

## ELECTRONICS REPORT

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### BUSINESS & MARKET NEWS

**Solid-State Memory** - Seagate Technology LLC plans to add solid-state drives based on flash memory chips to its lineup of storage products sometime in 2008. Seagate will introduce the drives across a range of products including desktop and notebook PCs, offering various storage capacities. Sods, as solid-state drives are also known, use flash memory instead of magnetic disks to store information. Flash is a type of non-volatile memory, which means the chips retain stored information when power is off. Other memory types, such as DRAM, lose data when the power goes off. Sods offer a couple advantages over disk-based drives: they're lighter, consume less power and more rugged, making them ideal for laptops and mobile devices. They are also more expensive, but the price gap is narrowing as flash memory becomes increasingly cheaper. Seagate already makes hybrid drives, which combine flash memory with magnetic disks. Its Momentus 5400 PSD hybrid drive stores the most commonly accessed data on flash memory instead of on disks, which improves read time and speeds up the process of booting a computer, the company said. The drives are intended to be used in laptops and are available in capacities up to 160GB. *[We've been predicting the demise of magnetic memory since around 1985, so when long-time leader Seagate adds solid-state, this would seem like an important signal. But, maybe not. Seagate is in the storage business and may be just expanding the product line technology. Every time magnetic memory gets pushed by other technology, there's a breakthrough from IBM, who invented the technology in the first place. The last several breakthroughs, including GMR, came from IBM. And Big Blue has more density-boosting breakthroughs coming along. So don't count magnetic out for another decade or two.]* Source: ComputerWorld.



**Bosch on MEMS Business** - Robert Bosch GmbH claims to be the world's largest manufacturer of MEMS-based sensors, with production levels that exceed 100-million MEMS chips per year. In 2005, the company spun off subsidiary Bosch Sensortec to expand its MEMS offerings beyond automotive applications and into consumer and other products. Bosch has also licensed its proprietary deep-reactive ion-etching (DRIE) production technique to SiTime. for the manufacture of oscillators and timing chips. *[Bosch has the best reactive ion etching process and it is now being adapted to Through Silicon Vias (TSV) for 3D memory]*. Bosch began MEMS research over 20 years ago, but the earliest work did not lead directly to products. Today, Bosch has over 350 engineers working exclusively on MEMS chips. The first product was introduced in 1993 and was an integrated pressure sensor housed in a metal can for engine management. The sensor had better than 1% precision across its temperature range. Carmakers used it to measure manifold air pressure so reliably that it is still in volume production today. The first key process inventions were epitaxial polysilicon (epi poly) and deep-reactive ion-etching (DRIE) process, which enabled then to create structures perpendicular to the surface with variable geometries. Then Bosch invented a release process using a dry hydrofluoric acid process, which



was another breakthrough as it was much simpler than others at that time. Finally, they invented a wafer-scale encapsulation technology so stable that we could assemble and package our MEMS chips in inexpensive plastic packages.

Bosch also built the world's first accelerometer to be housed in a plastic package that provided a cost advantage compared with the very expensive ceramic and metal housings offered at the time. New products will include a CO<sub>2</sub> sensor (improve aircraft cabin air control), a tire pressure sensor that is quite sophisticated in terms of chip functionality; it includes a complete RF



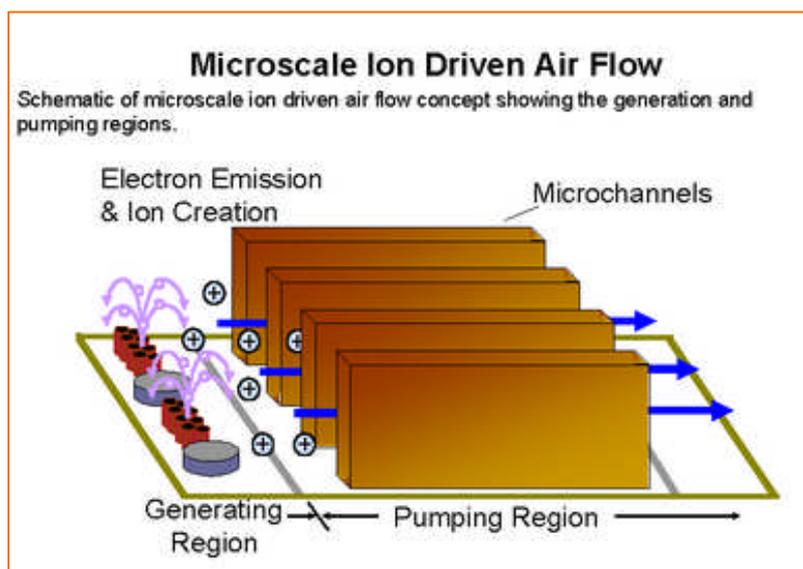
transmitter and a low-frequency transceiver, plus it must have very low power consumption. This device has to survive at least 10 years in the tire without changing batteries. There is a lot of interest in gyros, but they have the disadvantage of larger die, higher cost and higher power consumption; not a good fit for consumer apps, but can use a three-axis acceleration sensors. Future MEMS devices will include sensors with a broader range of functionality and a much better price/functionality ratio. Source: EE Times.



## TECHNOLOGY FOREFRONT

**New Cooling Technology** - The Purdue University work was funded by Intel and also supported with a National Science Foundation fellowship. Researchers have demonstrated a new technology using tiny "ionic wind engines" that might dramatically improve computer chip cooling; improvement is 250%. The problem with traditional cooling is limitation by a phenomenon called the "no-slip" effect; as air flows over an object, the air molecules nearest the surface remain stationary. The molecules farther away from the surface move progressively faster. This hinders computer cooling because it restricts airflow where it is most needed, directly on the chip's hot surface. The Purdue experimental cooling device was fabricated on top of a mock computer chip, works by generating ions using electrodes placed near one another. The device contained a positively charged wire, or anode, and negatively charged electrodes, called cathodes. The anode was positioned about 10-mm above the cathodes. When voltage was passed through the device, the negatively charged electrodes discharged electrons toward the positively charged anode. Along the way, the electrons collided with air molecules, producing positively charged ions, which were then attracted back toward the negatively charged electrodes, creating an "ionic wind." Within three years, researchers hope to

be able to miniaturize it and make the system rugged enough [Why so long? Sounds like the Ionic Breeze air purifier. Is this a known effect? This seems familiar]. Source: Newswire.



**The Ultimate e-ticket** - All Nippon Airways (ANA) of Japan will complete their rollout of a ticketless check-in and boarding pass service called SKiP! You book the ticket online thru either a computer or your mobile phone. Prior to arriving at the airport, you "place" the ticket onto your ANA Mileage smart card, or have the booking downloaded into your cell phone. When you get to the airport, you just wave your mobile or IC card at the reader. It confirms your booking, the light turns green, and off you go to the gate. At the gate, it's the same thing. This service has been in use at Haneda to Osaka for the past year and is working very well. Just turn up to the airport just before the flight and walk straight through security and onto the plane. Source: SlashDot.



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**Logitech's MEMS Mouse** - Every since I got the a Logitech pen that recorded and stored writing using photonics and special paper (unfortunately), I've been waiting for them to build an input device around MEMS. It's been a long wait, but here it is. Logitech took the covers off its MX Air Mouse this morning. Logitech's MX Air Mouse simply interprets how you move the mouse, regardless of where you point it. You can aim it at the ground and the cursor will move properly on your screen, which means you can be a little more casual when you use your home theater PC. It also works as a standard tabletop wireless mouse. Logitech has incorporated a few gesture controls. Flick it from side to side and you'll bring the volume up and down, for example. It also replaced the scroll wheel with a touch-sensitive strip between the two buttons. There's also a few media control



buttons on the new mouse that might take some getting used to before they feel as natural as they might on a standard remote control. The \$150 cost of the Air Mouse puts this device firmly in luxury territory. The product is already on the shelf. The technology behind this motion-sensing capability is MEMS. Expect to see more devices that use MEMS, but at a price that is more affordable to the mass market. Source: CNET.

**UAVs Monitor Wildfires** - UAVs are playing an increasing number of non-military roles.

VistaNav-SSR UAS Monitors Wildfires with Mercury Computer Systems. The company announced that it was selected by the Remote Sensing Applications Center of the U.S.D.A. Forest Service to support two wildfire monitoring and forest mapping projects in 2007 with the VistaNav(TM)-SSR Unmanned Aircraft System (UAS). The Remote Sensing Applications Center, located in Salt Lake City, Utah, provides technical assistance to agency field units using advanced



geospatial technology for improved monitoring and mapping of natural resources. The VistaNav-SSR (Smart Surveillance and Reconnaissance) system is a complete, high-performance UAS that includes a ground control station integrated with 3D Synthetic Vision and a small unmanned aerial vehicle (UAV). The system features miniaturized airborne and mission computing image processing capabilities designed to improve control and command functions, increase situational awareness, and integrate ground-imaging computations for aerial remote sensing applications such as oil and gas pipeline monitoring, border surveillance, forest fire detection and monitoring, precision

agriculture, and more. Flying above fire at night can be dangerous for manned aircraft, and low-level manned aircraft flights are not currently utilized for safety reasons. Unmanned aircraft systems can fly long missions, survey wildfire sites at low altitude, and transmit critical data to enable decisions that are more informed more quickly. Source: EDA Geek.

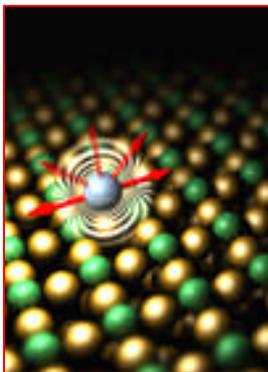
**More War Bots** - The US continues to move to UAVs for combat. The U.S. Navy awarded Northrop Grumman a 6-year \$635.8-million contract to further develop the X-47B fixed-wing unmanned air system (UAS). The funding for the Unmanned Combat Air System Carrier Demonstration (UCAS-D) program will allow Northrop Grumman to conduct take-offs and landings from the U.S. Navy's nuclear-powered aircraft carriers. The UCAS-D award is the culmination of several years of effort with the Navy to show the benefit of melding the capabilities of a survivable, persistent, long-range UCAS with those of the aircraft carrier. The UCAS-D program will reduce the risk of eventual integration of unmanned air systems into carrier environments. Northrop Grumman will build two X47-B aircraft for the U.S. Navy and the first will take flight during late 2009. The company expects to begin the first carrier landings in 2011. The X-47B, a sister-ship to the X-47A, has a cruising altitude of over 40,000 feet and a combat radius of 1,500 nautical miles. The stealthy vehicle can carry an internal payload of 4,500 pounds and can travel at high subsonic speeds. Source: Daily Tech.



## **NANOTECH ELECTRONIC EMPHASIS**

**Ultimate Disk Drive Density** - *[This may actually go beyond nanotech since is single-atom stuff].*

The highest density hard-disk drives need about 1 million atoms to store a single bit of information. IBM, at their Almaden Research Center (San Jose, CA), demonstrated the ability to store and measure a bit on a single atom. *[IBM has lead the way in magnetic density research, and even discovered new phenomenon along the way. Their latest work could yield hard drives with ultra-high storage capacity, so don't write off the old magnetic drive just yet.]* IBM's claims its atomic-level demonstration could pack up to 1,000 times as much information on a hard disk than current technologies. The future hard drive could store 30,000 full-length movies on a device the size of an iPod. The latest hard drive architectures use perpendicular recording, which depends on exotic new magnetic media. Magnetic anisotropy, a measurement of the ability of a media type to retain a bit, is the most important parameter for next generation perpendicular recording media. IBM has been able to measure the same property for a single magnetic atom. Using the atomic microscope *[invented by IBM]*, they can take a single atom, measure its magnetic anisotropy, put another atom next to it, see how that affects the first atom's magnetic anisotropy. This approach was used to learn how to develop a material with the ultra-high data storage densities. Next, IBM researchers will measure the anisotropy of different types of atoms at room temperature to find a stable, ultra-dense material for use in commercial hard drives. They intend to find a material combination, a particular magnetic atom on a particular surface that has the ability to stably maintain its magnetic orientation plus have be ability to switch between states so we can quickly flip its spin. They expect to demonstrate such a stable media material within the next couple of years. Source: EE Times.



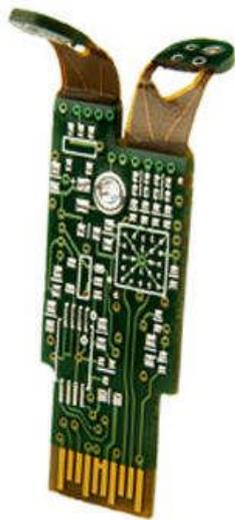
**Nanotube Connectors for ICs** - The circuitry in microchips is presently made by adding successive patterned layers of metal and semiconductor, separated by insulators; tungsten or copper are the most common. Researchers from the Hong Kong University of Science and Technology are planning to replace traditional plugs with carbon nanotubes. The idea is to create the circuitry as usual but with a hole where the plug would normally sit. They then grow carbon nanotubes in the hole to connect the layers together. This idea should scale well since smaller circuit sizes can be connected using fewer tubes. The nanotubes should also be less susceptible to the problem of migration. Carbon nanotubes are grown using chemical vapor deposition in the presence of a catalyst such as iron, copper or platinum, so obviously this will have to be done in a way that does not "poison" the electronic characteristics of the chip. The question is, how easily this can be incorporated into current chip production. *[We've been hearing the "CNT Connection" idea for several years and the concept is overly obvious. But how form CNTs, or conductive carbon ropes in all the right places, is the issue. I'll bet on one of the big semiconductor leaders, like IBM or Intel. But it's only a matter of time that new connector materials will be introduced.]*



Source: New Scientist.

## MATERIALS

**More Polyimide with Rigid-Flex on the Increase** - Compeq (Taiwan) will start producing rigid-flex printed circuit boards for Apple iPods in small volumes in August, but shipments will ramp up in September. Compeq has also received validation for high density interconnect (HDI) and rigid-flex PCBs for Apple's iPhone series. The rigid-flex PCB segment is expected to account for 15% of the company's third-quarter revenues. Taiwan's handset PCB makers have been actively developing their rigid-flex PCBs products, as the higher level of technology required to produce such products draws a higher average selling price (ASP). Wus Printed Circuit expects the revenues from rigid-flex PCBs to increase to 30% of the company's total revenues by the end of the year, up from 10% currently. Unitech Printed Circuit Board has predicted that rigid-flex PCBs will account for more than 10% of company sales in 2007, up from about 8% in 2006. The overall handset PCB market in the third quarter will be better than the second quarter although orders from Motorola remain weak, the sources. Compeq's handset PCB shipments will reach 35 million units in the third quarter, up from 30 million units in the second, the sources indicated.



Source: DigiTimes.

## TELECOM

**Wave Wars** - Wi-Fi is presently the king of the unlicensed band, but can it keep the crown? Market research firm In-Stat. Despite says no. According to them, Wi-Fi is destined to be overtaken in market volume by Ultra-wideband (UWB) technology. Since most digital interconnects are adopted first in PCs and then by consumer electronics, winners and losers in the wireless connectivity race will be determined by their ability to win, and hang on to, sockets in the mobile PC backplane per the In-Stat



**Ultra  
Wideband  
Systems**

report. Over the long term, the two wireless technologies will co-exist in PCs and complementary products, and although legacy wired interconnects will exist on the PC platform for several years usage should transition to UWB in a very short time. *[Since Wi-Fi works quite well, and products are widely available from multiple sources, there must be strong compelling reasons to switch. I haven't seen anything in UWB to merit the predicted transition].*

**Wi-Fi to Replace Wired Ethernet** - The Burton Group suggests that companies should begin



making plans for switching their local-area networks (LANs) from wired to wireless. They say that the new 802.11n standard "will put pervasive mobility on the fast track. In their report, they claimed that 802.11n will make serious inroads into wired Ethernet's market within 24 to 36 months. Reasons include a growing numbers of laptop users, increased use

of mobile applications and the deployment of voice over Internet Protocol, or VoIP. The 802.11n offers a maximum of 248-Mbps. While recent advances in radio design, security and wireless management would soon make 802.11n the preferred LAN access technology, wired Ethernet would continue to be necessary in switch trunks and data center networks for many years to come. The new version of 802.11n promises higher throughput, and better range and bandwidth, than its predecessors. However, the standard's ratification has been a controversial affair, with final approval by the Institute of Electrical and Electronics Engineers (IEEE) poised to come as late as 2009. As a result of that delay, the Wi-Fi Alliance, the nonprofit formed to certify interoperability between Wi-Fi products, began certifying equipment conforming to the draft standard earlier this year in a bid to give customers, particularly those in the consumer sector, some confidence in the interoperability of various vendors' 802.11n devices. Source: CNET.

**BUT, Municipal Wi-Fi Faces Financial Hurdles** - *[This is about money and the right business model, NOT the technology].* Last year, it seemed like just about every



major U.S. city was drawing up ambitious plans to build wireless Internet networks. Now, economics is blurring the vision as city leaders and the companies proposing to build the Wi-Fi networks haggle over whether the projects make financial sense. The problem came into sharper focus this week as projects in San Francisco and Chicago unraveled while another high-profile deal in Houston neared a breaking point. Cities and companies

are rethinking the models that they are adopting. Wi-Fi networks have either already been built or are under consideration in 455 cities and counties across the United States. The second thoughts about municipal Wi-Fi revolve around questions about whether the networks will generate enough revenue to justify the multimillion-dollar investments to build and maintain them. San Francisco Mayor Gavin Newsom was recently informed that EarthLink was rescinding a proposal to cover the estimated \$14 million to \$17 million cost of building the city's Wi-Fi network. Had the San Francisco system been built, EarthLink planned to charge about \$20 per month for Wi-Fi access that would have been three to four times faster than a free service subsidized by ads sold by Google Inc. San Francisco still hopes to find other vendors willing to build a Wi-Fi network in its city, an effort that Google said it will continue to support. Last year, Google completed a free Wi-Fi network in its home town of Mountain View that the company says attracts about 15,000 users per month. EarthLink had doubts about whether it could sign up enough San Francisco subscribers to recover its costs there, based on its experience so far in other cities, including Philadelphia and New

Orleans, where it has already completed or is still building Wi-Fi networks. Chicago canceled its \$18.5 million Wi-Fi project after concluding it would require the city to spend too much money to help finance it. Financial worries also have jeopardized a \$20 million Wi-Fi network in Milwaukee. The project remains in its testing phase, but the vendor, Midwest Fiber Networks, has publicly expressed concerns about whether the network will attract enough customers to recoup the investment. Source: Associated Press

**AA Wi-Fi in 2008** - American Airlines (AA) will utilize AirCell's high-speed broadband network in 2008 on Boeing 767-200 aircraft. The service will provide Internet, VPN and email access to Wi-Fi capable devices in all seating classes for a fee. The cost of admission for AA is \$100,000 per plane according to AirCell. Passengers can expect to pay no more than \$10 per day for unlimited service. The service will be mainly provided on AA transcontinental flights and the company will install cellular towers around the continental U.S. to accommodate AirCell's broadband service. Each 767-200 plane will feature one antenna on the top of the aircraft and two on the bottom to receive the signals. Passengers will then be able to connect to Internet using 802.11a/b/g. Boeing had originally planned to make its 787 Dreamliner Wi-Fi capable to give airlines the option of providing wireless high-speed broadband access to all passengers. Boeing later dropped the Wi-Fi idea and decided to use wired networking to save weight. Source: Daily Tech.



**Phone Wars Continued** - India overtook the U.S. as Nokia's No.2 market.



Nokia, the world's top cellphone maker, said that India overtook the United States in the Q2-07 to become its second biggest market while China remains #1. Nokia shipped 60-million handsets from its factory near the southern Indian city of Chennai in the 18 months to August, and expects demand to remain strong as India's user base surges. India has quickly become one of the largest markets and demand will not be limited to low-cost phones. Globally, Nokia sold 100.8-million phones in April-June and, according to research firm Gartner, had a market share of 36.9%. Nokia Siemens Networks (joint venture with Siemens) will invest \$100-million in India over the next 3-years. Nokia had earlier said it expected India to become its No.2 market by volume by 2010, so India has some surprises in store. Nokia has set up a design studio in India, the first in a series of global satellite studios to develop ideas for emerging markets. Seven global component makers have invested \$500-million in the Nokia Telecom Park near Chennai and are likely to employ more than 30,000 people when fully operational. Source: EMS-Now.



**China to pass 500-Million Cellular Connections this Year** - China is the largest cellular market in the world and will exceed the 500-million connections mark in the Q3-2007. China Mobile is leading the market with a market share of nearly 70%. Discussions around the introduction of new high-speed technology in China suggest the deployment of at least a TD-SCDMA network in time for the Beijing 2008 Olympics Games in July. The government and the regulatory body are in the process of issuing licenses to operators. With quarterly growth averaging around 4%, China is adding around 19-million cellular connections each quarter, with market penetration at 35% in Q2-07. China Mobile has a strong grip of the prepay market (79%), which accounts for 66% of the total market. The leading operator is growing at an average rate of 5% on quarter and 20% on year. In 2007, China Mobile is expected to continue on the same growth



trend. The opportunities for high-speed services in China have stirred many discussions around which technology will be introduced by operators and when the first commercial launch will happen. Today, under the control of the government and regulatory body (the Ministry of Information Industry), China Mobile, China Unicom and China Netcom are preparing for their TD-SCDMA commercial trials to start by the end of 2007 in the biggest cities: Beijing, Shanghai, Tianjin, Guangzhou, Shenzhen, Shenyang, Xiamen, Qinhuangdao, Qingdao and Baoding. As consumers are keen to adopt the new technology and the 2008 Olympic Games have been targeted for the commercial launch, local authorities are expected to issue high-speed network licenses soon. China Mobile has invested \$5-billion in the deployment of the new network, and a real push for a first commercial launch by mid-2008 across the biggest cities is expect, according to Wireless Intelligence. In this scenario, China Mobile's high-speed cellular connections could reach about 5% of its total connections by 2010, reaching 100-million connections by 2012. Source: DigiTimes.

## IP

 **QUALCOMM Engaged In Patent Misconduct - IP trickery doesn't work for very long - the Rambus trials should have made that clear. And now QUALCOMM is also learning a lesson about not combining patents and standards. This is on top of losing in the International Trade Commission Court.** A San Diego federal court just ruled that Qualcomm relinquished its rights to enforce certain patents it alleged that Broadcom had infringed on, relating to a high-definition video compression standard. The court found that Qualcomm engaged in standards abuse and aggravated litigation misconduct for deliberately concealing two patents as a committee developed the H.264 video standard. Upon publication of the international standard, QUALCOMM filed suit against Broadcom for infringing on the two patents in San Diego federal court in October 2005. The court's findings indicate that this is one of the most serious and egregious cases of standards abuse and litigation misconduct that our industry has ever witnessed. It has become very clear that getting your IP written into a standard amounts to give up some of the patent and getting a lot of bad press. This seems like common sense and I'm continually surprised at how companies ignore "honesty as the best policy". Meanwhile, Washington upheld a U.S. International Trade Commission ban on imported 3G cell phones using QUALCOMM chips, set to go into effect immediately.



## INTERNATIONAL NEWS

**Chinese Advanced Manufacturing Problems** - Universal Instruments (UI) has scrapped its manufacturing operation in Shenzhen, China, based upon persistent quality complaints from customers of its precision instruments. The company has since turned the facility into an assembly center to serve its global market. The move comes as U.S. companies begin voicing concerns about Chinese manufacturing. Unlike Mattel, the giant toy maker that recently recalled products made in China, UI did not outsource its manufacturing. But even



under its own banner, UI ran into problems. UI opened the manufacturing center 5-years ago to cut product costs and get closer to its market. It did succeed in cutting costs of its GSM product family in half and obtained 50% of its parts from local sources. Being a pioneer of highly sophisticated plants in China, UI believed it was well prepared to make the move. After carefully studying the location and available resources, it finally decided to build China's first high-precision SMT equipment factory in Shenzhen, home to 40% of China's electronics manufacturing.

With the proliferation of RoHS rules around the globe, thousands of factories are purchasing new surface-mount technology production equipment to meet the new environmental protection needs. UI should have been well positioned to take advantage of the opportunity. However, costs of flying expatriates to China to improve skills of technicians and hidden costs of outsourcing easily swallowed the costs reduction of labor and components. It is not difficult to find a parts supplier in China, but getting the right supplier at the right quality level for sophisticated surface-mount technology equipment is a challenge.

UI put huge effort into educating the suppliers, which further raised costs and stretched UI's resources. And while the problem was being solved, UI continued to lose market share. Market analysts do not believe China is ready for such high-precision manufacturing. Just shipping some Western engineers to China to train local engineers did not solve the problem, in part because China is not ready for low-volume, high-mix production. There is little emphasis so far on quality control and supply chain management, and language and cultural differences only exacerbate these problems. UI says it will not carry out purchasing and precision mechanical work in Shenzhen in the foreseeable future. If it reconsiders that decision, it will locate its operation in the Shanghai area, where education levels are higher. According to data from China's Ministry of Information Industry, the country imported 10,351 units of SMT equipment in 2006; 77.5 % from Japan. Driven by the fast growth in manufacturing products such as handset, notebook computers and digital cameras, China had a total of 20,000 SMT product lines with 50,000 units of production equipment by the end of 2006. Of that number, 90% of the equipment was imported from 2001 to 2006, with an annual growth rate of 27.2%.

**New China Gas Pipeline** - China launched a gas pipeline that runs from the southwestern inland of Sichuan to coastal Shanghai, another "energy artery" to fuel the booming but energy-poor east following the grand West-East gas project. The 1,700-km pipeline is expected to channel 12-billion m<sup>3</sup> of natural gas annually from the Puguang field in Sichuan Province to the central and eastern regions that cover Hubei, Anhui, Jiangxi, Jiangsu, Zhejiang provinces and Shanghai. The project, with an investment of \$8.25-billion, will start to channel gas to Shanghai at the beginning of 2010. Proven reserves of the Puguang gas field may reach 430-billion m<sup>3</sup> by the end of this year. China's proven reserve of natural gas has totaled 2.66-trillion m<sup>3</sup>. The gas-rich country has been promoting the use of natural gas to improve energy buildup and cut air pollution. Source: Xinhua



### **Vietnam Packaging Business**



Silicon Valley investors announced adding as much as \$200-million into a new chip-packaging plant in Hanoi. The newly formed Vietnam-Chipscale Advanced Packaging Services (V-Caps) will be led by a group of semiconductor executives with valley ties. The nation has 84-million people and is emerging as the new outsource "bargain" shop. Forecasters say that the economy will grow at 9% in 2007. The cost of doing business in Vietnam is about 50% as much as for China. Low cost is not the driving force for going there, but the culture a value system that is based on loyalty, creativity, knowledge, curiosity, tenacity, an advantage over most other countries. The 300,000-square-foot factory will be in the new Hoa Lac High Tech Park and will employ up to 1,500 workers. V-Caps will consider building two more similar facilities, as well. The company will assemble and test chip packages for semiconductor companies for an array of products, from cell phones to personal computers. *[We'll have to what and see if Vietnam will be the next Asian giant].* Source: SI.

### **India IC Revenues**



The Indian chip market was to reach \$3.8 billion in revenues in 2006, but actual revenues were about one-third less than that at \$2.69 billion. The India Semiconductor Association began surveying the Indian chip market in mid-2005. There was a sharp decline in average selling prices (ASP) in many end-user product categories contributed to the big shortfall between the forecast and the actual revenues. Products like mobile handsets accounted for most of the shortfall. The global chip market is growing at a rate of 8% to 9% annually while the Indian market is forecast to grow at a compound annual growth rate of 26.7% through 2009. India is emerging as one of the fastest growing region in the world. But the bill of materials for handsets fell sharply from \$25.7 to as less as \$11 and the decline in ASPs by over 40% contributed heavily to the shortfall in Indian chip revenues. Falling prices for discrete and memory products also cut chip revenues for color TV sets, especially those manufactured here. The falling bill of materials for modems, which dropped from as much as \$20.75 to just \$4.9 per unit, was another contributor as did parts costs for monitors, a key driver for the IT and office automation segments. The market update found that the chip market will nevertheless continue to grow since many Indian companies are expected to start manufacturing automotive electronic products. The market will also be boosted by anticipated demand for mobile handsets, desktops and notebooks, GSM base stations, set-top boxes and energy meters. According to the update, microprocessors are the biggest revenue source for the Indian chip industry. MPUs generated \$882-million in revenues last year, and are expected to grow to \$1.7-billion by 2009. Source: EE Times.