

35th Convocation Address at IIM-B

Dr. K Radhakrishnan
Chairman- Space Commission,
Secretary- Department of Space,
Chairman- ISRO

March 29, 2010

Mr. Mukesh Ambani, Chairman, Board of Governors; Eminent members of the Board of Governors; Prof. Pankaj Chandra, Director-IIMB; Erudite Faculty Members; Distinguished Invitees; Graduating Students and their proud Parents; Students; Friends from the Media; Ladies & Gentlemen ...

1. I stand before you with immense pride and enormous humility to share this momentous event as my *alma mater* offers to the nation yet another batch of bright, inspired, sharp, and ebullient thought leaders who have been imparted distilled knowledge, nurtured, trained and tested in this temple of management learning.
2. I had the privilege to be a proud graduate when the first convocation of IIMB was held. Indeed, it is a rare honor to come back wearing a different robe and to sit on the other side. The excellent education received from this institution has had a defining influence on my life and career, accelerating as it has done, the process of my transformation from a design engineer to a technical manager and to my current role.
3. I join the globalized IIMB community, to express from the profound depth of our hearts how proud and elated we all are about our *alma mater* that has been declared as the No.1 Business School in Central Asia, the Middle East & South Asia, and one among the top 27 B-schools worldwide by Eduniversal, Paris. As you walk out from the portals of this great institute with an iconic status in the society, you will have the additional

responsibility of carrying forward the legacy of unparalleled excellence and sustained achievement of this prestigious institute, and setting newer standards for those who follow you.

4. Last couple of years has been turbulent for the world economy: in fact it has shaken some of the strongest economies. Though Governments across continents have responded speedily and in rare unison, the path to recovery is expected to be long and arduous. India has not been immune to this shock. While at the aggregate level, it is commendable that our country has displayed remarkable resilience sustaining relatively high growth rates, several sectors have been impacted. Despite these setbacks, India's inherent strengths provide a strong foundation to better withstand such crisis.
5. Even as societies grapple with these challenges, the world is today confronted with yet another impending catastrophe, the phenomenon of global warming and climate change. Global warming exacerbates the challenges of poverty and environmental degradation and together they pose a threat of far reaching consequences to societies around the world. Adding to quality and efficiency, the ability to adopt low carbon operations as well as sustainable business practices will be one of the key determinants for businesses in coming years.
6. A powerful force drives the world towards a converging commonality and that force is technology.

7. Friends, 34 years ago, with firm determination I decided to continue with my career in space science and technology after my graduation from this institute. There were a few other like-minded management graduates in Mr. Kiran Karnik, Mr. Sudarshan P, Late N Sampath, Mr. D S Bhatia, Mr. K R Sridhara Murthi, your Prof. S Chandrasekhar *et al* representing IIM-A, & C. They joined ISRO in its nascent phase and saw it evolve into a great team providing valuable and self-less service to the nation.

7.1. We were fascinated by space, the last frontier for the human race that encompasses the study of our expanding universe starting from about 100 km above the earth surface, called the Karman line, to inter-planetary, inter-stellar, and inter-galactic space and beyond to find answers to the questions such as: Where do we come from? Where are we going to? And finally, are we alone in the universe?

Space platforms provided excellent opportunities to study the expanse around us, and through the several windows of the electromagnetic spectrum, helped us overcome the limitations imposed by the atmosphere.

7.2. We were confronted by the technological complexities required by the humankind to explore the space, to reach there defying the gravitational force of the Earth and the vagaries offered by the atmosphere, to be there withstanding the harsh space environment and to

return from there safely conciliating the thermal stresses during the re-entry into the atmosphere.

- 7.3. For an example, a satellite needs to attain a velocity of about 7.5 km per second to reach a polar sun-synchronous orbit of about 700 km to view the earth periodically even discerning objects as small as your car on the road. Last year when Chandrayaan-1 was put precisely in an orbit of 100 km around the moon, it was the beginning of a new era for the country, demonstrating our technological prowess in several disciplines.

Today, we can be proud of a sound indigenous base in terms of a multitude of technologies and infrastructure required for producing reliable space transportation systems and best-in-the-class satellites.

- 7.4. We were inspired by the national vision articulated by our beloved first Prime Minister, Pandit Jawaharlal Nehru – *“It is science alone that can solve the problems of hunger and poverty....The future belongs to science and to those who make friends with science”*.

Scientific and technological capability is a critical determinant for the rapid development of the country.

7.5. The founding father of the Indian Space Programme Dr. Vikram A. Sarabhai envisioned a meaningful role for space science and technology in finding solutions to the problems of the common man and society as a whole in our country - quite in contrast to approaches pursued by the other space-faring nations of that era. I take immense pride that the vision enunciated by Dr Sarabhai echoes the core values that ISRO has enshrined in its management philosophy and governance structure. We have indeed been 'practitioners' of this vision for many years now. We all shared this vision, and toiled to realise it and to enrich it as we evolved over the past five decades.

7.6. We realised that there was a purpose for our life when the fruits of space research reached the common man and society, touching their daily life, be it a fisherman, a farmer, a student, a patient from a remote area, an administrator or a policy maker in a metropolis. Several human lives could be saved by the timely information and connectivity provided by space platforms during natural disasters.

One professional study by an economist brought out that the direct economic benefits from space applications surpass the cost incurred and that our space systems are realized at half the cost compared to that of the other space agencies.

7.7. We had the satisfying experience of catalysing and facilitating the emergence of a space-industry ranging from large public sector to small and medium enterprises which strived in tandem with us in our pursuit for a self-reliant space programme- a strategic imperative in a discipline where knowledge and expertise are closely guarded due to geopolitical compulsions.

7.8. We are proud to see India as a front runner in the global comity playing pre-eminent roles in the International forums of space agencies and space-faring nations. It is equally satisfying to see India's emergence as a significant player in space commerce.

India is the role model to the world in space applications; one of the six in the world with capability to make satellites and launch them from her own soil; one of the four that demonstrated capability for re-entry of spacecraft from space; presumably the first one to orbit 10 satellites in one single mission and the facilitator for a major discovery of water molecules and water ice on the lunar surface.

All these were achieved with a shoestring budget as low as 3 % of NASA's expenditure on space programmes.

7.9. We have been bestowed with a unique organisational structure with the Space Commission as the apex policy-maker, the Department of Space ensuring parliamentary accountability, and ISRO as the executive wing, working in synchronism under one leadership.

Integrity of successive visionary leadership, remarkable political solidarity, unstinted public support and with no ambiguity of purpose ISRO is kept unmatched.

7.10. We as a team with élan and missionary zeal accomplished complex, technology-intensive missions, while imposing stiff targets on ourselves for performance, schedule and cost. Unique intra-organisational structures, systems and processes and inter-institutional linkages with the national user community, industry and academia were instituted.

Inculcation of high degree of management science in different functions is of utmost necessity for realizing any space programme – ours is no exception.

Firstly, Strategic Technology Management is a case in point. By definition, technology management is a set of managerial activities that include outlining the technology strategy, technology mapping, planning, and building a technology portfolio. As any technology goes through a chain of actions before it reaches the

beneficiary, it is equally important that critical market assessment and technology transfer is done appropriately. Secondly, in a technology R&D organization like ISRO – maintenance of innovation facilitative environment is of utmost priority. The concepts of Innovation Diffusion and Capability Maturity Model (CMM) are vastly applicable. Thirdly, commercial functions like procurement and inventory management have to be adapted in a way to best suit the requirement in terms of heritage, geo-political dynamics and control regimes enforced by the developed nations.

And, apart from the technical challenges, there are multitudes of managerial exertion like, budgeting, forecasting, capital investment, financial strategy, decision making under uncertainty, project management, operations management in realizing large, complex, high-tech space projects.

On the other hand, the space agencies like ours need to take the responsibilities to service the user community, engage them and help them to upgrade into new technologies and processes for streamlined demand chain. Public accountability has a major influence on our operational issues and they have their own unique challenges. Areas like industry integration, international cooperation and capacity building that

requires high managerial aptitude is fast gaining impetus.

Over the last five decades, ISRO has evolved a rich heritage, a legacy and organisational culture-popularly quoted as the “ISRO way of working”. The openness, resilience, team spirit coupled with organisational learning and adaptability has been the key success factors for us. Failures have been our great teachers and helped forge stronger teams.

8. Space science and technology has thus emerged as a significant player in the socio-economic and cultural development process, touching the lives of the common people of India, while demonstrating its technological prowess. The challenge before us is to sustain and take the ISRO Saga forward to the next level of excellence.

9. The Indian Space Programme is now on the threshold of a transition into developing newer capabilities, perspectives and direction for ensuring enhanced significance in the national scene and gaining international leadership in a few selected areas.

Space should become the bedrock on which the national systems for societal and other national imperatives are built up. Space should emerge as (i) a catalyst for breeding self-reliance in critical technologies, (ii) a facilitator for the creation of

national wealth, (iii) an enabler for gaining global leadership, and (iv) for improving the quality of life across all sections.

10. We are also sensitive to the rapid changes in the technological scenarios, global developments, national priorities and aspirations while taking cognizance of the geopolitical, strategic, economic, legal, environmental and socio-cultural dimensions of decision-making.
11. The leaders of tomorrow being nurtured and mentored to envision the transition of ISRO and harness the full potential of the newer generation under the ISRO Strategic Group, are engaged today in shaping up this new future. Further, ISRO's initiative of the Indian Institute of Space Science and Technology (IIST) is poised to strengthen the continuity of human capital.
12. The world is now going through the second cycle of space exploration with renewed interest in planetary exploration. A global system of Earth Observation Systems came up to enhance delivery of benefits to society in the areas of agriculture, water, weather, climate, environment, ecosystems, biodiversity, health and disaster management. Space-based global navigation systems have gained impetus with multiple service providers in the field. Novel concepts of space transportation systems, exploitation of higher frequency bands and enabling technologies are gaining momentum.

Long term sustainability of space assets, harnessing prized resources from other planets, orbital resources, space laws, space debris management, space tourism, bioastronautics and space biology, space robotics, manufacturing and processing in space environment-these are a few of the myriad of new developments.

We can hope that space technology will evolve and create a model for emerging science based enterprises with distinctive anatomy – one that will serve the demands of society, corporate, government and non-governmental organizations.

13. For India, the immediate future in space endeavour could be depicted as a compass with four arms of:

13.1. Space-based applications should become part of the value chain of the user community who should internalise them.

The priority would be to contribute towards the national endeavours in food and water security, weather and climate, environment and ecosystem, education and health care, skill development, rural communication, infrastructure development, disaster management support, smart governance, sustainable development and related national imperatives.

13.2. Creation, sustenance and management of operational space assets would become a key area of operation

with Indian industry emerging as a risk-sharing partner for the production of launch vehicles, satellites and ground equipment.

13.3. Newer capabilities should be developed towards (a) low cost access to space (b) contribute to answering fundamental scientific quests (c) scientific exploration of Earth as a total system, Moon, Mars and beyond in the solar system (d) the human space flight programme, eventually leading to human presence in solar system ensuring synergy of national capabilities and international cooperation; and

13.4. Advanced research should be undertaken in tandem with academia on cutting-edge technologies targeting to make India a technology leader in niche areas.

14. My dear friends, before I conclude I would like to leave you with a few thoughts to ponder over.

- i. Everyone must dream and aspire. Set your Vision and Goals high.
- ii. The smallest idea can create the biggest innovation. The best of strategy and planning do not yield much unless implemented effectively. Also, the fastest and most lasting learning is produced when you are engaged in finding real solutions to real problems.
- iii. Keep always in sight the economic dimension of time and timely decision making.

- iv. Inculcate the spirit of leadership. Judge by the number of leaders you help create and not by how many you had led.
- v. Measure your success not by wealth and fame but by how successfully you solved your problems. To be able to stand tall amidst adversity, to live your convictions and know that your actions and beliefs have transformed the lives of millions is at once a humbling and enriching experience.
- vi. Develop strength of character and deep-rooted values.
- vii. As you walk the path of professional success, do remember to contribute to the society that helped you grow. You need to redouble your efforts with ennobling vision and courageous leadership, in particular civil leadership, at making a difference to the larger society.

Finally, I would like to express my profound gratitude to the Board of Governors and other dignitaries for having given me this opportunity to address you on this august occasion.

I would again like to congratulate the graduating students with a special word of congratulations to those who have received awards and medals and wish them all success in life. My hearty congratulations to your families and to your teachers who provided the supportive ambience and shaped your intellect for you to achieve this coveted academic distinction. I wish, you choose a profession that will be driven by inquisitiveness and curiosity leading to the fulfillment of all your dreams whilst using your talent,

competence and energy for creating peace and happiness for the nation. May the Almighty always be with you in your journey of success.

Thank you, Ladies and Gentlemen.