

Association of Air Force Missileers AAFM Newsletter

"Victors in the Cold War"

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Missile Targeting and Alignment - Part I



AAFM Board Member and former targeting NCO CMSgt (Ret) Mike Kenderes and an alignment monument

Alignment Monuments at ICBM Sites - What are Those Things Anyway? - By Board Member CMSgt (Ret) Bob Kelchner

MbrNo L014, Torrance, CA

AAFM received an e-mail this summer from SMSgt Mike Novak, Malmstrom AFB. Mike questioned the purpose of the external concrete monuments at each of the Minuteman Launch Facilities and suggested an article about early targeting procedures. After noting in the September newsletter that we were preparing an article about the history of combat targeting, we have received dozens of e-mails and telephone calls from throughout the AAFM world. I received a telephone call in early November from one of my past Targeting Team mates from 1965, Fred Kerr, who I had not talked to in 41 years. Because of the intense interest in the Targeting and Alignment subject, we decided to do at least a three part series. This is a highly technical subject, with very technical terms, but we hope to address the subject in some clear, easy to understand articles. So, let's address SMSgt Novak's question.

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Cheyenne in September - A Great Gathering - by Col (Ret) Charlie Simpson, AAFM Executive Director

Executive Director

If you are one of the many AAFM members who missed our seventh National Meeting last September in Cheyenne, and you have talked to any of the 350 or so folks who were there, you know you missed a great one. Our visit to Wyoming was our biggest, best and busiest meeting in our history. It just makes us set our sights even higher for 2008 in the Washington, DC area.

We had absolutely outstanding support from the Little America Resort and Hotel, the historic Plains Hotel, the Museum of the Old West and everyone involved from Warren AFB. It was our first return to an operational missile base, and it was well worth the wait. Most of us could have spent several days meeting and talking to the superb young men and women who operate, maintain and support our ICBM force.

We were joined this year by people attending the individual unit reunions of three Atlas squadrons, the 548SMS from Forbes, the 556SMS from Plattsburgh and the 567SMS from Fairchild. We also had a number of veterans of the Atlas wing at Warren who came back home for the first time since leaving in the mid-1960s. As usual,



Executive Director Col (Ret) Simpson
Registration Desk

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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

Cheyenne - (Continued from Page 1)

CMSgts (Ret) Kenderes, Kelchner, Hines & Habenick in Cheyenne for National Meeting

we had members with experience in every system and every decade of Air Force missile history.

We started with a great informal gathering at the hotel Wednesday evening, and the hospitality suite was full any time we weren't into some other activity. Thursday morning's breakfast was the first of four that quickly became social occasions. Attendees have really enjoyed the early morning opportunities to mingle with others who were there while dining on an excellent buffet breakfast. We then spent the whole day at Warren, beginning with a warm welcome and review of 90th Space Wing activities by commander Col Mike Carey. Those of us more accustomed to formal, scripted briefings really were delighted by Mike's humorous, casual style. Following his presentation, we took our four busloads on four separate paths, with stops at the Warren ICBM Museum, hosted by Paula Taylor, a visit to the Minuteman and Peacekeeper training launch facilities, the maintenance building and the operations building, for a tour of both the helicopter area and the missile procedures trainer. At every stop, we were impressed with the knowledge, dedication and enthusiasm of the young officers, noncommissioned officers and airmen who talked to us about the system, their jobs and the Air Force today. During the tour, we had lunch at the Warren club, about the only rest in a busy day. Thursday evening, over 200 of us gathered for a Mexican buffet at the hotel, with no formal program to get in the way of renewing old friendships and making new ones.

After Friday morning's breakfast, some of us headed for the Warren golf course while the majority, three busloads, headed to Cheyenne for a city tour. Janet Cowley and David Marks from the Visitors Bureau hosted the tour and treated everyone to a look at Cheyenne's history. The group visited the historic Plains Hotel for lunch. Meanwhile, the golfers battled strong Wyoming winds, with the Colorado contingent taking all the prizes.

Rob Irvine, Jim and Diana Knapp, Darrell Anderson (2004's golf champ) and your's truly took the five prizes. Friday evening, we traveled to the Old West Museum for a barbecue dinner catered by the Plains Hotel, and ended the evening with entertainment by Rattlesnake Jake, who even enticed a few of us on stage to become part of a western band. Active Duty Advisor LtGen Bob Kehler, Deputy Commander, USStratcom, was able to join us for the dinner.

Saturday was meeting day. Following breakfast, over 200 of us met for a series of briefings. MGen Tom Deppe, commander of 20AF, gave us a thorough update on the ICBM force and current programs to sustain and improve it, as well as telling us more about the folks who keep the system operational today. Michael Hoskings, curator at the Minuteman Missile National Site, updated us on MIMI and its success to date, and Col (Ret) Joe Sutter, the newly elected Air Force Association President (now designated the Vice Chairman, Field Operations) gave us a rundown on the AFA today. We updated attendees on AAFM programs before transitioning to the Board of Directors meeting. All of your directors except for Joe Andrew, Dayna Castro, Mike Lehnertz and Roscoe Moulthrop were able to attend, with these four all having to cancel due to other more pressing personal issues. The board discussed the current status and future of your organization, considered some new award programs, discussed ways to stay involved with the active force and determined plans for future national meetings. You will see details about the issues discussed in other articles in this and future newsletters. The board decided to go to the Washington, DC area for 2008, either Tucson or Ogden for 2010 and to Great Falls, MT, in conjunction with the 50th anniversary of Minuteman, for 2012.

Saturday afternoon, about 150 folks toured an Atlas E facility maintained by Weld County, CO. Member Pete Ambrose is in charge of this facility and hosted the tour. Saturday evening was the big event, our National Meeting Banquet. We had almost 350 attendees, filling the banquet room at Little America. We hosted a number of young officers and airmen and their spouses from Warren as our guests, along with the Command Chief Master Sergeants from both 20AF and the 90SW. We had a number of other 20AF and wing personnel who also attended. We opened the evening when the Warren color guard posted the colors. We were honored to have as our featured speaker General Kevin Chilton, commander of Air Force Space Command.

Sunday morning more than 200 of us gathered

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Cheyenne - (Continued from Page 2)

for the final breakfast before heading our own ways. It was truly an outstanding event, from the fine food and service by the Little America Hotel to the support and hospitality of the folks at Warren. The feedback has been tremendous - and we are already working on 2008.

2006 Board of Directors Meeting

On 30 Sep 2006, the AAFM board conducted its biennial board meeting as part of the National Meeting in Cheyenne. The meeting was conducted at 1100 in the Little America Hotel. Board members Jay Kelley, President, Bob Kelchner, Treasurer, John Howe, Dick Keen, Mike Kenderes, Lance Lord, Bob Parker and Mark Silliman were present. Mike Lehnertz, Vice President, Dayna Castro, Secretary, Joe Andrew and Roscoe Moulthrop were unable to attend due to personal matters. Approximately 50 AAFM members sat in on the meeting. The Executive Director, Charlie Simpson, reviewed AAFM finance, AAFM programs and the recent election procedures and results.

The board considered an AF Junior ROTC Award proposal submitted by member Don Keltner, but decided that the program was too broad for AAFM support and voted against the proposal. The board did advise the executive director to look for other, more focused award programs for future consideration. The board discussed the eventual replacement of the executive director and asked him to prepare a detailed listing of all aspects of the job to see if parts could be given to more than one individual, including use of a paid staff member. This is a long term project since the current executive director plans on staying in the post for the foreseeable future.

The board discussed locations for the 2008 and later National Meetings. The board directed the executive director to determine if the Washington, DC area was feasible for 2008 and asked him to visit the area to scope out hotels and activities. The board decided to consider either Tucson or Ogden for the site of the 2010 meeting and to plan on Great Falls and Malmstrom AFB for 2012, in conjunction with the 50th anniversary of Minuteman.

Considerable discussion revolved around future programs and projects for the association. These included recognition programs, a second art project, involvement with Air Force leadership on the future of ICBMs and a wide range of other ideas. The president appointed a committee made of Dick Keen, Lance Lord, Bob Parker and Mark Silliman to come up with ideas and recommendations in these areas over the next year.

The members present were asked to participate in discussions at the end of the meeting on a broad range

of subjects, and many members gave feedback on preferences for future meetings, projects and AAFM involvement in AF programs.

The board meeting was adjourned at 1300



The new Air Force Memorial

It's Washington in 2008

It is still almost two years away, but AAFM will meet for its eighth National Meeting 9-13 October 2008 at the Hyatt Dulles Hotel, Herndon, Virginia. Your executive director and his wife Carol recently visited the area and negotiated with several hotels before finalizing the location. We made a small adjustment to the days of the week we normally meet to achieve a better hotel rate, with the 2008 meeting beginning on Thursday evening and ending Monday morning.

We will have a rate of \$89 per night, to include full breakfast for two, at the Hyatt. This rate is the same we have had the last two meetings. The Hyatt is a superb hotel with great facilities and offers free shuttle service to the Dulles terminal. It is also far enough outside the DC area to make access and parking easier for those who drive, and parking is free. Note that the hotel will offer a few rooms (very limited due to business demands during the week) for the same rate three days before and after our dates for those who want spend more time in the area. These will go fast.

Plans are far from final, but we will start with our normal welcome party on Thursday night. Friday we plan to visit the Pentagon, the Air Force Memorial, other memorials and the Udvar Hazy museum, which is near the hotel. That night we will dine at the hotel. Saturday, we will retain our normal schedule, with the gen-

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Washington (Continued from Page 3)*Our hotel for 2008*

eral membership meeting and board meeting in the morning. An optional tour will be offered in the afternoon. We will have our banquet, with the featured speaker, that evening. Sunday, we will offer a tour to the Gettysburg battlefield (John and Carol Moser have already helped with this one) and possibly one or two optional tours for those who prefer to visit some other site. Dinner Sunday night will be in the hotel. We will depart Monday after breakfast.

Over the next few months, we will be working tour and event details and arranging for the featured speaker and presentations for our member meeting. A number of local area members have offered to assist, and we'll put them to work as the date approaches. Plan early to join us and keep a couple of things in mind - once we open registration in late 2007, rooms will fill fast. And for all of those of you in the area, we will have to limit attendance to the banquet to 350 due to the size of the banquet facility, so get those reservations in quickly, too. The one limitation that we found at the hotels we visited was that all had similar sized ballrooms, except for one. However, we couldn't negotiate a price there for rooms that compared to the Hyatt offer. See you in 2008.

*Collimator***Monuments** (Continued from Page 1)

The requirement for Targeting and Alignment applied to all the major operational ICBM and IRBM systems. For the purpose of this series we will address only Titan I and II, Minuteman and Peacekeeper. Atlas and the IRBMs had very interesting targeting/alignment requirements, and we may include some history of that in the future. We do need an expert in that area to write some of that early history.

The external concrete alignment monuments at the Titan and Minuteman launch facilities were used to assist in optical alignment of the missile guidance system. The early guidance stable platforms required an external azimuth reference. That external reference originated with Polaris, the North Star. Obviously, the star could not be sighted from inside the launch facility. The early design of the Titan and Minuteman Weapon Systems (1958-1961) included a Polaris site tube from down in the silo equipment room area. By the time these facilities were being constructed it became obvious that sighting the North Star from inside the silo was not feasible. Consequently, an alignment monument would be required to be located from 1,000 to 1,500 feet from the LF. This distance was the optimal distance to reduce some optical error. The monuments were constructed of reinforced concrete, averaged 4 feet to 10 feet above ground, and were buried at least 10 feet in the ground. Some common terms used on the alignment teams were azimuth, degrees, minutes, seconds, arc second etc. and used a very accurate surveying instrument called a theodolite

The old Coastal Geodetic Survey Squadrons determined the azimuth of the monuments. The geodetics team (Usually 3 technicians) would sight Polaris from each of the monuments and measure several different angles. This was called an Astro check. The work was done at night, when Polaris was visible, and on a regular basis. The check was done every 2-3 years for each site. Those requirements changed over the years. An Astro card was issued for each site showing the azimuth of the monuments as viewed from the "A" point on the LF, e.g. 247 degrees - 15 minutes - 24.0 seconds. The monument azimuth was then used to determine the mirror azimuth down in the LF equipment room. The monument information was documented on the targeting data sheet and included in the target package for that LF. These packages were issued to the Alignment Teams prior to the dispatch to the LF. There were two mirrors mounted on the LF equipment room wall. By a series of surveying measurements an azimuth of the surface of the reference mirror was determined.

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Monuments (Continued from Page 4)

LtCol (Ret) Bill Kime using a theodolite

The procedure to determine the reference mirror azimuth required the use of two theodolites. One topside installed on a mount called the "A" stand and the other in the LF equipment room. A surveying target was required to be installed on top of each monument. No photo is available of the target at this time. One or more of the maintenance team members installed the targets. They would walk/hike out to the monuments, remove the protective plate, install & level the target. The target was illuminated and powered by a battery pack. A maintenance team member would operate each theodolite; a third would record all measurements on alignment sheets. The team would communicate via intercom using headsets. This task was titled "Reference Mirror Azimuth Verification" (RMAV). The task would take from 3 to 6 hours to accomplish, not counting travel time to the LF and time to penetrate the site. A typical RMAV dispatch duration was 12 to 16 hours. The alignment paperwork would be turned over to Quality

Reference Mirror



Control and Evaluation (QC) back on the base for audit. Once the mirror azimuths were verified by QC, the data was then used to align the collimator on site. (We don't have a photo of a collimator - can you help?).

The collimator alignment was a very critical task, and the ultimate reason for using the concrete monuments in the first place. The collimator was used by the stable platform on the guidance system as a reference point. The collimator was to be 90 degrees from launch azimuth. As new and improved guidance systems came to the field the RMAV task became obsolete.

As for many maintenance tasks there are thousands of wild and interesting stories experienced by the teams in the field. A few that come to mind: a brown bear in the area of the monuments preventing installation of targets; an alignment van buried up to the drive shaft in mud when attempting to drive out to the monument; a team member getting lost trying to find the monument out in the woods.

I hope this answers SMSgt Novaks question regarding the purpose of the concrete monuments. Over more than a decade of use, the monuments at all 1,054 ICBM sites had a story to tell. If you have an interesting, riveting story that would be part of our targeting series, please send it in.

Future Targeting & Alignment subjects will cover Targeting Vans and tape loading, the advent of the Azimuth Laying Set (ALS), RMAV's at VAFB during the Cuban Crisis Target, Alignment Team name change to Combat Targeting, UFO sightings and many more historical facts from world of Targeting and Alignment. *All photos provided by CMSgt (Ret) Mike Kenderes*

341SMW 25th Anniversary Print Available



A limited number of prints by artist Randy Mayse are available from AAFM. The painting by Mayse was used to develop a print to commemorate the 25th anniversary of the 341SMW at Malmstrom. Prints are available for a \$25 donation. See the inside back cover to order yours, using item number 58.

LOX (Continued from Page 5)



An Atlas E during DPL

A DPL Exercise - by LtCol (Ret) Neil Sanders,
MbrNo A0355, Mary Esther, FL

I had planned to attend the Cheyenne meeting, but had to cancel. I was assigned to one of the first Atlas-E crews at FE Warren AFB. I remained there until the E's phased out (first as deputy and then after my promotion to captain, as a crew commander). I especially looked forward to the tour of the Atlas E missile site near Greeley because I completed many crew shifts at that particular site. We called it Site-5.

My plan was to tell the people on that tour with me the following interesting experience I had at Site-5. I believe this incident never happened before or since with Atlas E and probably not with any other missile system.

My crew and I were on site duty the day a Dual Propellant Loading (DPL) exercise was scheduled. By this time, we were designated an Instructor Crew. DPL, for those not familiar with the term, is a major event. A launch countdown is initiated. All launch systems actually perform their various functions including raising the missile vertical and loading fuel and liquid oxygen. All other systems do their thing except the rocket engine firing mechanisms are removed to prevent an accidental launch.

My deputy crew commander and I initiated the countdown. I could follow the automatic sequence of actions taking place by observing the various Launch Control Console indicators changing from not illuminated to white to amber and green. Probably the only thing remaining of that console now are the securing boltholes in the floor. I could also view the missile on a TV screen. It was interesting to see it standing on its own (after the nose clamp was released the boom had moved back a few degrees free of the missile) and I could see the liquid oxygen "boiling off." The countdown was completed

successfully (perfectly as far as I was concerned).

We then initiated the operation to automatically return the missile to its normal position. The Launch Control Console indicators were telling me that systems were being reversed correctly and I could see the boom return to vertical along side the missile and the nose clamp close and lock, then our day's experience with total success went south.

My console went blank. No lights. Nada. The first thought that crossed my mind was Oh-expletive. Then I directed the deputy and our BMAT (Ballistic Missile Analyst Technician) to put us in emergency stop. On his side of the console, the deputy had an emergency stop button but nothing on that "dead" console was trusted at this time - the BMAT, with all his many panels (which he reported were functioning normally) also had an emergency stop switch.

The console's gauges indicated the correct pressure required in the missile. But not trusting the console, I directed the Missile Maintenance Technician (MMT) to manually maintain the pressure. His normal position during launch activity was standing by the Pressurization Control Unit (PCU). For those not familiar with the Atlas, the strength and rigidity of the missile was maintained by internal pressure. Without this pressure, the missile would collapse. The BMAT and MMT were located with all of the missile's associated ground equipment. For those who toured the site, it was the largest area you would have seen. I believe we called it the Mechanical Room or maybe the Machine Room.

Although he was not directly involved with our problem that day, I want to mention another equally dependable member of our 5-man crew, our Power Man. His job was to monitor and operate two huge diesel power generators. Normally, our site's electric needs were supplied by commercial power. But during a launch exercise, or a real one, both diesels would be up and running, one supplying our required power and the other one immediately ready to replace the original.

OK, back to the situation. We were apparently in a safe configuration and the obvious next question was: "How do we get the thing down?" Well, SAC had developed a procedure for just our kind of problem (to be initiated in the event of an emergency or malfunction not covered in our checklists). I don't remember the name for this procedure, but a good nickname would have been SYA.

I requested our command post to notify SAC that we needed this procedure to be activated. I was impressed

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DPL (Continued from Page 6)

with the response. Within a few minutes a telephone conference was set up with five locations: me, our command post, our Numbered Air Force command post, the SAC command post, the Depot experts, and General Dynamics, the company, with its Convair Division, that developed the Atlas.

I explained our situation to them and they went into a 'telephone huddle' to determine a solution. At the same time, my crew and I decided to see if we could come up with an answer. At our positions we each had the applicable checklists and related technical data. We each (the conferees and our crew) determined a procedure to manually bring the missile down. By manually, I mean, following my reading the instructions, the BMAT at his panels could switch and/or un-switch the individual actions one step at a time.

The two procedures were similar and both would work but ours contained fewer steps, resulting in less chance for something to go wrong. The conferees reviewed our procedure, OK'd it, and SAC approved it. With that approval, most of the stress I was feeling disappeared. By following the approved 'homemade' checklist exactly, I would not be liable for any bad results. And I was extremely proud of our crew for coming up with the final solution.

And it worked. In about 20-30 minutes, the missile was empty, all launch systems were shut down, and the missile was resting horizontally where it belonged. During this procedure, that crazy Launch Control Console decided to return from the dead. The indicators displayed a weird flashing of colors, but eventually settled down and the lights matched the missile's status and position. I advised the conferees of this, and they agreed with my recommendation that we remain in manual mode until the missile was down.

I cannot provide an epilog. We soon had our wing maintenance people and the company technical representatives (tech reps) all over the place. Panels on the launch control room's floor were removed so techs could get under the console. Everything that could be checked was checked, but the cause of the problem was never found. The console and all of the BMAT's panels indicated we were in standby mode with everything in the green ready for a launch. Site-5 remained operational until it was deactivated. I suppose the theory was that the systems did demonstrate an automatic countdown was performed correctly and if there was ever going to be an actual launch, there would be no need for a return system to operate. Fortunately, that theory was never tested.

AFSPC Vice Commander Receives Space Trophy - from the AFSPC/PA

The vice commander of AF Space Command is the recipient of the 2006 Gen Thomas D. White US Air Force Space Trophy. LtGen Frank Klotz, one of AAFM's active duty advisors, received the award during the Air Force Association's National Symposium on Space.

"I'm proud to represent nearly 40,000 space and missile professionals - the men and women of Air Force Space Command - deployed around the world, standing watch 24 hours a day, seven days a week, 365 days a year," said General Klotz. "Our people know and understand they have a very important mission that contributes greatly to the defense of our nation."

The trophy is awarded annually for the most outstanding contribution to the nation's progress in aerospace. "General Klotz has masterfully led the command during a period of transformation of space missions," said Bob Largent, AFA national chairman, "and inspired the evolution of both the space and missile missions to become responsive and invaluable to warfighters."

AAFAM and TV Documentaries

Our association continues to receive requests from researchers, authors and producers of television documentary shows for assistance, information and potential interviewees. We have assisted two shows recently. Members Terry Karsellis, who served in the Atlas F unit at Roswell, the 579SMS, and Paul Oleniacz, who served in the 395SMS at Vandenberg, were interviewed by the History Channel in the Presidential/Congressional bunker at the Greenbrier Hotel in West Virginia. The interviews focused on their experiences during the Cuban Missile Crisis. The show aired in December on the "Our Generation" series on the History Channel under the title "Duck and Cover." AAFM has a copy of the show

In October, shortly after the National Meeting in Cheyenne, executive director Charlie Simpson met a BBC Flashback TV crew at the South Dakota Minuteman Missile National Historic Site near Wall.

What was initially planned to be a short interview on missile execution procedures turned into a seven hour tour of the launch control center and a topside visit to the nearby launch facility. The BBC team also interviewed Gen Jack Chain, CinCSAC during the late 1980s, and Russian counterparts. The show, originally based on a 1983 NATO nuclear exercise, Able Archer, became a review of nuclear war procedures and is scheduled to air in March on the Discovery Channel.



MX Intercontinental Ballistic Missile: The Basing of the Controversial Weapon System,

Part I - by LtCol Fred Stoss, MbrNo L224, Oak Ridge, TN
This article is a condensed version of Fred's paper for a Master's degree he recently earned. Part II will follow in the next issue and will also include references. If you would like the references now, or have any substantive corrections, please email Fred at LGM_30G@yahoo.com

The Missile-Experimental Intercontinental Ballistic Missile (ICBM) has a controversial history spanning almost four decades. Conceived in the 1970s, this missile was one of several weapon systems designed to deter the leadership of the Soviet Union from engaging in a nuclear war with the United States.

Since the inception of the land-based nuclear missile force, one concern of the missile force was the issue of "survivability," or the ability of the missiles to ride-out an enemy nuclear attack. During the initial period of ICBM deployments, the Soviet Union's ICBMs did not possess the accuracy to seriously threaten the destruction of the United States ICBM force, even when it was relatively unprotected in "soft" basing configurations. By the late 1970s, American intelligence analyst believed that the Soviet Union's nuclear weapons attained the accuracy needed to destroy US land-based ballistic missiles. Given the increasing vulnerability of the Minuteman ICBMs, in 1973, the concept of a new, more survivable and powerful ICBM began to take form. Originally conceived as a replacement for the Minuteman series, the Missile-Experimental (or "MX," for consistency, the missile will be referred to as "MX" for this article, although the MX later became known as the "Peacekeeper") embodied several improvements over the Minuteman III.

The MX ICBM was a four-stage missile measuring 71 feet in length and weighing about 190,000 pounds. The most innovative features were its improved accuracy and its ability to carry up to ten multiple independently-targetable reentry vehicles (MIRVs) per missile. The high-yield warheads planned for the MX, combined with improved accuracy and its ability to carry many MIRVs, would provide the MX with a mighty punch.

As development of the MX ICBM continued throughout the 1970s and early 1980s, Presidents, members of Congress, and the Department of Defense scrambled to find the optimum basing method for the MX weapon system. This was not a new problem for ICBM basing theorists. Dating back to the 1950s with the first generation of ICBMs, the Department of Defense had considered many different basing configurations. Case-in-point, one plan conceived in the early 1960s, intended for the Minuteman I to be deployed on railcars, giving the system mobility, thereby permitting greater survivability than fixed silos. But the traditional fixed silo approach was ultimately selected over the more imaginative alternate approaches for the Minuteman series.

In 1976, the first deployment method was conceptualized for the MX ICBM that was labeled as the "deep trench" basing plan. Here, the missiles would be somewhat mobile in the deep trench system, operating within a network of tunnels. The trench-basing concept did not reach full-scale development, but some trenches were dug and tested to determine the feasibility of this option. Although several reasons led to cancellation of the trench concept, the primary weakness judged by President Carter was the difficulty to verify the MX missiles in accordance with future treaties with Soviet Union. President Carter was keen on reducing the number of strategic nuclear weapons. The Strategic Arms Limitations Treaty (SALT) I was ratified during the Nixon administration, and Carter intended to further pursue reductions with SALT II. He believed that the MX basing mode would have to incorporate the capability for the missiles to be verified via satellite reconnaissance. It was difficult to design a system to be immune from Soviet detection methods when on operational deployment and yet be capable of being displayed so that Soviet satellite reconnaissance could verify the numbers of deployed missiles. Consequently, shortly after President Carter entered office in January 1977, he eliminated funding for the deployment of the MX in the trench configuration.

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MX (Continued from Page 3)

The “deep trench” basing mode died quickly and quietly.

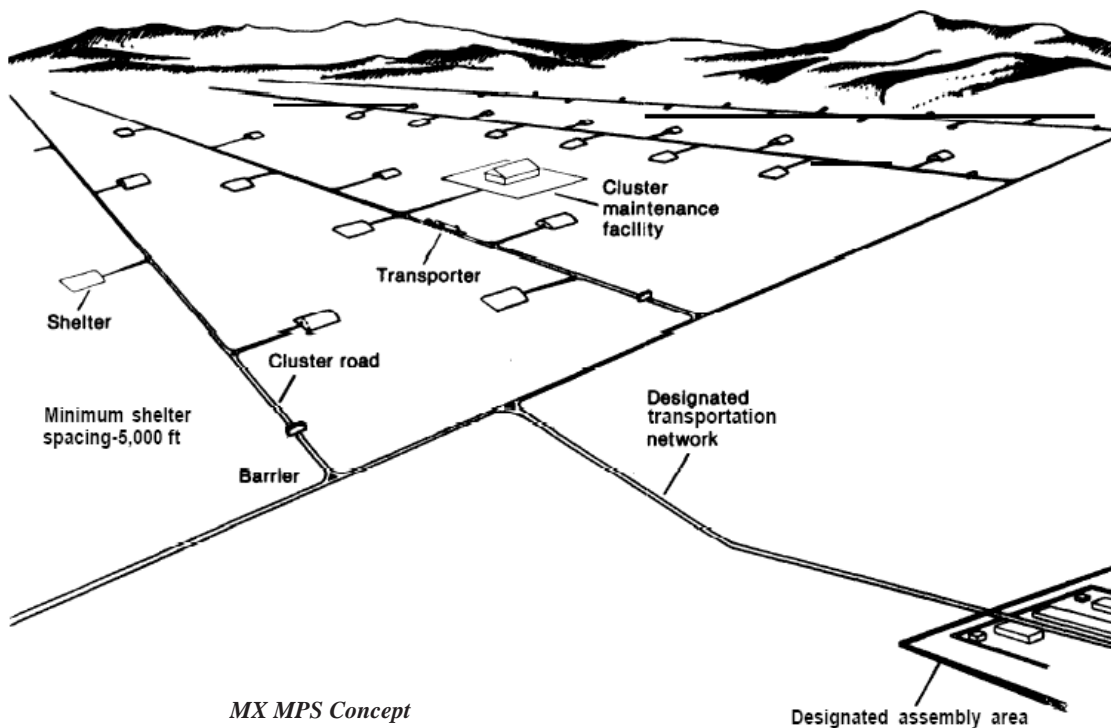
Meanwhile, Congress had granted funding for further MX development in the 1976 Defense Authorization Act. Congress insisted that “the development of an alternate basing mode as opposed to a fixed or silo-based mode, is the key element . . . none of this program’s funds shall be expended in fixed or silo-basing for MX.”

In the late 1970s, the Air Force initiated a full-scale effort to find a suitable basing mode for the MX. President Carter advocated placing the missiles in Multiple Protective Shelters (MPS). The Carter administration proposed to place 200 MX ICBMs in an underground system of railways with 2,400 possible facilities from which the missiles could be launched. The basic premise with MPS was that the missiles could be shuttled underground from one launch facility to another, thus, giving potential adversaries immense targeting difficulties—to ensure the destruction of the 200 MX missiles, they would be forced to target all 2,400 shelters. Each MX ICBM would be placed in its own underground “race-track” and shuttled by a 3,000 horsepower electrically powered locomotive. The tracks would be about fifteen to twenty miles long and launch facilities would be placed about every 7,000 feet; each MX would

be in one of twelve shelters in the closed track. Therefore, just to ensure the destruction of an individual MX ICBM, an adversary would need to destroy all twelve of this MX’s protective shelters. At that time, it was assessed that potential adversaries, such as the Soviet Union, did not have enough nuclear warheads capable of targeting the 2,400 notional shelters and at the same time, and yet cover their other targeting objectives. The MPS design also permitted a certain number of MX missiles to be displayed to orbiting satellites, allotting for a future verification regime with the Soviet Union.

The principal purpose of the MPS design was to facilitate deception. For the MPS basing mode’s tactic to work properly, the adversaries’ targeteers could not know in which of the 2,400 launch facilities the 200 MX missiles were housed. The concept became known as “preservation of location uncertainty” (PLU). To achieve PLU, several steps were to be implemented to hide the location of the missiles within the “racetrack” of the possible shelters. One method of deception was to use missile decoys that would operate on the railways along with the fully operational missiles. The Air Force’s procedures for the decoys would attempt to mirror the operations of the “real” missiles as much as possible. Also, the missiles and decoys would be shuffled around

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MX MPS Concept

Designated assembly area

MX *(Continued from Page 3)*

from time-to-time, further complicating tracking of the missiles.

Not long after the initial development of the Multiple Protective Shelters (MPS) concept, military planners determined that 2,400 launch facilities were insufficient in quantity to prevent the Soviet Union from destroying most of the MX force deployed in their facilities. Military intelligence analysts believed that the Soviet Union could deploy more warheads than those previously estimated. The Soviet military's latest ICBM, the SS-18, could carry ten warheads per missile in addition to their SS-19 force carrying six warheads each. American scientists later believed that the SS-18 had enough rocket power to boost up to 20 warheads per missile, albeit with smaller warheads than the normal configuration of ten warheads per missile. Therefore, in 1981, the Air Force decided to increase the number of proposed MPS launch facilities to 4,600, but left the number of MXs to be deployed at the figure of 200 missiles. Each of the missiles could now be in any one of 23 shelters on each of the closed track systems, making it even more difficult to destroy the entire MX force.

As the debate continued over basing the MX missiles in MPS, the Pentagon studied yet another alternative basing concept for the MX missile in what became known as the Shallow Underwater Mobile (SUM) system. With this plan, the MX missiles would be placed in small submarines. Because the SUM submarines would not be designed for extended deep-water patrols such as the Navy's Trident submarines, they were not as expensive as the latter making this an attractive basing option for the MX missile.

The SUM option gained support in Congress. Initially, this new idea was touted as being less expensive than the MPS system, with the added advantage of stealth since the submarines would operate quietly beneath the oceans. But, the SUM concept was short-lived. The program's expert, Dr. William Perry, concluded that the initial startup costs for SUM would be about the same as for the MPS system. Worse yet, since operating submarines was significantly more expensive than operating ICBMs, it was determined that SUM could cost up to four times as much as MPS over a fifteen year period due to increased operating and maintenance costs involved with submarines. While SUM looked like a possible alternative basing method for the MX missile during the MPS debate, it was found to have detractors, especially with the long-term costs, so the focus returned to the MPS basing option.

By the early 1980s, the MPS basing configuration came under attack by Congress as disadvantages of this basing system became apparent. First, it was to be widely dispersed, covering large tracts of land in Utah and Nevada and many Congressmen did not like the fact that the MPS method was going to be based near large civilian population centers. One Utah Congressional Representative stated: "this system is going to make Utah a red dot on the Soviet's target list and, as a result, the entire state could be destroyed." Interestingly, the southwestern states protested against becoming potential targets for large-scale nuclear strikes, whereas the northern states seemingly had no difficulty with having sizable numbers of nuclear weapons in their states, making them certain targets in the event of a nuclear exchange.

Environmentalists took issue with MPS basing in Utah and Nevada. Encompassing several thousand square miles for the 2,400 launchers (later options increased this number to 12,500 launchers), the MPS basing concept would disrupt the wildlife roaming the desert plains. The Bureau of Indian Affairs also took issue with the MPS concept over concerns that the system would be deployed on their lands.

Eventually, the Air Force devised plans to build 8,250-12,500 shelters to further complicate the Soviet Union's targeting of the MX ICBMs. In FY 1980 dollars, the cost for building just 5,500 launchers as part of the MPS concept was estimated at \$34.7 billion, including the \$9.9 billion required to build the missiles themselves. The MPS concept involved huge expenses that few members of Congress were willing to entertain.

For all of the above reasons, political leaders and citizens residing in Utah and Nevada attacked President Carter on the rationale of building the MPS system throughout his 1980 re-election campaign. Though this issue was not a significant cause of President Carter's defeat in the 1980 election, it is worth noting that Presidential candidate Reagan opposed the MPS basing throughout the 1980 Presidential campaign. As will be detailed in the following, Reagan became a strong supporter for the need for the MX missile, yet Reagan did not tout the MPS concept as the solution for the MX basing question.

When President Reagan entered office in 1981, he placed increased emphasis on modernization of almost all facets of military power, and nuclear weapon systems were at the top of his list. The MX program was a near-perfect fit with President Reagan's nuclear modernization

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C-5 Minuteman test in 1974

effort. Though the program had strong support in the Reagan administration, the same obstacle that the prior presidents struggled with initially dogged Reagan, that is, how to base the new missile system.

The Air Force developed a scheme to launch the MX from an aircraft. This idea was not new—in the 1974, the Air Force successfully launched a Minuteman ICBM out of a C-5A transport. The missile was not to be actually launched from within the aircraft, rather, it was to be dropped out of the back of the aircraft and the missile's computer fired its engines after it was clear of the plane. The 1974 Minuteman launch was proof that the concept could work.

With this new proposal, the MX-carrying aircraft would be positioned at Main Operating Bases (MOBs). If an attack on the United States would be detected and the MX-loaded jets would be at risk of destruction by an incoming attack, the aircraft would launch for their survival before enemy weapons would arrive at the airfield. If the aircraft seemed to be at a higher risk of a surprise attack, they would disperse from the MOBs to about forty alert bases throughout the United States. In this way, an adversary would have “locational uncertainty” about the position of the MX-carrying aircraft and would be presented with a difficult targeting scenario with the MX missiles spread among many locations for increased survivability. It seemed that this option would finally give the MX missile adequate survivability - the desired outcome for the MX basing question all along.

But the airborne basing of the MX ICBM had a significant flaw. Foremost, although this method of ICBM employment could ensure the survival of the MXs positioned in “alert” aircraft, this option would not be nearly as responsive to launch against an adversary under attack conditions. Each aircraft would need to takeoff and fly to designated launch points before the missile

could be dropped out of the plane and launched. Therefore, this concept went against the most important characteristic of ICBMs, that is, their prompt response launch capability. With missiles deployed in aircraft, it would take tens of minutes, if not more, to successfully launch MXs out of an airplane under a “bolt from the blue” attack. Also, the high costs of procuring C-5s for dedicated ICBM alert duty did not gain popularity within the Air Force.

Part II will appear in the March 2007 issue of the AAFM Newsletter

Prompt-Strike Missiles may be Deployed at U.S. Bases Abroad

An Air Force News Release

The Air Force is considering the possibility of basing future long-range, rapid-strike missiles at US-owned facilities abroad, according to the service's top space commander. Contractors have proposed Guam, a US territory in the western Pacific, as a potential basing location, according to other defense officials. Another possible candidate is reportedly Diego Garcia, a British territory in the Indian Ocean, where the United States has in the past fielded some military capabilities.

In an interview at AFSPC headquarters, Gen. Kevin Chilton told Inside the Pentagon (ITP) he has asked a team undertaking a "prompt global strike" analysis of alternatives "to look at the breadth of options" that might offer proximity to potential targets and flight paths that could avoid triggering concern among third parties. The analysis is to lay the groundwork for a weapon to be developed and fielded by 2020.

Under the prompt global strike mission, the Pentagon wants an ability to attack a target anywhere around the globe within one hour of a launch order. The idea is to be capable of disabling or destroying fleeting targets that might pose a serious threat to the US or its allies, such as weapons of mass destruction or terrorists that may be in place for just a short time. To undertake the mission in the near term, the Pentagon has proposed fitting conventional warheads on 24 Trident D-5 submarine-launched missiles, which are currently nuclear armed, and giving the weapons greater accuracy.

Defense officials and members of Congress have raised concerns that prompt global strike missiles, if used, could generate a hasty response from Russia or other nuclear-weapons nations if they mistakenly believe the missile is headed their way - particularly if it is unclear whether the US missile is armed with a conventional or nuclear warhead. If conventional ballistic missiles are

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Global Strike - (Continued from Page 3)

based on the US mainland, their trajectories might trigger such concerns, Gen. James Cartwright - the nation's top strategic commander - told ITP. Given that there may be "several points in between" the launch site and the target "that belong to other people, how do you base yourself in such a way as to not create additional enemies?" the Marine Corps general asked. One solution might be to deploy the long-range missiles abroad, thereby changing their flight paths to targets, though the Air Force was examining what might prove to be "political difficulties" associated with basing on foreign soil, Cartwright said.

Alluding to potential diplomatic hurdles, Chilton said he has asked his study team to limit its review of forward basing options to U.S.-owned facilities. "I'm not asking them to go look at, you know, what would it take to find another country and get them to agree to allowing us to base something there," Chilton said during the Dec. 11 interview. "This would be US property."

Though the general said he was reluctant to impose too many restrictions on how the analysts approach the problem, this is "the one constraint I'd put on them," he said. "Let's not go into looking at options that require us to have a diplomatic agreement with another country to deploy this," Chilton said. One alternative to forward basing might be to use a technology for prompt global strike that is able to maneuver in flight, thus flying around rather than over particular nations to be avoided, officials say. "I don't want to rule out any options at this stage," Chilton told ITP.

Lean principles Contribute to Missile Success - by Bill Orndorff 309th Maintenance Wing Public Affairs Hill AFB, UT (AF Press Release)

The members of the 309th Missile Maintenance Group completed assembly of Minuteman booster No. 75-939 7 Nov 2006, marking two years of early or on-time deliveries by the unit. The unit has maintained its completion and delivery record by using "Lean" principles, which helped organize work areas and remove waste from production processes. Coincidentally, the date also marked the 309th missile completed by the 309MMG and its squadrons, the 581st and 582nd Missile Maintenance Squadrons. The missile work is part of the Propulsion Replacement Program (PRP), a \$2.4 billion project designed to replace outdated propulsion materials.

The PRP takes the missiles, whose solid propellant has passed its shelf life, out of the silos and replaces them with refurbished missiles expected to last until 2020, said Yoon-Mi Hamrick, 582MMS director. "The mis-

siles are brought to the depot, where we strip all the components off, separate them by stages and then deliver them to launch systems for processing at the Bacchus plant or the promontory facility," Ms. Hamrick said. "The contractor reams out the old propellant from the motor, and casts new propellant. We transport them back to the depot, assemble them into functional ICBM boosters and deliver them back to the warfighter."

Missiles that once spent two weeks in the assembly process are now completed in about six days. The crews produce eight PRP missiles per month. Depending on the availability of facilities, four to six missiles are in various stage of work at one time. "It is a major undertaking that involves about 150 people such as missile truck drivers, disassembly and assembly crews, flight control mechanics, and cable and electronics technicians all working together to meet each customer due date," said Ms. Hamrick. "On a big logistics effort like this, you need to have everything in line and ready to go," she said. "One of the big things we did to be more efficient was establish a control room to direct the movement of missiles, line crews, preposition parts and sub-components, etc. The status of all activities is updated daily. Anything that is preventing the full usability of an assembly building such as equipment calibration, or a facility issue like a leaking roof is heavily scrutinized and promptly fixed. The control room report also has all facts in one concise report allowing managers to forecast possible delays then fix them before they happen." To thwart one possible delay, extra parts and sub-components for each missile were secured to create assembly kits. This ensures there would be no delays in missile assembly in case deliveries from the field are delayed by weather or other factors.

Daily coordination meetings with the 526th ICBM Systems Wing as well as a Five M review -which includes material, manpower, metrics, measurement and machinery — help anticipate and resolve problems. The most important message is about what teamwork can accomplish, said Col Robert Shofner, 526ICBMSW commander.

"PRP is a success story about communication and partnership between industry, the systems wing, the depot and the user," Col Shofner said. "If one of those team members fails, it all comes crashing down around "Two years of on-time deliveries is significant because it demonstrates to the warfighter we've overcome some real challenges on this program," the colonel said. "20AF's confidence in our team's ability to deliver

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on-time is a significant advantage because it allows them to effectively manage their most limited resource, the people who have to defend and maintain launch facilities.”

Completed missiles are shipped to Minot AFB, Malmstrom AFB, and FE Warren AFB. At its present production rate, PRP work on the missiles is expected to continue through June 2009.

Missile Squadron Poised for 72 hour Alerts

- by 1Lt Thomas Trask, 490MS, Malmstrom AFB, MT (Air Force Press Release)

Missile combat crews in the 490th Missile Squadron here are helping the 20th Air Force transform missile operations as crewmembers started performing 72-hour alerts using three-person crews 30 Sep 2006. 20AF Commander, MGen Thomas F. Deppe, suggested the 72-hour alert initiative and directed one squadron at each 20AF wing to test the program. Officials from 20AF will evaluate the program's progress after three months to determine whether to implement the initiative across all of the missile squadrons.

Within MGen Deppe's guidelines, each wing commander may implement the program as he prefers. The 490MS will convert from a four-flight organizational structure to a three-flight structure to better schedule the longer alert periods. Historically, combat crews consisted of two officers - one commander and one deputy commander - who performed 24-hour alert shifts, not including transit time to and from missile alert facilities. Crewmembers in the 10, 12 and 564MS will continue to perform alerts on 24-hour rotations.

The 490MS crews, augmented with select crewmembers from the 341st Operations Support Squadron and 341st Operations Group Standardization and Evaluation element, will conduct alerts for 72-hour periods. Crews will consist of two commanders and one deputy commander, and will continue to operate the launch control capsule in two-person teams. Individual crewmembers will alternate time between the LCC and the MAF. During the test phase 19 crews, 57 total officers, will participate.

The 72-hour alert schedule is built on a 45-day cycle. A benefit of the program is a more predictable schedule for crewmembers. Each 490MS flight will post on alert together and eventually will schedule training together to meet operations requirements. Crews should expect a maximum of six alert periods in 45 days. Though crewmembers may see an increase in time off alert,

crewmembers may also see an increase in work hours during each cycle.

“The biggest risk that jumps out to everyone is that it's different,” said LtCol Scott Fox, 12MS commander, who was on the initial 20AF project team to study the alert changes. “But the security forces members, facility managers and chefs go out for that many more days already.”

Another concern is crewmember down time. “People need to know that we're looking (at time off),” LtCol Fox said. “Even up through MGen Deppe; I heard him personally reinforce it. We need to try as hard as we can to come up with some protected amount of time off.”

“The plan is to have the first 48 hours, after returning from the field, reserved as hands off,” said LtCol David Mason, 490MS commander.

The program's longer work cycles are also of concern to crewmembers' spouses. LtCol Doug Smith, 490MS deputy commander, spoke with 10 spouses 19 September to answer questions about the program and help defuse concerns about the program's effect on time spent with families.

Officials also identified crewmember proficiency as a potential risk. “With two commanders to one deputy, that's a new ratio. We have to adjust our crew force to look like that ratio,” LtCol Fox said. “That means some of the deputies are going to upgrade to commander potentially much earlier than they would have under the current construct. That's a risk. Some of them might not be ready at the 12-month point, which is about when we expect the deputy-to-commander transition to take place under the new system.”

Benefits of the plan include decreased driving time, with resultant fuel and vehicle maintenance savings, and increased crewmember interaction with enlisted Airmen. Crews currently are sequestered underground during the 24-hour alert period and have little face-to-face interaction with the teams they command in the missile complex.

“With the 72-hour alert schedule, at least 12 hours of an alert is going to be spent topside where (crewmembers) can learn leadership,” said Col Sandy Finan, 341SW commander. “They can start developing leadership skills and interacting with the people they are leading.”

LtCol Mason hopes the trial period will help iron out any bugs and provide enough data and feedback for MGen Deppe. “All the planning is complete; now is the time to execute,” LtCol Mason said. “This is a big change

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A Word from the Association

AAFM Dues - we remind you about your annual dues for AAFM shortly before dues expire, but we don't bombard you with reminders - maybe we need to. Dues income is a down for the last few months because a number of you haven't renewed yet. We have mailed one reminder, and used the e-mail update to remind you (if you have e-mail) - but several members need to renew to keep receiving this newsletter. We have kept dues the same since we started almost fourteen years ago - and we have no plans to change them in the near future. If you have a question about your dues status, call, write or e-mail AAFM. We will remind you occasionally, but the cost, and the effort, of mailing out notices taxes both our budget and our "staff." If your newsletters stop coming, it means you have finally passed the date we finally stop sending copies to those who aren't current.

Active Duty Advisors - MGen Tom Deppe, commander of 20AF, has become part of our Active Duty Advisory Council, replacing Gen Lance Lord, who moved to our board after he retired. We will soon add a new senior NCO to replace CMSgt Ron Kriete, who also retired. They join LtGen Frank Klotz, LtGen Bob Kehler, Maj Kevin Mortensen and CMSgt Joe Lafferty as advisors.

Our National Meetings - as you read in this issue, we had an exceptional meeting in Cheyenne and have already begun planning for 2008. We expect a great turnout in the Washington area for our next meeting, and have lots of offers for assistance from some of the many local area members. We asked each attendee for feedback on our meetings, using a survey for the Cheyenne gathering. We had a lot of good comments from those who returned their surveys and a few suggestions. We will use these to make the gathering in 2008 even better. Those who attend our meetings know that we don't leave you much spare time. Between the tours, dinners and meetings, there isn't a lot of free time - and most of you like it that way. If you haven't joined us for any of the first seven gatherings, start planning now to be with us in 2008.

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.

LOX and RP-1 - I was the MCCC of crew R-20 on 14 May 1964. The account of the accident in the September 2006 issue of the AAFM Newsletter is accurate. If you are interested in how the countdown proceeded from start to finish, I had a CD made from a tape that someone anonymously left in my crew box several days after the accident. Probably a Standboard person. I sent a copy to the Museum of the Western Prairie, in Altus, Okla. and to the person who bought the Lone Wolf site near Altus. It now appears on the Siloworld site (just search Google for "harazda" and click on "Countdown Site #6". *LtCol (Ret) Cas Harazda, MbrNo A1159, Tampa, FL*

AAFM has a CD copy of the tapes from Siloworld. Contact us if you would like a copy

More LOX and RP-1 - I read with great interest about the Atlas accidents. At the time these accidents occurred they were brought up at our tour briefings, but no details were given. It was interesting to know just what happened even after all these years. While reading it brought back memories of a near accident at Plattsburgh. Crew R-41, commanded by Capt Francis Helsper, was scheduled for a standboard evaluation. After checking all the systems we started the countdown and everything went normal until the missile started to raise. Indicators indicated the elevator was unlocked and the oxygen vent pipe was raised. A few seconds later we got an indication that there was a problem in the system and you could see from the camera that the missile was not raising. The tape that was produced wasn't much help with the information it gave. The standboard MFT and I discussed the situation and both agreed that the problem could be in the electrical cabinets that controlled the elevator. After discussing with the commanders they dispatched us into the silo to see what we could do. About the only thing we could do

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aafm@afmissileers.org

www.afmissileers.org

970-453-0500

Letters (Continued from Page 14)

was to check circuit breakers and loose/corroded connections. We reset every circuit breaker and jiggled every connection we could see. Knowing there wasn't much else we could do and anxious to get out of the silo we returned to the LCC and reported to the commanders what we had done. I suggested to the crew commander that we try pressing the 'down' button on the control panel and he agreed. I really didn't expect any results, but a few seconds after pressing the button the down and locked indicator illuminated. Talk about sighs of relief, you could hear it throughout the LCC. The abort procedure was initiated and all went well after. The scariest thing about this was the oxygen content in the silo, knowing it wouldn't take much to set off an inferno. Needless to say, the first thing I did after returning to the base was get home and change my drawers. *SSgt (Ret) Bill Inman, MbrNo A2113, Henderson, NV*

Still More LOX and RP-1 - Another great newsletter. I was enthralled with the Atlas accident article. I was surprised, however, when I got to the "More Information about Missile Accidents" portion of the article. My Titan II book covers the Titan I OSTF explosion with interviews from Martin Marietta engineers that were there. In addition, my coverage of the Titan II accidents is, I believe the most complete in the open literature since it was based not only on interviews but also the accident investigation documents from the Air Force. All of my source material is in the Titan II collection at Peterson AFB AFSPC History Office. No big deal, just thought it would be a useful reference for others to know about, especially the documents at Peterson AFB. *David Stumpf, MbrNo A1008, Bowie, AZ*

My fault, David - I thought I had your book on the reference list, since it sits near my computer for ready reference. For those who don't know, David's book is "Titan II, a History of the Cold War Missile Program", published by the University of Arkansas Press.

341SMW Patches - I was based at Malmstrom AFB and got out in 1990. A few years ago my house was broken into and I lost my old uniforms. I want to replace patches that were on my uniforms. I am looking for subdued SAC and 341OMMS, an ICBM Master Technician patch and a subdued master missile badge. *Larry Womack, larrywormack@hotmail.com.*

Research Help - I am a History Graduate Student at Florida International University, in Miami, Florida, writ-

ing my dissertation on the social history of the missile in the United States in the early years of the Cold War. The years of my research are limited to 1950-1965. I am interested in hearing from anyone who worked on missile development, who were missilemen, and everyday Americans who had missiles within close proximity to their home - or on their property. The missiles I am most interested in include Nike, Atlas, Titan I and II, and Minuteman I and II. *Jessica Barrella wolfpaks@hotmail.com*

Mace Deactivation Anniversary - Thought that I would mention that the 40th anniversary of the deactivation of the Mace MGM-13A (TM-76A) weapon system in Germany has just passed. We lowered the birds and the NTCU drone, a constant fact of life for those of us who lived on or near the launch sites, stopped at 2300 zulu on 31 August 1966. *TSgt (Ret) Bob Bolton, MbrNo A1199, Lawrenceville, GA and editor of the TAC Missileer*

Taps for Missileers

Maj (Ret) Jerald Bozeman, an AAFM Life member, served in Titan II in the 381SMW and Minuteman in the 90MW and 91MW, lived in Derby, KS

Col (Ret) Rex Downtin, who was commander, 341SMW, 1964-66 and lived in Asheville, NC

Col (Ret) Ben Knight, who served in numerous missile assignments, including commander, 44SMW, and lived in Murrels Inlet, SC

Harold C. "Lucky" Loe, a member of the TAC Missileers, was in GEMS/MEMS, Mace B Bird, at Bitburg 1962-65.

Col (Ret) Nathan "Mike" Mazer was in the 341SMW, Malmstrom AFB during the Cuban Crisis, active in AFA and the Hill Aerospace Museum and lived in Ogden, UT

SMSGT (Ret) William H. Murray, an AAFM member, competed in Curtain Raiser from the 341SMW and lived in Williamsburg, MI

Phil Sesto, Joe Sesto's widow, lived in Santa Maria, CA. Joe and Phil were long time supporters of Vandenberg and missileers

LtGen (Ret) Charles Terhune and **Col (Ret) Frederic Oder** were both members of General Bernard Schriever's original team that developed our ICBMs. Both passed away earlier this year.

Dr Dean E. Wooldridge, a crucial figure in the development of the technology of ICBMs and nuclear warfare in the 1950's, and the W in TRW, lived in Santa Barbara, CA

72 Hour Alerts - (Continued from Page 3)

that affects the entire operations group and the way we conduct business. But I'm optimistic we'll adapt and move forward with the new alert structure if directed to do so after the demonstration period." The alert transformation is still being refined and there likely will be a few obstacles to overcome during the program's execution.

"We've sat down; we've brainstormed; we've thought about it from every angle," said LtCol David Bliesner, 341OG deputy commander. "There are going to be things that pop up and are consequences we didn't foresee. We're going to have to adjust to them on the fly." With so many changes taking place across the Air Force, 490MS officials recognize that change is the way of the future. "The entire Air Force is changing," Col Finan said. "We've done 24-hour alerts for a very, very long time. We are creating history here, and we want to be the ones who lead that change."



Crew S-150, MCCC Maj Joe Lear, AMCCC Capt Charlie Simpson and DMCCC Capt Gary Grim in 1966. We didn't wear alert uniforms except for alert in those days

Three Man Crews - 1965 - by Col (Ret)

Charlie Simpson, AAFM Executive Director

When MGen Deppe briefed us on the planned "three person crew" program at our National Meeting, it created a lot of discussion among those of us who served in Minuteman in the early days. Our crew force in those days was all male - so we, when we went from two to three in 1965, called them three man crews. It happened shortly after most of reported for duty at the new 321SMW at Grand Forks, at the beginning of the Minuteman Modernized/Deuce days. The nuclear safety folks had determined that, while the Minuteman I folks could "rest" while on duty, the nuclear safety concerns for the new, more complex systems for both Modernized and Deuce wings (what we then called Minuteman II) necessitated that both crew members be fully awake and alert at all times while manning the consoles in the LCCs. The system was different then - the two consoles, and the tasks associated with them, were totally different. To the existing crew consisting of a crew commander and a deputy,

we added a new position, alternate missile combat crew commander. At Grand Forks, the majors and lieutenant colonels were the commanders, the lieutenants and a few junior captains the deputies and most of us captains became AMCCCs. A very few senior captains got to move up, but most of us, who had come from the Atlas and Titan I systems, got to train, be evaluated and perform alert in both chairs. We had to adjust daily from being the leader to the follower, and had to be proficient as both the MCCC and the DMCCC.

In the 321SMW, we stayed with 24 hour tours, with each of us spending 16 hours below ground and eight above per tour. We tried a lot of combinations of the above/below mix over the almost three years we were in the three-man format. My biggest gripe was that for every evaluation that my commander and deputy got, I got two - one with each of them. Yet we all got one HQ pin if we did well. My twelve hours in the MPT per eval got the same credit as the six they each spent.

Probably the biggest difficulty we faced was keeping perspective during an eval. It was hard not to lead from the deputy chair, and it took an equal amount of concentration to ensure that one was the leader when he moved to the commander chair. More than one AMCCC was criticized for doing too much leading - or not enough - depending on where he sat and what he did.

In November 1968, we went back to two man crews - but we still couldn't sleep underground. So for several years, we had two crews at each site, one topside and one on the consoles. We tried 36, 40, 48 and 72 hour tours over the years until weapon system changes allowed us to "rest" below ground.

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@fcol.com

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

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

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