

findBIOMETRICS 2007 Year In Review

The response to this year's YIR was outstanding with 54 companies/industry experts responding to our questionnaire. We received responses from Canada, Spain, Australia, China, Ireland, Brazil, Hong Kong, Sweden, Mexico, Germany, UK, The Netherlands, Lithuania, Singapore, France, Korea, Japan, Italy and the USA.

Read what the industry leaders thought about significant events and announcements for the Biometric Industry last year; pressing issues facing the Biometric Industry for 2008 and what 2008 may hold for Biometrics. Was 2007 a good year for your company? What were some of the highlights? What will 2008 hold for your company?

Participants include:

LG Electronics, Neurotechnologija, NEC, Sagem-Morpho, Lumidigm, IBIA, Cross Match, Daon, Accu-Time, Identica, Cogent, L-1 Identity Solutions, Aware, IdentiPHI, NBSP, RF Logics, RCG Corporation, BIO-key, Greenbit, OSS Nokalva, San Jose State University, Cognitec, Griaule, Acuity, Deloitte UK, Privaris, Sequiam, Imageware, Bioscrypt, IdentiMetrics, Digital Persona, ZK Software, Ceelox, WCC, IriTech, AOptix, OmniPerception, Anviz, Human Recognition Systems, Futronic, Motorola, Agnitio, Precise Biometrics, SDKK, Fingerprint Cards, Biometrika, itWerke, Biometric Institute-Australia, AuthenTec, Janus, Panasonic, Biometrics 4ALL and Sage Capital.

Question 1. In your view, what have been the three most significant events/announcements for the Biometric Industry this year?

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Let's take a look at a summary of our findings.

The responses to this question were quite different than in past years. We received a much more diverse response with a total of 32 different events mentioned.

However one word stood out among all others...GROWTH. A total of 52% referenced growth as the top area this past year.

- Growth in Voice Biometrics,
- Growth in Mobile ID,
- Growth in Iris technology
- Growth in National ID market
- Growth in Multi-modal
- Growth in successful deployments,
- Most respondents felt that growth in the Consumer (non-government) market, with fingerprint laptops, Black and Decker's new consumer facing door lock, new sophisticated time & attendance/access control products and AuthenTec's 25 millionth sensor shipment, was most important.

Increased implementation of biometrics with special reference to National ID Programs was the next most significant area mentioned. Here are some comments:

- Successful implementations of facial recognition against e-passport images for border crossing at Faro, Lisbon and Brisbane airports.
- One of the more significant milestones during 2007 was the field trials of MasterCard's PayPass contactless payment system in New York City. This effort – supported by Citi, MasterCard,

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Cingular, and Nokia – is an important step in the evolution of fingerprint biometrics into consumer secure mobile commerce.

- Successful deployment of anonymous, enrollment-free fingerprinting at Disney World.
- Fingerprint readers have hit a price/performance point which has enabled integration into mainstream consumer and commercial notebook models from all major PC makers.
- The replacement of Proximity Cards for Access Control and Time and Attendance solutions by biometric smart cards in both the private and public sectors providing these solutions with individualized undeniable identification.
- AuthenTec continues to excel in the personal device arena reaching the 25 million sensor milestone.
- New technologies and new players are bringing us iris at a distance, iris on the move, and iris at a glance.
- Well-known, large manufacturers, targeting mainstream consumer markets made their first moves. We can now easily find a variety of biometric-enabled products such as safes, security solutions, gun-fire boxes, notebooks and locks, not just for specialized hi-tech companies only, but rather in the neighborhood store of most retailer chains.
- Win of the European BMS (the European Biometric System) behind its VIS (Visa Information System) to the Accenture led consortium; Important as it was probably the largest award of a biometrics project in 2007.
- The demand for greater efficiencies in law enforcement, along with improved speed and accuracy in biometric algorithms, has driven the proliferation of mobile handheld identification devices.
- Large government system deployments internationally – for example JAPAN VISIT and EU BMS – as well as initiations such as the FBI NGI procurement that is in progress. Additionally, the adoption of fingerprint technology by Disney for multi-day pass holders which demonstrates significant improvements allowing it to be used in a large scale commercial applications in a challenging environment.
- The increased emphasis, worldwide, on the need for personal privacy to go hand-in-hand with biometric security systems and the related emergence of personal, wireless biometric solutions.

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- The military's adoption of iris recognition systems for large scale applications, particularly in Iraq and Afghanistan, has helped bring biometrics more into the mainstream by demonstrating the superior accuracy and speed of the technology.
- The biometric passport implementation in Europe.
- The U.S. Transportation Security Administration (TSA)'s Transportation Worker Identification Credential (TWIC) began its first enrollments in Wilmington, DE. There were over 1,200 enrollments in the first three weeks of the enrollment process and more than 11,000 pre-enrollments. IMS Research estimates that 12 million workers will eventually be enrolled in TWIC.
- 2007 marked the introduction of many new biometric initiatives around the world, and major progress on the adoption of e-passports, biometric visas, and e-ID cards with biometric features.
- Initial or even continued penetration of commercial markets for biometrics and access control. Large corporations began investing in capabilities, platforms and markets.
- Increasing interest from the commercial sector: Speaker verification in particular is starting to be seen as a practical way of combating identity fraud in the financial industry. This is a significant event since the adoption of biometric solutions in the commercial arena has generally significantly lagged the government uptake, and this has held back the industry from higher levels of growth.
- First considerations for the security of the London 2012 Olympics seem to indicate that biometrics could play an important role in the preparation (e.g. construction) as well as the actual event.
- Large-scale deployments of ten-print auto capture technology demonstrate the utility of fingerprints for high-volume, high-throughput applications such as border control and visa applicant screening.
- The introduction of biometric door locks through a huge consumer channel – Home Depot – as a result of the partnership between Sequiam Biometrics and Black and Decker Kwikset. This is a signal of consumer acceptance.
- Another significant milestone was the continued evolution of “Iris at a Distance” capture technology. Companies like AOptix have emerged with amazing technology, and long standing pioneer Sarnoff has also made advancements.

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- The high profile mention of a biometrics database for FBI's NGI making front page news in The Washington Post. (December 2007)
- The progressing of the tender for the Indian Airways and Indian airports access control contract, to cover pretty much all of the sub-continent - the world's biggest single biometric contract so far.
- A second milestone is the wide recognition and acceptance of mobile biometrics in difficult settings, like the Mona Passage in the Caribbean, and in the world's harshest operating environments like Iraq and Afghanistan.

Activity concerning Financial Public Markets was mentioned by 36% of respondents. AuthenTec's initial IPO, ongoing M&A activity and the bankruptcy of Pay By Touch were some of the observations; some comments:

- The public markets embraced the potential of the commercial biometrics market with the successful IPO of Authentec on NASDAQ.
- Pay By Touch going into bankruptcy protection
- A large number of physical access control, data storage, and systems integration companies made strategic acquisitions in 2007 of firms that provide logical access software and biometric technology security solutions.
- Relatively successful Authentec IPO demonstrating Wall Street validation of the industry.
- Initial or even continued penetration of commercial markets for biometrics and access control. Large corporations began investing in capabilities, platforms and markets.
- The beginning of consolidation of the biometrics industry. We are starting to see some real merger and acquisition activity that indicates an industry getting to the next phase of growth.
- The filing of Chapter 11 by Pay By Touch after raising more than \$300 million in hedge fund money.

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- Pay By Touch bankruptcy filing in late 2007 is a clear proof that extraordinary funding (in this case \$320M) can not replace the necessity of hands-on biometrics technology experience and feasibility understanding. Additionally, attempt to change consumer behavior using biometrics technology without consumer demand for such change can be the doom of biometrics companies.
- I would say that the Authentec IPO was pretty critical along with the volume announcement...25 million sensors

Respondent's Submissions

Question 1.

What have been the three most significant events/announcements for the Biometric Industry this year?

- Successful implementations of facial recognition against e-passport images for border crossing at Faro, Lisbon and Brisbane airports.
- Successful deployment of anonymous, enrollment-free fingerprinting at Disney World.
- Work by NIST Image Access Division on biometric system usability.

James L. Wayman, San Jose State University

- Material progress on Government programs like TWIC, NGI and others. Programs are moving from "talking" to "walking".
- Relatively successful Authentec IPO demonstrating Wall Street validation of the industry.
- Initial or even continued penetration of commercial markets for biometrics and access control. Large corporations began investing in capabilities, platforms and markets

Jay M. Meier, President, Sage Capital Advisors, LLC.

- The public markets embraced the potential of the commercial biometrics market with the successful IPO of Authentec on NASDAQ.
- Fingerprint readers have hit a price/performance point which has enabled integration into mainstream consumer and commercial notebook models from all major PC makers.

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- Microsoft Vista has new features (e.g. UAC and Parental Control) which drive demand for the convenient security which fingerprints offer consumers and IT.

Vance Bjorn, CTO, DigitalPersona

- "Biometrics, in particular, is emerging as the fastest growing segment of the North American Access Control Market, benefiting tremendously from legislations such as the Aviation and Transportation Security Act."
- The emergence and acceptance of multi-modal biometric implementations and new modalities adds flexibility to biometric identification including the publishing of Vascular Pattern Matching as a biometric industry standard in ISO 19794-9:2007 for vascular image data interchange formats.
- The replacement of Proximity Cards for Access Control and Time and Attendance solutions by biometric smart cards in both the private and public sectors providing these solutions with individualized undeniable identification.

Terry Wheeler, President and COO, Identica Holdings Corporation

The industry continues to make significant progress in maturing both from the hardware and software perspective.

- First, reader quality continues to improve, and readers are available at very attractive price points. This is evident by the wide market penetration in laptops and more recently in deployment in other devices including cell phones.
- Second, the continued NIST testing provides government and commercial entities, integrators and system implementers with an unbiased testing benchmark to remove the mystique and interoperability issues that existed.
- There continues to be an unfulfilled market need to provide secure, accurate and convenient identification. Whether it is for government or commercial applications, biometrics have long been perceived as a natural solution to establish a person's identity and thwart ID theft, but the industry was not considered mature enough or "ready for prime time". The progress made in the first two items listed above now make biometrics a practical reality.

Mike DePasquale, President & CEO, BIO-key International

This has been said over and over that, "this year is year of the biometric". However in 2007 there have been some really significant changes for the iris biometric business. Government is focusing on pushing the industry to organize itself and address standards. Enterprises are looking at iris to solve internal identity verification concerns. We have seen great interest from large enterprises to financial institutions to energy companies to use iris recognition or at least prototype iris enabled applications. We are also seeing many

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governments around the world include iris recognition into future project requirement documents. *Mohammed Murad, Vice President Global Sales and Business Development, LG Electronics Inc. USA/ Iris Technology Division*

Among the most significant milestones for the industry in 2007, I would include the entry of big players like Microsoft into the arena; the increased willingness of government agencies like the FBI to embrace biometric technology; and the international scope of interest in biometrics, both in terms of development and application.

Peter DiMaria, Founder and Chief Executive Officer, Accu-Time Systems, Inc.

Of course there were many milestones this year. The ones that resonant for me are ...

- The arrival of Iris – As many industry pundits predicted and most everyone believed, the expiration of the original iris recognition patents has opened up the market for iris technology. New technologies and new players are bringing us iris at a distance, iris on the move, and iris at a glance.
- AuthenTec shipped its 25 millionth - While most industry hullabaloo has focused on developments in the government arena, Scott Moody and his team at AuthenTec continue to excel in the personal device arena reaching the 25 million sensor milestone. These sensors have been installed in personal electronics – laptops, phones, PDAs - helping to establish the foundation for the true the holy grail of biometrics; a global infrastructure that enables and is enabled by personal transactions authenticated by biometrics.
- The initial UK eBorders contract was awarded. It is gong to be very interesting to watch progress in the UK on their eBorders initiative – really a whole range of initiatives around UK border control. Will they progress at a smooth, methodical pace or will they stutter and stall with UK eBorders in much the same way the US has with their large-scale government projects (see following comment)?

OH and here is my vote for the most disappointing milestone of 2007 or should I say non-milestone ... a category you might consider adding ...

The almost pathetic on-going saga of the massive US Homeland Security based biometric programs that were supposed to drive the industry. TWIC, HSPD-12, Registered Traveler, REAL ID. Take your pick. Six years post 9/11 and counting and progress continues to move at a snails pace. Registered Traveler has basically gone commercial. TWIC has just begun enrollment and card issuance with initial uptake not surprisingly slow. REAL-ID faces a contentious uphill battle with several states already legislating noncompliance. And HSPD-12 enrollment is at very low percentages in those organizations that have even begun issuing PIV cards beyond initial tests.

C. Maxine Most, Principal, Acuity Market Intelligence

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- The launch of issuance of "PIV" biometric-enabled credentials to US government employees introduces the confluence of biometrics and smart card technologies in large-scale, standards-compliant solutions, a watershed event for both industries.
- Large-scale deployments of tenprint autocapture technology demonstrate the utility of fingerprints for high-volume, high-throughput applications such as border control and visa applicant screening.

David Benini, Director, Marketing, Aware, Inc.

- On the legislative agenda: President Bush signed the Improving America's Security Act of 2007 (the "9/11 Bill") which contains provisions to further secure our borders including mandating a biometric exit process as part of the U.S. Visa Waiver Program. This act also requires the screening of airport employees.
- From a programmatic perspective: The Department of Homeland Security recently began its transition from 2-fingerprint to 10-fingerprint biometric enrollment at U.S. Ports of Entry.
- Global Trends: Finally, 2007 marked the introduction of many new biometric initiatives around the world, and major progress on the adoption of e-passports, biometric visas, and e-ID cards with biometric features.

James W. Ziglar, President and Chief Executive Officer, Cross Match Technologies, Inc.

- Standards. In the course of this year important standards, such as the ones released by the International Organization for Standardization, were finally published. This brought us therewith not only the possibility, but furthermore the need of standardization in biometrics.
- Increased adoption. It can be seen there is a broader availability and a continuous drop in the cost of acquisition devices, especially fingerprint readers. This evidences an increased production scale, from where we can infer that biometrics adoption is speeding up.
- Mass-market products. Well-known, large manufacturers, targeting mainstream consumer market made their first moves. We can now easily find a variety of biometric-enabled products such as safes, security solutions, gun-fire boxes, notebooks and locks, not anymore in niches specialized hi-tech companies only, but rather in the near neighborhood store of most important retailer chains.

Iron Daher, President, Chief Scientist, Griaule Biometrics

- The progress of large biometrics-based projects like US-VISIT, TWIC, and Registered Traveler is in itself a significant milestone for the biometrics industry.
- In addition, the continued evolution of biometrics standards such as BioAPI is worth noticing.

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- BioAPI version 2.1 (also known as BioGUI) was published in 2007. The main addition to the standard is the much improved support for application-controlled GUIs, which will allow application developers to create sophisticated dialogs for the acquisition of biometric samples while ensuring a common look-and-feel across multiple core technologies.
- Another addition to the standard offers BioAPI applications to make use of the remote capabilities of the Biometric Interworking Protocol (BIP) which would enable the use of local as well as remote Biometric Service Providers (BSPs).

Bharat Shah, Deputy Director, Biometrics, OSS Nokalva, Inc.

- Move toward multi-modal solutions;
- Continued growth of biometric technology demand in government projects;
- Wider usage and acceptance of biometrical technology.

Irmantas Naujikas, Business Development Director, Neurotechnologija

- The announcement of the FBI Next Generation Identification (NGI) RFP, which includes the integration of the DHS US-VISIT database with the future FBI NGI database
- TSA releases guidance on biometrics for access control and QPL certification
- DHS plans to migrate to 10-fingerprint capture at all U.S. ports of entry over the next year

Teresa Wu, Marketing Manager, Cogent Systems

- Black and Decker Biometric door-lock; Important as it implicitly addresses public perception to privacy issues related to biometrics and takes away the association of fingerprints with crime and police
- Win of the European BMS (the European Biometric System) behind its VIS (Visa Information System) to the Accenture led consortium; Important as it was probably the largest award of a biometrics project in 2007
- The announcement of the results of MTIT (Minutiae Template Interoperability Testing) project; Important as it addresses a major issue in the industry of standardization and interoperability

Peter Went, CEO, WCC

In 2007 we saw a move toward a service-oriented architecture (SOA) that can easily and agnostically integrate a variety of products. A big milestone for the biometrics industry this year was the FBI's Next Generation Identification initiative, in which service-oriented architecture played a major role.

NEC has seen a tremendous increase in the usage of identification applications for quick or near real-time identification and authentication services. For example, mobile handheld

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devices are increasingly being used to identify someone on the street within a few minutes. The demand for greater efficiencies in law enforcement, along with improved speed and accuracy in biometric algorithms, has driven the proliferation of mobile handheld identification devices.

There has also been an increase this year in the use of fingerprints for dispositions, e-citations and in courts, making it even more important that information from multiple databases be accessible and available from a single repository.

*Barry Fisher, Vice President, Identification Solutions Division,
NEC Corporation of America*

- Advancements in sensors that capture biometrics “at a distance” and/or “on the move”. Between 2006 and 2007, significantly more offerings and more robust offerings have emerged.
- Large government system deployments internationally – for example JAPAN VISIT and EU BMS – as well as initiations such as the FBI NGI procurement that is in progress. Additionally, the adoption of fingerprint technology by Disney for multi-day pass holders which demonstrates significant improvements allowing it to be used in a large scale commercial applications in a challenging environment.
- Completion of FRVT/ICE and MTIT test and publication of results.

Catherine Tilton, VP, Standards & Emerging Technologies, DAON

- Progress in the deployment of government PIV, TWIC, and related smart card programs.
- The increased emphasis, worldwide, on the need for personal privacy to go hand-in-hand with biometric security systems and the related emergence of personal, wireless biometric solutions.
- The continued maturation of biometrics and convergence. A large number of physical access control, data storage, and systems integration companies made strategic acquisitions in 2007 of firms that provide logical access software and biometric technology security solutions.

John Petze, President & CEO, Privaris, Inc.

- The NIST Secure Biometric Match-on-Card Feasibility Study
NIST is exploring means to securely pass data across a contactless interface in recognition of the widespread use of contactless readers in the physical access world. Match on Card provides a means to authenticate the card holder to the card with the potential to replace the need to enter a pin.
- Power packed biometric edge devices take advantage of greater processing power in increasingly small chips, including:
 - “Smart” biometric door readers with multi-threading dual-core processors and Power-Over-Ethernet

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- Mobile biometric edge devices with on-board matching capability of 1:180,000 subjects
- TWIC Biometric reader specification published. Specification prescribes use of privacy key to encrypt and decrypt biometric processed across the contactless interface. This is further evidence of federal policy embracing a means to accommodate the widespread use of contactless technology in the access control environment without compromising privacy and security.

James Conniff, Deputy Director Sales & Marketing, Sagem Morpho, Inc.

The high profile mention of a biometrics database for FBI's NGI making front page news in The Washington Post. (December 2007)

David Johnston, VP, Market Development, Biometrics Programs, AOptix Technologies

- The biometric passport implementation in Europe.
- The biometric passport implementation in Japan.
- The use of Biometric information for travel all around the world

Y.M. Jiang, Marketing Director, Futronic Technology Co. Ltd.

- Pay By Touch going into bankruptcy protection
- AuthenTec IPO
- Delay of Cross Match IPO

Robert N. Allen, Sequiam Identity Management, VP, Strategic Development

- The U.S. Transportation Security Administration (TSA)'s Transportation Worker Identification Credential (TWIC) began its first enrollments in Wilmington, DE. There were over 1,200 enrollments in the first three weeks of the enrollment process and more than 11,000 pre-enrollments. IMS Research estimates that 12 million workers will eventually be enrolled in TWIC. Programs such as TWIC and HSPD-12 set multi-factor biometric authentication as the standard for strong authentication.
- Another significant event in 2007 also relates to the TSA. Three years after being mandated to create a list of qualified biometric products for airports, the TSA announced the first group of products for its "Biometrics for Access Control" Qualified Products List (QPL) in September, 2007. Bioscrypt's V-Station MIFARE V9.50 was one of only two readers placed on the list.
- Finally, 2007 saw the commercialization of 3D face recognition technology. 3D face imaging has made much advancement and is as fast and accurate as fingerprint recognition. The commercial sector is now starting to use it and recognize that its hands-free nature and speed make it an ideal solution where there is a large volume of traffic.

Matthew Bogart, VP, Marketing, Bioscrypt

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- FBI/CJIS RFP to upgrade IAFIS fingerprint database to a multi-modal database (gives credibility to modalities other than fingerprint)
- Pay By Touch potential bankruptcy (potential negative news coverage that the industry doesn't need)
- Increased support/presence of integrators at biometric conferences (good news/ bad news – good = increased clout and presence to promote biometrics. Bad = assume too much control of the industry.)

Russ Ryan, Vice President, National Biometric Security Project

- Announcement of TWIC deployments
- NGI RFP
- Continued focus on HSPD-12

Jim Miller, Chairman & CEO, ImageWare Systems, Inc.

I think the business is developing very well for the major players. Deployments in ePassport issuance, visa issuance, border control, and law enforcement show that the customer is relying on biometric solutions.

Juergen Pampus, VP Sales & Marketing, Cognitec Systems

- AuthenTec's shipment of 25 millionth fingerprint sensor
- Launch of mass biometric enrollment for Transportation Worker Identification Credential (TWIC) program
- Pay-by-Touch's bankruptcy

Walter Hamilton, Chairman and President, International Biometric Industry Association

- Worldwide transition from single finger to 10 fingers enrollment especially for US Visit and Europe VIS
- Real start up of the European eID Card initiative
- Law Enforcement adoption of 1000 dpi

Rainero Sergio, Marketing Director, GREEN BIT S.p.A

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In my view, if there are 3 significant milestones, we can talk on 2 points of views...

1. from the whole global industry;

- fingerprint identification is as important as RFID on technology, in some markets, the sales revenue of fingerprint already exceed RFID revenues.
- single chip technology for fingerprint identification will play an important role, and make the tremendous contribution in the consumer electronic market.
- standardization of Biometrics identification will be a general trend.

2. from ZK Software;

- our revenue through commercial channel is more than the revenues on government project, it is our highlight this year
- in China, we transform comprehensively to technical service and solution
- Single-chip technology can play in success after our company completed its commercial production

John Che, CEO, ZKSoftware Inc.

- Increasing interest from the commercial sector: Speaker verification in particular is starting to be seen as a practical way of combating identity fraud in the financial industry. This is a significant event since the adoption of biometric solutions in the commercial arena has generally significantly lagged the government uptake, and this has held back the industry from higher levels of growth.
- Vulnerability: Several organizations including the Biometrics Institute are now taking an in depth approach to vulnerability assessment and detection. This will benefit the industry in the long run by ensuring appropriate risk mitigation for users of biometric systems.
- Privacy: Issues concerning privacy and the protection of biometric information are gaining greater prominence. Significant interest is being show globally in the activities undertaken in this area in Australia.

Ted Dunstone, Chair Technical Committee (and CEO Biometix), Biometrics Institute

- Consumer / Enterprises shift

Over the years, the biometrics products are shifting focus for catering solutions for consumer and enterprises shortcomings. Various offerings are now available on the market to provide security and convenience towards everyday individual and enterprise users. Inline with the statement, the Acuity Market Intelligence concluded in a study with consumer/enterprise biometrics market size would overtake the government market by 2015 (Source: Acuity Market Intelligence, 2007)

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- **Enterprises in scales**
Enterprises from different levels have adopted biometrics technology to improve efficiency and security. The technology has been utilized to automatically prevent shoplifters in retail shops, protecting poverty shelters, providing ATMs' in rural areas of India, keeping track of staff attendance at the Bangalore rail stations, even as an anti-spy tools against competition rivalries during professional sailing races. Smaller enterprises focus the uses of biometrics as access control and attendance system to improve business efficiency resources.
- **Government adopted biometrics**
The launch of duo US VISIT program and UK passport/visa biometrics applications have had effects on the global government scenes. US VISIT requires the international travelers submission on their biometrics prior to the right to enter. UK passport and visa programs are currently fully operational. Overseas UK citizens or international travelers may apply at the regional embassies with submission of their biometrics information. Many other nations (such as Russia, Bangladesh or Slovakia) have expressed adoption in the close future.

Dr. Sri Hartati Kurniawan, Chief Information Officer, RCG Holdings Limited

- The first significant milestone is that tri-biometrics (finger, face and iris) are now the standard for the identity management industry. There is no better proof of this than the Department of Defense award for the design, development and implementation of the ABIS multi-biometric identification system. The market is clearly moving beyond fingerprint-only biometric recognition and multi-biometric systems are the new reality.
- A second milestone is the wide recognition and acceptance of mobile biometrics in difficult settings, like the Mona Passage in the Caribbean, and in the world's harshest operating environments like Iraq and Afghanistan. The application for biometrics in these environments goes beyond algorithmic development and is today in the form of practical and reliable hand-held devices built to withstand the realities of capturing, transmitting, receiving and matching biometric data in the field regardless of terrain or operating environment.
- A third milestone is the broad acceptance of IRIS as a biometric solution for a variety of applications in many different areas including; transportation, criminal, government and borders. L-1 Identity Solutions

Doni Fordyce, L-1 Identity Solutions, Executive Vice President of Corporate Communications

- Kick Start of the UK National ID Cards Scheme
- More activity from the large System Integrators who are now showing greater interest in the commercial biometrics Market – this demonstrates that growth is anticipated in this area

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- Report by security minister Lord West, which sets out proposals to build anti-terror measures into the design of buildings where people gather in large numbers, following June's attempts to attack a crowded London street and an airport terminal in Glasgow.

Neil Norman, CEO, Human Recognition Systems

- I would say that the Authentec IPO was pretty critical along with the volume announcement...25 million sensors
- I think the fact that Disneyworld is using biometrics to verify all their PAYING CUSTOMERS is also an important step for the use of biometrics to move to widespread public use.
- L1s continued consolidation of industry players
- On the negative side....the whole Pay by Touch debacle is just sad.

Bill Spence, VP of Transaction Systems, Lumidigm

This has been for the most part a steady year of progress for the biometric industry, with few surprises. The most significant milestones for the industry have been external, pointing to the fact that there really is a need for biometrics in security as well as convenience applications. For example, while noting the decline in European bank card fraud since *chip & pin* was introduced, one of the European Union's leading financial services authorities revealed that online fraud has increased by 8000% in two years.

So I would say that the events of real significance are those that outline the continuing challenges to our industry to deliver the best share that it can of any integrated solutions to real problems such as these. I believe that embedded fingerprint systems solutions will respond with increasing success to this demand for trust in the fight against fraud.

Lennart Carlson, CEO, Fingerprint Cards

The continued news of lost or stolen data, specifically on portable devices is a significant announcement for the biometric industry. Nothing announces the need for biometric adoption like data loss. The VA Administration analyst who lost his laptop and external hard drive with sensitive data on up to 26.5 million veterans and military personnel may be the poster child for hard drive encryption, but what will it take for companies to do a better job of protecting their data. Biometrics would be a great start.

Gerry Euston, CEO, Ceelox

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- Rapid proliferation of low-cost biometric devices-
OEM shipments of PC's and devices with integrated biometrics. The convenience and low cost of these devices will result in more deployments of enterprise software solutions, like Safesolution. Two of the inhibitors of large scale biometric deployments in the past have been cost and the proprietary nature of the industry. Those barriers no longer exist as our biometric middleware supports a vast number of devices and many PC manufacturers are offering integrated biometric devices in volumes that are pushing costs down. It is important to remember that these hardware solutions will usually lead market in a specific direction, ahead of the implementation of software solutions. As biometric devices are made available, via embedded hardware in notebook computers, the resulting increased availability of authentication hardware will create mass adoptions of this technology. Imbedding devices as a standard or add-on feature to equipment demonstrates to the corporate consumer that biometric authentication has become a widely accepted form of usable security. This combined with low cost peripheral devices has been welcomed by highly regulated organizations (HIPAA and PCI) that struggle to afford user-centric security measures within IT.
- US Government issued ID cards that incorporate fingerprint biometrics-
Legislation and regulations adoption—such as the Health Insurance Portability and Accountability Act (HIPAA) healthcare regulations, the Gramm-Leach-Bliley Financial Modernization Act—require that customer information, data, and financial records be kept secured, and outline substantial penalties for failure to do so, Sarbanes-Oxley, and directives, such as Homeland Security Presidential Directive (HSPD) 12, are defining the need for interoperable credentials for Federal employee. In addition, there is a general interest in meeting or exceeding best practices such as ISO 17799. These requirements in conjunction with continued highly publicized security breaches in computer networks and Internet sites, which have been traced to the vulnerability of password-based authentication systems by hackers and unauthorized access by disgruntled employees will drive the biometric industry forward.
- Adoption of Microsoft Windows Vista-
More scalable, secure and flexible than MSGINA, Microsoft has recognized that GINA login methods, which previously only supported username/password or PKI, are no longer adequate for today's multi-factor authentication requirements. By publishing an API that allows for third party credential providers to plug in their own GUI, biometric vendors have the ability to plug in their own workflows and user interface with the world's most popular client operating system.

Chris Collier, VP, Identity Solutions, IdentiPHI, Inc.

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One of the most significant milestones came at the beginning of this year with the release of NIST's 2006 Iris Challenge Evaluation results—the first third party evaluation of iris identification algorithms. Using a closed database, this evaluation measured the one to one accuracy of various iris identification algorithms. Out of eight participants, IriTech was one of only three entities (two companies) able to complete this evaluation. Our results with the NIST ICE tests grant strong independent third party validation to our core iris identification technology.

A second important event was NIST's recent announcement of the Iris Exchange (IREX) Evaluation 2008. This evaluation will test the interoperability and accuracy of compact data formats for the international standard. IriTech's proposed unsegmented polar format will be included in this evaluation as well as others, such as region of interest compression. IREX 2008 is an important step in creating the best iris image standard possible.

Another significant milestone was the continued evolution of "Iris at a Distance" capture technology. Companies like AOptix have emerged with amazing technology, and long standing pioneer Sarnoff has also made advancements. The strides these companies have made in capturing quality iris images from long distances are very exciting, and offer new markets for iris identification.

Daehoon Kim, Ph.D., CEO/President, IriTech Inc

- The U.S. Department of Homeland Security (DHS) has announced that it intends to integrate biometric exit procedures into the existing international visitor departure process.
- Compulsory fingerprinting becomes part of the UK visa application process in under half of the countries of the world.
- Ceelox and Symwave announce Strategic Partnership. Biometric solutions from Ceelox and Symwave will safeguard critical data for consumer and enterprise products.

Michael Qiu, CEO, Anviz Biometric

2007 was marked by the continued growth and adoption of biometric fingerprint sensors in laptop PCs and peripherals. In 2006, about one in ten laptops shipped included a fingerprint sensor. In 2007, we believe that approximately one in five laptops shipped will include a fingerprint sensor. This growing adoption was a major sales driver for AuthenTec during the year.

Beyond notebooks, we saw much broader adoption of fingerprint biometrics in a variety of other consumer products during 2007. These included new fingerprint-enabled home door locks from Black and Decker, home garage door openers from Master Lock, fingerprint-protected

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personal GPS units, remote controls, personal safes, and PC peripherals like keyboards, mice, memory keys, Wi-Fi access points and disc drives.

I also think one of the more significant milestones during 2007 were the field trials of MasterCard's PayPass contactless payment system in New York City. This effort – supported by Citi, MasterCard, Cingular, and Nokia – is an important step in the evolution of fingerprint biometrics into consumer secure mobile commerce. More than 7 million cell phone users in Japan already use their phone as a mobile wallet, depending on an integrated fingerprint sensor to secure mobile payments via the phone at thousands of retail locations, at subway turnstiles and restaurants. We believe that the PayPass trials conducted in New York in early 2007 signal the beginning of the adoption of fingerprint biometrics in cell phones here in the U.S., and that we'll see similar field trials in 2008 and U.S. carriers offering fingerprint-enabled cell phones late this year and in 2009.

Larry Ciaccia, President, AuthenTec

- Further development of standards and interoperability for the various types of biometric technologies
- An increased number of successful implementations within the government and key commercial verticals
- Heightened awareness of the benefits that biometrics are capable of providing both within the commercial and consumer sphere.

Sapna Capoor, Director of Corporate Development and Strategy (Global Markets), Agnitio

- In the UK, the most significant event in the industry was undoubtedly the start of procurement for the delivery of ID cards.
- Furthermore, interest in voice recognition seems to be on the rise – witness to that were trials/implementations of the technology within the financial sector as well as a major voice recognition conference in London.
- First considerations for the security of the London 2012 Olympics seem to indicate that biometrics could play an important role in the preparation (e.g. construction) as well as the actual event.

Bori Toth, Biometrics Lead, Deloitte & Touche LLP

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- The continued work being made on establishing and finalizing the biometric standards is promising, although it seemed slower than in previous years.
- Biometrics seemed to make more appearances in the media and entertainment outlets, especially in movies and TV shows. There were also a few airlines/airports that rolled out biometric technologies for a small percentage of their passengers. These will hopefully lead to a greater public awareness and eventual acceptance of the technology, but there is still much farther to go before they are widely accepted.
- The prices of biometric devices and equipment finally started to drop considerably.

Patricia Fisher, President, JANUS Associates, Inc

- EU Member States began BIODIV II pilots for the integration of fingerprint technology into travel visas and passports. Through projects like BIODIV II, governments are creating a double ring of security: identifying individuals before they travel with a biometric visa, then verifying it at the border.
- NIST (National Institute of Standards & Technology) released the results of their benchmark testing of 21 biometric vendors in their MINEX (Minutiae Exchange Interoperability Evaluation). The American National Standards Institute and International Committee for Information Technology Standards (ANSI INCITS) 378 fingerprint template tested in MINEX creates the possibility for a fully interoperable multi-vendor marketplace with applications involving fast, economic, and accurate interchange of compact biometric templates.
- Leveraging the updated worldwide standard for fingerprint interchange (ANSI/NIST-ITL 1-2007) and the FBI's EBTS 8.0 transmission specification, NIST and the FBI announced the formation of a new standardization effort to develop standards for Mobile ID systems.

*Robert Horton, Director of Strategy & Portfolio Management,
Motorola, Biometrics Business Unit*

- From Precise Biometrics' point of view, the major milestone is the positive response from the National ID Card market, where Match-on-Card technology in general and Precise Match-on-Card particularly, is now a required part of such large-scale smart card programs. This is reflected in tenders for National ID Cards where the majority of these tenders add this requirement as well as in programs started during 2007, such as the Portuguese Citizen Card for 14 million users.
- It is also encouraging to see such positive development for the integrated biometric solutions, more specifically the laptop-integrated fingerprint sensors, making a much wider population familiar with biometrics and opening up for volume markets and usage.

Thomas Marschall, CEO, Precise Biometrics

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- The consolidation of US Visit and of the global ICAO drive for e-passports.
- The progressing of the tender for the Indian Airways and Indian airports access control contract, to cover pretty much all of the sub-continent - the world's biggest single biometric contract so far.....
- The confirmation of OmniPerception face recognition as a chosen modality for two out of three of the successful final stage bidders for the UK Driving Licence Authority's new digital driving licence project - signaling the coming of age of the next generation of facial biometric capability.
David Bainbridge McIntosh, Chief Executive Officer, OmniPerception Limited

- First, the acceptance of biometrics has become much more widespread, with individuals becoming more accustomed to seeing iris and fingerprint recognition systems in place. This has enabled faster advancement of the technology, with more vendors and more products available on the market.
- Next, the leadership of the British government in implementing e-borders, a program that includes collection of biometric data on Britons and visitors to the UK to maintain integrity of the border and fight against terrorism and criminal activity.
- Finally, the military's adoption of iris recognition systems for large scale applications, particularly in Iraq and Afghanistan, has helped bring biometrics more into the mainstream by demonstrating the superior accuracy and speed of the technology.
Robert Gailing, Business Development Manager, OEM, Panasonic Security Systems

- The beginning of consolidation of the biometrics industry. We are starting to see some real merger and acquisition activity that indicates an industry getting to the next phase of growth.
- The introduction of biometric door locks through a huge consumer channel – Home Depot – as a result of the partnership between Sequiam Biometrics and Black and Decker Kwikset. This is a signal of consumer acceptance.
- The filing of Chapter 11 by Pay By Touch after raising more than \$300 million in hedge fund money – All we have to say is “WOW”!
Jay Fry & Anne Marie Dunphy, CEO & CFO, identiMetrics

The announcement of the PIV project would be the most significant milestone to in 2007. It is our view that the biometrics smart card and USB token will be the major fingerprint authentication devices for integration of physical and logical access controls.
Shinil Cho, Chief Information Officer, Secure Design

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Some important events which results where presented/discussed in 2007 are in our opinion:

- MTIT project (for minutiae interoperability)
- FVC2006 (performance evaluation)
- NIST Biometric Quality Workshop II

Andrea Patrignani, Account Manager, Biometrika

- Pay By Touch bankruptcy filing in late 2007 is a clear proof that extraordinary funding (in this case \$320M) can not replace the necessity of hands-on biometrics technology experience and feasibility understanding.
- Additionally, attempt to change consumer behavior using biometrics technology without consumer demand for such change can be the doom of biometrics companies.
- Implementation delay of HSPD-12 and the arbitrary deadline of Oct 27, 2006 has come and gone, yet less than 1% of federal employees and contractors are in compliance with the directive. This is a clear demonstration that the biometrics industry is for the long haul and biometrics technology is not quite ready for fast large scale deployment and biometrics vendors still have plenty of work and inventions ahead of us.

Edward Chen, President / CEO, Biometrics4ALL, Inc.

Payment by fingerprint is spreading rapidly in Germany

- Physical loyalty card-scan be replaced using biometric technology
- Biometrics go increasingly convenience

Ulrich M. Kipper, CEO, It-Werke Technology GmbH

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