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Answers for South Africa.

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Will we be protected by infrastructure spending in 2009?

There is a growing body of hopeful people who are predicting that South Africa's economy will be protected from a serious recession by the major infrastructure spending programmes from government, which will inject R787-billion into the economy over the next three years.

These optimists might well be right and I personally hope that they are because South Africa certainly needs to stimulate economic growth and improve its job creation programmes as rapidly as possible. There is a likelihood, too, that the Monetary Policy Committee may meet sooner than scheduled and agree to drop interest rates by a further 100 basis points to boost economic activity immediately.

However, I don't share the views of these optimists, primarily because the enormous infrastructure spending has little consequence for the man-in-the-street or the smaller specialist consultants and engineers who rely on various smaller projects to sustain a living.

If we look at the economic picture in more realistic terms, I think that we are facing the threat of a sustained recession and I put part of the blame for this squarely at the doors of the finance companies and banks that have extended easy credit to thousands of people in spite of the National Credit Act. In fact, some of the credit agreements were rushed through ahead of the promulgation of this new act purely so that the funding could be obtained.

When we consider, for instance, that ABSA has made a provision of R4,8-billion for bad debts (for the year ending December 2008) then it's clear that this group believes that many, many South Africans will be unable to meet their commitments. The provision comes at a time when the full impact of the global economic crisis has not yet reached South Africa.

Add to this the fact that about 7 000 vehicles a month are currently being repossessed and that summonses have increased by 24 percent and it's soon evident that deeply-indebted South Africans are battling to survive.

We know that the automotive industry is retrenching staff rapidly and that automotive component manufacturers have called on government to provide them with some support to prevent bankruptcies and further job losses.

In the face of these developments, I think that we are all in danger of deluding ourselves into believing that we need not be overly concerned about the economic outlook for the year. South Africa might not face the kind of catastrophic retrench programmes being imposed on Asian and European economies but I do think that we need to guard against our own complacency in the naive belief that we will avoid an economic melt-down.

We won't.

The question, therefore, is what can each one of us do to stimulate the economy by being more efficient in the tasks that we perform every day? What can we do to improve our personal productivity and start working smarter rather than harder?

Now is the time to hold back on hefty salary increases, to cut down on personal expenditure levels and reduce debts as rapidly as possible. We also need to accept that economic growth – at least for the next year – is going to be extremely limited.

Just because we have sporting events like the Confederation's Cup and the 2010 World Cup doesn't mean we'll be protected from protracted recession because commodity prices will still decline, orders will still be cancelled, manufacturing volumes will fall even though the rand is likely to drop against the major foreign currencies.

These are some of the realities facing us and while many of you may feel I'm being pessimistic, I believe that it's a realistic reflection of our potential plight.

Now, more than ever, we should guard against the notion that South Africa will not be affected by the global economic crisis. Of course, I hope that I'm wrong and the optimists are right.

And, it's one of the few times in my life when I'll gladly be wrong.

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Dell's releases its pricey touchscreen tablet computer

Dell has launched its new Latitude XT2 convertible tablet PC with multi-touch screen capabilities designed to enhance security, increase performance and extend battery life. The system costs at least R32 000.

Multi-touch capabilities on the Latitude XT2 allow users to use natural gestures like a pinch or tap for scrolling, panning, rotating and zooming, features that are designed to work with productivity applications. Dell's integration of multi-touch screen technology allows customers to use space of the display rather than just the touchpad.

Dell South Africa's brand manager, Llewellyn Chame, claims that the company revolutionised the tablet space by developing the first multi-touch capable product that allows users access to the entire screen. The Latitude XT2 can deliver more performance, security and manageability.

Other features include:

- Just over 11 hours of battery life using a six cell battery with an optional six-cell battery slice .
- Full-size keyboard, touchpad, point stick and battery-free pen.
- High touch accuracy

- Improved connectivity with new LCD-based wireless antenna design.
- Enhanced panel stability.
- SATA drive support.
- DDR3 RAM that can be extended up to 5GB.



Palm Pre – but is it under threat from Apple?

Palm has launched its own touch screen smartphone, dubbed the Pre, and initial reports are that it's probably the best product produced by the company yet. However, Palm may be facing patent lawsuits from Apple because Apple's been granted the patent for touchscreen technology on mobile phones.

According to Palm's Lynn Fox, the company has many of its own fundamental patents in place and this, she says, will prevent Apple from taking the company to court. Apple's chief operating officer, Tim Cook, has been asked if the company will pursue legal action against Palm. He skirted the issue by saying that Apple will "aggressively defend its intellectual property" but would not say

that Palm would be the focus of legal action.

Palm does have some direct connection with Apple because the current research and development head, Jon Rubinstein, played a key role in developing the iPod and other Apple products while working for Steven Jobs' empire.

Since Rubinstein joined Palm he's been responsible for a major reshuffling of all engineering staff and has brought a number of Apple employees across to work for Palm.

It is a pretty powerful smartphone that uses its own product, Synergy, to synchronise information from Microsoft Outlook, Google and Facebook calendars and contacts, provides e-mail service and GPS connectivity, driven through the touch screen interface.

The Pre has 3,1 inch touch screen with 24-bit colour and a physical QWERTY keyboard. It comes pre-loaded with Microsoft Outlook and various messaging systems are integrated into the phone. It provides standard text message and MMS functions and has built-in GPS, a three megapixel camera with flash and an accelerometer for viewing the display horizontally or vertically.

It comes standard with 3G and has Wi-Fi and Bluetooth as well. It has 8 GB of user storage and external USB mass storage support. The phone can be used as a laptop modem and synchronises with desktop or laptop computers through Palm's Touchstone charging dock. The phone weighs just 135 grams.



New BlackBerry touchscreen phone storms into South Africa



The BlackBerry Storm touchscreen smartphone has been launched in South Africa by the manufacturers, Research in Motion (RIM) and cellphone service provider, Vodacom. It has a high resolution display and provides 3G (HSDPA) network support, integrated GPS, desktop-style web pages, advanced multimedia features, a 3,2 megapixel camera and robust messaging capabilities.

The touchscreen uses BlackBerry's SurePress technology to aid in typing and navigation and give users feedback from the screen. The virtual keyboard responds in much the same way as a physical keyboard.

The phone has a built-in accelerometer, which automatically switches the display if the handset is rotated. When in portrait mode, users can type out a quick instant message or dial a number using the SurePress keyboard layout or a 12-key multi-

tap keyboard. A full QWERTY keyboard can be used in landscape mode.

It is pre-loaded with a number of applications including Facebook, Windows Live Messenger, Yahoo Messenger and Vodafone SatNav. It is available to Vodacom's prepaid and contract customers.

Asked about reports from the United States and Europe that the Storm had a number of software problems, RIM's South African representative, Deon Liebenberg, says that this may have been the case with earlier phones released towards the end of last year but all the software issues have been resolved and the South African phones are completely reliable.

There were reports from the United States that RIM had deliberately shipped buggy software in order to meet the launch deadline for the Storm. RIM's chief executive, Jim Balsillie concedes that there had been a lot of pressure on the company to get the phone out on time for the Verizon launch and as a result some of the phones were problematic.

Liebenberg emphasises, however, that any of the software issues that existed in the first shipments of phones have now been completely resolved. Statistics released in the US by Verizon in February indicate that more than a million BlackBerry Storm handsets have been sold since it was launched late last year.

In a separate development, US President Barack Obama has been allowed to keep his BlackBerry smartphone and will be able to use it to keep in touch with senior staff and a small group of personal friends.

He was also given a secure, advanced, high technology personal digital assistant fully loaded with encryption software that was devised by the National Security Agency. Although there has been no announcement on what model he was given, there is some speculation that he will carry a Sectera Edge mobile phone, developed as part of a Defence Department project to build a secure mobile device.

The device can switch from an ordinary mobile phone to a secure communications device at the touch of a button and its screen turns red when it is used in classified mode to signal that it can only communicate with similar handsets.

Apparently RIM's staff worked closely with security officials to make the telephone conversations on Obama's BlackBerry more secure. The major concern about Obama's use of the BlackBerry is that because the phone is in constant touch with the cellphone masts, a hacker could track his whereabouts. This is the primary reason that security officials have been reluctant to let Obama keep using his BlackBerry.

In a further development, Research in Motion has announced that it has done a deal with MTN Rwanda to distribute BlackBerry smartphones in that country, giving users access to e-mail, a mobile phone, Internet and numerous multimedia, business and lifestyle applications.

MTN Rwanda is the first mobile operator to offer the BlackBerry solution in that country and according to Themba Khumalo, chief executive of MTN Rwanda, the phones will greatly enhance productivity in a country that has limited fixed-line services and Internet access.

According to Mark Guibert, vice president corporate marketing for RIM, the Rwandan people will now have access

to a full suite of Internet applications, e-mail and a fully functional business phone. "Rwandans can join the huge family of BlackBerry users worldwide and benefit from the solutions we provide for them," says Guibert.

MTN will offer the BlackBerry Bold and the BlackBerry Curve 8320 smartphones in that country. The Bold provides business users with a high level of functionality and performance that is relatively intuitive for the new users. It supports tri-band HSDP networks and comes with integrated GPS and Wi-Fi.

The BlackBerry Curve 8320 provides users with advanced multimedia capabilities over and above the full functionality of e-mail and messaging services, web browsing and an expandable memory card slot. It has a 3,2-megapixel camera with built-in flash.

For companies, MTN Rwanda is also offering BlackBerry Enterprise Server software so that organisations can manage e-mail servers using any of the options including IBM Lotus Domino, Microsoft Exchange and Novell Groupwise.

According to Khumalo, individuals and small businesses in Rwanda can connect using the BlackBerry Internet Service, which provides users with access to ten supported corporate and personal e-mail accounts from a single device.

Launched in 1994, the MTN Group is a multinational telecommunications group, operating in 21 countries in Africa, Asia and the Middle East and has over 44-million subscribers around the world.



WATTnow

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WATTnow is published monthly by Crown Publications and the South African Institute of Electrical Engineers and it provides a fascinating insight into:

- Technology
- Energy and Electronics
- Science and Research and Development
- New products and interesting gadgets

In addition, WATTnow gives its readers extensive and in-depth coverage on a number of topical issues such as the energy crisis facing South Africa or government's plans to extend the roads network around Gauteng and toll motorists using it.

WATTnow also offers its readers a monthly in-depth article on one of the many fascinating aspects of engineering, ranging from the development of South Africa's nuclear energy capacity to the use of coloured lenses to correct dyslexia.

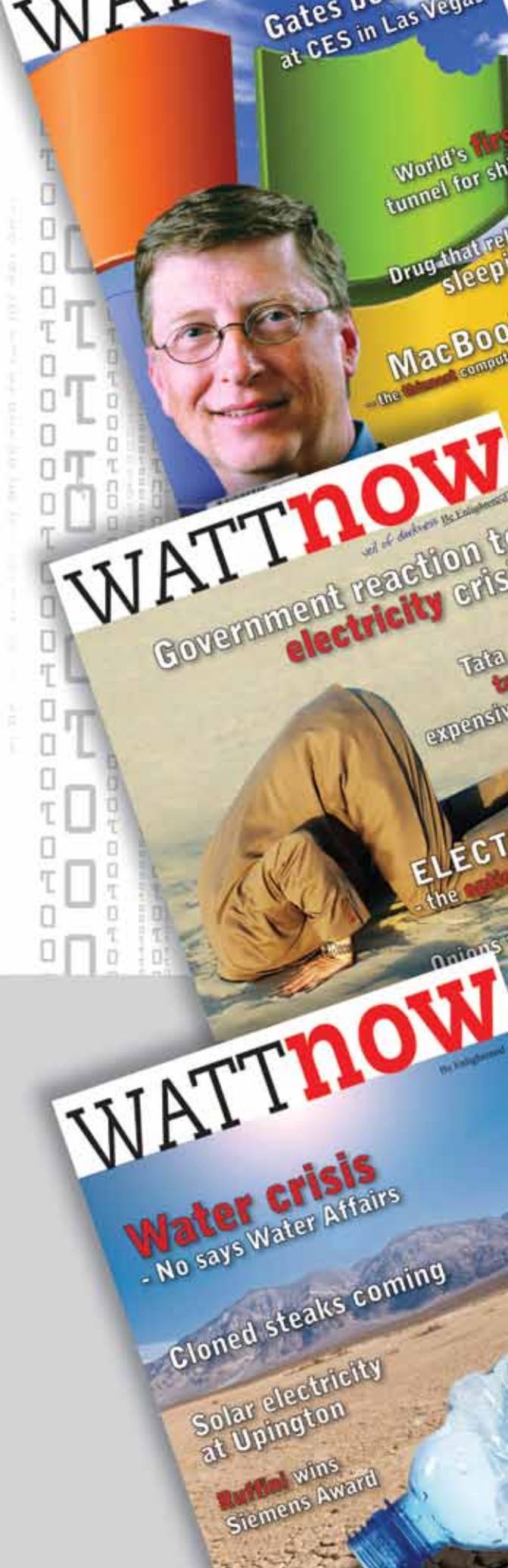
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A television set that's just 3 mm thick - but costs thousands

Sony has launched the world's slimmest television set, which has a screen that's just three millimetres thick and provides extremely crisp and colourful pictures. It is being sold for £3 489 and uses Organic Light Emitting Diodes, a different technology from the hugely popular LCD and plasma models.

Known as the Bravia XEL it has a contrast ratio of about a million to one compared with the ratio on an LCD of about 30 000 to one. Sony unveiled its OLED prototype about a year ago and the television sets are now in production. It is not known when the Bravia XEL will be available in South Africa.

OLED technology has light emitting diodes that emit their own radiance rather than relying on backlighting to illuminate the screen as conventional LCDs do. This means that the blacks on the OLED are pure black rather than dark grey.

Because the technology is extremely fragile and expensive, the biggest available screen size is just 11 inches, equivalent to a small, portable television set. According to Sony's UK representative, Jonathan White, hundreds of

orders for these new sets have already been received from people who are keen on buying and using the latest technology.

But retailers in the UK don't seem as convinced as White is, and say that the 11 inch screen means that the television set – thin and specialised as it is – will appeal to only a few customers. Retailers do see a future for the OLED technology but predict that it will take off in the years ahead when prices drop and screen sizes can be increased.



Now you can be a hero on the Hudson

Even though the US economy might be in a dreadful shape, it does not stop entrepreneurial flare and after the heroics of landing a fully-laden passenger jet in the Hudson River, there are now two new video games available for download.

The first is *Hero on the Hudson* which entices players to emulate the skill of pilot Chesley 'Sully' Sullenberger who became a hero when he executed a smooth emergency landing of his Boeing in the Hudson River, saving the lives of 155 people on board.

According to Kate Connally, spokeswoman for AddictingGames, *Hero on the Hudson* has already been played more than 1,4-million times. Apparently it takes the average user at least three attempts to be able to land the plane on the river.

Once the plane is landed safely, people troop out onto the wings to cheer you as the pilot.

The second game, *Double Bird Strike* is a lot trickier to play, ac-

ording to Scott Roesch, general manager of game creator atom.com. He says it took him at least 12 attempts before he could safely land the plane on the river.

Double Bird Strike has already been tried almost 150 000 times by Internet users and, according to Roesch, the most common players are mothers at home during the day. Before the game can be played, computer users are forced to watch a laundry detergent commercial featuring models on a catwalk.

According to Roesch, one of the most successful online games featured the Republican vice presidential candidate. The game *Go Hunting with Sarah Palin*, recorded 1,6 million tries.



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Solar power panel in Samsung's newest phone

Samsung has launched the world's first touchscreen, solar powered mobile phone that has a built-in solar panel and is designed in the shape of a shiny pebble. The phone, known as Blue Earth, is made from recycled plastic and is equipped with an eco mode that reduces power consumption and gets the most life out of the battery.

A full solar charge will last for between ten and 14 hours, providing talk time of about four hours. The handset can be charged normally using a conventional electricity socket. The solar panel is designed to provide power during use.

It has a built-in pedometer so users can measure how much smaller their carbon footprint is if they walk to a destination rather than drive. The phone was launched at the recent Mobile World Congress held in Barcelona. There is no detail on pricing at this point in time, but indications are that the Blue Earth will fall into the upper end of the mobile phone market.

LG unveiled a prototype of a new solar power device, but the company has not given any details of when or if this unit will be manufactured for the retail market.



Queen's website running but will she start blogging?



British monarch, Queen Elizabeth, who sent her first e-mail message in 1976, has unveiled her new website that allows her subjects to keep track of the royal family using an online map. The revamped

website, www.royal.gov.uk, displays the royals' past and future engagements on an interactive map supplied by Google.

The site has numerous new features including direct links to royal video clips on YouTube, job listings and a new section on the royal animals and pets. In fact, looking through the job listings there are vacancies for trainee butlers whose duties include delivering tea and coffee trays, breakfast trays and newspapers in "an efficient and discreet manner" to the royals.

Queen Elizabeth has yet to start a blog, but the site does have new audio and video footage from the archives and includes her first public speech, broadcast in October 1940, when she was still Princess Elizabeth. The speech was a message to the children of the Commonwealth, many of whom were living away from home because of World War II.

The site is apparently designed to be more user-friendly and is the third iteration of the website, which originally started in 1997.

The site was inaugurated at a Buckingham Palace reception by the Queen and scientist Tim Berners-Lee who invented the World Wide Web while working at the CERN laboratory in Switzerland.

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Survey – men want smartphones but women want telephones

Business and personal lives are converging, forcing some companies to provide different, flexible mobile phone solutions for their employees, according to the results of the recent Convergence Monitor Survey conducted by PricewaterhouseCoopers. The company surveyed over 7 400 clients and employees in 22 countries, including South Africa.

According to Johan van Huyssteen, communications leader at PwC Southern Africa, the objective of the survey was to determine what devices and applications professional people are using, how they are using them in both the business and personal context and what they would like to have in the future.

High-usage staff members comprised 24 percent of PwC respondents and were typically aged between 30 and 45. These people were more likely to be early adopters of technology and were concentrated among partners and the manager group.

Typically these users would spend at least 12 hours a week on a mobile phone - usually a smartphone and their personal monthly expenditure on mobile devices and services, was about R600 or more. They use at least 80 percent of all services offered on the device including voice, email, sms, video games, music, GPS and Internet access.

The majority, about two thirds of the respondents, fall into the 'medium usage' category, which includes younger people, but is spread more evenly among age groups and staff levels. They are slower to adopt new technologies and tend towards conventional mobile phones; speak for two to 12 hours a week; incur personal expenditure between R210-R590 a month and use between 20 percent and 80 percent of the available services.

Low usage and a cautious attitude come with age. This group of 45 years and up comprised only 14 percent of respondents and

they speak for two hours or less a week on mobile phones, personally spending less than R200 a month and use less than 20 percent of available services.

Van Huyssteen says the survey found some sharp regional differences in usage. For instance, respondents in the Asia-Pacific region are clearly more advanced in the use of most Web applications, are avid gamers, manage their photos, are social networkers, and use their mobile devices more frequently for on-line shopping, micropayments and money management.

He believes this may be driven in part by the maturity of technology in the Asia-Pacific regions but says that there could also be a direct correlation between the use of mass transit systems in the region, with people having more time to be on the phone while commuting in trains and buses."

Van Huyssteen warns that the convergence between personal and business use can give rise to some privacy and security problems as the lines of distinction become blurred. The survey shows that employees are highly concerned about privacy and prefer service plans that will not indicate the device location to the employer. In contrast, employers would naturally want a facility through which they can locate the device or employee."

As a single converged device is preferred, security concerns are heightened, with 55 percent of respondents agreeing that password protection is important. Again, in contrast, employers want the unrestricted ability to be able to wipe clean a lost mobile device, even if it means the loss of personal data belonging to the employee.

Interestingly, PwC's survey found that 85 percent of respondents have one or more mobile phones and the smartphones were used by 37 percent of respondents. The choice of mobile device among middle-aged people is for more utilitarian equipment whereas younger groups are more attracted to entertainment devices such as MP3 players and handheld game consoles.

Gender influences choice as well, with men

having a higher propensity for smartphones, while women favour mobile phones. For all other types of mobile devices, however, ownership by men outstrips that by women.

As expected, the survey found that voice calls are the most commonly used mobile application. High-usage respondents are keener on practical applications, such as e-mail, calendar and Internet access as they view their devices as productivity enhancers. In contrast, medium and low-usage respondents had more interest in entertainment features, such as camera and music, with quality issues cited as major inhibitors for camera and video applications.

Based on the results of the survey, Van Huyssteen says that companies will increasingly have to define what technology services they will support and what they are prepared to pay for as part of the monthly remuneration package.

For instance, companies frequently reimburse work-related expenses and even facilitate employee access to mobile device purchases through discounted service plans. Companies now need to have clear guidelines on these cost-issues, taking into consideration the level of the employee and the related income earned.

He says that employees readily accept that they do not own their laptop computer, which remains the property of the enterprise, but they still use them for certain personal applications or services such as storing pictures or music.

However, when it comes to mobile devices, the distinction is not as clear. Employees often insist on retaining complete control over the device. As application-rich devices become common-place, employees use the company device and this leads to a misunderstanding over using the device for personal purposes rather than business.

He says that companies now need to formulate clear policies (with necessary restrictions) on the use of mobile devices by employees.



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Underground water monitored by satellite

Several years ago the Overstrand Municipality started using borehole water for a natural underground reservoir near Hermanus and last year, some 1,5-million cubic metres of underground water was pumped into the De Bos dam, which normally yields about 2,8-million cubic metres of water annually.

Now, the Overstrand Municipality plans to link the underground water supply to a global satellite monitoring system so the water can be scientifically managed. The new groundwater project – that apparently uses some cutting-edge technology – has cost about R5,5-million to install.

As a holiday resort there is a large seasonal variation in water consumption in the Overberg area and the municipality has been concerned that it would face a serious water shortage because of the growing number of residential and business tenants in the region.

The main source of water is the De Bos dam, which has to provide water to the Greater Hermanus area as well as the villages of Fisherhaven, Hawston, Onrus and Sandbaai.

The municipality appointed Cape Town-based groundwater consultants, Umvoto, to explore the area for groundwater resources that were capable of adding reserves to the De Bos dam.

According to Umvoto's Dr Kornelius Riemann, the company concentrated its efforts on the Gateway well field and several boreholes were drilled into the Peninsula aquifer – a layer of water-bearing permeable rock that was able to store significant amounts of water.

When Umvoto struck water it came out of the ground at an astonishing 100-litres a second. Infrastructure including pumps, a pipeline and a pre-treatment plant were erected to carry the water to De Bos from where it will be pumped to the reticulation system at Hermanus.

Umvoto has installed a telemetry system for remote monitoring and control of the underground water and this provides the municipal staff – and Umvoto's staff in Muizenberg – with real-time data on the system.

The project will be monitored by the Hermanus Magnetic Observatory and the Chief Directorate: Surveys and Mapping (CDSM), the Water Research Commission and the Department of Earth and Atmospheric Sciences at Purdue University in Indiana.

The existing, continuously-recording GPS station at the Hermanus Magnetic Observatory will be supplemented with surplus GPS receivers on loan from CDSM and equipped with antennas purchased with funds from the Water Research Commission.

There are plans to link the GPS monitoring system to the Gravity Recovery and Climate Experiment mission that is measuring subtle changes in the gravity field around the Earth on a monthly basis. Twin satellites, launched in March 2002, are used to make detailed measurements of the Earth's gravity field and these help to identify the total amount of water stored beneath the Earth's crust.

Dr Chris Hartnady taking a GPS co-ordinate of a Hermanus monitoring site.



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Laser surveys defects in computer microchips

Microchip manufacturers could benefit from research done by laser physicist, Dr Pieter Neethling, on the defects in the production process. Neethling was awarded his doctorate in physics by Stellenbosch University for his dissertation, entitled Electric Field-Induced Second-Harmonic (EFISH) measurements of highly boron-doped p+-type Si/SiO₂.

According to Dr Neethling, silicon semi-conductors – in the form of transistors – are used to strengthen electronic signals or to switch them on and off. These transistors are used in a wide array of electronic gadgets ranging from computers to washing machines.

Silicon is ideal for the manufacture of transistors because it forms silicon dioxide, a naturally insulating oxide and when it is exposed to air is protected by an insulating layer of silicon dioxide. This is a very important characteristic when it comes to manufacturing transistors. As technology improves, transistors are getting more and more dense, becoming smaller and smaller.

According to Neethling, small concentrations of defects occurring naturally between silicon and silicon dioxide are playing a huge role in the way a transistor functions. His studies concentrated specifically on the behaviour of these defects and why they occur. Among other things, he irradiated oxidised silicon with an ultra-short pulse laser light – known as a near-infrared femtosecond laser – to trace defects, specifically after their electronic behaviour.

A femtosecond laser emits extremely short light impulses: one femtosecond equals one billionth of one millionth of a second. In other words, one femtosecond is, to one second, what one second is proportionately, to 32 million years. The laser monitors

defects using a technique called second-harmonic generation. Neethling hopes that manufacturers of silicon transistors will shortly be able to use this information to make more reliable microchips.

In a separate development, Dr Adriaan van Niekerk, a lecturer in the Department of Geology, Geography and Environmental Studies at Stellenbosch University has used an Internet-based spatial decision support system based on geographic information systems (GIS), to make it easier and cheaper for consultants and decision-makers to draw up specific land suitability maps.

These land suitability maps are used to visually depict whether a piece of land is suitable for development, agricultural purposes or conservation use. The system uses the Cape Land Use Expert System or CLUES, which was developed by Van Niekerk, for his doctoral thesis in geography and environmental studies entitled CLUES, a web-based land use expert system for the Western Cape.

The web technology can be used to compile maps to evaluate land suitability and provide cost-effective GIS technology for people in the Western Cape.

Van Niekerk says the development and demonstration of CLUES exposed several advantages and limitations of current technology and has demonstrated that the Internet offers great opportunities for the deployment of spatial analysis and modelling functionality to a wide audience.

He says that GIS has revolutionised geographic analysis and spatial decision

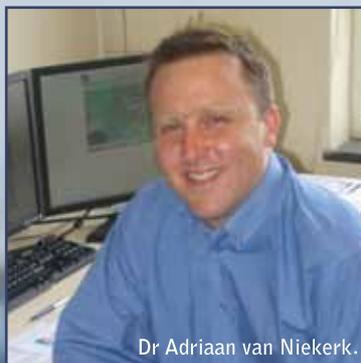
support and while the software is becoming more powerful, less expensive and more user-friendly, it's still limited to a select few users who can operate and afford these systems.

"With the introduction of web mapping tools such as Google Earth, accessibility to geographic information has escalated," Dr van Niekerk says. "Such tools enable anyone with access to a computer and the Internet to explore geographic data online and to produce maps on demand."

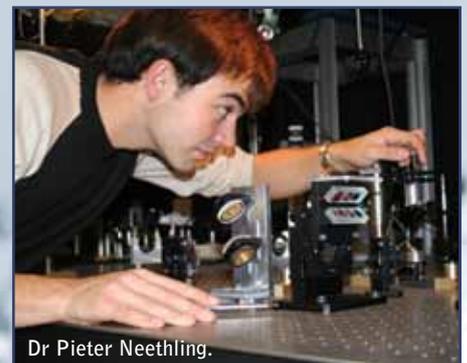
Web mapping products have a very narrow range of functionality. In contrast to GIS, that focuses on spatial data capture, storage, manipulation, analysis and presentation, the function of web mapping tools is to visualise and communicate geographical data.

"The positive impact of web mapping tools suggests that GIS has not yet developed to a level where anyone can use the technology to support spatial decisions and enhance productivity," he says.

CLUES comprises five components: a land unit database (LUD), knowledge base, inference engine, web map service (WMS) and graphical user interface (GUI). The LUD consists of polygons (land units) and attributes (land properties), while the knowledge base stores each user's land use requirement rules. These rules are used by the inference engine to rate the suitability of each land unit in the LUD. The result is then mapped by the WMS and presented to the users as suitability maps. Users can direct the entire analysis through a user-friendly GUI.



Dr Adriaan van Niekerk.



Dr Pieter Neethling.



Can South Africa weather the global economic melt-down?

Chrysler, GM facing bankruptcy?

General Motors and Chrysler will have to file for bankruptcy unless the government agrees to a bailout scheme that will cost taxpayers about \$17,4-billion. Both car manufacturing concerns say that they will not seek to reorganise their businesses under bankruptcy protection as this would scare away buyers and lead to liquidation anyway.

General Motors is seeking ways to cut unsecured debt of \$27,5-billion to just \$9,2-billion using an equity swap mechanism and is planning to shut down dealers and reduce, by half, its obligations to a health fund for retired employees. Its liability to the health fund is estimated at \$20-billion.

Chrysler has not provided any details on how it plans to cut its debt levels and return the organisation to profitability.

The global economic crisis is having a direct and extremely severe impact on many developed economies of this world and United States President, Barack Obama, warns that the current financial problems are probably even more serious than those of the Great Depression of 1929. He is pushing through legislation that will allow over \$900-billion to be used to support banks and some of the major manufacturing industries. Already 2,6-million people in the US have lost their jobs.

In China, manufacturing levels have fallen sharply and already an estimated 20-million migrant workers have been put out of work in previously busy industrial areas. China's Premier, Wen Jiabao, says that the Chinese authorities have promised to spend 4-trillion Yuan (\$585-billion) over the next two years to support the economy there.

In Britain, interest rates have dropped to zero percent and Prime Minister, Gordon Brown, is poised to guarantee toxic debt worth up to £200-billion in a second bailout scheme for banks that is designed to boost lending and attempt to fend off a prolonged recession. Already two million people in Britain are unemployed and this figure is expected to rise to at least three million before the end of the year.

Outspoken French President, Nicholas Sarkozy, has discarded any pretence of European solidarity in the economic crisis by clashing with the European Union authorities over his plan to lend €6-billion to Renault and PSA Peugeot Citroen on condition that these companies agree not to close any plants or cut jobs.

He has already criticised Germany's Angela Merkel for spending too little and Brown for spending too much on bailing out their own economies. Car production in Europe is expected to fall by at least 15 percent while global car production figures are set to decline by at least 21 percent.

The International Monetary Fund says that 16 countries in the Euro zone are likely to see their economies shrink by about two percent this year as business confidence wanes and projects and contracts are cancelled.

In Spain, buoyed by the construction industry for more than ten years, major housing projects have come to a complete halt and many Spanish workers have been retrenched and sent home where they are working as migrant workers currently picking strawberries alongside migrants from Romania and other parts of eastern Europe.

Clearly the world economic crisis is taking a significant toll on the developed and developing countries of this world. What does the economic crisis mean for South Africa in real terms?

Minister of Finance, Trevor Manuel, addressing members of Parliament during his budget speech, confirmed that the government will spend R787-billion on investments in infrastructure and says that this is a cornerstone of South Africa's contract with business, organised labour and its other social partners.

It seems that infrastructure spending in the rest of Africa is likely to continue at a rapid pace and the Development Bank of Southern Africa says that of the 2 361 projects that the continent has committed to, 1 114 are still going ahead despite the economic crisis and the difficulties associated with raising finance for developing countries.

Infrastructure spending doesn't compare with Asia where 20 000

infrastructure contracts have been cancelled this year and Europe where there are just 2000 contracts – out of a total of 34 000 – that are still going ahead.

Earlier this year, Manuel told representatives at the World Economic Forum that Africa could become "decoupled, derailed and abandoned" by the economic crisis and called for global co-operation to ensure that this does not happen to the countries of Africa.

World Bank President, Robert Zoellick, has assured Africa's leaders that it will provide rapid and flexible assistance to African countries being buffeted by the global recession. He told leaders attending the Assembly of the African Union meeting in Addis Ababa that the overall drop in the growth rate for countries in sub-Saharan Africa was 5,4 percent in 2008 and that this is likely to decline further this year.

However, Zoellick also said that its International Bank for Reconstruction and Development (IBRD) would be lending developing countries over \$100-billion over the next three years and will triple its annual investment to \$35-billion a year. As part of this funding, the IBRD is preparing a \$2-billion loan to South Africa to boost electricity generation capacity.

Zoellick says the Democratic Republic of Congo will receive an accelerated \$100-million loan for infrastructure maintenance, and plans are being prepared to increase financial support to the Comoros, Ghana, Kenya and Zambia. The World Bank's private sector arm, the International Finance Corporation, has also created an Infrastructure Crisis Facility with \$300-million at its disposal to top up financing for privately-funded infrastructure projects in Africa.

However, the extensive expenditure on infrastructure projects – particularly in South Africa – will certainly help to cushion parts of the economy from a prolonged recession. The problem is that much of this expenditure seems to be translating into job losses, contract cancellations and a lack of business confidence.

In explaining the impact of the world economy on workers in South Africa, Manuel told Parliament that when a global motor company cuts back on making cars, it cancels its orders for catalytic converters. The firm making catalytic converters is in the Eastern Cape. The mine producing the platinum that is used in the converter is near Rustenburg. "So when the catalytic converter order is cancelled a worker in Uitenhage and a mineworker in Rustenburg are both



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Poor South Africans borrowing too

A recent survey of almost 4 000 people by FinMark Trust shows that 28 percent of South Africans are currently borrowing money, compared with just 13 percent in 2007.

In Gauteng, about 43 percent of people with an average personal income of R4 100 are trying to borrow money followed by the Western Cape, at 35 percent on an average income of R2 200 and the Free State where 15 percent of people with an average income of R1 200 need access to credit.

About 15 percent of black people apparently use informal lenders compared with 10 percent of coloureds, six percent of whites and four percent of Indians. The study found that growth in banking services slowed down last year compared with the previous year when dramatic growth was recorded.

without jobs. The women who sell food or vegetables to these workers lose the sales and so on down the chain," he says.

Manuel's certainly not wrong: already most locally-based vehicle manufacturers are retrenching workers, with Volkswagen confirming that 400 jobs will be cut, Ford Motor Company saying that it will reduce its workforce of 3 000 by 25 percent and General Motors – who cut its workforce by 1 000 people last year – saying that another 150 jobs might be lost if Hummer production ceases in Port Elizabeth.

Stewart Jennings, the president of the National Association of Automobile Component and Allied Manufacturers (Naacam) has launched a strong attack on South Africa's politicians for what he says is their lack of insight and leadership in dealing with the global economic crisis. The component manufacturers have appealed for R1-billion in bridging finance from the government.

This sector has already shed 7 000 jobs in the fourth quarter of last year and warned that many of the component manufacturers would be forced to shut down resulting in a loss of skills and capabilities. Just over 70 000 people are employed in this sector of the economy.

The government has not yet agreed to provide a bridging loan to the component manufacturers and has yet to respond to their request for assistance. However, Manuel said during his Budget Speech that the five enduring principles that underpin government expenditure are:

- Protecting the poor.
- Sustaining employment growth and expanding training opportunities.
- Building economic capacity and promoting investment.
- Addressing the barriers to competitiveness that limit an equitable sharing of opportunities.
- Maintaining a sustainable debt level so that action taken now does not constrain development in later years.

That South Africa is heavily reliant on its commodity exports goes without saying and already there are indications that commodities exports are likely to decline further this year. So much so that Manuel has deferred the mining royalties regime from this year to next. By doing this the mining sector will not have to pay the government an estimated R1,8-billion and, Manuel hopes, this will assist companies in minimising job losses.

Certainly, the mining sector is likely to need every bit of assistance it can get if global forecasts are to be believed. The United States economy is expected to contract by 1,6 percent this year while the British economy is likely to shrink by 2,8 percent. China's gross domestic product fell to just 6,8 percent in the last quarter of 2008 and is expected to drop to its lowest level since 1990 this year.

India's growth rate is likely to drop sharply too while the world economy is projected to show growth of just half a percent this year. In Africa, economic growth of just 3,5 percent is forecast compared with the 5,4 percent it achieved last year.

Manuel warns that countries such as Brazil, India and Russia cannot raise foreign funding at anything less than premium interest rates and this scenario is likely to apply to African countries as well. South Africa's own cost of borrowing on international markets has risen sharply and will remain high.

In summarising the outlook for the South African economy Manuel

warns that South Africa's growth in the current year is forecast to reach just 1,9 percent – compared with 3,1 percent last year – mainly as a result of lower export earnings, weak consumer spending and a slump in private sector investment.

The extent of infrastructure spending will certainly help certain sectors of the economy – mainly major contractors capable of doing extensive civil engineering work – but for the small firms, the economic outlook for the year is not as rosy.

South African President, Kgalema Motlanthe believes that investment by the private sector in South Africa's infrastructure development is the key to halting the country from following its foreign counterparts into a recession.

He has urged development finance institutions, including the Industrial Development Corporation and the Department of Trade and Industry's agencies, to provide support for businesses that are showing signs of financial trouble.

During his State of the Nation address, Motlanthe said that the DTI had been instructed to work with unions and businesses that are already in trouble to devise a rescue plan. He said the government is particularly concerned about South Africa's export industries, including clothing and textiles, the automotive industry and the mining sector.

He said that particular attention will be paid to companies in industries that are showing early signs of job losses and distress such as the electrical and electronics sectors, the engineering industry and the building materials suppliers or manufacturers.

A Nedlac task team, lead by Herbert Mkhize, produced a report earlier this year calling for the "prudent investment of retirement funds and partnerships with the private sector in the implementation of the public infrastructure projects" being undertaken by government.

The report says that instruments such as government bonds are likely to be created to promote private sector investment in water, road, rail and electricity infrastructure projects. There was no mention of this in Manuel's Budget Speech to Parliament but that does not mean that the government will not launch some kind of investment instruments in the future.

South Africa's own economy is declining markedly if the figures



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from Statistics SA are accurate. For instance, 70 000 jobs were lost in the third quarter of 2008 as manufacturing output dropped by seven percent year-on-year in volume terms in December.

Doret Els, an economist at Efficient Group says that manufacturing output in the fourth quarter of last year dropped by 5,8 percent and this can subtract a full percentage point from economic growth for the country because manufacturing is the second-largest sector of the economy.

Steel sales in South Africa slumped by 27,1 percent in the final months of last year, dropping to just 886 000 tons after a sharp decrease of 42,8 percent in sales between the third and fourth quarters of 2008. Steel producers have responded by cutting prices and reducing production by about 30 percent.

Meanwhile, projects worth R1-billion at the Coega harbour have been put on hold as a result of the postponement of Coega's new deep-water port, Ngqura. Volumes at all South African harbours have dropped and in Port Elizabeth, volumes were 44 percent down in January this year compared with the same period last year.

According to the National Port Authority, none of the postponed projects had gone out to tender so the impact on the Ngqura port is believed to be minimal. Projects that have been dropped include the construction of an administration building, a tug jetty and expansion of the container quay.

Shipping companies report that shipping prices on the international market have dropped from an average of \$250 000 a day to just \$30 000 a day because fewer goods are being shipped to markets around the world.

Africa's largest aluminium semi-fabricator, Hulamin, says that sales of locally rolled products fell by 13 000 tons last year on the back of weaker demand from the automotive sector and destocking among distributors. Hulamin's chief executive Alan Fourie says the rate of destocking was "unprecedented", making it difficult to forecast what the demand would be for aluminium products in 2009. As a result of the downturn, the company has reduced the number of shifts being worked and reduced its contract labour force by about 180 people.

In the building and construction sector, statistics compiled by ABSA show that 77 998 residential building plans – worth R17,8-billion – were passed by local authorities around the country, a decline of 25,5 percent year-on-year. The number of residential buildings completed during the year was also lower at 64 473 units compared with 70 766 units in the previous year.

ABSA's economist, Jacques du Toit, says that this is clear evidence that the property sector is battling to deal with a significantly lower demand for new housing. His view is supported by tiling retailer Italtile, where company chief executive, Gian-Paolo Ravazzotti, says that very slow trading conditions characterised the first part of 2009.

In the non-residential buildings category, the level of plans passed rose by 27,6 percent year-on-year showing that there is still some activity in this sector of the building industry.

Meanwhile, the African Development Bank has said that

Jobs lost as companies report huge losses

Intel has confirmed that it will close down an assembly and test factory in Shanghai and move it to Chengdu in China's far west region. At least 2 000 employees will be affected. Intel is still going ahead with construction of a new plant in Dalian, being built at a cost of \$2,5-billion. Intel has closed plants in Malaysia, Philippines and the United States and already about 6 000 employees worldwide have lost their jobs.

Meanwhile, technology company NEC has confirmed that it will retrench 20 000 workers at its factories around the world after losses of \$2,9-billion for the year. Hitachi is also planning large-scale retrenchments and about 7 000 people will lose their jobs after this company announced that it had made a net loss of \$7,8-billion for the year.

South Korea has reported a drop of 32,8 percent in exports in January and the collapse in exports means that it will record a negative growth rate for the year. This means that South Korea will be in a recession for the first time in more than a decade after demand for the region's cars, consumer electronic products and ships dropped drastically.

India is also facing a recession as manufacturing activity contracted and exports fell sharply while in Indonesia export levels dropped by 20 percent, the fastest rate in seven years.

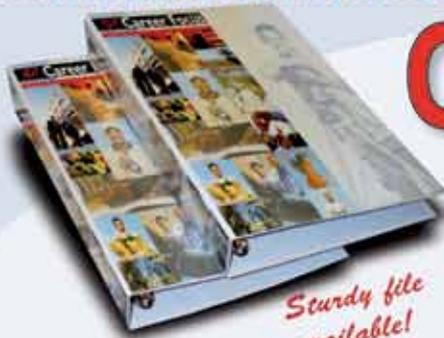
In Japan, major manufacturers, Sony and Toyota have reported losses and Panasonic, the world's biggest manufacturer of plasma television sets, says that it will lose \$3,9-billion this year – the first loss in six years.



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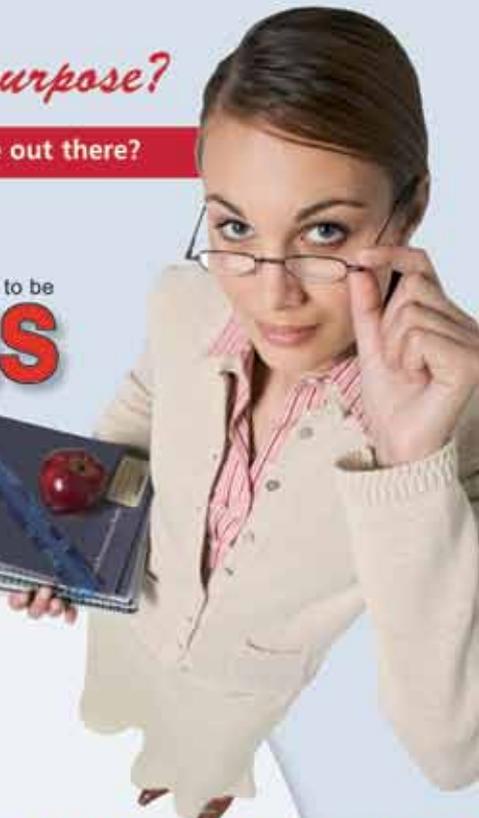


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it plans to triple its lending to African countries mainly to help the poorest nations on the continent withstand the impact of the global financial crisis. Addressing delegates attending the African Union Summit held in Ethiopia earlier this year, bank president, Donald Kaberuka said that a \$1,5-billion emergency liquidity fund had been set up along with a \$1-billion trade finance facility.

Last year the bank lent \$5,2-billion to countries in Africa.

Exactly how badly the global economic crisis will affect South Africa is the focus of much speculation among economists and commentators and there is certainly no clarity on whether this country will be shielded from the international economic woes. The infrastructure spending – along with other significantly large private sector investments will provide some protection but the key is whether the export industries will be able to sustain the global melt-down.

There is no doubt that the mining sector and the automotive sectors will face tough times this year and this is likely to have an impact on the supporting industries as well. But the vast injection of infrastructure spending by government, along with major projects from Sasol, Transnet and Eskom may help to sustain an economy that already has an unacceptably high level of unemployment.

Predictions now are dangerous – but there is some hope that in the next few years South African workers will not suffer as severely as their counterparts in other parts of the world.

How the Budget may affect engineers

- Infrastructure investment will continue to draw in capital goods, even though lower consumer demand, and softer real exchange rates will dampen import demand generating a sizeable current account deficit expected to average 6,7 percent a year for the next few years.
- Economic policy is aimed at accelerating growth and job creation, broadening economic participation and reducing poverty.
- R3,7-billion to be spent on low-income housing projects and R4,1-billion has been set aside for the second phase of the expanded public works programme.
- R787-billion to be spent on infrastructure investment, a further R6,4-billion on public transport, roads and rail networks, R4,1-billion for school buildings, clinics and provincial infrastructure projects and R5,3-billion for municipal infrastructure and bulk water systems.
- Major investments in power generation, transport networks and telecommunications are already underway.
- R1-billion for electricity demand management and tax incentives for investment in energy-efficient technologies.
- Budget deficit will rise to 3,8 percent of Gross Domestic Product next year while debt service costs will be about 2,5 percent of GDP over the next three years.
- South Africa is borrowing money to construct roads, power stations, classrooms and hospital wards and not to rescue its banks.
- The Siyenza Manje campaign has bought in skills to support municipal infrastructure investment. The Development Bank of South Africa is considering broadening this model to support financial management and delivery capacity in municipalities.
- Total government expenditure will amount to R834-billion, including a second tranche of the R60-billion loan to Eskom and an unallocated contingency reserve of R6-billion. Education gets 14 percent of the budget, an amount of R140,4-billion.
- A total of 31 new hospitals are under construction and 18 of these will be completed in the next three years.
- The number of police officials will be increased from 183 000 to 204 000 by 2011/12.
- Stricter controls of foreign travel, advertising, public relations activities and consultancy services will be introduced.
- The main budget revenue is R50-billion lower than projected in February last year because of slower growth, depressed trade and declining company profits.
- Mining royalties deferred until 2010 saving R1,8-billion for the mining sector.
- Infrastructure grants to municipalities of R67-billion over the next three years and R45-billion will be spent on the Breaking New Ground housing programme.
- Petrol to increase by 40,5 cents a litre and diesel by 41,5 cents a litre from April.
- VAT threshold increased from R300 000 to R1-million.



Dear Paddy,

Your article 'A lost generation of students doing OBE' attempts to analyse the present situation, to provide some historical perspective, and to make some tentative proposals of possible solutions.

We seem to be facing a conundrum around the matric examination. The old configuration, with all its benefits and limitations has been discarded, and the replacement seems no better, or worse.

Let us first examine the intentions of the whole matric examination structure. It seems to serve three different functions:

1. A check is needed by the Education Authority to verify that the 'Educators' have done a satisfactory job in implementing 'Departmental Policy' and have produced a batch of satisfactorily educated 'Learners'. This can be seen as analogous to an industrial post-manufacturing inspection process, where deficiencies in individual products are identified and corrected. Studies must also be made here on the needs and possibilities of process- and product improvement.
2. The tertiary education institutions (universities and others) need to evaluate prospective students for an adequate educational foundation which would enable them to study further. (It must be emphasised that it is not the function of a university to teach its students basic reading and writing skills in their chosen language of instruction or counting and basic arithmetic.)
A historical perspective here is that the word 'matriculation' really means enrolling at a university as an undergraduate student. It seems to be used today in that context mainly by Scottish universities.
3. The community at large, including prospective employers, desires to know that the high-school graduates are at least literate, and are fit to take a place in society and employment. Employers also feel that it is not their function to teach their junior employees basic reading and writing skills and basic arithmetic.

With these requirements in mind, we need to ask to what degree the matric examination, in both its 'new' and 'old' formats can be regarded as satisfactory.

The first point of 'Educational Quality Assurance' is not really visible to the general public, but the overall perception is that the education authorities pay little heed to this matter. There are far too many tales of unsatisfactory teaching performance being tolerated or ignored (for whatever reasons may prevail) to have any belief that this function is even recognised, let alone being carried out. Clearly there is room for much improvement in this area.

The universities seem to be caught in the cross-fire between their own academic needs and an unstated need to work with the student material they are given by 'the system'.

There has even been a proposal for a separate matriculation examination to be instituted with a higher standard, to suit the universities, but the logistic problems of such an undertaking on a country-wide scale would be immense. It would also create an enormous public outcry against such a perceived duplication of effort, and against the high costs of the large cottage-industry of cram-

colleges needed to prepare the candidates for such an examination. (By definition, the high schools in their present form would largely be ruled out.) There are also some vested interests within the existing educational sector who would oppose such a move.

The requirements of the business sector are disparate in nature, and are difficult to quantify, considering that there is a desire to employ only experienced staff, without any serious examination of how this experience can be acquired. (This is a common case of the 'Somebody Else's Problem' syndrome.) The needs of different businesses are so divergent that it is difficult to visualise a universal 'business education' training, although in some areas such training does already exist, with varied degrees of success (e.g. 'secretarial colleges' and sub degree-level 'IT training institutions'). The common practical solution will probably have to remain informal on-the-job training.

What is the way forward? The Education Minister's much-criticised plea to separate curricula issues from teaching-method issues does make a great deal of sense, without implying that there are not serious problems in both areas. To attempt to solve all such problems with one set of actions is just another case of a 'one-size-fits-all' approach.

The implied view that all was well in the previous education dispensation does not stand up to any detailed analysis, although the criticism seems to be well founded that the newer mathematics-related curriculum, particularly the debacle of the 'Maths Literacy' course, has seriously exacerbated the problem.

The teaching methods described as 'OBE' seem to be having serious teething problems. There are reported to be ongoing problems related to grossly inadequate teacher-training in the new methods, and also a seriously excessive workload on the teachers. It would seem that the OBE methods require a much greater attention to detail by the teachers, this in an environment where pupil-staff ratios are up to 50 pupils or more per class. It has been stated that anything above 25:1 is unworkable. Even in the past, a ratio above 30:1 was severely criticised.

The perceived high drop-out level among university students is nothing new, except perhaps in the detail of the numbers: around 50 years ago, at Wits University, each year there was an intake of 70 – 75 fresh matriculants in each of the more popular branches of engineering. Four years later, at graduation, these numbers had shrunk to about 20. This represents a drop-out rate in the region of 70%. Even matric high-flyers were then not immune to the drop-out problem.

The generally-accepted explanation at that time (and probably still partially true today) was the great disparity between high-school and university teaching methods. This disparity seems to have grown wider recently, resulting in a strong recognition of the need for 'bridging school' methods on or before university entry. The means to cover the extra costs, and the staff complement this would entail, are still a matter of contention.

It almost seems that the universities even then had little confidence in the matric examination, and were prepared to throw their doors open as wide as possible, and to do their own 'filtering' of students, since most

drop-outs occurred after the first year of study, and the correlation between failing students and their matric results was then poor.

In recent years, a large para-statal organisation, in the defence industry, ran a one-year pre-university bridging-school programme for matriculants who wanted to improve their marks in the science-based subjects needed by potential engineering and science students. At the end of the year, the students would re-write some matric subjects, and would then come into consideration for tertiary-education bursaries from the parent organisation. It provided about 100 student places each year, and reportedly received well over 4 000 applications a year from prospective students. The results from those lucky (or talented) enough to be selected were highly encouraging, but the costs involved would have been very high, so it is doubtful that such institutions can make a big contribution to solution of the problems without significant financial support. It is reported that some highly-regarded high schools are asking around R20 000 per pupil a year for tuition. Multiplying this by the number of matriculants needing help (seemingly in the tens of thousands each year) gives some indication of the size of the problem.

Further comment from anyone interested or involved would be welcome. Unanswered questions seem to revolve around the formulation of the details of a revision to the curriculum, the improvement of teaching standards and facilities, and the financing of the needed changes.

Tony Fisher
Retired Member: SAIEE

[The following is possibly the shortest letter ever written to WATTnow]

Dear Paddy

MOUSEBIRD

Garth Beresford

[So I responded with]

Hi Garth,

You might be right – to my knowledge, the Mousebird has a long tail. Secondly, it does not have the slight yellow marking on the front (at least as far as I know). I'll happily run a correction if you think it's necessary and you are correct.

Paddy

[So Garth responded – this time a little more eloquently]

Hi Paddy,

One of the characteristics of the mousebird is its "two-tone" bill that is clearly visible.

The main gist of my comment is to let you know that there are people who read your very excellent publication from cover to cover. So thanks for that.

Garth

[And then finally]

Hi Garth,

Thanks for your response. If you don't mind I'd like to publish your letter as I'm more than happy to admit that I'm a *nana*. You might well be right – apart from a couple of barbets, hoopoes and other common garden birds, about the best I can do, is to identify those ubiquitous LBJs that live around our homes and in our vlei's. The LBJs are more commonly known as Little Brown Jobs.

Paddy

I find the WATTNow magazine novel in its approach and enjoyable to read. I relish the good read and keeping in touch while sitting here in retirement in the UK. Please keep it up.

But, I'm afraid that your correspondent Hal Honey has seriously upset the applecart with the article entitled 'Fire at Betty's Bay', in the November 2008 issue. My SA correspondents are highly indignant that the article is so disparaging about the fire services. Can you print some form of apology? I attach a copy of the correspondence.

Peter Ratigan

[Editor responds: The fact that even one house burned down, let alone four, is certainly an indictment of the fire department and I certainly would not apologise for publishing this fact. Secondly, I think that the community of Betty's Bay, which evidently loves its town, should accept that a fire department that lets houses burn down is a pretty tardy excuse for a fire prevention service – but that's my personal opinion – Paddy.]

Experience the perfect performance and comfort

Daylight the form of light with which we are most comfortable is never constant. It changes in lighting level and colour temperature throughout the day and over the seasons, affecting our emotions, moods, perception and performance. It has been proven that the dynamics of daylight have a stimulating and inspiring effect. Utilizing this potential of lighting in offices, SmartForm enables the creation of 'Personal light' and 'Dynamic ambience', which have a positive effect on the well-being of office workers.

The SmartForm recessed range TBS460 is a concept with a combination of 'light beams' for ceilings with modular grids of 600x600 mm, 300x1200 mm and 300x1500 mm and for plaster ceilings. The luminaires are very flat, measuring only 45 mm (Pushing versions), and are easy to install. Square luminaires have 2, 3 or 4 lamps of 14 or 24 W. Rectangular luminaires have 1 or 2 lamps of 28 or 54 W and 35, 49 or 80 W.

The housings are filled symmetrically with 'light beam' micro optics, which are available in different quality levels and with closed or perforated infill plates. The high-quality finishing and the seamless rim with a height of only 5 mm ensure the luminaire blends in with every ceiling. The TBS460 luminaires have closed or perforated infill plates and are painted white or silver-grey. The attractive perforated pattern makes the luminaire appear richer when it is mounted in the ceiling.

Emergency lighting

In the SmartForm TBS460-461-471 we can supply a built-in emergency battery pack, enabling the luminaires to function as both standard and emergency luminaires in the event of a power failure. One TL5 lamp is connected to this emergency converter and gives a light flux as shown in the table. The battery pack provides 1 to 3 hours of emergency lighting. The rechargeable NiCd batteries are automatically recharged within 24 hours of the mains being restored. All luminaires supplied with an emergency pack are tested and approved and delivered with safety and maintenance instructions.

Lighting distribution features

At the heart of the TBS460 range is a patented Philips Omnidirectional Lighting Control optic. The 3-dimensional shaped lamellae improve light distribution, reduce glare in all directions and increase overall luminous efficacy. A variety of lamellae is available to provide tailor-made solutions for specific requirements.

Designed to fulfill most installation needs

The optics and infill plates are easily removable for quick and easy maintenance or bracket mounting: the optics have smart clips at the end lamellae and the infill plates have catches in the bottom plate. The de-mounted optic can be suspended using a plastic cord. For easy maintenance the MLO optics have a simple device for removing the cover, which is secured with V-clips in the housing.

Air handling

Air handling, air ventilation or air circulation is an important function for an office environment. For optimum light output in these luminaires with return-air facilities, the slots are positioned besides the micro-optic compartments. A return-air volume of 50 m³/hour is possible with a normal return-air temperature and a lamp output drop of less than 5%. Air-handling data, such as changes in the Light Output Ratio, thermal radiation, pressure drop and sound power, is available. The infill panels are available in closed and perforated versions. Both can be combined with air-handling functionality. Air handling is not possible in the opal optic (O) versions of the TBS460 and TBS461 or the TBS471 with MLO.

Noise transmission

Noise transmission between adjacent rooms can be a problem. The sound insulation of a ceiling system is in general >30dB. The standard luminaires have a sound reduction of roughly 5-10 dB. To reduce this room-to-room airborne sound transmission via the luminaires and ceiling, SmartForm luminaires can be equipped with sound-absorbing covers. These covers are made from zinc-coated steel that is lined with sound-absorbing material and will improve sound insulation to more than 15 dBA, without hampering the return-air facility. Of course, the data mentioned will vary according to the luminaire type. Depending on the luminaire type and ceiling construction, delivery will take place on a project basis (customized solution).

Safety cable

Due to regulations in some countries it is not permitted for the luminaire to only be fitted to the recessed ceiling. Instead, it must be connected to the fixed ceiling construction of the building. It is possible to order a universal suspension safety cable with the luminaire. This steel cable can be fixed diagonally (preferable) on the housing and should be connected to the fixed ceiling.

Protection foil

Philips supplies the SmartForm range as ready-to-install luminaires which come with optics, lamps and outside connectors. A strong plastic cover foil (re-usable) protects the optic against dust and fingerprints during installation. Once installation has been completed, this foil can be easily removed.

Range of ceiling brackets (suspension brackets)

Thanks to a range of smart brackets, the ultra-flat SmartForm TBS460 range can be easily mounted in different ceiling systems: exposed, concealed mineral or metal and plaster.

No brackets are required to mount the TBS460 in exposed ceilings (lay-in). The universal bracket ZBS460 SMB (4 pcs) can be used to secure fixation in the ceiling.

The ZBS460 SMB-TPM (4pcs) bracket is required to fix the TBS460 in symmetrical concealed mineral and metal ceilings with fixed 38-mm T-bars. The universal bracket ZBS460 (4 pcs) with a reach of 25-65 mm is required to fix the TBS460 in symmetrical concealed mineral and metal ceilings. The bracket can easily be screwed on the housing and is adjustable from inside and outside the housing.

The ZBS460 SMB-PLC bracket with a reach of 1020 mm is available for fixing TBS460 in plaster ceilings. Depending on the type of luminaire two optics may have to be removed.

Installation features

Exact fit for most standard modular ceiling systems with use of brackets.

- Wide range of connectors for mains and data
- Safety cable connected to building construction
- Protective foil to prevent dirt entering luminaire
- Smart packaging
- Maintenance features and tips

Energy efficiency

The latest optical technology has been used to create a highly effective optic, giving rise to new opportunities for saving energy. New SmartForm installations with C/D8-VH (Very High output) optics use up to 25% less energy than standard TL5 solutions.

Even greater savings can be made by retrofitting TL-D lighting installations with SmartForm luminaires. Because daylight-linking and presence-detecting lighting control systems can be included in the SmartForm range as an optional, extra, energy consumption can easily be halved in comparison to conventional office lighting solutions. The reduced energy consumption results in a lower cost of ownership and reduced CO₂ output, thus helping to protect the environment. The quality of the lighting is maintained, however, thanks to the Omnidirectional Lighting Control optic which increases luminous efficacy whilst at the same time reducing glare in all directions and complying with the relevant brightness limits. As a result, the SmartForm range enables sustainable and green lighting solutions to be created.



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Reflecting Philips' drive for simplicity, SmartForm recessed is a family of highly versatile modular luminaires. Available in square and rectangular versions for MASTER TL5 lamps, the SmartForm luminaires are designed to fit in a wide range of modular ceiling types (600 mm module grids) and plaster ceilings. Incorporating Master TL5 lamps, HF gear and lighting controls, the SmartForm luminaire allows energy savings of up to 50% compared to standard solutions

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A hundred years of the SAIEE – and more to come too

Although the event was never accurately recorded, historians agree that sometime in March 1886, George Harrison, a prospector who was working as a builder and handyman on the widow Petronella Oosthuizen's farm stumbled across the main reef of gold on which Johannesburg was founded.

There are several different versions of exactly how he found gold – the most enchanting being that he'd woken up with a dreadful hangover after a night of binge drinking with a friend by the name of George Honeyball. While he and his hangover were walking down the hill Harrison stumbled and fell. Furious, and grazed, he rose to his feet cursing and took a hefty kick at the rock that had tripped him up. A piece of quartz broke off, exposing the seam of gold – the greatest gold strike anywhere in the world.

How Harrison actually found gold is irrelevant now but what we do know is soon after the discovery, Harrison met up with George Walker – who was keen to go to Barberton in search of gold there – and showed him the reef he'd found. He even encouraged Walker to pan a sample of ore himself.

Convinced that they'd found a payable gold reef, the two men approached the farm owner, Gerhardus Oosthuizen, and after much debate and discussion entered into a simple agreement. It read: Contract entered into between Mr Gerhardus Cornelis Oosthuizen on the one part and George Harrison, George Walker on the other part, for the prospecting of gold or precious metals on the quarter farm Langlaagte, the property of the first-named.

The contract goes on to say that each of them will abide by the existing gold laws, that the contract would be null and void if no payable gold was found and finally that if they did find gold then they would be entitled to a stand and a water supply on the farm and would even be able to erect their machinery there to extract the ore.

And that was the birth of Johannesburg.

It was hardly surprising that millions of adventurers, prospectors, rogues, and even well-dressed businessmen descended on the mining camps set up on farms all around the region. The city of Johannesburg's growth was explosive and immediate with claims springing up

on virtually every farm in the district. As people moved in, so grogshops, hotels, bars and canteens followed. In fact, within the first few months of the gold find there were just 300 people in Johannesburg frequenting the fourteen so-called hotels in the tented camp known as Ferreira's.

Many famous men came to the Witwatersrand's gold fields and among them were Barney Barnato, behind Johannesburg Consolidated Investments, Cecil Rhodes, who started Gold Fields of Southern Africa and Alfred Beit, who represented the gigantic European financial house of Jules Porges & Company. By December of that year, 986 stands were offered for sale and the first stand, number 469 was sold for just less than eleven pounds. In three days, 936 of the stands were bought.

Within six years Johannesburg had grown into a fully-fledged city with thousands of inhabitants, a number of laid-out suburbs, a stock exchange, clubs, canteens and even a gaol run by its own police force. Among the layabouts, rogues, petty criminals, chancers and the prize-fighters that descended on Johannesburg there was also a very talented young engineer by the name of J Hubert Davies.

He had been doing a lot of work with electricity and was firmly of the opinion that electricity would become the sole power source to drive the stamps used to crush ore and extract gold from Johannesburg's reefs.

He had done a lot of work with electricity and was probably, at that stage anyway, Johannesburg's foremost authority on the use of electricity, which may have been the reason that he was invited to address the inaugural meeting of the South African Association of Engineers and Architects held in Johannesburg in 1892, just six years after gold was discovered.

Davies, in his address, said that miners found that it was easier to transport coal to the place where power was required than to transmit power from a generating station sited at a central position. "I hope to show that on many mining properties, considerable advantages will accrue from using electrical transmission as the source of power and that it can be transmitted from a single generating source."

He went on to explain quaintly how electricity functions: "A dynamo machine is driven by a water-wheel, steam-engine or other source of



The Transvaal University College building in Eloff Street, Johannesburg, where the early meetings of the SAIEE were held.

power, and generates electric current; this is carried by wires to an electric motor, which turns and delivers power when the current passes through it. An electric conductor, such as a copper wire, is moved across the magnetic field and electromotive force, or tendency to generate current, is produced in it; if the ends of the conducting wire are joined together so to form a complete circuit, an electric current will pass round. If the wire is moved downwards, between the poles, the current will be produced in one direction and if moved upwards, in the other direction.

“The value of the electromotive force produced will depend upon the strength of the magnetic field and the speed at which the wire is moved and will be in proportion to these; so that if a strong magnet is used and the wire is moved quickly a comparatively large electromotive force is obtained.”

Davies went on to explain that the advantage of using electric motors is that they are small, can be left alone for long periods, only occasionally needing a bearing replaced, and use almost no labour, eliminate transporting of fuels, running boilers at pitheads or anything else. He said that electrical power was more economical than any other method for carrying power over long distances as there is no wear and tear on the conducting wires.

Of course, Davies was a hundred per cent correct and while there were some questions about the use of electricity many of the engineers and architects agreed that electric power would be a primary power source in the years ahead. They were right and just five years later, in 1897, 22 electrical engineers got together to form the Society of Electrical Engineers at the first meeting in August 1897, where James Sivewright was elected president by the 50 founding members.

Within the next two years the society published 17 papers on subjects such as education, cable testing, three-phase working and interior wiring. But the South African war from 1899 to 1903 disrupted the gold fields, divided South Africa and led to British annexation of the two Boer Republics amid much hardship, animosity and grief.

When gold mining resumed, it was clear that the shallow gold reefs were petering out and that the mines would have to sink shafts and

tunnels underground to get at the valuable ore beneath the surface. Steam powered hoists were being used to raise the ore mined underground to the surface and eventually the weight and strength of the winding ropes prevented the miners from getting to deeper levels.

To overcome the problem, secondary hoists were needed and electric motors would have to be used underground to lift the ore. Thus it was that Mr AM Robeson, the consulting mechanical engineer working at Central Mining and Rand Mines Group, persuaded management to electrify all the mines in the group and this was the first clear signal that electrical power was soon going to dominate gold mining in South Africa.

According to historian, Dirk Vermeulen, government statistics showed that in 1905 the total capacity of electric motors was about 15 000 kW but four years later, in 1909 this figure reached 300 000 kW. And it was, in 1909 that three engineers JR Bradley, HB Murgatroyd and PE Gregson got together to form a new body. At first they considered creating a local offshoot of the London-based Institute of Electrical Engineers but this was abandoned and instead a local organisation was chosen.

Initially, they thought, the body would be limited to the old Transvaal region but after talking to engineering colleagues in other parts of the country it was clear that a new national body would be well supported. So it was that in June 1909 the first General Meeting of the South African Institute of Electrical Engineers was held at the Grand National Hotel in Johannesburg.

There were 117 foundation members and the first annual general meeting was held in November 1909 where the constitution was adopted and members of the first council were elected with CWR Campbell as the first president.

A hundred years later, the SAIEE is still going strong and its contribution to the electrical field in South Africa has been unbelievably significant. Electricity dominates almost every facet of human endeavour today and without electricity the entire world could no longer function efficiently.

The SAIEE's role has moved from its simple beginnings as a meeting



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John Hubert Davies, an early member of the SAIEE, provided many of the first electrical installations on the Rand and built up a large engineering enterprise known as Hubert Davies and Co (now known as Hudaco).

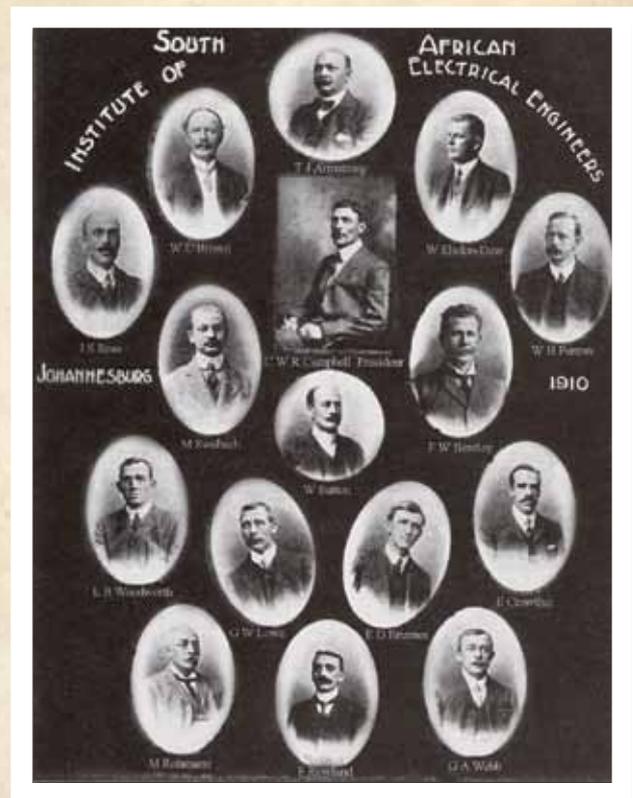
point for electrical engineers to share ideas and information to emerge today as one of the most prominent organisations of its kind in the country. It is internationally respected, has close ties with similar overseas organisations, has played a prominent role in education and human development and is widely respected by its peers in all other engineering disciplines.

And starting in March, the SAIEE will celebrate its 100th year of serving its membership of several thousand people and the greater community of Southern Africa as well.

Events planned for the year include:

- The start of the centenary celebrations is the induction of the new President, Du Toit Grobler, on 26 March at the AGM. This will be held at the Museum of Military History In Johannesburg.
- Various items to commemorate the centenary are available for sale to members including cuff-links, lapel badges, glasses, and a Centenary tie with the new logo.
- A science Unlimited Presentation in Stellenbosch for learners, with a talk by Rod Harker, past president, on Electrical Engineering as a career.
- There will be numerous shows around the country to stimulate an interest in science and technology among learners.
- The President's Invitation Lecture at the University of Johannesburg on the 28 May, although the speaker has yet to be finalised.
- A special commemorative tea-party will be held in June at Innes House, Observatory and this will be followed by a tour of the Observatory and Interactive Science Centre. Incidentally it is on this day 100 years ago that the first meeting of the SAIEE took place at the Grand National Hotel in Johannesburg.
- In June a science and electricity demonstration for learners will be held at Sci Bono in Johannesburg. This will feature well-known Tony Voorveld from the physics department at the University of the Witwatersrand.
- A Gala breakfast will be held on 24 July.
- The Faraday lecture screening in collaboration with the British IET SA Network will be held on 28 August at the Cedar conference centre in Johannesburg.

- Science Unlimited presentation will take place in Pietermaritzburg for learners between 25 and 28 August.
- The Bernard Price Memorial Lecture will be held in the University of the Witwatersrand's Great Hall.
- Past Presidents' lunch has been set down for a date in September while the Centennial Banquet will be held at the Wanderer's Club on 19 November followed by the Centennial Conference on 20 November at Sci Bono. Ten specialist speakers will look at the future of electrical and information engineering in the next decade in terms of telecommunications, energy generation and distribution, bio-engineering and entertainment.
- The Centenary Celebrations will end at the annual general meeting in March next year.
- A commemorative book entitled *The First Ten Decades, a History of the SAIEE* is due to be published later this year.



The first council of the South African Institute of Electrical Engineers (1910).

The case of Smith vs Abandoned Ship

A Los Angeles musician has apparently used Google Earth to track down a long-lost shipwreck that ran aground south of Refugio, Texas in 1822. The ship was carrying a cargo of silver and gold and, if the find is confirmed, could be worth as much as \$3-billion.

Musician Nathan Smith is fighting a legal battle with the owners of the land to allow him to excavate the site, which he has already explored with a metal detector. According to Smith, he used Google Earth to focus on an area called Barkentine Creek where the vessel was believed to have run aground.

He found an outline that was shaped like a footprint at the creek and, after consulting experts and exploring the area with a metal detector, became convinced that the vessel is buried underneath the mud. The owners of the ranch where the Spanish barquentine is thought to be buried have refused Smith permission to excavate there.

Documents and photographs of the area have been sealed by order of the court to hide the exact site and Smith told an earlier court hearing that it was even possible to make out an X, marking the spot, which he believes is part of the ship's capstan.

The case is known as Smith vs Abandoned Ship in order to preserve the secrecy and part of the case hinges on whether the spot, a wetlands area, is classified as land or as a navigable waterway. If it is a waterway, United States law allows the first person to find abandoned treasure to ask the federal courts and the US Army Corps of Engineers for permission to retrieve it.

If it is classified as land then the wreck belongs to the family of the ranch's late owner, Morgan Dunn O'Connor. Other legal experts claim that the creek is clearly outside any commercial waterway and if it is deemed to be in the water then the wreck belongs to the state of Texas.

Smith has been searching for the ship for more than three years.

The Texas coast is believed to be littered with shipwrecks but the notoriously muddy waters of the Gulf of Mexico have made treasure hunting particularly difficult in the region. Smith's site is believed to be reasonably close to Matagorda Bay, where an archaeological team discovered, in 1995, the wrecked ship belonging to a 17th Century French explorer *La Salle*.

Dangers of social networking sites are real for kids

While social networks have secured a place for themselves among Internet users, they certainly are not without serious dangers – particularly for children and adolescents. The level of abuse on networking sites such as *MySpace* and *Facebook* is staggering and earlier this year an 18-year-old male student in the United States allegedly blackmailed his classmates to perform sex acts with him.

The student, Anthony Stanci, apparently dressed himself as a girl and published the pictures on *Facebook*. He then invited his male classmates to send naked pictures of themselves to the 'girl' in question.

According to Waukesha County District Attorney, Brad Schimel, he then performed repeated sex acts on the boys or enticed them to perform sex acts on him, threatening that if they did not comply he would send the photographs to their friends and post them on the Internet as well.

He is charged with five counts of child enticement, two counts of second-degree sexual assault, possession of child pornography and repeated sexual assault. He apparently also sent a bomb threat to teachers at the Berlin Eisenhower Middle/High School and wrote a similar threat on a bathroom wall. He has been charged with making a bomb threat as well.

Officers found 300 nude images of juvenile males on his computer. If he is convicted, the maximum sentence on all charges is 300 years in prison.

In a separate development, *MySpace* has identified and barred some 90 000 registered sex offenders from using the site over the past two years. The astounding number was 40 000 more than *MySpace* had previously acknowledged according to Connecticut Attorney General, Richard Blumenthal, who is co-chairman for the task force of state attorneys looking into sex offenders' use of the Internet.

Facebook's chief privacy officer, Chris Kelly, has not yet had to handle a case of a registered sex offender meeting a minor through the *Facebook* site. He says that *Facebook* has enforced a 'real name' culture and has developed and deployed social verification and powerful privacy rules that allow people to interact in a safer way.

This didn't seem to deter Stanci who was able to post fictitious photographs of himself posing as a girl and using the names Kayla or Emily.



Toting up the business losses – in trillions

Data theft and other cybercrimes are costing businesses about \$1-trillion a year according to a study released by McAfee. Company chief executive, David DeWatt warns that there has been a significant acceleration in the production of malicious software (malware) in the past six months, with a 400 percent increase in 2008.

He says the malware being circulated is particularly insidious as it is designed to steal data, steal identities and steal money. And the criminals are getting increasingly sophisticated in the methods they use and the malware they build.

A survey of 800 companies in eight different countries showed that 80 percent of the malware was aimed at making a financial gain, in contrast to the more common viruses and worms, which mainly have a nuisance value. In the survey, 42 percent of companies said that laid-off employees represented the greatest threat to data security.

To complicate matters, the availability and power of removable storage devices, mobile phones and laptop computers has made it easier for people to steal data, which is often stored on servers operating in foreign countries.

The consequences of losing data are also becoming more significant and United States discount retailer TJX undertook to pay \$24-million as part of a settlement with MasterCard over a security breach that put credit card data for tens of millions of shoppers at risk.

The British Revenue and Customs lost the data on 25-million people exposing them to theft and fraud as well. The data has yet to be recovered. There is an increasing volume of credit card scams throughout the world and devices for scanning credit card data can be bought from many different international companies that offer services for stealing data on the Internet.

According to the survey, the average company has data worth about \$12-million stored on servers in another country and the location is most often in countries that do not have intellectual property laws in place to protect data integrity.

Pope spreads his gospel on YouTube

The Pope is preaching to millions of people on *YouTube* and has even launched his own dedicated channel to bring his (and God's) message to the people. The material is aimed at everyone from the devout Catholic to the casual browser and provides video footage of addresses by Pope Benedict XVI as well as news about the Holy See.

Material for the *YouTube* channel is being supplied by the Vatican Radio and the Vatican's own television centre in collaboration with Google. It is the Vatican's first plunge into using the new media but is not the first time that the state has embraced the Internet in order to spread the teachings of the Roman Catholic Church.

Since 1995 a website (www.vatican.va) has been publishing the pontiff's pronouncements and teachings. Furthermore, the church's unofficial mouthpiece and newspaper *L'Osservatore Romano* has its own website as does Vatican Radio, which broadcasts in 39 languages to people around the world.

A website dedicated to the Vatican City features six webcams one of which is permanently trained on the tomb of the last Pope, John Paul II. (Do you think this means that the Vatican knows something we don't?)





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Nine-year-old's game downloaded by thousands

A nine-year-old boy in Singapore has designed an iPhone application that allows children to draw on the touch screen, using their fingers, and then wipe the screen clear by shaking the phone. The program has been downloaded more than 4 000 times from the iPhone applications store.

The application was designed by Lim Ding Wen to amuse his younger sisters who were constantly nagging him about his phone. His sisters are aged three and five. Lim is fluent in six programming languages already. He started using a computer at the age of two and he has completed more than 20 programming projects.

Apparently he originally wrote the program for the Apple IIGS using Pascal as the main programming language and QuickDraw APIs to draw shapes in full screen mode and animate them using colour rotation. He then ported the program to the iPhone and the iPod touch.

The source code for the program is available at http://virtualgslarwe.com/Virtual_GS/Doodle_Kids.html.

His father, Thye Chean, is chief technology officer for a local technology firm and also writes applications for the iPhone. He says that every evening he and his son check the download statistics that are e-mailed to them by Apple and detail the downloads of Lim's application.

Lim is currently writing another application for the iPhone and, while he won't say much about it, it is known to be a science fiction game called Invader Wars.



Bill Gates releases even more bugs

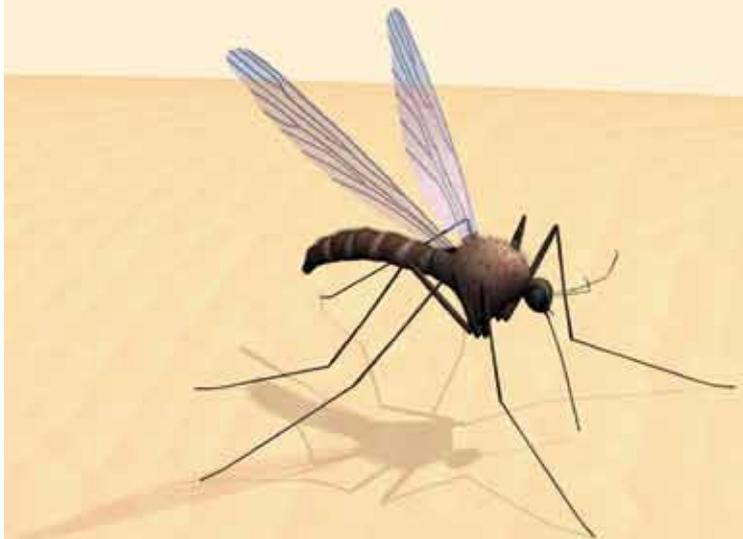
As a full-time philanthropist Bill Gates is really concerned about the fact that millions of people die from malaria every year. So much so that at an elite event held at the Technology, Entertainment and Design conference in California, he walked into the hall carrying a sealed box, which, when he opened it, released a huge swarm of mosquitoes.

People attending the event were stunned – and probably damned irritated too, by being bitten by these pesky creatures. What he was trying to do was drive home the message that investing in malaria protection is critical for the world.

The Bill and Melinda Gates Foundation has pledged \$170-million to helping researchers develop a vaccine for malaria. He told the audience that more money was currently being spent on finding a cure for baldness than on trying to come up with an effective way to stop people dying from malaria.

He called for a greater distribution of mosquito nets and other protective gear and said that one of the vaccines that had been developed would be entering an advanced testing stage in the next few months.

According to delegates attending the event, as Gates removed the lid from the sealed box he told them: "I brought some. Here I'll let them roam around. There's no reason only poor people should be infected." They said it was an "amazing moment" and provided the audience with a lot of food for thought. As one delegate quipped: "Gates released even more bugs into the world."





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Kırıkkale DPP, TURKEY

Bendable computer screens coming soon?

Researchers have developed a new semi-conductor ink that may help companies to manufacture bendable computer screens or inexpensive sensor tags that allow retailers to keep track of their stock.

According to Philippe Inagaki, chief executive of Polyera Corporation, the discovery lies in a new material that is capable of carrying a negative electrical charge that will allow manufacturers to use materials to manufacture a wide range of new gadgets with bendable display screens.

In the traditional silicon world there are two fundamental types of semi-conductors: the P-type which carries a positive charge and the N-type that carries a negative charge. Most semi-conductor inks have only been capable of carrying a positive charge.

Inagaki says that when inks can carry both a positive and negative charge it is possible to make chips and circuits that are faster, more reliable and more energy efficient. The ink can be used to print on thin film or paper using a modified ink-jet printer.

He claims that the breakthrough means that more powerful radio-frequency identity tags will soon find their way onto the market along with flexible computer screens and can be used to make a wide range of different sensors.

Apparently the company developed a new

molecule that lacks electrons in its core, making it a good transporter of a negative charge. The molecule can be dissolved in a solvent and it is this molecule that is used to make the ActivInk.

Inagaki says that the new ink will probably have a dramatic impact on the silicon technology that is so widely used to make semi-conductors.

In a separate development a new light-bending material has been discovered and this means that scientists are a step closer to developing a cloaking device that could actually hide objects from sight.

According to David Smith of Duke University in North Carolina the new material is made from 10 000 individual pieces of fibreglass arranged in parallel rows on a circuit board. These so-called metamaterials can be used to form a variety of cloaking structures that can bend electromagnetic waves such as light around an object, making it appear invisible.

Smith says that the technology could be used in the cellphone industry, for instance, where an antenna that should receive a signal is being blocked by an adjacent antenna. This technology would allow one of the two antennas to not be 'seen' by the cellular phones, cutting down on interference.

The new technology is not intended to replace the existing 'stealth' technologies that are currently being used by manufacturers of military equipment.



Gadget may trump touch screen technology

Researchers working at the Massachusetts Institute of Technology (MIT) have created a device that can turn any surface into a touch screen for computers and can be controlled by simple hand gestures. The researchers refer to it as a portable sixth sense device and it can be used to seamlessly channel Internet information into daily routines.

The gadget can take photographs, if a user frames a scene with his or her hands, or projects a watch face with the proper time on a wrist, if the user makes a circle there with a finger. The device uses a Web camera, a battery-powered projector and a mobile telephone, put together in a gadget that can be worn as a piece of jewellery. The signals from the camera and projector are relayed to the smartphone using a wireless Internet connection.

According to MIT Researcher, Dr Patty Maes, the gadget was made from ordinary components available off-the-shelf and put together for less than \$300. Apparently it can look at an airline ticket and then tell the user whether the flight is on time.

It can also recognise books in a book store and, using the Internet, can provide reviews of the book or details about the author that are projected onto a blank surface or page. The unnamed gadget is even able to download videos from the Internet and then play them on a blank surface.



More new species found – this time in Colombia

Ten new species of amphibians have been discovered in Columbia's mountainous Tacarcuna region, close to its border with Panama, and among the discoveries are three types of glass frogs who have skin that is so thin the internal organs can be clearly seen.

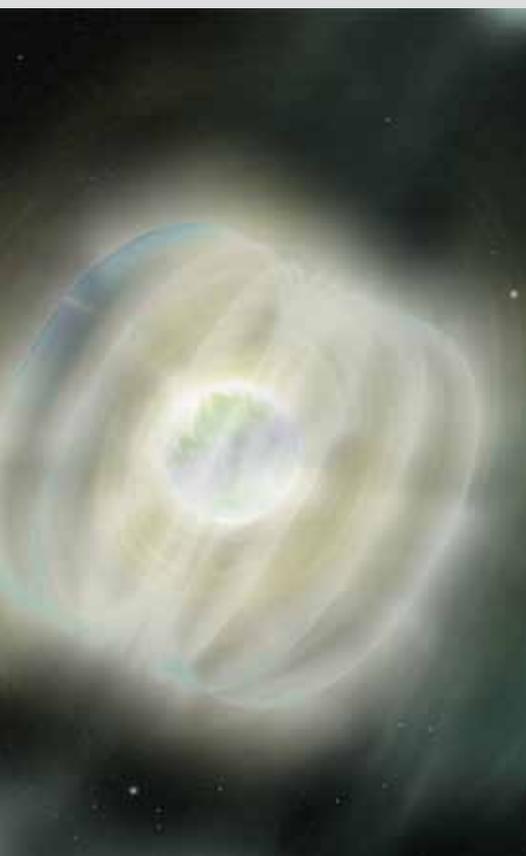
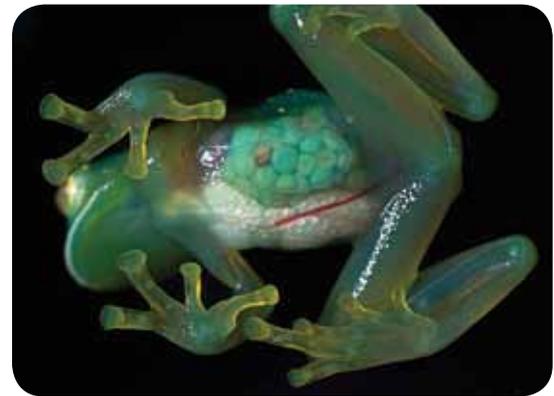
A group of scientists from Conservation International and the Ecotropico Foundation also discovered a new species of harlequin frog, a rain frog and a salamander. All in all the survey found some 60 species of amphibians, 20 reptiles and almost 120 species of birds, many of which are not found anywhere else in the world.

A rain frog, small lizard, salamander and unidentified snake were recorded for the first time in this region of South America. According to Conservation International's Jose Vicente Rodriguez-Mahecha, scientific

director of the organisation, the high incidence of new species of amphibians are a good indication that the forest region is not severely polluted.

He says the new species of amphibians are important indicators of environment problems as they are vulnerable to acid rain, pesticides and climate change. Columbia has one of the most diverse collections of amphibians in the world with 754 species recorded there.

About a third of the amphibian species around the world are apparently being threatened with extinction because of climate change, disease and habitat destruction. The Tacarcuna area of Colombia is an area of high biological diversity but is threatened by continued hunting, mining, illicit crop cultivation and the destruction of natural habitat.



Neutron star's flares puzzle NASA

A powerful neutron star that erupts with hundreds of flares in as little as 20 minutes has been the focus of much attention from astronomers at the National Aeronautics and Space Administration as it is only the sixth soft-gamma-ray repeater found in the universe.

NASA's Swift and Fermi spacecraft are monitoring the neutron star, which gives off rapid-fire outbursts. In 2004, a giant flare from another soft-gamma-ray repeater was so intense it ionised the Earth's upper atmosphere even though it was 50 000 light years away.

Using data from an X-ray telescope on board Swift, astronomer, Jules Halpern, at Columbia University was able to capture the first light echoes ever seen from a soft-gamma-ray repeater. Images show what appear to be expanding halos around the source and multiple rings formed as X-rays interact with dust clouds at different distances.

Scientists speculate that the source of the flares is a spinning neutron star – the super-

dense city-sized remains of a supernova. The star is about 20 kilometres wide and yet contains more mass than the sun. The particular neutron star being observed by NASA is believed to be a magnetar or a neutron star with an incredibly intense magnetic field.

The theory among scientists is that the flares from the soft-gamma-ray repeaters are caused by starquakes in the outer rigid crust of a magnetar. As its colossal magnetic field shifts, it strains the crust with enormous magnetic forces, often breaking it. When the crust snaps, it vibrates with seismic waves, much like an earthquake, and emits a flash of gamma-rays.

NASA's newer Fermi Gamma-ray Space Telescope that was launched last year will monitor and hopefully resolve, the finer structure within these events so that scientists can understand how magnetars unleash their energy. According to NASA in a period of just 12 days the magnetar has triggered Fermi's gamma-ray burst monitor 95 times.

Einstein is shown off at US technology conference

A rubberised, robotic model of Albert Einstein – that is capable of smiling and making eye contact – was shown to crowds of people who attended the recent Technology, Entertainment and Design conference in California. Known as an empathetic robot, Einstein was able to interact with people using emotional nuances and reaction to feelings.

The machine was developed by roboticist David Hanson and married to software designed by the Institute for Neural Computation at the University of California, San Diego. Hanson believes that this robot proves that one day computers will be able to relate to people and respond or listen to them at a level that has not yet been seen.

Hanson has been building robots for several years and most of these are now in museums, research institutes or universities around the world. Hanson designed his Einstein to mimic all of the face's roughly 48 facial muscles using 32 motors that are, in some cases, more versatile than the muscles they mimic.

Two hidden cameras look out from behind the life-like eyes. The robot's software tracks 13 parameters from the blink of an eye to the raising of an eyebrow or the wrinkling of a nose and then prompts the robot to react appropriately. Hanson is hoping to make a computer that can reliably detect when someone's smile is sincere or genuine.

Up close, the robot seems incredibly life-like and is complete with Einstein's shock of white hair, his large moustache and his piercing eyes.

In another development British scientists have created a robot that teaches itself to walk and appears to mimic the evolution of animals. The machine adapts itself when new limbs are attached to it.

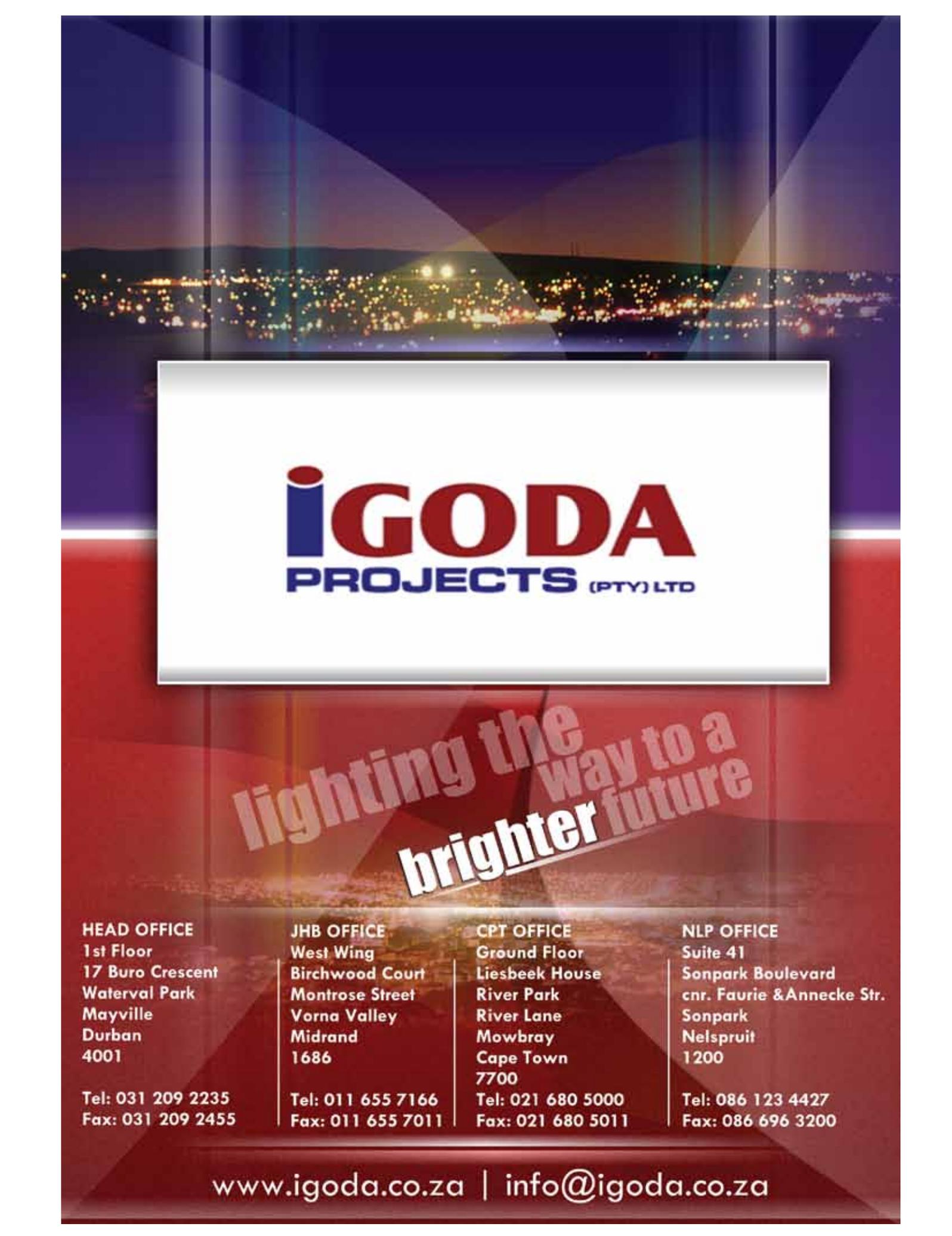
Dr Christopher MacLeod, an artificial intelligence engineer at Robert Gordon University in Aberdeen, points out that living creatures took millions of years to change from amphibians into four-legged animals but the robot can accomplish this in a matter of hours.

He says the team started with a simple robot about the size of a paperback book and fitted it

with two rotatable pegs for legs that could be turned through 180 degrees using motors. They then gave this simple robot's software its primary command: to travel as far as possible in 1 000 seconds.

The software set about finding the fastest form of locomotion to complete this task. At first the robot kept over-balancing until it 'learned' to move forward without falling over. Gradually it got better and better at moving until it could eventually hop along a bench in order to travel greater distances.





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Pacific Islanders originated in Taiwan

Bacteria from the human gut and linguistic evidence have provided clues as to how the geographically isolated Pacific Islands became populated. According to population geneticist at the University College of Cork in Ireland, Mark Achtman, the studies support the pulse-pause theory that people from Taiwan spread south-east, settling at different locations.

New technological and cultural innovations allowed some of these settlers to push further southwards through modern-day Philippines, Borneo and New Guinea, eventually reaching the most southerly point of the Polynesian Islands.

Achtman and his colleagues measured genetic variations in the *Helicobacter pylori*, a common gut microbe that travelled with humans when they first left Africa more than 60 000 years ago. Previous studies used the genetic analysis of H.Pylori to distinguish between the Buddhist and Muslim populations of India.

The group compared related sets of single nucleotide polymorphisms called haplotypes for 212 different bacterial populations collected from the stomach biopsies of Taiwanese and Australian aboriginals, highlanders from New Guinea and Melanesians and Polynesians from New Caledonia.

They compared these with 99 existing samples from Europeans and 222 from earlier studies in Asia and the Pacific.

What the researchers found was that the haplotypes from people's guts in Polynesia and Melanesia – islands that stretch from New Caledonia to Samoa – were genetically similar to the samples from aboriginal people in Taiwan.

More significantly, the Taiwanese bacteria had more genetic diversity than other populations. The genetic mutations accumulate over time, and because of this, migrating populations can be assumed to be a smaller subset of the population from which they originate. This led the researchers to conclude that people from the south Pacific originally came from Taiwan.

In a different study, Russell Gray of the University of Auckland in New Zealand conducted a phylogenetic analysis of 400 languages from south east Asia, Micronesia, Melanesia and Polynesia and came up with similar conclusions.

Gray and his colleagues reconstructed a family tree of languages to build genetic phylogenies and used a computer algorithm to compare more than 34 000 cognate pairs of words with a likely common root to generate what they called a forest of thousands of likely family trees.

By using archaeological evidence, such as dates from ancient texts, the team was able to estimate rates of language change and extrapolate more precise dates for earlier branches of the tree.

Mars and Mercury a rubbish dump?

The characteristics of Mars and Mercury could be explained through a radical new theory that suggests these planets were formed from the scraps of Earth and Venus. This is according to Brad Hansen, an astronomer at the University of California, Los Angeles. He says that Mars and Mercury are essentially by-products of Earth and Venus.

Scientists generally agree that the rocky planets in the solar system formed about 4.5-billion years ago from a wispy disk of gas and dust that originally ringed the sun. Over time, the microscopic dust particles coalesced into pebble-sized clumps and gradually the pebbles became boulders that formed into mountain-sized planetesimals, which then merged to form fully-fledged planets.

In computer simulations of this process, scientists assume that the dust particles were distributed evenly around the sun. But Andrew Youdin, a planetary modeller at the Canadian Institute of Theoretical Astrophysics, says that if the rocky planets formed from homogenous debris they should all be roughly the same size and orbit the sun in similar circular orbits.

However, Earth and Venus are both much larger than Mars or Mercury and the orbits of these two planets are more elliptical or eccentric than Earth or Venus. The scientific interpretation is that this is caused by chaos, with Jupiter's proximity to Mars influencing it.

Hansen postulates that the dust disk fragmented into bands of debris at various distances from the sun and Earth and Venus formed in one band or annulus in the inner solar system. As the Earth and Venus formed, they moved through a sea of pebble- and mountain-sized debris, capturing and assimilating some of the debris and hurling other chunks of it out into the annulus.

Bits of the expelled chunks collided with one another, creating a new orbit that gradually decoupled from the annulus. The computer simulations of this suggest that Mercury and Mars could have been formed from separated debris. Hansen says that his research indicates that about 90 percent of the debris in the annulus went into the formations of Earth and Venus and the left-over material formed Mars and Mercury.

In Hansen's model, the composition of the solar system's four rocky planets is strikingly similar to the way they exist today.

The Italian Job – maybe the crooks did get the money

In the movie *The Italian Job* the gold thieves, led by Sir Michael Caine's character, Charlie Croker, are left in a bullion-laden Bedford, see-sawing over a sheer Alpine drop. As the vehicle teeters on the end, Croker announces "Hang on a minute lads – I've got a great idea".

The movie doesn't say what the great idea was and viewers are left guessing the outcome. The Royal Society of Chemistry decided to use this as the theme for a competition and asked people to work out a method to extract the gold, without using a helicopter, and prove it with mathematics.

More than 2 000 entries were received and John Godwin, an information technology manager at Godalming in Surrey, found a way to remove the 3,2 tons of gold and the gang from the 1964 Bedford VAL 14 coach teetering on the edge of the abyss.

His solution was neat and relatively simple. First, four windows would have to be smashed: the two large central windows just 'air-side' of the pivot should be knocked outwards and then the two smaller windows above the twin

front axles would have to be knocked inwards.

A man should be lowered through the smaller windows to let down the four inflated front tyres which, Godwin points out, were acting as springs and exaggerating the rocking motion in the Bedford.

The next thing to do – and possibly the most important – was to empty the nearly full fuel tank. This would enable one of the 10-member gang to get off and gather up rocks to weigh down the bus. Once the bus was weighed down, the bullion could safely be removed.

Godwin says removing the estimated 165 litres of remaining fuel, weighing about 139 kilograms, is the key to safely getting the people and bullion out of the Bedford. He found an old VAL 14 bus at a depot near Cambridge and confirmed that the fuel tank was located near the overhanging rear.

He says that Croker could have emptied the tank by removing an access plank on the floor of the bus and reaching down to take out the drainage plug.

One of the judges, Dr Richard Pike, chief executive of the Royal Society of Chemistry, says that he was "extremely impressed" by Godwin's entry that demonstrated the kind of practical thinking that Croker would have used and then demonstrated that the solution would work from a scientific point of view.

For his trouble, Godwin won a three-night, all-expenses-paid trip to Turin, Italy.



What is it that makes people blush?

To this day, scientists have no idea what causes people to blush and Frans de Waal, professor of primate behaviour at Emory University in Georgia, says that blushing is one of the last missing pieces in the jigsaw of human development.

The human species is apparently the only species of primate that is capable of blushing, whether in response to embarrassing situations, shame, guilt (when caught telling a lie) or being exposed to some sexual innuendo.

For years, scientists have been trying to work out why human beings need to provide such an obvious signal to communicate self-conscious feelings. They say that blushing interferes with the unscrupulous manipulation of others. Professor de Waal says that it's possible early humans were subjected to selection pressures to keep them honest.

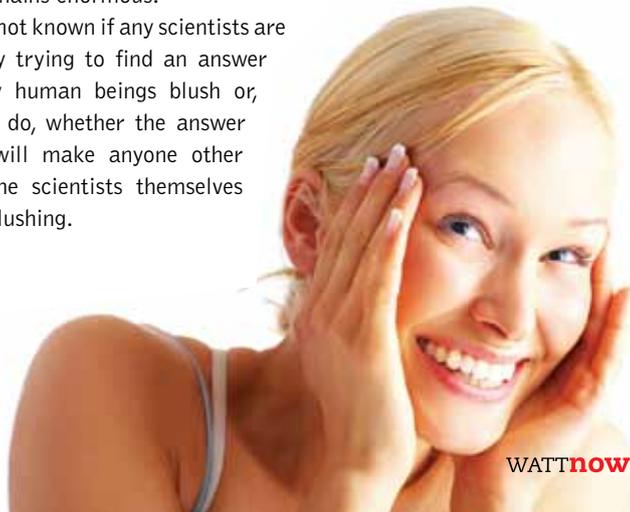
According to Kenneth Miller, a professor of biology at Brown University in the United States, while a great deal is known about the creative chemistry of early Earth, scientists have still been unable to come up with an explanation for why people blush.

As the world celebrates the 200th anniversary of Charles Darwin's birth, *New Scientist* magazine has asked a number of the world's

leading scientists to outline some of the biggest gaps in Darwin's theories about natural selection and the origin of the species.

Many of the top theorists and scientists have already argued that there remains no evolutionary explanation for the origin of life as the gap between a collection of molecules and even the most primitive cell remains enormous.

It is not known if any scientists are actively trying to find an answer to why human beings blush or, if they do, whether the answer itself will make anyone other than the scientists themselves start blushing.



Extinct ibex lives, but then it dies a few minutes later

Spanish scientists have used genetic material in eggs from the domestic goat to clone the Pyrenean ibex, a form of mountain goat that was declared extinct in 2000, after the last-known animal was found dead in northern Spain.

Shortly before the creature died, scientists preserved skin samples of the goat in liquid nitrogen. Using the DNA taken from these samples and combining it with the genetic material of goats, the ibex was successfully cloned.

However, the newborn ibex kid died shortly after birth because there were defects in its lungs. Many other cloned animals, including sheep, have been born with similar defects. The scientists remain confident that they will be able to resurrect newly-extinct species by using frozen tissue.

According to Dr Jose Foch, from the Centre of Food Technology and Research of Aragon in Zaragoza, the delivered kid was genetically identical to the Pyrenean ibex or Bucardo. He says that cloning the animals is the only way they will be able to resurrect the species.

The bucardo has distinctive curved horns and was once common in northern Spain and in the French Pyrenees. Extensive hunting in the 19th century reduced their numbers to fewer than 100 individuals. The animals were declared protected in 1973 but continued to die off so that by 1981 just 30 remained in the Ordesa National Park in the Aragon District of the Pyrenees.

The last living bucardo was a 13-year-old female known as Celia and she was found dead in January 2000 by park rangers.

Dr Folch and his colleagues applied cloning techniques similar to those used to clone Dolly the sheep, using a process called nuclear transfer which enables DNA from the tissue of the bucardo to be transplanted into eggs of the domestic goat. A total of 439 embryos were cloned and 57 of these were implanted into surrogate mothers.

Just seven of the embryos resulted in pregnancies but only one of the goats gave birth to a female bucardo, which died seven minutes later because of breathing difficulties. Researchers say the lung defect may have been due to flaws in the DNA used for cloning.

Some researchers are hoping that frozen DNA samples might be used to bring back species such as the woolly mammoth but scientists say that, even when preserved in ice, DNA degrades over time, leaving gaps in the genetic information required to recreate a healthy animal.

A nearly-complete genome of the woolly mammoth, which became extinct more than 10 000 years ago, has already been published, sparking hopes that it may be possible to synthesise the mammoth's DNA.

The Royal Zoological Society of Scotland is working on a project to clone rare African mammals such as the northern white rhino to save them from extinction. The Society has set up the Institute for Breeding Rare and Endangered African Mammals in the hope of using breeding technologies to conserve species such as the Ethiopian wolf, the African wild dog and the pygmy hippo.

There are already a number of scientific institutions around the world that are attempting to store tissue and DNA from endangered species in a sort of frozen Ark to preserve the DNA from thousands of animals before they disappear.



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There's hot and there's hot-as-hell

Astronomers have found a planet about 200 light years from Earth that heats up by 700°C as its elliptical orbit brings it closer to its own sun. Known as HD 80606b, this exoplanet (a planet outside our own solar system) is a giant ball of gas that is four times the mass of Jupiter.

Researchers at the University of California at Santa Cruz analysed the data collected from the NASA's Spitzer Space telescope to create pictures of a strange world as it is exposed to the inferno caused by a huge increase in temperature.

One image shows a thin, blue crescent on the 'dark' side of the planet, opposite its star, while the scorched side glows a deep, crimson red. The planet passed behind the star – an event known as a secondary eclipse – just before reaching its maximum temperature of 1 227°C, hotter than molten lava.

According to lead investigator, Gregory Laughlin, this is the first time that weather changes in real time on a planet outside our solar system have been recorded. He says it gives scientists a range of exciting clues to the atmospheric properties of the planet because as

it heats up it produces fierce winds moving at five kilometres a second that flow away from the 'day' side towards the 'night' side.

The planet's rotation causes the winds to curl up into large-scale storm systems that gradually peter out as the temperatures cool. The planet orbits its sun every 114 Earth days and is one of about a dozen 'hot Jupiter' extrasolar planets, which spin on their axes in such a way that the same surface is always facing the respective suns.

When HD 80606b is closest to its sun, the sunlight beating down on the planet is a staggering 800 times more powerful than when the planet is at the far end of its elliptical orbit. Its brightness increases at faster and faster rates as the planet draws nearer to the sun and this rises to a factor of just over a thousand times when it is at its closest point.

So far, scientists have identified about 300 exoplanets – some of which appear to have conditions similar to those on Earth – but there are far more of these planets waiting to be discovered. Almost all the information about exoplanets has come from data collected by the Spitzer telescope.

Eland enrol to join the Israeli army

African Eland are being used as infantry by the Israeli army in its fight against the Lebanese terrorist group Hizbollah. The eland have been deployed in no-man's land between a high-security Israeli fence and the southern Lebanese border.

The reason for this is that the foraging animals inside no-man's land perform the vital role of stripping foliage that could be used by Hizbollah fighters to stage an attack on the Israeli border guards deployed along the fence.

Eland were brought to Israeli zoos from Africa in the 1970s and about ten years ago the animals were introduced to army bases throughout Israel, primarily to cut down on maintenance as they eat their way through huge quantities of weeds, clean up any problematic areas, open trails and prevent fires.

Having successfully used the eland at various army bases, the authorities decided to introduce the creatures to no-man's land so that they could stop the excessive growth of foliage which provides possible hiding places for Hizbollah forces. In 2006, Israeli soldiers were kidnapped by Hizbollah, prompting the outbreak of war between the two sides.

Apart from the eland, Israeli soldiers are using surveillance drones the size of small birds to seek out enemies and, as the scale of urban warfare increases in the Middle East, Israeli forces have been testing a range of pistols that are capable of shooting around corners.

These pistols have not yet gone into active service – but the eland certainly are protecting Israel from raiding forces.





Image: <http://wot.motortrend.com>

P1-E – a new supercar for electric heads

A new supercar that will do 1-100 kilometres in just 2,9 seconds and has been designed by McLaren F1 designer, Jim Dowie, will soon be available in Britain at a cost of about £55 000. The prototype of the JJAD-P1-E will have a range of about 370 kilometres on a single charge.

According to Dowie, the P1-E is an affordable electric sports car that combines the advantages of a conventionally-powered vehicle and the electric drive train. The car uses twin electric motors and lithium-ion batteries that are placed close to the ground for better weight distribution and a low centre of gravity.

The four-wheel drive provides exceptional traction and allows regenerative braking on each wheel, the energy gain from which is used to top up the batteries.

It has gull-wing doors, is about the same size as a Lotus Exige, weighs just over a thousand kilograms and produces 149 kilowatts of power to propel the carbon-fibre and aluminium chassis to 217 kilometres an hour.

Solar tower to be built in marmalade country

A 17 MW solar thermal power tower is to be built in Fuentes de Andalucía, east of Seville in Spain, at a cost of about €170-million. The commercial scale plant is due to begin operating in 2011.

The technology uses heliostats to focus sunlight onto a solar receiver at the top of the tower. Salts, made up of sodium and potassium nitrates, are pumped to the top of the tower where they heat up to more than 500°C before being returned to a second tank and stored.

The salt moves through heat exchangers to generate steam, which drives a turbine. Once through the heat exchanger, the salts return to the cold storage tank and re-circulate around the system.

By using the salts, the tower can operate for up to 15 hours a day, without sunlight.

Torresol, a strategic alliance between Spanish engineering group Sener and the Masdar Initiative of Abu Dhabi, will be responsible for running the plant and aims to develop other solar tower projects in southern Europe, North Africa and the Middle East.

The largest power tower currently operates in Spain and produces just 10 MW of power although later this year a larger version of the tower, capable of producing 20 MW, will start operating in the region.



Filament holds ice shelf to the Antarctic Peninsula

One of the largest ice shelves in the Antarctica is on the brink of collapsing and scientists believe it is falling victim to the spate of global warming that is allegedly causing the climate change throughout the world. The flat-topped Wilkins Ice Shelf has an area of thousands of square kilometres and just 20 metres into the sea off the Antarctic Peninsula.

A strip of ice that has eroded into an hour-glass shape, and is just 500 metres at the narrowest point, binds the ice shelf to the

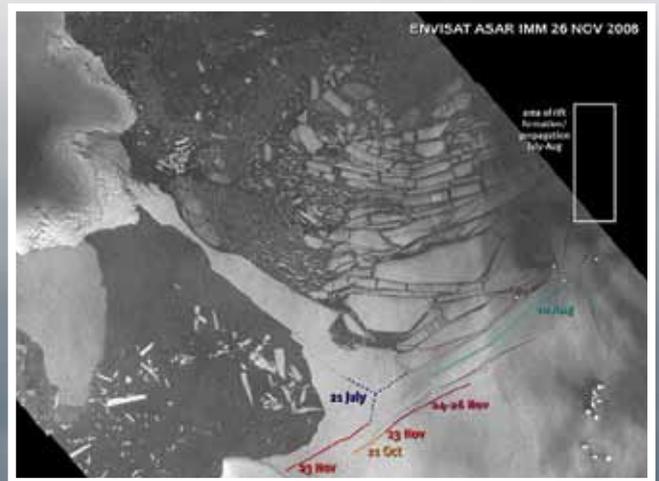
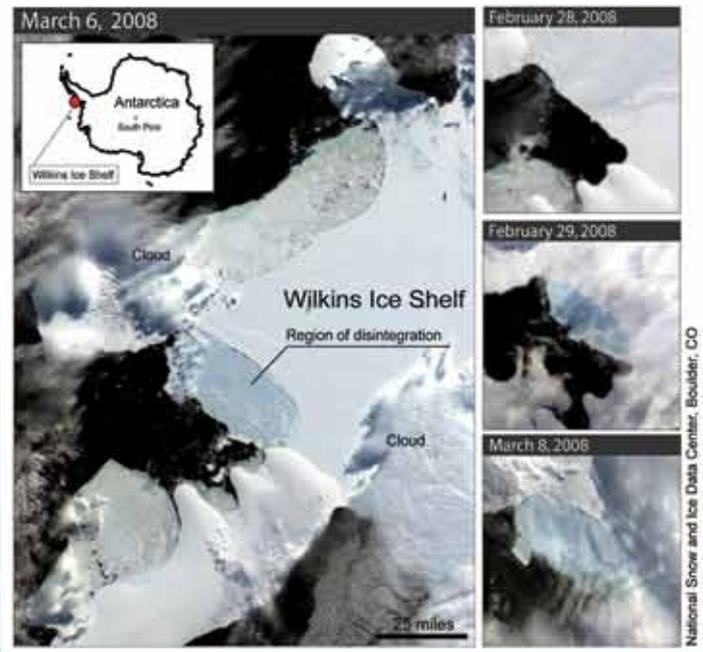
Peninsula. In 1950 the strip was almost 100 km wide but it has now dropped to just 40 km at its widest point.

According to David Vaughan, a glaciologist at the British Antarctic Survey, the Wilkins Ice Shelf used to cover an area of about 16 000 square kilometres but has lost about a third of its area in recent years. If the shelf breaks off the Peninsula, the sea is likely to sweep away much of the remaining ice and it will be lost forever.

Icebergs that are about the size of a shopping mall already dot the sea around the Wilkins shelf. Vaughan says that an aerial survey last year showed the ice shelf was "hanging by a thread" and was not expected to remain connected to the Peninsula for much longer.

Nine other major ice shelves have receded or collapsed around the Antarctic Peninsula over the past 50 years, and according to Vaughan, about 25 000 square kilometres of ice has been lost. Ocean sediments show that the melted ice shelves had been in existence for about 10 000 years.

Figures show that temperatures in the Antarctic Peninsula have warmed by about three degrees since 1950, the fastest rise anywhere in the Southern Hemisphere. There appears to be little sign of warming elsewhere in the Antarctica.



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Natural disasters cost R181-billion last year

Natural disasters caused damage estimated at \$181-billion around the world last year and killed almost 236 000 people according to figures compiled by the United Nations. In a report released on these disasters the UN says that these figures should serve as a severe warning to emerging economies as most of these countries are ill-prepared to deal with these types of hazards.

According to Salvano Briceno, director of the UN's International Strategy for Disaster Reduction, much of the devastation around the world was avoidable. He says the Sichuan quake and Cyclone Nargis that hit Myanmar in May contributed to 2008 being the most deadly year since the tsunami hit Indonesia, Sri Lanka, India and Thailand in 2004.

China had the highest number of natural disasters, with 26 recorded last year, followed by the Philippines with 20, the United States with 19, Indonesia with 16 and Vietnam and India recording ten disasters each.

About 98 percent of the deaths from natural disasters last year occurred in Asia. In Haiti, 500 people lost their lives when Hurricane Hanna devastated the region – the only non-Asian country to have suffered from one of the ten most deadly natural disasters that occurred in 2008.

Briceno says that developing countries that are expanding infrastructure rapidly should take note of the deaths that have occurred from natural disasters and put measures in place now to prevent loss of life when the next natural disaster occurs. He says this applies, particularly, to countries in the ring of fire region where earthquakes and other seismic events are commonplace.

The United Nations has been investing in emergency preparedness plans to help disaster-prone countries affected by natural disasters.



Gribbles may help to make biofuel



A tiny creature that is just two millimetres long and is known as a Gribble may hold the key to producing second generation biofuels, according to researchers at the Biotechnology and Biological Sciences Research Council in Britain.

The gribble, or marine woodlouse, is well known for destroying piers and the bottoms of wooden boats because the enzymes in its stomach efficiently break down the wood, turning it into sugar. Scientists believe that by imitating the process they will be able

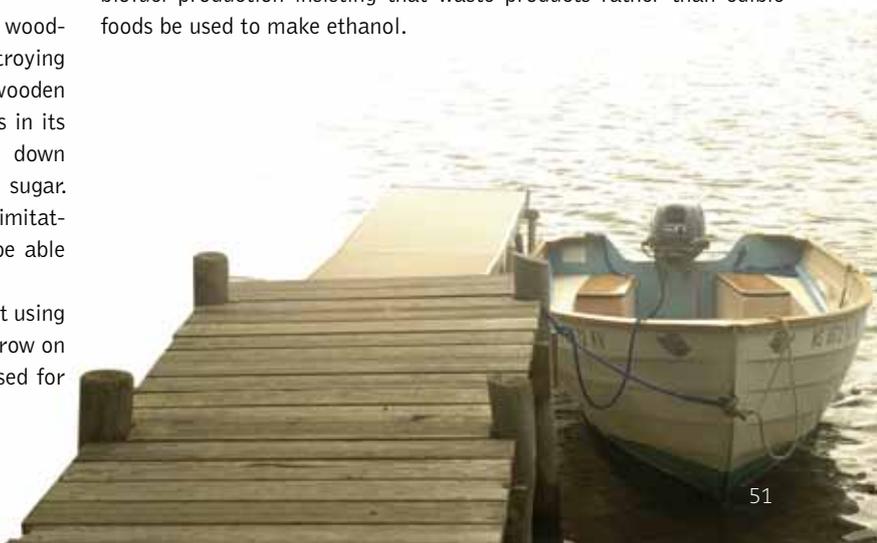
to produce fuel more efficiently from plants.

At the same time, a different team of researchers is looking at using willow trees and grasses as biofuels because these plants will grow on the estimated three-million hectares of land that cannot be used for

agricultural purposes. The researchers are also evaluating the use of straw and carrot-tops as a feedstock for biofuel production.

The biofuel process works by removing sugars from plants and converting these sugars into butanol and ethanol, and used as fuel.

There are a great many biofuel research projects underway around the world and Brazil is currently the leading biofuel producer mainly using the waste from sugar cane to make ethanol. However, after the food crisis of 2007, many countries outlawed the use of crops for biofuel production insisting that waste products rather than edible foods be used to make ethanol.



Eskom to build another coal-fired power station

Eskom is planning to build a third coal-fired power station and is pressing ahead with its return-to-service programme that will see Gas One in the Western Cape and the Ingula pumped-storage scheme in KwaZulu-Natal operating again.

According to Brian Dames, the executive in charge of generation, Eskom is prioritising its programme of working with Independent Power Producers and is trying to firm up its negotiations with these producers so that new projects can get underway during the first quarter of the year.

Commentators believe that the pricing structures Eskom is using, coupled with the long pay-back periods, are mitigating against new projects being undertaken by IPP, particularly in the light of the current global financial crisis that has resulted in the drying up of funding for new projects from major banks.

Dames says that Eskom is expecting only marginal or zero growth during the current year and indications are that there will only be a minor increase in demand for electricity next year.

As a result, Eskom has revised its forecasts and now says that it plans to increase the generation capacity by between 60 000 MW and 70 000 MW from now until 2025. Previous forecasts indicated that Eskom would need to generate at least 80 000 MW to meet demand by that date.

Dames says that Eskom is evaluating about 5 000 MW that has been offered to it by the IPPs in terms of the Medium Term Independent Power Producer Programme. A decision on these projects is expected by April.



Japan's satellite to monitor greenhouse gases

Japan has launched a satellite that it will use exclusively to monitor greenhouse gases around the world in the hope that the data it gathers will help to combat climate change. The satellite, Ibuki or 'Vitality', will enable scientists to measure densities of carbon dioxide and methane from 56 000 locations on the Earth's surface and in the atmosphere over the open ocean.

At the moment there are just 282 land-based observation sites around the world, most of them sited in the United States and Europe. Japanese officials say that the data collected from the satellite will add credence to existing research on greenhouse gases and contribute to establishing clear patterns of climate change around the world.

The satellite is equipped with two sensors and will track infrared rays from the Earth, which will allow scientists to calculate the densities of carbon dioxide and methane because these greenhouse gases absorb the rays at specific wavelengths.

The National Aeronautics and Space Administration is planning to launch its own Orbiting Carbon Observatory later this year to collect measurements of carbon dioxide in the Earth's atmosphere.

It is unlikely that the data from either of these satellites will be ready for use at the December gathering of 190 countries when they meet to try and replace the Kyoto Protocol with another treaty that will bind the wealthy nations to lower emissions targets by 2012.

The Japanese satellite will be in orbit for the next five years.



A £2 lamp that lasts for many years

Scientists at Cambridge University in Britain have invented a light bulb that will last for at least six years, use less energy than existing incandescent lamps and cost just £2 to make. The lamps are made using Gallium Nitride, a man-made substance that is used in light emitting diodes.

According to Professor Colin Humphrey, head of the research group, until now the production costs of making the lamps using Gallium Nitride have been prohibitively expensive as a single lamp would cost at least £20 to manufacture.

However, the researchers have now perfected a cheaper method of making the lamps and already production prototypes are being prepared as the first units are expected to be available – in the UK at least – within two years.

The lamps are 12 times more efficient than tungsten lamps and three times more efficient than the compact fluorescent, energy efficient lamps that are currently available on the market. The Gallium Nitride lamps will burn for 100 000 hours, illuminate instantly the current is turned on and can be dimmed.

Statistics compiled by the researchers show that if these lamps were installed in every home and office in the UK, the proportion of electricity used for lights would drop from 20 percent to just five percent a year.



Cambridge University Professor, Colin Humphreys, with his newly developed LED that has a lifespan of years and costs just £2 to make.

Iran capable of building a nuclear bomb?

Iran is expected to have enough low-enriched uranium to make an atom bomb by the end of 2010, according to the International Institute for Strategic Studies. The low-enriched uranium can be further enriched, giving Iran enough fissile material to make a nuclear weapon.

The International Institute's Mark Fitzpatrick, a senior fellow for non-proliferation, says that the further enrichment process would take about 12 months to complete but Iran's nuclear scientists will have to overcome various technical hurdles to achieve this.

Iran is apparently defying five United Nations Resolutions by enriching uranium inside an underground plant near Natanz. The process is said to be highly sensitive because it amounts to using dual technology. If the uranium is enriched to just four percent purity then it can be used to run a nuclear power plant.

If, however, it is enriched to above 87,5 percent then it becomes weapons-grade uranium and can be used to make a nuclear bomb. Inspectors from the International Atomic Energy Agency have been able to monitor Iran's plants and a report from the agency says that Iran was running 3 820 centrifuges to enrich the uranium. So far, only 630 kilograms of low-enriched uranium has been produced.

Fitzpatrick says that large quantities of low-enriched uranium will have to be made before Iran attempts to convert it into the high purity uranium needed to make weapons. He warns, however, that once the low-enriched uranium has been produced, Iran may expel the Atomic Energy Agency's inspectors and begin producing the high grade materials.

He says that Iran would also need to build missiles capable of delivering a nuclear warhead and at the moment the country has the Shahab-3 missiles, which have a range of about 225 kilometres. However, documents collected by the international agency indicate that Iranian scientists have been working on plans to convert these to nuclear warheads.

US President Barack Obama has already accused Iran of pursuing its plans to build a nuclear weapon and has also alleged that the country is sponsoring various different terrorist organisations. He has said that he plans to embark on direct diplomacy with Iran's leaders.

However, US Ambassador to the United Nations, Susan Rice says that the Obama administration insists that Iran must meet the UN Security Council's demands to suspend uranium production before any talks can be held on its nuclear programme.



A ‘Stark’ introduction to the SAIEE



Arnold Stark has joined the SAIEE’s head office in Johannesburg and will be working closely with Stan Bridgens and Mike Crouch during the centenary year of the Institution.

Arnold is an experienced electrical engineer who graduated from the University of the Witwatersrand in 1960 and then spent three years in Germany and Switzerland on a training

programme for Eskom and another year with the organisation working as a junior engineer on protection and communications.

In 1965 he moved to Montreal, Canada with a consulting engineering company and worked on the automation of small hydro-electric stations and did some site work in Newfoundland as well. He says it was during that period that he learned the importance of co-operation between the different branches of engineering such as mechanical and civil.

“It also made me realise just how important it is for young engineers to work on sites so that they can experience the real problems, frustrations and the eventual delights of achievement,” he says.

In 1967 he returned to South Africa and worked for Eskom specialising in power-line carrier communications and inter-tripping systems for power-line protection.

In 1971 he joined Siemens as the technical manager responsible for sales and project handling of the medium and high voltage systems including switchgear and synchronous condensers. It was during this time that he enrolled for a Master of Business Leadership programme through Unisa.

In 1981 he joined Brown Boveri (now ABB) as the manager of industrial systems and projects including the high voltage sub-stations in Soweto. He was also responsible for supply power to Ulco’s cement plant in the Northern Cape and worked on the high power, high-speed, variable-speed drive projects for Eskom boiler feed pumps at Matimba and Lethabo power stations.

From 1993 to 2004 Arnold spent his time managing teams of engineers in the cities of Johannesburg and Pretoria handling sub-stations, lines and cable projects. This work included budgeting, contract handling, commissioning and handing-over new sub-stations of end users.

“I think that engineers are mostly reticent about their achievements and refuse to blow their own trumpets and yet the engineer has a pivotal role to play in society and in the development of infrastructure and everything that contributes to it.

“There is an inter-dependence between engineers, technologists, technicians and artisans, and relationship is really crucial in the development, execution and maintenance of projects and infrastructure throughout the country,” he says.

Arnold is passionate about engineering as a profession and is clearly concerned about the fact that youngsters studying mathematics at schools are not being taught geometry any more. “Without geometry, how will any of these youngsters ever be able to qualify as engineers?” he asks.

In his spare time Arnold is an avid photographer using digital equipment and a ‘darkroom’ on a personal computer. He is part of the committee of the Camera Club of Johannesburg. He also competes in both the 94,7 and Argus Pick ‘n Pay cycle races and trains with his team, Cresta Wheelers.

During the winter season when cycling activity tends to dwindle, he takes part in various hikes as part of the Johannesburg Hiking Club. When not keeping fit or taking pictures, Arnold enjoys making furniture and doing metal and wood turning.

A range of new goodies for engineers

Surgetek has introduced a snap-on clamp designed to withstand electrical fault current conditions or for use in equipotential bonding of electrical components when linemen are standing on ladders and working on overhead line networks.

Snap-On Clamp devices are used with conductors ranging from 4 to 25 mm in diameter. The Snap-On Clamp and Earth Clamps are conditioned in a climate chamber according to IEC 60068-2-11 for aging purposes. The Earth Clamps are easily connected to a cluster bar and the Snap-On Phase Clamps are simply applied and removed with the aid of a two-clamp dispenser.

All terminations lock positively onto the snap-on phase clamps, and universal type screw clamps prevent accidental loosening of the terminations. All terminations are also sealed to prevent humidity penetration into the cable. The Snap-On Clamp is designed and manufactured locally.



The Surgetek Snap-On Clamp device.

SAIEE Western Cape is buzzing with activity

The SAIEE's Western Cape centre has concentrated on building its outreach programmes, increasing mentoring and student support, and continuing to develop its technology leadership initiatives according to chairman Larry Khuvutlu.

In reviewing the year at the Western Cape's annual general meeting, he told delegates that 2008 would be remembered as the year when the Council for the Built Environment bill was introduced and was fortunately sent back to Parliament for reconsideration after the engineering community objected strongly to the stipulations and changes contained in the bill.

"The SAIEE has played an important role in helping to defeat the bill, which, in its current form, threatened to deeply undermine the engineering community in South Africa and damage the international relationships that have been forged with many similar bodies overseas. It was a relief for all engineers when the bill was returned to Parliament for reconsideration," he says.

With regard to the disruption of electricity supplies and distribution in South Africa, Khuvutlu said that it was clear that great challenges would face the country in the years ahead unless there was an improvement in electricity generation and capacity, coupled with a reduction in electricity usage.

As a result of these demands the SAIEE conducted a series of lectures in different parts of the country to assist members of the public to appreciate the extent of the electricity problems and to come up with ways in which electricity could be saved and consumers,

industrial manufacturers and mining companies could cope with the distribution and supply problems.

"The session that we held in Cape Town was extremely successful with more than 90 people attending the event where frank and robust debate ensued. We plan to hold more of these information sessions in the years ahead as it certainly raises the profile of the SAIEE and, at the same time, provides helpful, practical information to members of the public," Khuvutlu said.

Referring to continuing professional development programmes, he said that the Western Cape centre had provided 14 specific presentations that carried CPD validation and he singled out the Coping Forum in May, the Demand Response and Smart Grids in Restructuring Power Systems presentation and the Energy Supply Crisis lecture as some of the most influential of the programmes undertaken last year.

Khuvutlu says that the centre will maintain an active CPD programme for electrical engineers in the Western Cape and urged delegates at the AGM to make a note of the up-coming events and to register for them early on, as there is a tendency for these events to be well-attended.

With regard to student activities, Khuvutlu said that the Western Cape Centre's student papers evening was a highly successful event with four Western Cape tertiary education institutions taking part. The winning entry came from Herman Dreyer, a student at the University of Stellenbosch who produced a paper on the Deco Cube. However, Khuvutlu pointed out that the standard of all entries was very high.

Skills shortage debilitating engineering sector

South Africa still faces a serious shortage of engineers and one of the top priorities for the country in the next few years is to address this skills shortage and devise sensible solutions, says Stan Bridgens of the South African Institute of Electrical Engineers.

He says that South Africa's economy and the implementation of its infrastructure development goals relies heavily on engineering skills and these plans will be jeopardised if a solution to the skills crisis is not found and implemented.

Bridgens, and SAIEE past president Ian McKechnie have compiled papers outlining the extent of the skills shortage in South Africa and these papers, with their recommendations, are available from the SAIEE.

In explaining the difficulties facing the South African engineering sector, Bridgens points out that it takes between eight and ten years for a productive engineer to emerge from a tertiary education system, because the student has to complete the course and then work for a

period of at least three years before getting the necessary recognition to register as a professional engineer.

According to Bridgens, the education system and the pre-preparation of scholars into an engineering discipline is sadly lacking and this is having a direct bearing on the number of engineers, technologists, technicians and artisans who are being trained in the country.

Bridgens' comments are borne out by a separate study by Alison Lawless, which showed that the shortage of engineers within municipalities in South Africa has reached critical proportions and is likely to get worse in the years ahead.

"South Africa's skills crisis has reached critical proportions and there will need to be some imaginative solutions need to be found to train more engineers, more rapidly and get them into productive positions if we want to maintain economic growth and implement infrastructure expenditure plans over the next few years," says Bridgens.

"And, I think it's the private sector that will have to seek ways of achieving this," he says.

Bergville High School Careers Day 2009

The SAIEE continues to support the Bergville Community Builders (BCB) in their efforts to help Grade 10, 11 and 12 learners by motivating, sharpening and broadening their dreams and providing tertiary careers knowledge.

One of the main events during the year is the annual Careers Day held at Amangwane High School, about 25 km outside of Bergville in KwaZulu-Natal.



This high school is one of 40 in the Bergville area. The Careers Day, which took place on the last Saturday of January this year was attended by an estimated 800 learners from 19 of the area's high schools.

In addition to the SAIEE, more than 15 organisations were present to expose learners to careers ranging from Engineering and Science to Agriculture, Wild Life and Financial Management.

A number of sponsored awards are given to the schools that have excelled. The SAIEE donated the most Consistently Performing School from 2005 to 2008 to Meadowsweet High School. The award consisted of a framed certificate and a deposit of R1 000 into the school account. Mr Majola, Manager of the Emanwaneni Ward, accepted the award on behalf of the school.



The SAIEE would like to thank the BCB for their efforts and also Vaughn Stone and Chris Ramble of the SAIEE KZN Branch for participating and demonstrating principles of electricity and magnetism to the over 100 learners that attended the SAIEE presentations.

Far left: Past SAIEE President, Viv Crone, presents the SAIEE award for the most Consistently Performing School to Mr Majola, manager of Emangwaneni Ward.

Left: Mr Majola expresses his joy at receiving this award!

Cutting live cables is no problem

Surgetek is importing a live line cable cutter from Haupa that can cut low and medium voltage cables up to 60 kV AC and protect the operator even if he or she accidentally cuts live cables. The cable cutter has been awarded the GS safety mark of approval.

With a cutting range of up to 90 mm diameter, the cable cutter is supplied with a ten metre long high-pressure hydraulic hose with a leak-free coupling system and an earth harness. The hose connects the double piston foot-operated pump to the cutting head, and has special insulating features to ensure a high standard of safety when cutting cables.

As the cutting head is generally not visible when cutting a cable, the cutting process can be controlled by monitoring the pressure gauge

that is attached to the pump. This process has been successfully and repeatedly tested in medium voltage applications with live cables, and has apparently gained international approval.



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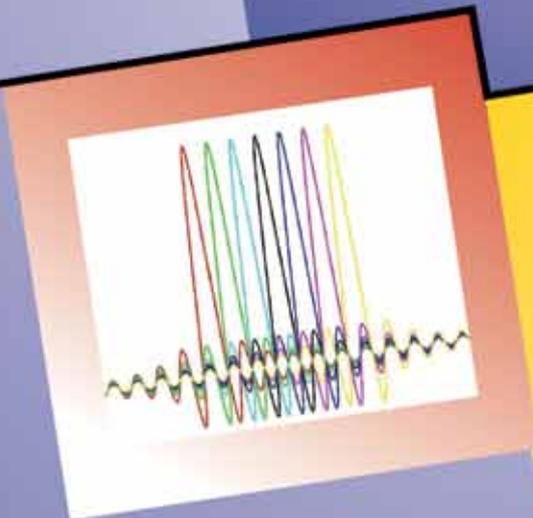
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