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1 JUNE 2018

A*STAR REDEPLOYS DATA STORAGE INSTITUTE'S RENOWNED CAPABILITIES IN ALIGNMENT WITH NATIONAL RESEARCH AND INNOVATION STRATEGIES

Singapore – Due to rapid technological advances and the wave of digitalisation, the data storage industry has evolved and been transformed. The hard disk drive (HDD) industry in Singapore has been impacted by these global trends. Considerable consolidation has taken place and much of the production now happens outside of Singapore.

Given these dramatic industry shifts, A*STAR has decided to redeploy its highly celebrated talent and resources at the Data Storage Institute (DSI) to other A*STAR research units to deepen and complement relevant capabilities in those units in order to deliver greater impact in line with national priorities.

During the mid-1980s to 1990s, Singapore manufactured half of the globe's Winchester disk drives and nearly 70% of the high-end drives that are integral to data centres in a cloud economy. Originating as the Magnetics Technology Centre (MTC) in the early 1990s, DSI played a key role in building and spurring the growth of Singapore's HDD industry. It has raised the value of the industry through working with key players, effecting technology transfers and R&D collaborations, and grooming scientific talent for the private sector.

Impact of Digitalisation on Data Science and Technology

Today, digital information is exchanged at lightning speed. Mobile devices, more powerful than PCs a few years ago, can now fit modern processing power in a pocket. Revolutionary platforms such as the Internet of Things keep everything from home devices to factory floor machines connected so that they can be smart objects able to sense and respond to their environments.

These are just some of the manifestations of the revolutionary digital age. Data technologies have become vitally important to all sectors of work and life. From super

technologies like hard disk drives that produce forces equivalent to a jumbo jet flying millimetres off the ground, to cloud-based services where data is stored and delivered everywhere, anywhere and anytime.

This inexorable march of digitalisation has impacted all types of industries, therefore, a closer coupling of data science and technology with complementary research capabilities within A*STAR can derive greater synergies for contributing to Singapore's economy.

Leveraging Highly Celebrated Expertise Developed at DSI

While DSI will no longer function as an independent research unit in A*STAR, its expertise in non-volatile memory, disk drive design and systems, and data centre network technologies, will continue to contribute significantly to the agency's key priorities such as Future of Manufacturing, Artificial Intelligence, Industrial Internet-of-Things and Cybersecurity.

As an example, although the industry is moving away from magnetic technology, DSI's capabilities in non-volatile memory and optical storage research will enable its scientists to contribute to the next generation technologies of artificial intelligence, edge computing and quantum information.

Achieving Better Alignment for Singapore's RIE[1] Ecosystem

As A*STAR drives economic mission-oriented research and development that advances science and innovation, it has to pro-actively adapt to, and anticipate, the rapidly changing industry landscape and opportunities arising from shifts in global trends and demands.

The redeployment of DSI's talent and resources allows A*STAR to organise its capabilities to better support the strategic technology domains of Singapore's RIE national strategy, and develop competitive advantages.

The founding Executive Director of DSI, currently the Chief Executive Officer of National Research Foundation (NRF), Prof Low Teck Seng said: "When DSI was established in the early 1990s to undertake R&D in storage manufacturing, it moved Singapore up the value chain from merely manufacturing hard disk drives to higher value-added activities such as hard disk media research and hard disk drive design. As a result of this, in 2009, Singapore was manufacturing eight out of 10 high-end enterprise drives and nearly half

[1] RIE: Research, Innovation and Enterprise

of all hard disk media[2]. Today, as the data storage industry evolves, I am happy to see that DSI's capabilities and resources are being redeployed to take Singapore's electronics and infocomms industry to the next level."

Prof Chong Tow Chong, who served as DSI's Executive Director for 12 years from 1998 to 2010, now the President of Singapore University of Technology and Design (SUTD) said: "DSI has achieved international recognition for being a pioneer in developing data storage technologies. By translating research into economic outcomes for Singapore, DSI also played a critical role in moving Singapore's data storage industry up the value chain and creating high-value jobs. As data storage technologies evolve and data science becomes increasingly important in this digital revolution, it is now time for a new resourcing strategy of DSI's talent and capabilities so that they can continue to contribute to A*STAR's mission and Singapore's economy. I wish DSI staff every success on their new journey, and I am confident that they will continue to excel and do well."

Mr Lim Chuan Poh, Chairman A*STAR, said: "Over the years, DSI has made significant and invaluable contributions to Singapore's electronics and infocomms industry. In its earlier years, DSI anchored MNCs here to catalyse the growth of the local HDD sector. To better respond to the changing industry's demands, DSI's talent and resources have been redeployed within A*STAR. Our strong capabilities in data storage, data science and analytics will continue to be important drivers of our economic mission. These capabilities will synergise with those already in the other research institutes and programmes to further enhance their value proposition to the Advanced Manufacturing and Engineering Domain, and deliver greater impact for Singapore's economy."

Annex A – About the Data Storage Institute (DSI)

The Data Storage Institute (DSI) was established in April 1997 through the expansion of the Magnetics Technology Centre (MTC) founded in July 1992 by the Agency for Science, Technology and Research (A*STAR), then known as the National Science & Technology Board (NSTB), and the National University of Singapore (NUS). DSI's purpose was to undertake R&D in magnetics technology for hard disk drives (HDDs). By 1999, DSI was counted among the top six[3] data storage R&D institutions in the world.

[2] https://www.mti.gov.sg/NewsRoom/Pages/Mr-S-Iswaran-at-DSI%E2%80%99s-20th-Anniversary-Dinner.aspx
[3] http://www.academia.edu/204360/THE_DYNAMICS_OF_HDD_INDUSTRY_DEVELOPMENT_IN_SINGAPORE

DSI played a key role in building and spurring the growth of Singapore's HDD industry, working with key players such as Seagate, Connor, DEC, Toshiba, Hewlett-Packard and Western Digital. It achieved this through strategic initiatives to effect technology transfers to the industry, R&D collaborations with HDD companies, and grooming scientific talent for the private sector.

In 2002, DSI became the first non-USA organisation to be invited to join the National Storage Industry Consortium and the first research institute in Singapore to be awarded the People Developer Standard by the Standards, Productivity and Innovation Board. The following year, DSI won the 2003 Singapore Innovation Award for its work on femto slider and low fly-height technology.

In 2004, a research team from DSI was presented with the National Technology Award (NTA) for their excellent optical disk research and invention of a multi-speed, multi-function optical disk. DSI researchers continued to garner the NTA in 2005 and 2006. One of DSI's research scientists, was also named among the world's top 100 young inventors in 2004 by MIT's Technology Review Magazine.

In 2010, DSI signed an agreement with hard disk drive manufacturer, Western Digital, to collaborate on the development of advanced head, media and hard drive system design for next generation disk drives.

In 2011, DSI signed an agreement with Hitachi Asia Singapore to work on a new generation of storage for genome sequencing.

In 2013, DSI Principal Scientist, Professor Boris Luk'yanchuk was awarded the prestigious President's Science Award 2013 for his outstanding input to the theory of laser-matter interactions and light scattering by nanoparticles, in particular to Fano resonance in plasmonic materials.

In 2016, DSI scientist Dr Arseniy Kuznetsov clinched the prestigious international IET A F Harvey Engineering Research Prize 2016 for his outstanding contributions to research in the field of lasers and optoelectronics, as well as pioneering research on dielectric nanoantennas.

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About the Agency for Science, Technology and Research (A*STAR)

The Agency for Science, Technology and Research (A*STAR) is Singapore's lead public sector agency that spearheads economic oriented research to advance scientific discovery and develop innovative technology. Through open innovation, we collaborate with our partners in both the public and private sectors to benefit society.

As a Science and Technology Organisation, A*STAR bridges the gap between academia and industry. Our research creates economic growth and jobs for Singapore, and enhances lives by contributing to societal benefits such as improving outcomes in healthcare, urban living, and sustainability.

We play a key role in nurturing and developing a diversity of talent and leaders in our Agency and research entities, the wider research community and industry. A*STAR's R&D activities span biomedical sciences and physical sciences and engineering, with research entities primarily located in Biopolis and Fusionopolis. For ongoing news, visit www.a-star.edu.sg.