A Tribute to Albert A. Smith, Jr.

A collection of memories by leading members of the IEEE EMC Society

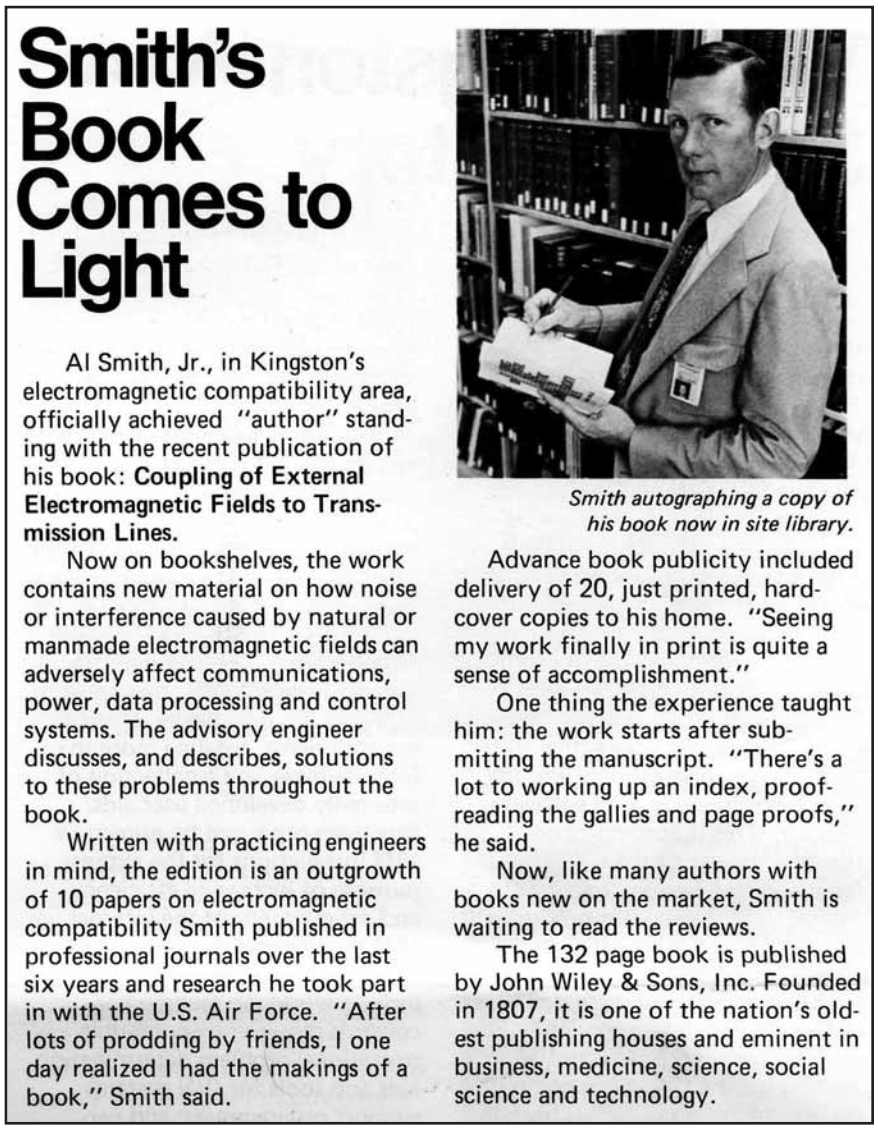
The IEEE EMC Society lost one of its most prominent members with the passing of Albert A. Smith, Jr. on July 30, 2006. Mr. Smith was not only a brilliant engineer, mathematician, and technical writer, but he also was able to use his extraordinary abilities to achieve practical and useful results. Although he is no longer with us, his accomplishments will be everlasting.

Albert A. Smith, Jr. received the B.S.E.E. degree from the Milwaukee School of Engineering in 1961 and the M.S.E.E. degree from New York University in 1964. From 1961 to 1964 he was employed by the Adler-Westrex Division of Litton Industries where he was engaged in the design of HF and Troposcatter communication systems. In 1964, he joined the IBM Corporation as a member of the Electromagnetic Compatibility (EMC) Laboratory in Kingston, New York. He transferred to the IBM EMC Laboratory in Poughkeepsie, New York in 1980, and returned to the Kingston EMC Laboratory in 1989, where he worked until his retirement in July 1991.

During his career at IBM, Mr. Smith performed theoretical and experimental investigations in areas such as wave propagation, field attenuation by buildings, antennas, radio noise, equipment calibration, radiated RF electromagnetic-field immunity, power and communication-line surge immunity, lightning effects, electromagnetic data security, TEMPEST, and the biological effects of non-ionizing radiation. As a senior engineer at IBM Poughkeepsie, he was responsible for the electromagnetic compatibility of IBM's large computer systems. He designed the IBM Poughkeepsie Open Area Test Site (OATS) for measuring electromagnetic radiation from large computer systems, the largest OATS of its kind in the world with a 50-ft diameter turntable, a 70 x 70-ft plastic building, and a 100 x 180-ft ground screen.

Throughout his career, Mr. Smith made fundamental contributions to the theory of the coupling of electromagnetic fields to transmission lines, the characterization of electromagnetic measurement sites, and antenna calibration. He also contributed to the development of national and international EMC standards.

A fellow of the IEEE, Mr. Smith was an associate editor of the IEEE Transactions on Electromagnetic Compatibility and past chairman of the IEEE Technical Committee on Electromagnetic Environments. Also, Mr. Smith served on the American National Standards Institute (ANSI) ASC C63 Subcommittee 1, Techniques and Developments, and Computer Business Equipment Manufacturers Association (CBEMA) subcommittee on Electromagnetic Compatibility, ESC-5. He was author of the books *Coupling of External Electromagnetic Fields to Transmission Lines* and *Radio Frequency Principals and Applications*. He was also coauthor, with Edward N. Skomal, of *Measuring the Radio Frequency Environment*. A member of Eta Kappa Nu, Tau Omega Mu and Kappa Eta Kappa, Mr. Smith published more than 20 technical papers.



Smith's Book Comes to Light

Al Smith, Jr., in Kingston's electromagnetic compatibility area, officially achieved "author" standing with the recent publication of his book: **Coupling of External Electromagnetic Fields to Transmission Lines.**

Now on bookshelves, the work contains new material on how noise or interference caused by natural or manmade electromagnetic fields can adversely affect communications, power, data processing and control systems. The advisory engineer discusses, and describes, solutions to these problems throughout the book.

Written with practicing engineers in mind, the edition is an outgrowth of 10 papers on electromagnetic compatibility Smith published in professional journals over the last six years and research he took part in with the U.S. Air Force. "After lots of prodding by friends, I one day realized I had the makings of a book," Smith said.

Smith autographing a copy of his book now in site library.

Advance book publicity included delivery of 20, just printed, hardcover copies to his home. "Seeing my work finally in print is quite a sense of accomplishment."

One thing the experience taught him: the work starts after submitting the manuscript. "There's a lot to working up an index, proofreading the gallies and page proofs," he said.

Now, like many authors with books new on the market, Smith is waiting to read the reviews.

The 132 page book is published by John Wiley & Sons, Inc. Founded in 1807, it is one of the nation's oldest publishing houses and eminent in business, medicine, science, social science and technology.

Al Smith, Jr., was a noted author in the area of electromagnetic engineering.

From the IBM files dated 1969 comes this promotional photo documenting one of the numerous articles and technical papers Mr. Smith published during his lifetime.

Upon retirement, Al Smith enjoyed playing golf with friends. Obviously, he enjoyed a good sense of humor too!

Remembering Al Smith by Robert F. German, German Training and Consulting, LLC

I met Al Smith in 1980, shortly after he began working at IBM Poughkeepsie. I was a member of the IBM EMC Laboratory in Boulder, Colorado and had been asked to characterize a recently built semi-anechoic chamber. After researching the various techniques that were being employed throughout the industry, I concluded that the best method to quantify the chamber's performance was to volumetrically measure its vertical and horizontal site-attenuation using biconical and log-periodic antennas, and compare the results to the theoretical site-attenuation of an ideal site. I had been able to determine the relative levels of the radiated fields versus frequency at the receiving antenna and the corresponding voltages at the receiver, but I was unable to calculate those fields from the voltage at the signal generator that was driving the transmit antenna. I discussed the problem with Al and he immediately offered that it might be possible to calculate the radiated fields using the antenna factor of a transmit antenna, measured while the antenna was used for reception.

The following Monday morning, Al called and said he had solved the problem over the weekend. He made it a point to mention that he had derived the necessary equations on his workbench in the garage, because the kids were playing in the house. To this day, I can still picture Al sitting at that bench and smoking his pipe while deriving those equations. Al's approach to calculating site-attenuation was clearly revolutionary and later was the basis for the volumetric site-attenuation measurement technique currently specified in ANSI C63.4 and European Norm (EN) 55022. Armed with this new site-attenuation measurement technique, Al then developed The Standard-Site Method for Determining Antenna Factors, the method for calibrating antennas from site-attenuation measurements performed on an OATS that is specified in ANSI C63.5.

I last spoke with Al in July 2005. He mentioned that he had recently considered writing a second edition of his first book, but had decided instead to use the time to refine his golf game. I was not surprised to hear this, since I knew that he was an avid golfer. But I had no way of knowing that it was the last thing he would tell me. The EMC community, as well as the entire engineering community, will sorely miss him.

Remembering Al Smith by James B. Pate, Lenovo Corporation

Although Al had a passion for electromagnetics and radio wave propagation, he found a second passion in golf. Golf was the elusive and unattainable challenge for perfection and mastery that Al pursued later in life. Al was constantly trying to find the right club and continued to work on improving his golf swing. Once on a business trip to Arizona, we played at a local municipal course in Tucson. He had to rent some clubs from the clubhouse, which were a fairly shoddy collection of mixed irons and woods. He played pretty well that day and putted very well with the rented putter in the bag. We both had flights to catch a couple of hours after the round. We started to pull out of the parking lot on the way to the airport, and Al asked me to stop while he ran back inside. Next thing I noticed, he was coming out of the Pro Shop with that putter in his hand. He bought it for $10 and hand carried it on the airplane that day (I don't think that would happen these days). He got so involved in trying to find the best equipment that he got into club making. He enjoyed building a new driver or a new set of irons or trying different combinations of shafts and heads. While he was editor of the IEEE EMC Transactions, I would review papers for him. Ultimately, our conversations would turn into discussions about the latest and greatest driver he had just built. It wasn't long before he called me and said he was writing another book. This time it was a golf book. I was a little surprised at that since Al was not a scratch golfer, and I wondered what he would write about. I found out later it was about how to be a club maker. This was so much in character because once Al figured something out he wanted to share his understanding of how it worked with others. I'm glad I had the opportunity to learn from him during our careers at IBM and most important-

ly to have been able to share our common passion for golf.

Remembering Al Smith by Donald N. Heirman, Don HEIRMAN Consultants

I remember Al's contributions to our ANSI ASC C63™ work in the late 1970's and early 1980's on open area test site validation and in particular the use of Normalized Site Attenuation that still is practiced today in validating test sites. I recall the time when he presented his work on how close a reflective object had to be to the measurement axis to affect the results. He was quite practical and in fact to make his point, he conducted an experiment where he had a pickup truck as I recall moved from far away and perpendicular to the measurement axis and then inched it closer and closer to the measurement axis. He did this until the received signal from the transmit point (on the center of the turntable where products were to be tested) altered the signal received at the receive antenna position. At the time, we all thought that such a large obstacle could be quite distant from the axis and still present a significant undesired reflector that would adversely affect the received signal. Well, that was not the way his experiment showed as the truck ended up close (I don't recall how close now) to the measurement axis before it made a significant difference in the received signal. So his show and tell made the point more than any calculation or modeling and that really impressed others and me on the committee.

From a young age, Al Smith showed the tremendous drive and high energy that propelled him to be a leader in his career at IBM and within the IEEE EMC Society technical community. His first job was being a newspaper delivery boy.

Another facet of his personality that made him unique was his dedication to his children. At the top of his technical standards contribution, his wife passed away and he pulled out of the standards work so that his spare time from his day job could be spent being "Mr. Mom" to his children. While I am sure that there are other examples of this devotion to family, Al's story is the only one I can relate to with such a sudden switch in "careers".

As the years wore on and the work on antenna calibration as well as test site attenuation continued, we missed his input to argue his technique first hand. I will always wonder how much more of a difference he would have made if he joined us in the international deliberations on these topics which are waging even today in the IEC/CISPR as well as C63™. But no matter how much is being done now, Al's seminal contribution in the early 1980's will live on. There are few that can have that statement made of them.

Editor's Note: Many thanks to Bob German, Barry Pate and Don Heirman for sharing their recollections on the illustrious life of Al Smith, Jr. The Newsletter is grateful for the support of Mr. Smith's daughter, Denise Wynters, and his son, Matthew Smith, who contributed the numerous photos shown in this article, and his brother, Raymond Smith, who shared his personal recollections on Mr. Smith's upbringing and career as below from his home in Australia. EMC

A Tribute to My Brother, Albert Aloysius Smith

by Raymond Smith

My brother Albert and I, and our parents, were all born in Yonkers, New York. For the first 18 years of our lives, we all lived in a one-bedroom apartment in a twelve family tenement house on Ravine Avenue, next to the New York Central railway line. We lived not far from the factory area on the next street up from Woodworth Avenue, where the famous engineer Mr. Otis from Massachusetts invented and manufactured the elevator which enabled the building of skyscrapers farther south in New York City. Our father, Albert senior, worked very hard and very long hours driving a truck. He and his older brother Jack started their work lives with the Ben Franklin Transport Company. It was a company that ran boats up and down the Hudson River (delivering loads of sugar and general freight). From bullock and horse drawn carts of the 19th century, the company then switched to trucks on the roads with the advent of mechanised road transport. Captain Peane, a devout Episcopalian, was a captain of the company's best ship and a principal of the company. Captain Peane lived near the famous Getty Square and was a member of the Saint John's Episcopal Church. Our father, Albert Aloysius Senior, and my brother, Albert Aloysius Junior, were named after the Pastor of Saint Joseph's Catholic Church on Ashburton Avenue by our Irish grandmother, Mary Smith, nee Mary Cary. (Saint Joseph's church was instrumental in founding the monastery Church of the Sacred Heart around 1890.) Our father started as a non–driving helper, working alongside his older brother Jack, during the Depression years. He delivered reels of copper cable to New York City, the veins of a growing and throbbing metropolis. Our father put a million miles on the roads around New York before dying of lung cancer, as did his father, a year after retiring.

My brother Albert had a mathematical ability - bordering on genius level - which was backed up by an extraordinarily high IQ. This was not sufficiently recognised until he joined the Navy at age 18 when they tested recruits and discovered that Albert's ability was outstanding. They sent him off to the

radar/sonar training center where his hands-on background with things electrical was firmly established. After his stint with the Navy as a technician, Al enrolled as a college student. I can remember his continuously outstanding academic results; he seldom got less than an A grade for any of his courses, even when studying an exotic subject like the Russian language. Not only did he achieve the highest grades of any student who previously attended the school, but also he was chosen to give the Valedictorian address. I just wish I had a copy of it now after fifty years to read his idealistic sentiments.

When he was a high school student, my brother Albert was obviously bored and took little interest in the pedestrian pace of the crowded classroom that often pitched its studies to the middle and lower end of the intellectual spectrum. At the end of the school day he would chuck his books into his locker with no intention of doing any homework. I envied his ability, however, as I was a grind who achieved high grades in the same high school a few years later but slaved over my science and mathematics texts for hours every night.

But Albert was more than a mathematical genius. I remember once seeing him reading a book when he was thirteen years of age. I asked him what it was. It was a book of plays by Shakespeare. He was reading it out of interest. When other kids were thinking about football or baseball, Albert was drawing electrical circuits and repairing our neighbour's radios. Evidence of his electrical circuit diagrams was uncovered when I was cleaning out the attic of our mother's house in Yonkers a few years ago.

When we were boys, my big brother Albert was a great fishing enthusiast. He spent many hours fishing for eels, bullheads and perch in the Hudson River. He even kept a diary of all of his catches for 1947. His favorite fishing spot was Electrical Pole 383, which unfortunately no longer exists as a signpost on the river. This I sadly discovered when I went looking for it on a nostalgic trip to Yonkers a couple of years ago.

One of the photos of Albert in this article is as a paperboy for the Yonkers Record, a paper that people subscribed to in order to check the "numbers." The "numbers" were the horse racing results of the previous day. Many of our neighbours were addicted to racing and betting and needed to check daily for winnings. Albert's dedication to the faithful delivery of the paper won him the distinction of being voted the best paperboy in the system. It was obvious that Al was going to work his way out of a poor neighbourhood one way or another.

In concluding, I would just like to thank God for a brother who was not only taller than me at six foot three inches but who had a towering high intelligence that he applied in advancing the field of electrical engineering. It wasn't just his outstanding work at IBM, an iconic American and international company. It wasn't just the books he wrote in the field of electrical engineering or his work with the editorial staff of prestigious journals that is inspirational, but he was greatly committed to his family. After his wife died, Albert dedicated himself to his two children, Denise and Matthew, who he guided into useful, prosperous, and happy adult lives. Being a single parent is a no mean accomplishment. We cannot ask more of a man than to contribute as he has. He advanced the scientific and engineering community and the world is richer for it. He was a dedicated father and the world is richer for it. Thank God for his contribution. And, while at it, ask God to reward him. EMC