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Keynote Address by Dr Ng Eng Hen, Minister for Education and Second Minister for Defence, at the Singapore – Massachusetts Institute of Technology Alliance 10th Anniversary Symposium on Wednesday, 21 January 2009 at 9:15am, The Ritz-Carlton Millenia, Singapore

Good Morning

Dr Tony Tan, Chairman, National Research Foundation (NRF)

Professor Tan Chorh Chuan, Chairman, SMA Governing Board and President, National University of Singapore (NUS)

Dr Susan Hockfield, President, Massachusetts Institute of Technology (MIT)

Dr Su Guaning, President, Nanyang Technological University (NTU)

Distinguished Speakers and Guests

Faculty Members, Staff and Students from SMA, MIT, NUS and NTU

Ladies and Gentlemen

Ability and Passion

1. Thank you for inviting me to speak at this milestone event, the 10th anniversary for the Singapore-MIT Alliance (SMA) Symposium.

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SMA – A unique relationship over 10 years

2. If at Singapore's founding in 1965, then with a per capita of US\$512, a clairvoyant prophesied that a partnership would be formed in the future between institutions in Singapore and MIT, he would have been rightly deemed delusional. But here we are in 2009, celebrating a 10-year anniversary of a successful partnership among MIT, NUS and NTU.

3. A decade as partners would be an opportune time, as any, to give pause and reflect on this special relationship that Singapore has with MIT. It would be important to recollect what drew us together. We want to survey what has been created through this alliance; what did we do well and where could we have done better. What we each gain in this relationship? Did our influence extend beyond ourselves – was there a leavening effect on others? And gleaning from these insights, we ask ourselves how we should take this partnership forward.

4. It is important not to imagine that this was a match made-in-heaven and partners perfectly suited when SMA was formed ten years ago. Obvious differences existed in the history and international standing of the institutions in this alliance. Then, in

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1999, MIT, which had first admitted its students in 1865, had been established for 134 years – one full century older than Singapore, who gained her independence in 1965. MIT is considered by many as the leading technological institute in the world. It draws the *crème de-la-crème* from the US and indeed the World at large. NUS and NTU, like Singapore, have progressed swiftly over the years, but were still consolidating their positions.

5. What explains this attraction between Singapore and MIT? To understand this relationship, I believe we have to dig deeper, back into our past and of our vision for the future. As in most mergers, the value system of partners counts, and is often the most critical factor.

Common beliefs and shared vision

6. For me, the most distinctive element in both MIT and Singapore is our deep and abiding belief in educating people, and that through them the advances in science can make our World a better one. This belief is ingrained in MIT's mission statement: "to advance knowledge and educate students in science and technology that will best serve the nation and the world in the 21st century; we seek to develop in each member of the MIT community

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the ability and passion to work wisely, creatively, and effectively for the betterment of humankind.”

7. “Ability and passion” are hallmarks that characterise MIT’s spirit. What about Singapore? For Singapore, we are no less emphatic in enhancing our human capital, our only natural resource. But our motivation to develop Singaporeans’ abilities has often been framed within a materialistic and utilitarian umbra - and for good reason. Singaporeans need no convincing that the key to ensuring continued economic development and prosperity is through education. This explains why the majority of parents send their children for extra tuition after classes, and then some more to art, music, language, and dance lessons. Our message on life-long learning for adults has often been couched in pragmatic terms - it equips our workforce with skills that are relevant to the economy so that they can secure good jobs, as well as create knowledge that would enable us to innovate and move up the value chain. This practical slant on developing “ability” has resonated because for the last 40-odd years, Singaporeans lived through poverty and transformation. They remember vividly how Singapore struggled in its beginning to give a reason for its existence to this region and the World. Poor, its society fractured by communists and

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communalists, without a hinterland for markets and resources, and with many mouths to feed, survival was the name of the game at the outset. The British troop-withdrawals in the 70's, which then accounted for 20% of our GDP, compounded fears and dreads and tightened the knots that we felt in our guts.

8. Singapore's laser-sharp focus on ability is now renowned but it would be a mistake to think that passion was not as prominent in our ethos or road to progress. Sadly and wrongly, in our persona and messaging, we may have inadvertently down-played "passion". (The French and Italians are perceived to be passionate but less so the Singaporean.) But passion has always been a vital ingredient in Singapore's making: for those who believed that we were ideally placed to be a trading port some 190 years ago; for those who defended Singapore in World War II and suffered through the Japanese Occupation; for those who risked life and limb fighting the Communists; for our founding fathers who built an Independent Singapore against overwhelming odds.

9. Passion, courage and determination have always been at the heart of seminal events that changed Singapore's course. In fact, behind every icon of modern Singapore, lies a story of a group of

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people committed to its success with passion, with a capital “P”. Changi Airport, the Port of Singapore Authority (PSA), the Housing Development Board (HDB), Jurong Island, the Economic Development Board (EDB), our Universities, Polytechnics and the Institute of Technical Education (ITE) – the list goes on. But in modern, comfortable, and a more prosperous Singapore, there is a risk that we have forgotten or ignored this. We can become lulled into complacency and believe that success is formulaic and inevitable. We can play perfectly the music of a great composer, but as a soul-less rendition, achieve little effect.

10. I believe firmly that the passion to create something better than ourselves, sometimes as an end in itself, is important, even vital, if we are to bring Singapore to the next level. This is particularly true in the arena of education and scientific advancement. Our educational institutions must never become pedantic and sterile environments. To continue the Singapore story, the next generation of young Singaporeans must be convinced that they can accomplish great things here, in Singapore, and have the passion to try. For MOE, we must continue to develop the ability of our students. But at the same time, we must keep or re-ignite their passions, about learning, exploration and discovery,

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and wanting to make a difference. Our policies and initiatives over the years have indeed followed this theme across all educational levels. Let me share some of them with you.

11. Next week, the Primary Education Review and Implementation (PERI) Committee, which MOE's Senior Minister of State Grace Fu chairs, will release their recommendations. In their deliberations, they met up with many focus groups. In the focus groups, the need for keeping passions alive in our primary school pupils was a recurring theme from all stakeholders. Parents, teachers and industry leaders wanted learning to take place in an environment that ignited the interest and increased the confidence of children, especially at the primary level. The report is a good one because it sets out many practical steps to get us from platitudes to reality, to improve our primary school environment. The report does not call for a fundamental overhaul because an emphasis on science and mathematics, which we are traditionally strong in, is still important to do well in today's technologically-driven world. Instead, the report proposes different and more engaging ways to achieve these learning outcomes. SMS Fu's Committee has asked for sizeable commitments to expand existing primary schools, build new schools and facilities, hire more teachers and support staff.

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This is worth spending, if stakeholders are convinced that these changes will bring positive benefits to our students. The report will be made public and its recommendations given a full airing at the upcoming Committee of Supply discussions over the Budget.

12. In our secondary schools and junior colleges (JCs), over the past years, we have been creating multiple pathways, refining the way we teach and adding different types of schools – NUS High School for Maths and Science, School of Science & Technology, Singapore (SS&T), School of the Arts (SOTA), Singapore Sports School (SSS) – to cater to varying abilities of our children. These initiatives have sparked excitement, as the system adjusts to our students, rather than the other way around. MOE is now studying ways to provide more opportunities for Polytechnic students to further upgrade after they graduate.

13. What about our Universities? Professor Tan Chorh Chuan and Dr Su Guanng update me regularly about the progress of their Universities and I meet the senior management of both universities occasionally. I am glad that in all my interactions, there is still that glint in their eyes, the pride and ambition to want to take NUS and NTU higher.

14. The New University at East Coast also offers a unique opportunity to create something different and valuable to our educational landscape. On a clean slate, it offers academics that rare opportunity to set things right *ab initio*, from the beginning - better integration, and course design, and to organise faculty and related structures in innovative and functionally thematic ways – something which would be hard to do in established Universities. But beyond this, the New University will also be established in a Singapore and indeed, in a world quite different from the past, both in circumstances and challenges, when compared to NUS or NTU, which are much older, and even SMU, which was established only 9 years ago. I am not referring to the current global financial crisis and economic slowdown, which will pass, although it may take a few years to do so. This financial crisis will not threaten our physical survival. But there are critical issues that do, and these will continue to exist when this crisis is over - issues related to global warming and sustainability, energy, food security and pandemics, to name the more important ones. Risks from these complex problems have not gone away just because the whole world is presently seized with measures to overcome the financial crisis.

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These complex problems will need advances in science and technology to help solve if not mitigate their impact.

15. Our neighbourhood has also changed. The next few decades will witness the rise of Asia, as China and India build their capabilities and extend their influence. The US, despite the massive loss of wealth in this financial turmoil, will still be the dominant World power and scientific powerhouse for the foreseeable future. I believe this because its systems and people are unmatched in vibrancy and innovativeness and have demonstrated time and again, the ability to make radical changes, shake off the dust from crumbled edifices and get up to build a new and progressive order.

16. It is in this context that we must position the New University. We cannot know the future, but we can make linkages that will prepare us well for it. This was the idea behind wanting to form partnerships with leading institutes in US and China for the New University. We are well into the process of selecting a potential US partner. For the Chinese partner, developments are well on the way. Last year, this idea of a tripartite partnership was brought up by Prime Minister Lee and Senior Minister Goh during their visits

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with senior Chinese leaders, who agreed that the proposal should be followed up. In December last year, I visited two leading Universities in China and met up with their Presidents and senior faculty to discuss this proposal. The possibility of a trans-Pacific Singapore-US-China partnership through a campus here in Singapore has gained interest. The prospect of students and faculty from the three partners exchanging ideas and collaborating on long term projects is exciting, for both expected and serendipitous outcomes. This is a significant challenge and requires a long-term commitment from all partners to make this work, but if done well, will benefit the institutions, their students, and their faculty immensely. This is worth doing and I am glad to report that both Universities I had visited in China have formed steering committees to evaluate this proposal. Both University Presidents from the Chinese Universities will be coming to Singapore in the next few months to further explore this link-up.

Achievements of SMA

17. Let me now return specifically to SMA. Lofty goals, altruistic aspirations and passionate endeavours are necessary but no guarantee of success. For a reality check, we must examine what SMA has produced over the past 10 years. SMA was founded to

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achieve excellence in engineering research and education. Its goal was to establish a new paradigm of interaction in global research and education among MIT, NUS and NTU. SMA wanted to attract and develop the very best engineering and life sciences graduate students and researchers from Singapore and Asia. What has been its progress over the last 10 years?

18. As shared by the Director in his message, SMA has graduated close to 800 PhD and Masters students who are highly sought after by industry. Its graduates have won international awards and their research projects have made a palpable impact.

19. Nearly 9 in 10 graduates from the Class of 2007 were employed within 3 months of graduation. But beyond this, it's the individual success stories that excite. Danny Soh is one such individual who founded his own company and now provides customised digital marketing solutions to big names such as Ogilvy & Mather and ExxonMobil.

20. This interaction among the faculty of MIT, NTU and NUS has been healthy for all involved. It provides students with international perspectives, exposes them to outstanding teachers and

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researchers, and encourages intellectual discussions with other top international students. Residency opportunities at MIT and the use of video conferencing technology that allow students in all three universities to interact have facilitated these exchanges. Feedback from the students has been positive. For instance, Kapil Daga from Gujarat, India, a Dual Masters student in the Chemical and Pharmaceutical Engineering programme, said that he benefited not only from the demanding coursework during his training at SMA and MIT residency, but also from the exchange of ideas at tea parties. Professor Yue Chee Yoon, co-Chair of the Manufacturing Systems and Technology Programme shared how he had benefited from the SMA's expertise through cross-disciplinary teaching and research.

21. The public profile of SMA has helped NUS and NTU raise the bar for their education and research programmes and in recruiting world-class faculty. That standards have been raised is clearly illustrated in the recent set up of Research Centres of Excellence (RCEs)¹. So far three have been established: the Centre for Quantum Technologies and the Cancer Science Institute of Singapore at NUS, and the Earth Observatory of Singapore at

¹ These Research Centres are defined by international standards of excellence, aimed at conducting world-class investigator-led research with a global impact.

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NTU², all led by academics who are at the forefront of science in their respective fields.

22. We have already heard Professor Hardy Chan's updates earlier that SMA has done very well in its outreach to industry. With some 470 internship projects and another 31 collaborative research projects with companies and Research Institutes, the research work has been relevant to industry. Take for example the collaborative research project by Professor Gregory Stephanopoulos from MIT and Associate Professor Too Heng-Phon from NUS. The team developed microbes, which they term "super-germs"³ that may act like factories to produce blockbuster drugs such as the anti-cancer Taxol, traditionally derived from Pacific Yew Trees, or the anti-malarial Artemisinin. Their hope is that these super-germs could eventually replace the need for extracting compounds from plants for some of these drugs, which would be good news for the pharmaceutical industry as well as for our environment.

² National Research Foundation website; URL:
<http://www.nrf.gov.sg/nrf/otherProgrammes.aspx?id=144>

³ These super-germs are microbes which only need to consume sugar. They could be developed into microbial factories to produce blockbuster drugs like Taxol and Artemisinin. Through metabolic engineering of new pathways or tweaking pathways in their bacterium hosts, the group obtained yields many more times than other production methods. In fact, their super-germs produced 100 times more of the anti-cancer precursor Taxadiene. As six threatened Pacific Yew Trees are needed to produce a single therapeutic dose of the drug, the research team will also be helping to save the environment as a double bonus.

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23. Most importantly, SMA has forged closer relationships and understanding between faculty and students in MIT, NUS and NTU. These relationships form strong foundations to build on for the future and it is to the future that I'll now turn to.

Future collaborations

24. Two initiatives synergistically build on and continue the strong educational and research linkages between NUS, NTU and MIT engendered by SMA. The first initiative is the Singapore-MIT Alliance for Research and Technology (SMART), funded by the National Research Foundation (NRF). SMART will be geared towards research projects with industry impact. SMART's Innovation Centre launched its first call for proposals in 2008, and will provide grants for joint research projects among NUS, NTU and MIT faculty with the potential for licensing and commercialisation.

25. To complement SMART, I am happy to announce today, a new phase for the SMA programme. MOE will now set aside a total of S\$48 million to fund up to 100 research scholars from NUS and NTU who will undertake research at SMART. In addition, the funding will also provide for a research supplement for faculty from MIT, NUS or NTU who will co-supervise the scholars. We want to

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see a steady supply of PhD student talents that would boost the research efforts of the SMART investigators as well as raise academic and research efforts at NUS and NTU. These PhD students will have the privilege of working under the supervision of leading academics from all three universities – MIT, NUS and NTU, and spend up to 6 months in MIT.

Conclusion

26. In conclusion, I would like to thank all those involved in SMA from MIT, NUS and NTU, who have worked very hard with passion to turn dreams into reality and aspirations into achievements. We celebrate your successes and look forward to the spawning of new beginnings. In particular, I look forward to the Singapore-MIT Alliance for Research and Technology (SMART), and the SMA Graduate Fellowship Programme, to continue the discovery of knowledge and the creation of technology for the “betterment of humankind”. Thank you.