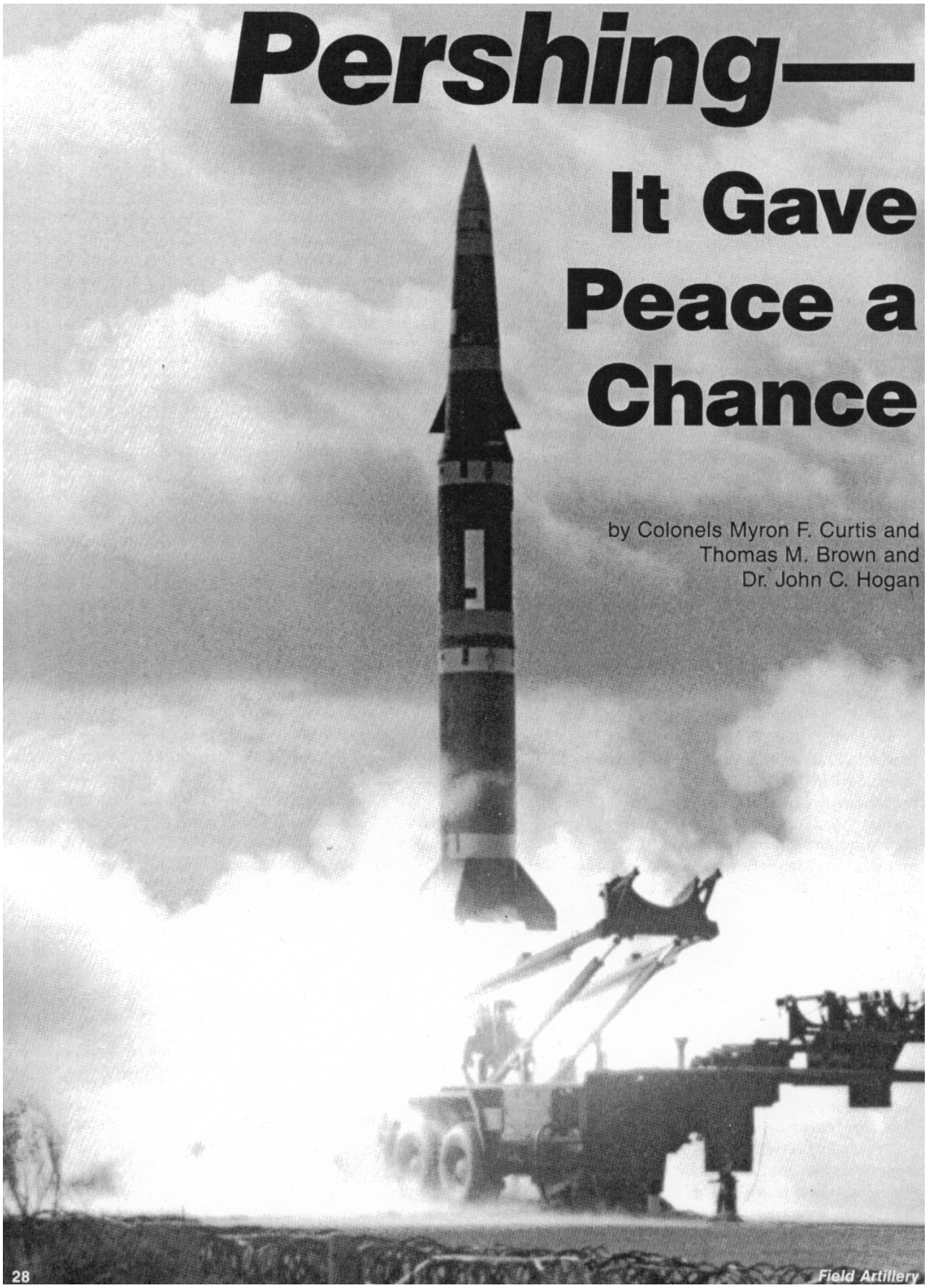
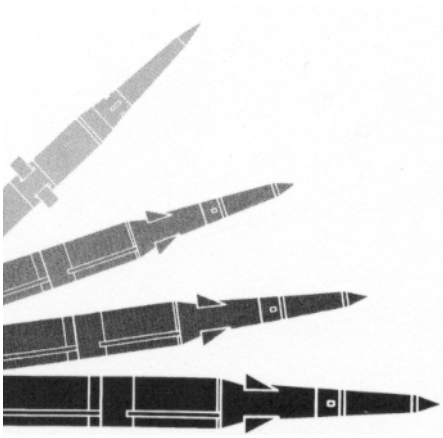
Pershing—

It Gave Peace a Chance

by Colonels Myron F. Curtis and
Thomas M. Brown and
Dr. John C. Hogan

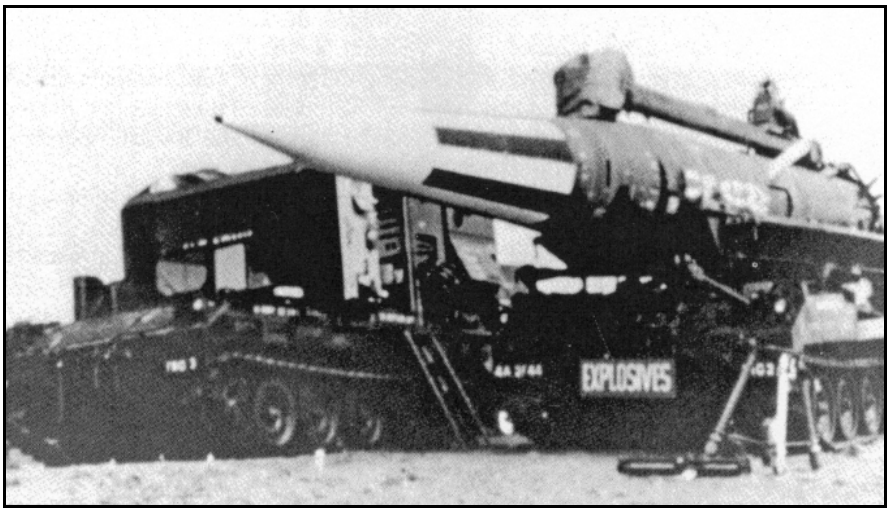




In 1991, the US and our Ally Germany will destroy the last of the Pershing II missiles in compliance with the 1987 Intermediate-Range Nuclear Forces (INF) Treaty. The Pershing's awesome lethality and remarkable precision drove the Soviets to the nuclear arms control negotiating table.

And though the Pershing's days are numbered, its successful development in a short time, unique tactical testing and the spin-offs of its technological advancements will impact developing land-mobile missile systems for years to come.

Until the last Pershing II is destroyed, the quality and professionalism of the soldiers who man the system will make it one to be reckoned with.



The early Pershing I missiles were built around the M-474, a fully tracked, modified M113 armored personnel carrier.

Pershing's History

At the end of World War II, war as it was fought for thousands of years was changed forever. With the dawning of the nuclear age, mass destruction was an instant possibility.

The ability of a country to build up large stockpiles of men and equipment to launch cross-border attacks was seriously jeopardized. With the advent of modern missile systems, the massing of troops and equipment was no longer practical.

By the mid-1950s, the US Army was equipped with such missiles, but they were liquid-fueled, large and cumbersome. But new technologies already were emerging that would make future systems better adapted to the battlefield environment.

In January 1958, the US Army was directed to proceed in the development of a solid-propellant ballistic missile to replace the liquid-fueled Redstone missile—the beginning of the Pershing program. Earlier missile systems largely had been developed in-house by the government. But this time, the Army teamed with a civilian contractor to take advantage of the expertise.

The Glen L. Martin Company (now Martin Marietta Missile Systems), Orlando, Florida, was selected as the prime contractor for the new Pershing system in March 1958. The goal of producing an accurate, cost-effective weapons system in a minimum amount of time was of paramount importance to the partners in the early development efforts.

One primary concept for the Pershing program was to minimize flight test failures on the premise that it was easier (and cheaper) to make repairs on the ground instead of "in the air." With this objective came thorough testing of the many parts before integrating them into a complete missile. This attention to detail enabled the first successful test firing of a Pershing missile on a ballistic trajectory on 25 February 1960, just short of two years after the initial contract was signed. **Pershing I.** In 1962, the first operational Pershing battalion was activated at Fort Sill, Oklahoma. Its mission: to organize and train and field test this new system. Since the nose of a Pershing warhead fits neatly inside an old fashioned pickle barrel, the goal of the new battalion was to put every test missile launched "into the pickle barrel"—a lofty goal.

The early Pershing (PI) system was built around the M-474, a fully tracked, modified M-113 armored personnel carrier. It was believed this system would be mobile enough for the Pershing to go any where the field Army deployed. The Pershing firing platoon included a warhead carrier, fire control computer, power station and tropospheric communications system mounted on an M-474.

The system could move overland or could be transported on helicopters or in cargo aircraft. The unique mix of mobility, long-range and warhead lethality gave the commander an unprecedented increase in firepower to focus on enemy forces to a depth of up to 700 kilometers (about 430 miles) in front of the forward line of own troops (FLOT).

The initial deployment of the US Pershing battalions to Europe was in 1964. Within months, the Secretary of Defense directed the Army upgrade the capabilities of the Pershing system to assume the mission of a theater quick reaction alert (QRA) force. The battalions

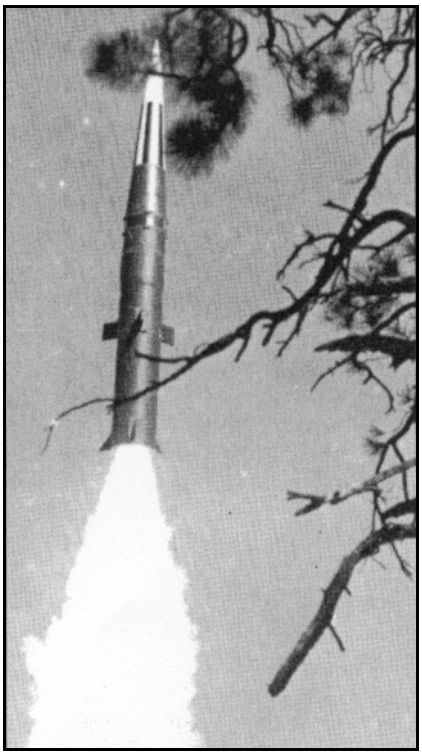
were to provide short-notice nuclear fire support on high-priority targets assigned by the Supreme Allied Commander in Europe (SACEUR). This was decisive in the development and fielding of the improved PIa system.

The PIa was the first of many upgrades to the Pershing system. Major modular improvements were made to the ground support equipment. Increasing the number of launchers from eight to 36 per battalion improved total firepower. These improvements significantly increased the maintainability, mobility and reaction time of the system.

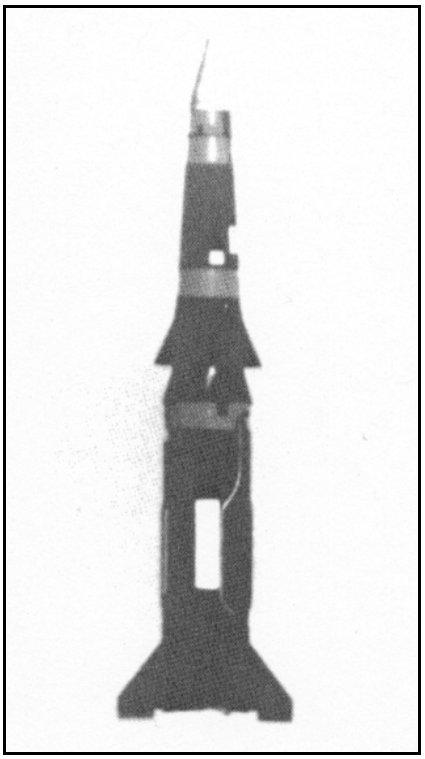
In 1964, West Germany agreed to buy the Pershing under the Military Assistance Sales Program. They bought enough PI hardware to equip two Pershing wings in the German Air Force. (A wing is comparable to a US battalion.) The German wings reached full readiness status in 1966. Through the years, the Germans have participated in all major modular improvements to the Pershing. In 1971, the German Air Force changed from the PI to the improved PIa system.

Both US and German units have participated in test firings assessing quality, reliability and safety since the beginning of the Pershing program. Both airlifted Pershings from the field to US test ranges at the Kennedy Space Center in Florida and the White Sands Missile Range in New Mexico.

Evolutionary improvements continued throughout the 1970s with the introduction of the automatic reference system (ARS) that automatically aligned the missile's on-board inertial reference system, eliminating the requirement for pre-surveyed missile firing sites. The sequential launch adapter (SLA) allowed countdown and launching of up to three missiles without moving the fire control computer, power station and cables. These improvements significantly reduced reaction time and increased the system's pre-launch survivability (PLS). **Pershing II.** In December 1979, the US made a major commitment to our NATO Allies in the Dual-Track Agreement in which they committed to improve the long-range theater nuclear force to counter the increased threat from the Soviet SS-20 missiles and Backfire bombers. This agreement called for modernizing the Pershing system and developing the US Air Force ground-launched cruise missiles (GLCMs) while continuing nuclear arms control and elimination initiatives. The Agreement brought about the Pershing II system.



An early Pershing I missile firing at the Kennedy Space Center in Florida.

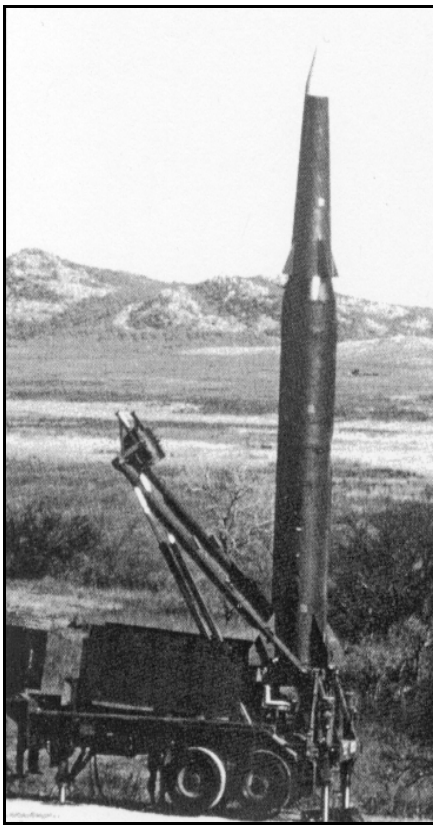


A Pershing Ib being launched. This missile was as accurate as the Pershing II.

In 1964, West Germany bought the Pershing missile system to deploy with US forces in Germany. The German Wings (comparable to US Pershing battalions) reached full readiness in 1966.

Improved missile motors and the change from an inertial guidance system to a highly accurate radar area correlation guidance system produced a missile system with considerable built-in flexibility and increased potential to fly a wide range of missions. With an increase in range from the PI's 740 kilometers to 1,800 kilometers, a 10-fold increase in accuracy and selective warhead yield and greatly reduced emplacement and displacement times, the Pershing II was a formidable threat to any potential enemy.

The fielding of the PII in Europe gave the commander, for the first time, the ability to rapidly strike deep into the enemy's rear operational area with enough destructive force to desynchronize the forward movement of the rear echelons. The PII's pinpoint accuracy could surgically destroy hardened point targets. Such devastatingly precise nuclear strikes would cause forward movement to grind to a halt with the PII destroying units and disrupting logistics and communications. These capabilities, coupled with



Captain Dave Drummond

A Pershing II at Fort Sill, Oklahoma. The missile's fielding gave the commander the ability to strike deep with enough destructive force to desynchronize the enemy's rear echelons.

the PII's ability to penetrate all known air defense systems, were instrumental in forcing the Soviets to the arms reduction negotiating table.

The future of the PII missile system is now measured in months. On 8 December 1987, President Reagan and General Secretary Gorbachev signed the historic INF Treaty that requires the total elimination of the Pershing II missile system be completed in 1991. However, the advanced missile system technologies, innovative management programs and integrated support systems developed for the Pershing will influence existing and future land-mobile missile systems well into the 21st century.

Innovative Technologies

Since the beginning of the Pershing program, modular flexibility was a design requirement for the system. Because of the ever-changing tactical and political demands on the field commander, the ability to tailor his response to a threat is critically important.

Some innovative technologies were tested using the Pershing system. Though not all of the hardware has been produced, enough analyses have been completed to assure the capabilities are available for other applications as the need arises.

Nuclear earth-penetrator warhead. This warhead penetrates deep into the earth before exploding and destroys the target with minimal collateral damage. It can neutralize point targets, such as airfields; dams; command, control and communications complexes; or hardened missile sites. Advanced testing of the earth-penetrator components has proven the technical viability and tactical value of this warhead.

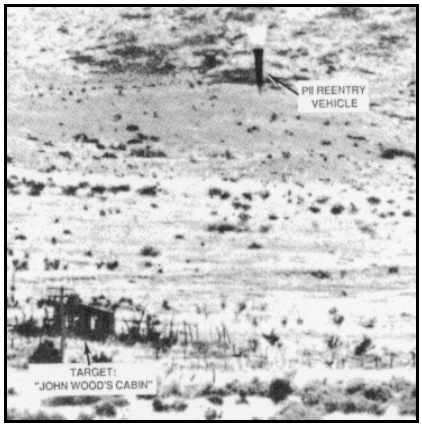
Single-Stage Missile. A variation of the PII missile that was tested extensively is the PIb, a single-stage missile designed to use the PII first-stage solid-propellant motor and the PII re-entry vehicle. This option can give us a missile with a range of 740 kilometers, (the same as the PIa) but with the highly accurate terminal guidance capabilities of the PII.

Another variant is the PIc, a single-stage, terminally guided missile that uses a modified PII second-stage, solid-propellant motor and the re-entry vehicle. The PIc has a maximum range of about 400 kilometers with the same accuracy as the PII.

Before implementation of the INF Treaty, the PIc variant was a candidate for replacing the aging Lance missile system. Though the PIc was never test fired, the concept of using missile components in a mix-and-match fashion to achieve specific battlefield capabilities is being considered for future systems.

Anti-Satellite Technology. Looking into the future even farther, the Army is evaluating the possibility of using the Pershing guidance technology in an anti-satellite role. As originally envisioned, a low-cost anti-satellite system could have been developed using the existing PII missile motor sections with modified guidance and warhead sections.

But under the provisions of the INF Treaty, all PII solid-propellant missile motor sections are being destroyed under the watchful eyes of Soviet INF Treaty inspection teams on-site. Still, using missiles not limited by the INF Treaty and the PII guidance technology can give the US a ground-based, quick reaction, anti-satellite missile system to destroy enemy satellites that are surveillance threats.



A Pershing II warhead landing with pinpoint accuracy.

Pershing Personnel

As important as the hardware is, the people are what made the Pershing the deterrent it has been during the years. Without the professionalism and dedication of people—from the deployed forces to the rear most supply clerk in the continental US (CONUS)—the Pershing II system wouldn't have been effective, regardless of its technological capabilities.

The 56th Field Artillery Command is the US forwardly deployed unit charged with manning and maintaining the PII missiles in the NATO area. Battalions are at Schwaebisch-Gmuend, Heilbronn-Neckarsulm and Neu Ulm, Germany. With a dual mission and dual chain-of-command, this highly complex organization stays constantly combat-ready with its remaining PII missile force standing alert at all times.

The mission of the 56th Field Artillery Command is to be prepared to execute its portion of the SACEUR Scheduled Plan in one of two forms. During peacetime, several firing batteries always are standing QRA, covering assigned targets in the Warsaw Pact and Western USSR. The other firing batteries rotate through a maneuver, maintenance and pre-alert cycle. During periods of increased tensions, all firing batteries deploy to widely dispersed field locations and assume an increased alert posture. The 56th Field Artillery Command will continue performing this vital deterrent mission until the last firing battery stands down in 1991 to destroy its equipment under the provisions of the INF Treaty.

Pershing II Redlegs demonstrate their system's combat readiness and remain on guard until end-of-mission.

One of the truly unique aspects of the Pershing program has been the close relationship of the 56th Field Artillery Command with the 3d Battalion (Pershing), 9th Field Artillery (3-9 FA) at Fort Sill, Oklahoma. The 3-9 FA was key to the unqualified success of the total Pershing program.

The Battalion's original four-fold mission was to (1) train personnel in the CONUS rotation base before being assigned to Pershing units in Europe, (2) support missile firings at both eastern and western test ranges, (3) verify changes to missile and ground support equipment in CONUS before implementing it system-wide and (4) validate new tactics and procedures before introducing them to the European theater.

The 3-9 FA truly has been a test-bed organization and a window to the future of the Pershing system. This ability to test equipment changes and operational concepts before making expensive changes in the whole system has proven its worth time and again and increased the operational effectiveness of the worldwide Pershing force.

Survivability—Key to the Future

Survivability is the key to the future of any land-mobile missile system. Without enhanced survivability, improving hardware, software and fielding new systems still could leave a missile system too vulnerable. Improved mobility, reduced tactical site signature and an increased ability to hide firing positions in silent postures until called to action are all significant factors in the survivability formula.

During the years, the Pershing community has taken the lead in testing new equipment and techniques. For example, instead of the usual 10-kilometer separation between firing units, the tactical commander might choose a significantly larger area to disperse his assets. This ability to exploit the technical capabilities of a system in a tactical environment will play an important part in the survivability of other weapon systems. The search for new and, perhaps, radically different operational concepts is a continuing effort.

Pershing Peacemaker

The life of the Pershing system is fixed in time by the INF Treaty. But the influence of the Pershing system and the exploitation of its advanced technologies will impact existing and developmental land-mobile missile systems well into the future.

The hard work, dedication and professionalism of the men and women of the Pershing battalions and wings coupled with the highly advanced technology of the Pershing II have combined to produce a highly lethal and precisely accurate missile system that brought the Soviets to nuclear arms elimination negotiations. And though we never had to fire a missile in anger, **Pershing truly gave peace a chance.**

Colonel Myron F. Curtis is the Training and Doctrine Command (TRADOC) Liaison Officer for all military activities and aerospace contractors in the Huntsville-Redstone Arsenal, Alabama area. He served as the TRADOC Systems Manager for Pershing II at the Field Artillery School, Fort Sill, Oklahoma, and for three years as Commander, 1st Battalion (Pershing), 41st Field Artillery (a PIa firing battalion), in West Germany in the 1980s. Colonel Curtis also commanded D Battery, 3d Battalion (Pershing), 84th Field Artillery (a PI battery) in Europe in the 1960s.

Colonel Thomas M. Brown is the Director of the Weapons Systems Management Directorate at the Missile Command (MICOM), Redstone Arsenal. He's responsible for six major system areas, including the Pershing and Lance missiles, and serves as Executive Agent for the INF Treaty Technical and Experimental Program. Before his current assignment, he was the Pershing Project Manager, also at Redstone Arsenal. Colonel Brown was Director, Business Management Office, Strategic Defense Command, Huntsville, Alabama, advising the Ballistic Missile Defense Project Manager and DA-chartered project managers, among others. He also served as Chief, Program Management Office, Ballistic Missile Systems Command, Huntsville.

Dr. John C. Hogan is Manager of Advanced Programs at Martin Marietta Missile Systems, Orlando, Florida. His responsibilities include missile concepts for nuclear and non-nuclear systems; survivability, chemical warhead and earth-penetrator technology; and applications of ballistic missiles to deep interdiction. Before the signing of the INF Treaty, Dr. Hogan worked primarily on Pershing II and pre-planned product improvements to the system, including as Lead Engineer for the Pershing II nuclear earth-penetrator and air-burst and surface-burst warheads.