies, precision machinery and fabrication). By creating synergies among these five areas, the Centre will be able to offer end-to-end metalworks solutions from product design and fabrication to advanced non-destructive testing and inspection services.

“Our focus will be on delivering consultation and advisory services, prototype and fabrication services, trial productions, engineering inspection, evaluation

and analysis, all within these five technology areas,” elaborates Dr Samsudin.

The question is, how?

ENGINEERING SYNERGY

It is no coincidence that the five technology areas under the Engineering Consulting Centre all have something to do with metal, of course. The new structure is a deliberate move to explore possible synergies among these areas, and Dr Samsudin believes that although the technologies are different, they nonetheless complement each other in specific ways.

“The foundry and tooling technology technicians are both involved in product design, casting and machining,” explains Dr Samsudin. “Our NDT and failure investigation processes can help ensure the quality and the root cause of any defective structures or parts of those designs during their production and fabrication as well as in-service.”

That synergy will extend across the rest of the Design and Engineering Division, too, as the services provided in the Engineering and Consulting Centre will no doubt prove invaluable to the metal-intensive work in the Automotive Engineering Centre and Advanced Automation Centre.

“The NDT and failure investigation processes will provide the analysis and recommendations that customers need in order to improve the quality and safety of their products and processes,” explains Dr Samsudin, who was once Programme Head of the Joining Technology and Inspection Programme. “With our advice, they can eliminate their product defects sooner and accelerate their time to market.”

A CLASS ABOVE THE REST

The NDT and failure investigation programmes at SIRIM are among the company’s most successful programmes commercially. Although also an NDT service provider, SIRIM is nonetheless obliged to act as a training centre for new NDT technicians to ensure that the needs of industry are met – qualified NDT technicians are in very high-demand, and there are simply not enough technicians out there to do the work.

“Our failure investigation and analysis services are very much favoured by the oil and gas sector,” Dr Samsudin says. “This is due to our impartiality, independence and professional reporting. Furthermore, our NDT and Failure Investigation laboratories are ISO 17025 certified by Suruhanjaya Akreditasi Makmal Malaysia (also known as SAMM).”



MARK OF DISTINCTION: SIRIM is the only AWS-accredited test facility in the Asia-Pacific region.

SIRIM’s engineering centre is the only test facility in the Asia-Pacific region that is accredited by the American Welding Society (AWS). It boasts an impressive track record and is the preferred partner of global oil and gas conglomerates such as Schlumberger, Petronas and Shell. Such

international recognition does not come easy. Yet Dr Samsudin still wants to do more.

Once content to just get by on a few exclusive deals with major oil and gas industry partners, the Centre now aims to consolidate its resources and move up the value chain within its target markets in construction, manufacturing, fabrication and more. Dr Samsudin intends to change the way the Engineering Consulting Centre does business and leverage its track record and expertise in a way that only SIRIM can: by becoming the NDT and failure investigation industry benchmark.



Dr Samsudin: “SIRIM is the industry benchmark in welding technology in Malaysia”

“The American Welding Society (AWS) is the world centre of excellence in welding technology, and our welding personnel possess international certifications that far outweigh those of any other service provider in the country,” says Dr Samsudin. “All we have to do is put these qualifications to good use. We must make sure that our customers are aware that SIRIM is the industry benchmark in welding technology in Malaysia.”

What this means for the Centre’s customers is better service and more useful reports. Because SIRIM’s technical evaluations are recognised internationally, customers will find it easier to use their reports when negotiating globally. Furthermore, whereas other service providers are only able to tell you what is wrong with your welding or materials, SIRIM’s engineers are qualified to actually make recommendations about what you can do to fix those defects.

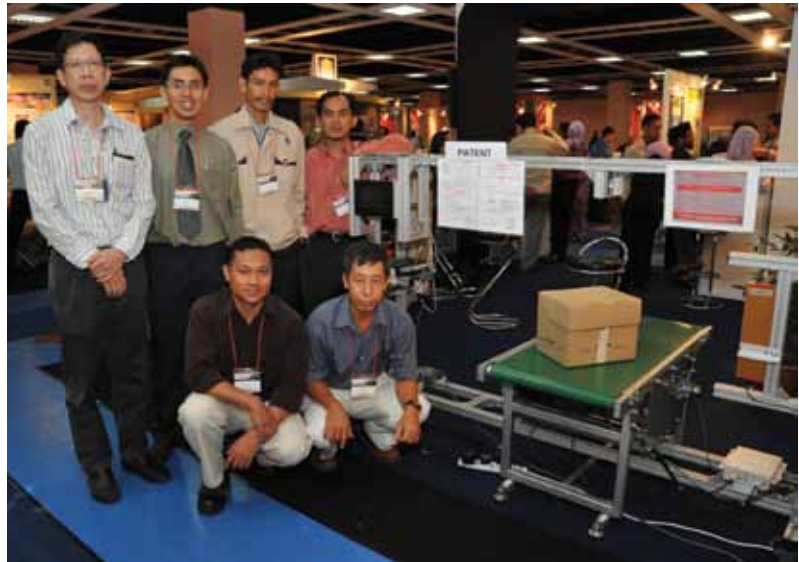
“We don’t want to just tell our customers whether they pass or fail – I don’t think that is of much value in the real world,” Dr Samsudin elaborates. “We want to be able to tell them what is wrong and how to fix it, too – that is what service should be all about.”

Six SIRIM projects win medals at the Malaysia Technology Expo 2010

Researchers shine at the ninth MTE with innovative inventions and intelligent applications.

ONCE AGAIN, SIRIM researchers walked tall with six medals at the prestigious Malaysia Technology Expo (MTE 2010) in February 2010. It was the Expo's ninth anniversary, and the theme "Driving Innovation Towards Commercialisation" resulted in a wealth of new ideas and inventions with more than 800 inventions.

SIRIM identified six innovative projects for the event and all the projects received a medal – three silver and three bronze. The winning projects are:



Goh Peng San (far left) with his team members showing off their winning project at the expo.

Silver Awards:

"Automated Volumetric Scanning and Weighing Machine"

A Volumetric Scanning and Weighing Machine for use in freight forwarding operations. The automated volumetric measurement is accomplished with patent

pending volumetric detection system comprising of an ultrasonic sensor, two laser sensors, a conveying system and a microcontroller. The project was led by Goh Peng San with team members Gooi Chye Seong, Mohd Rafedin Rakiman, Fazal Redza Abd Radzak, Shaifull Azhar Othman, Nor Hidayaty Mohd Nor and Goh Eng San.



Dr Mohamad Zahid Abdul Malek with his winning project.

"Photopatternable Hybrid Organic-inorganic Sol-gel Materials for Planar Optical Waveguide Applications"

To produce planar circuitary technology based on synthesis hybrid organic-inorganic sol-gel materials for photopatternable techniques. The project was led by Dr Mohamad Zahid Abdul Malek with team members Mat Tarmizi Zainuddin, Nik Mohd Azmi Nik Abdul Aziz, Hasrina Hashim, Samsul Azrolsani Abdul Aziz Nazri and Dr Aishah Isnin.

“Potential Applications of Waste Rubber as a Binder In Metal Injection Moulding”

A waste rubber binder-system for use in injection moulding of metal powders with a hope that it will be developed to replace conventional binder systems. The project was led by Istikamah Subuki, Dr Mohd Afian Omar, Dr Hanafi Ismail, Muner Taha, Norsyakira Abdullah and Fauzi Ismail.

Bronze Awards:

“Improved HF Antenna Design for Wireless Authentication”

Spiral-typed antenna for use with the HF reader prototype (also developed by SIRIM) for handled applications. The project was led by Noraishah Shamsudin with team members Nor Azlina Muslim, Rahimi Alrozi, Dzurliza Ahmad and Borhanudin Md Yusof.

“Generic Microcontroller Training Kit”

A way for engineers to speed up the design and testing process when developing applications while integrating different modules into one. The project was led by Al Malek Faisal Mohd Amin with team members Mohd Suhaimi Abd Wahab, Khairul Fatiah Md Yunos, Mohd Azam Shah Abd Hamid and Bolhi Bordin.

“Palm-based Flux for Binary and Ternary Lead-free Solder Alloys”

A new flux formulation for preparing lead-free solder pastes which are either binary or ternary alloy in nature. The project was led by Mohd Amin Hashim with team members Dr Aishah Isnin, Nur Shuhada Shaari, Nor Adhila Mohammad and Wedianti Shualdi.



Team leader Istikamah Subuki (far left) with the silver medal-winning waste rubber binder-system.



Senior Researcher Al Malek Faisal Mohd Amin (far right) explaining how the Generic Microcontroller Training Kit works.



SIRIM's researcher explaining the benefits of Palm-based Flux for Binary and Ternary Lead-free Solder Alloys.

SIRIM appoints SPAN as standards writing organisation

THE NATIONAL WATER SERVICES Commission (SPAN) was appointed as a Standards Writing Organisation (SWO) by SIRIM Berhad earlier this year to prepare and develop standards related to sewerage works, equipment and systems in Malaysia.

With the signing, SPAN became the sixteenth organisation appointed as an SWO in the country in SIRIM's bid to develop more standards in various fields for the local industry. SIRIM was represented by its President and Chief Executive, YBhg. Ir. Hj. Yahaya Ahmad who met with SPAN's Chief Executive Officer, Dato' Teo Yen Hua at the signing ceremony held at SIRIM's headquarters.

Standards are considered strategic national tools that can be used to determine the necessary requirements of safety, quality and even environmental protection in the country. As an SWO, SPAN will assist in preparing standards related to planning and design functions of sewerage works, construction, installation,



YBhg. Ir. Hj. Yahaya (right), President and Chief Executive of SIRIM Berhad signing the MoU with Dato' Teo Yen Hua (left), CEO of SPAN.

operation and maintenance, and also testing and commissioning of sewerage equipment and systems.

“We hope that the scope of appointment will be extended in the future to include other areas where SPAN has the expertise,” said Ir. Hj. Yahaya Ahmad at the ceremony. “We need more standards in order to support the national development agenda.”

SIRIM@Scomi Day

SCOMI ENGINEERING AND SIRIM shared a day of Q&A together in March this year as the two companies explored avenues of possible cooperation and development. The idea for the event came about after SCOMI Engineering Berhad's President and CEO, Syahrudin Bin Samsuddin paid a courtesy call to SIRIM earlier this year.

The event kicked off with a speech by YBhg. Ir. Hj. Yahaya Ahmad, President and Chief Executive of SIRIM who led SIRIM's entourage to SCOMI's plant in Rawang. This was followed by a word from Syahrudin Samsudin, President of SCOMI Engineering, after which came a presentation on SCOMI by Jonathan Lentell. SIRIM's entourage was then taken on a tour of SCOMI's coach and rail manufacturing facilities.



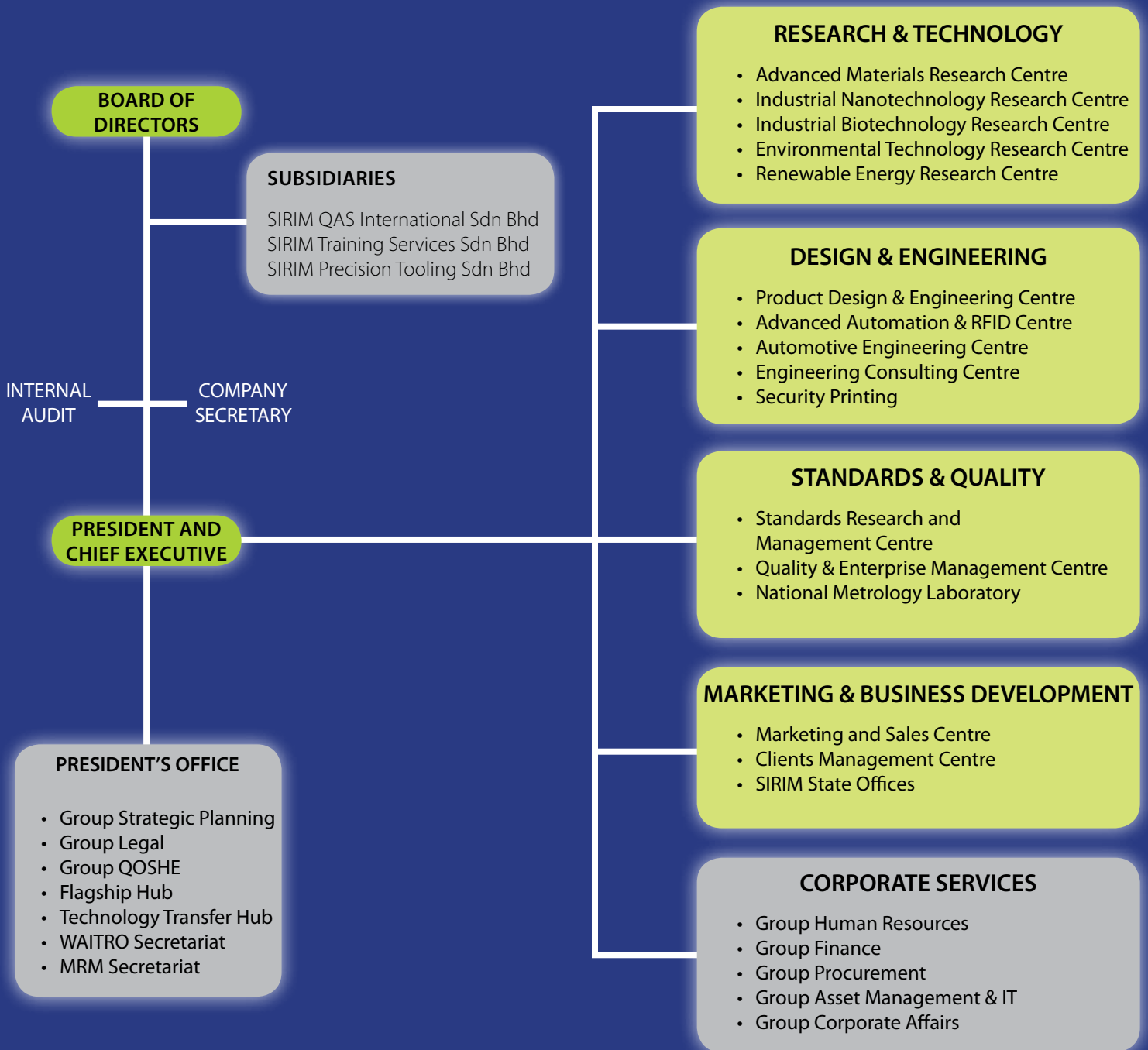
Dr Surani Buniran (left), Head of the Electrochemical Materials Programme at SIRIM explaining SIRIM's research and products to SCOMI officers while Zurina Mohd Bistari (right), General Manager of SIRIM's Clients Management Centre looks on.

SIRIM was honoured to have the opportunity to present its activities and services in R&D, Design Engineering, Standards, Quality, Testing Services and the Automotive Engineering Centre. This was followed by discussions in which both companies explored areas of mutual cooperation.

THE ALL NEW

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◀ **17 December 2009** – Participants from the 25th Asia Pacific Metrology Programme (APMP) General Assembly 2009 being briefed on the facilities at the National Metrology Laboratory. A total of 260 participants from technical institutions from around the world took part in the APMP.



◀ **8 February 2010** – President and Chief Executive of SIRIM Berhad, YBhg. Ir. Hj. Yahaya Ahmad (left) presenting the MS ISO 9001:2008 certificate for Quality Management System to DYMM Sultan of Selangor, Sultan Sharafuddin Idris Shah at Istana Alam Shah in Klang. Istana Alam Shah is the first palace office in the country to receive the certification for the management of the Sultan's gourmets, the administration of the palace and the management of the palace's customs.



▲ **12 January 2010** – Home Minister, YB Datuk Seri Hishamuddin Hussein (right) receiving the MS ISO 9001:2008 certificate from President and Chief Executive of SIRIM Berhad, YBhg. Ir. Hj. Yahaya Ahmad, for the Malaysian Prisons Department in Putrajaya. The Quality Management System certification is for the management for short and long-term incarceration from registration to release of prisoners.



▲ **19 January 2010** – Participants listening to a talk at the Nanotechnology Roadmap Planning Workshop at the Grand Blue Wave Hotel, Shah Alam. The workshop was held to gather information and ideas as SIRIM has positioned itself as the Centre of Excellence in Nanotechnology.



▲ **26 January 2010** – Vice President, Research and Technology Development Division, Dr. Zainal Abidin Mohd Yusof (second from right) briefing the delegation from Universitas Hassanuddin, Makassar, Sulawesi, Indonesia who are interested in collaborating with SIRIM on the development of seaweed, tissue culture, sago, wild honey and entrepreneur development.




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