**Minuteman Missile History**

The Minuteman missile is maintained on alert in an unmanned, hardened underground launch facility (LF) approximately 80 feet deep, 12 feet in diameter, and covered by a 100-ton blast door which is blown off prior to missile launch. A launcher support building (LSB) buried near the launch tube contains environmental control equipment and standby power sources. An electronic surveillance system is used at the LF to detect intruders. The missiles are deployed in "circular" flights of ten missiles controlled by a single, centrally located launch control center (LCC) manned by a Missile Combat Crew. The LCC contains all equipment needed by the crew to control and monitor the missile and the LFs. Each LCC is separated from the others by a minimum of 14 miles and is buried at a depth of 40 to 100 feet below grade. The missile alert facility (MAF) topside contains living quarters and support equipment for the facility manager (FM), chef, and security personnel. The 490 Missile Squadron consists of 50 LFs arranged in five flights (Kilo, Lima, Mike, November, and Oscar). For survivability, each missile is located at least three miles from adjacent missiles and are redundantly interconnected by a buried, hardened cable network which connects them with the LCCs. Each LCC continually monitors the operational status and security of the ten missiles and LFs in its own flight and has the capability to control, monitor, and launch all 50 missiles in the squadron. Launch, if directed, must be commanded by at least two different LCCs in the squadron or by the airborne launch control center (ALCC) aboard a modified EC-135.

**LGM-30A/B Minuteman I**

In the late 1950s advances in solid-fuel propellants enabled the Air Force to develop its first solid-fuel ICBM, the Minuteman I (LGM-30A/B). Formal development began in September 1958, and after an extraordinarily rapid development program, the Air Force put its first ten Minuteman ICBMs on operational alert at Malmstrom AFB, Montana, in October 1962. Deployment proceeded at an equally furious pace, and within 5 years 1,000 of the solid-fuel missiles stood poised in their silos.

Minuteman is a three-stage, solid-propellant, rocket-powered ICBM with a range of approximately 5,500 nautical miles. Minuteman also possessed an all-inertial guidance system and the capability of being fired from hardened and widely-dispersed underground-silo launchers. A consortium of five contractors produced four distinct models of the Minuteman ICBM weapon system, each model being an improvement over the former: Minuteman I (models "A" and "B"), Minuteman II (model "F"), and Minuteman III (model "G"), the latter capable of carrying multiple independently-targetable reentry vehicles (MIRVs).

The Western Development Division (WDD) was interested in solid-fuel ICBMs in 1954, but at the time found that solid-fuel motors did not produce sufficient thrust and were difficult to control. The Air Force, however, did not abandon the technology, and the WDD and the Wright-Patterson Air Development Center sponsored research in solid fuels throughout the mid-1950s.

By the spring of 1957, Air Force research indicated that a solid-fuel ICBM was possible. That fall the Air Force Ballistic Missile Division's (AFBMD-it changed its name effective June 1, 1957) Col. Edward Hall designed the revolutionary Minuteman ICBM. In marked contrast to the first generation Atlas and Titan I liquid-fuel missiles, Hall proposed building a relatively small, three-stage solid-fuel missile that would be inexpensive to build and maintain. He envisioned basing thousands of the missiles in unmanned, heavily hardened and widely dispersed silos linked electronically to a series of central launch control facilities.

The Air Force was initially cool toward the new concept, but was spurred into action when the Navy proposed modifying its Polaris submarine-launched ballistic missile (SLBM) for use as an ICBM. Anxious to defend its role in solid-fuel development, in February 1958 AFBMD sent Hall to Washington to brief the Secretary of Defense, the Secretary of the Air Force, and the Strategic Air Command's General Curtis LeMay on the Minuteman concept. They were impressed with the program, and quickly allocated the AFBMD $50 million to begin research and promised the development center another $100 million if they proved that the Minuteman was indeed feasible.

In July 1958 AFBMD began to develop the components and select the contractors. By the following September the missile development command had made sufficient progress to convince the Air Force to support full Minuteman system development, and the following month the AFBMD chose the Boeing Airplane Company as the missile assembly and test contractor. Shortly thereafter, the AFBMD awarded the guidance contract to the Autonetics Division of North American Aviation (later a Division of Rockwell International) and the reentry vehicle contract to AVCO Corporation. To develop the first-, second-, and third-stage motors AFBMD sponsored a competition between the Thiokol Chemical Corporation, the Aerojet General Corporation, and the Hercules Powder Company. The Air Force awarded the initial contracts with the under-standing that the company with the most promising design would win the production contract.

In September 1959 the AFBMD successfully launched a Minuteman first stage motor directly from an underground silo, thus proving that the missile would survive the rigors of a subsurface launch. In February 1961 the AFBMD launched a Minuteman containing all three stages and operational subsystems from the Air Force Missile Test Center in Florida. This was called an "all up" test. The missile performed flawlessly and after a flight of 4,600 miles its reentry vehicle landed within the designated impact zone.

Based on the success of the initial test flight, in March 1961 the Department of Defense formally accelerated the Minuteman program and gave it the same development priority as the Atlas and Titan ICBM programs. In November 1961 the AFBMD launched a complete Minuteman from a silo at the Operational Standardization and Test Facility (OSTF) at Vandenberg AFB, California. The missile recorded a successful flight of 3,000 miles.

In conjunction with the Minuteman development effort, the Army Corps of Engineers Ballistic Missile Construction Office (CEBMCO) built the launch facilities. Construction of the launch facilities and launch control centers at the first Minuteman squadron at Malmstrom AFB, Montana began in March 1961 and was completed late the following September. On October 22, 1962, SAC placed its first flight of ten Minuteman missiles on operational alert.

Deployment of the Minuteman force was accomplished with amazing speed. The Minuteman launch facilities were much smaller and easier to build than the Atlas and Titan launch facilities. Using prefabricated components and standardized construction techniques, CEBMCO built 1,000 silos by 1966.

From its very inception, the Minuteman program was oriented towards mass production of a simple, efficient, and highly survivable ICBM capable of destroying all types of enemy targets with consistent reliability. The Air Force hoped that such a program would reverse the unfavorable trend towards succeeding generations of progressively more costly ICBMs and provide the Strategic Air Command with a weapon system that was inexpensive to operate and maintain.

During the early development phase of Minuteman, the Strategic Air Command favored the concept of deploying at least a portion of the programmed force (from 50 to 150 ICBMs) on railroad cars. SAC submitted a requirement to the Air Staff on 12 February 1959 calling for the first mobile Minuteman unit to be operational no later than January 1963. To determine the feasibility of deploying Minuteman ICBMs on mobile launchers, SAC ordered a series of tests to be conducted, nicknamed "Operation Big Star." Beginning 20 June 1960, a modified test train, operating out of Hill Air Force Base, Utah, traveled across the western and central United States so technicians could study factors such as the ability of the nation's railroads to support mobile missile trains; problems associated with command, control, and communications; the effect of vibration on sensitive missiles and launch equipment; and human factors involved in the operation of a mobile missile system. Originally, six trial runs were projected, but only four were necessary to realize all test objectives. On 27 August 1960, the last of four Minuteman ICBM test trains arrived back at Hill AFB and the Air Force announced that the test of the Minuteman mobility concept had been completed satisfactorily.

Despite SAC's repeated pleas in favor of mobile Minuteman, the Air Force assigned top priority to the fixed silo-based Minuteman concept. Furthermore, on 28 March 1961, President John F. Kennedy deferred further action on the development of the three mobile Minuteman squadrons in favor of three additional squadrons of silo-based Minuteman units. Secretary of Defense Robert S. McNamara finally settled the issue on 7 December 1961 when he canceled the mobile Minuteman development program.

Minuteman I was deployed in two variants, Minuteman I/A and I/B. Minuteman I/A was an interim weapon because a flawed first stage reduced its range by 2,000 miles. Rather than delay the entire Minuteman program while it corrected the problem, the Air Force elected to go ahead and deploy 150 Minuteman I/As. By July 1963 150 Minuteman missiles were on operational alert; that number increased to 300in October 1963, 450 by March 1964, and in June 1965 the 800th Minuteman I missile was turned over to its SAC crew at F.E. Warren AFB, Wyoming.

A decision regarding the final size of the silo-based Minuteman ICBM force was not made until December 1964. A new Minuteman system program directive issued on 11 December 1964 established the final Minuteman force at 1,000 missiles. Three years earlier, on 1 December 1961, Headquarters SAC had activated the first Minuteman squadron, the 10th Strategic Missile Squadron (ICBM-Model A Minuteman I) at Malmstrom Air Force Base, Montana. Only two other model "A" ICBM squadrons were activated by Headquarters SAC. These were the 12th Strategic Missile Squadron, activated on 1 March 1962, and the 490th Strategic Missile Squadron, activated on 1 May 1962, also located at Malmstrom. The next thirteen Minuteman squadrons activated by the Strategic Air Command were all model "B" Minuteman I units.

Strategic Air Command housed each Minuteman I, whether a model "A" or "B", in an unmanned, hardened, and widely-dispersed (three-to-seven mile intervals) underground-silo launch facility. A missile combat crew of two officers stationed in a hardened, underground launch control center monitored each flight of 10 launch facilities (five flights per squadron). For purposes of command, control, and communications, hardened underground cables linked all five launch control centers of a Minuteman squadron.

The Minuteman Force Modernization Program initiated in 1966 to replace all Minuteman I's with either Minuteman II's or Minuteman III's continued through the latter 1960s and into the mid-70s. The last Minuteman I series "An missiles were removed from their launch facilities at Malmstrom AFB, Montana, on 12 February 1969. These facilities were refurbished and outfitted with Minuteman II series "F" missiles. Boeing Aerospace Company, the contractor responsible for remodeling the launch facilities, completed the nine year modernization effort on 26 January 1975 when it turned over to SAC the last flight of ten Minuteman III missiles at the 90th Strategic Missile Wing, F.E. Warren AFB, Wyoming. The Minuteman I was deactivated in 1972 when the Air Force began it's modernization process to the Minuteman III.

**LGM-30F Minuteman II**

In service since 1965, the Minuteman "F" was a three stage, solid propellant, intercontinental ballistic missile. Because solid propellant is so stable in storage, the missile can be stored almost indefinitely and yet be ready to launch on short notice. This ICBM had a range of over 7,000 nautical miles and carried a single nuclear warhead. 450 missiles were fielded at one time, though the Minuteman II has been decommissioned and the missiles disassembled.

Even as the Minuteman I program raced forward, the Air Force began developing the new Minuteman II. On 2 October 1963, shortly after the first model "A" and "B" Minuteman I squadrons achieved operational status, Headquarters USAF issued Annex A to Specific Operational Requirement 171 which established a requirement for the Minuteman II ICBM (Model "F").

The new missile was a significant improvement over its predecessor. A more advanced missile than either model of the Minuteman I, the "F" model incorporated a new, larger second-stage, improved guidance system, a greater range and payload capacity, and an increased capability to survive the effects of nuclear blast. A new second-stage motor with a single nozzle and a secondary liquid injection for thrust vector control increased the missile's range from 6,300 to 7,000 miles. The new motors also enabled the Minuteman to carry the larger W-56 warhead with a yield of 1.2 megatons. An improved guidance system made the missile more accurate, and it could store a larger number of preprogrammed targets within its internal memory. Moreover, Minuteman Il also carried penetration aids to camouflage the reentry vehicle during reentry.

In view of the numerous advantages of the Minuteman II, Secretary of Defense Robert S. McNamara approved the Minuteman Force Modernization Program on 8 November 1963. The project entailed the eventual replacement of the entire force of deployed Minuteman I ICBMs, 150 "A" and 650 "B" models, with Minuteman IIs.

The Air Force awarded Boeing the Minuteman II contract in March 1962 and the Seattle-based contractor conducted the first test flight in September 1964. In May 1966 SAC placed its first Minuteman II squadron on operational alert, and by April 1967, accepted its 200th Minuteman 11. At that point the Minuteman force stood at 1,000 missiles; 800 Minuteman Is and 200 Minuteman IIs. Continuing its missile modernization effort, throughout the late 1960s the Air Force replaced many of its Minuteman Is with Minuteman Hs, and by May 1969 it had 500 Minuteman Is and an equal number of Minuteman IIs on operational alert.

To prepare for the emplacement of the newer model Minuteman II ICBM, it was necessary to completely retrofit the original Minuteman I launch facilities, launch control facilities, and associated ground equipment. The Minuteman Force Modernization Program began at Whiteman Air Force Base, Missouri, on 7 May 1966 when the first flight of ten model "B" Minuteman missiles were removed from their silos at the 509th Strategic Missile Squadron. On 1 February 1965, Headquarters SAC activated the 447th SMS at Grand Forks AFB, North Dakota, making it the seventeenth Minuteman squadron and the first to be equipped with "F" model missiles. Fourteen months later on 1 April 1966, SAC activated the fourth Minuteman II, and the twentieth and last Minuteman squadron, the 564th SMS, at Malmstrom AFB, Montana. Once the 564th SMS achieved operational status on 21 April 1967, the deployment of the programmed force of 1,000 Minuteman ICBMs was completed.

In FY96, the last Minuteman II booster was dismantled at Hill AFB, UT, and turned over to the Rocket System Launch Program. All Minuteman II silos at Ellsworth AFB, SD, have been destroyed, with the exception of one National Park Service missile site. Approximately 1/3 of the sites at Whiteman AFB, MO, had been destroyed by FY96, with the remainder programmed for FY97.

**LGM-30 Minuteman III**

Five hundred Minuteman III missiles are deployed at four bases in the north- central United States: Minot AFB and Grand Forks AFB, North Dakota, Malmstrom AFB, Montana, and F. E. Warren AFB, Wyoming. Operational since 1968, the model "G" differs from the "F" in the third stage and reentry system. The third stage is larger and provides more thrust for a heavier payload. The payload, the Mark 12 reentry system, consists of a payload mounting platform, penetration aids, three reentry vehicles (RVs) and an aerodynamic shroud. The shroud protects the RVs during the early phases of flight. The mounting platform is also a "payload bus" and contains a re-startable hypergolic rocket engine powered by hydrazine and nitrogen tetroxide. With this configuration, the RVs can be independently aimed at different targets within the missile's overall target area or "footprint". This concept is known as Multiple Independently Targeted Reentry Vehicles (MIRV).

The LGM-30 Minuteman missiles are dispersed in hardened silos to protect against attack and connected to an underground launch control center through a system of hardened cables. Launch crews, consisting of two officers, perform around-the-clock alert in the launch control center. A variety of communication systems provide the National Command Authorities with highly reliable, virtually instantaneous direct contact with each launch crew. Should command capability be lost between the launch control center and remote missile launch facilities, specially-configured EC-135 airborne launch control center aircraft automatically assume command and control of the isolated missile or missiles. Fully qualified airborne missile combat crews aboard airborne launch control center aircraft would execute the NCA orders.

The Minuteman weapon system was conceived in the late 1950s and deployed in the early 1960s. Minuteman was a revolutionary concept and an extraordinary technical achievement. Both the missile and basing components incorporated significant advances beyond the relatively slow-reacting, liquid-fueled, remotely-controlled intercontinental ballistic missiles of the previous generation. From the beginning, Minuteman missiles have provided a quick-reacting, inertially guided, highly survivable component to America's nuclear Triad. Minuteman's maintenance concept capitalizes on high reliability and a "remove and replace" approach to achieve a near 100 percent alert rate.

 Development of the last of the series, the Minuteman III, began in December 1964. By the time the last Minuteman IIs of the 564th SMS were placed on strategic alert in the spring of 1967, significant progress had been made on the development of the more advanced Minuteman III ICBM. The Minuteman III, using modernized Minuteman I and Minuteman II ground facilities, provided reentry vehicle and penetration aids deployment flexibility, increased payload, and improved survivability in a nuclear environment. The missile was the first ICBM to be outfitted with MIRVs that enabled a single missile to carry multiple warheads, each programmed to attack a different target. The Minuteman III reentry system could deploy penetration aids and up to three Mark 12 or Mark 12A multiple independently-targetable reentry vehicles. A liquid-fueled post-boost propulsion system maneuvered the missile prior to deployment of the reentry vehicles, while upgraded guidance system electronics enhanced computer memory and accuracy. The new missile contained an improved third-stage motor with a liquid injection altitude control system and a fixed nozzle that increased the range to over 8,000 miles and significantly increased the payload. A liquid-fuel post-boost propulsion system maneuvered the missile before deployment of the reentry vehicles. An improved guidance system with an expanded memory also improved the system accuracy; the Minuteman III warheads are said to be accurate to within 800 feet.

In February 1968, the fourth Minuteman III test vehicle fired from Vandenberg AFB completed a successful 5,500-mile flight. In January 1971 the first squadron of Minuteman Ills was turned over to the 91st Strategic Missile Wing at Minot AFB, North Dakota. The force modernization effort continued throughout the early 1970s and by July 1975 there were 450 Minuteman IN and 550 Minuteman Ills under SACs control.

Beginning in 1966 the Air Force instituted a comprehensive long-term maintenance program to ensure that the Minuteman force remained a strong and viable deterrent for years to come. In 1966 the Air Force initiated a Minuteman ageing surveillance program and in 1976 began a long-range service life extension analysis for the propulsion system. The latter effort resulted in the remanufacturing of the Minuteman II second-stage motor and an investigation of the condition of the liner in the Minuteman III third stage. Also during the 1970s many of the Minuteman launch facilities were further hardened and the missiles were fitted with new command data buffers that facilitated faster retargeting. In 1985 the Air Force began the comprehensive Rivet MILE (Minuteman Integrated Life Extension) program destined to take the Minuteman force into the twenty-first century.

On 17 April 1970, an important Minuteman III milestone was reached when the first missile was placed in a silo assigned to the 741st Strategic Missile Squadron, Minot AFB, North Dakota. At the end of December, the 741st SMS became the first SAC Minuteman III squadron to achieve operational status.

Strategic Air Command expected Minuteman to play an important role in the command's force structure beyond the year 2000. To ensure the reliability and maintainability of the Minuteman force into the next century, the Air Force initiated a major Minuteman upgrade and modification program. Rivet MILE (Minuteman Integrated Life Extension Program) began 1 April 1985 at the 341st Strategic Missile Wing, Malmstrom AFB, Montana. This joint Strategic Air Command and Air Force Logistics Command effort was the largest single missile logistics program ever undertaken within the ICBM program.

Through state-of-the-art improvements, the Minuteman system has evolved to meet new challenges and assume new missions. Modernization programs have resulted in new versions of the missile, expanded targeting options, significantly improved accuracy and survivability. Today's Minuteman weapon system is the product of almost 35 years of continuous enhancement.

Peacekeeper missile deployment also affected the Minuteman force. As part of the strategic modernization program undertaken in 1982, Strategic Air Command deployed fifty Peacekeeper missiles in modified Minuteman III silos assigned to the 400th Strategic Missile Squadron, 90th Strategic Missile Wing, F.E. Warren AFB, Wyoming. Conversion began on 3 January 1986, when the first Minuteman came off alert, and the phaseout of the 400th SMS's Minuteman IIIs was completed on 11 April 1988.

The current Minuteman force is structured in a wing squadron, and flight concept. Each missile wing consists of three or four squadrons. Missile wings at F.E. Warren AFB, Grand Forks AFB, and Minot AFB have three MM III squadrons, totaling 150 MM III per wing. Malmstrom AFB had four MM III squadrons totaling 200 missiles once Grand Forks AFB deactivated. Each missile squadron has five flights interconnected by a network of hardened, buried electronic cables. A missile flight consists of an Missile Alert Facility (MAF) electronically tied to 10 Launch Facilities (LFs). The LFs are located 3 to 16 miles from the MAF, with each LF situated 3 to 9 miles apart. These facilities are interconnected by a redundant network of hardened, buried cables, or a single path of hardened, buried cables plus a medium frequency radio (Grand Forks AFB and Squadron IV at Malmstrom AFB). Any MAF within a squadron can monitor status, command tests and launch any of the missiles within its own squadron. Also, the Airborne Launch Control Center (ALCC), under restricted conditions, can launch any missile within the Minuteman Force. Each MAF is staffed 24 hours a day by a missile combat crew of two officers.

As a result of U.S. initiatives to cancel development programs for new intercontinental ballistic missiles and retire the Peacekeeper ICBM, Minuteman will become the only land-based ICBM in the Triad. To compensate for termination of the Small ICBM and Peacekeeper Rail Garrison programs, DOD will conduct an extensive life extension program to keep Minuteman viable beyond the turn of the century. These major programs include replacement of the aging guidance system, remanufacture of the solid-propellant rocket motors, replacement of standby power systems, repair of launch facilities, and installation of updated, survivable communications equipment and new command and control consoles to enhance immediate communications.

The Rapid Execution and Combat Targeting (REACT) equipment modification was installed in a total of 50 Minuteman III Launch Control Centers at F.E. Warren AFB, WY; Malmstrom AFB, MT; and Minot AFB, ND; with a Final Operational Capability date of 31 July 1996. All modified sites are presently on operational alert status. Key features of the modification program include: reduction of retargeting time by 50 percent, integration of Launch Control Center Command & Control and Higher Authority Communications, automation of routine functions to reduce crew workload, increased crew survivability, replacement of obsolete Command & Control and Higher Authority Communications equipment, and implementation of two-level maintenance.

The Minuteman III Guidance Replacement Program (GRP) consisted of a five-year engineering and manufacturing development (EMD) program. The program requirement is to extend the service life of the Missile Guidance Set (MGS) beyond the year 2020 by replacing aging parts/assemblies with current, high reliability technology while maintaining the current accuracy performance. During FY96, the system Preliminary Design Review (PDR) and a number of component critical design reviews were successfully conducted. Engineering Models (EM) of the MGS were built and tested to identify design weaknesses prior to the critical design review, and to lower the risk in the operational models used for qualification testing and initial operational test and evaluation. EM testing was also conducted at the Intercontinental Ballistic Missile (ICBM) Strategic Missile Integration Complex (SMIC) to verify compatibility with the actual missile hardware interfaces. GRP is also upgrading electronics in the Minuteman III MOD 7 telemetry wafer.

On 16 September 1998 the Minuteman III Guidance Replacement Program (GRP) successfully completed a second flight test from Vandenberg AFB. This second and final program development flight test further validated the end-to-end operational capability of the ICBM with the upgraded guidance system. The first flight test was conducted on 24 June 1998, and was found to meet or exceed all operational requirements. Following lift-off from Vandenberg AFB the missile traveled approximately 4,200 miles to the Kwajalein Missile Range. The flight test program followed successful completion of more than two years of rigorous ground testing conducted at government facilities in Albuquerque NM, Ogden UT and Vandenberg AFB and the Boeing facility in Anaheim CA.

Full-rate production began in 2000 with a total of 652 units being produced to support 500 operational Minuteman III ICBMs. The upgraded guidance system low rate initial production (LRIP) efforts were initiated in March 1998, with award of the LRIP contract to Boeing. Guidance hardware build efforts commenced at Boeing’s El Paso TX manufacturing facility; where all previous GRP engineering and operational model hardware was built. Honeywell, a teammate on the program, conducts program production and test activities at its site in Clearwater FL. The first operational guidance systems were delivered to the Air Force in early 1999, ahead of the contract schedule.

In December 1995, the Minuteman Propulsion Replacement Program (PRP) was declared an Acquisition Category IC program. The program requirement is to extend the service life of the current Minuteman III rocket motors through 2020. All three stages underwent successful preliminary design reviews which updated the development specifications necessary to achieve the program requirements. Additionally, the Stage 1 rocket motor fabrication processes were demonstrated. The Stage 2 motor was successfully fired with new insulation materials, including environmentally friendly propellant manufacturing processes. The Stage 3 motor demonstrated its first design changes in a static firing at the Arnold Engineering Development Center rocket motor test facility. PRP also experienced a major challenge in FY96. The sole producer of a key propellant ingredient had an event at their facility causing the loss of their manufacturing capability. The program developed several options to find a new source of the material or to demonstrate the feasibility of another material.

The ICBM Team successfully tested a 33.4 year old Minuteman Stage 1 motor at the Utah Test and Training Range on February 24, 1999. LMS and Thiokol personnel in support of the Minuteman Stage 1 aging surveillance program conducted the static test, designated AS-16. Motor performance was very much as expected and even met motor specification requirements designed for Production Quality Assurance (PQA) motors. This 33.4 years old motor was the oldest Stage 1 motor ever tested. This test was the last of a series of 16 aging surveillance tests of Stage 1 motors conducted since 1994. The next aging surveillance test of an operational Stage 1 motor is scheduled for the year 2005.

The Minuteman MEECN Program (MMP) will replace the aging Survivable Low Frequency Communications System (SLFCS) in the Minuteman (MM) Launch Control Centers (LCCs) with an integrated Extremely High Frequency (EHF) and Very Low Frequency/Low Frequency (VLF/LF) communications capability. As the newest link in the Minimum Essential Emergency Communications Network (MEECN), this effort will provide the LCCs with the ability to receive Emergency Action Messages (EAMs) in the EHF and VLF/LF spectrum and send force report- back messages over EHF. For the MM LCCs this will include integration into the Higher Authority Communications/Rapid Message Processing Element (HAC/RMPE) processor. Missile Procedure Trainers (MPTs) and Minuteman Enhanced Procedures (MEPs) trainers as well as the development/maintenance systems will be modified to reflect changes to the ICBM operational system. Performance requirements for this program are specified in the ICBM LCC EHF System (ILES) Operational Requirements Document (ORD), the VLF/LF Communications Capability for the ICBM LCCs ORD, and the MMP ORD Addendum. The ISST and AFSATCOM systems will stay intact until deactivated by AFSPC.

 In order to meet warhead levels set by START II, the United States has decided to permanently DEMIRV Minuteman III missiles from their current capability to carry up to three reentry vehicles to a newly configured single reentry vehicle system once the treaty enters into force. "Downloading" Minuteman III missiles from three reentry vehicles to one lowers the military value of each missile; reduces the likelihood of any country expending resources to preemptively attack America's ICBM force; and decreases the probability of future US leaders being force into a "use or lose" position. For a downsized force of 500 single reentry vehicle Minuteman III to continue to be an effective deterrent force, the guidance replacement program will improve the needed accuracy and supportability that is inherent in a smaller missile force. Peacekeeper missiles will be deactivated by 2003, provided START II is ratified and enters into force. Ultimately, a total of 500 single RV Minuteman IIIs will be the nation's ICBM deterrent force through 2020.

The Safety Enhanced Reentry Vehicle [SERV] program consists of modifications to existing hardware and software to accommodate the MK21/W87 RV on the MMIII weapon system. These modifications consist of the following: changes to weapon system software, changes to the RS to accommodate RV mounting, guidance hardware changes, and changes to support equipment (SE). The program will replace the MK12/W62 and MK12A/W78 (RV's) with a single MK21/W87 RV on 350 missiles. The remaining force will consist of 150 single MK12A's.