

Speech by Mr. S S Gokhale, Director VNIT, Nagpur

...Mr. Ajai Chowdhry, Chairman and CEO of HCL Infosystems, Prof. S. N. Pathan, VC RMT Nagpur University, Dr. Sukumar Devotta, Director, NEERI, Distinguished invitees, Ladies and Gentlemen – Good Evening to you all. I consider it an honor and privilege to stand before you and share few thought with this august gathering. I would like to compliment HCL for following this theme of HCL Mind Conclave over the past few years and taking it across the country. It is this single minded pursuit that has enabled HCL to achieve its' unique and strong industry position in the country. Hovering a few kilometers above the surface of the Earth, we live in an undifferentiated and undivided mass of land. Up above, no one recognizes LOC, POK and similar distinctions. The only topography that can be seen is the coastline, the islands, the Great Wall of China etc. What is India over here? Can it be identified only at the ground level? Well these are only a-biotic points of view. There is an in-depth understanding of what India really is, what it consists of and what a true Indian's identity is. A heavy touch of human nature, languages, vast number of religions, rich heritage, variety of culture and a glorious past is included in the search of what we are and where we belong. As far as the present and past generations can remember, all we can visualize of our country's past is India in the shackles of the British rule. Over 500 princely states were formed as a result of the infamous divide and rule policy, united abruptly and maybe erroneously to form a nation in 1947. Is that how the country was born? Certainly not! The land of the foremost civilization, the most vied area by fortune hunters, the centre of education in the medieval times – all seem to be forgotten. The richness, both in monetary and ethical sense, the origin of multitude of religions, the birthplace of saints and intellectuals like Dayanand Saraswathi, Vivekananda, Dynaeshwar ... what does it all account for in the modern world? Cynics may say that we should not take credit for what we are and where we belong. I wonder how they will give reckoning of the happenings of the past. It will be broadly termed as coincidence only by citizens lacking in self-esteem or foreign dispensation. As wise man once said, history reflects into the future. To be what we were before, we must and should try to relive the glimpses of the past into reality of today. Turning to Science and Technology; Concept – Fiction – Reality appears to be a natural consequence and chronologically, it might as well be yesterday – Today – Tomorrow. Just to illustrate this point I would like to take couple of examples in the Indian context. Travel by air was a concept that fascinated the man and he tried to emulate it originally as novelty. In the epics like Ramayana there are instances where Pushpak Vimana has been mentioned though the exact and precise details about how it was to have been achieved are not known. And as recent as last month the seventy some old man Singhanian achieved the feat of going solo around the world in hot air balloon. Similarly we realized the power of unexplained powers of the universe such as the Sun and the Rain and conceptualized these as Gods. Again in the Mahabharata there were incidences of Kauravas and Pandavas battling it out with Agniastra – Parjanyastra etc. In the final desperate moments when Ashwathama releases Brahmastra, the unborn children in the wombs of the mothers were still-born. Was it not the Hiroshima and Nagasaki incidence narrated thousands of years earlier as fiction? And then again the Iraq US war of early nineties showed the fight between Scud and Patriot missiles as appears to be replay of Mahabharata sequence. In 1780 Tipu Sultan used rockets against British weighing 2.2 to 5.5 kg in iron cylinder casing allowing greater pressure, thrust & range of 1.5 to 2.5 km. The British were greatly impressed by these rockets using iron tubes. At the end of war more then 700 rockets and sub systems of 900 rockets were captured and sent to England. William Congreve thoroughly examined the

Indian specimens to reverse engineer and making its copies that were later used successfully in naval attack on Boulogne (1806), siege of Copenhagen(1807) and also against fort Washington (New York) during America independence war, that is recounted as, "rockets' red glare" in U.S. National Anthem "The Star Spangled Banner". Most of the time we as Indians were very good in conceptualizing various complex systems and processes and these were vividly described in various scriptures. Where we lacked was in making these functional and operational, or to be precise developing the appropriate technologies. May it be because by nature we were not aggressive or assertive enough? Without being too harsh I must narrate some notable successes as well. Former Scientific Advisor to the Prime Minister, Dr. Arunachalam used to expound the Metallurgical theme from Temples to Turbines. His basic premise was that the technology to make defect free bronze statue of dancing Cosmic Nataraja, and the modern Turbine Blades with investment casting or lost wax method are basically the same. And this technology was perfected in the Mohenjodaro and Harappa Civilizations - nearly 2000 BC is an eye opener. I might add that we are still struggling to make a viable and fully functional gas turbine engine albeit with newer stronger materials & alloys. In the past, we had remarkable success in goal oriented time bound projects – may it be the Nuclear Power or Satellite and Missile Designs and launching these by our own Vehicle. I would like to place before you the example of BrahMos Supersonic Cruise Missile jointly developed by India and Russia. These missiles can attack surface target at as low an altitude as 10 meters at speeds around Mach 2.8 and range of under 290 km. The ship and land based versions have 200 kg warhead whereas the aircraft launch version has 300 kg. This is one of kind cruise missile with low radar signature enabling it to escape enemy detection and having dual mode solid and liquid propulsion to achieve desired levels of maneuverability and accuracy. American Tomahawk subsonic cruise missile causes comparatively less kinetic energy damage. Indian Space Research Organization's programs are pretty well known to everyone. Starting with initial SLV-3 failure in 1979, it has very quickly graduated into full fledged commercial space launches which are used by many other countries including some from European Union. The GSLV which stands nearly 50 m tall and with a liftoff weight of 400+ tons can place 1.5 ton satellite in Geo-Synchronous Transfer Orbit of 180x36000 km with three stage propulsion system. The remarkable success of ISRO could be summed up by the fact that out of total 13 flights of SLV, ASLV and PSLV in 20 year period between 1979 and 1999, only four failed due to component failure. These were indeed extremely complex systems and once we realize that we are one of the handfuls of nations in the world to have achieved this distinction, one feels very proud of our achievements. Remote sensing, communication, weather forecasting, tele-everything are some of the direct benefits. More than anything else the technological spin-offs from space explorations were phenomenal. The miniaturized electro-mechanical systems, developing new materials, logic of manufacturing to transportation, tele-controls, VLSI designs etc are just to name a few. And these have infiltrated our everyday lives from mobile communication, fuzzy controlled washing machines to satellite World Space Radio and so on. One is baffled little at time when one realizes that all this happened in our life time. For a cash strap country such as ours this indeed was a luxury at least for near sighted persons. We fought the odds of sanctions and technology denials of the Western and supposedly progressive nations. However the success was possible because few brave political and scientific leaders believed and trusted the efforts put in by dedicated scientists and it paid rich dividends so much so that we can talk on equal terms on some of these issues. The recent Nuclear Treaty between USA and India as well as the proposed Chandrayana mission of ISRO and the interest shown by NASA is the witness of these fantastic achievements of our scientific community. These are not

isolated incidences. There are similar glorious examples in various disciplines from Medicine, Agriculture, Literature, Spirituality etc. The question is how do we proceed further and make ourselves tuned to the rapidly changing world in terms of relevance and competition. Engineering education of today has become extremely important in the era of LPG. The focus has shifted from merely producing something to managing all sorts of resources effectively and efficiently, concern for the environment and associated green technologies that are interdisciplinary in nature etc. In the IT and ITES, one need to be conscience about reduction in product development cycle time and achieving cost competitiveness. How do you get there? And probably at this point my role as technical education administrator comes in to picture. While glancing through this morning's Hindustan Times, I stumbled across an interesting piece and I quote "President George W Bush issued a grim warning to American children on Tuesday: Better develop the skills in math and science to compete with Indian and Chinese children, else new jobs will go off to the two Asian giants." Not withstanding the shortfall all across, Indian education system ranks way above the pricy ones that one will find in our neighborhood such as Singapore or Malaysia. They might have better and expensive infrastructure but we definitely have better teachers. There are sizeable number of Indian Scientists in NASA and probably similar number of Indian Entrepreneurs in Silicon Valley which should be attributed to the excellent education they received at some part in their lives. However currently we are confronted with the broad issues of quality, quantity and equality in education. The IT industry has come out of 9/11 and is booming phase. With a massive manpower requirement in the IT – ITES sector we have to achieve it in a quick time as the industry can not afford to wait or slow down. There is critical shortage of infrastructure, teachers, institutions etc. and one has to evolve some novel methods to circumvent these bottlenecks. There is no dearth of students as this year nearly 3 lakh students are appearing for JEE for about 4000 seats and another 5.4 lakh for AIEEE competing for around 10000 places. To shape these young minds is indeed a great challenge. Theory, laboratory practical apart, we need greater and active interaction with the industry to identify the challenges of the future. Innovations and creativity is one aspect that gets compromised in the rote learning mode – and I feel strongly that this spirit needs to be rekindled. The Academic Institutions provide trained human resource for the Industries. We need something in return from the Industries. We would like to invite the industry professionals to be a part of academic community. The Academic Institutions would be greatly benefited if the Industries set up Research Laboratories on our Campuses where projects of joint interest could be taken up. We would like to look beyond the Grants and Aid received from Government channels. Industry Projects, Summer Term Jobs, Faculty Sabbaticals are just some of the mechanisms to achieve these goals. I understand that the Industries can not ill afford to waste lot of time in non-productive activities. So may be we will try in terms of Teleconferencing and Distance Education Programs. In the Concept we had Guru Brahma, Guru Visnhu, Guru Devo Maheshwara! In Fiction we had Ekalvya and the mud statue of Dronacharya from whom he learnt! In Reality we have EDUSAT – Satellite dedicated fully for the purpose of Education – Televised Guru we may call! I guess we have gone full circle from yesterday – Today – Tomorrow!

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