

*2013 Ammunition Hall of Fame Inductee*  
**DR. JOSEPH A. LANNON**



Dr. Joseph A. Lannon was not a uniformed Soldier; however he dedicated his career to pursuing the ideals of the Ordnance Corps and improving weapons and ammunition for the Warfighter. With his quiet and unassuming manner, he accumulated a host of achievements in support of our Warfighters. He plied his own unique blend of scientific and leadership abilities in developing weapons and munitions tempered by his love of his chosen profession to provide better tools of war and a safer environment for those Soldiers who accept the ultimate challenge to wield those tools.

Early in his career, Dr. Lannon leveraged his talent as a freshly minted PhD and focused on research and development (R&D) as applied to conventional weapons and munitions. When Dr. Lannon began his career as a Research Chemist at Frankford Arsenal, PA, he started in small arms armaments in June 1966 working in the laboratory on ignition and combustion of gun propellants. He was recognized for publications devoted to scientific knowledge and principles to advance the understanding of ignitions of propellants in the gas phase. Among early examples of his achievements, he was acknowledged by the White House Office of Science and Technology for his work on explosives and munitions detection. He was elected to the 1970 edition of the Outstanding Young Men of America for his outstanding work as a research chemist. He continued to work and share his accomplishments by publishing his research in the *Journal of Chemical Physics*, the *Journal of Molecular Spectroscopy*, the *Journal of Ballistics*, *Spectrochimica Acta*, *Combustion and Flame*, and others. He was commended for contributions in the science of increased firing accuracy, improved logistics, and reduced gun barrel erosion in papers he authored on the “Effect of Chrome Plating on the Wear Characteristics and Ballistic Performance in the 155mm Artillery System;” on “Wear Additive Optimization Studies for the High Zone charge in the 155mm Artillery System;” and “An Evaluation of a Wear Additive Placed Into the Propellant.”

In 1977, Dr. Lannon demonstrated his commitment to the Warfighter by foregoing other career opportunities when Frankford Arsenal closed. Instead, he transferred to Picatinny Arsenal to carry on his work and continued to thrive. During his early time at Picatinny, Dr. Lannon was instrumental in doing propulsion work on ammunition including 105mm and 120mm tank systems. This included interior ballistic calculations, propellant selection and optimization, and igniter optimization. He served as chairman of the Armament Research and Development Command (ARRADCOM) Wear and Erosion Team in which he developed the Gun Barrel Wear and Erosion program. Through it, he assessed the role of propellant and rotating band on wear in large caliber gun barrels and developed/tested wear resistant coatings and liners. He led a team effort in a project that resulted in a validated cost saving of over \$1 million in FY82 for changing the wear reducing liner in the M724A1 round.

Up until 1981, Dr. Lannon’s work as a research chemist was recognized by promotions up to the GS-14 level in a non-supervisory capacity. In 1982, he crossed over into leadership as

a Supervisory Chemist in the Gun Propulsion Branch. He combined leadership responsibility for 90 employees with his technical skills. Through his diligence and managerial acumen, he advanced the science in wear and erosion by hosting international symposia. He directed actions necessary to prepare the first insensitive munitions policy for the US Army. This technical policy became the basis for a tri-service policy approval for the Joint Ordnance Commanders Group. In 1991, he led the Army effort to identify a taggant that would not affect explosive properties, but can be used to tag explosives to detect them with existing sensing devices. This enabled the US to sign an international agreement to tag specific classes of explosives and prevent terrorists from using them on commercial aircraft.

In March 1991, Dr. Lannon was honored for his accomplishments by being selected to the Senior Executive Service as Director of the Energetics and Warheads Division (EWD). In this position, he was responsible for life cycle engineering including research, exploratory/engineering development and product improvement in propellants and propelling charges, explosives, pyrotechnics, pyrotechnic devices, and warheads to advance lethal and survivable weapons systems. He led 220 employees and managed \$150 million worth of facilities and \$100 million of scientific equipment. Dr. Lannon invested over \$27 million facility and lab equipment modernization. He transitioned numerous technologies in energetic materials and warheads from tech base programs to engineering development for munitions and missiles that enabled the US Army to maintain lethality on the battlefield. He chaired the Ordnance Sub-panel for DOD Weapons Reliance Program developing joint projects with the other services in energetic materials and warheads. He served on the review panel for DoD/DoE Block program on energetic materials and transitioned technology from DoE to our Army laboratory.

In July 1996, Dr. Lannon was named Director of the Warheads, Energetics and Combat-support Armaments Center (WECAC). His primary mission was developing, managing, and executing programs in propellants and propelling charges, explosives, pyrotechnics, pyrotechnic devices, warheads and their manufacturing techniques, munitions packaging, materials, pollution prevention/abatement, technical and engineering support of production/fielded items, and demil technology. He led a team of 550 employees with over \$200 million of laboratories and experimental facilities and scientific equipment in excess of \$150 million. During his tenure, over 70 of his employees received Army R&D awards. He invested over \$20 million in facility upgrades and \$30 million in new scientific equipment. He was responsible for type classifications/material releases of over 30 weapon systems. He established the Defense Ordnance Technology Center (DOTC) formerly known as the Warhead and Energetic Technology Center (WETC) whose purpose was to develop goals and objectives in ordnance technology using resources of the partners to help accelerate fielding of advanced energetics, warheads, and fuzes. He served as Reliance Weapons System Panel Chair from 2001 until 2003 to coordinate all DoD programs on conventional and directed energy weapons systems. He provided the Defense Technology Assessment Plan, and tech reviewed weapons programs to avoid duplication and generate cost savings across DoD.

In October 2003, Dr. Lannon was appointed as the Senior Technical Executive for the Armament Engineering and Technology Center (AETC). In addition to energetics, packaging and environmental missions, Dr. Lannon now was in charge of formulating, guiding, and managing research, development and engineering efforts in all conventional weapons and

munitions systems, fire control, and fuze and precision armaments at ARDEC. He managed and directed over 1,800 employees and was responsible for a budget of over \$159M. He managed over \$400 million worth of facilities and scientific equipment in excess of \$220 million. He invested \$15 million in improving facilities and \$20 million in upgrades to lab equipment. He had 13 armament systems type classified and 18 armament systems released to IRAQ. He introduced the use of modeling and simulation (M&S) in munitions design to eliminate iteration, building and testing. In doing so, optimizing a design which took up to 12 to 18 months was reduced to 3 to 6 months. M&S had also allowed new warhead designs involving unique shapes to be constructed that would otherwise be difficult to conceive. This enabled designs with a better than 75% increase in lethality. Dr. Lannon had warhead designs incorporated into Tube-launched, Optically tracked, Wire command-link (TOW) guided missiles; Hellfires; Javelin; Sense and Destroy Armor; Wide Area Munitions; and other designs for combat system munitions. He directed that computer-designed warheads be linked with in-house model-based controlled fabricating machines whereby prototypes were built to live test against real targets. These techniques were applied to designing and model-controlling the manufacturing process for new energetic material formulations and munitions packages and have enabled higher energy insensitive energetic formulations to be developed and fielded, as well as lighter and less bulky munitions packaging.

Dr. Lannon always cared about his people. As the ARDEC Champion of Human Resources for over 15 years, Dr. Lannon established strategic management plans with goals and objectives for hiring, training, educating, rewarding, and retaining his workforce. His efforts led to the hiring of over 800 scientists and engineers mostly to succeed our retiring workers; that new hire workforce had a retention rate of over 95%. He received the DoD Gold Medal for the Acquisition, Technology and Logistics Workforce Development Award for employee training and education in 2005 and 2009. He reorganized middle management positions, eliminating layers and use integrated customer product teams to reduce development time and costs while empowering junior engineers. He introduced and helped lead the integration of Lean Six Sigma (LSS) in 1999 where he emphasized the importance of learning about and establishing processes for fact-based decisions and continuous improvement. By instituting LSS, ARDEC increased manufacturing start-up product yield for new artillery munitions explosives from 13% to over 80% and reduced production costs by over \$35 per pound. Using LSS, ARDEC had Value Engineering savings of about \$100 million and \$3.3 billion cost avoidance since the program began.

Dr. Lannon accomplished implementation of physics-based model prototyping capability which allowed the retention of critical process knowledge, enabled process scale-up and expansion of the manufacturing base, and enhanced the ability to rapidly respond to contingency and emergency needs. Technologies developed under this program had a 50% reduction in design lifecycle time and a 30% reduction in design cost. Dr. Lannon set up an in-house team to produce the Modular Crowd Control munitions (3,000 items) for emergency release to Bosnia when industry had trouble with production. This resulted in an on-time release to Soldiers going into harm's way. Dr. Lannon was also heavily involved with the process for recycling materials from obsolete munitions. When the US stopped producing TNT because of environmental issues, stockpiled TNT was used to fill the need. When that was depleted, a process was developed in-house to recycle TNT from obsolete munitions just in time to load Air Force bombs to support

the wars in Afghanistan and Iraq resulting in a cost saving of over \$50 million. He was also an essential proponent for the emergency release of the latest decoy flares that protect aircraft from infrared seeking missiles during the Afghanistan and Iraqi wars.

Dr. Joseph Lannon assumed the role Director for the Armament Research Development and Engineering Center (ARDEC) in September 2005. He managed over 3,600 people, 64 labs, 800 buildings, and a budget of \$1 billion. Dr. Lannon built ARDEC into a world-class workforce to execute and manage integrated life-cycle engineering processes required for the research, development, production, field support and demilitarization of munitions, weapons, fire control and associated items. These items represent over 90% of the Army's lethality capability. The results have been outstanding. Since 2005, ARDEC has invested \$200 million in state-of-the-art R&D facilities/equipment. It was won 34 Army R&D Achievement Team Awards with 112 individual recipients. ARDEC facilitated the fielding of 107 new systems, to include 68 full materiel releases and 89 urgent materiel releases on those systems to meet the needs of our Warfighters. ARDEC has won 17 out of 50 possible awards in the Army Greatest Inventions competition since FY05. Warfighters play a major role in selecting these winners. ARDEC won the Large R&D Laboratory Award four times since 2004. The organization became a world class, role model organization in November 2007 when President George W. Bush and Commerce Secretary Gutierrez announced that ARDEC was the first federal recipient of the prestigious Malcolm Baldrige National Quality Award in the non-profit category for organizational performance excellence.

During his tenure from 2000 until retirement, Dr. Lannon directed the construction of the following: Davidson Advanced Warhead Development Facility - \$11.7M; Armament Software Engineering Center - \$15.5M; Precision Armaments Lab for sensor development - \$8.8M; High Energy Propellant Formulation Facility - \$17.7M; Pyrotechnic Research and Technology Complex - \$9.9M; Soft Recovery System for up to 155mm, High G test munitions/components - \$9M; and the Explosives R&D Loading Facility - \$8M.

Dr. Lannon was a champion of Army values. Along with encouraging ethics frequently, he led by example. The example that he set was embodied in his own discipline, best described by the statement that "he was a disciplined gentleman." He was at work at 0400 hours each morning and stayed late. Meetings started on time; emails were answered in incredible short order. Yet he was amazingly approachable and friendly. His ethics and loyalty emanated out of this discipline which was a natural byproduct of the order of his life. His behavior spoke much louder than his words and said that he was a responsible and ethical man who expected nothing less from his workforce.

Dr. Lannon retired in July 2010. He served his country with distinction for over 44 years. Dr. Lannon was prolific in his research. Throughout his career he published over 40 articles in open literature and presented over 100 times at scientific meetings. From his vantage points in the laboratory to his positions of leadership, he dedicated his life with character and humility to the challenge that is the Warfighter. He has helped us shape that challenge through products and services that instilled confidence, reassurance, and dominance on the battlefield.