

Missile Maintenance Career Field

Being introduced to missiles

Prior to enlisting, the Air Force had prospective enlistees take an aptitude test called the Airman Qualifying Exam (AQE). The AQE was scored in four major areas, General, Administration, Mechanical, and Electronics. Your AQE scores were reviewed and considered by the Air Force prior to entry into its service. My results were received within a couple weeks of taking the exam and the recruiter provided information about the four aptitude areas and how they would be used to define your career path in the Air Force. All four of my AQE scores were the same and I chose mechanical as my preferred aptitude area.

After my enlistment and towards the latter part of basic training our training flight was told that on this day we would be making career field selections. We received little, if any, information on what we were about to do other than the career field you selected could not be scored higher than the score from your selected aptitude area. We entered a classroom and I remember seeing different career fields listed on a chalkboard with an AQE score by each one. In the mechanical aptitude area there were three selections, jet engine mechanic, aircraft airframe repair, and missile maintenance. The statement was made that if your AQE score matched up with the career field you picked you could be assured that you were going into that career field. I selected missile maintenance even though I really had no idea of what that would entail, but missiles seemed much more appealing to me than what aircraft maintenance would be. After all, I had frequently seen many aircraft, but only television presentations and subsequent pictures of dramatic rocket launches sending our astronauts into space. I also had been intrigued reading about Nike missiles being based in my home state even though I had not actually seen them.

Technical school training

After basic training and several more weeks waiting for orders, I arrived at Chanute AFB, IL late on Christmas Eve in 1969. I spent my first few weeks at Chanute waiting for the next missile maintenance training class to start. During that time there was usually KP duty to occupy my

days to what seemed like endless waiting for training to begin. Finally, in mid-January, two classes started at the same time, one class began in early morning ending in mid-afternoon and the second class began mid-afternoon and ended in the late evening. Each class would keep their respective schedule for the approximate twenty-week course. Classes would be held in Grissom Hall, our training building named after the late astronaut who died a few years before.

The training was broken in many segments. Individual classes lasted a week or two in duration. We started with training on pneumatics, hydraulics, pneudraulics, electronics, etc. Each class concluded with a test that required a successful score. It wasn't until later in the training that we began to learn specifics about the Minuteman weapon system itself. It was quite amazing to learn that we had 1,000 Minuteman ICBMs located throughout many states and I (and probably most in the class) had no knowledge of this up to that point.

We studied illustrations of the launch facilities and learned how the missile and the accompanying systems operated and were maintained. We also received information on some of the differences between the six missile wings. It was quite an experience as a class to see what we were going to be doing along with the potential bases we could be assigned to. Grissom Hall had a large bay in it with an above floor steel tube mock-up of the upper portion of the launch tube. The mock-up contained a training RV and training G&C installed on the top of a third stage interface. There was no closure over the top of the tube, but rather a simulator representing the interior of the RV/G&C semitrailer van. It was a realistic trainer to receive initial instruction and perform the actual first steps of training for an RV or G&C removal and replacement.

At a point in training we could select our first, second, and third choices for our base of preference and eventual assignment after completing the course. We were informed it was wisest to select from the six operational bases as Vandenberg AFB and Hill AFB, the other two bases on the list, were pretty much a waste of a selection as no student in recent memory were able to go to either as their first assignment. I remember selecting Ellsworth AFB as my primary choice for no memorable reason other than I had been in South Dakota a few years

earlier and had remembered the Black Hills which Ellsworth was located close to. Near technical training conclusion, I received orders for Ellsworth AFB.

Operational base training

I arrived at Ellsworth's 44th SMW, a wing of 150 LGM-30B Minuteman missiles, in mid-June 1970 and it was a month or so until my initial Missile Maintenance Team (MMT) was formed and we began to train together. In that month there was opportunity for base orientation, a start to getting military driver's license for the multiple vehicles we would need to drive, to receive your toolbox and tools, pick up winter survival gear, etc., etc. The other members of my team consisted of our team chief being reassigned from the B-52 Hound Dog missile program, a technician arriving from the recently decommissioned Mace missile system in Okinawa, a Minuteman qualified technician from another team that was no longer intact, and two of us recently out of tech school on our first PCS assignment.

We received instruction from an MMT training team with the training broken into segments over the next couple months. Some of the first segments were learning how to check out and perform pre-operational checks for maintenance vehicles and the multitude of support equipment required for our tasks at the launch facility. This was important because vehicle and equipment problems discovered after leaving the base could mean delays that ate into our working timeline of 16 hours or 15 hours when transporting an RV. Other tasks such as: site penetration and departure; elevator workcage removal and installation; RV/G&C van positioning, setup, and teardown; launcher closure opening and closing; missile safing pins installation and removal; assisting with missile installation and removal; RV removal and replacement; and G&C removal and replacement, along with many lesser performed tasks were taught over the course of the training.

Ellsworth had an on-base full scale LF trainer that provided easy access for RV and G&C training. The training was really centered on RV and G&C removal and replacement, as they were the most frequently performed tasks an MMT team performed. Once trained and ready to be evaluated, each team received an evaluation by the Wing's MMT Quality

Control Team on RV removal and replacement and another evaluation on G&C removal and replacement. For these two major evaluations, each team member had to receive a successful qualified grade on each task they performed in order for the team to be certified to work on the operationally deployed missiles. The evaluators closely scrutinized each individual on each task and a team had a sense of accomplishment when passing these evaluations.

A few days after completing our G&C evaluation we were able to stand at attention before the wing commander for certification. Our team chief provided a canned briefing to the commander and the commander followed with questions of his own towards all of us. He then certified us as MMT team members, and we became eligible to work on any of the 150 missiles in the wing.

While the evaluations and the certification were memorable there were a couple other events that I can easily recall from training. One was a dispatch to the off-site trainer. Missile site L-06 was an off alert sortie with a dummy warhead. That dispatch served as a reality check to the increased effort and time needed when performing an actual dispatch rather than using the on-base trainer. Driving times, gaining clearance to access the site, having to do all the prep tasks of site penetration, workcage installation, lowering support equipment into the equipment room, etc., and vice versa on our departure, presented a greater overall challenge than we came to expect when using the on-base trainer. At the on-base trainer, we could leave equipment in place and pre-positioned in the equipment rooms and launch tube. The trainer also had a separate entry with stairway leading to the first level equipment room in lieu of penetrating the site via the PAH each time we needed entry into the launch facility.

The second recollection was our first dispatch after being certified. The practice then was to have a couple training team members accompany a team on its first dispatch after certification. It was just a practice to make sure things go well. For that first dispatch, we had a little over a hundred mile drive to the furthest site to the east of Ellsworth, LF E-03. We had a G&C to remove and replace and it was a very hot, 90 plus degree day with a strong wind. Memorable because I worked topside and came back sunburned, windburned, and exhausted after a 16-hour

day. Soon that would become the norm as we all adapted to lengthy dispatches in many different elements of weather.

Pre-departure

Preparing for our day of maintenance was very important. You needed to be sure you had everything you needed and that everything you needed was serviceable. On the way in for a dispatch, you typically had to stop at the armory and pick up either a .38 pistol if transporting a G&C or an M-16 rifle if transporting a RV. If transporting both items, we needed to carry both weapons. Once at the shop, the two topside technicians (worked above ground and in RV/G&C van) typically started by ensuring the RV/G&C van and its tractor were good to go from a visible review of the vehicle's chassis, tires, fuel level, batteries, etc., and a review of the vehicle's records to make sure there were no outstanding discrepancies that could impact its use. The bottom side technicians (worked in the launcher equipment rooms and launch tube) performed similar checkout tasks on the 5-ton rated maintenance van.

The RV/G&C van's auxiliary power unit (APU) was checked and operated along with verifying capability for the van to assume power from facility or site power. Hoists were checked for proper operation in each direction in both vans. The RV/G&C van's security system was checked by arming the system with all access doors (front, back, and floor) closed and then by verifying each door's switch would sound the alarm when a door was opened. The maintenance van contained the many pieces of support equipment needed to penetrate the site and perform all tasks in the launcher. A multipage checklist was used to help ensure nothing was forgotten and we ensured all test equipment was within its calibration period and also self-tested to confirm serviceability, that all torque wrenches were calibrated, that quick release pins were working, that the compressed dry nitrogen bottle contained adequate pressure to lower the closure's lock pin, that all items were tightly secured on shelves, in cabinets, in drawers, or to walls of the vehicles to prevent damage while traveling to the site, plus many other functions to help ensure this trip would be successful. A technical order (TO) kit about the size of a footlocker containing the TO's and checklists we needed or might need was also signed out and secured in the maintenance van.

The team chief and assistant team chief picked up the launch facility entry keys and classified codes used to authorize entry into the launcher. The team chief also received a briefing from plans and scheduling on weather, road concerns, and could receive work orders to correct launch facility problems in addition to the items we were being dispatched to fix. Only smaller accompanying work orders would be assigned if we were going on a major task such as an RV or G&C replacement.

The last task before departing on a G&C replacement dispatch was to upload the G&C container (with G&C inside it) into the RV/G&C van. The container was placed into the van using the van's hoist and then secured to the van's floor. Power was supplied to the container via the van's APU to keep the G&C environmentally controlled. Security was then set on the van after closing up all the doors. If taking an RV then the van was driven to the weapons storage area (WSA) to upload the RV and secure it on its pallet in the van before traveling to the LF. The added security requirements when accessing the WSA always added more time to our timeline before base departure. Accompanying security during travel was typically an armed security policeman that would also be responsible for on-site security at the LF and would receive coding to open the PAH's A circuit. Security was tighter when transporting an RV. In the early 1970's, the maintenance team simply traveled with an additional security policeman so two security policemen traveled in the maintenance van. Before that decade was over that changed to add a commissioned officer as a convoy commander in a lead vehicle, then a US Marshall to accompany the convoy, then later additional security forces in separate vehicles to the front and aft of the convoy along with observation from a helicopter. It was not uncommon for delays to occur while waiting on all support to be in place before traveling.

Prior to driving to an LF that could have a drive time anywhere from one to nearly four hours we would always feel good if we used no more than approximately one and a half to two and a half hours to get off base, but it wasn't all that uncommon to have three, maybe four hours or possible a little more before departing the base due to running into problems, whether it was equipment, personnel, or other logistical

issues. There was a dependency on so many things outside the maintenance team's control that contributed to our departure time.

Traveling to and from the site

Due to the size and weight of the RV/G&C van, it could only travel over authorized routes. That meant certain LFs that were only an hour and a half away when driving a lesser vehicle was really two and half hours away for us with road and bridge limits factoring in for safe travel with the RV/G&C van.

Winter brought its challenges with harsh weather. At times after heavy snowstorms a large dump truck from base civil engineering equipped with a front mounted snow blower and loaded with road sand might be needed to lead our maintenance vehicles to help ensure safe passage over roads leading to the launch facility. Blowing snow was the culprit in creating drifting quickly and we fought it not only while traveling, but also while on site. There were times when the winds created a blowing blanket of snow over roadways to the point where no road could be seen, but it would be perfectly clear looking upward or sometimes even at eye level. This was when you had to pay closer attention than normal to where road edges were.

Another thing we had to pay attention to was to make our radioed security checks every 15 minutes back to job control via our VHF radio when transporting classified missile components. We would identify an LF we were passing by, a landmark, road intersection, mile marker, or some other point that could be interpreted by job control as to our location. Missing a security check could have the possibility of sending out security forces to locate us.

Upon site arrival we used our vehicle's VHF radio to communicate to the LCF to gain permission to break the site's outer zone security. Once on site and then using the site's communication network in the LF's support building we passed coding back to the LCC that would identify us and permitted us to receive the PAH B plug combo, to break the IZ security, and begin site penetration. If another team was already on site, combat targeting for example to overwrite launch coding, site

access would be much easier with the on site targeting team chief personally verifying us before our site entry.

On-site maintenance

The most frequent task that an MMT team performed was G&C removal and replacement which, of course, entailed the task of RV removal and reinstallation. A team's proficiency typically improved the longer they worked together doing these tasks and each of the five team members had a function and a hand in many tasks long before removing an interface bolt securing the RV or G&C, and the same can be said after the RV or G&C was fully installed.

Preparation tasks such as: site penetration, lowering equipment down the PAH to the launcher equipment rooms, positioning and readying that equipment, penetrating the launch tube, installing the workcage and workcage motor, installing missile safing pins, retracting the launcher closure lock pin, setting up test equipment and cables, precisely positioning the RV/G&C van to ensure it would be centered correctly over the missile after launcher closure opening, removing the G&C container's upper portion to ready the new G&C for installation, connecting the hydraulic motor and pump for opening the launcher closure and then opening the closure, were just a few of the many tasks required before thinking about the removal of missile components. It was the same process when the purpose of the maintenance was completed, and everyone did their part in tearing down and removing the equipment and in securing the launch site in preparation for departure.

Each person on the team performed tasks broadly based on their assignment as team chief, diving board technician (worked on the lowered launch tube access door commonly called the diving board), workcage technician, or topside technician (2 of these on the team). The longer a team worked together the more each member began to learn how they fit into the team and also develop correct expectations on what the other team members did and, as a result, their proficiency improved. Not all teams necessarily worked in identical manners though, for example one team might have the team chief and diving board technician install the workcage and another team might have the

diving board technician and the workcage technician install the workcage, or one team might have the team chief pressurize the ballistic actuator to lower the closure's locking pin and another team had the diving board technician do that task. So as long as a team worked together things went pretty well, but when someone was on leave or sick and a replacement technician was assigned for a dispatch there was always a little bit of a slowdown or questioning of who was doing what that added to the timeline on site. This was when the team chief was really needed to manage the team's performance to ensure safety and that tasks were completed efficiently and correctly.

There were other less frequent tasks performed by an MMT team such as assisting a missile handling team for missile removal and replacement with MMT being responsible for all the functions in the launch tube. There were even more infrequent tasks usually caused by a damaged component such as needing to remove and replace a launcher closure multiplying linkage or an upper umbilical cable. In many cases, the less frequent tasks became more of a challenge simply due to unfamiliarity or running into obstacles such as a seized fastener that had been installed for many years and was now corroded.

Bitter cold weather always slowed our maintenance speed. It was very difficult to work in the winter gear we were provided. Thermal underwear was a necessity and parkas would have been nice to use, but limited our mobility if we did wear them. Everything became more difficult in the colder weather from manually lowering equipment up and down the PAH to stabilizing the RV/G&C van since grease in the manually operated screw jacks become more like thick glue rather than a lubricant. Quick release pins might freeze in the locked positions and normally flexible environmental seals on the RV/G&C van flaps and elsewhere got so hard they became ineffective in sealing or being able to connect together.

One thing missing in the cold winter though were snakes. In the warm weather, rattlesnakes and bull snakes loved the cool concrete under the launcher closure. There was enough clearance for snakes to rest under the closure in the area outside the closure to launch tube bearing surface. It was also attractive to mice to enter that area which in turn attracted the snakes. It was very common to run into snakes when

opening the closure. They came out, but never went too far away to make us feel comfortable. The best remedy for a wary rattlesnake was shooting a CO2 fire extinguisher at them when they cleared the immediate area of the launch tube opening. It froze the snake at least temporarily to dispatch it. And there were several times when a snake would rather go over the edge of the launch tube and fall to the bottom of launch tube rather than scurry away. The actual fall never seemed to kill the snake and we did find snake skeletons at the bottom of some launch tubes.

Return to the support base

Return trips to the support base were similar to the trip out with the exception that we were much more tired now and sleepiness would sometimes settle in and we had to be cautious of that when driving back. Regardless of which direction we traveled, we would see antelope and deer in the plains or lower hills along with a lot of other wildlife like fox, jackrabbits, hawks, etc., and depending on our dispatch time bright and spectacular sunrises or sunsets.

Once back on base, we first downloaded the RV at the WSA if we were bringing one back. Otherwise, we serviced our vehicles and proceeded to turn over the G&C housed in its container before turning in our vehicles, equipment, keys and codes, etc. It was important to always document any vehicle or equipment discrepancies so the items could be fixed before being configured for their next dispatch. The same was true of the team chief filling out forms about our completed maintenance and documenting any discrepancies found at the launch site from cork repair needed on a missile interstage, to the backup power diesel generator leaking oil, to a PAH "B" plug combo cover fastener that wouldn't tighten, and everything in between.

It was always good for the team to know that the missile that was "down" and that we just dispatched to work on – was now back on strategic alert. We usually found out by the time we got back to the base if combat targeting was successful in loading coding to the missile to bring it back to alert. Contrary to our Air Force counterparts in aircraft or other areas that could eventually see the end item actually perform post maintenance, we had to take satisfaction in knowing the missile we

just worked on was now simply ready to go. Hearing “the bird is back on alert” was a satisfactory conclusion to the day’s dispatch.