

Thomas Alva Edison, American inventor 1847 – 1931.

Thomas Alva Edison (February 11, 1847 – October 18, 1931) was an American inventor and businessman who developed many devices that greatly influenced life around the world like the Electric Bulb and the phonograph. Dubbed "The Wizard of Menlo Park", he was one of the first inventors to apply the principals of mass production and large teamwork to the process of invention and therefore is often credited with the creation of the first industrial research laboratory.

Edison is considered one of the most prolific inventors of all times holding 1093 U.S. patents apart from patents in U.K, Germany and France. He is credited with numerous inventions that contributed to mass communications and in particular telecommunications. His advanced work in these fields was an outgrowth of his early career as a telegraph operator. Edison originated the concept and implementation of electric-power generation and distribution to homes, business and factories. His first power plant was on Manhattan Island, New York.

Edison's major innovation was the Menlo Park. Built with funds from the sale of Edison's quadruple telegraph, it was the first institution set up with the sole purpose of producing constant technological innovation and improvement. Edison was legally attributed with most of the inventions produced there though many employees carried out research and development under his directions.

Thomas Edison died on 18th October 1931 in New Jersey. Even though he was far from being a flawless human being and may not have the avuncular personality that was so often ascribed to him by myth makers, he was an essentially good man with a powerful mission...driven by a superhuman desire to fulfill the promise of research and invent things to serve mankind.

Schedule:

5:00 p.m.: Tea

5:15 p.m.: Lecture

About IEEE Student Branch NITW

"We have merely scratched the surface of the store of knowledge which will come to us. I believe that we are now a tremble on the verge of vast discoveries – discoveries so wondrously important they will upset the present trend of human thought and start it along completely new lines."

- Thomas Alva Edison

The IEEE student branch NIT Warangal is an active student member group of the IEEE Hyderabad section. Since its inception in the year 1972, it has been fuelled by the never – ending enthusiasm of the members and the vision of our counselors, towards the development of technology. In 2008, the student branch bagged 2 awards at the RIO level, the "Most Vibrant Student Branch" at the RIO Student Congress held in January 2008 at Chennai and the "Exemplary Student Branch Award" for the same year. And in 2009, our branch counselor Prof. D.V.S.S. Siva Sarma bagged the "The Best Student Branch Counselor Award" at the RIO level.



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IEEE STUDENT BRANCH NITW & HYDERABAD SECTION

PRESENT

The 3rd "Edison Memorial Lecture"

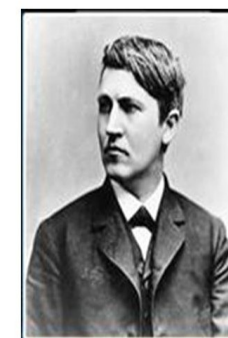
On

Impact of OFDM and MIMO Technologies on Wireless Communications

by

Prof. V.U.Reddy

(IIT hyd / Life Fellow of IEEE)



- **Date:** 11th February, 2010
- **Time:** 5:00 p.m.
- **Location:** NCH, NITW

 **IEEE**
Celebrating 125 Years
of Engineering the Future

“Genius is one per – cent inspiration and ninety – nine per – cent perspiration.”

In 1884, Thomas Alva Edison was a part of the first technical meeting of the AIEE (a new organization formed for to support professionals in their nascent field and to aid them in their efforts to apply innovation for the betterment of humanity – American Institute of Electrical Engineers) at Philadelphia. In 1912, the IRE (Institute of Radio Engineers) was established on similar lines for the development of radio and electronics. Through the leadership from these societies and the application of their members’ innovations to the industry, electricity wove its way into every aspect of daily life. Increasingly their interests began to overlap and in 1963, they merged into the IEEE.

To commemorate the contributions of this great innovator and inventor, the IEEE Student Branch NITW organizes an Edison Memorial Lecture every year on his birthday.

WIRELESS COMMUNICATIONS

Mobile wireless communication encounters non-line-of-sight (NLOS) propagation. While line-of-sight (LOS) propagation results in a single-path communication channel, NLOS propagation gives rise to multi-path communication channel. A multi-path channel is a frequency selective channel. Wireless communication also encounters fading, in addition to NLOS propagation. Because of multi-path propagation and fading, reliable communication and high bit rate transmission are very difficult to realize. OFDM (orthogonal frequency division multiplexing) converts a multi-path channel into sum of parallel single-path channels. It is well known that for a given transmit power, a linear memory less modulation achieves highest spectral efficiency, bits/Hz/s, in a single-path channel. Further, the modulator, demodulator and equalizer are simple in complexity with OFDM.

There is a growing demand for high data rate wireless systems. For example, video streaming of HDTV (high definition TV) data wirelessly demands data rates of the order of Gbps. Because of fading, a single-input single-output (SISO) communication system cannot provide these data rates even with OFDM. This motivated the development of multiple-input multiple-output (MIMO) wireless systems with multiple antennas at the transmitter and receiver. Information theoretic results show that MIMO systems achieve high spectral efficiency in rich multi-path environment leading to high data rates. A MIMO space time architecture developed by Bell Labs, called V-BLAST, achieves a significant portion of this capacity under fast fading. We can use multiple antennas for spatial multiplexing if increase in data rate is required, or for providing diversity order (diversity gain) if higher reach is required.

In this lecture, we will present the motivation behind OFDM and MIMO, discuss their impact and point out the challenges they pose.

The Speaker



Received B.E, M.Tech and Ph.D. (Electrical Engineering) from the Osmania University, Hyderabad, IIT Kharagpur and the University of Missouri in 1962, 1963 and 1971, respectively.

He held brief assignments with Bell Telephone Labs (Holmdel) and the University of the West Indies (Trinidad and Tobago) before returning to India in 1972. He was an Assistant Professor at IIT, Madras (1972-76), a Professor at IIT Kharagpur (1976-79), and a Visiting Professor at Stanford University (1979-82). Later, he joined the University as a Professor and Project Director of Research and Training Unit for Navigational Electronics (1982-88) (he was its founding Director). In March 1988, he moved to the Indian Institute of Science (IISc), Bangalore, as a Professor of Electrical Communication Engineering (he was the Department Chair during 1992-1995). After retiring from IISc in 2001, he held CTO and Chief Scientist positions with the Hellosoft India Pvt. Ltd., during 2001-2003 and 2006-2008, respectively, where his work was mainly focused on the design of WLAN and its enhanced version.

In March 1988, he moved to the Indian Institute of Science (IISc), Bangalore, as a Professor of Electrical Communication Engineering (he was the Department Chair during 1992-1995). After retiring from IISc in 2001, he held CTO and Chief Scientist positions with the Hellosoft India Pvt. Ltd., during 2001-2003 and 2006-2008, respectively, where his work was mainly focused on the design of WLAN and its enhanced version. During 2003-2005, he was Microsoft Chair Professor with IIIT, Hyderabad, where he started Wireless Communications Research Centre. Since July 2007, he is associated with IIIT, Hyderabad, as Institute Professor, and since May 2009, he is also associated with CR Rao Advanced Institute of Mathematics, Statistics and Computer Science, University of Hyderabad Campus, as Distinguished Scientist Emeritus.

He held several short-term visiting appointments with the Stanford University and the University of Iowa during 1986-1999, and spent part of his sabbatical during 1995-96 at the Research Centre Imarat, Hyderabad. During the last 37 years, he worked on several research projects funded by Defense Research & Development Organization (DRDO) and served as a Member and Chairman of several DRDO Project Review Committees.

His earlier research areas have been in adaptive and sensor array signal processing, and since last 15 years his research interests have been in physical layer design for OFDM based wireless systems and low complexity decoders for MIMO systems. His most recent interests are in blind modulation classification and MIMO Radar.

He was on the Editorial Boards of SADHANA (a Proceedings of the Indian Academy of Sciences), Indian Journal of Engineering and Materials Sciences, and Proceedings of the IEEE. He was the Chairman of the Indian National Committee for International Union of Radio Science (URSI) during 1997-2000 and Member of the URSI Standing Committee on Developing Countries during 1999-2002.

He is a Fellow of the Indian Academy of Sciences, the Indian National Academy of Engineering, the Indian National Science Academy and the IEEE. He received S.K. Mitra Memorial Award from IETE in 1989. He holds 2 US patents and 2 more are under process with Patent Office.