

Powering the future growth and prosperity of the UAE through a safe, clean, efficient and reliable civil nuclear energy program

مؤسسة الإمارات للطاقة النووية  
Emirates Nuclear Energy Corporation



## HISTORICAL ENGINEERING

# Happy B-day, Mr. Tesla

By Nenad Kolibas

This July, the world celebrates and reflects on the life and inventions of Nikola Tesla, the father of electricity as we know it today, on the occasion of his birthday.

Serbo-Croatian, American Scientist and Inventor Nikola Tesla, one of the greatest inventors of all time, was born July 10, 1856, in Smiljan, in the Austro-Hungarian Empire.

After studies at universities in Zagreb, Graz and Prague, and spending several years working in Hungary and France, Tesla immigrated to America in 1884. He arrived in New York with few material possessions and little money, but his creative mind and capacity to invent would lead him to make his mark in his new country and in history. Initially, Tesla worked very closely with Thomas Edison, however, differences in scientific approaches and methods quickly led the two to take divergent paths.

In 1882, Tesla made the discovery that changed the world by inventing the Alternating Current (AC). The patent rights were soon bought by George Westinghouse, thus precipitating a power struggle between the Edison's Direct Current (DC) and Tesla-Westinghouse's AC system. In 1888, Tesla obtained US patents covering an entire poly-phase AC system (i.e., generators, transformers, motors) that remains unchanged in principle today.

Tesla's system was used to light up the World's Columbian Exposition in Chicago in 1893. This success was a key factor in winning him the contract to install the first power machinery bearing Tesla's name and patent numbers at Niagara Falls.

Tesla soon established his own laboratory, where he experimented with shadowgraphs similar to those later used by Wilhelm Rontgen, who discovered X-rays in 1895. Countless experiments conducted by Tesla included work on the carbon button lamp, the power of electric resonance, and various types of lighting which resulted in the invention of neon and fluorescent lights.



Mr. Tesla, in front of his high frequency transformer in New York City

In 1898, Tesla performed the very first demonstration of the wireless remote control by navigating the tele-guided boat before a crowd in Madison Square Garden. Also, Tesla's basic radio patent was granted in 1900 (the design was initially stolen by Marconi, who attempted to patent it in the UK).

In his laboratory in Colorado Springs, Tesla made what he regarded as his most important discovery—terrestrial stationary waves. This discovery proved that the Earth could be used as a conductor and would be responsive, like a tuning fork, to electrical vibrations of a certain frequency. He staged the first demonstration of a wireless power transmission by lighting up 200

lamps without wires from a distance of 40 kilometers and creating artificial lightning that produced flashes measuring 41 meters. The latter demonstration has never since been replicated, and Tesla's relevant files mysteriously disappeared after his death.

Tesla's focus then shifted to turbines and other projects, and he later patented the bladeless turbine. Due to lack of funds, many of his ideas remained in his notebooks, which continue to be examined by engineers today searching for unexploited clues.

Rather poor and almost forgotten, Nikola Tesla died alone on January 7, 1943, in a New York hotel room. Today, he is recognized as one of the main founders of modern radio communications through the invention of inductively coupled resonant electric circuits and his patents for Tesla coil and radio tuning device. Most of his estate, including many of his notes, calculations and letters, are housed in the Nikola Tesla Museums in New York, Belgrade, and Zagreb.

In 1960, the Conférence Générale des Poids et Mesures honored Nikola Tesla by naming the International System of Units (SI metric system) for measuring magnetic flux density or magnetic induction (commonly known as the magnetic field) after him.