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# WORKS AND LIFE OF DR. KALAM

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## ABSTRACT

Dr. A.P.J.Abdul Kalam born on 15th October 1931 at Rameshwaram, in Tamil Nadu, specialized in Aero Engineering from Madras Institute of Technology. He initially worked in DRDO in 1958 and then joined ISRO in 1963. Dr. Kalam has made significant contribution to Indian satellite and launch vehicles of ISRO and also in the missile programme of DRDO. As project Director, SLV-III, he contributed for the design, development and management of India's first indigenous Satellite Launch Vehicle (SLV-III) to inject Rohini satellite in the near earth orbit. He was responsible for the evolution of ISRO's launch vehicles programme and configurations. He rejoined DRDO in 1982 and conceived the Integrated Guided Missile Development Programme (IGDP) for indigenous missiles.

## INTRODUCTION

He was Scientific Adviser to Defence Minister and Secretary, Department of Defence Research & Development from July 1992 to December 1999.

As Chairman, Technology Information, Forecasting and Assessment Council, he generated the Technology Vision 2020 document – a road map transforming India from Developing India to Developed India. He provided overall guidance to a number of Homegrown Technology Project and major technology missions such as Sugar, Advanced Composites and Fly Ash utilization.

Dr. Kalam has served as the Principal Scientific Advisor to the Government of India, in the rank of Cabinet Minister, from November 1999 to November 2001. He was primarily responsible for evolving policies, strategies and missions for generation of innovation and support systems for multiple applications. Also generating science and technology task in strategic, economic and social sectors in partnership with Government departments, institutions and industry. Dr. Kalam was also the Chairman, Ex- officio, of the Scientific Advisory Committee to the Cabinet (SAC-C).

Dr. Kalam took up academic pursuit as Professor, Technology & Societal Transformation at Anna University, Chennai and involved in teaching and research task. Above all ,is his mission to ignite the young minds for national development by meeting high school students across the country.

Dr. Kalam was conferred with the Degree of Doctor of Science (D.Sc. *Honoris Causa*) by 30 Universities/academic institutions. He is recipient of several awards including the Indira Gandhi Award for National Integration 1997.

Dr.Kalam has been awarded Padma Bhushan in 1981, Padma Vibhushan in 1990 and Bharat Ratna in 1997.

## CAREER

He received his degree in aeronautical engineering from the Madras Institute of Technology in 1958. After graduation, he joined India's Defence Research and Development Organisation (DRDO) to work on a hovercraft project. In 1962, Kalam moved to the Indian Space Research Organisation (ISRO), where his team successfully launched several satellites. He made a significant contribution as Project Director to develop India's first indigenous Satellite Launch Vehicle (SLV-III) which successfully placed the Rohini space satellite into near earth orbit in July 1980.

In 1982, Kalam returned to DRDO as Director, focusing on Indigenous guided missiles. He was responsible for the development and operationalization of the AGNI and PRITHVI missiles. This earned him the sobriquet "India's missile-man". He also helped in the formulation of healthcare products using technology developed for missiles.

In July 1992, Kalam become Scientific Advisor to India's Defence Minister. As the Principal Scientific Advisor to the Indian government, he held the rank of a Cabinet Minister. His work led to the successful Pokhran-II nuclear tests in 1998, which reiterated India's position as a nuclear weapon state. Kalam was also the Chairman, Ex-officio, of the Scientific Advisor Committee to the Cabinet (SAC-C) and piloted the "India Millennium Mission 2020". Kalam later took up academia as a Professor of Technology & Societal Transformation at Anna University, Chennai from November 2001 and was involved in teaching and research task. Above all, he took up a mission to ignite the young minds for national development by meeting school students across the country. Kalam was elected the 11$^{th}$ President of India and took office on July 25, 2002.

## HONOURS

Kalam has the unique distinction of having received honorary doctorates from at least thirty universities, as also India's three highest civilian honours, the Padma Bhushan in 1981; the Padma Vibhushan in 1990; and the Bharat Ratna in 1997. He has recently refused an honorary doctorate from University, stating he is satisfied with the ones he has earned with his hard work and determination.

## PERSONAL LIFE

Kalam observes strict personal discipline, vegetarianism, teetotalism and celibacy. Kalam is a school of Triukkural; in most of his speeches, he quotes at least one kural. Kalam has written several inspirational books, most notably his autobiography *Wings of Fire*, aimed at motivating Indian youth. Another of his books, reveals his spiritual side. It has been reported that there is considerable demand in South Korea for translated versions of books authored by him.

 

**TRIVIA**

- His love of children is well known, he encourages their audiences with him.
- On Tuesday, 19 February, 2006, he created history by becoming the country's first President to undertake an undersea journey. Abdul Kalam boarded the INS *Sindurakshak,* a Russian-origin kilo class submarine, from the Visakhapatnam Naval dockyard. The duration of journey was around three-and-half hours during which Kalam had lunch with the crewmembers.
- While studying at the Madras Institute of Technology, he used to head the vegetarian mess despite being a Muslim himself.
- Initially he wanted to become a pilot, but was rejected and then opted for aeronautical engineering later.
- In 08 June, 2006, he created history by becoming the first president to undertake a sortie in a fighter aircraft, a Sukhoi-30 MKI, from Lohegaon (Pune) airbase. As a 78-year old, he created a record by becoming the oldest Indian co-pilot to do so. The president donned a G Suit before boarding the aircraft. The flight, flown by Wing Commander Ajay Rathore, lasted 30 minutes flying at a height of six eight kilometers in the air at a speed of 1500 Km/h.
- His popularity among Indian youth is evident from the request to his re-election as president petition in Petition Online site is the one of the Top 10 petitions.
- As President, he donated his income from his first 10 months in office to the NGO created and managed by Mata Amritanandamayi.
- As a sign of his popularity among Indian youth, MTV- India recently nominated him as one of the prospects for its MTV India Youth Icon for the year 2006.

**BOOKS**

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- Envisioning an Empowered Nation: Technology for Societal Transformation by A.P.J.Abdul Kalam (Tata McGraw-Hill Publishing Company Ltd, 2004) ISBN 0-07-053154-4
- Guiding Souls: Dialogues on the Purpose of Life by A.P.J.Abdul Kalam, Arun K.Tiwari, (Ocean Books, 2005) ISBN 81-88322-73-3
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**WORK**

"Dreams float on an impatient wind, a wind wants to create a new order. An order of strength and thundering of fire." – from a poem written by Dr. A.P.J.Abdul Kalam is the undisputed father of India's missile program. He has breathed life into ballistic missiles like the Agni and Prithvi, which put China and Pakistan well under India's missile range. It is too exhausting to track Dr. Abdul Kalam's achievements to date. In the '60s and '70s he was a trail blazer in the space department. In the '80s he transformed the moribund Defence Research and Development Laboratory in Hyderabad into a highly motivated team. By the '90s Kalam emerged as the czar of Indian science and technology and was awarded the Bharat Ratna. His life and mission is a vindication of what a determined person can achieve against extraordinary odds. Even at 71, he is indefatigable and dreams of making India into a technological superpower. More importantly, he is still capable of acting on it.

Born on 5th October 1931 at Rameshearam in Tamil Nadu, Avul Pakir Jainulabdeen Abdul Kalam studied at Schwartz High School in Ramanathapuram. After graduating in science from St. Joseph's College in Trichi, he did his DMIT in Aeronautical Engineering at the MIT, Madras, during 1954-57.

After completing his third year at MIT, Kalam joined Hindustan Aeronautics Limited (HAL), Banglore as a trainee.

Here, he was posted at the Technical Center (Civil Aviation). He lost his resentment of failure, thinking he would be able to make aero planes airworthy if not fly aero planes. During his first year in the Directorate, he carried out a design assignment on supersonic target aircraft with the help of his officer-in-charge, R.Varadharajan, and won praise from the Director, Dr. Neelakantan. Then he was sent to the Aircraft and Armament Testing Unit (A&ATU) at Kanpur to get shop-floor exposure to aircraft maintenance.

Upon his return to Delhi, he was informed that the design of a DART target had been taken up at the DTD&P and he was included in the design team. After that he undertook a preliminary

 

design study on Human Centrifuge. He designed and development a vertical takeoff and landing platform and Hot Cockpit. Three years later, the Aeronautical Development Establishment (ADE) was formed in Bangalore and he was posted there.

At ADE, Kalam served as a senior scientific assistant, heading a small team that developed a prototype hovercraft. Defence Minister Krishna Menon rode in India's first indigenous hovercraft with Kalam at the controls. But for reasons never explained, the project which would have been a considerable international achievement in those days, was not encouraged. This was probably one of the reasons why he moved out of ADE in 1962 and joined India's space program.

During 1963-82, he served the Indian Space Research Organisation(ISRO) in various capacities. Here Kalam initiated Fibre Reinforced Plastics(FRP) activities, then after a stint with the aerodynamics and design group, he jointed the satellite launch vehicle team at Thumba, near Trivandram and soon became Project Direct for SLV-3. As Project Director, he was responsible for carrying out the design, development, qualification and flight testing of 44 major sub systems. The project managed to put Rohini, a scientific satellite, into orbit in July 1980. He was honoured with a Padma Bhushan in 1981.

In 1982, as Director of DRDO, Kalam was entrusted with the Integrated Guided Missile Development Programme (IGMDP), India's most successful military research task to date. The programme constituted of 5 major projects for meeting the requirements of the defense services and for establishing re-entry technology.

The 5 project were scheduled to be completed in a time frame of only 10 years and consisted of:

1. Nag- an anti-tank guided missile
2. Prithvi- a surface-to-surface battlefield missile
3. Akash- a swift, medium-range surface-to-air missile
4. Trishul- a quick-reaction surface-to-air missile with a shorter range
5. Agni- an intermediate range ballistic missile, the mightiest of them all

From his SLV-3 experience, Kalam had learned the advantages of team work and of sharing the tasks with partners in private and public sector industries. In the new management structure of the missile program, Kalam, as the Chairman of the Programme Management Board, delegated almost all executive and financial powers to five carefully selected Project Directors and kept himself free to address the core technology issues. His task was to inspire and monitor over 20 institutions and partners outside- ranging from large public and private sector suppliers to small specialist firms that needed seed money to take up the precision tasks.

The naval version of Trishul launched from INS *Dronacharya*. The missile went up more or less on schedule: Trishul in 1985, Prithvi in 1988, Agni in 1985 and the other in 1990. The development and successful flight test of Prithvi, Trishul, Akash, Nag, and Agni established the

 

indigenous capability towards self-reliance in defense preparedness. The success of 'Agni' surface missile was a unique achievement which made India a member of an exclusive club of highly developed countries. The Trishul has the unique distinction of being capable of serving all three services.

The establishment of the Research Centre Imarat (RCI), a campus 8km from DRDL, in 1988 was perhaps the most satisfying achievement for Kalam during the missile years. He received generous funding from the Government to build the futuristic centre, which is totally geared for work in advanced missile technologies. Its state-of-the –art facilities are set in a unique ambience and the level of comfort accorded to the individual worker is matched by few R&D institutions. And Kalam's interest in the environment saw RCI emerge as an oasis in a rocky wasteland. It has a small farm that meets the food requirements of those who stay in the RCI quarters. Kalam was awarded the Padma Vibhushan in 1990.

Dr. Kalam and Defence Minister G. Fernandes at the Agni II missile launch in 1999. On 25th November 1997, in appreciation of his contributions to Indian defense and science, Dr. A.P.J.Abdul Kalam was awarded India's highest civilian honour-the "Bharat Ratna". In October 1998, he bagged the prestigious Indira Gandhi awards for national integration (for 1997).

After 10 years in DRDL, he went to New Delhi to take over from Arunachalam as Scientific Adviser to the Defense Minister- reluctantly, many in DRDL felt. But the system created by Kalam had taken a firm hold in that decade and the missile programme passed on smoothly into its final phases of production and induction.

In Delhi, Kalam as head of the DRDO had to deliver other prestigious projects, such as the Arjun MBT and the Light Combat Aircraft(LCA) projects. "Strength respects strength", this is Kalam's usual response to the question why India needs its own missiles or a battle tank or a combat aircraft. While management practices he adopted for the missile program have inevitably rubbed off on these projects, there are no miracles to be had in strategic development areas. There have been technical problems. Even in the missile program, work on the SAMs and the ATM is slower than anticipated. But Trishul's recent multiple test flights have demonstrated that the system Kalam put in place has inherent strengths.

Kalam is by no means a miracle man. As the head of a vast network of laboratories-whose products include avalanche-controlling structures in Kashmir, water desalination kits for the Thar desert, a world class sonar submarine finder for the latest warship-INS Delhi, and infra-red night vision goggles for the Indian Army- Kalam's attention is necessarily a bit diffused. His self-effacing persona cloaks a formidable catalyst which can make people work.

Army General V.P. Malik with Dr. Abdul Kalam at the launch of INS Delhi Kalam is happiest at the drawing board, in discussion with his scientists on how their dreams for the next millennium can be fulfilled. The projects envisaged include an air breathing hyper plane spacecraft that draws oxygen from the atmosphere rather than carry it all the way from the

 

ground, reusable missiles and stealth technology. Kalam has shown that with adequate funding, freedom from procedural holdups and a people-oriented management, India can make products of internationally acceptable technical standards in a demanding arena like defense.

Science, according to Kalam, is a global phenomenon. He feels there are a few areas where India can develop its core competence. These areas are software engineering, computer products and design, agriculture and food, aviation, defense research and space technology and chemical engineering. "This will lead to a highly beneficial economic and social progress for the nation".

Kalam's advice to the youngsters of the nation is to “dream, dream and dream and convert these into thoughts and later into actions”. Also to "think big". "We are a nation of a billion people and we must think like a nation of a billion people. Only then can we become big". On 25th November 1999, Dr. A.P.J. Abdul Kalam was appointed Principal Scientific Advisor to the Government of India and accorded the rank of a Cabinet Minister. His role was to advise on overall scientific development in the country on issues relating to scientific and technical policy in different sectors. Kalam also advised on matters relating to achieving technological self-reliance and foreign collaboration.

On December 8, 2000, the Deputy Chairman of Planning Commission, Shri K.C.Pant conferred the "Life-time Contribution Award in Engineering 2000" on Dr. A.P.J.Abdul Kalam at the annual function of the Indian National Academy of Engineering in New Delhi. Speaking on the occasion, Kalam said that Engineering and technology should be used for the upliftment of the people living below the poverty line.

Kalam (left) with the award On November 10, 2001, Dr. A.P.J. Abdul Kalam quit as principal scientific advisor to the government. Sources close to Kalam, said he quit become of "lack of executive authority". However Kalam has been for quite some time keep on pursuing academic interests and helping scientists the country in developing their research capabilities. That’s why after quitting he took over the job as distinguished professor at Anna University.

Dr. Kalam has spent the past few years developing the concept of "India Millennium Missions 2020"- a blueprint for transforming India into a developed nation. He calls it "the second vision of the nation" and says he want to focus on the children of India to ignite in their minds a love for science and the nation's mission: a developed India.

On July 25, 2002, Dr. A.P.J. Abdul Kalam was sworn in as the 11th President of India by Chief Justice of India B.N.Kirpal in the Central Hall of Parliament at an impressive function telecast live across the country. Kalam took the oath in the name of God as a 21-gun salute boomed in the background.

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