Nike and Me

Elliot Deutsch

Photos from author's collection unless otherwise stated.

More than 50 years ago, in the late 1950s, between the Korean and Vietnam Wars, I had the honor as well as the pleasure of serving in our country's Cold War missile air defense. Many of my acquaintances viewed peacetime military service as an impediment to their civilian careers. To the contrary, I pleasantly discovered that my "scientific military service" contributed to my "air defense military service" and that my combined military service was a significant asset in six years of work for a defense contractor, and even to the small business I founded in 1966.

Even though we were "at peace," there was a real need for round-the-clock readiness against a possible nuclear attack by Russian bombers. I believe that service in this "high-alert" field left a much deeper impression on me than previous service in a military research laboratory.

There are several excellent books(1) on America's 1950s Cold War air defenses, and numerous manuals(2) describe how this now-obsolete equipment operated. My goal is not to tell how the equipment worked but to show what it was like "living" in air defense and sharing some of the more unusual experiences - happy, sad, frustrating, and humorous - that went along with turning dials and tracking aircraft. So readers may better understand some of these events, I have included a brief explanation of the overall air defense process and technical operations of a Nike battery, since they were all interconnected.

Military Service, Spring, 1954

After four years of ROTC, along with my diploma came a commission in the army infantry and orders to active duty the following spring. I took advantage of the delay by enrolling in graduate courses, retaining my research assistant job in the Physics Department, and visiting Scandinavia, where I saw *Tirpitz* lying on its side in the Fjord near Tromso.

Soon after the re-start of classes, I received new military orders - a branch transfer to the Chemical Corps and a reporting date of next spring at the Chemical Corps School, Fort McClellan, AL.

Active Duty, July 1955

After Chemical School, my first duty station was the Army Chemical Center (ACC), Edgewood, MD, working in what amounted to a ballistics laboratory. Serving as ACC's officer of the day on a quiet Sunday, I received a frantic call from the staff duty officer who was sending MPs to help me "apprehend" the crew of a civilian airliner that had just landed on our airstrip "without permission." I was also to investigate a group of civilians seen on the airstrip. In reality, the chartered airliner had come to transport air-defense artillerymen from Edgewood to White Sands, NM, for their annual firing practice. The "leader" of the "civilians" was my friends' boss, the CO of the 54th Antiaircraft Artillery Missile Battalion. He thought the post's reaction was hilarious and we had a good laugh after all was clarified. From then on, if he and I chanced to meet at the officers' club, we drank to something or other.

One evening at the club, my artillery friends brought me over to their boss and laughingly asked him to help turn me from a "lab technician" into a "real soldier." Surprisingly, he made an offer I could not refuse. If I agreed, he would cause all the paperwork to be completed that would transfer me from

the Chemical Corps to the Artillery, enroll me in the Guided Missile School at Fort Bliss, and then arrange for my transfer back to his battalion at Edgewood. He also offered pre-missile-school training, in my spare time, at his Edgewood Nike battery, C/54 (C Battery, 54th AAA Missile Bn).(3) I accepted and treated all to drinks.

The 35th Antiaircraft Artillery Brigade

In 1955, the 35th AAA Brigade was responsible for the antiaircraft defense of Philadelphia, Baltimore, Washington, and Norfolk, with both gun and missile battalions. The 24th AAA Group defended Philadelphia, with the 19th, 51st, 506th, and 738th AAA Battalions. The 17th AAA Group was responsible for the defense of Baltimore, with the 35th, 54th, 89th, and 602nd AAA Battalions. The 14th, 36th, 70th, 71st, 75th, and 601st AAA Battalions defended Washington, under the 19th AAA Group. Under the 3rd AAA Group, the 38th, 56th, and 550th AAA Battalions defended Norfolk. All the battalions were regular army except for the 70th AAA Bn, Maryland National Guard, until 1956, when it was joined by another Maryland National Guard AAA battalion, the 684th. Over the next few years, the gun battalions were either inactivated or converted to Nike missile battalions. In 1955, the national defenses contained more Nike than gun battalions, and by 1960, they were all Nike.(4) The 54th AAA Missile Bn was under the 17th AAA Group, whose HQ was next to our battalion HQ at Fort Meade.

Guided Missile School, 1957

I began spending all my spare time at the missile battery on post - C/54. The officers and crew included me in all activities, even if only to watch with explanations. Except possibly for the dangerous task of fueling a missile, they patiently lead me through hands-on operation of just about every piece of equipment on the site.

Fort Bliss, El Paso, Juarez, the Franklin Mountains, the treeless desert, and the region's average 5% relative humidity were all very new and novel for someone from the green, humid east. The Guided

Hinman Hall, Guided Missile School, Fort Bliss, TX.

Missile School and its related classrooms, laboratories, and equipment were intriguing. Most mornings, I could hardly wait to get to class to learn something new. Particularly exciting were our visits to the Red Canyon firing ranges at White Sands.

Like many others at Bliss, I bought a good, used, Cushman motor scooter from a departing soldier for $100 for local transport between classes and even around town. There was always room to park a scooter on the [illegible] before I departed.

Elliot on Cushman scooter, Fort Bliss, TX.

I was extremely grateful for my "pre-school training" at Edgewood. It was an invaluable tool for learning more, learning faster, and doing well in class. Most classmates, ranking as high as major, with longer military service than mine, had only served with AA guns. Only one other classmate had ever even "touched" missile equipment. This gave us a distinct advantage in serious as well as fun activities and created a friendship, which continued beyond school because this classmate was assigned to a missile battery at Fort Hancock, NJ, about 170 miles from Edgewood. On a visit to his battery, I had my

first contact with Endicott coast defense batteries.

All members of our class seemed to be good students and anxious to learn everything possible but, on occasion, some "nasty little instructor" might give a classmate a bad time for making an honest mistake. My friend and I could and occasionally did retaliate by employing "technical tricks" to make the instructor's "Here's the right way to do it, stupid" demonstration fail.

Traveling to and from Texas offered me another pleasant opportunity – two chances to spend time with Elaine during our long-time, long-distance courtship.

The Nike-Ajax Battery

When land-based guns were no longer a viable defense against high-altitude, high-speed aircraft, the U.S. began development of ground-to-air missiles based on the WW2 German Wasserfall guided AA missile and similar missiles.

The first Nike-Ajax battery – probably more as an experiment than an actual defense - was emplaced in a fenced field at Fort Meade, Odenton, MD, in 1954. I saw it there, from various angles but could only guess at what it was.

While most Nike-Ajax batteries contained one "missile system," some batteries like our C/54 Battery at Edgewood known as "dual batteries," contained two complete and independent missile systems,

Nike-Ajax missile.

operated by two crews.

In addition to the administrative area, the tactical layout of a typical CONUS Nike-Ajax battery consisted of two areas within visual range but separated by about ½ mile. At a typical integrated fire control (IFC) area, a visitor would notice a generator building, three radar antennas, acquisition (ACQ), target-tracking (TTR), and missile-tracking (MTR), a radar collimation mast, and two trailers linked by an interconnecting-corridor building. The battery-control trailer contained a tactical-control panel and tactical-control signal panel for the battery-control officer, acquisition-radar controls with associated PPI and precision indicator scopes, computer cabinets, a telephone switchboard and radio network equipment, one horizontal and one vertical plotting board, an event recorder, and a manual plotting board. In the radar-control trailer were the missile-tracking radar console with one radar scope for its single operator and the target-tracking radar console with one PPI scope and three "A scopes" for its three operators. The PPI scope showed a "scan" similar to a map view, while the A scopes depicted

Nike acquisition radar and generator building, Edgewood, MD. To the left of the acquisition radar is the generator building; to the right of the radar are, left to right, the edge of the battery-control trailer, the interconnecting corridor building, and the radar-control trailer.

Nike IFC ready room, Edgewood, MD.

Battery C, 54th AAA Bn, erecting missiles at Nike launcher area, Edgewood, MD. There are more than 12 missiles visible, which means some are resting on the rails between launchers.

azimuth, elevation, and range in a linear display.

In a typical launcher area were a generator building, a launch-control trailer, three below-ground missile storage magazines (pits), a missile test and repair building, a revetted area for fueling or de-fueling, and several small storage buildings. In the launch-control trailer, with its external mast-mounted test transponder, were the launching-control console, the telephone switchboard, and a status board.

Entering one of the three underground magazines either by the stairs or by ladder down an escape hatch, one would see a hydraulic elevator with attached loader-launcher No. 2, missiles on storage racks, and the launching-section control panel in the protected personnel room.

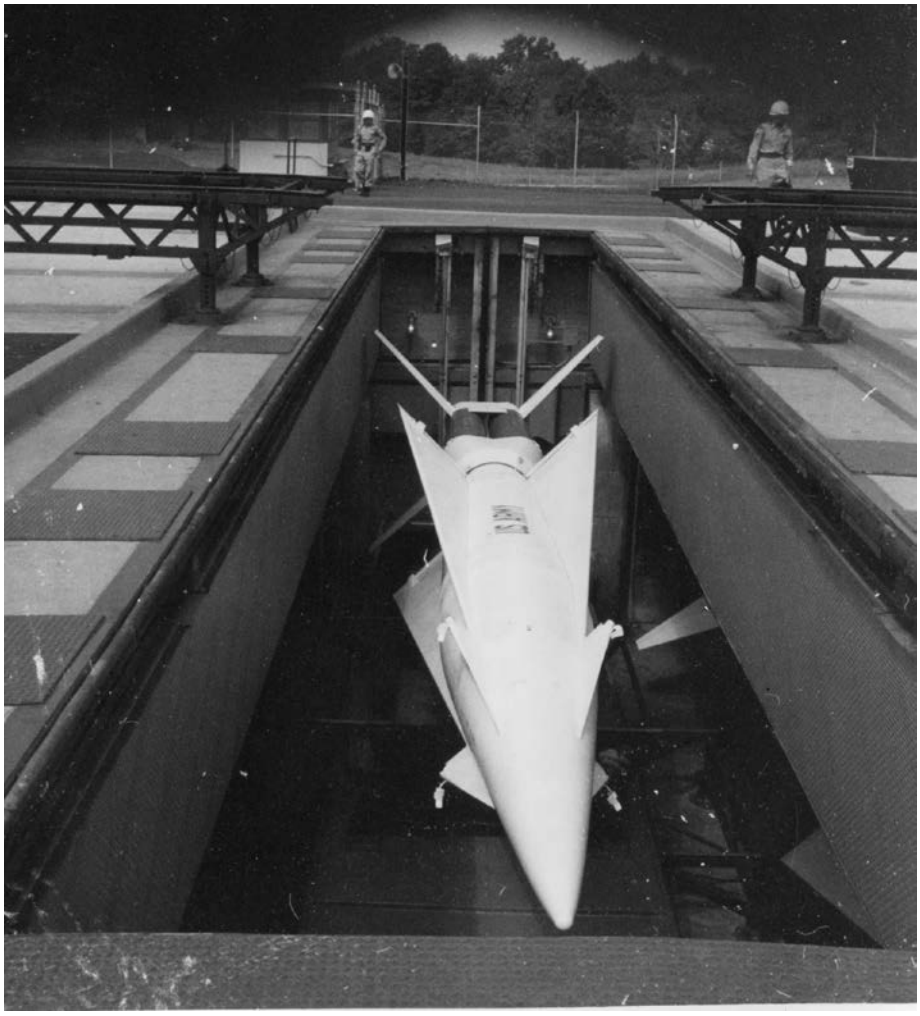
A single launcher-loader was an electrical-hydraulic machine designed to erect a handling rail complete with mated booster and missile to launch position. Each battery launcher area was equipped with 12 launcher-loaders, four per underground magazine. Of these four, Nos. 1, 3, and 4 were permanently mounted topside and No. 2 was mounted on the elevator.

Overview of a Small-Area Air Defense

A single Nike-Ajax battery could successfully detect and engage one target at a time and conceivably could have been deployed for air defense of a small geographical area or a small military facility, but this would have been impractical and, to the best of my knowledge, was never done. It was more practical to deploy a full missile battalion with four firing batteries. If necessary, without the coordination of a "Missile Master" system, the four battery-control officers could, by radio or telephone, using the manual plotting boards verbally assign hostile targets to their four systems. In wartime, the four batteries would provide greater defense in depth and more missiles. In peacetime, they would provide for rotation of alert status – a battery's readiness to fire - between the four batteries. One of the four batteries was always at each of these four conditions: ready to fire in 15 minutes; ready to fire in 30 minutes; ready to fire in two hours, while the fourth was out of service for repairs, maintenance, and rest.

Overview of a Large-Area Air Defense

For defending more ground like our Baltimore-Washington area, Air Defense Command employed a "Missile Master" system to coordinate the fire of the missile batteries. A typical Missile Master was equipped with emergency generators, surveillance radars with greater ranges than those of the individual batteries, high-precision height finders, banks of manned consoles through which Missile Master personnel could electronically and verbally communicate with and control the outlying batteries, a "giant" computer to link it all together, and a FUIF (fire unit integration facility) system that could designate hostile targets to individual batteries by placing electronic symbols adjacent to the radar return signals on their scopes. Some Missile Master systems were supplied with additional "out-lying" or "gap-filler" radars to cover areas masked in some way by geography. Our Baltimore-Washington system had five such gap fillers.



Nike-Hercules missile at unidentified location in Baltimore-Washington defenses. Background may have been censored for security reasons. *U.S. Army Center of Military History.*

Overview of Cooperation with the USAF

I had little contact with high level commands but I did know that in the late-1950s the Air Force deployed a SAGE (semi-automatic ground environment) system; linked to a nation-wide series of long-range radars and giant computers it exchanged air-defense data with the army's Missile Master

systems and probably with other branches of service - airborne radars, off-shore radar towers, foreign allies, etc.

Overview of Baltimore-Washington Air Defense

The B-W air defense resembled an elongated oval which covered both cities. The Missile Master system and 35th AAA Brigade HQ & HQ Battery were located near its center at Fort Meade, MD. *Rings of Supersonic Steel*(5) portrays the defenses as they were in 1968. Battery and battalion designations, types of missiles, models of radars, shift of control to/from either U.S. Army or Maryland National Guard and many other little details all changed over the years but, in essence, the defense units remained where shown. On that or any map, you can see where the batteries were located. Two of the five outlying radars were at Nike batteries at Chronhardt and Sweet Air, MD. The remaining three were at Ft. Miles, Lewes DE; Crisfield, MD; and Camp A.P. Hill, VA.

Typical Battery Training Exercise:
Independent or in Conjunction with Missile Master, and Ultimately, the Air Force

In the Baltimore-Washington corridor, thanks to heavy, round-the-clock civilian and military air traffic, it was always easy for individual batteries and the Missile Master to find "targets" to track. I do wonder what batteries located in remote areas used for aerial targets for their training exercises?

Any individual battery could, and did, conduct frequent training or testing exercises individually or in conjunction with higher headquarters. Thanks to a feature in the battery's computer which monitored all the inputs, one could tell within close tolerances if a simulated firing would have been an MA (mission accomplished) or not. Practice made perfect – most of the time!

Battery C, 54th AAA Bn, fueling Nike-Ajax missile, Edgewood, MD.

A Missile Master system could and did order regular training exercises to teach and reinforce coordination of and cooperation between all the firing batteries of the defense. Missile Master personnel could place appropriate symbols onto the screens of participating batteries and also monitor a battery's performance in the exercise. When the USAF was involved, a SAGE center would declare a training alert to include whichever army regions they chose. SAGE radars could see all the same, and many more, "targets" than we saw at Missile Master and the batteries. SAGE operators could place target designation numbers beside each of their selected "targets" along with either friendly or hostile symbols which appeared on the Missile Master scopes and were then passed along to individual battery scopes.

Simulated Firing at a Battery

The battery-control officer (BCO) sat in the battery-control trailer (BCT) facing the tactical-control panel and the tactical-control signal panel.(6) Immediately to his left he could view the PPI of the acquisition radar located outside the trailer. To his left two assistants operated the acquisition radar and the plotting boards on the wall. To his right an assistant operated the telephone switchboard, the radio communications equipment, and the events recorder on the wall. Other assistants stood by to adjust the computer and related equipment on the back wall. On the PPI, the BCO could view all air traffic within a roughly 25 mile radius. Hopefully, he could differentiate between friendly and hostile targets by engaging the IFF (identification, friend or foe) system – provided that the correct codes for this date

Inside a battery-control trailer in Baltimore-Washington defenses.
U.S. Army Center of Military History.

has been entered into the battery's system and also into the transponders in each friendly aircraft. If so, the IFF system would place a "friendly" symbol next to the radar return of each friendly aircraft. This IFF symbol was separate and distinct not only from the radar return but from any numbers or symbols applied by Missile Master or SAGE. If an aircraft had no symbol, it might be hostile!

Now, the BCO (or SAGE and Missile Master, in that order, if they were involved in the operation) would select one target for the one missile that the battery could fire at one time. The BCO and ACQ radar operator would examine the target closely on the precision indicator, just to the left of the PPI, and then designate that selected target to the three target-tracking radar (TTR) operators seated at the far-end console in the radar-control trailer (RCT) at the opposite side of the interconnecting corridor building. Once a target was designated, the TTR would automatically slew to that target, lock on, and begin tracking it in azimuth, elevation, and range. The TTR operators could make manual adjustments. Next, the BCO selected one of the 12 missiles erected on their launchers(7) which illuminated a pilot light on the tactical-control signal panel. That signal was also sent to the MTR console in the radar-control van and the launching-control console in the missile-control trailer located in the launcher area. The MTR operator then locked the MTR onto the transponder in the selected missile electronically.

After the computer analyzed the target position, altitude, direction, and speed, the system would notify the BCO that the computer could now plot a constantly-changing intercept point both target and missile should arrive at simultaneously – thereby allowing for the offset distance at which maximum lethality is achieved from the blast patterns of Ajax's three on-board warheads. The BCO was now ready to simulate fire by lifting the safety cover and activating the fire switch. Even under these simulated firing conditions, the computer would plot the imaginary course of the missile against the actual course of the selected target, leaving an inked paper record of the operation on the plotting board paper roll and also on the event recorder.

In the case of an actual launch, once the missile left the launcher, it would rise rapidly to a high altitude where, on commands from the computer via the MTR, it would nose over into a dive to attain very high velocity toward the target. During this dive, it would receive steering commands from the MTR which directed the missile to the changing kill–point where it would detonate. In an actual defense situation, to prevent interference from signals sent by adjoining batteries to their launched missiles, each missile was equipped with a specific and different delay line in its guidance unit circuitry which assured that the missile would accept electronic command signals only from its own battery's MTR.

Return to Edgewood and C Battery

My first assignment after Guided Missile School was, as promised, to C Battery, 54th AAA Missile Bn, (C/54) at Edgewood. This was definitely a good deal for me because here, on a very small post, I already had many friends and acquaintances.

C/54's IFC and launcher areas were at opposite ends of ¾–mile-long Bellardi Road, which intersects Fairview Point Road about ½ mile from its end at Bush River. Fairview Point Road runs from MD 755 along the south side of Amtrak's main line (Back then, the Pennsylvania RR). Remnants of the battery were still visible on my last visit in January 2013. When I arrived in 1957, C Battery's barracks and other administrative buildings were on ACC near the 54th Bn HQ close to the south end of Weide Army Airfield. No traces of the battery or battalion buildings remained on ACC in 2009. In 1957, the IFC and launcher areas were equipped with ready rooms where manning crews could sleep

or rest while the battery was on 15-minute-alert status. After my transfer from C Battery to Battalion HQ in 1958, new barracks and facilities were constructed for C Battery at the intersection of Fairview and Bellardi Roads. In 2013 these buildings were still in use by others and appeared to be in good condition.

Orderly room, Battery C, 54th AAA Bn, Edgewood, MD, before construction of battery's administrative buildings between IFC and launcher areas, about 1958 -1959.

The first test or initiation of a new officer reporting to a battery from school was to operate the system, track a target, and successfully simulate firing a missile. This test showed what and how much he had learned at missile school and also served as an initiation. There was a trick - I knew the trick but did not let on.

What the green graduate did not learn in school was that in a training exercise at an operating battery, armed with live, ready-to-fly missiles, just before pressing the firing switch the BCO would speak these magic words into his headset: "verify booster squib disconnected," to which a launcher area crewman would reply "booster squib disconnected, sir." Why? Because the booster squib ignited the booster's solid fuel which launches the combined Nike-Ajax booster and missile. Once the booster's solid fuel grain is expended, air drag makes the booster fall back to earth. The separation of the two bodies activates a system that ignites the Ajax's liquid-fueled rocket motor.(8)

Unknown to the green officer, the launch crew would gleefully spring into action. The second that the "fire signal" was detected in the launcher area, two launcher crewmen used a crowbar to advance the missile about ½ inch forward on its handling rail on the launcher, thus sending a "missile-away" signal to the tactical control signal panel in front of the victim BCO. Simultaneously, other launcher crewmen would "fire" a CO^2 fire extinguisher into the microphone of a headset connected to the battery network so that the victim BCO hears the "roar of the missile booster" in his ears – and it was loud! A crewman in the battery-control van shouted "Sir, you just fired a live missile" and the young officer would run to the nearest escape/viewing hatch to see his missile flying – but there was nothing to see and everyone laughed.

More Training

As time passed, I gained more and more experience and skill with both the IFC and launcher equipment. I felt comfortable at my tasks and before long I was judged capable of operating the system alone, without supervision or backup. Still unmarried, I was more than willing to swap night shifts with married officers so that I could get more experience with the equipment.

Operational Readiness Inspection (ORI)

Before long, I experienced the dreaded ORI. At any time of the day or night – just as un-announced as a Russian bomber – the ORI inspection team, in two sections, would invade our IFC and launcher areas. The ORI team leader switched the status control to Red Alert, sounded the siren, and started his stopwatch. Asleep or awake, our crewmen rose and scrambled to their stations while ORI team members evaluated their performance and also tested the equipment for operational perfection. In 15 minutes the battery had better be ready to simulate firing a missile and to achieve a computer-simulated mission accomplished on some passing aircraft. There were literally hundreds of technical parts that could fail to be up to standards and there were lots of things our crewmen could do incorrectly to win demerits. Passing the test did not win much praise since success was not only expected, it was demanded. Failure to pass an ORI meant a lot of trouble for the battery commander from the battalion commander. As best I recall, C Battery usually did very well on inspections - at least on one of our two operating systems.

Double Battery, Double Firepower, Double Trouble

The 54th Missile Bn's C-Battery in Edgewood was a "double battery" – two co-located control systems and two co-located launching systems. The percentage of double to single batteries was small but they were emplaced for specific reasons such as greater firepower or unusual geography. In this case, I believe, the co-location was to compensate for the gap of about 20 miles of wetlands and Chesapeake Bay lying between Edgewood and the next battery to the east in Chestertown, MD.

C Battery's two IFC systems, known to Missile Master as Gillette Five Seven and Gillette Five Eight were theoretically identical but that's where any similarity ended. One system - the system located farthest from the IFC area gate – had serious, even mysterious, flaws. Some joked that it was haunted or cursed but it was definitely "bad," just as the other system was "good." No matter how many checks, tests, or repairs were performed, the bad system remained bad. If our maintenance men determined that today's malfunction in the bad system was due to chassis "X" and they replaced it with chassis "X" from the good system, the bad system still would not operate correctly. More confusing was that chassis "X" from the bad system performed perfectly in the good system. Over many months, Ordnance technicians and factory technicians visited but were unsuccessful in correcting the problem(s). It was finally decided to replace all the chassis in the bad system with new chassis – but it still did not work. Then they replaced all the cables – much more difficult than replacing the "plug-in" chassis – in the bad system but it still performed erratically.

The bad system was essentially taken out of service and turned into a training school. The final solution was reached after my transfer to battalion HQ. Once the new Hercules missile system arrived at C battery, they removed the bad system's trailers and set the Hercules system's trailers on the same pads. Now C battery had one good Ajax system and one great Hercules system. But this did not end the career of the bad system. They found a new job for it where it became well-known - more about that later.

1958 - Dangerous Radar, Foolish Man, or Both?

A young officer assigned to C Battery talked of his coming marriage in his home town. Anxious for "lots of pictures," he said he would buy "all the flashbulbs and film at the PX." I missed the show but received a full account. Friends said "he drove from the PX to C Battery, removed a large, grocery-sized bag from his car, clasped it to his chest and walked toward the battery-control van. As he approached the acquisition radar and was 'swept' by the 1-megawatt beam, it made his bag light up 'like the sun.'" The magnesium-wire filling of the bulbs must have acted as half-wave antennas and absorbed enough RF energy to "flash" all the bulbs. He was fortunate not to receive bad burns.

Party Time

The officers of C/54 and 54th Bn HQ occasionally cooperated at party time. I recall how hard we worked before the Christmas party one year to "frame" the officers' club entrance with two Nike training missile elevated to 30 degrees on universal handling dollies. Artillery dominated the Chemical Corps post that year.

At the end of a meeting, one of the officers recalled a college fraternity that had used a toilet for a punch bowl. Our XO relayed the idea to our CO who asked me to find a toilet. In a few minutes we were off to the salvage yard. I made introductions, the CO selected the bowl, the S4 did the paperwork, and we phoned our motor pool to pick up and steam clean it. My next door neighbor and friend (unlikely on a large post) Col. Jim Grenade, the CO of Edgewood Arsenal, offered to clean the bowl in a phosphoric-acid dip tank which would "leave it looking factory new and hospital clean." We ordered a wood chest from the carpenter shop, ground off the discharge tube to make the bottom flat, filled the trap with melted paraffin and we finished it off with large AAA and battalion decals. It served as the distinctive centerpiece at parties either for First Artillery punch or an ice bucket.

Officers' club, Army Chemical Center, Edgewood, MD, Christmas, 1957.

Elliot in front of battalion HQ, 54th AAA Bn, 1958.

1958 - Flying Saucer over Baltimore?

One of our two C-battery missile systems was on 15-minute status and I was officer in charge. Most of our crew and I were asleep in the ready room. Maintenance men – NCOs and/or warrant officers - worked in shifts to maintain our ready-to-fire status. At about 2 AM, one of the maintenance men woke me and called me out to the trailers to enjoy the show and also to authenticate their observations. On the acquisition radar's PPI scope and, simultaneously, on the target-track radar's PPI and azimuth "A scope," our men were observing live video of a high-speed object making erratic direction changes, almost right angles, over Baltimore. Grid squares on the radar scopes verified the target location. To make sure they were not being fooled by a problem with our equipment, our men contacted other batteries – also on 15-minute status – on other sides of the city. All were viewing and tracking the same target over Baltimore. When one operator reported it moving in a particular direction or making a sudden turn, all the other operators verified the same movements. Whatever this was, in did not look or perform like any other "unusual" or noteworthy flight over our area. The USAF always notified us in advance of such flights for our training purposes. After 10 or 15 minutes "it" disappeared from all our radars at the same time. What could it have been? All batteries reported the event but never heard another word about it.

1958 Orders to Headquarters

About 6 months after my arrival at C Battery, the 54th Battalion's missile officer departed suddenly and I was selected as his replacement. A missile officer served as the battalion's assistant S-3, responsible

for technical operations and training. He and his team inspected the four firing batteries: A on Paper Mill Rd. near Phoenix, MD; B on Greenspring Ave., near Chronhardt, MD, (north of Towson); C at Army Chemical Center; and D on Harford Road near Fork, MD.

Elliot, third from left, inside 54th Bn HQ.

IG Inspection

Inspector-general inspections were the BIG INSPECTIONS on which might hinge the career of a unit commander. With the announcement of the first IG inspection after my transfer to battalion, the battalion commander requested that I accompany him on all its technical portions - operations of the four firing batteries. These many years later, I can only guess that he was accompanied by his S1 for inspection of orderly rooms and his S4 for the supply rooms.

In the battery-control trailer of the first battery to be inspected, the IG team – a BG and assistants – ordered the battery commander (BCO) to run through a typical simulated firing drill. As the BCO followed the well-known and frequently repeated steps, he explained each one to the IG team. When the BCO announced that a missile had been selected, the BG asked "How many missiles will you fire" to which the BCO replied "one, Sir!" (the AJAX system was designed that way!!!) but the ignorant BG insisted he wanted us to fire three missiles to make sure of hitting the target. Neither the BCO nor the battalion CO responded promptly, so I nudged the CO with my elbow and he finally explained to the ignorant BG. Did the BG need more schooling or was he really testing us? As best I can recall, that inspection went well for us.

Rating the National Guard

While battalion missile officer, I was the "rating officer" for the 684th AAA Bn, a Maryland National Guard unit training at Edgewood, commanded by Col. George Gelston. It was a fun assign-

ment. Every morning they opened their day with a wine toast to the state and country. Their "office," a short walk from my battalion office, was actually a tent next to a building and I made several trips daily. Gelston was a pleasant chap but his XO, a major and a teacher, tried to intimidate me during the first few days, in an attempt to influence how I would be rating them. To be honest, I had not the faintest idea, but having learned of his teaching profession, I calmly notified him that I would pay particular attention to spelling, grammar, and punctuation in all written documents coming from their office. He never said another word about it. In the end, after I turned in what I considered a fair rating, Gelston told me it was one of, if not the highest, he had ever been awarded. That may have been of some value to him, as he was subsequently appointed adjutant general of the Maryland National Guard.

Trial Counsel, 1958

One of my additional duties at battalion was the trial counsel [prosecutor] of the special courts-martial presided over by 19th Artillery Group – the next higher headquarters. I had witnessed a few trials and went out of my way to attend a few more to gain experience before my first trial. I was amazed at how ill-prepared some of the participants appeared. One battery commander fumbled while trying to identify the accused, a member of his unit, and an unsure first sergeant bungled through the offenses that he, I guess, had leveled against the defendant in his battery. I decided to personally investigate each case and to meet with all involved parties before each trial. I soon grew to enjoy the process. Most cases were standard problems but two deserve retelling:

GOOD GUY: A good soldier took leave to visit family. On his return trip to base, with adequate time to sign in before his leave expired, he was stopped in a speed-trap town and ended up in jail. The local authorities did not notify the army and held him until there was no way he could not be AWOL – by many days - by the time he returned. I do not recall if he was subsequently locked up at Edgewood or APG but what a damned injustice! I did my job and presented the evidence. The soldier was convicted and sentenced by the board after which I went immediately to the Group CO who, on explanation, dropped all charges, reversed the sentence, and left a good soldier with clean record. Yes, sometimes a good guy can win – with help!

BAD GUY: Corporal X was a bum in uniform, promoted and broken repeatedly. About 1955, stationed in Germany, he married German woman. In perhaps 1957 he was ordered to the 54th Missile Bn, but his wife remained in Germany. About 1958, he dated and married one of four women who operated a brothel in their rented Edgewood house. Wife No. 2 refused X's request to move to Army housing with him so he moved to the trailer home – on Willoughby Beach Rd. - of a married woman whose husband was in the MD penitentiary. The trailer lady became pregnant and X took her, as his wife, to the army hospital at APG for care. A doctor suspected something and wrote a letter to X's CO but the letter was ignored and lost on the CO's desk. On a payday night in 1958, a C-Battery soldier woke in his barrack to find X going through his belongings, woke others, and they subdued X and held him for the MPs. The next morning, charges were filed and the case was referred to me. My investigation disclosed many past wrongs and now X's recent misdeeds.

The trailer-woman's husband had been released from prison and they all lived in apparent harmony in the trailer, until X was arrested. Soon after his arrest, wife No. 2 applied for benefits and a few weeks later wife No. 1 arrived from Germany with two small children and applied for their dependent's benefits. The only factors in X's favor were that the two children were too young to be his. As new charges accumulated, the 19th Group CO asked me for a progress report. After much debate between "make him pay for all his misdeeds" and "get him out of the service ASAP," we chose the latter. In a very short time, X was reduced to E1, given a bad conduct (or perhaps, dishonorable) discharge and was deprived of any and all benefits. X and his gang were no longer the army's problem!

Total Confusion

After a few months in battalion headquarters, I felt like a long-time member of this smoothly working and friendly group of officers and non-coms. The firing batteries were performing well and the men were keeping out of trouble. Then, one morning, a troubled CO, Lieutenant Colonel York, called all the "tech" personnel into his office and asked our thoughts on a new technical directive from brigade's new G3.

With no copy machine available, he read each paragraph to us and we all agreed the document contained contradictory statements and, in short, "the equipment just doesn't work that way." More confusing orders followed, but our CO finally overcame the problems, somehow.

I eventually learned how this confusion may have arisen. A few years later, after my transfer to HQ Battery, 35th Brigade, a young, fellow officer in the G3 section told a few friends that as soon after the new G3 took office, he looked over the file cabinets and said [in essence] "I want every one of those damn papers [orders, directives, etc.] re-written with my signature is at the bottom." Apparently, he decided to reword them as well, perhaps to make them appear to be his original work.

Repaying Bad Checks, 1958

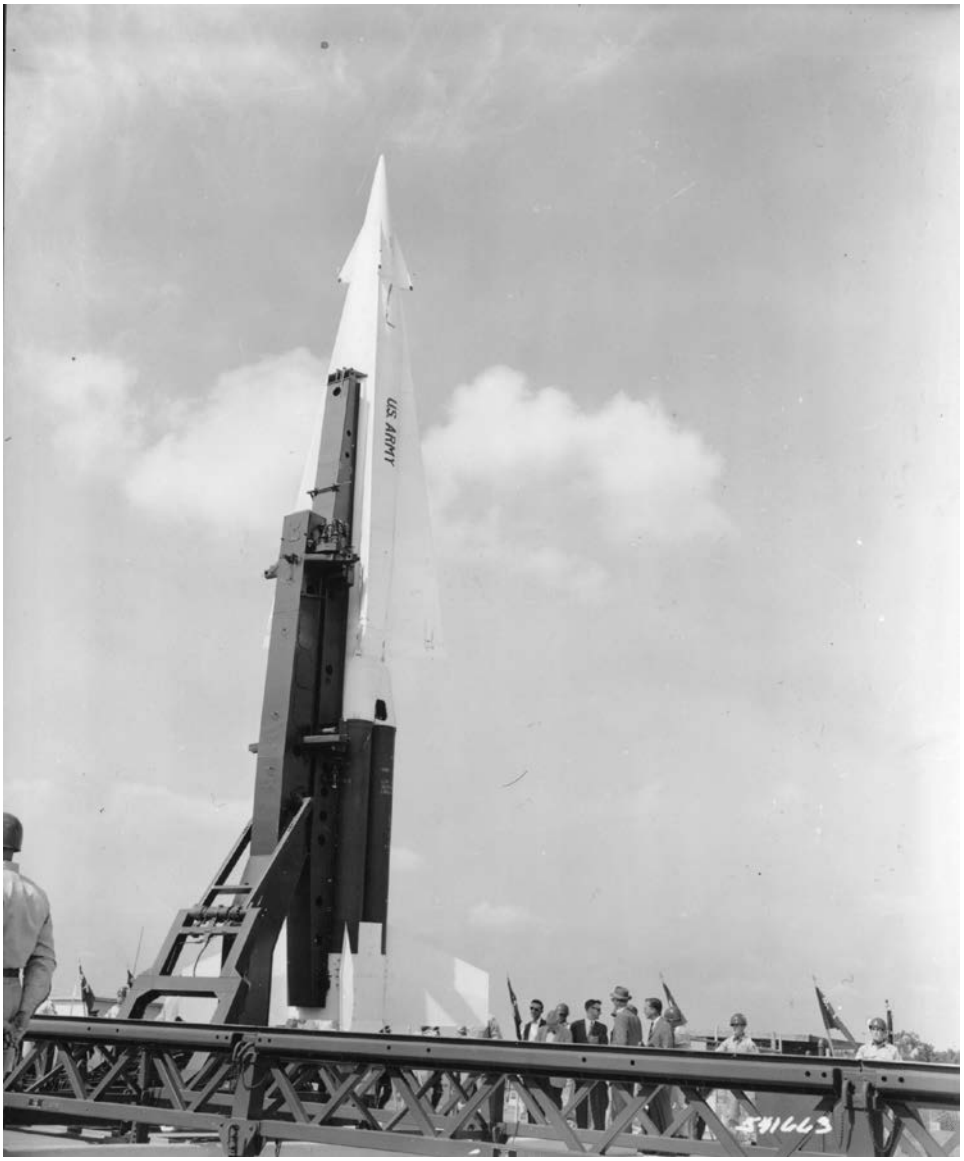
Another unusual task that fell on me was to repay the bad checks and bad debts of an officer who, for unknown reasons, had gone astray. His family sent a bundle of cash, close to $2000, to our office and the CO selected me. Equipped with the cash, a list of names and addresses, a sedan and driver, and a clerk-typist with a typewriter, we were off to exchange money for signed receipts. The CO suggested carrying a sidearm but I had that covered already. It was an interesting day driving all around the Baltimore area exchanging cash for signatures. We met some interesting people and I made apologies and tried to explain something I barely understood. Who knew how or why an apparently nice, young "officer and gentleman" went bad.

Battalion Operational Readiness Inspection (ORI)

On my team were experienced warrant and non-commissioned officers and drivers. Our objective was to test the readiness of our four firing batteries to make certain that they could perform their defensive mission. We would arrive, unannounced, at any hour of the day or night, in two separate vehicles, at the gates of the IFC and launcher areas of the "hot" 15-minute battery or occasionally the 30-minute battery. On entering the gate, we dropped off one man to prevent the guard from announcing our arrival. Allowing a few minutes for our team members to take their stations, I would enter the battery control van, switch the status to RED, sound the siren, and start a stop watch.

Battery crewmen rushed to their stations as my team members observed and took notes. We checked EVERYTHING – radars, computer, generators, communications, missiles, launchers, and crew performance. Most important was that in 15 minutes, the BCO could press the FIRE switch and the computer and related displays would let everyone know that a simulated mission had been accomplished.

Little praise was given for passing an inspection – that was expected. Failure brought the wrath of the battalion commander upon the unlucky battery commander and sometimes upon me for not doing enough – whatever - to have prevented that failure. After the inspection, successful or otherwise, there was always a critique to discover how performance could be improved and to disclose areas where more training was required.



Nike-Hercules missile in launch position, Baltimore-Washington defenses.
U.S. Army Center of Military History.

Types and Causes of ORI Failure

Immediately after the arrival of our new battalion CO, he asked to accompany us on inspections to better see his batteries in action. The morning after the first inspection, we took time to analyze everything that we had witnessed the night before - what was right, what was wrong, and where and how performance could be improved. The worst failures might be called "incredible stupidity." The best example might have been checking for low air pressure in missiles; each one deducts points. Every morning, a launcher-area crewman was assigned to inspect each missile for low air pressure. Our ORI team inspected all missiles for low pressure and time and time again this simple detail contributed lost points to failures. Picture hundreds of such "little things" that had to be just right for a "mission accomplished."

We were all concerned and the battalion CO suggested checking the intelligence levels of some of these men. The army tested recruits and assigned an AFQT score. AFQT scores low enough indicated

the soldier was, in today's terminology, "mentally challenged." He collected the names of some of the repeatedly worst performers and asked personnel to check their AFQT scores. BINGO! But what could we do about it? No immediate cures existed.

Army vs. Wedding, 1958

Elaine and I planned on a May 1958 wedding in Maryland. Months earlier my battalion CO met with me to discuss a special assignment that sounded interesting. Later in the year, the army would be installing the first Nike-Hercules system in the Baltimore-Washington defense in one of C/54 Battery's two facilities. Since the Hercules missile could be equipped with a nuclear warhead, he needed to send an officer to a special school that covered warheads, radiological safety, and some nuclear physics. Fantastic assignment but the school would be held in Alabama at the same time that we planned to wed. I requested he send another officer, but he replied that he and other commanders had considered that but determined that I had the closest educational background and, because this was the very first class of the school, their goal was not only to educate me but to have me evaluate the school's worth for future classes.

Faced with no alternative, I negotiated a nice deal that was also a little wedding present for us: he would put me on special assignment that authorized per-diem pay for a week before and a week after the school. These two weeks became our honeymoon and everything worked out well.

I learned interesting new technology, awarded the school a good rating, and learned something about myself even if a little late – that married life definitely improved my school performance. I graduated second in our class of almost 30 with a 98 average.

Mars Radio Station, 1958

A Special Services request sent to battalion was forwarded to me. Some C/54 battery personnel asked permission to set up and operate a MARS (military ham radio station) at the site. Why not? Good recreation contributes to good morale and this hobby could also teach electronic technology to other men. But without funds, how and where do we get the equipment? Simple – let's go see what we can scrounge from Aberdeen's B-29s! I called the airfield scrap yard for permission, assembled a group of ham operators, borrowed a 2½–ton truck, loaded it with tools, and headed for APG. We liberated several of each of the pieces the men thought would do the job and we also selected extra goodies, like a bombsight for our "scientific study." As best I recall, after some experimentation and hard work they assembled a working MARS station, erected an antenna on a telephone pole, and put the station on the air.

Career Manglement at the Pentagon

With the expected arrival of a new Nike-Hercules system at C/54, Artillery Career Management scheduled me to return to Fort Bliss for the Hercules Missile Officer Course. After graduation, I would be assigned to a new Hercules battalion, the first to be on Okinawa. There would even be concurrent travel for my family. But since nothing ever goes right, the Chi Coms soon began shelling the off-shore Taiwanese islands of Quemoy and Matsu and DOD diverted a Hercules battalion then on route to its new CONUS location and sent it on the next fast boat to Okinawa. That killed my orders to school and I would soon become excess baggage but not before they worked me and my battalion associates half to death.

Hercules Comes to Edgewood

To prepare our battalion and C/54 for the new Hercules system, most of the C/54 officers and key men along with half our battalion staff were sent to Ft. Bliss for several months of school. That left C/54 with two junior lieutenants and our battalion with only two missile-trained officers, the XO and me. He and I now would have to be on call 24/7 for any and all alerts at C/54 while still performing our regular jobs at battalion. If he or I had to shop at the commissary or PX on the way home, on leaving our office I would call the switchboard, identify myself, and tell that I was on the way to the commissary. Once there, I would go to their office to inform our switchboard of my location. On leaving for home and again on arriving at home I would again call the switchboard. My ORI team and I would in effect be inspecting our XO or me at the controls of C/54. The XO decided that we needed help but from where? Our new S4 was a QM type putting in his two years with a combat arm and he didn't know a missile from a bowling ball. Our chaplain and Medical Service Corps officer had been assigned for a while and were familiar with the batteries so they were selected as trainees and I was their trainer. Before long they could at least get things started at C/54, if necessary, while waiting for us to arrive. It was actually fun teaching the basics to these co-worker friends who were very willing students.

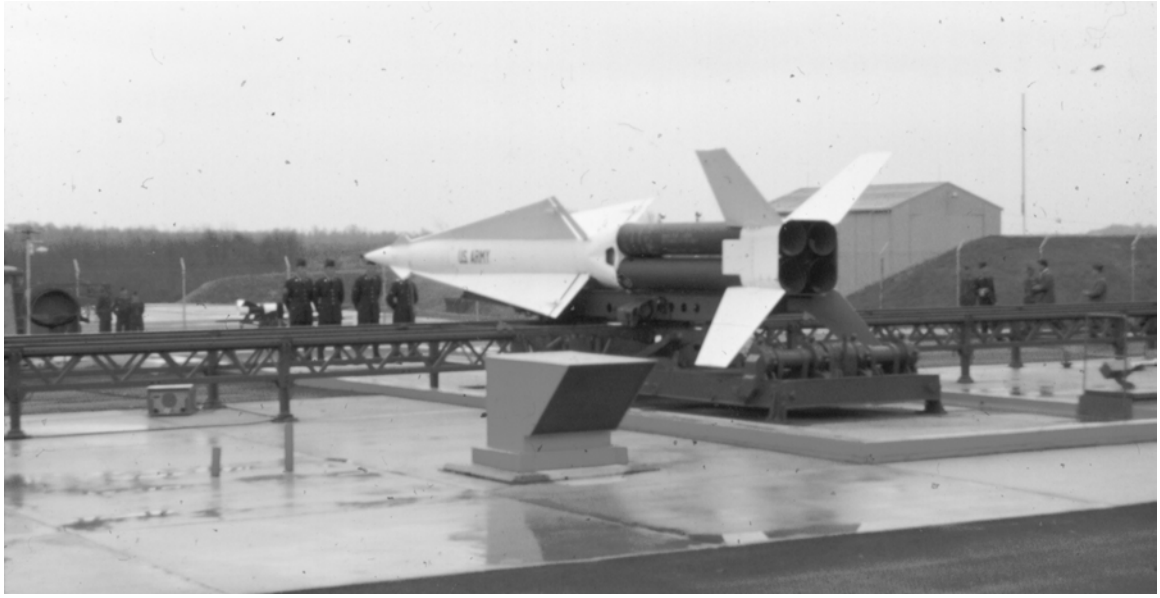
Playing With Hercules, 1958

As civilian technicians progressed with the installation of the new Hercules equipment at C/54, the XO and I watched eagerly. When they were testing it, we asked for a chance at the controls which were almost identical to Ajax but with longer range and more features, and we could lock onto targets south of Washington, DC.

During a training exercise one evening, the XO and I participated with the Hercules rather than the Ajax system. As usual, Missile Master designated specific targets to specific batteries. Instead of engaging our assigned targets, the XO and I took turns engaging every possible target at maximum

Nike battery at Edgewood, MD, manned by Battery C, 54th AAA Missile Bn.
U.S. Army Center of Military History.

range and we and our crew were having a ball. When Missile Master complained, we told them that we were testing our new system. We "recklessly" engaged every possible target and reported "mission accomplished" on each. For one "blip," on which we reported "mission accomplished," we failed to examine it on the precision scope to see that it was actually three aircraft rather than one. Missile Master asked which of the three aircraft we had engaged. Thinking fast, the XO told them "All, we used a big one" – intimating "nuclear warhead set to high yield." Finally someone at Missile Master realized that we had reported "downing" many more "enemy aircraft" than the number of missiles we could possibly have on site. Missile Master's duty officer called to ask where we had obtained the "additional missiles." I calmly responded "From the same place you got all the enemy aircraft, sir." I was teased about that for a long time.



Nike-Hercules missile on launcher at dedication ceremony for Hercules emplacement.

Fatal Accident, 1958

The most serious problem during my years of service occurred shortly after my transfer from C/54 to the battalion. On May 22, 1958, a missile suddenly exploded on its launcher at a battery in Leonardo, NJ, and ignited or detonated seven adjacent missiles on their launchers. Tragically, six military and four civilians were killed and others were wounded. Something was very wrong and we had to do whatever was necessary, at once, to prevent a recurrence.

We heard many explanations, but very soon, urgent orders arrived for what was called "Operation Fix It." The two most important were: (1) no more than one missile was to be erected above the storage pit at one time for any reason other than an actual enemy attack and (2) the explosive components of each missile – the two arming devices, the three warheads and the explosive harness (5 Primacord lines) and the 5-way connector linking all of them were to be inspected for any flaws by teams of civilian and military technicians. Technicians from each battalion inspected a few missiles in advance to have some ready in case of an attack. We moved each missile to be inspected away from the missile storage pit. In time, engineers constructed a revetted area on the opposite end of the launcher site from the fueling revetment. On the missiles I personally examined, we found nothing worse than some cases where an un-authorized turn of wire solder had been wrapped around one or two of the coupling sleeves for a tighter fit. We removed the solder, reassembled everything correctly, and as best I recall, neither we nor later inspectors found any problems in our defense.(9)

Gunfight (?) at C/54, Edgewood, 1958

On a fall Saturday, I was working as duty officer on C/54's Ajax system. The Hercules equipment had been fully installed but was not yet operational. The missile area was patrolled by armed men with guard dogs and there were usually more armed personnel in both areas. Even in the battery-control area, I usually carried my M1911 A1 pistol and occasionally my new 4-inch S&W .44 Magnum.

I was walking from the Ajax unit to the Hercules unit when I suddenly I heard the distinct sound of a projectile passing overhead and the report of what sounded like a shotgun from the marshy area between our site and Bush River. There were no buildings or roads in that marsh, hunting was prohibited, and nobody should have been there for any reason. What were they firing at - the crew, the radar equipment, our pet deer? A second shot following the first brought the armed gate guard and some men to my side. I fired three quick pistol shots at the ground, in the direction of the shooter, hoping to make him aware of our presence. Whoever it was replied with three quick shots in our direction. It was time for us to make a more definitive response! To protect the guard from possible legal action, I borrowed his carbine, switched it to full automatic, poked the barrel through the fence and swept the marsh area with all 30 rounds in the magazine. This was probably the most exciting thing that had happened there in years. No more shots came our way and our men began cheering. One called out "You got 'em, let's look for bodies." They ordered a 6 X 6 truck from the motor pool and drove all around the marshy fields but could find nothing.

In my report, which surprisingly brought no questions, I surmised that whoever was shooting in our direction had most likely entered the area by boat probably to hunt deer illegally and fled by boat. This was not an unusual an occurrence at C/54. Every few months there was some unusual activity along the fence line toward which the guards often fired. This activity may have resulted from our remote location – railroad to the north, marsh to the east and south and little-used WW2 firing ranges to the west. Previous reports included seeing flashlights moving along the fence, finding a ladder against the fence, finding cut wires and someone taking flash pictures at night. The guards frequently fired in the direction of these disturbances and sometimes their bullets cut the fence wire which meant a call to post engineer for repairs.

Excess Baggage, 1959

When our officers and men returned from Hercules School, they brought with them a new missile officer trained in the Hercules system and I became excess baggage. As a result I was re-assigned to the Missile Master system at Fort Meade. Elaine and I were assigned a tiny, army-leased, 3-bedroom, 1-bath house in Glen Burnie, MD. It was almost like living on post because there were dozens of other artillery troops living all around us and we could carpool.

Missile Master

Working at the Missile Master was interesting duty – 24 hours on and 48 hours off. The enlisted crewmen on duty could sleep in a ready-barracks across the street from the Missile Master building and the officers could sleep in a ready room with bunks next to the control room. On very rare occasions a crew worked for much of a 24-hour shift, but most of the time one could get 8 hours of sleep and it was nice to have two full days off.

The Missile Master control room had a stepped floor like a theater, so all stations could see the manual plotting and status boards in the front. Scaffold catwalks behind the manual boards allowed personnel to write backwards on them for the whole room to see. Even though the Missile Master

Missile Master building, Fort Meade, MD, after arrival of the Air Force detachment, since there are two "arctic towers." At the left end of the "tunnel" building from the Missile Master building is the generator building to which they added one more unit, essentially the engine and generator of a railroad locomotive. The main entrance to the building is to the rear of the Nike-Hercules missile, not far from the gate and guard house. To the right of the gate house is one of the two motor-pool buildings. The barracks in the foreground were for HQ Battery. *U.S. Army Center of Military History.*

system had automatic tracking capability – I believe it was called semi-automatic tracking - there was a row of manual tracking consoles directly in front of the manual boards. Behind these manual trackers were consoles for the height-finder radars and surveillance and entry consoles for the acquisition radar through which operators would enter targets into the Missile Master system. Further back in the room were consoles through which Missile Master officers communicated and exchanged digital information with all the firing batteries involved. At the very rear was a glassed-in suite with control consoles for the defense commander and staff.

Above the dropped egg-crate ceiling of the control room were two parallel banks of fluorescent lamps, one of which had blue plastic filters over the tubes. The white fluorescents were normally on but when Missile Master ran a mission, someone would call out "go to blue" and one of the crew switched on the blue lamps and switched off the white lamps casting an eerie blue light on everyone and everything.

We ran drills with all the missile batteries to make sure their training was up to standards.

Enemy Planes over Towson, MD

It was lunch time; we normally ate in shifts and I was one of the officers in the Missile Master control room. Suddenly the Air Force SAGE System called to say there were enemy planes in the area. We rushed to action stations and called up the entire defense. I began to operate a surveillance and entry console right next to another officer at a height-finder console – not our normal stations – which allowed us to monitor all video and symbology and to speak with the Air Force until more operators arrived and took their places. On our screens we could see no radar returns from actual aircraft but there were symbols, placed by SAGE, indicating hostile aircraft. Returning operators were contacting batteries in the Baltimore-Washington defense and before long the entire defense was at battle stations.

Soon, my scope showed live video returns from actual aircraft in the immediate area of the hostile symbology. Switching on the IFF, I saw "friendly symbols" adjacent to these live returns which indicated that they were the fighters the Air Force had scrambled – but still no live video of actual hostile targets. I asked the Air Force to patch me through to the flight leader of the scrambled fighters to find out what he could see. He reported "No hostile, or any aircraft" at various altitudes, which I could verify from his position on the height-finder screen adjacent to mine. They flew around searching bur could see no hostiles. In time, the alert was cancelled and everyone returned to normal.

Later the Air Force sent the answer to the mystery: USAF radar near the tip of the Delmarva Peninsula, "saw" and apparently began tracking fishing boats out in the Atlantic. The radar reported the azimuth of these boats 180 degrees out of position, which, when we examined a map, put the boats over Towson, MD. Unlike the UFO seen and tracked by several batteries over Baltimore a few years earlier, this event could be explained.

HQ Battery, 35th AAA Brigade

Just as I was becoming proficient with Missile Master, the HQ battery XO was transferred and I was selected for the job – and a job it was, with more than 400 men (almost battalion size) working all over the area, an air section, five outlying radars, and $70 million dollars worth of property for which I had to take responsibility. Look on Google Maps at the corner of 20th St. and MD Rte 175 (Annapolis Road). The HQ Battery orderly room was near the corner where the Vet Clinic is now. Some of the HQ Battery barracks still stand on 20th St. The Missile Master building is the large structure across the street. Note the Hercules launcher in the field between. You can see remains of some of the radar towers behind the Missile Master building.

The Right Man for the Right Job

Soon after my assignment to HQ 35th, I was told by my predecessor to take punitive action against a certain EM who had been the worst mail clerk in the history of warfare. First Sergeant Bettein knew little other than that the EM had done a noticeably poor job in the mail room and was quickly replaced by another man. I had to investigate.

I discovered that the man was from a seacoast town in New England where he had worked in his father's boatyard. He may have been a lousy mail clerk, but he had a clean military record and, more important, he appeared to be, and soon proved himself to be, a master craftsman at boat building and woodworking. Why punish him? We put him to work at his highest instead of his lowest skill, and everyone benefited. We arranged for him expand a small workshop in one of our buildings and we put him in charge of repairing and improving anything and everything wooden in our large area and many buildings.

Flying a Chopper, 1959

Under the administrative control of HQ Battery were Missile Master's five outlying radar sites. My duties included inspecting these sites monthly for administrative issues. Two were co-located on the Nike sites in Cronhardt and Sweet Air, MD, within easy driving distance of Ft. Meade. The remaining three were at Camp (now Fort) A.P. Hill, VA; Ft. Miles (Lewes), DE, and Chrisfield, MD – 80, 100 and 100 miles from Ft. Meade, respectively.

My policy for inspections was to drive to the two close sites and to fly to the three distant sites. Our 35th Brigade had its own air section with four choppers – two 3-place Hiller H-23s and two twin rotor Vertol H-21s. Previously I had taken a few chopper rides but now I had to travel several times each month. With our own machines and pilots who were friends and neighbors, I now sat in the second seat and received free flying lessons. It was a great experience, lots of fun, and I got to play "WW II fighter pilot." Using a speck of dirt on the canopy as a fixed gun sight, I could maneuver the chopper to keep my "sight" on a particular highway vehicle just as a P-51 pilot might have held his fixed sight on a German locomotive!

Nike gap-filler radar at Fort Miles, DE, atop Battery 519.

Bataan Death March Survivor Has a Drinking Problem, 1959

Unlike most typical military units, our HQ Battery troops worked in the various brigade offices, the Missile Master, or the outlying radar sites. Our battery staff, including my "old school, old soldier" first sergeant, Wildred Bettein, seldom saw or and possibly did not recognized some of our men. One day there came a call to the orderly room from Brigade; "Where is MSG ***?" Bettein and I both wondered "who is MSG ***, and what does he look like?" After some investigation, we were advised to look in a certain bar in Odenton, MD, aka "Boomtown." There he sat enjoying his nth drink of the day. We escorted him back to the battery area and soon uncovered some sad and frightening facts. He was a longtime drunk, but had survived the Bataan death march and would be eligible to retire in a few months with the rank of captain. Disturbing as that was, there was worse news – our man worked in the brigade's top-secret cryptographic vault.

We explored "help" agencies on post like AA but what should we do about his security assignment? We also considered - however alcoholic he may now be, how could we in good conscience take legal action against a man with his service record? With my CO's approval, I took the matter directly to the

brigade XO, who marched me right into the general's office. We decided to destroy all records of his security assignment, destroy the badge that allowed him access to the Missile Master building; assign him to the "permanent grass-cutting detail," advise him to join AA and try to stay out of trouble. We did all in our power to ease his last few months in service and as best as I recall, he made it.

Supply Problems

No Beds for You!

A new directive assigned an Air Force detachment – radars, computers, consoles and about 80 personnel - to the B-W Missile Master system. The single, enlisted AF personnel would be billeted in my HQ Battery already at a strength of about 400 men. I was XO and supply officer - no small job with a property book of $70 million - of HQ battery and I went to work immediately with my acquisitive supply sergeant. Our battery had adequate mess facilities and buildings but we learned that there was an acute shortage of beds at Ft. Meade. Sgt O'Donnell used all his abilities to requisition, beg, borrow, trade for and steal about 35 beds but we were still short almost 50. Repeated 1546 forms submitted to Post Supply came back "no more beds for you!"

Our battery CO was on leave and USAF men were trickling in daily. In desperation, after trying every other source, I phoned the brigade commander, BG Francis Ammerman. I explained that he was my last resort and added, "Doesn't AR *** (I forget now) state in effect that a commander may not go home until his men have been billeted properly, and sir, if I can't go home tonight then . . . ." . He got my message, laughed, and promised to call right back and he did - "The beds are on the way." I boldly asked how and where he had managed to find them to which he replied "Simple, I called the 2-star over me." The good news was that we got the beds. The bad news was that some of the "dead wood" over which I had to step to get the beds was now angry with me. (I didn't care since I had already decided to end my almost 6-years of military service – and these frustrations were some of my reasons. Two years later, Frank Ammerman retired and came to work at the same defense contractor facility where I had been working since I left the service. We were both pleasantly surprised and enjoyed talking over old times.)

Trading with the Navy

As HQ/35 Battery experienced supply shortages of necessary housekeeping items, it was decided to build up our surplus for future use or trading. When we heard that the navy was disposing of surplus at the Washington Navy Yard we did some paper work and before long my supply sergeant and I led a small convoy of trucks and men to WNY. After submitting papers and while our men were loading desks, lockers, beds etc, I invited Sarge to explore the navy yard with me. Inside one humongous building (the big gun shop), we saw men dismantling gigantic lathes and other machinery. I wish I had brought a camera. In a warehouse, we watched men disassembling a variety of large, intriguing, optical instruments into piles of lenses, prisms, and various metal parts. We were invited to help ourselves to anything. I still have one big prism as a souvenir.

Walking past a riverside dock where a submarine was moored, we learned the meaning of a nautical term. Neither of us had ever been aboard one so I asked if we could visit. We were led down a ladder in the conning tower where a crewman explained the periscope and related equipment. Sarge leaned against that ladder we had just descended and neither of us paid attention when a voice from above called out "Down ladder." Serge found himself lying on the deck under the feet of a surprised sailor.

Critical Supplies and Computer Problems

Many of the critical supplies for B-W air defense came from a giant warehouse at Ft. Meade. Simultaneously, the government was experimenting with computers for inventory control. As with many new concepts, this computerized supply system had lots of bugs but better to fight the bugs in peacetime than later in war. What supply failed to consider was that except for the shooting, our commanders considered air defense to be on a war status. When our supply people complained about unavailability of parts we all learned something interesting: even if the parts were physically in the warehouses, as long as the computer showed them as *OUT OF STOCK* the supply clerks would not allow them to be drawn. This policy was possibly a good idea for computer programmers but not for air defense.

The warehouse functioned not unlike a modern supermarket. On arrival, supply men compared their shopping list to a computer printout and then went to the warehouse to pick products from rows of shelving. If they saw a needed item not on the available list, they hid it in other boxes or under clothing or snuck it out behind the back of a distracted check-out clerk. I heard one amusing account about shoplifting a particular electrical cable that was on the shelf but it was listed as *OUT OF STOCK* in the computer. They returned later that day for more parts. Among them was a thin man wearing the raincoat of a fat man. Once out of sight between shelves, they wrapped the cable around the thin man under his fat coat and he walked out to the truck while they took the new parts through the checkout counter.

Mobile Nike display. To the right of the standing man are consoles of the battery-control trailer and to his left would be the radar-control trailer. Visible is one of the three TTR operators (azimuth) at his console. To his left, but not visible here, would be the TTR's elevation and azimuth operators and then the MTR console and its operator.

New Career and Stardom for the Bad System, 1959

I was surprised to learn that C-battery's "bad" integrated fire control system had been moved to a warehouse at Ft. Meade for transformation to a mobile, public display of a missile system. At first opportunity, I went to visit. Each cabinet and console was palletized for easy transport by fork lift from a transport trailer to an indoor or outdoor display area. The interconnecting cables, carefully removed from the vans were now clearly marked for rapid and easy assembly and disassembly. Large, attractive signs were being made to identify each piece of equipment, tell its job and how it worked. They would later add missile-launching consoles, a training missile on a dolly, and one on a launcher to the display. I saw one set up and "operating" with a full crew for Armed Forces Week in a hanger at Andrews AFB. It was a thing of beauty.

Handle Plutonium Carefully, 1959

One day I discovered that I was responsible for one new model nuclear warhead for the Hercules missile. "My warhead" had been delivered to C/54 in Edgewood, the first Hercules battery in the defense. As soon as C/54 finished training (they would soon replace all their old warheads) it became my responsibility – WHY ME, LORD? – to move it to the next Hercules battery on the list in Waldorf, MD.

I met with the CO of Fort Meade's Nuclear Escort Detail (or similar name) to make final plans. C/54 would have the "nuke" disassembled and packed in shipping containers ready for transport and we would transport it through Maryland to the new site. I would provide about 10 armed men in 5 sedans. Escort would draw a large semi from the motor pool and provide a few more sedans and armed, radio-equipped men to ride in all the vehicles. I would drive the lead sedan with Escort's second in command, a radio man, and one of my men. The semi would be located in the middle of the convoy. The Escort CO would drive the last sedan. My men carried .45 automatics and .30 cal. M2 carbines while the Escort team carried an assortment of weapons including ancient .45 cal. Thompson M1s.

The crew at the Edgewood site had promised to have everything packed and ready for us early in the morning on moving day, a Friday. We mapped our route in advance to avoid Baltimore's new Harbor Tunnel – since there was a long list of prohibited items that included "wet animal hair," of all things. We would travel through and around Baltimore using as much as possible of the partially completed beltway. Included in our goal was to make our delivery at Waldorf and return the trucks and sedans to Fort Meade's motor pool before it closed at 1700 hours.

We drove in convoy from Ft. Meade to Edgewood but the warhead was not fully packed and we had to help complete the job. By the time everything was inventoried and loaded, it was very late and we had not yet packed and secured some small accessories. To save time, we wedged them into our sedan trunks so that they would not roll around in the semi-trailer. I recall that the can with the plutonium was placed in my trunk. The Escort CO and I concluded that it would be impossible to complete our mission in time unless we used the Harbor Tunnel. Security regulations for transporting such cargo stated that "we would not stop for anyone, for any reason," which we would/could enforce with our armed crew. We sent a man onto the post for tunnel tickets and set off down US 40. Once at the tunnel, I told the agent how many vehicles were behind me, in convoy, and handed over a ticket for each. There was only one interesting event on the trip - at the intersection of US 301 and MD 5, US 301 bridges over MD 5 and ramps down to its right lane. The steady stream of traffic on MD 5 would have prevented us from entering and continuing as a convoy. I halted on the down ramp for a radio conference. The Escort CO decided to have one of his men from the second sedan get out and

stop traffic on MD 5 until we were all in column again on the shoulder of MD 5. This man fearlessly walked out into the traffic lane with his arms above his head. In his left hand was a red flag and in his right was a Thompson. All traffic stopped! I'd guess he had done that before. All went well from there on. I have never heard of anyone else transporting such cargo through the tunnel.

Postscript

After I left the army, I took a job as an engineer at Westinghouse, near BWI Airport, working on mechanical aspects in the development of some kind of missile for a proposal to the government. Out of curiosity, I read portions of the text prepared by others. One thing that stood out was that the missile used a liquid-fuel rocket motor that burned the same ingredients as a Nike Ajax – IRFNA, JP4, and UDMH. However, someone had substituted a completely wrong substance for one of these ingredients. I pointed this out to my boss, who said something like "Not our department's problem." But if our company's name was to go on the proposal, it should not have contained errors. At lunch time, I sought out the writer, Werner Hohenner, a German scientist who had been brought to the U.S. along with Werner von Braun. He turned out to be a very pleasant chap who appreciated my discovering the error and wanted to know how I knew of these details and all about how Nike worked. No promotion or raise, but I had made an interesting acquaintance who invited me back to his lab and who occasionally visited me in my office.(10)

Sources and Notes

1. Mark Morgan and Mark A. Berhow, *Rings of Supersonic Steel* (San Pedro, CA: Fort MacArthur Military Press, 1996). Christina M. Carlson and Robert Lyon, *Last Line of Defense* (Denver: NPS, 1996). Christopher Bright, *The Quiver of Zeus: Nike Anti-Aircraft Missiles in Fairfax County* (Fairfax County, VA: Fairfax Chronicles).
2. War Department, FM 44-80 *Procedure and Drills for Nike 1*; TM 9-1970-2 *Ammunition Antiaircraft Guided Missile M1 . . .;* and a pile of work books from the Guided Missile School still in my basement.
3. Abbreviated history of C, 54th AAA Missile Bn: Constituted March 2, 1899, as Battery N, 1st Regiment of Artillery. Redesignated 1901 as 11th Company, Coast Artillery, Artillery Corps, in 1916 as the 9th Company, Ft. Mills and then 9th Company, CD Manila and Subic Bays. Redesignated 1924 as Battery G, 1st Coast Artillery, reconstituted 1950 as Battery C, 1st Coast Artillery Bn. Battalion redesignated 1954 as 54th AAA Missile Bn and activated at the Army Chemical Center (Edgewood, MD). Inactivated 1958 at Edgewood. In 1959, consolidated as part of the 1st Artillery, a parent regiment under the Combat Arms Regimental System. In 1971, redesignated 1st Air Defense Artillery Regiment. James Sawicki, *Antiaircraft Artillery Battalions of the U.S. Army*, Vol. 1 (Dumfries, VA: Wyvern Pub.), pp. 152-53.
4. Davis S. Knox, ed., *35th Antiaircraft Artillery Brigade* (Miller Pub. Co., n.d, ca. 1954-55). Http://www.ftmeade.army.mil/museum/Museum_AAA_Missiles.html.
5. *Rings of Supersonic Steel*, p. 39.
6. The BCO and others leaders wore two headsets, taped together. One was connected to the regional air defense network and the other to the battery network. Each mic had its own switch so that we could listen to both networks all the time but speak only to the selected one. The mic switch on the local or tactical network was probably open all the time while the one to Missile Master was press-to-talk, so they did not hear all our chatter.
7. After the missile explosion accident at the New Jersey battery, in peacetime only one missile would be outside the storage pit.
8. The Ajax engine burned a mixture of JP4 (a jet engine fuel) and the oxidizer RFNA (inhibited red fuming nitric acid), which were forced into the rocket combustion chamber by high-pressure air stored in a spherical pressure vessel. These two liquids do not react without the introduction of a small amount of a third, critical substance

UDMH (unsymmetrical dimethylhydrazine), which was stored in a separate chamber. The RFNA, one of the most corrosive substances known, was "inhibited" to keep it from eating through its aluminum storage barrels or the missile's oxidizer tank by adding a small amount of fluorine, an even more corrosive substance, which reacts with the aluminum to produce a protective coating of aluminum fluoride - immune to etching by RFNA. Nasty stuff!

9. Http://ed-thelen.org/mono-7.html

10. Hohenner, who worked on the development of the German V-1 "Buzz Bomb," made major contributions to the development of the U.S. Navy Polaris missiles. He died November 24, 2000. http://articles.baltimoresun.com/2000-11-29/news/0011290120_1_scientist-polaris-missile-ballistic-missile.