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R&D for Service Companies
By Daniel Burrus

When you think of organizations that have a research and development (R&D) department, what type of organization do you think of? Most likely, you think of manufacturers, software developers, drug companies, biotech companies, and defense contractors, to name a few. You probably did not think of property casualty insurance companies. After all, they don't make anything; they sell a service, in this case, insurance. Many service companies, such as banks, brokerages, and advertising companies, do not have R&D departments. Why? They don't think they need them. However, there is at least one Property casualty company that has had an active R&D department and over the years, it has produced both competitive advantage and higher profits. The company is Progressive Insurance.

Little Things Can Make Big Differences

One of the early wins for the Progressive R&D team was to find a more accurate way to rate the risk of drivers applying for auto insurance. At that time, insurers were all using the same method, which focused on the driver's past driving record and the home address. This was good, useful information, but as those of you who have read my articles over the years know, there is no competitive advantage in doing the same thing your competitors are doing. The Progressive R&D team looked at a wider field of available data, ran some experiments, and found an amazing fact: Drivers who have poor credit ratings have more accidents. As a matter of fact, they found a direct correlation between the driver's credit rating and the number of claims. The lower the credit rating, the more claims they filed. This provided Progressive with a far better tool for rating risk, and in turn, provided superior financial results and a major competitive advantage.

The Competition Will Copy

Whenever a company implements a new advantage, their competitors will notice and copy it to the best of their ability. They may even improve upon it. That has happened to Progressive, and today all property casualty insurance companies rely on this method for determining risk and establishing rates.

Finding The Next Advantage

One of the biggest mistakes companies make when they establish a new competitive advantage, is to rest on that advantage and fail to develop a new one. Thanks to Progressive's R&D department, they have been testing a new advantage. They have developed a "Black Box" for a car, similar to the Black Box used by all commercial airlines. The car's Black Box keeps an exact record of the roads used, the speeds traveled, and the time of day at each point of the driver's journey. If the driver speeds, the Black Box will record it, and that information will be available for the insurance company to review at any time. If an accident does occur, sensors in the Black Box record the direction, speed and amount of impact. Combining that data with the exact time and location of the automobile provides the insurance company, as well as the court, with accurate data as to what actually happened. It's easy to guess that drivers who know they have a speeding problem would not like having a Black Box on their car. In addition, privacy issues would keep insurance companies from requiring their customers to use the Black Box system. So, who would want to use this device? Progressive has found that drivers who know they are good drivers are willing to use the Black Box, if it will lower their insurance cost. I would also speculate that drivers who already have several violations (and therefore pay a higher rate) but feel they are good drivers would also agree to use the Black Box, if it would lower their rate. So far, it is only an experiment by Progressive's R&D department, but it is a great example of out-of-the-box thinking that all service companies should be doing, but seldom do because they have no one assigned to the task. Do you have a R&D department in your organization? If not, should you?

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TECHNOLOGY NEWS HIGHLIGHTS

CLOTHING INSPIRED BY PINECONES

A new "smart fabric" that adjusts to changing body temperatures is the latest product of biomimetics – the concept of using ideas from nature to develop new, cutting-edge products. In this case, the "smart" material mimics a mechanism similar to when pinecones release their seeds. The scales of pinecones are made up of two different layers of fibers running in opposite directions. As they dry out, the inside layers expand more than the outside layers, causing the scales to bend outward. By applying this same principle (only in reverse), researchers have been able to develop a material that automatically breathes when you get hot and sweaty. The cloth is covered with tiny flaps approximately 1/5000 of an inch wide. When they absorb moisture, the inside surface of the fabric expands, bending the flap backwards. As body temperatures and moisture drop, they shrink again, closing the flap. In addition to keeping people comfortable, clothing that changes shape and/or color with its surroundings might make an interesting fashion statement, and could be available within a few years.

For information: Prof. Julian Vincent, University of Bath, Bath BA2 7AY, United Kingdom; email: j.f.v.vincent@bath.ac.uk; Web site: http://www.bath.ac.uk

ARTIFICIAL HEART RECEIVES THUMBS UP FROM FDA

More than two decades after Barney Clark received the first artificial heart, the CardioWest (a descendant of the original Jarvik-7) became the first artificial replacement organ to receive FDA approval. Designed as a "bridge-to-transplantation" device, the Temporary Total Artificial Heart (TAH-t) sustains heart failure patients until a donor heart becomes available. CardioWest is implanted by removing the lower portion of the heart. The artificial device is sewn into place and connected by hoses to an external pump. The patient's blood pressure and cardiac output are quickly restored so that other organs can recover their normal function. As a result, patients are healthier for the transplantation procedure, increasing the chances of success. It is estimated that there are 8,000 people on waiting lists for heart transplants, and 30 percent will die before a donor becomes available. The cost for the new implantable heart will be $80,000 to $100,000.

For information: SynCardia Systems, Inc., 1992 E. Silverlake Road, Tucson, AZ 85713; phone: 520-545-1234; fax: 520-903-1782; Web site: www.syncardia.com

FDA APPROVES CHIP FOR HUMANS

For the past several years, implantable microchips have been widely used to track stray pets and restrict access to secure locations. But recently, the FDA approved their use as a means of providing medical practitioners with vital patient information to help speed care in emergency situations. About the size of a grain of rice, VeriChip™ is a RFID (miniaturized radio frequency identification) device that is implanted just beneath the skin. When energized by a proprietary scanner, the chip transmits a unique identification number, which, in turn, allows access to a secure, password-protected, subscriber database containing personal information, such as blood type, allergies, and known medical conditions. Because the VeriChip is activated by the scanner, it doesn't require its own battery or other power source. The company is also marketing the device as a personal verification system to curb identity theft and to enhance security of banking and credit card transactions.

For information: VeriChip Corporation, 400 Royal Palm Way, Suite 410, Palm Beach, FL 33480; phone: 561-805-8000; fax: 561-805-8001; Web site: www.4verichip.com

COMPUTERS THAT CAN "SEE"

A new technology called 3DAWARE will soon make it possible for computer systems to visually interact with people and surroundings on a level that was not previously possible. A key component of this revolutionary system is an algorithm that processes images to give machines "spatial awareness." The concept is similar to depth perception in humans. Our left

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and right eyes view objects from slightly different perspectives. The brain automatically processes this difference (called parallax), enabling the viewer to discern variations in distance between objects. Although computers are capable of computing such information, stereovision can require up to 2 billion computations per second, making it impractical for real-time, motion picture processing. Computer experts recently found a way to speed up this process by comparing the relative intensity of pixels to their surrounding pixels. The difference is converted to distance measurements using calibration parameters specified by the user. The net result is a system that can see, interpret, and respond to its surroundings automatically. In addition to security surveillance, possible applications for the new technology include collision avoidance and navigation for vehicles and robots, gesture tracking for video games, and assistive medical care.

For information: Tyzx, Inc., 3895 Bohannon Dr., Menlo Park, CA 94025; phone: 650-618-1510; email: info@tyzx.com; Web site: www.tyzx.com

AUDIO SURVEILLANCE

Researchers at the USC Center for Neural Engineering are working on a new surveillance system that increases security by listening for atypical sounds and automatically notifying authorities of any suspicious activity. The software-based system uses mathematical algorithms to model the way the brain interprets sound. However, it is far more sensitive than the human ear, and is capable of more precisely distinguishing between similar sounds. The first application for the system will be to monitor urban activity. Mounted on light poles, a part of the device is used to "listen" for sounds, such as gunshots or the rattle of someone climbing a chain link fence. If sound is detected, surveillance cameras will automatically be directed toward the source of the noise, enabling remote monitoring over a broad area. Other uses for the system could include surveillance of deserted borders. By detecting footfalls or whispers, unmanned sections could be monitored continuously, greatly enhancing security.

For information: Theodore Berger, University of Southern California, Center for Neural Engineering, Los Angeles, CA 90089; phone: 213-740-8017; email: berger@bmsr.usc.edu

ENVIRONMENTALLY FRIENDLY GOLF BAG CART

A new fuel-cell-powered golf bag carrier recently debuted at tournaments in Europe. The trials are being conducted to determine if this newest development in golf gear is ready to be released for mass production. The motorized carrier is powered by a 100-watt fuel cell pack that measures only 10 by 8 by 6.5 centimeters but delivers enough electricity for an eight-hour round on the course. A canister of hydrogen supplies the needed fuel, and the only emissions are a few drops of water.

For information: Solucoes Racionais de Energia, SA (SRE), Poligono Industrial do Alto do Ameal, Pav. C13 Maralhal, 2565-641 Torres Vedras, Portugal; phone: +351-261-91 01 80; fax: +351-261-91 12 46; email: info@sre-fc.com; Web site: www.sre-fc.com

SAFER, MORE EFFECTIVE WEED CONTROL

Scientists at the University of Texas have found a way to make herbicides more effective – a breakthrough that could drastically reduce the amount of weed killers used every year by farmers and other groundskeepers. Weeds have a built-in mechanism to defend themselves against foreign compounds. However, a newly developed compound called Resistox inhibits the production of these protective enzymes, rendering plants indefensible to toxins. In a field test where Resistox was combined with a conventional herbicide called atrazine, the amount of herbicide required to keep a corn crop weed free was reduced by 50%. In the future, a similar technique may be used to reduce human resistance to drugs.

For information: Stanley Roux, Jr., Ph.D., University of Texas at Austin, Molecular Cell & Developmental Biology, 1 University Station, Stop A6700, Austin, TX 78712; phone: 512-471-4238; fax: 512-232-3402; email: sroux@uts.cc.utexas.edu

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IN THE SPOTLIGHT: ORGANIC LIGHTING

Because of their ability to operate at very low power levels, organic light emitting diodes (OLEDs) have been regarded as highly desirable alternatives to standard liquid crystal displays, and researchers in Dresden recently discovered a way to make them even more efficient. They found that the conductivity of the diodes can be increased by infusing the outer layer with another organic material. This reduces the amount of power that is lost as heat, thereby improving light efficiency. Working with a green-emitting OLED, they were able to boost the output to 90 lumens per watt — a level that is about ten times greater than a green incandescent bulb and twice as efficient as currently available green OLEDs. The company is currently working on doubling the output of red and blue OLEDs as well, giving them the necessary components for a full color OLED display. With additional research, the team believes that OLEDs could eventually even surpass fluorescent tubes, the current standard for lighting efficiency.

For information: Sabine Koch, Novaled GmbH, Zellescher Weg 17, D-01069, Dresden, Germany; phone: +49-351-42776 0; fax: +49-351-42776 29; email: sabine.koch@novaled.com; Web site: www.novaled.com

WiMAX BRINGING BROADBAND ACCESS TO THE REST OF THE PLANET

High-speed wireless Internet access will soon be more than a pipe dream, thanks to WiMAX (wireless broadband networks). A forum of equipment and component suppliers is overseeing the deployment of WiMAX to insure compatibility between manufacturers and to implement the IEEE 802.16 standard that addresses the long-range limitations of DSL and cable. Currently, DSL and cable are only accessible to a small fraction of global users. As a "last mile" technology, WiMAX will fill the gap in many areas where it simply is not cost-effective to install such services. And in emerging markets, where little infrastructure exists, WiMAX promises to provide accessibility in areas that would never be served by "wired" technologies. Recently, Intel unveiled one of the first requirements: its first "system-on-a-chip" (codenamed Rosedale), which will allow home and business computers to access the Internet at speeds of up to 75 Mb per second, over distances as far as 30 miles. It plans to begin building the chips into products in 2005.

For information: WiMAX Forum, 3231-C Business Park Drive, Suite 131, Vista, CA 92081; Web site: www.wimaxforum.org

NANOTUBES CLEAN UP WATER

A team of scientists has developed a reusable carbon nanotube filter that traps bacteria and viruses. By devising a way to get carbon molecules to collect on the inside of a quartz tube, they constructed a cylinder of nanotubes that are arranged radially and packed together tightly (envision a fistful of spaghetti). When water is pumped through the cylinder walls, water molecules pass through the tiny gaps, but many common bacteria and viruses, which are larger molecules, get stuck. As is typical of carbon nanotubes, the filters are strong and heat resistant enough to be ultrasonically cleaned or even autoclaved many times over.

For information: Pulickel Ajayan, Rennselaer Polytechnic Institute, 112, Materials Research Center, 110 Eighth Street, Troy, NY 12180-3590; phone: 518-276-2322; email: ajayan@rpi.edu; Web site: www.rpi.edu

"GUIDED MISSILES" TARGET CANCER

Interferon beta is a known anti-cancer therapy, but toxic side effects have limited its therapeutic value. Recently, however, researchers found a way to minimize the negative side effects by delivering the treatment directly to the tumor. Tumor-specific stem cells are encoded with the interferon beta gene. Once introduced into the body, they act like "guided missiles" to target only the tumor cells. In this way, healthy tissue can be bypassed while higher concentrations of the anti-cancer therapy are delivered to the tumor. The method has been tested on mice, and human trials are expected to begin soon.

For information: Michael Andreeff, University of Texas, M.D. Anderson Cancer Center, 1515 Holcombe Blvd., Houston, TX 77030; phone: 713-792-6161; Web site: www.mdanderson.org

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