Nanocube Memory Ink Development Progress

Strategic Elements Ltd (ASX: SOR) is pleased to provide an update on the Nanocube Memory ink invented by the University of New South Wales and being developed at VTT Finland, a world leading research and technology Company. **Please note that attached to the back of this announcement is a recent release from the Embassy of Finland, Canberra.**

**VTT Development**
In latest development work advanced polymer (plastic) material was sourced from a large Japanese producer of polymer films and related services and Inkjet printed with Nanocube ink and silver top electrodes.

Bending testing was performed using an MTS universal testing device where a sample is attached between two clamps which are moved towards each other at a controlled speed and distance. The objective is to simulate the bending radius of roll to roll production scale printers.

Endurance tests are typically done to find out whether a device can withstand the repeated writing/reading of data over a period of time under real world simulated conditions. Results successfully demonstrated that the Nanocube ink is able to create memory cells with endurance testing of at least 1000 cycles even after bending the plastic (see photo) to various radius.

It is known that thin films (layers of materials) in nanotechnology devices may absorb moisture, leading to physical changes and property/performance degradation. In microelectronic devices this is solved through using barrier layers of materials to protect the miniaturized electronics and other components.

Further development has commenced at VTT to identify and incorporate a barrier layer that will combine effectively with a layer of Nanocube ink in order to further enhance memory performance. Extended endurance testing will be conducted after the incorporation of a barrier layer.
Scale Up Activities
The Company is also finalising an agreement with a renowned development organisation to provide technical expertise in the initial scale up of the Nanocube ink to larger batch sizes.

The capability to fabricate increased quantities of ink will also enable the Company to test additional potential manufacturing techniques with production scale potential in coating Nanocube ink onto materials.

PrintoCent
The Company is also participating June 7th and 8th 2017 in its third meeting of PrintoCent, a select consortium of approx. 50 global companies operating out of a specialised facility in Finland that contains the world’s first pilot factory for printed electronics. As part of this third meeting, customer needs are being presented by NOKIA and needs for printed electronics integration by GE Healthcare.

PrintoCent runs a continuous process to establish value chains for joint projects and offers opportunities to the consortium. PrintoCent members include large global companies such as BASF, Merck and Dai Nippon Printing. The facility contains the world's most advanced industrialisation capabilities for printed electronics.

UNSW
Work at the University of New South Wales has recently identified further improvements in the fabrication of the ceramic nanocubes contained within the ink as well as advancing new Intellectual Property contained within the patent application filed in December 2016. The Company will release further details on these developments as soon as it is able to do so.

Nanocube Technology
Low cost traditional printing processes combined with advanced inks and new forms of flexible materials and glass to put electronics where they could never go before e.g. wrapped around curved surfaces, attached to clothing or on building infrastructure. The Nanocube ink is made from cerium oxide and is comprised of billions of tiny cubes that are roughly 10 nanometres thick, or about 10,000 times smaller than the thickness of a sheet of paper. Digital information (a series of ones and zeroes) is encoded and stored on the Nanocube memory cells by applying an electrical current, which changes the cell between a resistive and conductive state.

The Company identified the technology opportunity at UNSW in 2015 and committed resources to constructing prototype inks and producing data for patent and intellectual property purposes. UNSW are continuing to work on expanding the IP position of the technology and has committed large investment in printed electronic equipment and infrastructure.

Additional development of the technology has occurred outside of the UNSW laboratory since August 2016 through an agreement with VTT Finland, a recognised world leader in Printed Electronics. It has a strong network of experience in the sector through its collaborative work with some of the largest companies in the world. VTT has over 4000 employees and over 1200 patent applications and patents.

**Please note that a recent release from the Embassy of Finland, Canberra is attached to the back of this announcement.
An Aust-ounding and Finn-tastic Collaboration

Strategic Elements and VTT (Technical Research Centre of Finland) recently entered into a stage two development agreement, to assist in further developing Strategic Elements’ printed ink memory technology. We spoke with Charles Murphy, Managing Director of Strategic Elements, in regard to this collaboration with VTT. What is this technology? What is it like to work with Finns? You’ll find the answers below!

What is Strategic Elements all about?

We seek to empower innovation by providing high-risk high-reward opportunities with funding, intellectual property protection, company formation, incubation, scale-up and partnering.

Strategic Elements operates as a registered Pooled Development Fund (PDF) on the Australian Stock Exchange under the code ‘SOR’.

Under the Federal Government PDF program our investors pay no capital gains tax or dividends to compensate for the higher risk of us backing innovative small and medium sized companies.

We strive to take part in developing projects that explore brand new fields of innovation. There is no restriction to any particular industry sector except for those excluded under PDF program rules such as property.

What is your approach to fostering innovation?

We encourage curiosity and seek out skilled people that are thinking differently to everyone else. We strongly believe in the need to keep asking questions at every stage of development.

How did you find out about VTT and why did you choose to collaborate with VTT?

VTT is recognised globally as a world leading research and technology company with over 1200 patents and patent applications whilst also being a trusted partner to some of the largest companies in the world.
VTT was one of the first groups into the Printed Electronics space. We were introduced through the PrintoCent Pilot Factory for Printed Electronics in Oulu. VTT is a founding member of the award winning facility. PrintoCent provides a world class design, development and manufacturing environment for Printed Electronics.

What are Strategic Elements and VTT working on at the moment? Can you explain it for our readers?

Strategic Elements is funding the development of printable memory ink technology. The ink contains tiny ceramic cubes thinner than a human hair that assist it to store and remember information or data.

The memory ink has been inkjet printed onto glass and plastic substrates and is transparent to the eye.

The goal is to bring memory to devices and surfaces with different shapes and new flexible forms.

The technology was invented at the University of New South Wales by Professor Sean Li and his materials research team. The license is held in a 100% owned company which we have sole funded so far.

How has your team responded to this intercountry collaboration?

We have been very impressed at the level of professionalism shown by the VTT team and others that we have met. Our Company has responded well to this and a strong working relationship is being built.

How have the two organisations assisted each other throughout the collaboration process?

We invited a team from the Printed Sensors and Electronic Devices team based at Espoo to Australia and they spent some time with the inventors in the University of New South Wales laboratories. This was a valuable exercise that enabled scientists and our Company to quickly trade ideas and experience.

Have there been ideas and results that otherwise would not have come about? If they can be disclosed, what were they?

The outcomes so far are confidential, but I can say that VTT has contributed significantly to our understanding of the technology. The team we are working with have exceptional skills and experience in the Printed Electronics space.

What has it been like to work with Finns? What differences or similarities have you noticed (in terms of culture, attitude, ideas etc)?

We have found Finns to be very detail orientated and practical in their approach. There is a great deal of similarity with the Australian attitude of being forthright.

What is coming up in the future with Strategic Elements and VTT?

We will be reviewing the outcomes of Stage Two in the next few weeks and will be discussing the future potential strategy to advance the technology further. Our experience working with VTT has been incredibly positive and we will definitely be seeking to keep working together in the future.

Interview conducted by Karen Khoo
Strategic Elements Ltd
Strategic Elements shares are listed on the Australian Stock Exchange under the code “SOR”. The Company is registered under the Pooled Development Program run by the Australian Federal Government to encourage investment into SME’s. SOR focuses on backing innovation in the technology and resource sectors. To assist Pooled Development Fund’s to raise capital, the Federal Government enables most shareholders in a Pooled Development Fund to make capital gains and receive dividends tax-free. In return the Company must back only Australian SME’s.

Enquiries please contact:
Mr Charles Murphy, Managing Director
Phone: +61 8 9278 2788 Email: admin@strategicelements.com.au Web: www.strategicelements.com.au