

Association of Air Force Missileers AAFM Newsletter

"Victors in the Cold War"

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Missile Targeting and Alignment - Part II

Coming - 40th Anniversary of the Competition Special Issue

*Curtain Raiser - Olympic Arena -
Guardian Challenge*

Send us your stories, photos and memories about your experiences in competition. We will commemorate the 40th anniversary of the first Missile Competition, Curtain Raiser, with a review of all 40 years from members who participated in the "Comp." Send by e-mail or mail.



Alignment in Winter on the Northern Tier

In the December 2006 issue, we began a series on missile targeting and alignment with an article by AAFM Board Member, CMSgt Bob Kelchner, who served as a member of a Minuteman targeting and alignment team at Malmstrom and in the 3901SMES. We continue with the series this issue with four more stories that tag on to Bob's opening article. You may see some repetition - so we can let each person tell their own tale. Alan Wright provided our photos in this issue. We will continue the series in the June issue.

Target and Alignment Officer at Malmstrom - by Alan Wright, MbrNoA1308, McCall, ID

Allan served as target and alignment officer on team Tango 4 on the MMII system from 1967-1970 at Malmstrom. His team targeted two missiles pulled from Malmstrom and taken to Vandenberg in 1970 for operational test flights. He says there may be a few errors in some of his recollections of almost 40 years ago, and welcomes comments and corrections that other members may recall. I'll get the photos on a CD in the mail as soon as possible.

A target and alignment team had three basic jobs to do at a missile site. The first and simplest was called an Overwrite and Shutdown. When a missile went off alert due to some malfunction in the guidance and control unit (G&C) or reentry vehicle (RV), the first thing that needed to be done was to overwrite the target information loaded in the G&C for security purposes. The missile site was then shut down so that other maintenance teams could remove and replace the defective part. No actual repair was undertaken at the site. Everything on the missile was remove and replace. Running the overwrite tapes and shutting down the site only took a couple of hours once we were inside. If the weather was nice, the next maintenance team arrived on time, and the site wasn't too far from base, we might be out for as little as eight hours. We still needed to turn in all our equipment - essentially the reverse procedure of getting ready to go out - but an eight hour job was considered a luxury.

Once the problem at the site was fixed, a target and alignment team was needed to perform a TASU (Target, Alignment, and Start Up). Most often the other maintenance teams had departed so we would penetrate the site. Once inside we had three basic tasks to perform. One was to align the collimator, located on a concrete bench on the upper level of the launcher equipment room (LER), to the reference mirror bolted onto the wall of the LER. The

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The Mission of the Association of Air Force Missileers -

- Preserving the Heritage of Air Force Missiles and the people involved with them
- Recognizing Outstanding Missileers
- Encouraging Meetings and Reunions
- Keeping Missileers Informed
- Providing a Central Point of Contact for Missileers

Targeting - (Continued from Page 1)*MMII G&C with alignment window*

reference mirror was about a foot in diameter, two to three inches thick, and what was called a “first surface mirror.” This meant that the reflecting surface was on the outer layer of the mirror, unlike ordinary mirrors that have clear glass over the reflecting surface. This allowed for an undistorted reflection. The mirror was very precisely ground. It was intended that the mirror could not move, and also very important not to touch the surface of the mirror.

The alignment process involved using a theodolite to measure the angle from the mirror to the collimator. The theodolite was positioned in front of the collimator on the bench built into the LER wall. One person did all the shooting while another recorded the measurements. One began by aligning the theodolite with the reference mirror and “shooting” at the light beam reflection from the mirror (the light beam was generated inside the theodolite, bounced off the mirror and the reading was measured by the theodolite). This gave the direction that the surface of the mirror was pointing. We then turned the theodolite toward the collimator and aligned it on the edge of the light beam transmitted by the collimator. The light beam in the collimator could be adjusted to achieve the correct angle. Once the angle was set, we had to verify it with 20 measurements from the mirror to the collimator, each being within a very strict tolerance. One measurement was taken with the theodolite in the normal position, then the second was taken by inverting the telescope and taking a reverse measurement. The third was taken normally and the fourth in reverse etc. These measurements were taken to 1/1000 of an arc second (a circle is measured by 360 degrees, 60 minutes to a degree, 60 seconds to a minute, and a second broken into 1/1000s). (After 40 years, I am not sure the accuracy measurement correct) This was a very time consuming procedure and if any

measurement fell outside the tolerances then the personnel switched jobs and the whole process was done again. When a team was new, team members were slow and often the procedure had to be repeated (sometimes several times).

The second job was to load the target tapes into the computer on the missile. This was done from an equipment rack located on the upper level of the LER. We lowered and installed a tape transport and control monitor into the rack. Following the technical orders we were then able to load the tapes (about 10+ spools of tape) one at a time through the tape transport. The mylar type tape was about one inch wide and contained numerous perforated holes. It did not appear to be electromagnetic tape. The target and alignment team had no need, and therefore did not know what information was being transmitted to the missile. Once the tapes were loaded we received a numerical readout which we reported back to the base. If the readout matched the number at the base Code Room, the tapes were successfully loaded.

The final job on a TASU was to start up the site. This involved carefully following the tech orders through a series of pressing buttons and turning switches. Once the G&C acquired the collimator (meaning locking on to the light beam) and the start-up process was completed, we pressed a button which caused a yellow light to come on showing missile “enabled”. We verified this status with the LCC and we were then able to begin to close up the site.

The target and alignment team was always the last team to leave the LF. All other teams had left prior to the TASU being started. Closing the site was also a time consuming process. All our equipment had to be lifted up the access tube and carefully loaded into our vehicle. I made the last check of the LER and switched the “plug” to start it up into the tube. This took about 10 minutes. I

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*Cold Weather Theodolite Sighting*

Targeting - (Continued from Page 2)

then closed the locking bolts for the plug and climbed out of the tube for the last time. We pulled and unbolted the top of the ladder, pulled the safety barriers, finished loading the vehicle, and closed and locked the personnel access hatch (PAH). We then left the site and locked the gate. Once outside the gate we called the LCC and asked them to reset security. This could take up to a half an hour. We then had to wait for them to report security (both inner and outer zone security) was set, and we were free to return to base. If the job, including the time to get back to the base, took longer than 16 hours, we were directed by Job Control to the LCF to rest, eat, and sleep for eight hours before returning. When a team was fairly new this wasn't uncommon for a TASU. Also if weather was bad, the LF was a long way from base, or if things just didn't go smoothly we might have to divert to the LCF for rest.

The third target and alignment team job was called an RMAV (Reference Mirror Azimuth Verification). This was normally only done once a year and on a scheduled basis. That was the good news, that we knew when we were going to be out on one of these jobs. The bad news was that this was by far the longest job we had at a missile site. An RMAV was also almost always done at night, generally in the Spring when it was still cold, to avoid heat waves distorting our theodolite measurements. About half of this job also took place above ground.

There were three "monuments" located around the LF, as described last issue by Bib Kelchner. Monument A (also called station A when we had a theodolite mounted) was located adjacent to the launcher closure door track. The other two monuments were outside the fence in farmers fields and were several hundred feet apart. A monument consisted of a concrete pillar about 4 ½ feet tall (above the base) and about 18" in diameter,



Shooting an angle



Collimator Alignment

with a metal plate and anchor bolt in the top. Around the pillar was a raised circular base maybe 15 feet in diameter and 3 feet high that helped protect the monument from disturbance. The monument was apparently buried deeply in the ground, and they were not supposed to move. The two monuments in the field were called monuments B and C.

The first job, after penetrating the site, was to "shoot" the monuments. We would set lighted "targets" on monuments B and C and the theodolite on Station A. We would then measure the angle between B and C (20 times as in a TASU) and compare it with previously established measurements. If they were in tolerance, it assured us that monument A had not moved (nor had the other monuments). In the meantime one team member would unbolt the above ground steel cover off the sight tube, which was a diagonal hole about 12" in diameter that ran from near monument A down into the LER a few feet above the reference mirror. The angle of the tube allowed us to sight the theodolite on station A at another theodolite set up in front of the collimator.

When we verified station A was sound, we would set up a second theodolite in front of the collimator. This blocked the light beam from the collimator to the missile which put the missile in an interim status as it reverted to a backup mode for its alignment. We also had to remove a steel plate from the inside end of the sight tube and about 10 steel and concrete buffer plates locked inside the tube. Each plate had to be twisted by hand about a quarter turn and pulled out of the tube. This allowed us to see from the theodolite in front of the collimator to the theodolite on station A. The downstairs theodolite then did 20 measurements between station A and the reference mirror. If these measurements were within tolerance we had verified the azimuth for the reference mirror. Next we realigned the collimator to the reference mirror as in a TASU (another 20 shots). If any shot was out of tolerance, that series of shots would be done again

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before proceeding.

Finally, once the collimator was aligned we proceeded to have the missile reacquire the Collimator and verified the system was back on alert. Hopefully we remembered to close up the inside of the sight tube before the missile acquired the collimator or we had to crawl under the light beam to get the job done. Locking up the site was as in the TASU.

An RMAV could take over 12 hours. A new team could easily exceed 16 hours. A highly experienced team might be able to do it faster but if there were any glitches we were resigned to spending time at the LCF for sleep. Team experience really came into its own during an RMAV. All team members knew all the tasks to be done and in what order. While 2 members were taking "shots" the third was always busy getting ready for the next task or closing up when a task was finished. This applied to all Target and Alignment jobs. A good team rested only when waiting for the site or others to complete their jobs.

Targeting and Alignment - Another View

- by TSgt (Ret) John Mills, MbrNo L248, Minneapolis, MN

I spent eight years on Combat Targeting Team (targeting and Alignment Teams became CTTs), beginning at Ellsworth in 1977. During that time, I was a team member, team chief (I believe I was SAC's first CTT enlisted Master Team Chief following removal of officers) and later on CTT Instructor. I did all targeting tasks and worked with the infamous Azimuth Laying Sets (ALS) in the performance of Reference Mirror Azimuth Determinations (RMAD). Following four and a half years at Ellsworth, I PCS'd to Vandenberg where I took over the CTT Instructor position upon completion of leadership school in early 1982. During my time at Vandenberg, I continued with the ALS and RMAD's until the summer of 1984 in which a discrepancy was found at LF08. On all other sites, targeting was done prior to a launch to verify the accuracy of each guidance package. Unlike Ellsworth, the missile guidance set (MGS, or the guidance and control unit or G&C) was not aware of our intrusions, nor was the collimator connected to the guidance. We only measured the accuracy of the platform using a simulated in-flight program called the Heading Sensitivity Test (HST). During the HST, CTT would measure 12 different simulated in-flight platform positions. The HSTs were run from Hill AFB, through the Rockwell Autonetics engineers and technicians on site. Air Force

targeteers would do all the measurements, while the Autonetics personnel would take all the readings and perform the actual math (unlike all other targeting teams). HSTs took nearly 10 hours to perform and were quite intense.

Bob Kelchner reports "the collimator light beam entered the missile through a window into the missile guidance set". While this is technically true, it didn't occur exactly in the way he explains it. Each end of the platform had two mirrors which rotated every 15 minutes, and plunged on the half hour. The collimator sent a beam of light which reflected off the platform mirror, and the collimator measured the deviation between its original collimation, and the reflection. The collimator sent this data through cabling into the Logic Coupler and through this interface, it entered into the MGS. The MGS interpreted the information, and then directed the platform to move to a position closer to the deviation between the collimator beam, and its reflection. Each subsequent rotation technically got closer to perfection, but if anyone has ever done any math, if you half each fraction, you can never reach zero; which is how the MGS saw itself.

Editors Note: Bob Kelchner's article, December issue, referred to the MMI NS-10 MGS which only had one platform mirror and did not plunge

Back to the LF08 problem, LF08 began reporting errors on three previous downrange flights where the guidance set was reporting errors as great as 30 seconds off what the RMAD's were reporting. To better understand how great a problem this was, one arc second equates to approximately a foot off target at 40 miles. At 4000 miles, its approximately 100 yards. Do the math, 30 seconds is far off target and a critical error. With the upcoming turnover of the site to Peacekeeper in 1985, SAC was very concerned about an integrity issue. SAC and Autonetics sent three of us down to Anaheim Hills to the Autonetics guidance system division to measure the accuracy of the ALS. We recreated LF08 and for 21 days, we performed RMAD's around the clock, till we couldn't read a theodolite any longer. Through our test, it was determined that changes to the task over the years had created significant task performance errors. Furthermore, the reduction in RMAD sequences from ten to four increased the error rate by nearly 30 percent. The reason the sequences were dropped was do to the length of time it took to accomplish the task and the inability to keep all sets within the prescribed five second tolerance. Unfortunately, it was determined the ALS never really warmed up enough to allow the built in gyro's to work properly until after four sets were accomplished. Our

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trip report led to the implementation of the new execution plan tape change that removed the RMADs requirement at Ellsworth in 85-86.

Following our return to Vandenberg, SAC and Autonetics ordered us to open up LF08 and shoot the monuments. Geodetic Survey Squadron had to come out to the site and measure the placement of the monuments, while Boeing and Autonetics dug up the old tech orders which described the tasks. Following six weeks of training, SSgt Henry Silberman, A1C Randy Corran and I performed the first RMAV in over a decade. The difference between the RMAD and RMAV proved that the ALS procedures had indeed been corrupted and all data collected on each of the Vandenberg LFs was now considered inaccurate. Since Vandenberg alignment procedures did not directly affect the accuracy of the guidance systems in launches, the efficacy of the HST program remained. Eventually, I trained the civilians to replace me when I PCS'd to Grand Forks in 1985. The irony is that the person I trained had trained me at Chanute in 1977.

On a side note, anyone that has ever penetrated a LF at Vandenberg always asks about the giant green door with the huge hinges above the collimator bench. I did, too, when I arrived, yet nobody knew for sure what they were for. Everyone had a guess, but the answers varied. When I performed the RMAVs at Vandenberg, we dug up the old A monuments and discovered the answer to the big question. According to the Boeing rep, in the original days of Minuteman I, the sites were developed to have an elevator system built into each site. All the racks, batteries, motor generators and other heavy equipment were lowered onto an elevator which then lowered the equipment into the LER. The elevator was located south east of the PAH ladder, between the launcher closure and the A monument. The elevator raised itself to ground level, and then lowered to the height of six inches above the collimator bench, then pivoting 180 degrees to lower and extend to the solid floor of LER I. When we dug up the monument, we excavated the elevator area too. To our surprise, the cabling and the control box were still intact and powered up. Unfortunately, the big green door was welded shut and could not be opened. We greased up the zerk fittings and attempted to raise the elevator. It came up and down without any problems whatsoever. According to Boeing, the elevator concept was abandoned in the early days due to the cost and the security issues involved. After the elevator idea was scrapped, all equipment was later downsized to fit into the PAH.

The Wandering Titan Silos - by SMSgt

(Ret) Don Billsbarrow, Tucson, Az

I am submitting this tale to you in response to Bob Kelchner's request for an "interesting and riveting" story pertaining to missile targeting. My 3901SMES boss, LtCol (Ret) Rex Thompson sent me a copy of the December newsletter thinking that I may have some input.

It all started a few years into the operational phase of the Little Rock AFB 308SMW Titan II program. After several unsatisfactory missile evaluations laid on us by the 3901SMES, the proverbial stuff hit the fan. It was initially assumed that the cause of the unsatisfactory evaluations were improper missile alignments performed by our alignment teams. This was difficult to accept because I had been performing missile alignments in conjunction with AC Spark Plug (part of General Motors Delco) engineers prior to activation and throughout my seven years at Little Rock. In addition, I wrote the alignment procedures that were used throughout the Titan fleet and won the first SAC Missile Combat Competition, Curtain Raiser, In 1967. Consequently, I was sure the problem was not alignment personnel, but to prove it I had to convince upper management that the silos were actually moving and not the fault of 'The Best Alignment Team in SAC.

It required several years in eliminate all the possibilities before SAC Headquarters would accept the fact that missile silos with ten foot thick walls of concrete and steel would or could move in azimuth enough to render the missile useless. It did not help our situation any that McConnell and Davis-Monthan were not experiencing the same problem. However; after the fact, we discovered that Davis-Monthan was seeing something similar but to a lesser degree.

Throughout this whole ordeal, I maintained graphs that illustrated the results of each survey in an attempt to maintain the systems within tolerance and anticipate what the 3901SMES would find on their next visit. The graphs clearly showed the alignment moving out approximately eight arc seconds and back in the opposite direction approximately the same amount after a correction was made. But to no avail. Until we determined what was causing the movement we were at the mercy of lady luck.

We qualified the topside angles by performing a procedure we obtained from the Coastal Geodetic folks called "closing the angles." This was accomplished by first shooting target B to target C from position A, then

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moving the theodolite to B monolith and shooting target C to target A. The final step was to move the theodolite to monolith C and shoot the A to B angle. If the sum of the angles equaled 180 degrees, the topside references were good and this allowed us to proceed with the survey and transfer the azimuth down the 40 foot sight tube to the porro prism located on the autocollimator pedestal. Obviously the "closing" procedure added several hours to an already lengthy procedure.

The next step in the elimination process was to install a reference mirror on the silo wall in a position that would allow us to shoot the angle between the wall and the porro prism in conjunction with the topside angles. The wall to porro angle indicated that the collimator pedestal was not moving independent of the silo wall. We later verified this by using the Azimuth Laying Set (ALS) that we were testing with TRW and Hill AFB engineers.

The results of the ALS finally removed the monkey from our backs ... the silos were moving! But what was causing the phenomena? We found out almost by accident one cold winter night. Early on, we suspected that the cycling of the 700 ton silo enclosure door might be the culprit because one of the large door stop assemblies was positioned within ten feet of position A.. No such luck. However, within the same area of position A the diesel exhaust duct was located. Unfortunately, the only activity that would prevent us from performing our surveys was a scheduled diesel run. And that was only because of the fumes and noise. But due to our heavy alignment schedule, I decided to continue with the survey even though the diesel automatically came on due to an electrical problem.

For several hours I chased the porro prism from an acceptable azimuth to an out-of-tolerance condition of nine arc seconds. The diesel stopped and I once again chased the azimuth angle back to an acceptable level. The mystery was solved!!

The diesel exhaust duct was built into the silo wall and traversed its way approximately 75 feet topside. The problem was it was very close to the autocollimator pedestal on level two which was also part of the silo wall. All Titan complexes were supposedly built the same. To this day it is not known why the heat of the diesel exhaust affected the Little Rock complexes and not the other Titan II organizations.

Obviously there was no quick fix for the problem and the ALS only managed to eliminate the topside efforts and that was a good thing. I'm reasonably certain that the magnitude of the problem provided the extra push

that SAC needed to replace the existing external azimuth system with the independent Carousel system. And that was also a good thing.

(The Carousel guidance system that the chief mentions replaced the original Titan II guidance in the late 1970s, under the Rivet Hawk program. By that time, the originally system was not supportable logistically so a new system had to be found if the Titan was to continue in service. The Carousel was an off the shelf AC Delco system used in commercial aircraft.

Targeting at Ellsworth and Whiteman - by MSgt (Ret) James Denman, MbrNo A1082,

Angola, IN

I really am glad to see that the old T&A section is getting some notoriety. I spent two years at Ellsworth in T&A, and then on to Whiteman where I worked with Kent Miller in Quality Control (QC) in T&A. Altogether I have about 5 years experience in T&A/CTT both on line and in QC and for awhile as one of the team trainers. Those monuments could get real interesting.

I recall while at Ellsworth we were dispatched to do an RMAV on one of the eastern flights out close to Kadoka. We got there and could not find the monument. I set up the theodolite and swung an angle to where it should be and lo and behold - a haystack. We walked out there and the haystack had been piled right on top of the monument, so we called it a night and returned home to have the legal office go out and have a conversation with the rancher.

One of my fondest memories was that in the middle of winter we had to take an extra man with us to keep changing the batteries in the targets. All night long the extra man would walk from the site to A monument, change the batteries and continue on to B monument, return to the site, have a cup of coffee and start over. One of the best jobs while I was at Whiteman was to take a helicopter and fly to the sites to investigate whether there was corn growing between the site and the monuments. We then came back with a report and the next day a dispatch would be made for CE to go out and mow the corn with a tractor and brush hog. We really only needed a path wide enough to sight through but those guys always gave us enough room that a semi truck could have gone there. We always had a lot of roasting ears.

T&A was a very demanding and interesting job, we did all of our RMAVS at night because the heat of the day would distort the image and make it harder to get a

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good result. We had to shoot angle A, B/C, and D, and then angle X. Each angle was shot 16 times, eight in direct and eight in reverse, and a mean was calculated for each angle for that angle to be good. Angle A was between the monuments, B/C was a compound angle using the two theodolites looking at each other, D was between the two mirrors in the silo and X was between one of the mirrors and the collimator. This final angle had to fall within a tenth of an arc second, as that was what the stable platform would lock on. Those two mirrors and the one on the stable platform were what is called a first surface mirror, which meant that the coating was on the front of the glass instead the rear, to prevent parallax of the image. Some of the folks might remember TSgt Billy Downey and Tsgt Jack Hannigan, the T&A instructors of the 394SMS at Vandenberg. They came to Ellsworth after ORT was completed. One of the hardest jobs I had was while I was trainer at Whiteman. Our crew was selected to go to the team training section because we were very good and what would normally take 16 hours to do we had down to about eight. To watch the new guys fumble their way through was very frustrating, but we managed to get the job done.

I attended the reunion of the 44MIMS (the early years) in September, and we had a lot of war stories. We went to D09 and D01, which brought back a lot of good memories. Those monuments are still there and a lot of the people on the tour asked what they were. We gladly explained their function. The guide we had is a retired Highway patrolman from South Dakota. He said at the present time everyone wants to use them for target practice. I noticed that the mirrors were gone inside the training silo, because after my time the new guidance section did not need them.

I look forward to read about the targeting van. Each time a missile was targeted it was a gamble as to whether it would get through calibrate, and that was two and a half hour wait. I recall that when we were buying off the sites at Ellsworth one of my jobs was to target a site that Boeing had finished and if we made it to strategic alert our targeting officer would sign off and it became our site. We had difficulty with the targeting console and my partner and I sat in the van waiting on the civilians and wheels to sort out the next move. I suggested to my partner that we borrow the drawers out of the Boeing targeting van so we switched the drawers and started the site up again. When everyone came out of the house trailer we were almost through calibrate and lo and behold we achieved strategic alert. We never told

anyone we switched the drawers.

We look forward to more stories about a key task in missiles - getting it aligned to the target. How about some of you folks from some of the earlier systems? Tell us how you did this task in your system.

Launch Facilities see Security Enhancements

- by Tech. Sgt. Daniel Cox, 90th Maintenance Operations Squadron, Warren AFB, WY

The fast-rising secondary door, recently installed on the base launch facility trainer here, is the Air Force's newest tool in the security of the nation's most powerful intercontinental ballistic missile force. It replaces the original secondary door, which came online with the Minuteman I at Malmstrom AFB, Mt., in 1962.

The system provides a time deterrent to entering a launch facility through the personnel access hatch. In the event of a security threat it allows the secondary door to be immediately raised, closing the hatch and deterring unauthorized access. During normal operation, the system delays access to the launcher equipment room, which houses missile support systems, preventing access to unauthorized personnel. The system delay also maintains weapon system integrity while permitting controlled access to authorized personnel.

There are many components that make up the new system, such as a new electromechanical actuator, a mechanical device that raises the 7-ton secondary door at a speed of 10 inches per second. This is significantly faster than the previous system that would crawl at nine inches per minute. With the newer technology, teams can completely secure access to the launcher equipment rooms in 30 seconds with just a touch of a button, where the previous system could take as long as 20 minutes.

The new fast-rising door gives F.E. Warren Airmen another tool for the protection of America's most powerful resource. The ability to rapidly secure launcher equipment rooms from unauthorized access allows the men and women of the 90th Space Wing to focus their attention on getting the maintenance done and sorties on alert. F.E. Warren is the second base after Minot AFB, ND, to receive this \$417-million upgrade. After its successful inspection, Air Force Space Command is set to authorize the new system for deployment to the field. The inspection is scheduled for April. The projected completion date for installation in the launch facilities is 2011.



MX Basing Concept

MX ICBM: The Basing of the Controversial Weapon System, Part II - *By LtCol Fred Stoss, MbrNo L224, Oak Ridge, TN*

The next plan for basing the MX was labeled the Closely Spaced Basing (CSB) configuration; also known as “dense pack.” This proposed basing method was opposite to the traditional approach of protecting ICBMs. To date, the Air Force had spaced Titan and Minuteman launch facilities several miles apart. By doing so, it required at least one enemy warhead to destroy one launch facility; a one-for-one exchange. An enemy would not get any “two-for-one good deals” by destroying two ICBMs with only one warhead. The blast effects of a nuclear warhead, while they are tremendous, dissipate significantly over distances from the location of detonation. Thus, with several miles separating the hardened launch facilities from each other, multiple missiles sitting in the facilities could not be destroyed by one enemy warhead.

The CSB plan cut against the grain of the Minuteman and Titan basing concept. The core idea behind the CSB scheme was that the ICBMs would be intentionally positioned close together. Its configuration had three key components: first, that the missile would be placed in super-hardened launch facilities; second, the launch facilities would be positioned in close proximity to each other for mutual protection; and finally, an anti-ballistic missile (ABM) defense system would contribute to the defense of the CSB missile base.

The first component, super-hardening, required improved construction technologies over those the Air Force had previously used in the construction of Minuteman launch facilities. In 1981, the Defense Nuclear Agency, after thorough research into the

Minuteman launch facilities, believed that it was possible to design launch facilities to have much greater hardness levels than previously built silos. Although never tested, the CSB planners envisaged the launch facilities would be able to withstand 60,000 to 70,000 psi - significantly harder than current launch facilities in the United States. Secretary of Defense Casper Weinberger testified to Congress, that the CSB launch facilities could withstand a 27-megaton (MT) blast from a Soviet SS-18. To counter this new basing concept, it was assumed the Soviet Union would need to place a single, large warhead on at least part of their SS-18 fleet -the warhead could possibly be in the 30 MT range.

Super-hardening was not the only means of protection for the CSB concept. By basing the launch facilities close together, if an adversary attempted to destroy the facilities in a first-strike, the launch facilities could be protected by a phenomenon called “fratricide.” Fratricide means that the effects of one “friendly” weapon could destroy another “friendly” weapon before the former weapon can detonate on its target. For example, if an adversary sent a large number of warheads in an attempt to destroy the CSB MX missile field, the initial exploding reentry vehicles would damage or destroy the remaining incoming reentry vehicles and would therefore not destroy the MX missiles sitting in the CSB complex. Four features of the fratricide phenomena were expected to occur after the first incoming warhead exploded. First, the intense radiation traveling near the speed of light from the first impacting warheads would disable nearby warheads. Second, the nuclear “blast wave,” lasting for several seconds, would destroy neighboring warheads. Then, the nuclear fireball, lasting up to a minute, would prevent incoming warheads from detonating at the desired location. Finally, the cloud of debris that extends to high-altitudes would remain for hours, and would damage the delicate warheads as they entered the target area. Therefore, according to this theory, it would be an advantage to base launch facilities close to each other for the mutual protection benefits of the fratricide phenomenon. The Department of Defense determined that 1,800 feet of space would be the proper distance to assure their objectives.

Another characteristic of the CSB mode was the addition of an anti-ballistic missile (ABM) defense system. The idea of using an ABM was a touchy issue. While the SALT II treaty permitted an ABM system, the United States elected not maintain an operational system. The United States had in fact deployed a system for a brief

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period in North Dakota, but it was shut down in short order after attaining operational status.

But, the CSB configuration had several disadvantages that made the Congressmen wary of the concept. Congressmen were concerned that the CSB concept was only scientifically feasible on paper and that there was a lack of hard evidence to prove the concept. One senator produced a classified document that apparently created doubt as to the technical aspects of the CSB concept. Although it is not yet possible to determine the exact content of the letter to which the senator referred in the Congressional Record, no Congressman or testifying official disputed the arguments in the memo. Congress was also concerned with the ability of the Soviet Union to develop ways around the fratricide problem with targeting the CSB concept. The Department of Defense also stated that by the late 1990s, the Soviets could produce deep penetrating and highly accurate warheads capable of destroying the MX force in the CSB launch facilities. Congress ultimately disapproved President Reagan's "dense pack" basing in the fall of 1982, primarily because the CSB mode had too many technical uncertainties. Also, most thought that it was best to not use an anti-ballistic missile (ABM) system. Though the SALT II agreement permitted ABMs, Congress believed that it would be an act of good faith to not field an ABM operational system, and that the goal of the United States should be to ban all ABM systems. To be sure, recent world events has reversed the American perspective on the need of an ABM system, but at the time, most believed that an ABM system was destabilizing to the nuclear deterrent policies of the United States.

At this point, Congress considered an alternative to the MX missile - to upgrade the existing Minuteman force and cease developing and procuring the MX ICBM altogether. The Air Force did not advocate an upgrade to the older 450 Minuteman IIs because a complete redesign of the guidance system would be necessary. But, upgrading the 550 Minuteman IIIs was possible because the Minuteman III used newer technologies and would be well suited for an update. Some upgrades of the Minuteman III were already underway at the time of the MX debate. Three hundred of the Minuteman IIIs were receiving a new, more powerful warhead, the Mark 12A. The guidance computers of the entire Minuteman III force also received the new NS-20 computers, improving accuracy and reliability. The option of enhancing the Minuteman III to such a degree that it could approximate the capabilities of the MX ICBM did not receive strong

Congressional support. First, the cost of upgrading the Minuteman IIIs would be approximately 60 percent of the cost of the MX ICBM, yet the Minuteman III would still not achieve the same degree of accuracy offered by the MX. Also, deployment of the enhanced Minuteman III would not have been available for up to two years after the proposed MX deployment, a key concern by some Congressmen intent on increasing America's nuclear capabilities in the near-term in light of the new and more capable missiles being fielded by the Soviet Union's armed forces. To these Congressmen, time was of the essence and a further delay in deploying a new missile system was unacceptable. The Air Force went back to the drawing boards.

Another option Air Force planners explored was the development of a completely new ICBM. This fresh model would incorporate some aspects of the MX ICBM yet would also add several new capabilities. Using the same guidance technology that the MX used, this new missile would be smaller than MX and carry only one warhead (versus the ten warheads carried on the MX). The purpose of its small size was to allow this ICBM to be "road mobile" and earned the new missile the nicknames of "Small ICBM" and "Midgetman." The road mobility would permit the ICBM to be more survivable than the typical fixed basing of the United States ICBM force because it could travel to many different locations on a moment's notice, greatly complicating the Soviet Union's ability to effectively target it. The single warhead missile would be a benefit for future arms control agreements by demonstrating the possibility of discontinuing multiple independent reentry vehicle (MIRV) ICBMs, thereby possibly reducing the overall number of warheads for both sides. Of course, there were disadvantages to the Midgetman. Deployment of the Midgetman could not take place until at least the early 1990s, four-plus years from the time that the MX could be deployed in Minuteman launch facilities. Also, if the Soviet Union were to build large ICBMs with MIRVs, a single warhead missile such as the Midgetman would not be a cost-effective program to maintain warhead parity with the Soviet Union. The Midgetman program was continued for the time being, but it was no longer viewed as a replacement for the MX program.

With the MX ICBM program in jeopardy, President Reagan appointed Lieutenant General (Ret) Brent Scowcroft, to be the Chairman of the President's Commission on Strategic Forces. This Commission was designed to be a bipartisan committee that would make

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recommendations on the best basing mode for the MX. Many members of Congress supported this commission for they were also probably concerned that either a suitable basing mode for the MX missile would have to be found or else the program itself would have come to an end.

Scowcroft's report drew five conclusions concerning the MX missile. First, the existing ICBM force was getting older and less reliable. Second, the ICBMs could no longer threaten the most valued targets in the Soviet Union, such as their command and control infrastructure. Third, the Commission believed that the leadership of the Soviet Union must overtly witness the United States' resolve in modernizing the American nuclear arsenal before the former would enter into meaningful arms negotiations. Fourth, allies of the United States, observing the will of the United States to deploy modern forces on its soil, would be more inclined to improve their forces for the defense of NATO. Finally, the least expensive way to achieve the above aims was to place the MX ICBM into existing Minuteman III launch facilities, saving \$10 billion dollars over the Closely Spaced Basing (CSB) system and \$30 billion over the Multiple Protective Shelters (MPS) basing system. In April 1983, President Reagan endorsed Lieutenant General (Ret) Scowcroft's conclusions. It was now in the hands of Congress to determine the fate of the MX program.

Placing MX missiles into Minuteman III facilities provided the quickest replacement option for the aging Minuteman ICBM force. Since the MX's inception, the Air Force had ensured that the MX missile's specifications would permit it to be housed in Minuteman launch facilities, apparently as a hedge in the event no other solution could be found for basing the new MX system. Although basing the MX in Minuteman facilities was not the preferred basing option, apparently the Air Force privately held this option as a backup plan. Speed of deployment was an issue for the MX program. The United States had not deployed a new ICBM since the early 1970s, and the existing ICBM fleet was getting long in the tooth. Conversely, by 1983, the Soviet Union's Strategic Rocket Force (SRF) had deployed over 600 new ICBMs with considerable counter-force capability, specifically, the SS-17, SS-18, and the SS-19.

As the debate over this option went to Congress, some Congressmen argued in defense of the basing of MX in Minuteman launch facilities because it provided the United States a stronger position at arms negotiations conferences. Four presidents - Nixon, Ford, Carter, and

Reagan - all supported the MX ICBM. Yet, after ten years of debate, the government could not agree on the proper basing mode for the MX. If the United States did not deploy the new ICBM, the leadership of the Soviet Union could perceive that the United States did not have the national will and cohesion to continue its national security programs. If the United States deployed the MX, then the leadership of the Soviet Union, convinced of the United States commitment to equality in strategic forces, would perhaps be more willing to accept arms control initiatives. Some Congressmen also argued that if the United States could put the Soviet Unions' ICBM launch facilities at the same risk that they held the Minuteman force, then the Soviet Union would also need to come up with a more survivable, and consequently more expensive means of deploying their ICBMs; economic productivity was an area in which Congress perceived the Soviet Union to be clearly disadvantaged when compared to the economic might of the United States. Hence, this could further improve the odds that the Soviet Union's leadership could be enticed to enter into arms control agreements. Eventually, the MX ICBMs could be used as a "bargaining chip" to be offered up for destruction at future arms control meetings, assuming that the Soviet Union would likewise destroy their MX equivalents, such as the SS-18.

The most prevalent argument against placing the MX ICBM in Minuteman III launch facilities was the lack of survivability of the fixed sites. In some studies, only a small percentage of the Minuteman III launch facilities were expected to survive a massive first-strike by the Soviet Union's strategic forces. A common theme in the concerns of the Congressmen who opposed to placing the MX into a fixed basing mode was that "such vulnerability is simply inviting disaster. The Soviets can very easily pinpoint and destroy our MX system in soft silos." Several senators also believed that the vulnerability of the fixed basing of strategic weapons might actually invite a first-strike by an adversary. If tensions were high, the Soviet Union might decide to pre-emptively destroy the MX launch facilities, thus eliminating a good portion of the United States' hard target kill capability.

Further, until 1983, there was one theme that predominately emanated from Department of Defense officials: that is, to place MX ICBMs in Minuteman launch facilities was not a good idea. In 1981, Air Force officials contended that "An essential feature of the MX deployment is that the basing mode be survivable. One does not obtain that through placing them in Minuteman

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silos.” Also in 1981, “MX Permanent Basing,” an Air Force report, argued that MX ICBMs in Minuteman facilities do “not provide the required pre-launch survivability to withstand a Soviet first strike and promote strategic stability.” Finally, another Air Force official stated in June, 1981: “If we have an MX in a silo and an announced policy that our finger is on the trigger, then I think that has to force the Soviets to get a little closer to the trigger . . .”

Suddenly, by mid-1983, the Department of Defense officials changed their position and embraced the idea of putting the MX into existing Minuteman silos. In testimony to the Armed Services Committee, a litany of Department of Defense officials and respected weapon system experts endorsed placing the MX ICBM into Minuteman III launch facilities during testimony. Lieutenant General (Ret) Scowcroft reiterated the five recommendations described earlier that he and others agreed upon as part of President Reagan’s Commission on strategic forces. Although he did not believe that placing the MX missiles in Minuteman silos was the perfect solution, Scowcroft thought that the MX must be deployed “to preserve both peace and freedom” and putting the missiles in existing fixed silos would be the fastest way to correct the strategic nuclear weapon imbalance between the Soviet Union and the United States. Next, Dr. John M. Deutch, a former dean of Massachusetts Institute of Technology and a member of Scowcroft’s Commission, strongly endorsed the latter’s recommendations and rationale. Casper Weinberger, then the Secretary of Defense, stated that deployment of MX into Minuteman silos was the quickest solution to attain proper nuclear deterrence, essentially agreeing with all of the points raised by Scowcroft. The list of supporters for the Scowcroft Commission grew as testimony continued, eventually including George Shultz, the Secretary of State, and all of the Joint Chiefs of Staff. But the reason for putting the MX into existing silos really came down to the fact that either the decision was to be approved and funded by Congress, or the entire MX program had to be scrapped. Four Presidential administrations and several Congresses wrestled over the MX decision by debating such issues such as the need for this advanced missile, its high cost, and the basing mode. In the end, the executive and legislative branches wanted to procure and deploy the new weapon, although the final approved basing method seemingly violated the caveats attached to the MX development, namely survivability. On May 25, 1983, the Senate approved

Resolution 26, giving final approval of both houses of Congress for MX procurement and deployment of the missile into Minuteman launch silos. The resolution passed by a vote of 59 yeas to 39 nays. With that vote, the Air Force finally received what it wanted—an approved and funded basing method for the MX ICBM.

After the vote by Congress in 1983 to put the MX ICBM into Minuteman III launch facilities, the Air Force intended for the MX to be fully operational by 1986. But yet again, there were more obstacles for the Executive branch to overcome before the MX weapon system could become a credible nuclear deterrent.

Disagreements occurred between Congress and the Executive branch over the exact number of MX missiles that should be produced and placed in the Minuteman III silos. The reader may recall that President Carter unsuccessfully requested 200 missiles for the Multiple Protective Shelter (MPS) concept. President Reagan’s also unsuccessful Closely Spaced Basing (CSB) concept included a reduced plan to deploy 100 MX missiles. By the time that the Executive branch finally enjoyed success with the plan to put the MX into Minuteman III launch facilities, the President’s request was down to only 100 MX missiles due to budget cuts within the Department of Defense. As the emplacement of the MX missiles began at F.E. Warren AFB, Wyoming, Congress second-guessed its earlier decisions on the number of MX ICBMs to be funded. At one point during Congressional debate, the number of MX missiles Congress was willing to pay for dropped down to a mere 20, due to further demands within Congress to lower the defense budget. When money is involved, decisions can change quite quickly.

By 1985, Congress swung towards supporting a larger number of missiles to be funded. The Air Force was hopeful for its request, seconded by President Reagan, for 100 deployed MX ICBMs. When the final Congressional vote on the MX deployment occurred later in 1985, this proposal for 100 MX ICBMs won approval in a close vote in the Senate, but faltered in the House. An amendment to the bill was later introduced, reducing the number of MX ICBMs to be placed in Minuteman III launch facilities to a total of only 50. This amendment and bill passed easily through Congress. President Reagan subsequently signed the bill, thereby approving only 50 MX missiles to be deployed in Minuteman silos. Congress left the possibility open for procurement of additional MX missiles over-and-above the 50 slated for fixed-silos. But Congress did have one stipulation: no more than 50 MX ICBMs could be fielded in converted Minuteman III silos.

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Additional MX ICBMs could be reconsidered by the legislative branch provided the missiles would be based in a method other than fixed silos.

With the door left open by Congress for another opportunity to deploy more MX missiles, the Department of Defense once again sought options for which to base the new missiles. They put their stock in an option that was tested during the initial Minuteman period—deployment on railcars. The Department of Defense requested 50 MX ICBMs for deployment on railcars, of course, in addition to the 50 missiles to be placed in fixed-silos. The idea was to deploy two MX ICBMs per train, for a total of 25 missile-carrying trains. This deployment method required only minor changes to the MX missiles so it was a technically feasible option. Each MX-carrying train was to be comprised of one engine and six cars: one for the launch control center, one for maintenance support, two missile railcars, and two cars to carry security personnel. This train's cars would resemble "normal" commercial rolling stock, thus to be able to hide amongst the heavy traffic on United States railways, and thereby provide to the MX ICBMs mounted in railcars additional survivability. The cost of the rail deployment system was estimated to be \$9.1 billion - the cheapest of any of the mobile options submitted to Congress for the MX ICBM.

As with all of the options discussed for the MX ICBM, there were some disadvantages of rail basing. The House Armed Services Committee accused the Air Force of not considering the impact on the citizens of the United States, because of the public "interface" problem. The Committee believed the extent of public opposition to the railway based MX missiles would be very large. Committee members anticipated that many communities would proclaim themselves to be a "nuclear free zone" as an indication of their opposition, and that Congress would likely be forced by public sentiment to limit the range of travel by MX-carrying trains, thus restricting their operations and making them less survivable than they otherwise would be were they to have unrestricted access to the commercial rail network.

The Department of Defense's name for the deployment of MX missiles on railcars was "Peacekeeper Rail Garrison." The Air Force vigorously advocated this deployment, but this proposal quickly died out as the Cold War came to a close. Interestingly, Congress did not cancel this last initiative to base MX missiles in a survivable mode; rather, President Bush did so during his review of future nuclear weapon requirements and programs as part of his optimistic "New World Order." In his address to the

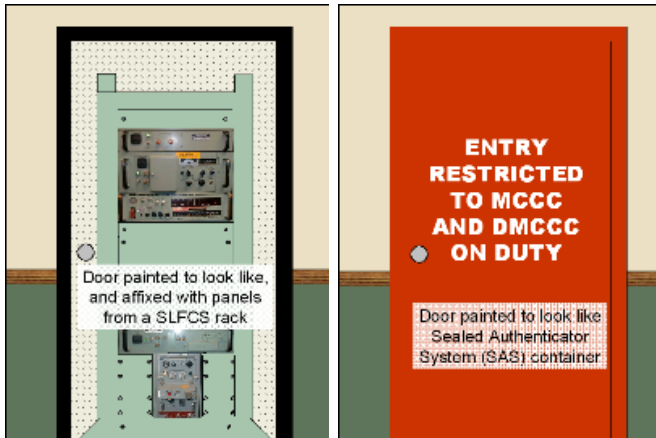
nation on September 27, 1991, President George H.W. Bush asserted:

"The world has changed at a fantastic pace, with each day writing a fresh page of history before yesterday's ink has even dried. And most recently, we've seen the peoples of the Soviet Union turn to democracy and freedom, and discard a system of government based on oppression and fear...I am announcing today a series of sweeping initiatives affecting every aspect of our nuclear forces on land, on ships, and on aircraft. I met again today with our Joint Chiefs of Staff, and I can tell you they wholeheartedly endorse each of these steps...I am terminating the development of the mobile Peacekeeper ICBM...."

With the end of the Cold War, further discussion in the Executive or Legislative branches of the American Government on deploying the MX missile in any form other than the 50 weapons placed in fixed-silos ended. Ultimately, the decision on how to base the MX ICBM came down to deploying the missiles in the least survivable as well as the least expensive basing mode, that is, the placement of the MX missiles in existing Minuteman launch facilities, or else to scrape the new missile altogether because the Executive and Legislative branches could reach a consensus. After ten years of debate, this basing option was the only one that could enjoy Congressional approval. In the end, the MX missile system was operationally deployed in Minuteman launch facilities for almost twenty years, deactivating in 2005, thus ended the complicated history of the MX ICBM.

Peacekeeper missile installation





Two of the painted doors in the Heritage Room

Chief Gene Moore Memorial Missile Heritage Room - by Capt Kevin

Michael, 392TS

From the early days of missiles, almost every missile warrior who has ever sat on-console, especially those in SAC systems, had to first pass through the halls of the 392nd Training Squadron, formerly the 4315th Combat Crew Training Squadron. The schoolhouse is the common bond between all missile operators – the place where careers began and lifelong friendships are formed. Some of the best missileers have the opportunity to pass through these halls a second time, returning as AETC instructors, charged with molding all future 13S (the current specialty designation - 18XX for you older missileers) officers and replenishing the northern tier with educated and motivated missile operators.

The current schoolhouse instructor cadre thought there was something missing from the IQT experience, something they couldn't quite put their fingers on and Capt Dan Hays, the Training and Development Flight Commander, was finally able to articulate it. The schoolhouse has the opportunity to teach and instill ICBM heritage to the students. There is plenty of pride and prestige in being a missileer, and plenty of experienced ICBM operators within the 381st Training Group and across Team Vandenberg to explain to the young officers why the job is important. But the students were only really exposed to ICBM history in the AETC-sanctioned lesson plans and PowerPoint slides. There simply needed to be more explanation of the traditions and culture.

So Capt Hays, with the help of several other instructors, conceptualized the CMSgt Gene Moore Memorial Missile Heritage Room. As a self-help initiative, they began transforming the Emergency War Order vault's large break room into a living museum dedicated

in Chief Moore's honor. Moore was one of the first instructors at Vandenberg and involved in the first test launch there. The goal is to instill ICBM pride, culture, customs, and heritage while still providing a place to relax and network for both past, present, and future missileers.

Over the course of many weekends, the instructors began to transform the stark white break room into someplace they could all be proud of. They painted the walls, installed chair rails and baseboards, and laid laminate flooring. They stripped an old Command Data Buffer training mock-up for parts to lay into an elaborate break counter – including a launch panel, enable panel, and 5 status monitoring panels. The instructors called back to the wings to get patches and scarves from the current units, which they then placed under the plexiglass that protects the console pieces.

The counter, flooring and walls are now complete, and the Heritage Room was officially reopened as a break room on 9 March 07. Instructors appreciate the room for the history and heritage and use it to congregate bringing-up "alert stories" and sharing them with their students. Squadron and group leadership are reminded of their pre-REACT days, and share stories with the instructors and students. It is then that everyone realizes the "Missileer Experience" is common in us all. We all have played a part in the ICBM heritage and are obligated to pass that culture along to those who come after us. In a few years, it will be today's students who are instructors, and they will be charged with mentoring a new generation of missileers, passing along the ICBM traditions. It is the goal of the Heritage Room to make that process even easier.

The Heritage Room concept still has a long way to go. The funding has been slowed to a crawl, and the pace is slow, limited to all but Saturdays. But the commitment of the men and women of the 392TS is still very much alive. The Thor Warriors of the 392TS will make the Heritage Room a reality, as a tribute to the long lines of heroes who have sat, silently and patiently, defending our nation through nuclear deterrence.

The Heritage Room is looking for donations of any kind. If you have memorabilia that you would like to donate, please send it to:

The Heritage Room, 599 8th Street, Ste 112, Vandenberg AFB, CA 93437.

Every item donated to the room will be logged with the name of the individual that donated it.

A Word from the Association

Washington 2008 - We continue to work the details for our next National Meeting, at the Hyatt Dulles near Washington, DC. Many of you have offered to help with local area details - we will start using you later this year. Watch future issues for more details.

Active Duty Advisory Council - our council is now complete. It now includes LtGen Frank Klotz, LtGen Bob Kehler, MajGen Tom Deppe, Maj Kevin Mortensen, CMSgt Joe Lafferty and CMSgt Charles Lee. Since ceased having active duty board members a few years ago, we have maintained the Active Duty council, and update it occasionally as members retire. Welcome to MajGen Deppe and Chief Lee.

Member Directory - we recently provided the 2007 directory, a 62 page document, to all members with e-mail addresses. If you didn't get one and have e-mail, contact us at aafm@afmissileers.org and we will send one. For those without e-mail, printed copies will be mailed in later this month. You can save us over \$5 if you request an e-mail version.

Dues Status - note that you can now tell your dues expiration date by looking at the cover of the newsletter. The three or four digit number on the top line of the address label, above your name and the line *****AUTO** is your expiration date. If it says 807, it means your dues are paid through August 2007. If your "number" is smaller than 307, you need to renew - either send a check or go to the web page and use a credit card.

New CDs - I have been scanning many documents that members have provided onto CD, and will give the hard copy documents to some of the museums we support. Notice the new CD list on the inside back cover. We will continue to add documents and photos as they become available. The same for DVDs - have added some early films and documentaries to that collection, too.

Missile Models - we are still working on good quality models. you can use the form on the back cover to tell us you are interested - we are getting closer.

Letters to the Association

Address your letters to AAFM, Box 5693, Breckenridge, CO 80424, or send by e-mail to aafm@afmissileers.org. Letters may be edited to fit - content/meaning will not be changed.

And Even More LOX and RP-1 - Seeing Bill Inman's letter about the Standboard that turned into an emergency got the old memory going. I was the deputy on crew S-06 with Harry Hutton, MCCC, Duane Hoard, BMAT, Ernest Marin, MFT and Franklin Parker, EPPT. (Thanks to Melvin Driskill for the names). I had forgotten that we were doing a standboard during a PLX. As my cloudy memory recalls it was at Site 10 or 11 northwest of Pittsburgh. The main thing I would add to Bill's story is that when the missile stopped, the down locks released and the stretch was taken out of the elevator cables raising the missile out of the LOX and other down lock connections, but the elevator motor didn't drive the missile into the up locks. Seems to me that the missile only rose a couple of feet. The first reaction was to notify the world that we had a problem. Of course, the answer was to drive the elevator back down into the safe position, but as Bill said, nothing happened. The only pressurization we had was boil off for the LOX tank and internal for the RP-1. So it was essential we get the thing hooked to something. As Bill said, the MFTs were nominated to go into the silo and check the CBs and anything else they could think of. Of course, they didn't just put on their hard hats and go into the silo. Had to don the emergency gear including the rotten old ScaPac breathing apparatus before they went in. All this had been cleared with SAC and the rest of the world. Meanwhile, we deputies were watching the pressure gauges with great concentration. After awhile and while everyone else is concentrating on the elevator problem, we depts notice the RP-1 pressure decaying. Not alarmingly but a steady decay. It was known to be a real mess if the intermediate bulkhead between the LOX and RP-1 got the positive pressure on the wrong (LOX) side. Anyway, we just went into manual mode and the pressurization system worked as advertised. We were quite fortunate that day and the system

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Letters (Continued from Page 14)

knowledge of those two MFTs saved the day. *Col (Ret) Jon Eckert, MbrNo A0791, Panama City, FL*

Airborne MM - Several years ago, a program was afoot to see if MM could be launched from a C-5 (a missile was extracted via parachute and one stage may have been ignited). Later there was an effort to try launching a MM stage from a C-130. Do you have any info on these programs? MajGen (Ret) Gary Curtin, MbrNo A0666, Fairfax Station, VA

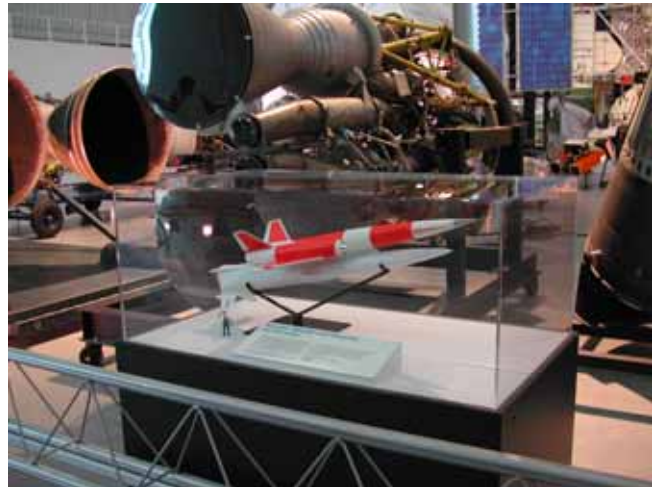
We are trying to gather information for articles about both the airborne launch tests and the one successful and two unsuccessful attempts at operational base launch. If you have info or would like to write an article, let AAFM know.

Chanute LF - I was a civilian instructor at Chanute and had the opportunity to become a part of the overall system through the many schools and meetings where ATC, SAC and the contractors interfaced. Now that those days are history, I am trying to restore the training silo here at the old Chanute AFB. I am in need of various items of equipment, but first a hydraulic pump and pipe pusher is needed to open launcher door to get ventilation inside. Our LF has had a bad case of water seepage and no ventilation. If you could assist in locating these items of support equipment and Technical Orders on the Environmental System and maintenance on the LF, I would be very grateful. *Donald Madden, Board Member, Octave Chanute Aerospace Museum, 521 W Champaign Ave, Rantoul, IL 61866 or by phone at (217) 369-4994*

Custom Models - Bill Getz sent me an e-mail from your group discussing the need for missile models. I have been building models for most of my life, and have many scratchbuilt rocket/spacecraft models in museums around the country, including three works at the Smithsonian's NASM in Washington, DC, and the Hazy center at Dulles airport. Although I couldn't do any models you need for free, mainly due to my hectic career as an airline pilot, I think I might be able to do them for a reasonable price, depending on what your requirements are. I have a lot of respect and admiration for the many accomplishments your group did in safeguarding our country from harm during the cold war, and also developing technology in spaceflight during those years. Please let me know what kind of models, scales, pricing constraints, etc., if you have not finalized your selection of a company to build these models. Possibly I might be able to help out some in this area. I'll include a few pics of models at the

NASM that I built for your inspection. *Dave Gianakos 303-972-3181 cell 303-522-7634 dave_gianakos@yahoo.com*

While AAFM is working with suppleileers for desktop missile models - and we are getting closer, some of Dave's works may interest some of the museums we support. If your museum needs quality missile models, contact Dave. A sample of his work is below, a Navaho.



Do you know what this pin is?

We were asked about it by a French officer. Greg Ogletree thinks it is from the Matador days in Germany, probably for either site or flight 3 at some Matador base. Let us know if you can identify it.

Taps for Missileers

Bruce Chalfant, an AAFM member and former captain, served in Minuteman in the 341SMW and 351SMW and lived in Morristown, NJ

Maj (Ret) Harold P. Edwards, an AAFM member, served in Matador and Mace and lived in O'Fallon, IL. His son John is also a missileer and one of our second generation AAFM members.

LtCol (Ret) Charles R. Hedrick, served in Minuteman in the 351SMW, lived in 83, of Seminole, FL.

LtCol (Ret) Edward Westlake worked in manned space systems in the early years

LtCol (Ret) James Kunkel, served in Minuteman in the 455SMW, 351SMW and at Ogden and lived in Scottsdale, AZ

Capt (Ret) Rex Wilbanks, served in Minuteman in the 351SMW, and lived in St Petersburg, FL.

564MS Heritage Reunion Week

The 564th Missile Squadron, better known as "Deuce", will be celebrating 41 years of continued excellence with its Annual Heritage Reunion, 30 April - 5 May 2007. Throughout its long and distinguished existence, the 564MS has fulfilled many roles with varied weapon systems and has served at many installations, both at home and overseas. Constituted as a heavy bombardment squadron on 19 December 1942, to its transition to an active missile squadron 14 December 1965, the 564MS has a heritage all members cherish. To celebrate our story we hold an Annual Heritage Reunion to unite past and current members of the squadron and enhance morale and esprit de corps.

This year's event consists of a Kick-Off Breakfast, tours of a Missile Alert Facility and Launch Control Center, a "Deuce" sponsored Golf Classic, and ending with a Heritage Dinner. The Heritage Reunion continues to be an inspiring event, with squadron alumni in attendance from up to 30 years in the past. Deuce invites you to attend heritage week and celebrate a history of courage, sacrifice, family, and excellence!

To RSVP call DSN 632-6884, Commercial (406) 731-6884, or visit our website at www.564ms.com.

Missile/Space Comp - No for 2007

Since Curtain Raiser in 1967, SAC, ACC and then AFSPC have conducted an annual missile - now the space and missile - competition every year, with four exceptions. There was no comp in 1967 due to the Viet Nam war, again in 2003 and 2005 due to the war on terrorism, and this year because of a new policy. Guardian Challenge, the current competition, will now be conducted every two years, along the lines of some of the aircraft competitions. Right now, the next event will be in 2008 - we will keep you advised on time and location.

Because 2007 is the 40th anniversary of the initial competition, we will put together a special AAFM newsletter later this year to commemorate the anniversary and cover the history of the competition. We would like your stories and photos to help us document this important annual event. Whether it is a complex tale of you and the evaluator or a one-liner about some experience at Vandenberg, we can use them all. Send them by e-mail to aafm@afmissileers.org or mail to AAFM, PO Box 5693, Breckenridge, CO 80424. We'd like all your tales and photos by the end of August so we can make the September issue the "Comp Issue."

Reunions

The "real" 20th Anniversary of 308SMW Deactivation, 12-16 September 2007, Little Rock, AR, contact William Leslie, 937-255-2783, info at www.308smw.com or e-mail william.leslie2@wpafb.af.mil

SAC 2008 - 30 April - 4 May 2008, Dayton, OH, reunion and dedication of the SAC Memorial

TAC Missileers - 2-4 May 2007, Tucson, AZ, contact Joe Perkins, perkster@fcil.com

12MS Red Dawg Reunion - 27-30 June 2007, Malmstrom AFB, MT, contact 1Lt Amanda Bender, 406-781-1449 or redawgreunion@hotmail.com by 31 May 2007.

351SMW Reunion - 19-20 May 2007, Whiteman AFB MO, contact Ken (Archie) Bunker, 660-826-4183 or Bill McEachern, e-mail mefaye46@comcast.net, 970-493-1006

455SMW (Minot) 3- 8 April 2007, Austin, TX, contact dsmith5331@aol.com or eduardkat@yahoo.com

485th TMW (Florennes GLCM) - 7-10 Jun 2007, Tacoma, WA, La Quinta Inn & Suites 1425 E 27th Street, Phone 253-383-0146; extension 0 or 4 to make hotel reservations. Call 570-278-2482 for information or go to www.stdcomp.com/485tmw

51MMS (Vandenberg) - October 2007, Dayton, OH, go to www.51stmms.org for more information

564MS Heritage Reunion Week - 30 April - 5 May 2007, Malmstrom AFB, MT, contact 1Lt Roland Rainey, 564MS/DOC, Cell 406-781-1601, email roland.rainey@malmstrom.af.mil or call (by 20 Apr 07) 406-731-6884. Info at www.564ms.com

50th Anniversary of the first Atlas Launch - 21 July 2007, 1895 Camino Del Rio So (Mission Valley) San Diego CA, e-mail atlas.reunion@yahoo.com or go to http://members.cox.net/atlas_reunion/

OCS Class 58-A - 11-14 September 2007, Holiday Inn at the AmeriStar, Council Bluffs, IA. Don Aldridge (daldridge@cox.net)

4ACCS - 15-17 June 2007, Rapid City, SD. Info at <http://4accs.blackhills.com/> Contact Jeff Bixler at jbixler7@rap.midco.net

Association of Air Force Missileers - 2008 National Meeting, 9-13 Oct 2008, Hyatt Dulles, Herndon, VA.

Reunion Notices should be to AAFM as early as possible for the newsletter, web page and e-mail updates.