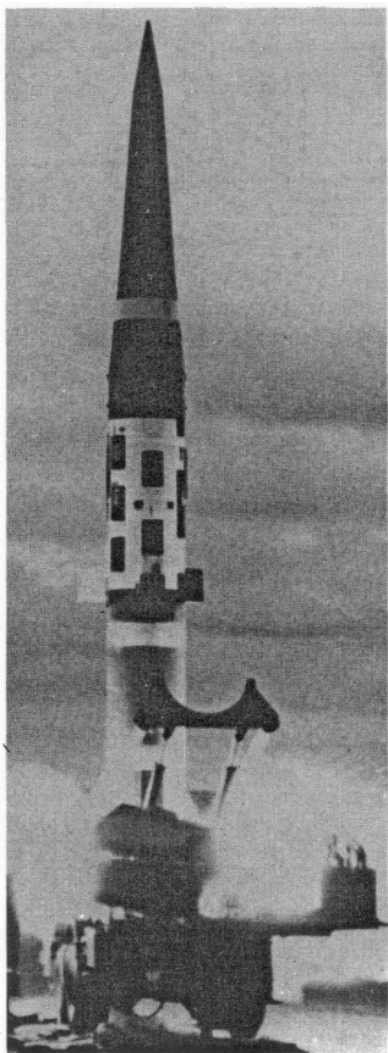


A New Look Of Pershing

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The Pershing missile system is taking on a new look, and with that new look comes an expanded responsibility and the most awesome firepower capability ever to rest with a battery or battalion commander.

Named in honor of America's World War I leader, General John J. "Blackjack" Pershing, the nucleartipped weapon was conceived by an army-industry team in late 1957 as a replacement for the Redstone. The first contract was issued in March of 1958 by the Army Missile Command, Redstone Arsenal, Alabama, to the Martin Marietta Corporation's Orlando Division, which still serves as prime contractor for the system.

Just 3 months after the design study contract was awarded, the first Pershing roared from a pad at Cape Canaveral (renamed Cape Kennedy). This first firing began a 3-year series of launches—one of the most successful strings for any major missile system.

Meanwhile, the first Pershing battalion, the 2d of the 44th Artillery, was being organized at Fort Sill, Oklahoma. Activated in June 1962, the new unit launched its first missile in August of the following year.

Pershing units were first assigned to Europe in 1964 with a mission "to provide nuclear fires in support of special employment or in general

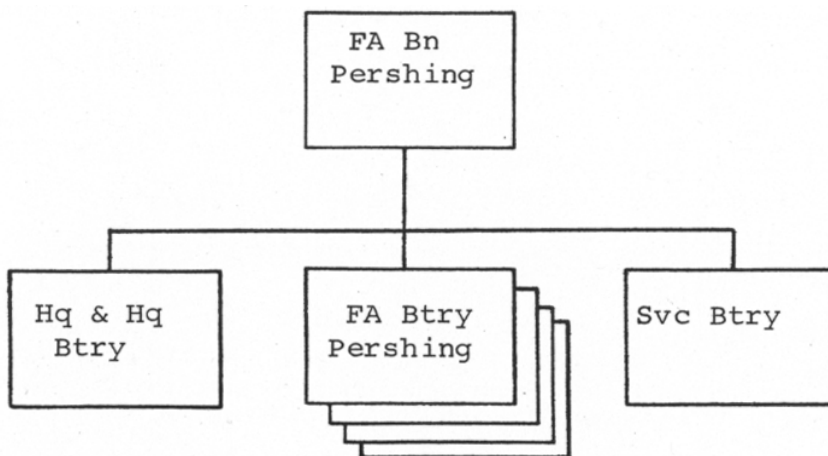


Figure 1. Initial organization of a Pershing 1 Battalion.

support of the field army or independent corps." To fulfill this requirement, each battalion was organized with a headquarters and headquarters battery, a service battery, and four firing batteries (fig 1). Not shown in figure 1 is the inclusion of a direct support maintenance unit as an organic part of the battalion. These maintenance sections are found in the service battery.

Each firing battery, in turn, operated under a table of organization and equipment (TOE) which called for only one programmer test station (PTS) and one erector-launcher. Both were mounted on the XM474 tracked vehicle and assigned to the battery's single firing platoon in late 1965. A second erector-launcher was eventually added to the platoon's firing equipment.

The long-range communication requirement between battalion and each firing battery is met by the use of the AN/TRC-80 radio terminal set. This tropospheric scatter radio uses a technique whereby radio waves are scattered in the troposphere to be picked up by a receiving station using a directional antenna aimed at a pre-calculated spot in the sky. Truly a pinpoint directional system, it can provide a high degree of immunity from jamming and interception. The radio set is also carried on the XM474 tracked vehicle.

The firing battery organization (fig 2) was acceptable as long as the primary mission was general support, but a new mission was being developed for the Pershing units in Europe. This mission was QRA—quick reaction alert.

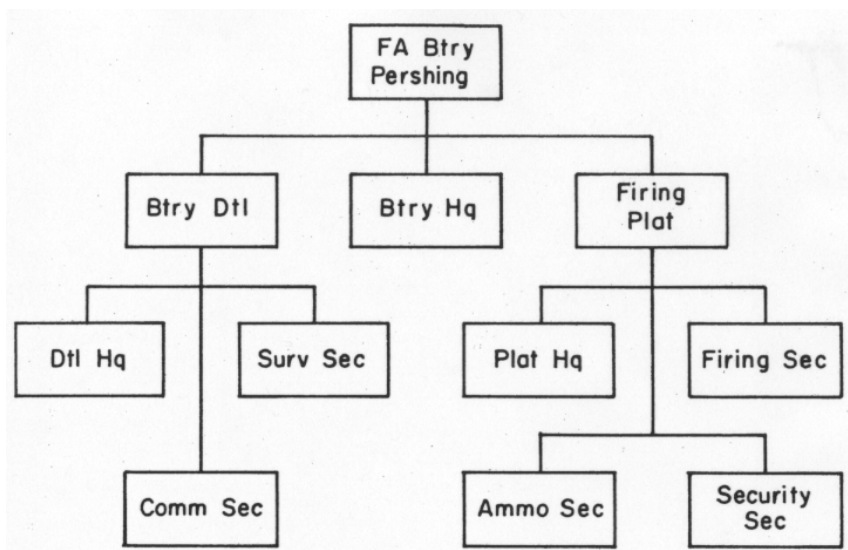


Figure 2. Initial firing battery organization for the Pershing missile system.

QRA placed additional requirements on both men and equipment. To fulfill the new mission, each battery was augmented with the firing set equipment (one programmer-test station and two erector-launchers) from another battery in the battalion each time it went to the field. This solved the most immediate problem but caused several others, including the critical one of maintenance. This was the result of a natural tendency to maintain one's own equipment first and someone else's second.

In addition, a new piece of long-range communication equipment was added to each firing battery. The AN/TRC-133 radio set, composed of five single-sideband radios, became the prime means of Pershing communication.

In 1966 the Department of the Army authorized the development of new ground support equipment (GSE) for the Pershing system. The improved system was designated the Pershing 1a or P1a.

Asked why the Pershing was being improved, LTG Austin W. Betts, Chief of Army Research and Development, told the House Defense Appropriations Sub-Committee:

"The mission requirements are rather different. You will recall, as a field army support, surface-to-surface missile, we had planned that the

Pershing would have a refire capability. Consequently, we did not expect to have to get every missile launched as quickly as possible. That was not the nature of the mission.

When we go to the QRA role for the Pershing, the object is to have as many launchers as reasonably possible so that we can get a maximum number of missiles off in the shortest possible time. It is rather a difficult requirement."

The most noticeable change which resulted was the switch from tracked to wheeled vehicles and a greatly increased rate of fire. The 5-ton, M656-series vehicles, developed by the Ford Motor Company, permit rapid movement over improved roads without serious loss of cross-country maneuverability. The new 8-wheeled drive (8×8) transporter reduces the vibration of equipment, which may further reduce the maintenance requirements. It is hoped that the increased system reliability will result in a smoother ride.

Other changes included the development of a new mobile countdown control station, the programmer-test station (PTS fig 3)). The new PTS incorporates the latest state of the art technology. Designed for



Figure 3. The Pershing 1a improved programmer-test station (PTS) programs the trajectory of the missile, controls the firing sequence, performs tests that simulate post-launch missile operation, and provides the operator with a visual indication of the firing sequence. To the rear of the PTS is the power station, which supplies electrical power, conditioned air, and high pressure air to the missile and ground support equipment during the countdown.

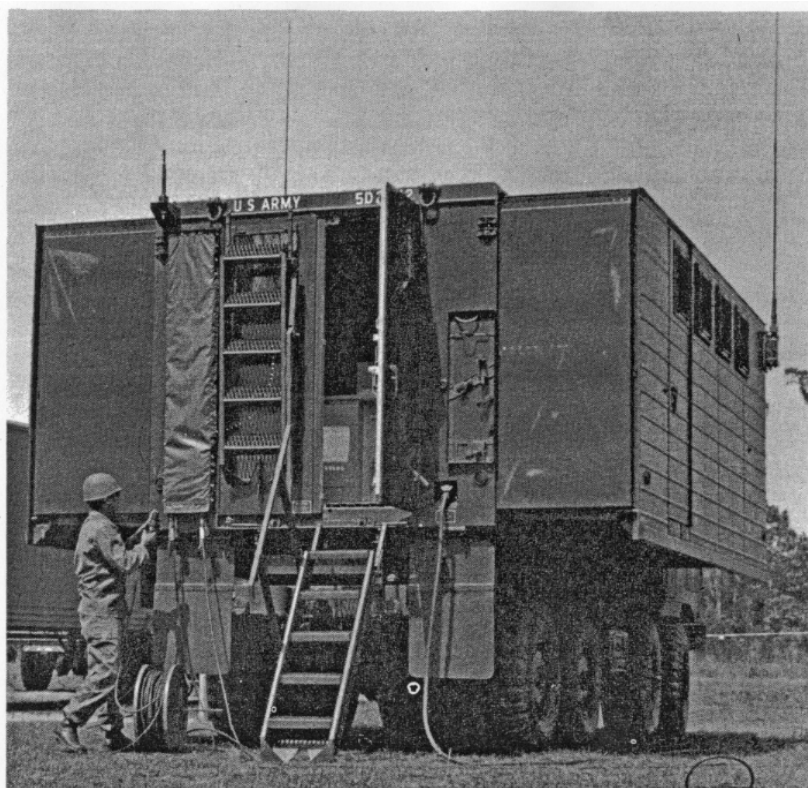


Figure 4. The Pershing 1a battery control center (BCC) is being readied for tests in Orlando, Florida. It is designed to give the battery commander a better means for controlling and monitoring firing site activities, is mounted in an expando-van atop an M656 truck, and is linked by radio with higher headquarters.

greater reliability and simpler operation than its predecessor, the P1a PTS presets, tests, resets, and monitors the missile and controls all phases of countdown. It has the capability of testing the missile sections separately while in their containers or testing the missile assembled on the erector-launcher. The programmer test station, completely computer-controlled, can isolate internal malfunctions down to plus-in-modules which can be easily replaced by the operator at the firing site. It can also detect malfunctions in the missile and the ground support equipment.

The PTS is mounted on an M656 vehicle along with a multifuel turbine-driven power station that furnishes electrical and pneumatic power and conditioned and high-pressure air to the missile and electrical power to the ground support equipment.

A redesigned fast reacting erector-launcher has also been added. Both the improved PTS and the improved erector-launcher were built to meet the requirement imposed by the QRA mission.

A new but integral part of the Pershing 1a system (P1a) is the battery control central (BCC). Mounted in an M4 "expando-van," the BCC provides the battery commander with a centralized command and control facility with which to monitor and control the firing platoons. In addition, it provides communication links with higher headquarters as well as extensive intra-battery communications.

The modified expandable M4 van is mounted on an M656 vehicle. Electrical power for the BCC is provided by a trailer-mounted 15-kilowatt



Figure 5. Being emplaced for action is the radio terminal set AN/TRC-80, with its 8-foot parabolic antenna. The communications set is transported on the new M656-series vehicle and is used in the battalion to battery communications link.

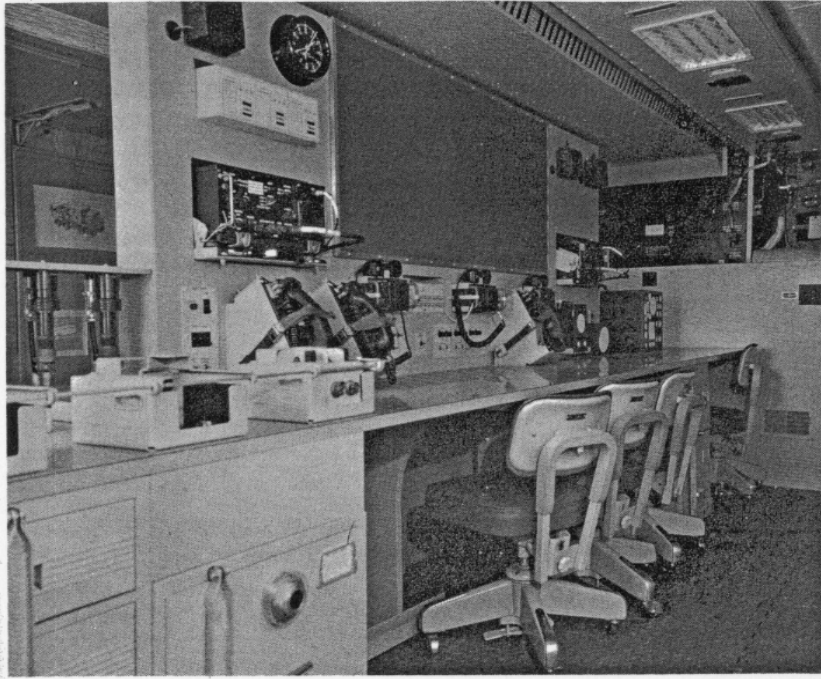


Figure 6. The interior view of a battery control central with communication equipment.

generator, which is towed by the battery control central vehicle. Communications equipment (fig 6) located in, or remotely to, the BCC consists of the following: the MCC/17, AN/TRC-80, AN/TRC/133, SB/22/PT, AN/VRC-46 and -47, and AN/GRR-5.

An added convenience afforded the battery commander is that he may install both the PAL T-1500 device and the remote firing boxes in the BCC van. This will enable the commander to assemble the warhead and initiate the firing sequence from within the battery control central.

The fielding of the Pershing 1a system required a new TOE to reflect the QRA mission and the utilization of the new equipment in that role. Thus, the mission of the Pershing battalion, stated in TOE 6-615G, is "providing nuclear fires for special employment or for general support of field operation."

One change made by the current P1 TOE was to increase the number of men in a battalion from 1,102 to 1,680. The major changes occurred in the firing batteries (fig 7). The P1a battery is composed of three firing platoons. Each platoon has a firing section with one improved PTS and three improved erector-launchers. This firing platoon,

compared with the original P1 battery, has an increased firing capability of 50 percent.

Stepping up to battery level, each P1a firing battery has three PTS's and nine erector-launchers, and each launcher is loaded with an assembled missile. The result is a 450-percent increase in firepower. In effect, the P1a battery has greater firepower than the entire battalion had under the old P1 concept.

With the increased responsibility, the new TOE calls for a major as the P1a battery commander and a captain leading each firing platoon, thus providing a real challenge for commanders at both levels. By comparison, the major commanding a P1a firing battery with nine launchers has under his control one more erector-launcher than did the lieutenant colonel commanding the current P1 battalion. At the same time, unless the rank of the battalion commander is altered, that lieutenant colonel will have 36 launchers under the P1a organization, as opposed to only 8 under the P1 organization, which is a 450-percent boost in missile delivery capability.

The overall battalion structure, while radically changed internally, retains its external appearance as shown in the D-series TOE (fig 1).

A comparison of the equipment in the new P1a battery, with that of the old, is shown in figure 8.

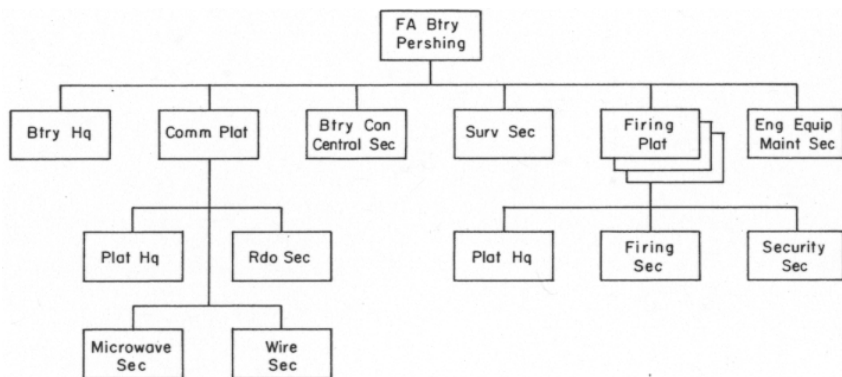


Figure 7. Pershing 1a firing battery organization.

COMMUNICATIONS	TOE 6-617D	TOE 6-617G
AN/MGC-17	1	1
AN/GRR-5	2	4
AN/PRC-25	0	4
AN/VRC-46	4	8
AN/VRC-47	1	2
AN/TRC-80	1	1
AN/TRC-133	0 (1*)	3
AN/GRC-106	5 (0*)	0
AN/GRC-125	2	2
VEHICLES		
Trucks		
¾ ton	9	16
2½ ton	9	22
5 ton 6×6	9	16
5 ton 8×8	0	4
Fire Fighting	0	3
Tank, water, 1,000 gal	0	1
Tractor, 5 ton 8×8	0	9
Utility ¼ ton	6	9
Van: shop 2½ ton	0	2
Wrecker: 5 ton 6×6	2	4
MISSILE COMMAND ITEMS		
Azimuth Laying Set	2	6
Erector-Launcher	2	9
Battery Control Central	0	1
Programmer-Test Station	1	3

*changed by MTOE

It should be pointed out that only the major items of equipment are shown in the three classifications.

Figure 8. Table of equipment.

One of the obvious changes that emerges is the ratio of increased firepower to the increase in manning necessary to maintain and operate the equipment. A little simple arithmetic shows that a 65-percent increase in people provides a 450-percent increase in destructive power and target coverage.

As General Betts told the congressional sub-committee, the object is to get as many missiles as possible off the ground in the shortest time. "It is a rather difficult requirement," he added.

Difficult? Yes. But not impossible with the improvements being made under Pershing One Alfa.