

## CORPORATE

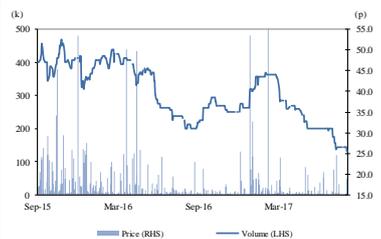
Current price 25.5p

Sector TMT

Code (TEK.L)

Listing AIM

## SHARE PERFORMANCE



	1m	3m	12m
—TEK.L	-8.9%	-17.7%	-20.3%

Source: Fidessa, Allenby Capital

## SHARE DATA

Market cap (£) 10.9m

Shares in issue (m) 42.3

52 weeks High Low

52.5p 25.5p

Financial year end November

Source: Company Data, Allenby Capital

## LARGEST SHAREHOLDERS

CM Gross 20.3%

NW Wray 17.3%

Legal &amp; General 6.7%

AMH Inglis 3.6%

MD Barnard 3.6%

Source: Company Data, Allenby Capital

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## TEKCAPITAL(TEK.L)

*Solving the innovation dilemma*

Tekcapital has developed an innovative global university intellectual property (IP) investment and commercialisation model. This aims to reduce the risk of adverse investment selection through the combination of a proprietary discovery search engine, a global network of universities, a panel of scientific experts, a low cost of acquisition of IP licences and faster value realisation. The company has started to monetise its IP portfolio by out-licensing and bringing in external investors. The core IP investment business is complemented by Tekcapital's services it provides to both corporates and academic institutions. Tekcapital assists universities in bringing their innovations directly to potential corporate licensees and corporates as they look to address the challenge of the accelerating pace of innovation cost-effectively. Tekcapital is addressing a substantial market opportunity with its unique combination of IP services and investment.

- **Differentiated model:** Unlike other listed IP plays (such as Mercia Technologies (MERC.L), IP Group (IPO.L), Allied Minds (ALM.L) or Touchstone Innovations (IVO.L)), Tekcapital is not aligned to any particular universities, institutions or geographies and has access to IP produced by c. 4,500 institutions in 160 countries. Second, Tekcapital has recruited an extensive network of scientific advisors (50+) to select and evaluate IP. Third, it makes a small upfront payment for an exclusive licence to the IP coupled with a revenue share. Finally, in most cases, it looks to out-license the IP to corporates rather than building up companies around the technology itself. As such, Tekcapital's time horizons are much shorter than traditional VCs. Overall, the Tekcapital model helps to reduce risk whilst retaining a considerable upside.
- **Accelerating innovation:** The pace of innovation has accelerated and companies are struggling to maintain their relevance as new entrants introduce highly disruptive business models. The question is how to secure the necessary innovation and corporates are increasingly looking outside the organisation. Academic institutions offer a considerable source of IP that is currently not being commercialised and are facing pressure to generate a greater return on this IP.
- **Monetising IP:** Since its formation and IPO in 2014, Tekcapital has built up a portfolio of 59 exclusive licences to patents, applications and industrial designs and it is now in the process of monetising these IP investments through routes that include out-licensing, trade sale or IPO. Some of these licences are held by Belluscura, a provider of medical devices, where Tekcapital has a 48% stake. In December, Tekcapital signed a licensing deal with Wecast Technology Group.
- **H1 profitable:** In July's interim results, Tekcapital reported an H1 PBT of \$1.6m on revenue of \$3.8m and a net asset value of \$8.0m, that included \$3.1m of net cash. The NAV is equivalent to \$0.19 per share. This was mainly a function of Belluscura's successful \$1.7m private placement in March that provided an unrealised gain of \$2.9m. This demonstrates the potential uplift available on Tekcapital's IP portfolio from follow on investments and Tekcapital's model in action.

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## INVESTMENT OVERVIEW

### Facilitating the flow of IP

Innovation has become a highly sought after commodity as companies look to remain current and differentiate themselves. Universities are sitting on substantial IP assets and are continuously generating new IP. As funding becomes tighter, these institutions are coming under pressure to commercialise these assets. Tekcapital is one of listed companies looking to facilitate the flow of IP from academia into the commercial world.

### Differentiated model broadens reach, reduces risk and results in a shorter time to exit

Tekcapital operates a different model from the likes of IP Group (IPO.L), Touchstone Innovations (IVO.L), Mercia Technologies (MERC.L) and Allied Minds (ALM.L), however. Whereas the other listed companies have aligned themselves with particular universities, institutions or geographies, Tekcapital has taken a global approach and has the largest group of University IP suppliers (>4,500). This is complemented by a multi-disciplinary network of scientific advisors (>50) to select and evaluate IP. Second, Tekcapital is focused on out-licensing IP to companies rather than building up companies around particular IP. Consequently, it will hold IP for shorter periods than the seven to ten years typical of a VC. Tekcapital pays a small upfront fee to the institution to secure an exclusive licence to the IP with an ongoing revenue share. This is a lower risk model as Tekcapital is able to spread its investment across a broader spread of companies.

### Complementary IP services business

This IP investment business is complemented by a range of IP services Tekcapital offers to corporates and universities. Tekcapital assists universities in bringing their innovations directly to potential corporate licensees and corporates as they look to address the challenge of the accelerating pace of innovation cost-effectively. The company is also retained by a number of blue chips to identify and evaluate relevant IP.

## INNOVATION MARKET

### Accelerating pace of innovation

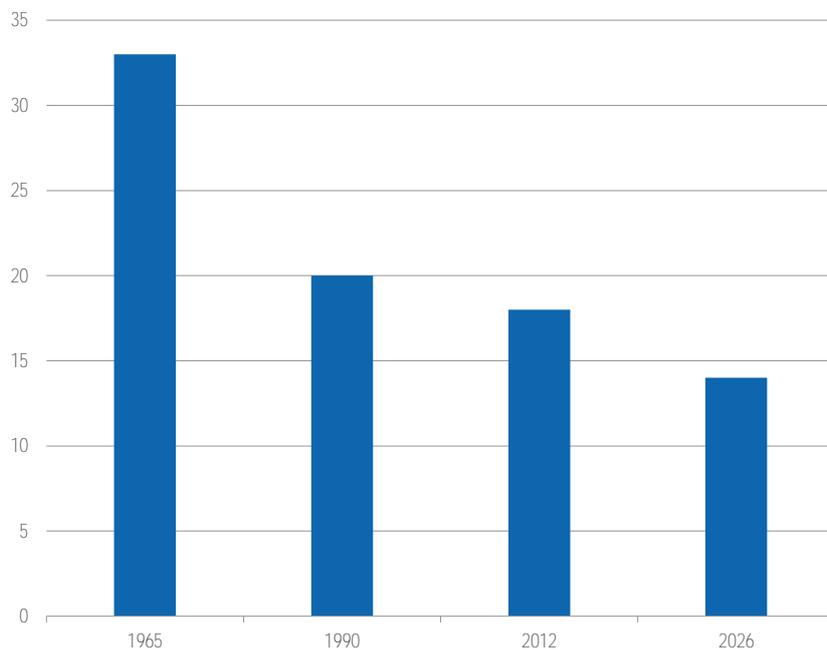
The pace of innovation has accelerated and companies are struggling to maintain the rate of development to avoid the risk of losing relevance. Research by Innosight in 2016 analysed the average amount of time companies had spent on the S&P 500 over the past 100 years and found that the churn in the index has been accelerating and it forecasts a further reduction in tenure with almost half of the current S&P 500 expected to be replaced over the next ten years. Only 64 companies have endured on the S&P 500 list for all of the past 50 years and more than 1,600 companies have appeared on index at one time or another.

### Unicorns and disruptive business models

The increased pace of change is attested to by record M&A activity and the emergence of start-ups with **multibillion dollar valuations** ('unicorns'), such as Uber, Airbnb, Netflix, Dropbox and Spotify, that have introduced highly disruptive business models. Business leaders need to be looking for **potential 'fault lines' in their industry that may signal weakness in existing business models or a shifting customer base.**

A number of companies have staged comebacks but these are the exceptions. Those companies that have endured and produced strong growth have invested in long-term innovation, made big moves to enter new markets and exited declining ones.

Average time companies have spent on the S&P500 (years)



Source: Source: Innosight - Corporate Longevity: Turbulence Ahead for Large Organizations

The question is how to identify the necessary innovation to keep moving a company forward. Corporations are increasingly looking outside the organisation for this innovation. For example, there are more than 70 corporate accelerators (Source: Corporate Accelerator DB) from companies that include Sprint, Microsoft, IBM, Google and Intel, offering funding typically up to \$100k. There is an acceptance that large enterprises are not necessarily best suited to innovation and accelerators enable them to tap into the creativity and energy of entrepreneurs. That said, Coca Cola closed its Founders Program after three years and eight investments.

#### Academia offers a considerable IP source

Academic institutions offer a considerable source of IP with c. 100,000 discoveries per annum that encompass every discipline but c. 80% of these discoveries never leave the institutions. At the same time, institutions are coming under pressure to commercialise this IP.

Innovations may have been conceived to solve a problem rather than generate revenue. But businesses and universities can have a mutually beneficial relationship, where business can fund university budgets in exchange for IP.

Last September, Reuters published the second edition of its The Reuters 100: The World's Most Innovative Universities, based on the number of patents filings and research paper citations. The US contributed 46 of the 100; Japan had nine; France and South Korea had eight each; Germany seven; the UK five; Switzerland, Belgium and Israel three; Denmark, China and Canada two; and the Netherlands and Singapore each have one.

The survey found that big breakthroughs – even just one highly influential paper or patent – can push a university up the rankings but as that discovery fades, the ranking will also suffer. Consequently, truly innovative institutions will score well as they put out ground breaking work each year but also that corporates need to spread their nets far and wide.

#### TTOs a potential bottleneck

Technology Transfer Offices (TTOs) were created to facilitate the flow between corporates and academia but entrepreneurs have often found dealing with TTOs frustrating.

Invention Discovery Network,  
InventionEvaluator, Vortechs

## TEKCAPITAL'S SERVICE OFFERING

Tekcapital bridges this gap with the IP investments it has available for license and the IP services it offers.

Tekcapital's proprietary Invention Discovery Network (IDN) provides access to internally screened IP from more than 4,500 research institutions in 160 countries. This breadth of reach mitigates against adverse selection and increases the chances of identifying valuable IP opportunities for Tekcapital to invest in or show to its corporate clients. InventionEvaluator delivers analytic reports to assess the commercial potential of IP. This IP is then reviewed by the board that consists of 55 scientists. Finally, Vortechs Group offers technology transfer executive recruitment services.

In April 2016, Tekcapital announced the acquisition of certain assets and the business of Vortechs Group, a technology transfer executive search business. The current associates and management of Vortechs, that was founded in 1998, remained in place. The acquisition provided a complementary service as well as access to an enlarged network of contacts within the technology transfer market. In FY15 (December), it recorded revenue of c. \$350k and a pre-tax loss of \$3k. Tekcapital issued 0.6m new shares at 47.5p/share and \$100k in cash.

Tekcapital acquired the intellectual capital assets and certain other assets but not the corporate entity, certain fixed assets and none of the liabilities. For operating the Vortechs Group's business on behalf of Tekcapital and for covering all the related business expenditures, Tekcapital is paying Vortechs a management and service fee, based on revenue achieved for a minimum of five years.

## Unrealised gain on Belluscura

## INTERIM RESULTS

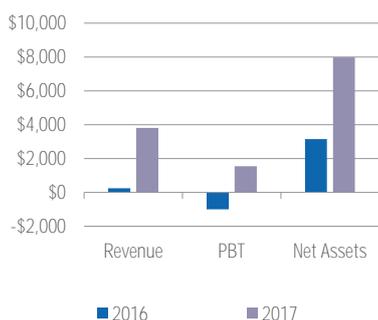
In H1, Tekcapital reported revenue of \$3.8m up from \$0.2m in H1 FY16. This was primarily a function of the unrealised gain on the revaluation of its investment in Belluscura following its \$1.7m private placement as well as an increase in services revenue. Revenue from services increased 157% to \$0.6m.

The increase in revenue resulted in a PBT of \$1.6m (H1 FY16 loss: \$1.0m). The fair value of the portfolio stood at \$4.1m (FY16: nil) and net assets were \$8.0m. Net cash at H1 was \$3.1m (H1 FY16: \$1.8m) with cash operating outflow of \$1.4m and \$0.6m spent in investing activities offset by the placing of \$3.1m.

Operational highlights in the portfolio in H1 included:

- Notice of Allowance received from the US Patent and Trademark Office for Tekcapital’s energy harvester technology. This enhances the IP position around the electro-mechanical energy harvesting technology that was licensed from the University of Michigan in June 2015. Management believes the technology can be used in the development of new power generation devices (such as in-shoe).
- Production and independent testing of  $\mu$ Salt that has enabled the independent comparison of  $\mu$ Salt’s features against traditionally salted snack foods. A taste test of traditional potato chips versus those salted with  $\mu$ Salt with approximately 40% less sodium than traditional potato chips, yielded non-statistically significant difference in perceived salt flavour.
- Belluscura completed its private placement of c. \$1.7m. This reduced Tekcapital’s ownership interest in Belluscura to 48%. Belluscura is also exploring an IPO.
- Launch in May of the Tekcapital App on iOS and Android to facilitate searching global university IP. The app provides access to information on international university patents across the range of disciplines. The app automatically indexes a user’s progress and can export patent data via email. It is also linked to Tekcapital’s Invention Evaluator service.
- Out licensed air-conditioning technology to Wecast Technology Group
- Acquisition of Gesture Recognition Technology (Trace-it) licence to a software program and parent application from the University of Central Florida that helps to improve the accuracy and speed of existing gesture recognisers

### Summary financials



Source: Company

Net assets stood at \$8.0m, equivalent to \$0.19 per share, reflecting the increase in the fair value of the portfolio following the Belluscura private placing. The other IP investments are held at cost on the balance sheet and hence further fundraisings at a premium would have a material impact on the NAV.

## TEKCAPITAL INVESTMENT PORTFOLIO

### Broad portfolio of IP investments

Since its formation and IPO in 2014, Tekcapital has built a portfolio of 59 exclusive licences to patents, applications and industrial designs and it is now in the process of monetising these IP investments through routes that include out-licensing, trade sale or IPO. Some of these licences are held by Belluscura, where Tekcapital has a 48% stake. The key initiatives include:

### Medical devices

## BELLUSCURA

Belluscura was established in December 2015 to provide premium proprietary medical devices at affordable prices by acquiring exclusive licences, then manufacturing and selling devices deemed to be non-core or undervalued by major medical device companies. It commenced commercial sales operations in June 2016 and recorded an operating loss of c. \$1.0m from incorporation to 30th November 2016. The company's current core portfolio of four products are:

- Slyde, a lightweight and compact stretcher designed for use in emergency evacuations of multi-storey structures. This was initially being sold in the US and was launched in Europe in March.
- Passport, a surgical trocar designed as a camera port for use in laparoscopy (keyhole surgery). It features the patented SmartTip technology that controls the cutting blade and has been designed to be compatible with the Da Vinci and Si robotic surgical systems. Passport was launched in the US in March and has expanded into other markets during 2017. It also has a CE Marking for distribution in the EU. It is expected to be the first of a family of trocars and cannulae.
- SNAP II, a level of consciousness monitor for use during surgical procedures requiring general anaesthesia. Management has been working on a number of updates for both the anaesthesia market and for applications outside anaesthesia.
- Wire Caddy, a wire management system that provides lubrication and organisation during multi-wire, multi-exchange operating room procedures, such as cardiology interventions, uterine fibroid embolisations and tibial angioplasties. It was designed by interventional radiologist Dr Shaun Samuels, acquired from Stryker Corp in September 2016 and was relaunched in the US in February with an EU launch expected later in 2017.

### 19 issued and pending patents and industrial designs

The exclusive product distribution licences were acquired from Stryker Corporation and they are protected by an IP portfolio of 19 issued and pending patents and industrial designs. The products have US 510(k) regulatory clearance where necessary.

Belluscura also has a co-exclusive licence and development agreement with Separation Design Group (SDG) to develop a next generation portable oxygen concentrator (POC). As part of the agreement, Belluscura has licensed a portfolio of six pieces of IP from SDG and is providing monthly funding towards the development of a prototype POC device.

Finally, Tekcapital novated to Belluscura its worldwide exclusive licences to the patent and related patent application for a non-invasive measurement of glucose in saliva for the treatment of diabetes – Saliva Glucose Measurement Technology (SGMT). This technology is licensed from and was developed by Arizona State University.

In April, Belluscura announced the acquisition of Nanotether Discovery Science for a total consideration of c. £265k that has been satisfied through the issue of new ordinary shares in Belluscura. Founded in 2012, Nanotether owns IP designed to accelerate the rate at which biomolecular interactions can be studied via biological assays, intended for use in the pharmaceutical and biotechnology markets, especially where there are high

throughput drug discovery programmes. Belluscura acquired all the IP, cash reserves and tangible assets but no liabilities. No employees or consultants remained with Nanotether and liabilities regarding previous and current employees were settled prior to acquisition.

As at 5<sup>th</sup> April, Nanotether had net assets of c. £281k that included cash of £204k and negligible liabilities. In the nine months to 5<sup>th</sup> April 2017, the company reported an operating loss of c. \$5k reflecting minimal levels of operating activity since the decision to move the business to a 'care and maintenance' basis. The acquisition reduced Tekcapital's ownership interest to c. 61% from c. 65%.

#### Successful private placement; potential IPO

In May, Belluscura raised c. \$1.7m through a Private Placement at a post-money valuation of c. \$7.6m, representing a c. \$2m uplift since October's fundraising. As a result, Tekcapital's ownership interest reduced to c. 48% from c. 61% and Belluscura is no longer consolidated into Tekcapital's group accounts. Management also reported that Belluscura is exploring an IPO in 2017.

### SALARIUS - $\mu$ SALT <sup>®</sup>

Although the need to limit salt consumption is widely understood, the average person in the US consumes c. 3,400mg of sodium a day - c. 50% more than the recommended maximum. This has contributed to the fact that the majority of the US adult population (56%) are living with prehypertension or high blood pressure that are leading causes of heart disease, the main cause of death worldwide. According to research cited by US Food and Drug Administration (FDA), lowering salt intake by 40% could save 500,000 lives and nearly \$100bn in healthcare costs over a decade. Much of this originates from prepared and processed food, such as snack foods and cereals.

There is a general move to reduce the amount of salt consumed. In 2016, the FDA proposed guidelines to reduce sodium consumption by more than 30% over the next ten years. The FDA has established proposed targets for c. 150 food product categories that contribute meaningfully to the amount of sodium in the diet. Large food producers have already had to set goals to reduce the amounts of salt and sugar in their products. For example, Mars has committed to reduce sodium in its foods by 20% over the next five years and Mondelez announced a plan in 2010 to reduce sodium use by 10% by 2020. A new study from the Finnish National Institute of Health and Welfare indicates that consuming too much salt doubles the risk of heart failure. This study is important because of its size and duration; it covered 4,630 men and women over a 12-year period.

Sample packaging of Salarium Table Salt



Source: Company

#### Same level of saltiness with much less sodium

Regular salt is not readily soluble in saliva because of its high density and large particles. This results in low-intensity and long-lasting spotty salty tastes. Salarium has a much smaller crystal size. The nano particles dissolve faster on the tongue to produce the same level of saltiness with much less sodium. Salarium works for any surface application and there are no added substitutes (such as calcium, potassium or magnesium salts) that can impart a bitter taste. In table salt applications, Salarium has 78% less sodium per ¼ tsp. serving when compared with traditional table salt (190 mg sodium vs 560 mg sodium).

A university controlled study found that Salarium when applied to crisps achieved taste parity with the flake salt control with a 55% reduction in sodium content, and there were no statistically significant differences in perceived saltiness among 20 judges on three occasions. The upshot is that Salarium can lower sodium consumption while still enabling consumers to enjoy the salt they love.

Tekcapital acquired US patent #8,900,650 B1 for low-sodium salt compositions in June 2016.

## Fried taste and texture but baked

## SMART FOOD TEK – CRACKLE-BAKED ®

Crackle-Baked is a patented food preparation composition and process, developed at the University of Arkansas, that makes baked chicken taste fried but uses 60% less fat. Frying imparts several features to food such as developing texture and colour and providing mouth-feel and flavour. Until now, no one has been able to duplicate these features through a baking process.

The composition and process brings a smaller amount of liquid oil into a powdered or wet batter coating for food products. The coated products, when baked, have the taste, texture and appearance of fried products. This significantly reduces the fat content in the finished product and enables baked products to substitute for higher fat content fried foods.

Crackle-Baked uses the application of enzyme-modified starch as an oil delivery system in bake-only chicken to provide the fried characteristics but improving the nutritional value by reducing the fat involved by c. 60%. The invention is an improved composition and process to bring liquid oil into a powdered/wet batter coating for food products.

The process can be incorporated into existing coating lines without modification and uses all commercially available products. A peer reviewed published study in the Journal of Food Science (Volume 79, Issue 5, May 2014) indicated that there were no significant differences between baked and fried samples in all sensory attributes.

Various native starches are hydrolysed by amyloglucosidase to a hydrolysis degree of 20% to 25% and plated with 50% (w/w, starch dry basis) with canola oil to create a starch-oil matrix. This matrix is then blended into a dry ingredient blend for batter and breader components. The process can deliver sufficient quantity of oil to create sensory attributes similar to those of partially fried food (e.g. crispness).

Last October, the Crackle-Baked process received the Notice of Allowance for a second patent application from the United States Patent and Trademark Office. The second patent (No. 14/962,823) has been exclusively licensed to Tekcapital from the University of Arkansas under the existing agreement, as announced in January 2015.

Increased air conditioner efficiency

## FRIGIDUS

Air conditioning manufacturers are looking to reduce the power consumption and thereby increase efficiency, as well as reducing the noise levels of outdoor air conditioning units and heat pump assemblies. The outside air conditioner condenser fans represent a significant energy consuming component and whilst there has been much work on improving condenser performance there has been less development of the condenser fans.

Tekcapital's patent portfolio encompasses a number of technologies for enhancing the performance of outdoor condenser fans through twisted shape blades with optimised air foils for improving air flow volume and heat pump assemblies plus noise reduction.

Out-licensed to Wecast Technology

In December 2016, Tekcapital out-licensed the exclusive worldwide rights to its portfolio of nine patents for the improvement of air conditioning efficiency to Wecast Technology Group, a subsidiary of Sun Seven Stars Entertainment & Media Group Limited, one of the largest and diversified private media and investment companies in China. The terms of the licence included an up-front payment to Tekcapital of \$100k and a 5% royalty on sales. Beginning with the second year of the licence agreement, there is a \$100k minimum annual royalty payment.

The technology is designed to improve the efficiency of condenser fan operations by up to 25%, compared with existing air conditioning units. The IP portfolio was developed and tested at the Florida Solar Energy Center (FSEC), part of the University of Central Florida. The rights were acquired by Tekcapital for, inter alia, royalty payments on future revenues. There were 4.5m central air-conditioning units sold in the US in 2015, according to the Air Conditioning, Heating and Refrigeration Institute.

Measures glucose concentration in exhaled breath

## NON-INVASIVE GLUCOSE TEK

Monitoring blood glucose levels is a critical aspect of management of diabetes, the eighth largest cause of death globally that is growing fastest in the developed world, according to the World Health Organisation. Current monitoring involves measurement from a blood sample, using a lance, strips and glucometer. Tekcapital's Glucose Breathalyzer measures glucose concentration in exhaled breath.

The monitor consists of a breath condensing unit that measures the temperature, volume and glucose concentration of the exhaled breath along with a condenser for background air. The concentration is corrected for the humidity and glucose concentration of the background air to yield more reliable measurements. This is not used in similar technologies. The concentration is then calculated with fluorescent spectroscopy.

The patent-pending technology was developed at Purdue University.

## LUCYD – HEAD MOUNTED DISPLAYS FOR AR

Tekcapital acquired the exclusive worldwide licence to the portfolio of 13 optical technologies from the College of Optics and Photonics at the University of Central Florida in April 2015. Tekcapital issued 479k new shares plus a revenue share agreement.

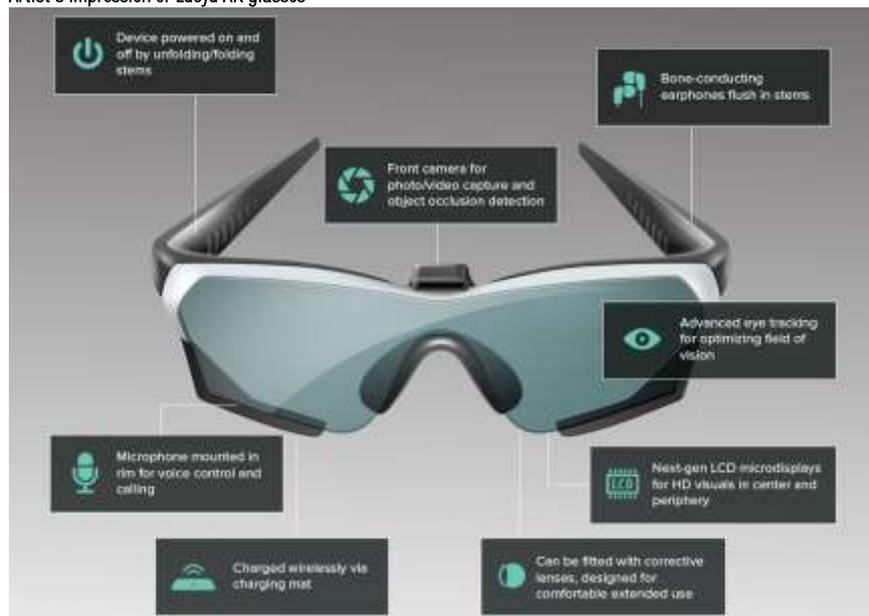
### Small form-factor Head Mounted Displays (HMD)

The portfolio covers technologies used in the development of small form-factor Head Mounted Displays (HMD) for distributed and collaborative augmented reality (AR) applications. The technologies include compact optical designs with micro lenslets and illuminators; eye tracking; eye and head motion analysis; eye glass designs; freeform optics design for non-symmetric, off-axis configurations; narrow to wide field of views with variable resolution; projected high brightness micro displays; see-through optics with occlusion support and 3D depth overlays. The features can be introduced in a new generation of AR glasses based on the licensed technology.

Near eye HMDs with transparent interfaces incorporated in smart wearable products are expected to enjoy widespread adoption. These HMDs will support augmented reality (AR) applications in consumer-grade lightweight video eyewear. These could become the interface of choice for smart wearable devices, gradually replacing the smartphone for many applications based on the unique technical features listed above.

AR is a live view of a physical, real-world environment with computer-generated sensory input such as audio, graphic or GPS data overlaid. AR enriches an individual's visual experience by superimposing supportive information (text, images, haptic feedback, sound etc) over what one sees when viewing the world. The AR market is forecasted to reach approximately \$83 billion by 2021 (Source: Digi Capital), with North America the key market with a CAGR of 79.6% by 2020.

Artist's Impression of Lucyd AR glasses



Source: Company

Lucyd technical features enabled by Tekcapital IP portfolio

AR Component	IP Features	IP advantages over current systems
<b>Light guide</b>	See through phase conjugate retro-reflective material (semi-transparent curved mirror). Micron level corner-cube arrays (TIR) with low light loss (high transmission efficiencies). Use free-form optics (freeform waveguides) to design any aperture shape. Match to any micro display requirements.	Free-form optical surfaces offer much larger degrees of freedom for optical design than rotationally symmetric optical surfaces. Opportunities for simplifying the overall optical structure, reducing system size and weight, and controlling the system's form factor. Combined with moldable plastic optics, free-form waveguide prisms can achieve low-cost, high-performance, lightweight HMD optics Avoid reflection light losses and color non-uniformity
<b>Microdisplays</b>	OLED High resolution, ~2" per pixel Implemented. Developed with LCoS and OLED (1280x1025, 1320x1040) Lower power requirements/brighter images (less battery power). Optimize for different micro-display requirements.	Lower power requirements/brighter images (less battery power). Optimize for different micro-display requirements. SXGA and larger.
<b>Projection optics</b>	Compact, lightweight telecentric lens designed with free form optics (aspherical and DOE). Tiling method to achieve very large fields of view (FOV) and high image display resolution.	Distortion free, large FOV (~ 120°) with constant magnification at any object distance, typically < 1.5% at the edge of FOV. Optimized FOV ~ 25° for eye glass formats. Correct for chromatic aberrations. Larger eye box sizes. Larger FOV, low optical distortion.
<b>Display resolution</b>	Demonstrated designs with 1024x1024 and 1392x1040 pixel microdisplays	Higher resolution true color images for AR applications (entertainment, industrial, medical)
<b>Eye tracking</b>	Designs for integrating HMD optics with eye illumination and optics to track eye movement. Free form optics combines 4 optical paths: Eye illumination by NIR LED NIR sensor for eye images Virtual display See through path for maintaining real world view	Compact HMD implementation for eye tracked applications – this is an emerging area for user interaction.

Source: Company

## MOJE – ENERGY HARVESTING TECHNOLOGIES

In June 2015, Tekcapital acquired the licensing rights to technologies that are intended to enable the commercialisation of energy harvesting from human movement in order to power mobile, wearables and monitoring devices.

The first is a piezoelectric micro-electromechanical system (MEMS) from the University of Michigan (patent pending US 2014/012690). This super-small, power generation device may be incorporated into footwear, apparel, sporting goods and recreational equipment to harvest the energy generated through vibrations. The device combines principles of micro electrical-mechanical systems originally designed to capture the energy generated by the vibrations of a beating heart, in order to charge the battery of a pacemaker implant. The Notice of Allowance was received in H1 FY17.

The second is the exclusive worldwide licence to a patented (US 8,368,290) rectifier-free, energy harvester/battery-charger circuit from the Georgia Tech Research Corporation. This technology conditions the AC (alternating current) from a piezoelectric transducer for the efficient conversion to DC (direct current). The conversion losses have been substantially reduced compared with other rectifier based technologies and is suitable for converting small amounts of energy from a variety of transducers.

Energy harvesting for charging mobile devices and wearables

Key applications for the combined transducer and conversion circuit include in-shoe power generation for recharging mobile devices and a wide range of wearable electronic sensors for monitoring and location applications.

## GESTURE RECOGNITION SOFTWARE – TRACE-IT

Improve the accuracy of the detection of gesture and character inputs

In May 2017, Tekcapital announced that it had acquired the worldwide exclusive licence to the software program and patent application from the University of Central Florida that helps to improve the accuracy of the detection of gesture and character inputs on touch devices, laptops and smartphones.

With this software, when a touch-sensitive device is provided with 2D input drawn with a stylus or made with a finger, synthetic data is produced with a new method called Gesture Path Stochastic Resampling (GPSR). It requires minimal coding to implement and rapidly decodes analogue gesture input for computation by resampling the input an optimal number of times and generating multiple variations of any gesture. As a result, it should be possible to improve the accuracy and speed of gesture recognisers.

GPSR selects random points along a 2D or 3D trajectory and scales the spaces between the points to create realistic variations of a given sample. The resulting series can be translated, scaled, skewed and rotated, as necessary.

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