N+1 SINGER

Company Update

IDEX (IDEX.NO)

Tipping Point

IDEX is well positioned with a strong IP portfolio to address the emerging significant opportunity for fingerprint sensors in the consumer mass market. It is one of only a small number of independent vendors remaining since Apple acquired AuthenTec, and Synaptics acquired Validity. The market is in the early stages of mass adoption, with Apple catalysing the market with the launch of the iPhone 5S which incorporates a fingerprint scanner. 2014 will be a pivotal year for IDEX where mass commercialisation of its swipe and touch sensors should commence. Beyond mobile devices, the opportunity in smart cards and the wider IoT market increase IDEX's opportunity to cUS$4bn by 2017.

- **Market at the Cusp of Explosive Growth** - IDEX ASA is a Norwegian public company specialising in fingerprint imaging and recognition technology. This market is at the cusp of explosive growth driven by smartphone adoption, with Apple's recently launched iPhone 5s incorporating a new fingerprint identity sensor. IDEX is convinced that fingerprint sensors will become the de facto standard mobile security in smartphones and other personal networked devices. This outlook is supported by recent announcements from major global leaders such as Microsoft and PayPal.

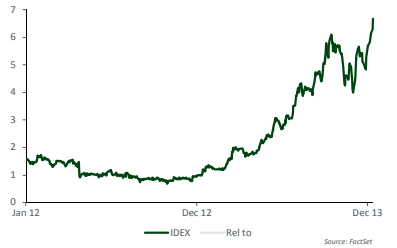
- **Strong IP Position, with a Cross-Licence with Apple** - IDEX holds 21 core patent families for capacitive sensors from 1997. These cover capacitive swipe, touch, IN-glass, and LiveFinger detection. Crucially, the group's patent coverage includes a cross-licence to certain key patents in 2007 that were then owned by UPEK, which was subsequently acquired by AuthenTec/Apple. We believe this patent position is and will increasingly become more important to OEM customers.

- **Volume Shipments to Commence from Q2 2014** - IDEX expects customer qualification of its swipe sensors for mobile communications to commence late 2013. It is then expected that these swipe sensors will be inserted into products in Q2'14 and volume shipments to commence in H2'14. Whilst it is later than some of its competitors in entering the market, IDEX believes its technology improves on the current swipe offerings. Beyond swipe, IDEX believes it will be in a position to launch its touch sensors in mid-2014 and that its offering will be at a disruptive cost point. Beyond touch, IDEX has a roadmap for in-screen integration which it believes offers the ultimate solution for mobile device fingerprint sensor integration.

- **Market Opportunity is Significant and Goes Beyond Smartphones** – Our scenario analysis shows that IDEX could generate EBITDA of between US$7-US$59m in 2015 and US$60-US$166m in 2016 based on the opportunity in mobile devices alone. Clearly, a number of assumptions have been made to drive these results, but we believe it is helpful in putting the group's valuation in context. Beyond the smartphone market, we believe that fingerprint biometrics will be the technology of choice for mass adoption in new areas such as the wearable markets and other new connected devices expected to emerge over time (Internet of Things (IoT)). This gives IDEX an addressable opportunity approaching US$4bn by 2017. As such, we believe significant value can still be created over the current market capitalisation of US$373m with strong execution of its strategy.

Date	03 January 2014
Price*	Kr6.66
- Dividend	-
	*Price as at COB 03/01/2014
Forecast Sensitivity	-
Fundamental View	-
Market Cap (Krm)	2,296
Enterprise Value (Krm)	-
Shares in Issue (m)	345
Freefloat (%)	-
Avg. Daily Volume ('000s)	581
Next Event	-
	-

IDEX Price Chart



	1M	3M	12M
Absolute %	20.0	13.8	572.7
Rel. Market %	-	-	-
Rel. Sector %	-	-	-

Source: FactSet

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Investment Summary

IDEX is an Oslo Axess-listed business with strong IP in fingerprint recognition technology for the consumer mass market, one of only a handful of companies able to participate in this multi-billion pound opportunity. This market is at the cusp of explosive growth driven by smartphone adoption, with the recently launched iPhone 5s incorporating a new fingerprint identity sensor. IDEX has made significant strides in 2013, attracting substantial growth capital and forging two strategic relationships which put IDEX on track for its first product insertion in Q2'14. In the last four years, IDEX focused on the smart card market whilst which has taken longer to commercialise than expected and has put it behind some of the other vendors who had an earlier focus on the mobile device market. However, its experience in the smart card market has given the group a more compelling roadmap going forward, with the ability to introduce touch sensors at a disruptive price point in mid-2014 and a further roadmap for in-screen integration, where glass is used as the sensor. More importantly, it appears to have one of the strongest patent and IP positions amongst independent vendors, with its patent portfolio including a cross-licence with Apple. Beyond the smartphone opportunity, the group is the only one with low-cost sensor technology that is thin and flexible enough to be compliant with the ISO standards for identity and smart cards. The opportunity here, together with the market for other emerging devices (Internet of Things), could prove to be even larger than the opportunity in mobile devices.

Whilst 2013 confirmed the group's market opportunity, 2014 will prove pivotal, with a leadership team and the organisational structure in place for full commercialisation of its IP. We believe delivery of key milestones will further highlight the group's value, which is already heavily underpinned by the recent consolidation activity in the sector. The shares have performed strongly in 2013, but we believe with strong execution significant shareholder value can still be created over the current US$373m market capitalisation.

Fingerprint Sensor Technology Goes Mass-Market, Sparked By Apple

The market for fingerprint sensor technology was catalysed by the acquisition of AuthenTec by Apple in July 2012 for US$356m (AuthenTec's annual revenues estimated at cUS$70m). AuthenTec was the market leader in fingerprint sensor technology and was already supplying to computer makers such as HP, Lenovo, and Dell. This acquisition did two things: 1) it removed a major independent supplier of the technology from the market, and 2) it signalled Apple's intent to use the technology in its products. In Sept 2013, Apple launched the iPhone 5s, which introduced the Touch ID, a capacitive touch sensor built into the home button which captures the user's fingerprint to unlock the phone and provides a secure way to approve purchases from the iTunes Store, App Store, or iBooks Store. It is clear that other players in the highly competitive smartphone market are following suit, rapidly developing smartphones with sensors. It is also worth highlighting that Both Microsoft and PayPal have also made positive statements regarding fingerprint sensor technology, emphasizing this market demand.

Opportunity in Non-Apple Mobile Device Market is Significant

With Apple transforming a major independent vendor into an in-house technology supplier, all eyes are on the opportunity in the non-Apple market segment for the remaining suppliers of fingerprint sensor technology. IDC estimates that there will be just over 1bn smartphones shipped in 2013 and this is expected to grow to over 1.7bn unit shipments by 2017. Data from Q2'13 showed that Apple accounted for 13.2% of shipments in the quarter, down from 16.6% in the same period the previous year. So whilst Apple remains a significant and highly influential player in the market, the non-Apple opportunity is substantial and forms the core of IDEX's immediate market opportunity. With the market price for swipe sensors currently at cUS$1-2 per unit and the market price for touch sensors anticipated to be at least 3-4x that of swipe, we see how the immediate opportunity is likely to be a multi-billion dollar one. IDEX estimates that the market opportunity in the consumer electronics space for finger print sensor technology will be worth US$2bn by 2015.

IDEX Is One of Three Remaining Established Vendors to Exploit Opportunity

There are various fingerprint sensor technologies in the market (capacitive, optical, thermal, pressure) but the only technology that has been successfully deployed in volume (laptops, ID terminals, and touchscreens) are capacitive sensors/readers. This is the technology that AuthenTec uses and its deployment by Apple is further validation that capacity sensors will be the key biometric technology for mass adoption. There are only 4 established vendors that use capacitive sensor technology: AuthenTec (now owned by Apple), Fingerprint Cards (Swedish listed company), US-based Validity (recently bought by Synaptics NASDAQ: SYNA), and IDEX. This makes IDEX one of a handful of companies well positioned to exploit a significant market opportunity.

Strong IP and Patent Position; Including Cross Patent with Apple

For major handset vendors competing against Apple, the IP and patent position of key technology suppliers like IDEX become extremely important going forward. IDEX holds 21 core patent families for capacitive sensors from 1997. These cover capacitive swipe, touch, IN-glass, and LiveFinger detection. Crucially, the group's patent coverage includes a cross licence to certain key patents in 2007 that were then owned by UPEK, which was subsequently acquired by AuthenTec/Apple. The latter puts IDEX in a unique position relative to the other vendors, which we believe will prove highly attractive and important to OEM customers.

Key Partnerships in 2013 Move IDEX Strategy Further

In 2013, IDEX entered into two partnerships that significantly moved its strategic plans forward. World Wide Touch Technology (WWTT), a HK-listed developer and manufacturer of a broad range of automation and hi-tech products which operates a Biometric Security Platform, invested c.US$9m during the year. This has provided IDEX funds to accelerate its strategic plans including the acquisition of PicoField (see below). IDEX also entered into a commercial partnership agreement with a global player in the mobile communications market, providing the group with strong channels to market and mass industrialisation capability. The scope of this agreement was recently expanded demonstrating further traction in commercialising products for the mobile market.

Imminent Product Insertion with Mass Production via Established Partners

IDEX expects customer qualification of its swipe sensors for mobile communications to commence late 2013. It is then expected that these swipe sensors will be inserted into products in Q2'14 leading to volume shipments in H2'14. Whilst it is later than some of its competitors in entering the mobile device market, IDEX believes its technology improves on the current swipe offerings (for example, it purports to be the only technology that can still get good results if a person were to swipe at a 40 degree angle) and in the case of touch sensors, it believes it will be able to enter the market with a disruptive offering, with a step-change in the price/performance ratio.

Strong Technology Roadmap Should See It Emerge Stronger Post Early Adoption Phase

IDEX's roadmap should see the introduction of its swipe sensors in volume from H2'14 and the product launch of its touch sensors by mid-2014. IDEX recently commenced a programme for commercialising its low-cost touch sensor with high biometric performance tailored for consumer devices. In Sept 2013, it acquired PicoField, whose patent and pending applications as well as other intellectual property relating to touch sensors strongly enhances IDEX's on-going touch sensor programme and expands the field of IDEX's patent protection. It is worth noting that executives at PicoField include two who were co-founders of Validity Sensors, Inc. each having more than a decade of experience in the fingerprint industry, adding a vast network of customer and supply chain contacts to IDEX. Beyond touch, IDEX has a roadmap for in-screen integration (embedding the sensor in the mobile phone's cover glass) which it believes offers the ultimate solution for mobile device fingerprint sensor integration.

Mobile Alone Can Drive Significant EBITDA in 2015 and 2016

We expect the non-Apple mobile device opportunity to be worth over US$1.2bn by 2016. Our base case assumes that the group is able to achieve c20% market share in 2015 and 30% market share by 2016. Management believes that the group is capable of delivering gross margins of between 35-45% (note: Fingerprint Cards reported gross margin of 42% and 49% in Q2 and Q3 this year). Even with accelerating operating expenses, our scenario analysis shows that IDEX could generate EBITDA of between US$7-US$59m in 2015 and US$60-US$166m in 2016 based on the opportunity in mobile devices alone. Clearly, the analysis was based on a number of assumptions (attach rates, ASPs, market share etc.), but we believe our scenarios were reasonable and that the exercise is helpful in putting the group's valuation in context.

Market Opportunities Over and Beyond Mobile Device Market

Although the mass market opportunity for fingerprint sensor technology has been significantly catalysed by smartphone adoption, the addressable market goes beyond the mobile device market. The IDEX SmartFinger® Sensors is the only biometric sensor thin enough to comply with ID/Smartcard form factors. The group is also already involved in security and bag lock projects. We believe that fingerprint biometrics will be the technology of choice for mass adoption which can have widespread application in new areas such as the wearable markets and other new connected devices expected to emerge over time (Internet of Things (IoT)). IDEX estimates that these additional markets will increase the opportunity for the group to close to US$4bn by 2017.

Market Consolidation and Size of Opportunity Supportive of Valuation

Apple acquired AuthenTec for US$356m in August 2012. The price paid should be viewed in the context of Apple turning AuthenTec from an external supplier of fingerprint sensor products into an internal resource for Apple. In Sept 2013, Synaptics (Nasdaq: SYNA) announced that it will pay US$92.5m in stock and cash plus potential performance payments over a multi-period of up to US$255m for Validity Sensors. Synaptics has been proactive in pursuing its preference for embedded touch (vs one-glass) solutions, working closely with LCD manufacturers. It has displayed a similarly aggressive stance on integrating fingerprint sensing, making it more appealing as a one-stop shop. It therefore seems feasible that a market consolidation could be initiated by the touch panel or touch controller vendors. The level of consolidation activity in the mobile device value chain together with the size of the market opportunity lead us to believe that there is still significant value to be created with strong execution of the group's strategy.

2014 will be a pivotal year for the group to show success in commercialisation of its compelling product roadmap.

Key Risks

Commercialisation Execution

IDEX has been late in commercialising its products in the mobile device market (as it initially focused on the smart card market), trailing the likes of Fingerprint Cards and Validity in terms of design wins and commercial implementations under their belt. Whilst there are encouraging signs of IDEX's progress towards product insertion/volume shipments (most notably the expansion of its agreement with a major player in the global communications market), there is still a risk on the timing and success of such commercialisation.

Once commercialised, IDEX's prospects are dependent on its ability to deliver products, to win market share, to retain the right staff, and to successfully defend its IP rights. Success or failure in these various aspects will be a key driver of the value of the shares.

Delays in Market Development

Fingerprint sensors within mobile devices have many advantages, and the market development has been kick-started by Apple; the inclusion of a sensor in the iPhone 5S has been well-received. However, the preferences of consumers for one particular technology, e.g. touch sensors vs. swipe sensors, could dictate the pace of adoption. The more device OEMs that wait for the price of touch sensors to drop, the further out into the future mass adoption is likely to be.

Market development can also be influenced by consumer adoption. This will ultimately determine the share of the handset market which can be addressed by fingerprint sensor vendors.

The rate of adoption of fingerprint sensor technology on smart cards and broader Internet of Things (IoT) segment is also very difficult to predict.

Potentially Lumpy Orders and Low Visibility

The mobile sector is characterised by high levels of secrecy, with design wins and partnership agreements mostly remaining anonymous. This makes it difficult to identify any strong trends or draw any meaningful conclusion on news announced by different players. On top of this, orders can be very lumpy with low visibility in terms of potential size or timing of deals. This can make valuation exercises even more challenging.

Company Background

IDEX ASA develops and delivers world-leading fingerprint sensor technology, products and authentication solutions. IDEX's vision is to ensure individuals a safe, secure, and simple use of personal ID. IDEX has, since 1997, been a pioneering company in the field of capacitive fingerprint sensing technology, and owns and controls the earliest, basic patents for low cost fingerprint sensors. As it holds key early fundamental patents within the fingerprint sensor industry, IDEX is in an influential position to exploit the mass market potential of this technology for secure ID. The company is headquartered near Oslo, Norway with a representative sales office in the Far East. IDEX ASA (ticker IDEX) is listed at the Oslo Axess market place on the Oslo Stock Exchange.

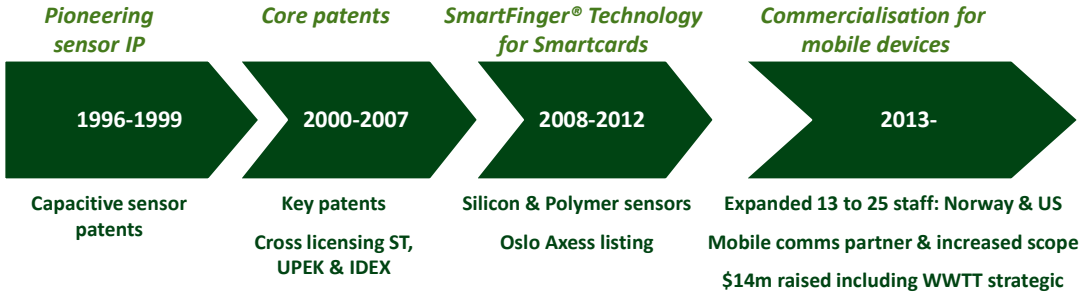
IDEX is one of a handful of established vendors in the space. With Apple's acquisition of AuthenTec in 2012, the market for fingerprint sensors was catalysed leading to much interest and activity at IDEX. We highlight below the key developments at IDEX in 2013 thus far.

IDEX Key 2013 Highlights

- **Feb 2013** – IDEX presents a novel SmartFinger Sensor-in-glass technology concept for fingerprint sensors in mobile phone display glass at the Mobile World Congress 2013 in Barcelona. This uses IDEX's principle of separating the sensing array from the electronics. The unique, patented through-substrate via connections enable the fingerprint image to be read through virtually any material such as glass, silicon, polymer and ceramics.
- **March 2013** – IDEX and a global partner serving the mobile communications market have reached a framework agreement (terms undisclosed). IDEX has started technical collaboration with the global partner including the immediate dispatch of a technology package for review and development purposes.
- **April 2013** – Successful placing of shares raising NOK 30m (original target was NOK 22m)
- **May 2013** – Hemant Mardia, ex-CEO of Filtronic, appointed as new CEO; Ralph W. Bernstein continues as CTO
- **May 2013** – Apple and AuthenTec verify IDEX's licensing agreement sanctioning that IDEX maintain its licensed rights to important, early patents for fingerprint sensors.
- ***Sept 2013 – Apple launches iPhone 5s with a fingerprint sensor, heralds a new era of security on mobile devices***
- **Sept 2013** – IDEX receives strategic investment from World Wide Touch Technology (WWTT) for NOK 30.6m. WWTT is a Hong Kong listed company, operating chiefly in Hong Kong and the People's Republic of China and has approximately 2,400 employees. The company develops and manufactures a broad range of automation and high-tech products, modules, and components, and operates a Biometric Security Platform (division).
- **Sept 2013** – WWTT invests a further NOK 23.6m in IDEX
- **Sept 2013** – IDEX acquires the assets and intellectual property rights from PicoField Technologies Inc. PicoField possess a patent and pending applications as well as other intellectual property relating to touch sensors, strongly enhancing IDEX's existing touch senor programme and expands the field of IDEX's patent protection which is of critical importance to OEM customers.
- **Oct 2013** – IDEX opens office in the Silicon Valley area, an important step in achieving a global presence for IDEX. Shortly after, the group opened a development centre in Boston, which will be the major technical department of IDEX America.
- **Oct 2013** – IDEX joins the Fast Identity Online (FIDO) Alliance. IDEX will be a Sponsor member and participate in the definition of protocol standards for secure authentication. Being a Sponsor member of the FIDO Alliance provides an ideal opportunity to collaborate with the major industry leaders who are now defining protocol standards for secure user verification. The FIDO Alliance focuses the industry cooperatively in delivering standard protocols.
- **Oct 2013** – IDEX has agreed terms on expanding the scope of its partnership agreement with the global communications partner. This demonstrates the traction that IDEX is gaining in commercialising its product roadmap for the mobile communications mass market.

- **Jan 2014** - Funds managed by Invesco Asset Management Limited have agreed to acquire 60,000,000 new shares in IDEX at a subscription price of NOK 5.00 per share, totalling NOK 300 million. The pricing of the shares is based on the weighted average price on the 10 trading days to 20 December 2013, when the investment terms were substantially agreed. Following the share issue, Invesco will hold 14.8% of the shares in the company. Upon subscription in the offering, the funds managed by Invesco will also receive 30,000,000 warrants, each at an exercise price of NOK 7.50. The warrants are open to be exercised 12 months after the date of their issue and will expire 24 months after issue. The issuance of shares and warrants are subject to the approval of an extraordinary general meeting of shareholders in IDEX. The meeting will be called for as soon as practical and will take place on or about 27 January 2014.

IDEX Positioned for Growth

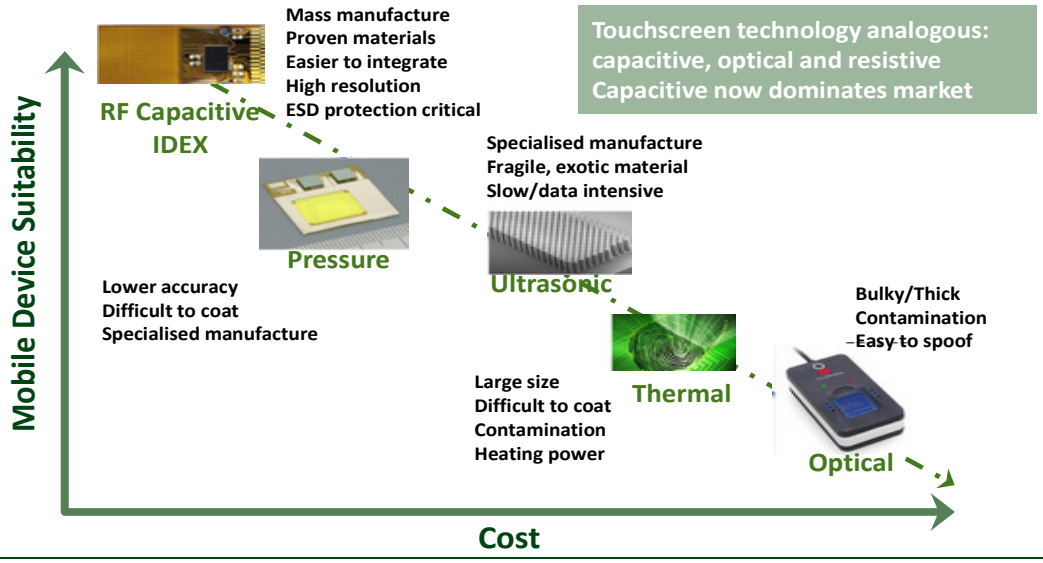


Source: IDEX

Product Background

IDEX has been a pioneering company in the field of capacitive fingerprint sensing technology over the last 15 years. There are different types of fingerprint sensors/readers available in the market, but there is strong support to the view that capacitive technology (such as the one employed by IDEX, AuthenTec/Apple, Validity, and Fingerprint Cards AB) will be the technology of choice for mass market/volume products such as mobile devices. We take a look at these various technologies below. The barriers to new entrants are extremely high given the level of patent protection these established vendors already have on the technology and processes.

Sensing Technology for Mobile Applications: Capacitive Sensors is the Technology of Choice



Source: IDEX

Optical: Building on existing digital camera technologies (CCDs and CMOS sensors), these technologies use light reflected from the fingerprint to generate electrical charge. The sensors can be affected by stray light and surface contamination, including latent prints left from a previous user. They are also relatively easy to fool with a convincing picture of a fingerprint. Optical sensors/readers are also bulky and so whilst cost is attractive, it is unlikely to be deployed in volume in consumer products.

Thermal: These sensors use pyro-electric materials also found in infrared cameras, which change their electrical property based on the temperature. The skin temperature at fingerprint ridges forms a pattern with the ambient temperature where the fingerprint valleys are found. The sensors have to be extremely high resolution, and suffer from one major drawback: the areas under the fingerprint valleys take around just one-tenth of a second to heat up to the temperatures of the ridges, erasing the image. Again, with such restrictions, it is unlikely to be the technology of choice for consumer products such as mobile phones.

Pressure: Pressure sensing scanners can be made very thin and are often used in electronic devices. Early pressure sensing scanners had to make a trade-off between durability and quality because any protective layer on the detector surface would diminish the contrast of the impression. There are two types of pressure sensing detectors available, conductive film detectors and micro electro-mechanical devices (MEMS). Conductive film sensors use a double-layer electrode on flexible films. MEMS is a newer technology that uses extremely tiny silicon switches on a silicon chip. When a fingerprint ridge touches a switch, it closes and is detected electronically. However, the coating remains a significant problem in this technique.

Ultrasonic Sensors. Ultrasonic scanners have an advantage of being able to see beneath the skin. This provides not only verification of a live finger but also provides more information as a biometric measure. But this technology is slow, expensive, bulky, and too data intensive for most access control applications. Ultra-sound sensing requires quite a big device with mechanical parts, and is quite expensive. Moreover, as it takes a few seconds to grab an image. It is not suited for large production volumes at low cost.

Capacitive: Skin is conductive enough to provide a capacitive coupling with an individual capacitive element in an array of capacitor plates. The fingerprint ridges are closer to the sensor and have a higher capacitance, whilst valleys are further away and have a lower capacitance. These sensors can be sensitive to electrostatic discharge, but are insensitive to ambient lighting and have a higher tolerance to contamination than optical sensors.

There has been strong validation for capacitive technology with the acquisition of AuthenTec by Apple and with the launch of the iPhone 5S, which uses a capacitive touch sensor. Capacitive sensors have already been deployed in millions in laptops and ID terminals and have also been launched in Android mobile devices in H2 2013. As highlighted, IDEX owns and controls the earliest, basic patents for low cost fingerprint capacitive sensors so whilst it has been later than its competitors to the market, we believe it remains strongly positioned for the significant opportunity in this space.

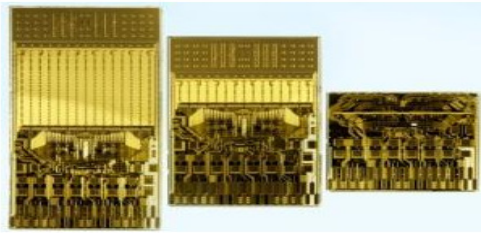
The SmartFinger Fingerprint Sensor

The SmartFinger® sensors are based on state-of-the-art polymer process technologies and offer small, ultrathin and flexible swipe fingerprint sensors compliant with the form factors specified by the ISO/IEC 7810 standards for identity and smart cards. The finger swipe area is only 50 µm thick, while the total thickness of the fingerprint device including ~15 mm2 signal processing chip is less than 0.35 mm. It has low power consumption and offers superior biometric performance. It can be easily implemented into a variety of applications requiring biometric authentication such as mobile phones, one-time password devices, smartcards, ID cards, access control devices and biometric tokens. The technology is protected by multiple patent families covering subjects such as sensing principles, sensor component design and image processing algorithms (more on this later).

Key Product Highlights

The SmartFinger® Sensor Family

- Industry's thinnest and most flexible – 0.5mm thick
- Unsurpassed image quality and biometric performance (false rejection, false acceptance)
- Compliant with ISO Card from factor
- A variety of customizable geometries available
- Alternative I/O connections, ZIF, ACF and BGA
- On-board micro controller capability



SmartFinger® Embedded Biometric System

- Small software footprint
- Minimal hardware resources required
- On Device enrollment, template storage and verification
- Reference design and development kits available

SmartFinger® Sensor Asic

- Supports 256 imaging channels
- Unsurpassed swipe speed and skew correction
- Low noise amplification
- Finger-on detection
- Low power consumption
- Flip-chip interface

Source: IDEX

Combining the extremely small software footprint with a low-resource microcontroller of choice and alternative configurations, IDEX is able to offer a complete biometric authentication solution tailored specifically for mobile phone and card applications. The technology is available to OEMs and system integrators as either components for integration into products, or by technology licensing using their own in-house product capabilities, supply-chain, and distribution.

IDEX has since 1997 developed its sensor technology with several CMOS design iterations for optimized performance, power consumption, ESD protection, and Signal-To-Noise. Extensive knowledge of multiple manufacturing processes has been used to implemented designs using standard PCB technology, Silicon MEMS, and polymer plastics.

Patent Position and Cross Licence with Apple

IDEX has been focussing on low-cost fingerprint recognition technology since 1997 and has built up a strong patent portfolio. In the smartphone supply chain, patent coverage is critical and companies spend a great deal of time and money defending their position. The group has an extensive first to file patent portfolio in Active RF capacitive fingerprint sensing with 21 patent families granted and another 5 in filing. It is generally acknowledged in the biometrics market that there are two basic principles for reconstruction of a 2D image from a line (swipe) sensor:

1. The "stitching principle", patented by Thomson-CSF, now ATMEL. (US 6,289,114)
2. The on-the-fly image reconstruction (IR) based on finger movement sensing was originally patented by SINTEF (US 7,110,577, US 7,054,471 and US 7,333,639). IDEX holds a world-wide exclusive license and sub-licensing right to the SINTEF patents.

IDEX holds rights to patents within the following areas:

- Single-line sensor
- On-the-fly imaging
- Low-noise measurement system
- Navigation capabilities
- Imaging through polymer, glass, or silicon
- LiveFingerTM spoof detection
- Multiplexing techniques for low cost fingerprint sensors
- Area fingerprint sensors based on a sensor grid array

In addition, IDEX has filed several patents covering its latest technology and product development.

IDEX previously announced that, through a legal process in 2007, IDEX was granted a licence to certain key patents at the time owned by fingerprint sensor company UPEK Inc. The patent rights of UPEK were later assigned to AuthenTec (a spin-out from Harris Corporation) which was then acquired by Apple. Apple and AuthenTec have now verified IDEX's Licensing Agreement through a notice of so-called "recordal" of the licence to key patents in the field of fingerprint sensing. The License Agreement has been recorded by the United States Patent and Trademark Office sanctioning that IDEX maintain its licensed rights to important, early patents for fingerprint sensors. The patents encompass semiconductor swipe fingerprint sensors and navigation devices.

A more detailed discussion of the group's patents are provided in Appendix 1 of this note.

Competitive and Strategic Positioning

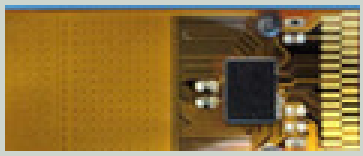
The most significant competitors in the space are AuthenTec (now acquired by Apple), Fingerprint Cards AB, and Validity Sensors Inc. (now acquired by Synaptics). These companies mainly supplied to the laptop and PC peripherals market. AuthenTec and Fingerprint Cards rely on silicon chip technology, while Validity offers polymer-based fingerprint sensors, similar to that offered by IDEX. Validity has sold tens of millions of sensors to the PC industry, mainly Hewlett-Packard. Swedish based Fingerprint Cards (listed on Nasdaq OMX Stockholm) provides low-cost silicon-based fingerprint sensors to the mass market mobile handset and laptop computer market. As mentioned, IDEX's main competitors have made further progress in commercialisation of their product but IDEX is looking to close this gap in 2014.

In its Q3 results in 2013, IDEX disclosed more details about its imminent launch in swipe sensors and what looks to be a potentially disruptive offering in touch sensors and ultimately a differentiated in-display solution.

Key highlights of the Q3'13 Announcement include:

- Qualification of swipe sensors by the end of 2013
- Q2 2014 Product insertion of swipe sensors
- Volume shipment of swipe sensors in H2 2014
- Touch Sensors product launch by mid-2014 – expect this to be a disruptive price point

IDEX Product Roadmap

Swipe Sensor	Touch Sensor	In Display
		
Qualification phase: End 2013 sample mobile market **Q2 2014 Product Insertion Volumes H2 2014** **Durable Polymer sensor with miniature Silicon ASIC** **Best in class performance** **Mass production Partner**	**Development phase: Mid 2014 market launch** **Durable Polymer sensor with extended small Silicon ASIC** **Disruptive price with high performance** **Mass production partner**	**Technology phase: Swipe and touch** **Unique IN glass sensing: Ultimate solution** **Convergence of capacitive touchscreens with fingerprint sensing**

Source: IDEX

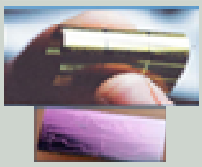
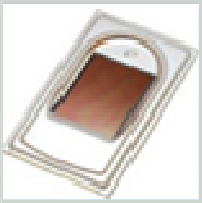
IDEX Product Differentiation

Swipe sensor requires the user to drag their finger across the sensor strip, accumulating partial images which are then pieced together to generate a complete image. Most companies started with swipe sensors, and they have the advantage of smaller imaging arrays, smaller ICs and therefore lower costs. Whilst IDEX will be later in the market with its swipe sensors, it believes it will have better performance than what is available in the market in terms of image quality and biometric performance (false rejection, false acceptance) and unsurpassed swipe speed and skew correction.

However, the swipe sensors are more susceptible to wear, they are less accurate due to the distortion of the finger surface, and they are more difficult to use particularly in portable devices which have to be held steady with the other hand. As such, there is a consensus view that touch sensors will be more appealing, particularly for the higher end smartphone models. It is in touch sensors that IDEX believe it will be able to introduce a product at a disruptive price point without sacrificing performance. Its design allows for a much smaller silicon ASIC than those offered by competitors. Its touch sensor programme was also recently enhanced by the acquisition of PicoField who have particular expertise in this space.

Beyond swipe and touch sensors, IDEX has a roadmap to offer a fingerprint sensor embedded in the display cover glass of mobile handsets, SmartFinger® Sensor-in-glass. The Sensor-in-glass concept uses IDEX's principle of separating the sensing array from the electronics. The unique, patented through-substrate via connections enable the fingerprint image to be read through virtually any material such as glass, silicon, polymer and ceramics. In markets such as consumer electronics where aesthetics is a huge driver of the demand dynamics, IDEX believes in-glass sensors will prove to be the most elegant solution and that it is well positioned for it.

IDEX Capacitive Sensor Advantage

	IDEX: polymer swipe	IDEX: polymer touch	Competitive Silicon touch	Apple Silicon touch sensor
PROPRIETARY SENSOR OVERCOMES COST DRIVEN BY SILICON AREA				
MOBILE DEVICE SENSOR SIZE	9mm Typical Silicon only 7mm swipe	8x8 or 10x10mm Optimum for secure mobile devices	8x8 or 10x10mm **3x area vs. Apple**	<5x5mm Acceptable user experience
SILICON ASIC SIZE	10 sq. mm	20 sq. mm	100 sq. mm	36 sq. mm
MASS VOLUME SELLING PRICE	**$1-$2**	**Major reduction vs. competitors**	**$5-$8 H1 2014**	**COST $7-$10**
	Low cost flex polymer sensor thin cosmetic coating	100 sq. mm low cost flex polymer sensor thin cosmetic coating	Cost scales vs. IC area **Existing size secure ID niche market 200 sq. mm >$12** Fragile silicon IC	Reduced biometric security due to size Protection: expensive sapphire glass lens

Source: IDEX

As has already been proven by Apple's acquisition of AuthenTec, there is strategic value in fingerprint sensing IP. There are few remaining companies, of which Fingerprint Cards and IDEX are the two largest, Validity having been acquired by Synaptics in October 2013. Synaptics develops human interface solutions, such as touchscreens and touchpads, for many major consumer electronics companies for a variety of devices including notebook PCs, PC peripherals, mobile phones, digital music players, and remote controls. The group has been proactive in pursuing its preference for embedded touch (vs. one-glass) solutions, working closely with LCD manufacturers. It has displayed a similarly aggressive stance on integrating fingerprint sensing, making it more appealing as a one-stop shop. It therefore seems feasible that a market consolidation could be initiated by the touch panel or touch controller vendors

Whilst the competition between these companies is high, there is a large addressable market. Considering that Samsung has historically displayed a preference for multi-sourcing components, it could be argued that there is ample room for these players as well as other niche vendors to do well.

There is also significant competition at the device OEM level. However, Apple's strategy has historically been to develop a much tighter integration within its ecosystem than the other mobile device manufacturers. Its acquisition of AuthenTec could therefore be considered natural for Apple, but rather unlikely for other OEMs.

The dynamics of the mobile device value chain provide a strong underpinning to the value of companies like IDEX, who own key IP in fingerprint sensing technologies.

Fingerprint Sensor Mobile Device Value Chain

Source: IDEX

Significant Market Opportunity

The market opportunity for IDEX's technology has always been significant but has been made much more immediate by the recent developments in the smartphone market. We look closer at the addressable opportunity below and also discuss the wider opportunity outside of the smartphone market.

Market Dynamics for Fingerprint Sensors in Smartphones

The ultra-portable nature of smartphones and tablets, their high monetary value, and the vast quantities of valuable personal data stored on them, have all made them attractive and relatively easy targets for theft. Reliable access control, which is difficult or impossible to circumvent, is therefore vital. It is also becoming increasingly common for smartphones to be used to carry out a variety secure transactions, including mobile banking, where personal authentication is required. A single device which can provide reliable identification for the device itself, as well as being made available to apps developers, is ideal provided the level of both false acceptance and false rejection is acceptably low.

The smartphone market has begun to include biometric authentication devices to address these issues. Biometrics, essentially, means using an individual's physiological characteristics or behaviour to generate a set of numbers that can be used to uniquely identify them consistently over time. Biometric identification systems have existed for a long time, with research in the area supported by the potential security benefits vs. other authentication procedures such as passwords, codes or tickets. Of the physiological characteristics which can be used for identification purposes, fingerprint sensing is seen as the most suited for the consumer mass market because of its performance and measurability as well as its security. Whilst larger items such as laptops have used the technology for many years, the size and cost of fingerprint sensors has historically prevented their inclusion in devices such as smartphones.

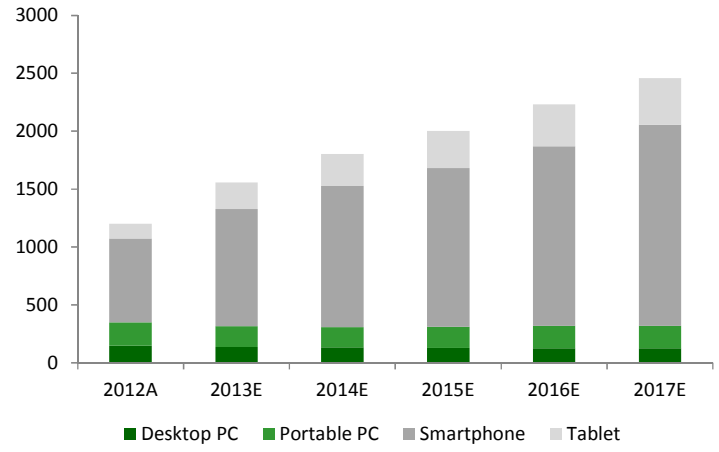
The smartphone market has been catalysed by Apple's acquisition in July 2012 of security company AuthenTec. AuthenTec had just announced its first smart sensor specifically tailored for secure NFC mobile commerce, which was eventually included in the iPhone 5S, launched in September 2013. As seen before, when Apple introduces a technology into the marketplace, it can spur widespread adoption across a number of end markets. A recent review of the iPad Air captures this sentiment well:

"So it's perfect then (referring to the iPad Air)? Not quite. The thumbprint scanner on the iPhone 5S is so good I now find myself constantly hovering my thumb over the home button, wondering why it won't unlock. Entering my password seems like a monumental task. It was fine before and now it's not. Thanks Apple".

As flagged, Apple's competitors now have a limited range of companies to provide similar technology for their own devices. This forms the core of IDEX's opportunity in the smartphones/mobile device market. We take a look below at the size of this market.

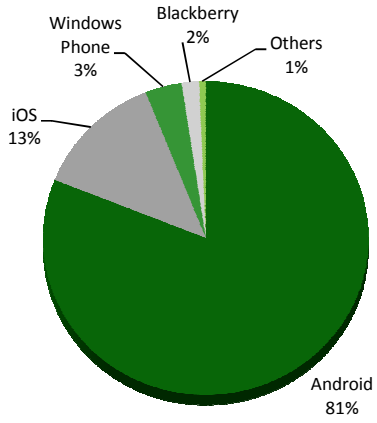
IDC estimates that shipments of smart connected device will rise from 1.6bn units to 2.5bn units by 2017 (58% growth over that period). Smartphones will account for 71% of the devices shipped up from 65% in 2013. It is also worth noting that as at Q3'13, only 13% of smartphone devices shipped were Apple (iOS). This leaves a significant part of the market that IDEX can address.

Smart Connected Device Shipment Forecasts in million



Source: IDC

Q3'13 Smartphone Shipments by Operating Systems



Source: IDC

We believe that attach rates for fingerprint sensor technology on smartphones and tablets will gather pace from 2014. To size the market opportunity for IDEX, we assume that the non-Apple mobile device market stays at c85% of devices shipped for smartphones and c70% for tablets. We then assume attach rates of 15% in 2014, 25% in 2015, 40% by 2016, and 50% by 2017. We assume that from 2015, touch sensors form an increasing part of the market. **This results in a non-Apple mobile device opportunity worth US$675m in 2015 and over US$1.2bn in 2016.** We show the analysis below:

Sizing the Mobile Device Market Opportunity

	2014E	2015E	2016E	2017E
Volume Forecasts				
Non-Apple Smartphones (m)	1,037	1,169	1,318	1,474
Non-Apple Tablets (m)	195	224	254	285
Fingerprint Sensor Attach rates	*15%*	*25%*	*40%*	*50%*
Non-Apple mobile devices with fingerprint sensors (m)	185	348	629	879
of which swipe	*80%*	*65%*	*50%*	*35%*
of which touch	*20%*	*35%*	*50%*	*65%*
Pricing Assumptions				
Swipe ASP (US$)	1.25	1.10	1.00	0.90
Touch Sensor ASP (US$)	5.00	3.50	3.00	2.50
Blended ASP	2.00	1.94	2.00	1.94
Total Non-Apple Mobile Device Opportunity (US$m)	**369**	**675**	**1257**	**1706**

Source: N+1 Singer, IDEX

Scenario Analysis: Opportunity for IDEX

As discussed throughout this note, we believe that there are three companies well placed to address the non-Apple opportunity: Synaptics, Fingerprint Cards, and IDEX. Whilst IDEX has come later to market, under the new leadership focus on smartphones, we believe that by 2015/2016 its strong IP, lower cost of production (particularly of touch sensors), and wider product roadmap will help it corner a good percentage of the market. We show a sensitivity analysis below of what this can mean for IDEX in 2015 and 2016, assuming various levels of market share.

IDEX Revenue and EBITDA Opportunity

	2015			2016		
Non-Apple Mobile Devices with Sensors		**348**			**629**	
Total Non-Apple Mobile Device Opportunity (US$m)		**675**			**1257**	
Scenario	**Low**	**Base**	**High**	**Low**	**Base**	**High**
IDEX Market Share	*10%*	*20%*	*30%*	*20%*	*30%*	*40%*
In US$m						
Revenues	**68**	**135**	**203**	**251**	**377**	**503**
Gross Margin	*35%*	*37%*	*40%*	*37%*	*40%*	*42%*
Gross Profit	24	50	81	93	151	211
Operating Costs	(17)	(19)	(22)	(33)	(27)	(45)
EBITDA	**7**	**31**	**59**	**60**	**124**	**166**
EBITDA Margin	*10%*	*23%*	*29%*	*24%*	*33%*	*33%*

Source: N+1 Singer, IDEX

Our base case assumes that the group is able to achieve c20% market share in 2015 and 30% market share by 2016. Management believes that the group is capable of delivering gross margins in the mid-40's which we have assumed in this scenario analysis. As a point of reference, it is worth noting that Fingerprint Cards reported gross margin of 42% and 49% in Q2 and Q3 of this year. Operating expenses are accelerating (management expects cUS$14m in 2014) and we have scaled operating expenses in line with expected volume/revenues. **Our scenario analysis shows that IDEX could generate EBITDA of between US$7-59m in 2015 and US$60-US$166m in 2016 based on the opportunity in mobile devices alone.**

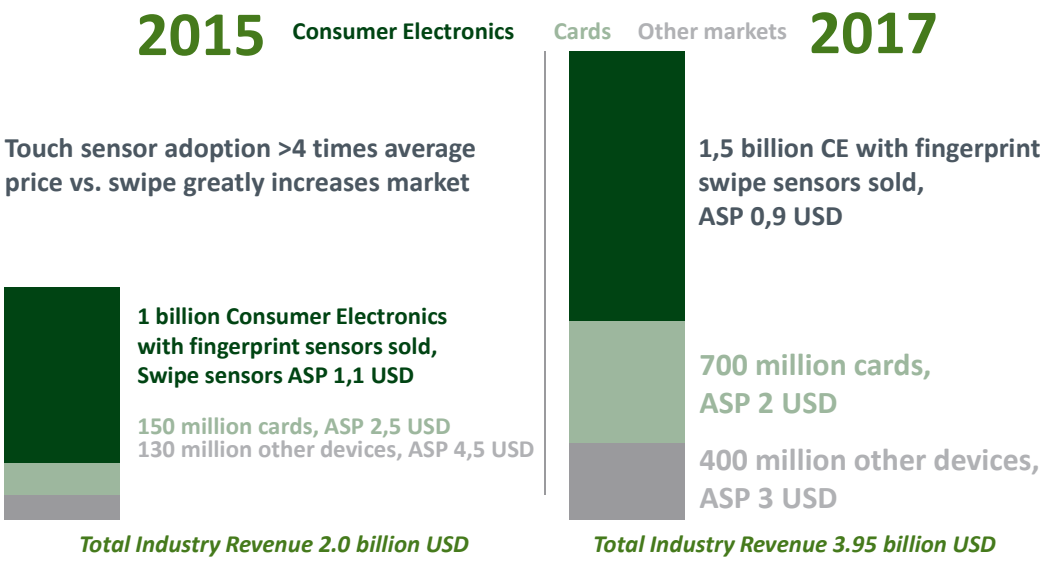
Clearly, there have been numerous assumptions used in the analysis above, but we believe the exercise is helpful in identifying the opportunity and putting the group's current c. US$373m market capitalisation in context.

Opportunity Outside Mobile Devices

In addition, the IDEX SmartFinger® Sensors is the only biometric sensor thin enough to comply with ID/Smartcard form factors. Smart card with biometrics can help give the ultimate solution to security, having all the utilities and functions of the smart card. Biometrics adds another layer of security to the already existing smart cards, providing identification and can protect privacy. The fingerprint system-on-card concept imposes strong demands of the fingerprint sensor solution in terms of thickness, material flexibility, as well as cost. The group's patented dual-chip implementation of the SmartFinger sensors offers customisation of materials, geometry, and device packaging solutions required for such applications. The ASP for smart cards is expected to be higher than in smartphones, which may represent a bigger market opportunity for the group in the medium-term.

Longer term, we believe that fingerprint biometrics will be the technology of choice for mass adoption for emerging areas such as the wearable markets and other new connected devices expected to emerge over time (Internet of Things (IoT)). The group is also already involved in security and bag lock projects. Specifically, IDEX and a Chinese technology company are collaborating closely to develop a security device in which IDEX's SmartFinger solution is embedded. The parties extended their cooperation by a memorandum of understanding at the end 2012. The customer is currently preparing demonstrators as part of a proof of concept of a complete security system

IDEX Market Opportunity



Source: IDEX

So whilst IDEX has taken longer to commercialise some of its products due to an earlier focus on the smartcard market, we are highly encouraged by its product roadmap and believe it is well positioned in the medium and long-term to fulfil the requirements of various end markets for fingerprint sensor technology. We believe 2014 will be a defining year for the company and that investors will increasingly see it has one of the most complete and defensible product offering for fingerprint sensor technology.

Appendix 1: IDEX Patent Position

Family 30 – Line scanner
Assignee: SINTEF
PCT/NO98/00182, priority date June16, 1997
Description: AC capacitive linear sensor.

PCT Abstract:

Method and apparatus for the measuring of structures in a fingerprint or the like, comprising the measuring of chosen characteristics of the surface of the fingerprint, e.g. by measuring capacitance or resistivity, using a sensor array comprising a plurality of sensors, being positioned in contact with, or close to, a portion of the surface.

The characteristics is measured in at least one line of measuring points along an elongated portion of the surface at given intervals of time, the sensor array being an essentially one-dimensional array, moving the surface in relation to the sensor array in a direction perpendicular to the sensor array, so that the measurements are performed at different, or partially overlapping, portions of the surface, combining the measurements of the measured portions of the surface to provide a segmented, two-dimensional representation of said characteristics of the surface.

Norwegian patent:	304766
US patent:	7,110,577
US continuation I:	7,054,471
US continuation II:	7,333,639
EPO patent:	EP 0 988 614B1.
EPO divisional patent:	EP 1 304 646B1.
Japanese patent:	4051093

Family 2 - U-shaped surface
PCT/NO99/00038, priority date 26.02.1998.
Description: sensor with U-formed surface

PCT Abstract:

This invention relates to an apparatus for measuring structures in a fingerprint or the like, comprising at least one sensor array adapted to be positioned close to, or in contact with, the surface of the fingerprint, the sensor array being adapted to measure chosen characteristics of the surface, e.g. by measuring capacitance or resistivity, at a plurality of positions.

At least one sensor array comprises at least one line of sensors, adapted to measure said characteristics at chosen intervals of time, the surface having a relative movement in relation to the sensor array with a direction essentially perpendicular to the at least one line of sensors, and at least one of the outer ends of at least one sensor array protrudes towards the surface to be measured, providing an essentially U-shaped cross section in a plane perpendicular to the direction of said movement.

Norwegian patent:	307065
US patent:	6,785,407
EPO patent:	EP 1 058 513
Japanese patent:	4469493

Family 4 – Substrate,
PCT NO01/00238, priority date June 9, 2000
Description: Finger print sensor with substrate vias.

PCT Abstract:
The invention relates to a sensor chip, especially for measuring structures in a finger surface, comprising an electronic chip of a per se known type being provided with a number of sensor electrodes for capacitance measurements, the chip being positioned on an electrically insulating substrate being provided with a number of openings through which electrical conductors are provided, the ends of said conductors constituting a sensor array for capacitance measurements so that the sensor array is positioned on a first side of said substrate and the electronic chip is positioned on the other side of the substrate.

Norwegian patent:	315017
US patent:	7,251,351
US continuation:	7,848,550
EPO patent:	EP 1 303 828 B1
Japanese patent:	4708671

Family 5 – Miniaturized sensor
PCT NO01/00239, priority date June 9, 2000.
Description: AC capacitive scanner made in single chip.

PCT Abstract:
Sensor chip, especially for measuring of structures in a finger surface, characterized in that it comprises an electronic ship being in a per se known way provided with a number of sensor electrodes for capacitance measurements, the chip being provided with a first layer comprising a metal or another electrically conducting material over and coupled to the sensor electrodes and a first dielectric layer substantially covering the first metal layer.

Norwegian patent:	315016
US patent:	7,283,651
US continuation:	7,518,382
EPO patent:	EP 1 303 829
Japanese patent:	4818564

Family 6 - measurement system
PCT NO01/00240, priority date June 9, 2000.
Description: Measurement system for AC capacitive scanner.

PCT Abstract:
This invention relates to a system for measuring patterns in a surface, especially in finger surfaces, the system comprising a number of sensor electrodes being provided with an electrically insulating material over which the surface is to be moved, and at least one stimulation electrode for providing a varying current or voltage between the stimulation electrode and the number of sensors through the surface, in which the sensor electrodes constitutes an essentially linear array,

- that the stimulation electrode is positioned separately from the array of sensor electrodes,
- that the system comprises a generator coupled to the stimulation electrode for applying a current or voltage with a varying amplitude or phase to the surface, and
- that the system comprises a measuring unit coupled to the sensor electrodes for, during the application of the current or voltage, measuring the impedance at the sensor electrodes in a time sequence and calculating values of predetermined characteristics of the surface and combining the calculated values for the sensor electrodes over the time sequence for generating a representation of the surface pattern.

Norwegian patent: 314647
US patent: 7,184,581
EPO patent: EP 1 292 227B1
Filed in Japan

Family 9 – Navigation
PCT NO01/00243, priority date June 9, 2000.
Description: Navigation tool for connecting to a display device.

PCT Abstract
This invention relates to a navigation tool for connecting to a display device, comprising at least two sensor elements having known positions relative to each other, each sensor element being coupled to detector means for recording a change in a predetermined parameter and timing means for determining the time of change at each sensor element and calculating means for calculating the direction and speed of the recorded changes based on the relative positions of the sensor elements and the duration between the recorded changes.

Norwegian patent: 316482
US patent: 7,129,926
EPO patent: EP 1 312 037B1,
Filed in Japan

Family 10 - Pointer
PCT NO01/00244, priority date June 9, 2000.
Description: Pointing tool for connecting to a display device

PCT Abstract
This invention relates to a pointer tool for connecting to a display device, comprising a number of sensors elements being positioned on a two-dimensional surface, for measuring a predetermined parameter at a surface, the measured quantity being sampled at a chosen rate, and calculating means for comparing the measurements from the sensor elements for detection of movements in two dimensions over the elements based on changes in the measured parameter, the time between the changes and the known relative positions between the sensor elements.

US patent: 7,308,121
US continuation: 8,005,275
EPO patent: EP 1 328 919B1.
Filed in Japan.

Family 16 – Live finger
PCT NO03/00157, priority date May14, 2002
Description: Live finger detection system.

PCT Abstract:
This invention relates to a sensor assembly and a method for measuring characteristics of a surface, preferably skin, comprising a first pair of current supply electrodes coupled to a current source, providing an electrical current to the skin, at least one pickup electrodes at chosen positions relative to the current supply electrodes, at least a first of said pickup electrodes being coupled to an instrument for measuring the voltage between said first pickup electrode and at least one of the pickup or current supply electrodes.

Norwegian patent:	321659
US patent:	7,856,262
EPO patent:	EP 1 503 668
EPO divisional:	EP 2 160 977
Japanese patent:	4699753

Family 17 – Wet and dry fingers
PCT NO02/00465, priority dates Dec 7, 2001 and May 27 2002 (Family 19).
Description: Use of local electrode to improve wet finger performance.

The PCT-application is a combination between Family 17 and Family 19.
PCT Abstract:
Sensor device for performing measurements on an at least partially conductive surface, the sensor comprising a number of conductive structures at or directly below the sensor surface, said conductive structures consisting of at least one stimulation or current sink electrode 1 and a number of sensor elements 3 coupled to interrogation electrodes in an electronic circuit for measuring impedance between the electrodes 3 and said at least one stimulus electrode 1, the sensor device also comprising at least one additional clamping electrode being positioned in the vicinity of said sensor elements and being coupled to a chosen voltage.

US patent:	7,606,398
EPO patent:	EP 1 481 358B1
Japanese patent:	4387795

Family 18 – Calibration excitation
PCT NO03/00071, priority date March 1 2002.
Description: Measuring system using calibration electrode as drive electrode.

PCT Abstract:
This invention relates to a sensor module for measuring structures in a surface, especially in a finger surface being moved over the sensor module, comprising a number of sensor elements, and an outer electrode located aside the sensor elements, the sensor elements being coupled to at least one AC drive circuit providing a varying current or voltage, thus coupling a signal through the sensor elements to the outer electrode.

The sensor elements are also coupled to an electronic circuit positioned on a substrate, said substrate comprising conductor leads coupling the sensor elements to the electronic circuit, and said electronic circuit being adapted to measure the magnitude of said capacitance or AC impedance.

Norwegian patent: 316796
US patent: 7,239,153
EPO patent: EP 1 581 111B1,

Family 20 – Live finger II
PCT NO03/00405, priority date Dec 3 2002.
Description: Live finger detection system, based on IDEX' developments.

PCT Abstract:
Method and sensor assembly determining the condition of a structure, especially for confirming if a measured fingerprint is on a live finger, by measuring characteristics
of close to the structure surface, the sensor comprising a first pair of current supply electrodes coupled to a current source, providing an electrical current to the skin, at least two pickup electrodes at chosen and different positions relative to the current supply electrodes, at least a first of said pickup electrodes being coupled to an instrument for measuring the voltage between said first pickup electrode and at least one of the pickup or current supply electrodes, storage means for a predetermined set of values characterizing a certain condition of the surface, and means for comparing the characteristics from each pickup electrode with the measurements of the other pickup electrodes and with the predetermined set of characteristics for determining the surface condition.

Filed in US, EPO, NO, Japan, China and South Korea.
US patent: 7,848,798
EPO patent: 1 567 057
Japanese patent: 4528130

Family 23 – silicon substrate
PCT/EP2009/061260
Priority date 01.09.2008 (application)
Description: Silicon substrate with insulated via holes.
Abstract
The invention relates to a sensor for measuring structures in a surface, e.g. a fingerprint sensor comprising a chosen number of sensor elements at chosen positions for coupling to a finger surface having a size less or comparable to the size of the structures in the finger surface, and a processing unit including interrogation electrodes coupled to said sensor elements for providing impedance measurements at said finger surface, the processing unit being mounted on one side of a substrate and the sensor elements being positioned on the opposite side of said substrate, the substrate including through going first conducting leads between said sensor elements and said interrogation electrodes. The substrate is made from a semiconductor material such as silicon and said first conducting leads are constituted by through going substrate sections of a chosen size surrounded by an insulating dielectric separating them from the substrate

Norwegian patent application No. 2008 3766
US patent: 8,487,624
Applications filed in CN, EP, IN, JP, KR and US.

Family 24 – Surface sensor
Norway No. 2009 3601, Priority date 29.12.2009
Priority date: December 29 2009 (application)
Description: Flexible substrate.

Abstract:
The invention relates to a sensor for detection of properties and structures of an organic tissue and its surface, e.g. a fingerprint sensor comprising a chosen number of sensor electrodes at chosen positions for coupling to a finger tissue and its surface having a size less or comparable to the size of the structures, characteristics or properties of the finger tissue or surface, and a processing unit including electronic circuitry connected to said electrodes for detection of the voltage at, or the current flow in the electrodes, thereby providing for detection and collection of information of related capacitance, impedance, electromagnetic field, fingerprint, tissue aliveness or other biometric, physical, physiological, thermal or optical or characteristics or properties of the tissue or its surface positioned over the electrodes, the processing unit being mounted on one side of a substrate and the electrodes being embedded in said substrate, the substrate including through going first, second and third conductive paths between said sensor electrodes and said measurement circuitry. The substrate is made from a polymer material such as Polyimide, implemented as a rigid or a flexible multi-layer build-up substrate, said first, second, and third conductive paths are constituted by through going substrate sections of a chosen size and material.

European application	EP2519913
US provisional	No. 61/290,630 filed

Applications filed in (CN, IN, JP, TW)

US 12/688,790, Priority date: January 16 2010
Description: Electronic imager using an impedance sensor grid array and method of making

Abstract:
An novel impedance sensor is provided having a plurality of substantially parallel drive lines configured to transmit a signal into a surface of a proximally located object, and also a plurality of substantially parallel pickup lines oriented substantially perpendicular to the drive lines and separated from the pickup lines by a dielectric to form intrinsic electrode pairs that are impedance sensitive at each of the drive and pickup crossover locations.

US patent: US 8,421,890

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