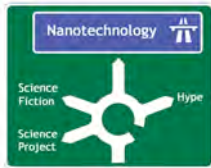


# Finding Markets For Emerging Technologies



Tim Harper, Cientifica Ltd, London

Pune January 2008

## Agenda

1. Nanotechnology - Current & Future Prospects
2. Taking Technology To Market - Strategies & Pitfalls
3. Case Studies
4. Questions & Discussion

## Tim Harper

- Head of Nanotechnologies at European Space Agency
- Serial Entrepreneur
  - Cientifica Ltd
  - Nanosight Ltd
  - Serious Games Ltd
- Founder of European NanoBusiness Association
- Chair / Chief Advisor of Several National Funding Bodies



# We Wrote The Book on "Nano" in 2002

"The Nanotechnology  
Opportunity Report is a  
breakthrough - it is the first  
complete report of the state  
of our field"

-Meyya Meyyappan director of  
the Center for Nanotechnology  
at NASA Ames, March 2002

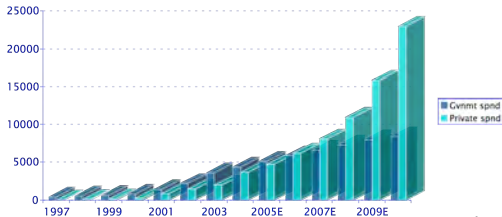


## Cientifica - Doing Not Talking

Recent Projects Include...

- Designing and Implementing the \$200m Saudi Arabian National Nanotechnology Strategy
- Setting Up A \$180m Nanomaterials Facility in the UAE
- Setting Up & Financing a \$35m Displays Production Facility in Malaysia
- Managing a \$150m Nano/bio Fund
- Investor & Government Advisory Services

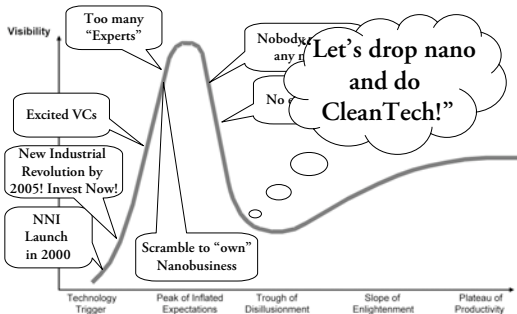
## Government and Private Nanotechnology Spending



Source: Cientifica Ltd

# Nanotechnology: Over Hyped and Oversold?



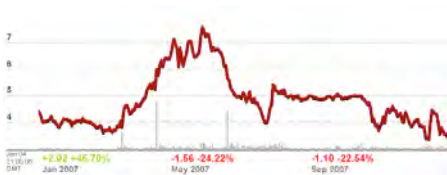




## Advance Nanotech



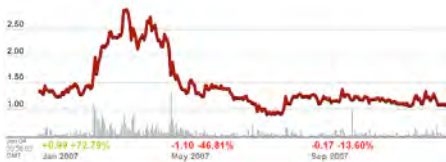
## Arrowhead Research



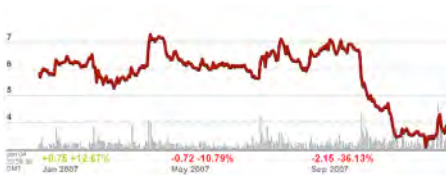
## Harris & Harris



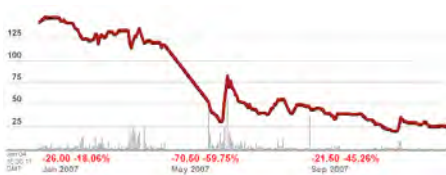
# Nanoproprietary



# Nanophase



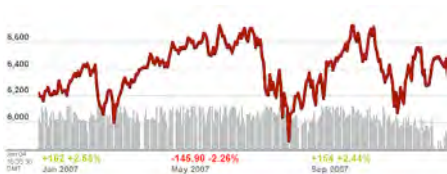
# Oxonica



## Common Themes

- All companies were based on technology rather than markets
- All used financial markets to raise capital
- All are or are becoming zombie companies

## Major Indices Are Flat, Nano Is Down



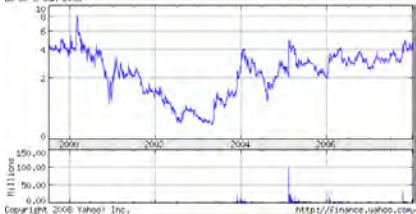


## Altair - A Successful Materials Company?



## Not In The Long Run!

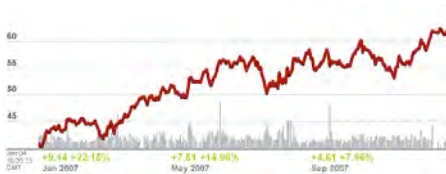
ALTAIR INTERNATIONAL INC.  
as of 3-Jan-2008



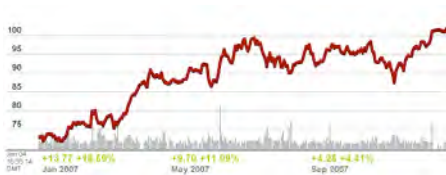
# What Happens To Nanomaterials If...

- We understand our markets
- Respond to our customers needs
- Have good channels to market
- Have sufficient resources to make it work and
- Don't put all our eggs in the same basket?

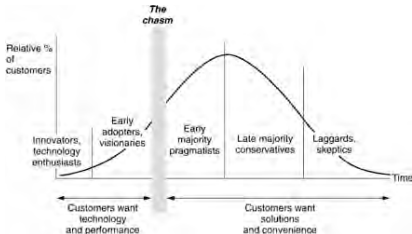
# Bayer



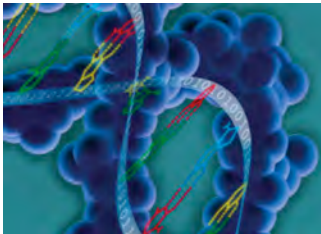
# BASF

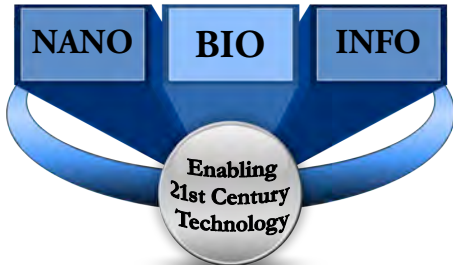


## It's Just Getting Interesting



## Where Are The Opportunities?

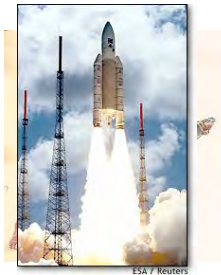






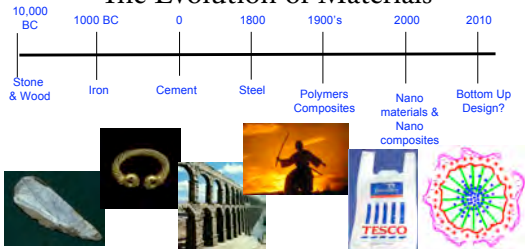
## Nano

- Materials Have Always Been Vital to Humanity
- From clothing, heating, hunting to semiconductors and satellites



ESA / Reuters

# The Evolution of Materials

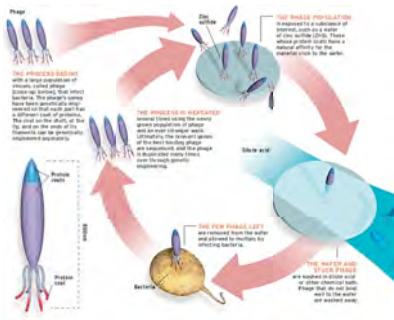


Adapted from Hermann, W. Chem. Eng. Technol. 21(7), 549 (1998)

## Bio

- Nature is the ultimate nanotechnologist
- Bottom up, energy efficient design
- The future of nanotech is wet





## Info



From chart recorders to supercomputers  
Focus has shifted from acquiring data to extracting  
information

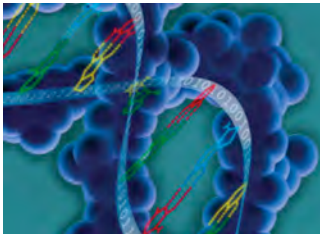
# Convergence Is A Reality

## Carlson's Curve

“By the end of the decade  
their practical upshot will,  
if they continue to hold  
true, be the power to  
synthesise a string of DNA  
the size of a human  
genome in a day”



## The Future Is Wet -Industry



# Nanosight In Nanotoxicology

“You cannot compare it to anything else. It is unique! With NanoSight you have the whole cluster distribution, and DLS often smears that out.

In fact, there are a lot of shocks and disappointments when you start to use it, as you see really how the particles are organized for the first time, and you understand just how limited DLS is in these respects”

- Professor Kenneth Dawson at UC Dublin - lead investigator for the European Nanotoxicology project NanoInteract



## Common Industrial Themes

57% of all industry R&D is related to nanoparticles and structures

Pharmaceuticals  
Paints & Coatings  
Biosensors  
Lubricants  
Fuel Additives  
Inkjet Additives

End use is in a  
liquid medium

# Consensus On Why The Future is Wet

- We will see an increasing use of soft and wet rather than hard crystalline materials as a result of nanotechnologies.
- Even among silicon based technologies there is a growing need to interface these with biological systems in almost every application, from medical diagnostics to human interface devices
  - Results of invitation only conference on “The Future of Tools”

## Consensus On Why The Future is Wet

- Much of nanoscience is concerned with the bottom up self-assembly of materials, a process developed over four billion years by nature, which to a large extent takes place in a liquid medium.
- Most nanotechnology laboratories are dominated by wet chemistry
- Analysis of nanotechnology literature reveals an ever-increasing blurring of the boundaries between physics, chemistry and biology

## Instrumentation & Standards - The Trillion Dollar Enabler?

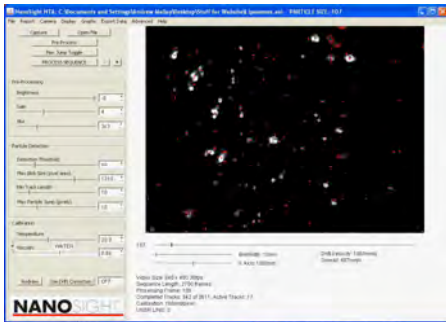
- Statistically Meaningful Data
  - Is the half dozen particles we see representative of the whole batch?
  - Just because we can't see it happen doesn't mean that it won't!
- Quality Control
  - Can we buy the same material this week, next month and in ten years?
- New Materials and Processes
  - This is not the semiconductor industry

## The Decline Of Electron Microscopy?

- But it makes the future of tools increasingly unpredictable.
- Growing number of niche opportunities for tool manufacturers
- By concentrating on 1980's style platforms some of the existing market leaders risk being blind sided by new entrants, or companies which hit the sweet spot of an emerging analytical trend, whether by accident or design

# New Challenges Require New Instruments






# Nanosight In Nanotoxicology

“You cannot compare it to anything else. It is unique! With NanoSight you have the whole cluster distribution, and DLS often smears that out.

In fact, there are a lot of shocks and disappointments when you start to use it, as you see really how the particles are organized for the first time, and you understand just how limited DLS is in these respects”

- Professor Kenneth Dawson at UC Dublin - lead investigator for the European Nanotoxicology project NanoInteract





# Nanotech Markets

The Rise of NanoBio

# The Cientifica Technology Diffusion Model

## Inputs

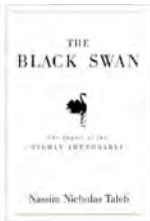
- Global corporate R&D spending from over 1000 companies
- Global nanotechnology R&D spending
- R&D Intensity
- Primary market research

## Assumptions

- Public acceptance will be irrelevant
- >80% of academic research funding yields no economic value and takes 7-10 years to market
- Mature supply chains and quality control by 2012 leading to step function in adoption

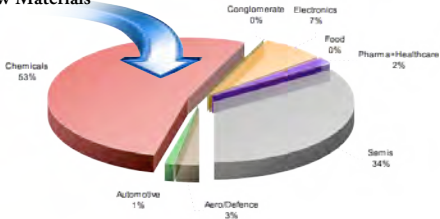
# Disruptive Technologies Are Inherently Unpredictable

- Fullerenes discovered in 1985 and carbon nanotubes in 1991
- Twenty-two and sixteen years ago respectively
- Pace of adoption is increasing, but by a few %, not orders of magnitude



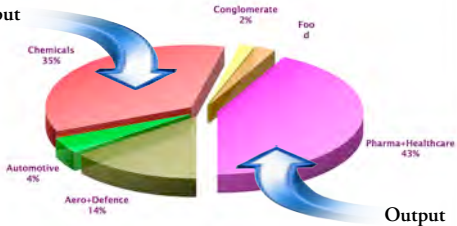
## The Nanotechnology Market in 2007

Raw Materials



### Nanotechnology Market 2012

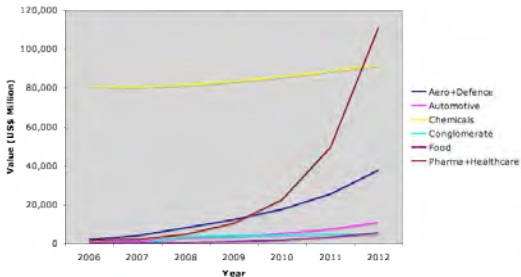
Input



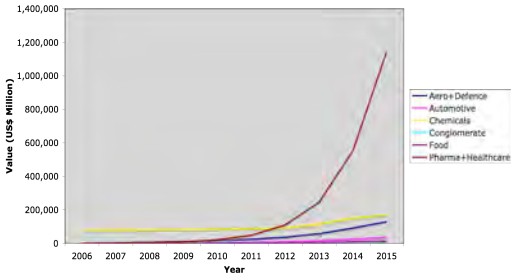
# Nanomaterials - The Primary Industry of 21st Century?



### Nanotechnology Market Evolution 2006-12



### Nanotechnology Market Evolution 2006-15





## The Rise of Nano-Bio

### Strong Demographic Drivers

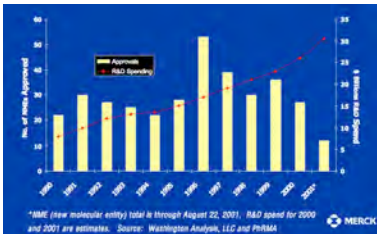
- Aging population
  - US, EU, Japan and China
- Increasing wealthy
- Expectations of an active healthy life
- From killer diseases to chronic conditions

## The Rise of Nano-Bio

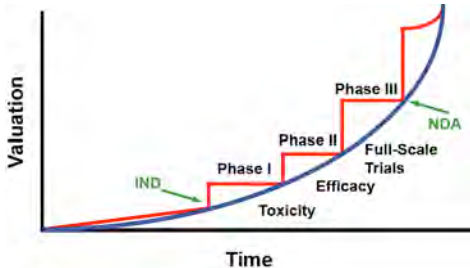
### Strong Financial Drivers

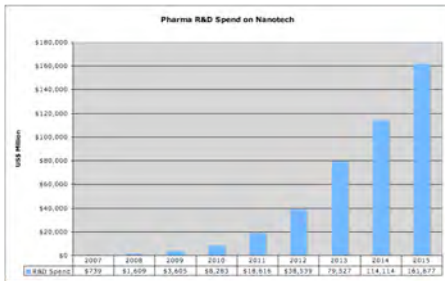
- Drug development costs \$500 to \$2,000 million
- Only one in 13 drugs put into preclinical development now reaching the market, versus one in eight in 1995-2000
- Pharma looking to replace 'blockbuster' strategies
- Much of innovation being outsourced

## More R&D - Less Product

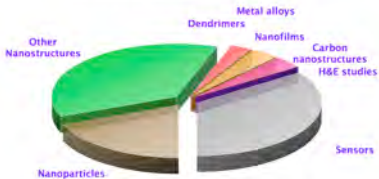


## Clearly Defined Valuation





Pharma & Healthcare R&D - Total \$447m



2005 Funding

## Data Sources

Pfizer, USA  
Johnson & Johnson, USA  
GlaxoSmithKline, UK  
Novartis, Switzerland  
Sanofi-Aventis, France  
Roche, Switzerland  
Merck, USA  
AstraZeneca, UK  
Eli Lilly, USA  
Wyeth, USA  
Bristol-Myers Squibb, USA  
Amgen, USA  
Schering-Plough, USA  
Abbott Laboratories, USA  
Boehringer Ingelheim, Germany  
Takeda Pharmaceutical, Japan  
Schering, Germany (now part of Bayer)  
Merck, Germany  
Novo Nordisk, Denmark  
Biogen Idec, USA  
Sankyo, Japan (now part of Daiichi Sankyo)  
Eisai, Japan

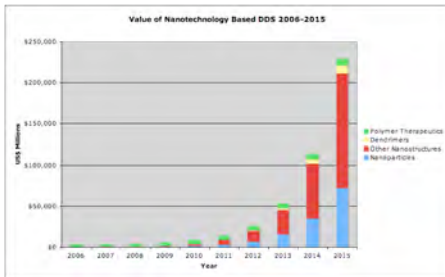
Serono, Switzerland  
UCB, Belgium  
ALTANA, Germany  
Yamanouchi Pharmaceutical (now Astellas Pharma), Japan  
Daiichi Pharmaceutical, Japan (now part of Daiichi Sankyo)  
Genzyme, USA  
Mitsubishi Pharma, Japan (now part of Mitsubishi Chemical)  
Chiron, USA (now part of Novartis, Switzerland)  
Forest Laboratories, USA  
Allergan, USA  
MedImmune, USA  
Teva Pharmaceutical Industries, Israel  
Cephalon, USA  
Applera, USA  
Millennium Pharmaceuticals, USA  
Schwarz Pharma, Germany  
Shire, UK  
Kyowa Hakko Kogyo, Japan  
Gilead Sciences, USA  
Lundbeck, Denmark  
Ono Pharmaceutical, Japan  
Shionogi, Japan

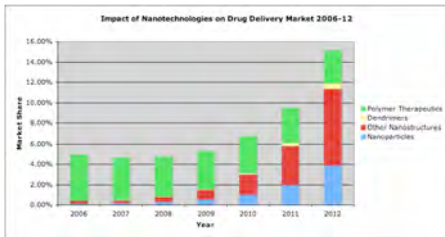
## A Market Shift

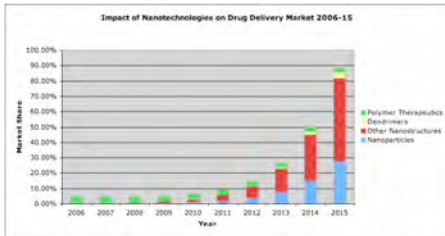
- 91% of this market is currently accounted for by polymer therapeutics
- The growth rate of polymer therapeutics will be in single figures
- Will be overtaken by both nanoparticles and nanostructured delivery techniques (i.e. encapsulation – vesicles or liposomes) within a few years
- Much of this is subject to regulation as a drug delivery mechanism rather than as a New Molecular Entity





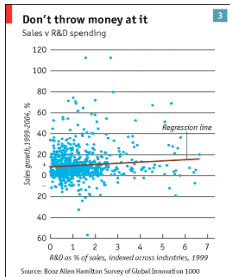






## R&D Alone Is Not Sufficient

- Little correlation between corporate R&D and sales



# Taking Technology To Market

Strategies and Pitfalls

What is the most important data that you should rely on in order to create a scenario for your client entering the market?

- Where to find information
  - Paid vs free
    - Sources of Info
      - Off the shelf reports
      - Commissioned research
  - Good googling

What is the most important data that you should rely on in order to create a scenario for your client entering the market?

- Key information
  - Total Markets vs Addressable Markets
    - How big is the market?
      - Our market segment or...
      - The market for our product
    - How much can we address?



What is the most important data that you should rely on in order to create a scenario for your client entering the market?

– Can we....

» Market in Japan?

» Provide support in China?

» Address our competitors markets?

– Should we...

» Concentrate on local markets?

## How to develop the Business Plan

- Good v bad BPs
  - Good BPs...
    - Have a concise executive summary
    - Demonstrate a realistic assessment of risks
    - Show sound understanding of the target market
    - Identify initial customers

## How to develop the Business Plan

- Show why the founders can be trusted with your money!
- Bad ones don't get read!
  - 1 in 20 don't get read past the executive summary
  - Top VCs receive thousands of BPs / year

## How to develop the Business Plan

- Technology vs market focus
  - How much of the business is technology?
  - Markets are 30%
  - Management is 40-50%
- Now we know our market, how do we communicate it to investors?
  - Market Size
    - Is it growing?
    - How fast?

How do you evaluate niche market opportunities, especially from the standpoint of a new technology producer?

- Where is the market - is there a market?
  - Big players can get it wrong
  - Mitsubishi - Buckyballs
  - Start ups cannot
  - One mistake and you are out of the game
- Who needs the technology

How do you evaluate niche market opportunities, especially from the standpoint of a new technology producer?

- Where is the pain?
- What do you offer that they need
- Industry is technology agnostic
- Can you be 10x better, 10x cheaper?

## Competitor benchmarking

- Concentrate on your business, not theirs
- Intelligence
  - Talk to customers
  - Talk to partners
  - Web based monitoring

## Basic rules for risk assessment of a new technology despite its scientific excellence

- Is there a market
- Is there a way to market
  - Can it be scaled up?
    - From the lab to the pilot plant
    - From pilot plants to full scale production
  - Is it reliable?



Basic rules for risk assessment of a new technology  
despite its scientific excellence

- Can you guarantee quality?
  - The "Black Watch"
  - Carbon Nanotubes
    - Terminology
    - Standards
    - Unreliable supply chain means no industrial interest

Which are and how you should consider the policy and legislative hotspots?

- Existing legislation
  - Local partners will be able to give info
  - Varies with product (drug, medical device...)
  - And region (EU vs US...Korea vs Germany for stem cells)
  - Some areas are technology friendly (e.g. Singapore)
  - Technology development schemes (\$)

Which are and how you should consider the policy and legislative hotspots?

- Measures to stimulate technology investment
- Tax
  - Capital Gains Tax
  - Options
  - Others are less so - most of the EU?
- Future legislation

Which are and how you should consider the policy and legislative hotspots?

- Nanotechnology regulation
- *“The U.S. Department of Energy (the single biggest funder and employer of scientists in the U.S, \$18 billion) just this week directed its laboratories to treat all things nano as high hazards. Imposing the formal high hazard categorization significantly impacts the research on nanomaterials.”*

## Product penetration and market positioning

- Barriers to market
  - Competition
    - Can they close the door by..
      - Controlling their customers
        - » Intel / Microsoft
      - Outspending you on R&D

## Product penetration and market positioning

- Public attitudes
  - GMO's
  - Nanotech
    - L'Oreal change in marketing
- Supply chain
  - Quality

## Product penetration and market positioning

- Stability
- Market Positioning
  - Generating a USP
    - Understanding of applications
    - and markets
    - and competitors

## Product penetration and market positioning

- Partnering
  - Solving distribution and support issues
  - Getting a foot in the door of established industries



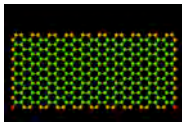
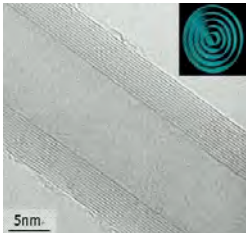
# Case Study 1 - Carbon Nanotechnologies Inc

Trying To Find A Market For A “21st  
Century Wonder Material”

## Strategy

- To use the intellectual property of Nobel Prize winner Richard Smalley to produce high quality carbon nanotubes
- To be able to “own” both the IP and the know how to produce CNT

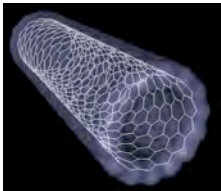
# Nanotubes



Material	Young's modulus (GPa)	Tensile Strength (GPa)		Density (g/cm <sup>3</sup> )
MWNT	1200	150		2.6
Steel	208	0.4		7.8
Epoxy	3.5	0.005		1.25
Wood	16	0.008		0.6

## Key Applications of CNT

- Conductive polymer composites and coatings
- Structural composite applications
- Cables and fibres
- Batteries
- Healthcare
- Food safety



## The Wonder Material



## 2002 - Big Plans

**CNI has the brains, the cash,  
now all it needs is the market**



July 29, 2002 -- Carbon Nanotechnologies Inc. (CNI) seems to have it all -- a Nobel laureate as its co-founder, a veteran management team and highly qualified staff, \$15 million in angel funding and a working pilot plant.

What the two-year-old producer of carbon nanotubes lacks is a commercial product and a market, Chief Executive Bob Gower said when comparing CNI to his turnaround of Lyondell Petrochemical Co. in the 1980s.

 Email this article

## 2003 - Scale Up

### Here come the nanotubes

By Michael Kanellos

Staff Writer, CNET News.com

Published: September 12, 2003, 4:00 AM PDT

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**Carbon Nanotechnologies, the company that produces carbon nanotubes for IBM and various research institutions, plans to expand production over the next two years, a move that could help jump-start commercial deployment of nanotubes.**

The Houston-based company plans to increase production of *single-walled carbon nanotubes* to around 100 pounds of nanotubes a day, according to Tom Pitstick, director of business development for the company. CNT will also begin erecting a full-scale commercial plant capable of producing 1,000 pounds of tubes a day in 2005.

Right now, the company can produce only around a pound or two a day,

## 2003 - Still Looking For Applications

- "There are almost no applications for this material today and there are also no plants for producing this material today... and there is not much capacity."
  - Tom Pitstick, Production Director 2003



## 2004 - Consolidation



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### Carbon nanotechnologies companies merge

By Michael Kamelias  
Staff Writer, CNET News.com  
Published: December 22, 2004, 12:49 PM PST

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**In a deal that will help solidify its patent portfolio while the nanotech industry gains momentum, Carbon Nanotechnologies Inc. announced on Wednesday that it will merge with C Sixty.**

CNT is one of the leading proponents of carbon *nanotubes*, thin strands of pure carbon that can be used to strengthen plastics or create semiconductors. By contrast, *C Sixty* specializes in fullerene carbon, tiny soccer ball-like molecules consisting of 60 carbon atoms that researchers and analysts say could become important in the pharmaceutical industry.

Financial terms of the merger were not disclosed.

\*For composite materials or electrical applications, fullerenes aren't

## 2007- Valued At \$180m

March 22, 2007, Unidym, a subsidiary of nanotechnology specialist Arrowhead Research, has bought Carbon Nanotechnologies Inc., as the search for a mass-market application of carbon nanotubes continues.

Sold for \$5m in Arrowhead stock!

## Case Study 2 - Nanosys

The Intellectual Property Land Grab

## Strategy

- Raise sufficient capital to make a nanotechnology IP land grab
- Buy and develop IP and partner with major companies desperate for nanotech
- Get an early exit for investors on the basis of potential rather than sales

## From IP

Raised \$70m in financing by December 2003

*"Today, our focus is on very simple things," said Stephen Empedocles, a co-founder and director of business development. "Things that we can do in the next couple years to get into the market so that people will have valuable nanotechnology at their fingertips."*

## To IPO?

- Technology is described as about to change the world with words like “They have the money, they have the talent. Now it’s just about execution”
- IPO was expected to garner between \$350 and \$370 million for a company with revenues of \$3 million based solely on contract research rather than any sales

# To No IPO

## Nanosys pulls \$100 million IPO plan

By Rex Crum, CBSMarketWatch.com  
Last update: 3:59 p.m. EDT Aug. 4, 2004

SAN FRANCISCO (CBS.MW) — Nanosys, considered to be one of the bright lights of the emerging nanotechnology industry, said Wednesday that poor market conditions had forced it to withdraw its anticipated \$100 million initial public offering.

In a filing with the Securities and Exchange Commission, Palo Alto, Calif.-based Nanosys (NNSY: . . ) said "the volatility of the public capital markets" had created a situation whereby the company feels it would not be wise to proceed with its IPO.

The company gave no further details about why it pulled its offering, but said it might undertake an IPO in the future.

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 [The week's top news and analysis: Mon. 8/3/04](#)

## Case Study 3 - NanoTex

A Simple Idea With A Large  
Addressable Market



## Strategy

- Adding 'nanoscale' polymer whiskers to fibres makes them stain resistant
- Build a 'nano' brand based on this effect
- Licence to garment manufacturers worldwide

# First Announcement in 2000

## Burlington Notes Progress in New Technology Initiative

PR Newswire - New York

Date: Jun 27, 2000

Text Word Count: 339

### Abstract (Document Summary)

GREENSBORO, N.C., June 27 /PRNewswire/ -- Burlington Industries, Inc. (NYSE: BUR) noted progress on new technology being developed by Nano-Tex, LLC, a technology company in which Burlington owns a 51% equity position. Nano-Tex, formerly named AvantGarb, is an advanced materials company applying the science of nanotechnology to textiles.

George W. Henderson, II, Chairman and Chief Executive Officer of Burlington Industries, speaking to an investor group today, said research to date has produced good results. "Nano-Tex scientists are applying nanotechnology to textiles by developing unique polymer chemistry," Henderson said. "The goal is to permanently impart highly desirable features to fibers and fabrics, without losing softness, durability or breathability. We are currently testing some of the processes in Burlington's manufacturing plants and seeking market feedback on initial trials.

## Focused On One Product Not 100

- Appointed branding expert Donn Tice as CEO
- Recruited executives from fashion industry to develop end user relationships
- Provided technical support to end users
- Technology was compatible with existing processes (important for family owned businesses)

12/19/2009 11:37:11 AM

## Nano-Tex Drives Global Expansion Plan With New Hires in North America, Europe, Asia

Nano-Tex, LLC, the leader in textile enhancements that deliver superior comfort and feel in performance-everyday fabrics, is implementing a key part of its global expansion plan with new hires and regional offices in key textile regions worldwide.

Nano-Tex has tapped industry veterans in North America, Europe and Asia who will help the company maximize its NANO-TEX treatments, assure manufacturing quality control, and expand business into new apparel and interiors categories internationally.

Most recently, Donna Hill joined Nano-Tex as director of business development in North America. Hill, a former marketing and sales executive with Liz Claiborne and Levi Strauss, is responsible for building brand relationships and product placements in the women's wear and children's wear markets. Hill is based in Greensboro, N.C.

Beni Bildik, formerly with the Gap in Turkey, will serve as business development manager in Europe for Nano-Tex. Bildik, based in Turkey, will establish new relationships with European mills and brands. Bildik brings specific expertise working with mills in Turkey, the sixth largest apparel exporter in the world, and second largest in the European Union.

To build the company's presence in Asia, Nano-Tex has hired Stanley Cheng as business director for North Asia, based in Hong Kong responsible for expanding the company's operating infrastructure to support the region, including licensing deals, apparel and interior relationships and overall Nano-Tex brand awareness. Cheng worked with W. Gore & Associates for nearly 10 years, where he played a key role in building domestic business of GORE-TEX fabrics in greater China and Korea.

### [TIPS Nano T102](#)

Advanced Nano T102 Manufacture  
[www.tips.com.cn](#)

### [Alkemia Info and News](#)

News and other info from Alkemia T  
Estremis  
[www.alkemia.com](#)

### [Tulstena A.S.](#)

We produce all types of entering w  
[tulstena.com](#)

### [Vinea Interiors](#)

Solutions for a sustainable world of  
[www.vinea.com.br](#)

## Now A Global Brand

水をはじき、ヨゴレにくい  
NANO-TEX 加工!

nano-pelのメカニズム

水滴と油滴が弾き飛ばされ、  
生地表面を乾かします。

MINIMIZES STAINS  
LIQUID REPELLANT

NANO-TEX  
Fabric

水をはじき、  
油をはじき、  
ヨゴレにくい

「NANO-TEX」加工は、生地表面の  
撥水・撥油を実現。  
ナノレベルでの生地加工により、  
快適性をアップしています。

急な雨、それはいつも靴を悩ませて  
きました。

「NANO-TEX」加工は、生地表面の  
撥水・撥油を実現。  
ナノレベルでの生地加工により、  
快適性をアップしています。

## Case Study 4 - Singular ID

[An Academic Spin Out That Made It](#)

# Singular ID

# How our technology came about...

- **Magnetic hard disk drive technology**
  - Quest for ever-denser information storage
  - “In-plane” to “out-of-plane” magnetic bits
  - Materials R&D – nanotechnology of candidate films
  - Highly regular and uniform disk media – very difficult!

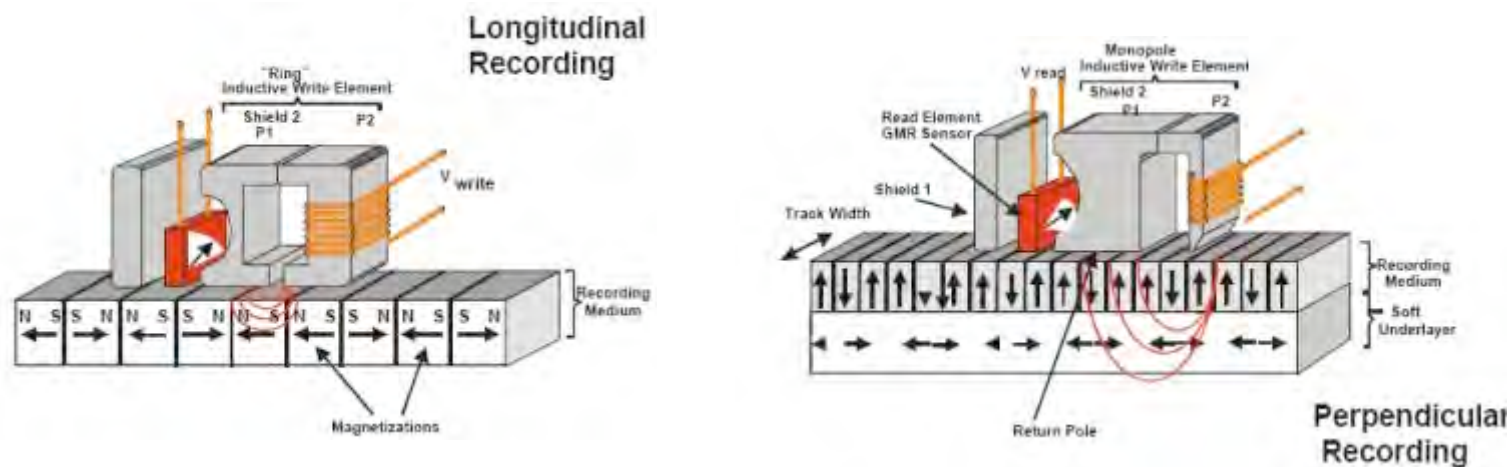
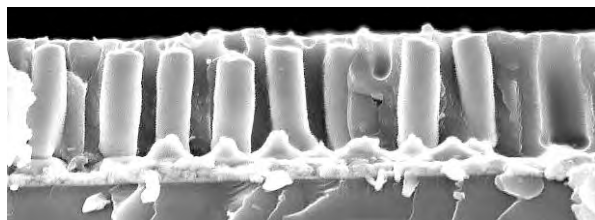
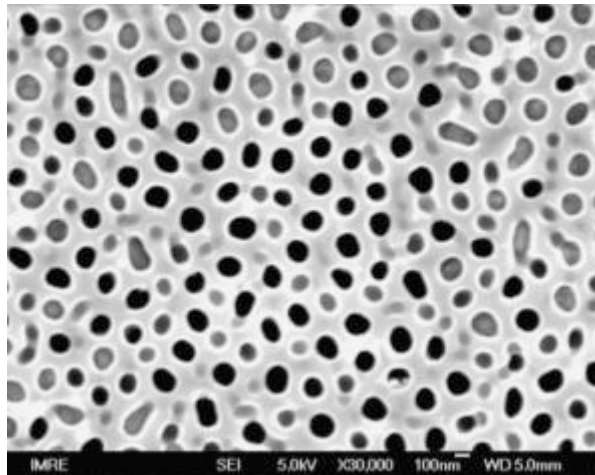


Image source: Hitachi Global Storage Technologies

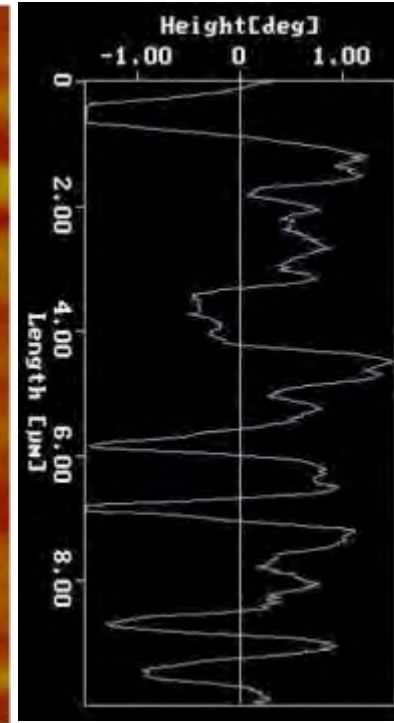
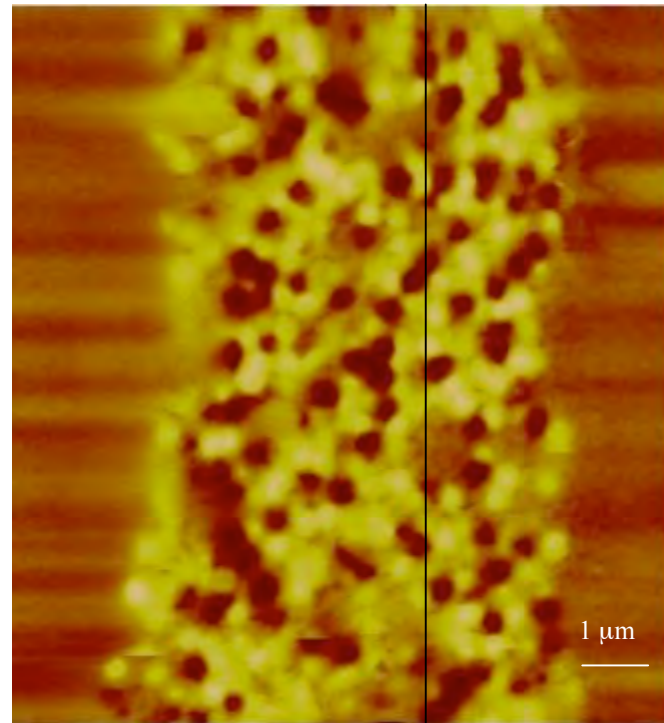


# Nanotechnology & Materials

- Anodized alumina composites**



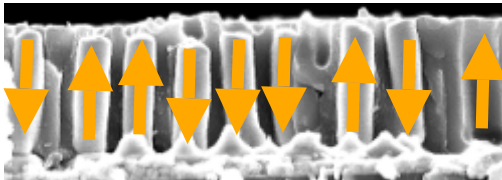
**SEM – plan and x-section**



**AFM and MFM analysis**

# Modus Operandi

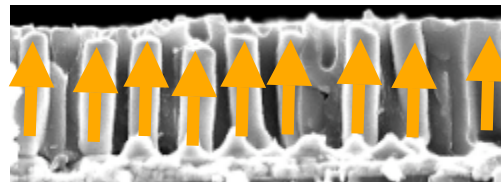
## 1 Nano-bar magnets



Tag attached to object

## 2

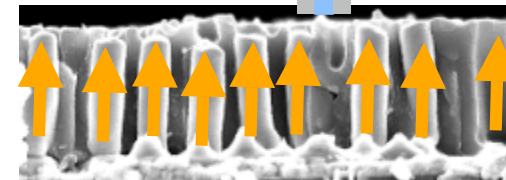
Magnetic field applied



Nano-magnets realigned

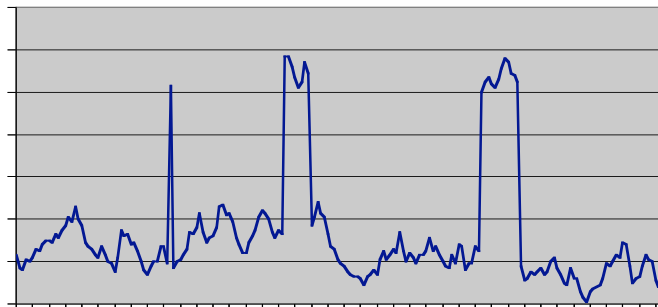
## 3

Read head scans across

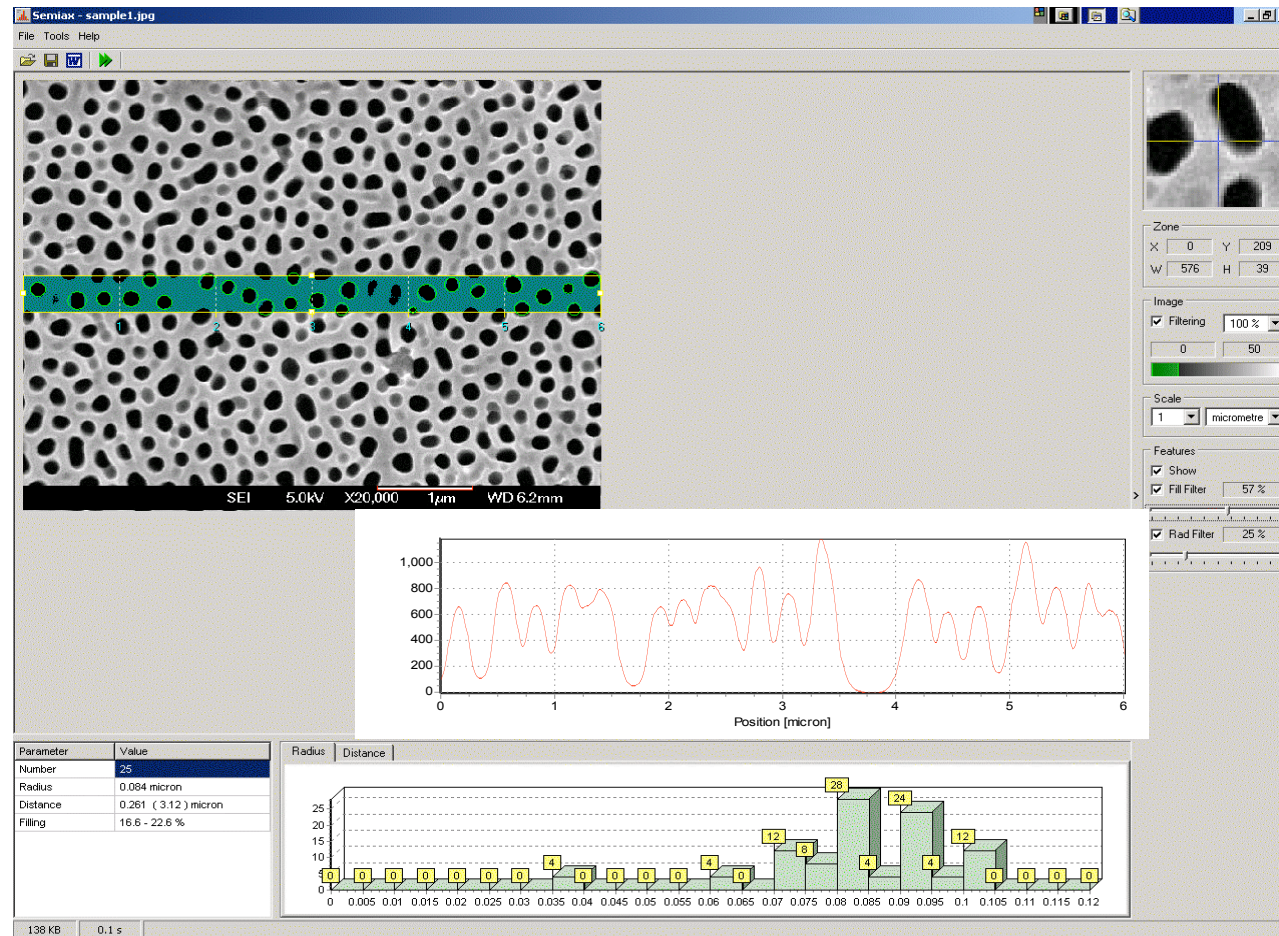


Magnetic field read

Read-head output from a portion of a *Singular ID* nanoscale tag



# Modeling Capability



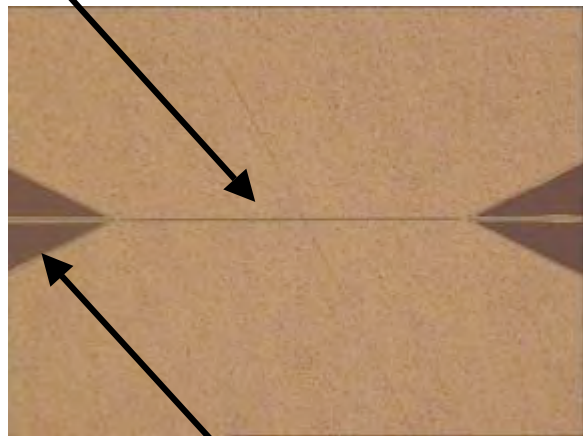
**Tailoring the materials – real images, modeled responses**



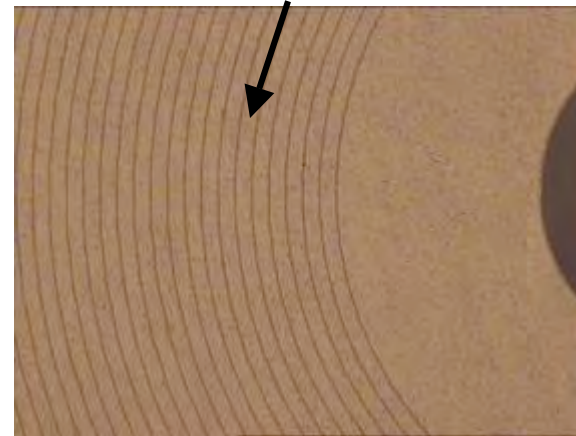
# Know-how

- **Relocation**

**1 mm x 2 micron  
magnetic track**



**2 micron wide magnetic  
tracks**

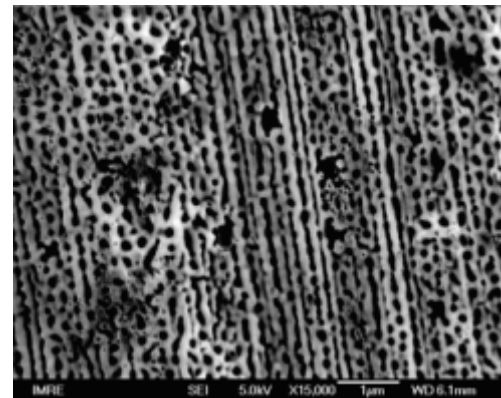
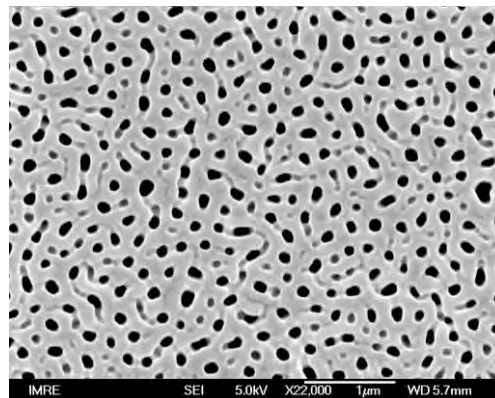
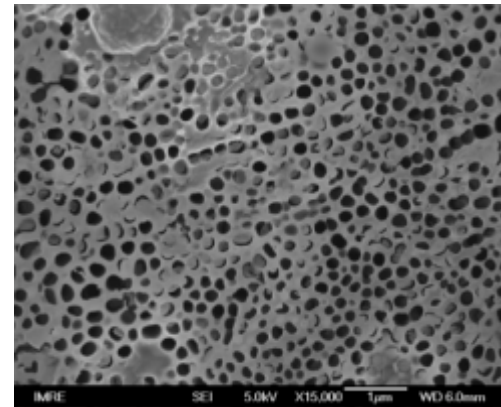
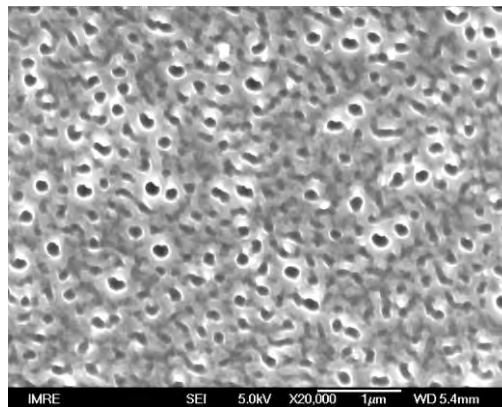


**Fiducials and location guides  
contain magnetic material**

- **Fingerprint regions with fiducial markings and guides**
- **All regions (fiducials, tracks and surroundings) are co-planar**

# Know-how

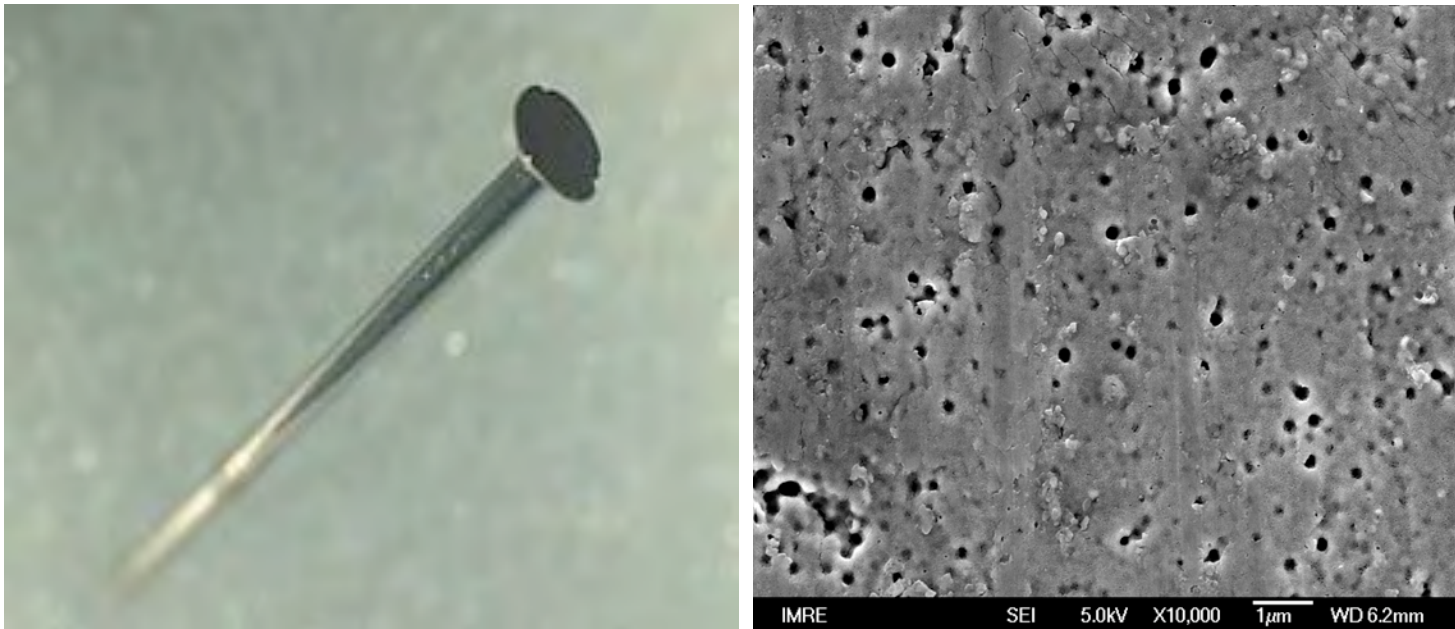
- Control of morphology



Changes in processing conditions and precursors

## Know-how

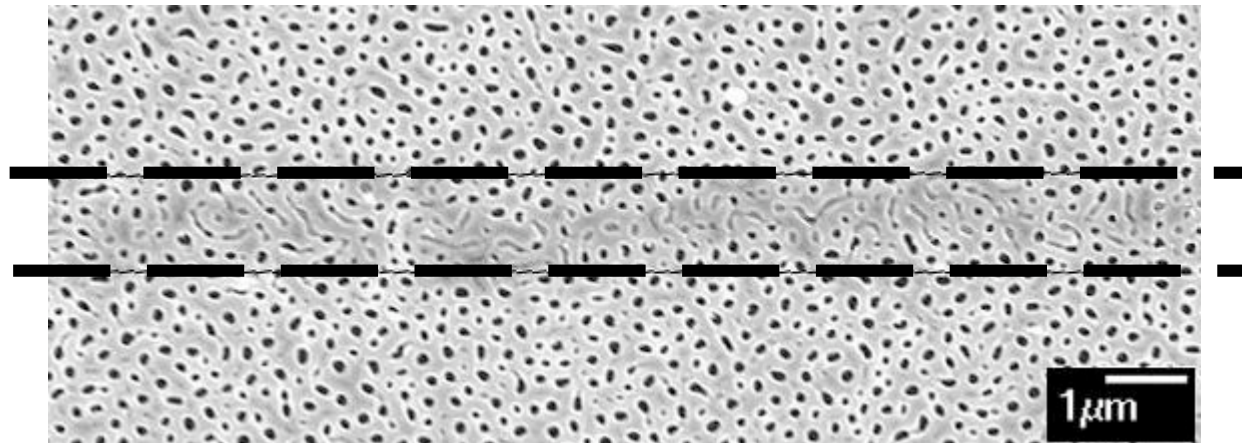
- **Direct incorporation onto items of interest**



**Initial trials directly on a pin-head – ‘materiametrics’**

# Know-how

- **Patterning**



**1 micron wide regions demonstrated**



## Route to market

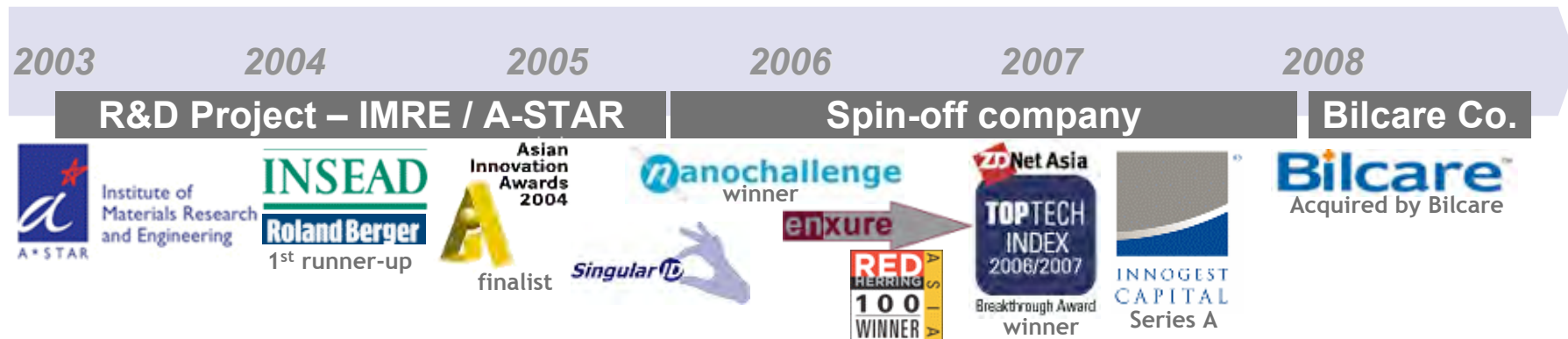
- **Getting to market was important...**
  - Our approach is not limited to 'nanotechnology'
  - Similar principles apply to slightly larger (micro-) size scales
  - Relocating tags with inexpensive scanners important
  - Speed of reading on production line crucial
  - Commercial cost must be low
- **First products**
  - Blend of micro and nanotechnology
  - Still prohibitively difficult / impossible to replicate the detail
  - B2B: Initial customers to be Principals / distributors / inspectors
  - B2C: Target the consumer as tags become prevalent
  - **enxure** launched Aug 2006



# Singular ID – an innovative high technology company



- **Head-quartered in Singapore**
  - R&D, manufacturing, sales & marketing
- **EU operations in Italy**
  - Applications development, sales
- **Series A funding**
  - Closed ~US\$ 1.5m finance July 2007
- **Acquired by Bilcare**
  - Bought for ~US\$ 13m Dec 2007



## Initial Markets

- **Singular ID's technology is broadly applicable**
- **Currently focused on three key sectors**



### **Pharmaceuticals & Biomedical Products**

Singular ID was recently acquired by Bilcare

### **Luxury Goods**

Singular ID has a subsidiary in Northern Italy

### **Automotive (Engineering) Components**

Singular ID's first major customer is in this sector

## Example: Automotive application

- **Provided *enxure* as a full turn-key solution**
  - Delivered database hardware, software and scanner / phone sets
  - Modified production-line printer for real-time data management
  - Repeat order for full year of label supply / service
  - Supplying both product and recurring authentication service



**Sanden label with unique barcode and tag**



**Global Identification Feature, Nov 2006**



**Sanden software**

# Our Products & Services



enterprise brand security system



## • Products

- Secure barcode labels
  - copy proof, pre-registered, customised formats
- Portable scanners for authentication by inspectors
- Desktop scanners for vendors / EPOS
- Database system integrated with production line

## • Services

- Data-hosting and authentication transaction management
- Data-mining, benchmarking, audits and report generation
- Web portal for customer and client access

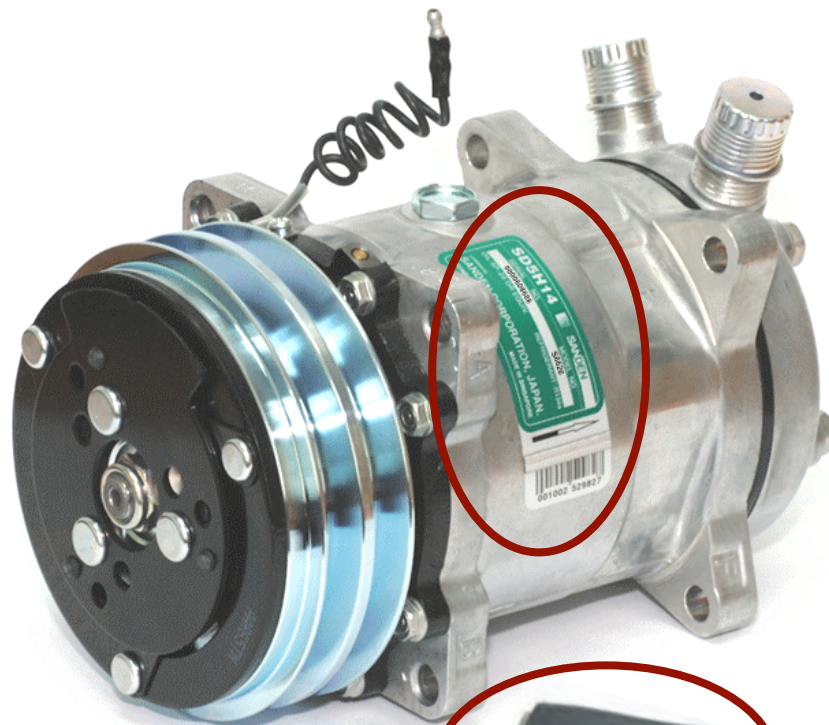
## • Future / on request

- Secure RFID labels and compatible scanners
- Tag integration with product
- Covert solution engineering
- Brand security policing and inspection
- Third party mobilisation (e.g. customs officials)

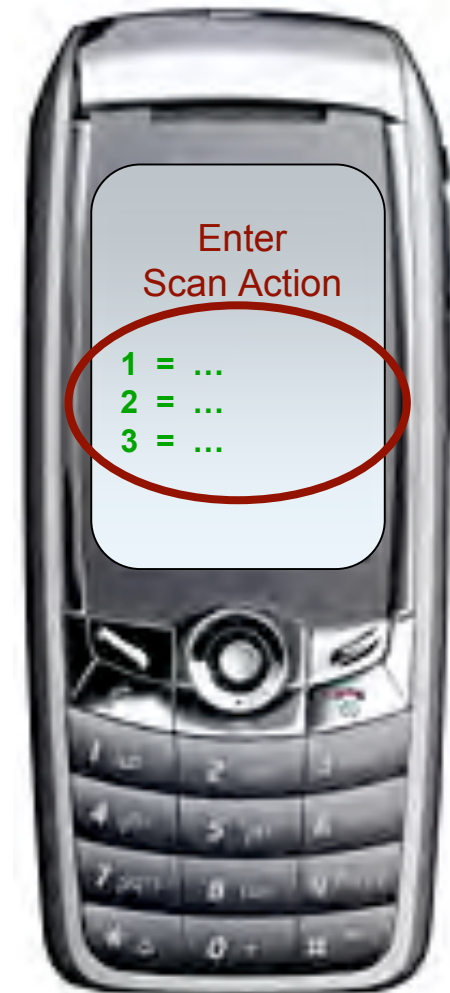
**Evaluation kit available**



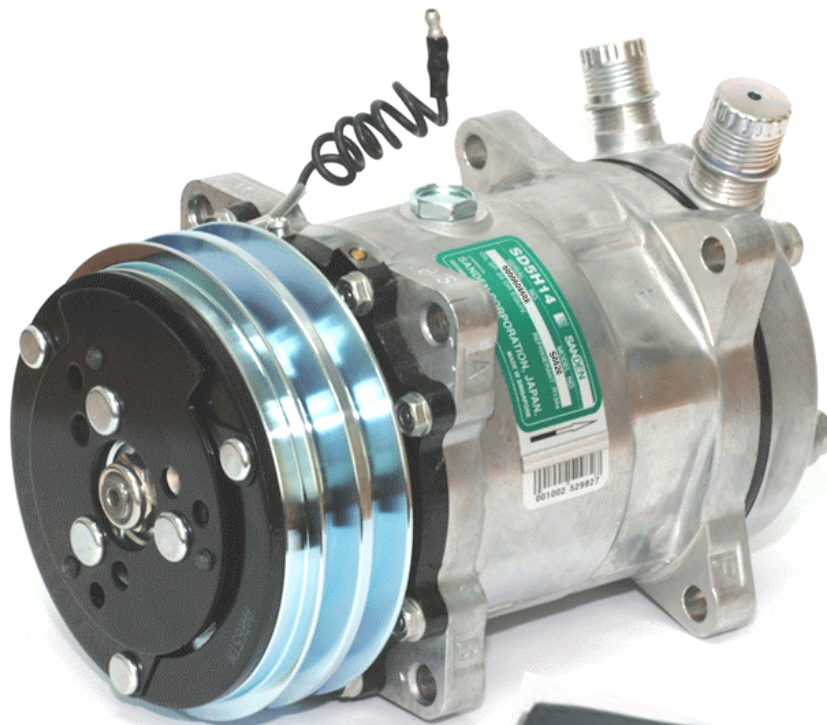
**enxure is customisable...**



**enxure scanner**



...but using automotive as an example

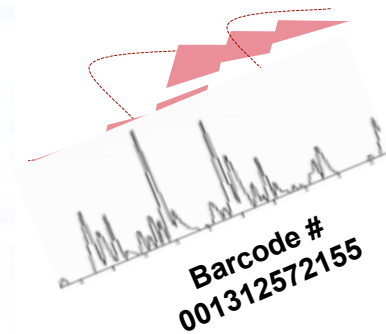
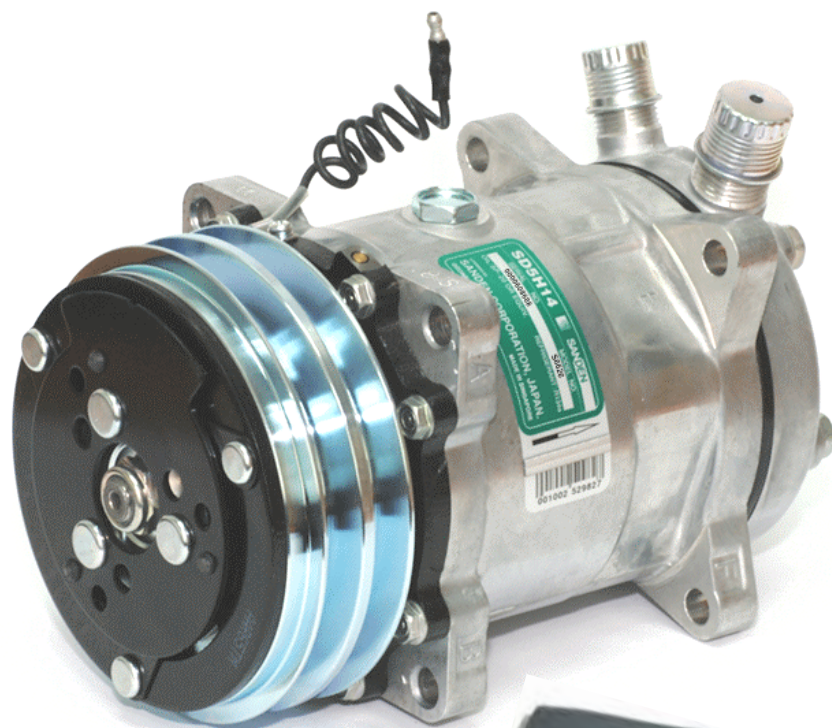


**enxure scanner**





# Sales - authentication



**enxure scanner**

**SANDEN**

Delivering Excellence

## SANDEN to use New Tagged Labels on Compressors to Combat Counterfeits

Sanden International (Singapore) Pte Ltd ("SIS") is pleased to announce that we will be using a nano-technology based brand security system, *ensure*, on our compressors to combat counterfeits.

*ensure* labels aim to provide brand protection and help to authenticate genuine Sanden compressors against counterfeit compressors. This will also provide confidence to all our customers on the purchase of genuine Sanden compressors.

The new label will contain the basic product information as in the current label. It uses a unique fingerprint technology in the form of a magnetic strip, combined with a barcode.

To check whether the compressor is genuine, you can have the compressor authenticated at our authorized distributors' outlets where the magnetic strip/barcode will be scanned with an immediate readout. Special proprietary scanners will be used.

Kindly note that Sanden International (Singapore) Pte Ltd is the only Sanden manufacturing plant producing SD5 compressors. All new labels will have the "Made in Singapore" print.

### Authorized Distributors are as follows:

S. D. Kam Company	Tel : 6241 9111
Unica International Pte Ltd	Tel : 6842 1212
Wui Hong Enterprises Pte Ltd	Tel : 6747 9864
Nagoya Unica Pte Ltd	Tel : 6297 2395

For more information, you may visit our website  
<http://www.sanden.com.sg> or write to [acmktg@sanden.com.sg](mailto:acmktg@sanden.com.sg)

**Sanden International (Singapore) Pte Ltd**  
**Sanden House, 25 Ang Mo Kio Street 65, Singapore 569062**

## Singapore



## THÔNG BÁO ĐẠI LÝ CHÍNH THỨC

Công ty Cổ Phần Kỹ Nghệ Lạnh Hoa Sảng (Hoa Sang JSC) là nhà phân phối chính thức cho các loại máy nén lạnh Sanden tại Việt Nam dưới sự chỉ định của Công Ty Quốc Tế Sanden Singapore từ ngày 1/6/2007

Với sự chỉ định này, Chúng tôi đã kết hợp mô Trung Tâm Khách Hàng Sanden tại Số 206, Đường Nguyễn Trãi, Quận 1, Tp HCM. Trung Tâm sẽ trưng bày và phân phối tất cả các loại máy nén Sanden, đồng thời Trung Tâm cũng thực hiện các dịch vụ bảo trì, sửa chữa, bán lẻ và giải quyết các yêu cầu liên quan.

Cùng với sự khai trương Trung Tâm này, chúng tôi cũng đã giải thể công nghệ mới nhất của Sanden - Công nghệ Enxure - nhằm ngăn chặn tình trạng hàng giả đang gia tăng trên toàn quốc.

Enxure là một hệ thống bảo vệ thương hiệu vượt trội vốn có thể đi và xác nhận máy nén Sanden chính hãng và chất lượng phục vụ khách có trên thị trường. Công việc này còn mang lại cho khách hàng của Sanden và Hoa Sảng, hệ thống này còn mang lại cho khách hàng tâm khi đã mua sản phẩm Sanden chính hiệu.

Song song với việc sử dụng công nghệ Enxure, các nhãn hiệu thay thế cho các nhãn hiện tại. Nhãn máy mới sẽ chứa những giống như nhãn hiện tại, nhưng được tích hợp "mã nhận diện" và hệ thống mã vạch. **Đổi với những máy nén Sanden trên nhãn máy mới luôn có in dòng chữ "Made-in-S"**

Nhằm giúp khách hàng dễ dàng nhận biết máy nén Sanden các máy nén giả, một Logo Sanden mới cũng sẽ được đưa ra. Hãy liên hệ với Công ty Hoa Sảng để biết thêm chi tiết.

Chúng tôi hy vọng tiếp tục nhận được sự ủng hộ của



**HOASANG J.S.C.**

Công Ty Cổ Phần Kỹ Nghệ Lạnh HOA SẢNG  
206 Nguyễn Trãi, Quận 1, Tp HCM  
Tel: 84 8 8300069 Fax: 84 8 355 650  
<http://www.tuhoasang.com>




# Vietnam

[illegible]

## Thailand




# Information sheets – within product carton



## Sanden introduces Brand Protection Technology

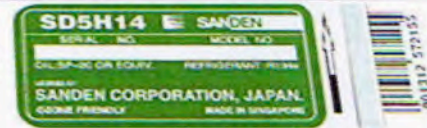
Sanden International (Singapore) Pte Ltd has introduced our latest technology, **Enxure** to combat the rising counterfeiting problem. The new label will contain the basic product information as in the current label and will incorporate a unique fingerprint in the form of magnetic strip and barcode. The new label can only be **authenticated using special scanning equipment**, which is available only with Sanden authorised dealer.

Example for SD5H R134a compressor



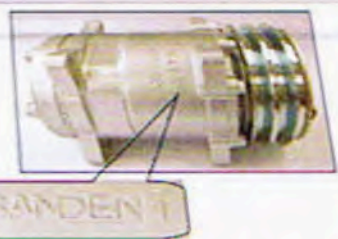
**Current Label**

→



**New Label**

In order to further assist customer to differentiate genuine Sanden compressors from counterfeit compressors, an embossed **SANDEN** logo will appear on the cylinder block.



Both the new label and embossed **SANDEN** logo will be applied to all SD5 compressors. Kindly note that Sanden International (Singapore) Pte Ltd is the only manufacturing plant producing SD5 and all new labels will have the **"Made in Singapore"** print.

For queries and authentication, please contact our authorised dealers in your area or write in to [acmktg@sanden.com.sg](mailto:acmktg@sanden.com.sg).

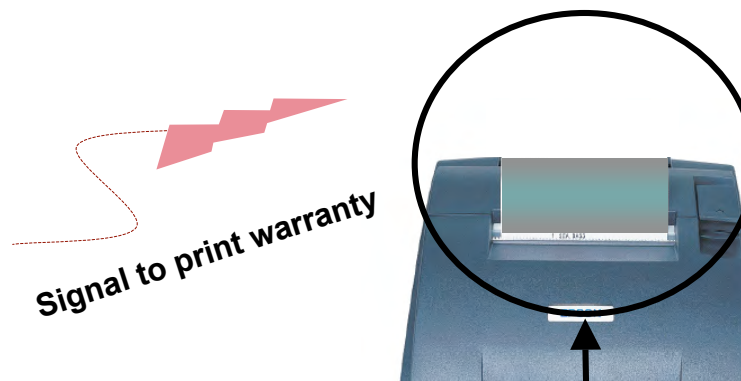
## Sales – transaction code



**enxure scanner**



## Sales – instant warranty





**OFFICIAL WARRANTY**

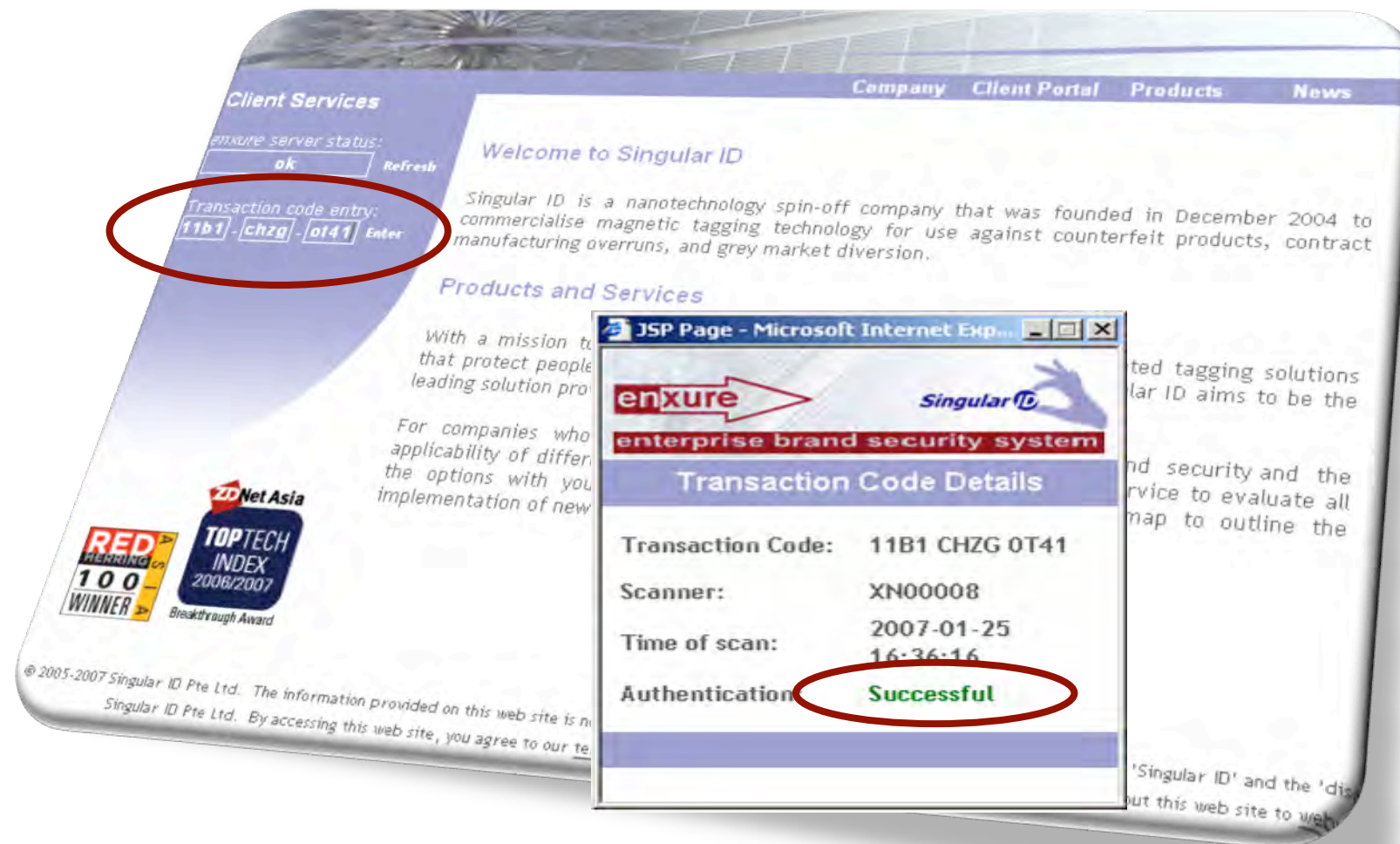
Thank you for Purchasing a Genuine XXXX Product  
Please retain this Warranty

**Warranty #: 11B1 CHZQ OT41**

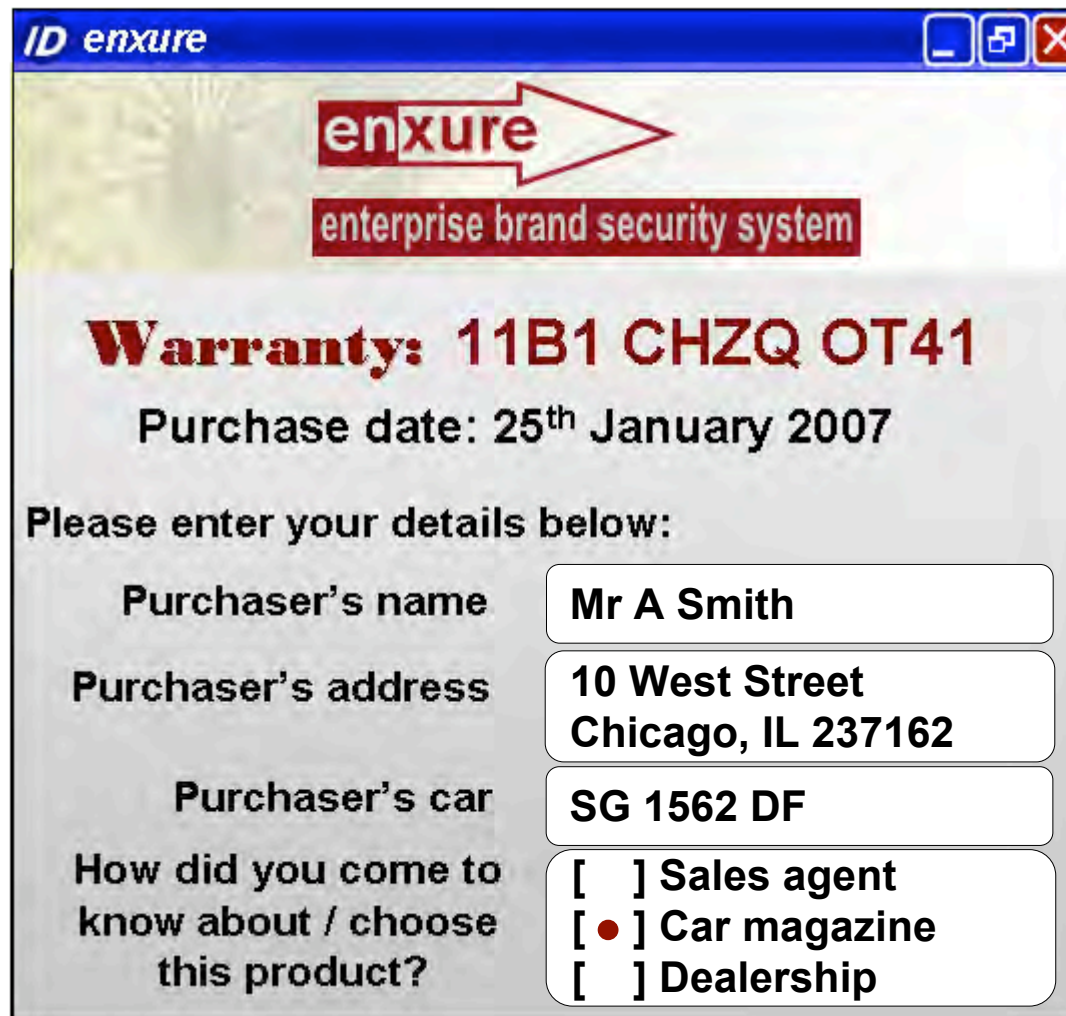
Please take the time to log into our website to  
complete your warranty [enxure.XXXX.com/warranty](http://enxure.XXXX.com/warranty)

By taking a minute to complete the online  
questionnaire you will help us to serve you better

# Sales – customer check



## Sales - warranty manager



**ID enxure**

**enxure**  
enterprise brand security system

**Warranty: 11B1 CHZQ OT41**

Purchase date: 25<sup>th</sup> January 2007

Please enter your details below:

Purchaser's name	Mr A Smith
Purchaser's address	10 West Street Chicago, IL 237162
Purchaser's car	SG 1562 DF
How did you come to know about / choose this product?	<input type="checkbox"/> Sales agent <input checked="" type="checkbox"/> Car magazine <input type="checkbox"/> Dealership



# Our Operational Model

## Leveraging on alliances

Channel Marketing

Joint ventures

Brand security companies

IT Platform companies

## Out-sourcing & partnerships

Established hardware suppliers

Scanner contract manufacturers

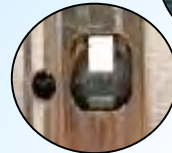
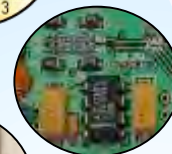
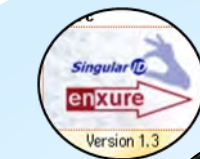


Tag and Label contract manufacturers

Aurigin technology

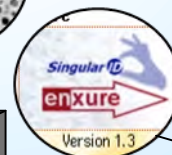
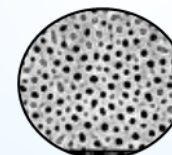


Internet & Mobile service providers



Singular ID

IP & Systems Integration



Data management

Customers



# Summary

- **Global trade**
  - Counterfeiting and supply chain management issues
  - Can lead to brand erosion and safety issues
  - Innovative solutions are still required
  - Nanotechnology can help prevent counterfeiting
- **Singular ID**
  - Five years of technology development
  - Products on the market
  - Strategy for extensive customer adoption

## Acquired in 2008

**Hindu Business Line - Chennai, India CHENNAI:**  
**Bilcare Ltd has announced that Bilcare Singapore Pte Ltd**  
**has bought 100 per cent of Singular ID for \$19.5m**



Tim Harper  
Cientifica Ltd.

[www.cientifica.com](http://www.cientifica.com)

Business Information and Consulting  
London Oslo Singapore Mumbai



**cientifica**