

2006 Peter Mark Medal Presentation

THE 2006 Peter Mark Medal for Outstanding Contribution to Electromagnetic Launch Technology has been awarded to Mr. Alexander Zielinski of the Propulsion Science Branch of the Army Research Lab, Aberdeen, Maryland. The award was presented by Dr. Harry D. Fair on behalf of the EML Permanent Committee at the 13th International Symposium on Electromagnetic Launch (EML) Technology, held on May 22–25, 2006, in Berlin, Germany.

The Peter Mark Medal, initiated in 1983, is named in honor of the late Professor Peter Mark, solid-state physicist and electrical engineer from Princeton University whose enthusiasm, intelligence, and vision helped contribute to the initiation of the U.S. program on electromagnetic launch technology. In addition to his participation in the development of the initial proposal to the Department of Defense, Professor Mark's early contributions as one of the founding members of the U.S. National Advisory Panel on Electromagnetic Guns and Launchers and his technical insight provided inspiration and direction for the emerging research program.

Mr. Zielinski was awarded the 2006 Peter Mark Medal in recognition of his outstanding contributions to the science and technology of electromagnetic launchers. He is internationally recognized as an expert in pulsed-power technology, solid-armature railguns, integration of tactical vehicles, innovative diagnostic techniques, and modeling. His enthusiasm, persistence, and careful experimentation have been the cornerstone of the U.S. Army program. Mr. Zielinski has been vital in maintaining support and direction for the Army's program in electromagnetic launch technology.

Mr. Zielinski was introduced to the concept of electromagnetic propulsion during his sophomore year at New Jersey Institute of Technology (NJIT). Under the tutelage of Drs. Fair, Peter J. Kemmey, and Thaddeus F. Gora at Picatinny Arsenal, New Jersey, he quickly developed a passion for this technology that still thrives in him today.

After graduating from NJIT with a B.S. in electrical engineering in 1986, Mr. Zielinski enthusiastically accepted employment at the U.S. Army Ballistics Research Laboratory (BRL). During the early 1990s, the BRL was combined with other similar organizations into what is now known as the Army Research Laboratory (ARL). Today, Mr. Zielinski leads a team of researchers within the Propulsion Science Branch of ARL on projects in electric armaments, solid-armature contact transition, materials, and computational electrodynamics. His expertise in the area of electric armaments technology has brought national and international recognition to Mr. Zielinski and the ARL.

Several important advances in the investigation of electric propulsion have brought Mr. Zielinski recognition. His approach for analyzing complex, transient behavior with unique diagnostics and instrumentation is well known in the community. The most notable techniques developed include an interferometric technique to measure rail displacement, a pressure transducer adapted for the electrothermal (ET) plasma environment (for which he and co-investigator Dr. John Powell received the Best BRL Technical Report award in 1992), and an infrared thermographic technique for pulsed-conductor thermophysical behavior. Mr. Zielinski complements and corroborates his experimental findings with considerable use of numerical analysis.

Mr. Zielinski has developed several methodologies for assessing the system effectiveness of the electromagnetic railgun. He integrated the design of the solid armature with the flight vehicle, and most recent programs utilize some or all of his methodology to develop programs that lead to challenging demonstrations. Most notable among these are demonstrations of non-transitioning, lethal launch packages at 2.4 km/s, launch of a high-explosive payload from a railgun, and successful large-caliber tests executed in the U.K.

Mr. Zielinski has also been a major contributor to the evolution of electric armaments for the conventional ballistics community. In the early 1980s, railguns launched nonaerodynamic bodies in indoor facilities. Mr. Zielinski established the EM Facility at the Transonic Experimental Facility located at Aberdeen Proving Ground, Maryland. Over the past decade, Mr. Zielinski has been proactive in upgrading the EM Facility's energy storage and instrumentation capability to support an ever-growing demand from the ballistics community to produce weapon-level performance from railguns. Mr. Zielinski is the first and only researcher to conduct an accuracy test of an electromagnetically-launched round. Mr. Zielinski managed on-site contractors, students, and Government range personnel to provide ARL with the distinction of being the first and only U.S. facility to launch and fly a tactical configuration at significant range.

Mr. Zielinski has collaborated on experiments and journal articles with established, world-renowned researchers from the Institute for Advanced Technology (IAT), Science Applications International Corporation (SAIC), and the Center for Electromechanics (CEM) of The University of Texas at Austin. He is a regular contributor to the IEEE International EML Symposium, the Electric Launcher Association, and the International Symposium on Ballistics. Articles have also been published in the *AIAA Journal of Spacecraft and Rockets* and the *Journal of Applied Physics*. Mr. Zielinski has produced over 100 publications in the field of electric armaments, with over half in refereed journals.



Dr. Harry D. Fair (left) presents the Peter Mark Medal to Alexander Zielinski.

Mr. Zielinski maintains his passion for electric armaments and has investigated novel applications of non-railgun operation. A unique pulsed air-core transformer for igniting propelling charges in a large-caliber conventional gun was developed. A key feature of this work involved minimizing the hazard for spurious ignition. The work relied on significant theoretical, analytical, and experimental studies. More recently, pulsed inductor design and fabrication expertise was exploited under an advanced survivability program.

As a result of Mr. Zielinski's efforts, a greater fundamental understanding of the operation of electromagnetic launchers is now available and is being used to progress applications throughout the armed services.

HARRY D. FAIR, *Chairman*
International EML Symposium Committee