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Scientist Technocrat Industry Expert Entrepreneur Educationist

Committed To Excellence in Electronics Design in a Career Spanning 50+ years.....



Retired Senior Scientist BARC, 23 years pioneering service. Left a deep impact and remembered as an R&D administrator and a legendary figure.

Leading Electronics and Technology Expert in Mixed Analog and High Speed Design, Noise Analysis and Suppression.

Innovator, Technocrat and Entrepreneur, credited with **creating** award winning products.

Founder Core Technologies –A Company committed to excellence in Data Acquisition and Dynamic Weighing Machines for the last 30 years.....

Areas of Expertise

- **Mixed Analog** & Digital Design
- **High Speed** Design Techniques
- Noise Analysis using FFT algorithms.
- Compliance to various IEEE standards on EMI/RFI emissions
- Development of **DSP algorithms** for modern 8,16 & 32 bit controllers
- Applications of Photomultiplier tubes
- **Expert Team builder** and R&D administrator.

Major Achievements & Awards

- Offered a **Ph.D. Degree** after completion of 2 years and Doctoral thesis on Signal Processing at **University of Milan, Italy, 1969**
- Selected for **Homi Bhabha Fellowship** award for contribution to FFT analysis in the field of acoustics, **1980**
- Appointed **Scientific Advisor, Prime Minister's Office** (1981 – 1983)
- **Represented India at International Conference** on “Advances in Nuclear Reactor Noise Analysis” - Gatlinburg, USA -**1977**
- **Visiting Faculty** to IIT(B), COEP Pune, VJTI, Sardar Patel College (1984 – 1988) and Examiner for Bombay University
- **Advisory Member** to AICTE Western Region.
- Governor 's nominee as Technology Advisor to SNTD university.

Career History

Bhabha Atomic Research Center (BARC), Mumbai

1960 - 1983

Team Leader

Section Head

Head, Analytical Instruments Division

- ♣ Successfully developed instrumentation for Nuclear Spectroscopy. Achieved Successful transfer of technology (T.O.T) to ECIL for production - (1960 - 66)
- ♣ Built and Guided a core team of dedicated scientists specializing in Signal Processing to build India's **first Real Time FFT Processor** on very tightly managed shared infrastructure, resource and cost budgets as part of Reactor Noise Analysis for estimation of dynamic Transfer characteristics of Nuclear Reactors. **Considered a major breakthrough for the country in 1974.** Presented research findings at International Conference on “**Advances in Nuclear Reactor Noise Analysis**” held at Gatlinburg, TN, USA -1977.
- ♣ Appointed Chairman of Training School Selection Committee - 1970
- ♣ **Conceived and Initiated** program for Research and Development in Robotics (1973), later converted into a fully functional Division of BARC for developing Robotic systems for Nuclear Reactors.

- ❖ **Conceived and Initiated a Research program for Digital Image Processing** for Metallurgical studies using the fledgling Micro processors then available. Project named **Micro-Met** to stress the μ P connotation. Group was later converted into a full-fledged Section under Advanced Computing Division (1975)
- ❖ Pioneered the effort to develop **Stress Analysis Techniques** using Acoustic Emissions as part of Non-Invasive Stress analysis of Nuclear Reactors - **1975**
- ❖ **Pioneered research in flow measurement** techniques, as a crucial requirement for estimation of Power output of Nuclear reactors using non-invasive methods more accurately than existing technology available. Guided team to develop Turbulence Transit Time measurement technique using real time Correlation Computational methods. Indigenously developed an **80 point Real Time Correlation Computer** with sampling speeds ranging from 10 μ S to few seconds. This instrument has been extensively in use at the **Fast Breeder Test Reactor IGCAR, Kalpakkam, T.N.**, for characterization of Molten Sodium flow and has been recognized as a contribution of considerable significance in attaining self sufficiency and reducing foreign dependence for India (1980).
- ❖ Managed Annual revenue budgets of over Rs 50.0 Lakhs and Project budgets of over Rs. 1.0 Crores (at Rupee value of mid 70's).
- ❖ As number two Scientist in Reactor Control Division, Formulated proposals for BARC's 5th plan for modernization of Divisional facilities.
- ❖ **Appointed as Scientific Advisor to Prime Minister's Office** in 1981. In 1982 Tasked by the then **Prime Minister**, Mrs Indira Gandhi, to conduct a nationwide Talent Identification programme for Technology Development and to formulate a road map for the Nation for the decade of the '80s. Appointed chief Co-ordinator for this program, organized a national debate on Technology development in the Country culminating in a Conference held in March 1983 "**To Identify thrust Areas towards Excellence in Electronics and Technology for India**" (at Vigyan Bhavan, New Delhi). Proceedings of this conference published in an eponymous 600 page Report by the then Department of Electronics, which became an important reference document for country's many prestigious programs initiated in the mid 80s by the Government of India. Some of the recommendations made in this report included,
 - 1 Promotion of the Software Group from T.I.F.R. to form National Centre for Software Technology (NCST) in Mumbai, resulting in formation of the **Centre for Development of Advanced Computing (C-DAC)**
 - 2 Formation of OPTEL and Gallium Arsenide Facility under Ministry of Defence at Hyderabad was proposed in this report.
 - 3 Formation of **Advanced NUMerical Research & Analysis Group (ANURAG)** a facility for development of super computers under Defence Ministry.

Founder & CEO, Core Technologies

1987 – To Date

Technocrat, Innovator, Industry Expert

Consultant and Advisor To Govt. of India

Some of the Award Winning and Prestigious Projects Completed in Core Technologies,

- ◆ **High Speed Data Acquisition system for BARC** **1991**
As a fledgling company, successfully developed, a **256 Channel High Speed** (10 K Samples/Sec) **High Resolution** Data Acquisition System employing direct data streaming to PC Hard Drives and result presentation on PC screen. Product was placed 2nd in the **BEST IMPORT SUBSTITUTE** Category at **Wissitex Exhibition**, 1991, Mumbai. The system is still working after 22 years and has been of great help to BARC in its R&D activities pertaining to Reactor Dynamics.

- ◆ **High Speed Data Acquisition and Landing Gear Test Rig Automation System** for Light Combat Air Craft Project, Hindustan Aeronautics Ltd, R&D, Bengaluru **1993**
Developed a 106 channel Data Acquisition System to monitor temperature and stress parameters in the landing gear of Light Combat Aircraft (LCA). Successfully overcame challenges in storage of sheer volume of streamed data at 10 K Samps/Sec for over 210 seconds and in presentation of sorted results within 10 minutes of data acquisition on the PC screen (**No mean task by 1993 PC technology standards**). HAL has made good use of the system and is believed to be in fully working condition.
- ◆ **Check Weigher for Packaging Industry** **1994**
Developed the country's very first indigenously developed Check Weigher having a speed of **60 packs /min** at **±0.01% accuracy** for the Packaging Industry, in collaboration with Nichrome Metal Works, Pune. Won the **BEST PRODUCT OF THE YEAR Award** at Interpack exhibition, 1994.
- ◆ **Pharma Log and ValiDAQ - Products for Pharmaceutical Industry**
Developed special Data loggers for the Pharmaceutical Industry, conforming to US FDA Regulation 21 CFR Part 11 and WHO Norms for Pharmaceutical Formulations manufacturing. These products are being sold under the brand name Pharma-LOG and Vali-DAQ fully supported by two proprietary software packages, Scan-LOG and Vali-DAQ RGS. Unique and novel design of Instrumentation Amplifier with built-in 3-wire lead length compensation.
- ◆ **Loop Powered Wind Alarm Monitoring System for Konkan Railway** **1996**
Pioneering product developed for specific requirement of Railways to trip the Railway Signaling System, halt trains and alert station officers located at a distance of up to 15 KM of abnormal Wind velocity on bridges longer than 500 meters in length or 50 meters in height. Exclusively uses loop power technology to transmit wind velocity data over a 4 – 20 mA current loop with multiple stringent interlocks.

Other Achievements and Awards

During tenure at BARC was actively involved in various R&D Administrative Tasks such as:

- ♣ Chairman of Selection Committee for Graduate Engineers 1972 -1983,
- ♣ Member Internal Promotion committee for Scientist/ Engineers to grade SD/D
- ♣ Dean Faculty of Electronics Engineering , BARC Training School, 1970 – 1983
- ♣ Member Stores And Purchase Committee 1975-1983
- ♣ **Senior Member Directors Technical Advisory Committee 1978-83.** Committee constituted by Director, BARC to groom future leaders for Country's Nuclear program
- ♣ Member Technology Transfer Group in-charge of Electronics Technology Transfer to the Industry. (1975-1983)
- ♣ Appointed as Scientific Advisor to Prime Minister's Office 1981.
- ♣ Appointed as Liaison Officer to coordinate with Cabinet Advisory Committee, PMO.
- ♣ Contributed towards design of Barrel Shifter Hardware in VLSI design of Super Computer Chip ANUCO, and designed X.25 based front end processor using Motorola 68000 for the 64 node Parallel Processor developed by ANURAG, DRDO, Hyderabad, (1990-94).
- ♣ Invited to be on the prestigious board of Advisors to DRDO to help scientists diagnose issues in the feedback control system of components required in the Space Research Program. Met and interacted with the scientists at RCI to identify grey areas in characterization of critical control system components. At Core Technologies developed a characterization system involving highly complex real time calculations using 8 bit Embedded processors in 1995
- ♣ Founder member of Indian Physics Association.

- ♣ Has been a consultant to leading companies and Government bodies, notably DRDO, ANURAG, RCI, CDOT, IDEMI, NELCO, Bradma of India, Mahindra and Mahindra, Blue Star, Datamatics, Dynalog, Oriole among others.