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ICBM Strike Planning - *by LtCol Andrew S. Kovich, MbrNo A1140, Commander,90th Maintenance Operations Squadron, FE Warren AFB, WY*

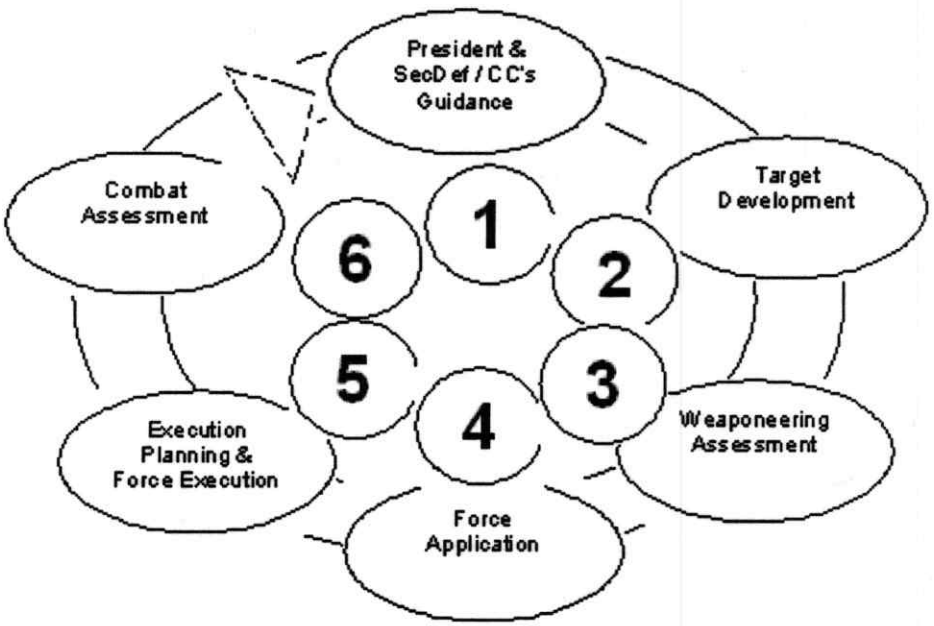
The original purpose of this article was to educate the AFSPC community on the Intercontinental Ballistic Missile (ICBM) strike planning process, and it has been adapted to be part of the AAFM targeting series. The article discusses the "big picture" of the ICBM strike planning process as part of the nuclear planning process. Next, a description of specific people, processes and products involved in the ICBM strike planning process provides detailed procedures required to place bombs on target, on time.

Nuclear Planning Process. The Nuclear Planning Process is a six step process beginning with "guidance and priorities issued by the President, Secretary of Defense, and Chairman of the Joint Chiefs of Staff and culminates with the final step of combat assessment."[1] The six phases of the process include: 1) President, Secretary of Defense and Commander's guidance outlining objectives and intent to initiate the planning cycle; 2) Target development, validation, nomination, and prioritization focuses on adversary centers of gravity for attack; 3) Capabilities analysis results in a weaponeering assessment describing expected results to include target sets and consequences of execution; 4) Commander's decision and force assignment matches specific weapon systems to targets; 5) Mission planning and force execution consists of the tasking order, unit preparation and presidential authorization to execute; and, 6) Combat assessment determines whether military objectives have been achieved."[2] This six-step process is similar to other planning processes such as the Joint Air Tasking Cycle (JATC), used to produce the Joint air Tasking Order (JATO), and is the basis for ICBM Strike Planning.

The nuclear planning process is useful for missile personnel to understand because it is not unlike the JATC or the ICBM Strike Planning Process and thus provides a solid base from which to relate to other USAF operations. Now that a baseline understanding of nuclear planning has been established in general, a more detailed review of the ICBM Strike Planning process follows. It should be noted that the strike planning process for ICBMs uses a similar methodology to the JATC and the Joint Space Tasking Order (JSTO) process as well.[4]

ICBM Strike Planning Process. The ICBM Strike Planning Process also uses a six step process and consists of guidance, target selection/desired ground zero (DGZ) construction; allocation, application, timing/ deconfliction; Joint Plan Interim Change (JPIC) production/distribution; mission plans; and, assessment, wargaming/analysis. Like all planning processes, the ICBM process begins with guidance from senior leaders.

Step 1 – Guidance. Step 1 of the process is the policy developed to guide the employment of nuclear



Nuclear Planning Process [3]

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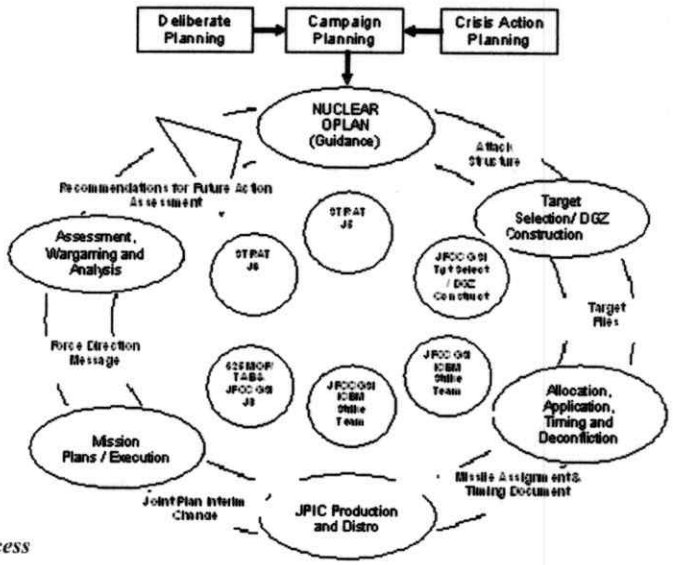
weapons. Nuclear guidance begins with the president and is refined by each lower echelon ultimately ending with the Commander, US Strategic Command (CDR USSTRATCOM) guidance to OPLAN planners. Nuclear guidance at the presidential level is codified in a presidential directive. The presidential directive is issued by the president, incorporates the advice of the National Security Council, and provides the broad policy objectives for US nuclear forces. Upon receipt of these Presidential Directives, the Defense Department focuses the guidance into military employment objectives. The Secretary of Defense produces the Policy Guidance for the Employment of Nuclear Weapons (NUWEP) which provides objectives, targeting philosophy and constraints. This guidance is in turn refined by the Chairman of the Joint Chiefs of Staff (CJCS) in the form of the Joint Strategic Capabilities Plan nuclear supplement (JSCP-N). The JSCP-N provides nuclear warplan direction to USSTRATCOM for OPLAN development. Finally, the nuclear OPLAN is the result of the planning efforts of the USSTRATCOM Plans and Policy Directorate (J5) and the USSTRATCOM Joint Functional Component Command, Global Strike and Integration, Plans and Integration Directorate (JFCC GSI/J5) and is directly supported by the six nuclear task forces assigned to USSTRATCOM.[5] Task Force 214 (20AF) is the task force with direct control over ICBMs. All actions taken by strike planners are in direct support of this plan. Once specific OPLAN objectives are codified, intelligence personnel and targeting experts begin the process of analyzing enemy centers of gravity for attack.

Step 2 – Target Selection/Desired Ground Zero (DGZ) Construction. The JFCC GSI Target Selection Division and the DGZ Construction Branch in the JFCC GSI Plans division are the key players involved in step two. The nuclear OPLAN directs a specific attack structure be designed to prosecute numerous conflict scenarios. Step 2 of the planning process is related to target selection and DGZ construction. Target selection is the process by which USSTRATCOM planners distill the list of hundreds of thousands of world-wide targets identified by the intelligence community into a more manageable list of prioritized installations to be planned against to fulfill OPLAN requirements.[6] Enemy centers of gravity that may be likely targets for nuclear strikes include "military forces, military bases of operation, infrastructure supporting those forces; C2 systems and nodes, and WMD storage facilities, delivery systems and deployment sites."[7] Once the target list is compiled, aim points are identified for every type of weapon in the nuclear arsenal. In the nuclear targeting business, these aim points are known as DGZs.[8] DGZs are "planned locations on, above, or below the earth's surface, where a weapon is to be detonated to achieve the optimum/ allowable result."[9] The goal of this step in the process is to build DGZs that will allow the designated weapon to achieve a desired level of damage expectancy (DE). DE is determined by multiplying the probability of damage (PD) and the probability of arrival (PA) for a given weapon system. PD is determined by calculating the weapon yield, accuracy (CEP), height of burst (HOB),



ICBM Strike Planning Process

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target characteristics (VNTK) and desired level of damage.[10] PA is calculated by multiplying pre-launch survivability (PLS), weapon system reliability (WSR) and probability to penetrate (PTP).[11] WSR and PLS are planning factors provided to USSTRATCOM by the Commander, AFSPC as required by the JSCP-N.

AFSPC A3 Nuclear Operations Branch (AFSPC/A3NN) develops planning factors from information in the Weapon System Effectiveness Report (WSER) produced by the 526ICBMSW and approved by the Chief, Nuclear and Helicopter Operations Division (AFSPC/A3N).[13] The OPLAN outlines the required DE for specific target sets based on objectives. Depending on attack objectives, the strengths and weaknesses of a weapon system are assessed to determine the best weapon for a given mission. The product produced at step 2 is the individual target files which equate to the JPITL in the JATC. ICBM planners then begin the process of allocating and then applying weapons to targets in order to meet OPLAN objectives.

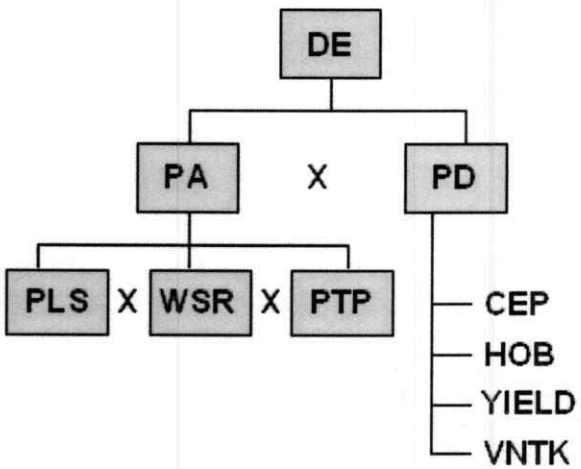
Step 3 Weapon Allocation/Application/ Timing and Deconfliction.[14] Allocation is the process by which the best weapon is selected for a target. "Each system has advantages and disadvantages...such as range, weapon yields, lead time, accuracy, recallability, and vulnerability to enemy defense systems."[15] USSTRATCOM planners receive inputs from their service components on the number of assets available for nuclear tasking. For ICBMs, AFSPC provides USSTRATCOM with the Forces Available document that communicates the number of boosters and reentry vehicles (sorties/weapons) that will be available for planning. In turn, USSTRATCOM balances all other service inputs to determine their needs for a given weapon system. The result of this determination is distributed to all nuclear forces in the Force Commit document that outlines USSTRATCOM requirements for a given system and directs compliance with the USSTRATCOM Priority Maintenance Letter (PML) and the OPLAN.[16]

Ensuring the nuclear force is capable of meeting the objectives of a diverse attack structure is the goal of the ICBM Strike Team planner in USSTRATCOM's JFCC GSI. Maintaining the viability of the attack structure begins with sortie availability requirements. Based upon these requirements, the ICBM strike planner balances intelligence generated targeting requirements with missile unit sortie maintenance schedules. As a result, the planning process at USSTRATCOM can be initiated by a number of different factors. Intel updates on target sets can drive a change but most often the sortie modification schedule necessitates the need to retarget a sortie off of a high priority target to a lower priority target while the maintenance modification occurs.

Weapon systems require periodic maintenance to assure full mission capable (FMC) status of the platform. In addition, modifications to extend the service life or to improve reliability, accuracy, or timeliness of launch, are accomplished continuously through a weapon system's life cycle. As a result, modifications sometimes require the missile to be removed from strategic alert to accomplish required retrofit. Maintenance modification requests are submitted in the form of a Joint Plan Interim Change (JPIC) request letter.

The JPIC request originates in the unit Maintenance Operations Flight (MXOO) Plans and Scheduling Section and is then passed to the unit Weapons and Tactics Flight (OSK) Plans Section for review. Following OSK review, the request is submitted to 20 AF who provides a second review before sending to the ICBM Strike Team (JFCC GSI/J541) in the "Air Room" at USSTRATCOM. At this point, planners begin to determine how they will cover the target set allocated them based on current sortie availability.

ICBM Strike Team planners utilize the Missile Graphic Planning System (MGPS) to plan ICBM strikes. Once the planner determines where the sortie is required to be targeted to meet national guidance, the MGPS software allows the planner to assign individual weapons on specific sorties to a specific DGZ. MGPS then provides the capability to "fly out" the sortie to determine range and reentry vehicle footprint ability. A sortie's footprint is



Damage Expectancy[12]

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defined as the weapon's physical ability to fall within an ellipse on the ground given factors such as re-entry angle, distance to target, and speed. Essentially, planners apply and reapply weapons as necessary to account for all required targets and cover planned sortie maintenance. Planners then time the targeted sorties against all other existing missions in the overall OPLAN attack (ICBMs, SLBMs and aircraft weapons). This portion of the process is essential to integrate specific attack options and to prevent fratricide of friendly weapons. Once the missions are successfully timed, planners perform an internal quality check (QC) to ensure sortie capabilities are optimized and are planned according to guidance. An example of planning guidance is the requirement to use an alert weapon or a survivable weapon for a particular target. Additionally, requirements for a specified level of damage or for collateral damage constraints could be identified. Once the Strike Team has performed a QC on their target package, the targeting is submitted to another Air Room agency to perform a second QC check to ensure all required OPLAN targets are covered and in compliance with guidance. The product delivered at this step of the process is the Missile Assignment and Timing (MAT) document. The MAT is similar to the MAAP and contains every ICBM's assignment in the war plan.

Step 4 – JPIC Production and Dissemination. The ICBM Strike Team produces JPICs for each sortie/mission being targeted or requiring a targeting change. A JPIC is the only authority to change the alert category or targeting of an ICBM. JPICs include information related to sortie configuration, attack structure, target locations and time-on-target requirements. Two planners verify all JPICs, and one final QC planner reviews JPICs to ensure this data is correct before delivery to 20 AF's 625th Missile Operations Flight Trajectory Analysis Branch (625MOF/TABM) for mission planning and transmission to the field.

Step 5 – Mission Plans and Execution. The 625MOF/TABM performs the final verification of targeting information by matching the targeting received from the Air Room with the JPIC request originally submitted to the ICBM Strike Team by 20AF/A3NK. Next, 625MOF/TABM uses actual missile guidance set gyroscopic data to "fly" the targeting data provided by the strike team since MGPS only uses a facsimile of the minuteman operational targeting program. When 625MOF/TABM has "good flys" and all targets are within parameters, TABM releases the targeting data via a Force Direction Message (FDM) directly to launch control centers (LCC) for use by missile combat crews on alert. The Rapid Execution and Combat Targeting (REACT) weapon system provides missile combat crews the ability to rapidly retarget sorties by providing an interface between the Strategic Automated Command and Control System (SACCS) and the weapon system computer. Instead of manually inputting all target and execution plan information into the weapon system computer, the crew simply transfers the information contained in the FDM from the Higher Authority Communication (HAC) side of the REACT console to the Weapon System Control Element (WSCE). This capability eliminates the laborious process of typing sortie configuration data (PRP, GRP, number of RVs, RV type), RV reentry angles/spacing, target latitude/longitudes, attack option assignments, delay times, and country codes into the weapon system by hand. The Remote Data Change Targeting (RDCT) procedure is then accomplished to provide the sortie with the authorized targeting data. The same targeting data sent to missile combat crews is also transmitted by the ICBM strike team to unit OSK planners in JPIC formats.

USSTRATCOM's JFCC GSI Global Operations Directorate (J3) is responsible for command, control and execution of nuclear forces. Day-to-day, the current operations section is responsible for monitoring the daily viability of the war plan. Specifically, they track sortie alert status and how off-alert sorties degrade execution options. The JFCC GSI's Global Operations Center (GOC) is responsible for global situational awareness and is the mechanism for exercising operational command and control of the Nation's global strategic forces. The GOC's Emergency Action (EA) Team is responsible for transmitting directives to the alert force. "Based on Presidential orders, the GOC will execute global strike missions or send emergency action messages to the strategic nuclear forces."[17]

Step 6 – Assessment, Wargaming and Analysis. Step 6 is performed by the USSTRATCOM Capability and Resource Integration Directorate (J8) and ensures that "target effects are consistent with either the strategic or the theater campaign objectives. Combat assessment is composed of three interrelated components: battle damage assessment, munitions effectiveness assessment, and reattack recommendation."[18] In conventional planning, a mission is executed and then evaluated for effectiveness so guidance can be changed to improve the planning process. Combat assessments following a nuclear strike are equally important. During this assessment, intelligence data is collected on the

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enemy to determine if the desired effects of the attack were achieved. "If possible, combat assessment will be required to include estimates of environmental impact, including radiological contamination of soils, water, and air, as well as contamination carried from the target."[19]

In peacetime, the assessment process for nuclear planning is ongoing to ensure viability of the OPLAN for execution. This assessment occurs during simulations and wargames. For nuclear forces, a rigorous process using analysis tools is used to assess attack effectiveness at a given time. Enemy air defenses are just one example of the type of threats evaluated during a simulated execution of the war plan. Computer modeling is used to "determine if the required target effects are being achieved...consistent with the JFC's campaign objectives."[20] Now that we understand the process used by USSTRATCOM, let's drill down to the unit level for a description of the day-to-day process.

Day-to-Day Planning. The Plans and Scheduling Section in the Maintenance Group (MXG) precipitates the primary need for day-to-day sortie retargeting. The large number of Minuteman III non-aligned modification programs currently being implemented by AFSPC necessitates extremely close coordination between the maintenance Plans and Scheduling Section and the OSK Plans Section in the Operations Group (OG). In order to provide USSTRATCOM with the most capable/reliable assets, modification programs, rather than off-alert sorties, have become the priority for wing maintenance efforts. The primary modifications impacting sortie availability include: the Guidance Replacement Program (GRP) to replace portions of the missile guidance system to increase the reliability and maintainability of the weapon system; the Propulsion Replacement Program (PRP) to replace the propellant in the first three stages and some hardware components; the Propulsion System Rocket Engine (PSRE) to replace components of the post-boost vehicle and modernize support equipment; and, the Safety Enhanced Reentry Vehicle (SERV) to replace some of the older Minuteman reentry vehicles with newer, safer, and more reliable warheads. Additionally, government mandated Reentry System Limited Life Component (LLC) changes and other reentry system configuration changes based on Moscow Treaty are recurring maintenance requirements.[21] Balancing all of the sustainment and modernization programs with other mandated requirements demands meticulous planning on the part of every player in the planning process.

The following is a typical scenario for how the planning process is initiated by a needed sortie modification in the field. A sortie at FE Warren requires a missile remove and emplace to upgrade the sortie to a PRP/GRP/SERV configuration. Notionally, it takes 14 days to perform this maintenance actionm - a day to teardown (remove reentry system and post-boost control system), a day to pull the missile, approximately 10 days to perform maintenance required without a missile/warhead present, a day to emplace the missile downstage and a day to buildup (install reentry system and post-boost control system) the sortie.[22] For this action to take place, maintenance scheduling determines the total number of days required to be utilized and requests relief from priority assignments. However, this determination is complicated by uncontrollable events such as weather, road closures, personnel availability, security requirements or the inability to get necessary parts or equipment. Once all these factors have been accounted for, OSK forwards the request to 20AF who in turn sends the request to USSTRATCOM. Typically, these scheduled actions occur 45 days prior to the needed targeting. The ICBM Strike Team then begins building a monthly targeting package for the entire ICBM fleet (all unit requests included).

So, why is understanding this process and each unit or individual's role important to ICBM professionals? Because educating our airmen on the whole system, rather than just their individual pieces, is a necessary step to ensuring the ICBM team can continue to meet emerging threats with the most reliable nuclear weapon platform while undergoing historic levels of retrofit and modernization. All in all, these actions fulfill the AFSPC vision by being the "acknowledged experts and leaders in fielding, launching, and employing space power for the 21st century."[23] Learning the ICBM system will in turn lead to airmen capable of understanding other USAF processes or systems in use throughout any combatant command they find themselves in the future.

Notes

1 Draft Joint Pub 3-12 Joint Doctrine for Nuclear Operations, Final Coordination 15 Mar 2005, pxi

2 Ibid, pxi

3 Ibid, pII-4

4 In the STO process the joint space operations plan (JSOP) and space operations directive (SOD) are produced by the Strategy Division and equates to the JAOP and the AOD. The Combat Plans Division Target Effects Team is responsible for Target Development and the production of the Target Recommendation List (TRL). The Joint Space Effects Team performs deconfliction and produces the Joint Master Space Plan (JMSP). The JSTO

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Production Team produces and disseminates the Joint Space Tasking Order (equivalent to the ATO). The Combat Operations Division is responsible for executing the current JSTO and receiving unit reports. The Strategy Division conducts combat assessment and produces the Combined Assessment Report.5 Nuclear task forces include: Aerial Refueling/Tankers (TF294), Airborne Communications (TF124), Ballistic Missile Submarines (TF134 and TF144), Strategic Bomber and Reconnaissance (TF204), Land-based Intercontinental Ballistic Missiles (TF214)

6 Nuclear OPLAN targets are selected from thousands in the Modernized Integrated Database (MIDB) and form the National Target Base (NTB) from which options are generated.

7 Draft JP3-12, pII-5

8 A DGZ is similar to either a Desired Mean Point of Impact (DMPI) or a Desired Point of Impact (DPI) in conventional targeting. The DoD Dictionary of Military Terms as updated March 2007 provides the following definitions of DMPI, DPI, and aimpoint: DMPI—"A precise point, associated with a target, and assigned as the center for impact of multiple weapons or area munitions to achieve the intended objective and level of destruction. May be defined descriptively, by grid reference, or by geolocation." DPI—"A precise point, associated with a target, and assigned as the impact point for a single unitary weapon to achieve the intended objective and level of destruction. May be defined descriptively, by grid preferences, or geolocation." Aimpoint—"A precise point associated with a target and assigned for a specific weapon impact to achieve the intended objective and level of destruction. May be defined descriptively (e.g., vent in center of roof), by grid reference, or geolocation." Definitions available on-line at: http://www.dtic.mil/doctrine/jel/doddict/

9 AFTTP 3-1.ICBM Tactical Employment Minuteman III ICBM, 19 March 2007, p5-6

10 A target's vulnerability to nuclear weapon effects is characterized by a VNTK classification. The vulnerability number or VN portion of the classification refers to the target's vulnerability to blast damage. The "T" in the classification refers to either target sensitivity to overpressure (P) or dynamic pressure (Q). The "K" factor of the VNTK classification refers to a target's response to a 20 kiloton blast.

11 PTP: A calculated probability of arrival at the target, considering only the effects of enemy defenses along the route. WSR: The probability of a scheduled weapon arriving in the target area and detonating as planned excluding the effects of enemy action. PLS: The probability that a delivery and/or launch vehicle will survive an enemy attack under an established condition of warning.

12 AFTTP 3-1.ICBM, p5-12

13 WSR information is determined by using Olympic Play weapon system testing, Force Development Evaluations (FDE), and Simulated Electronic Launch (SEL) results.

14 "Weapons available for nuclear planning include: gravity bombs deliverable by dual-capable aircraft (DCA) and long-range bombers; the Tomahawk Land Attack Missile/Nuclear (TLAM/N) deliverable by submarines; cruise missiles deliverable by long-range bombers; submarine-launched ballistic missiles (SLBM); and intercontinental ballistic missiles (ICBM). These platforms provide CDR USSTRATCOM with a wide range of options." (Joint Pub 3-12.1 Joint Doctrine for Theater Nuclear Operations, 9 February 1996, pI-3)

15 Joint Pub 3-12.1, pvi 16 "The PML is a letter that identifies specific missiles assigned to high priority targets which must receive priority in maintenance scheduling." (AFTTP 3-21.2 Munitions and Missile Maintenance, 30 December 2005, p7-3)

17 Taken from USSTRATCOM Fact Sheet. Available on-line at: http://www.stratcom.mil/fact_sheets/fact_goc.html

18 Draft JP3-12, pII-5

19 JP3-12.1, pIV-6

20 Ibid, pIII-6

21 "On May 24 [2002], President George W. Bush and President Vladimir Putin signed the Moscow Treaty on Strategic Offensive Reductions. Under this Treaty, the United States and Russia will reduce their strategic nuclear warheads to a level of 1700-2200 by December 31, 2012, a level nearly two-thirds below current levels." Source: Department of State Fact Sheet available on-line at: http://www.state.gov/t/ac/trt/18016.htm#14

22 The post-boost control system (PBCS) consists of the propulsion system rocket engine (PSRE) and the missile guidance set (MGS). Examples of maintenance performed when a missile/warhead are not present include: silo modifications or periodic maintenance to accomplish write-ups that cannot be performed with explosives present and include but are not limited to the environmental control system modification, drain line modification, fast rising B-plug installation, and Rivet Mile tasks.

23 AFSPC Fact Sheet, available on-line at: http://www.afspc.af.mil/library/factsheets/factsheet.asp?id=3649

More Early Days - *by MSgt (Ret) James Denman, MbrNo A1082, Angola, IN*

I have a couple of more experiences to share with our readers evolving around the early target and alignment of Minuteman 1 and 2. One of the most notable situations we experienced was Good Friday 1964. I was stationed at Whiteman at the time -my T&A team was dispatched out in the field to do a start up. It was night and we were one of 2 or 3 Air Force teams in the complex that night as well as a couple of Boeing teams, all doing RMAVs as a part of the start up procedures. We had set up our equipment and I was topside operating the theodolite and my officer was on the second level operating the theodolite down there. The procedure always required us to read the azimuth number in the theodolite and also to give a reading of the bubble level on top of the unipod (for the topside station) and the operator in the second level did the same thing as he measured the mirror or the compound angles. This was done for each reading. The third man on the team would record the numbers and do the math. All three of us used a headset for communication with each other. I had given a reading

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