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FOR DOCTRINE DEVELOPMENT AND EDUCATION



ANNEX 3-72 NUCLEAR OPERATIONS

CATALOG OF DOCTRINE TOPICS

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Safety
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Reliability



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ANNEX 3-72 NUCLEAR OPERATIONS

INTRODUCTION TO NUCLEAR OPERATIONS

Last Updated: 14 December 2011

The Air Force role in nuclear operations is to organize, train, equip, and sustain forces with the capability to support the national security goals of deterring adversaries from attacking the United States and its interests with their nuclear arsenals or other [weapons of mass destruction](#) (WMD); dissuading competitors from developing WMD; assuring allies and partners of the US' ability and determination to protect them; and holding at risk a specific range of targets. The fundamental purpose of the US nuclear arsenal is to deter an enemy's use of its nuclear arsenal or other WMD.

The threat of global nuclear war has become remote, but the risk of nuclear attack has increased. Maintaining strategic stability will be an important challenge in the years ahead. Russia and China continue to modernize their nuclear capabilities, and both claim US [missile defense](#) and conventionally-armed missile programs are destabilizing. The most immediate and extreme threat today is nuclear [terrorism](#). The US should assume that violent extremist organizations that seek [nuclear weapons](#) would use them. Additional countries, especially those at odds with the United States, its allies and partners, and the broader international community, may acquire nuclear weapons.

Much as the Cold War ended quickly, new threats could appear without warning. New governments could conceivably change the course of a country's development in such a fashion as to lead to another cold war. Tensions between the United States, other countries, or rogue entities could increase to the point where a new or different deterrent strategy is required. Other strategic threats, not even imagined today, could develop in the years to come. The US cannot afford to ignore its nuclear doctrine, allowing it to sit on the shelf until another threat arises; effective strategic deterrence requires current doctrine.

Nuclear [deterrence](#) is not limited to preventing nuclear attack against the United States and its allies. The development of WMD, including chemical, biological, radiological, and nuclear weapons and their associated delivery systems, threatens US forces, allies, partners, and interests around the world.



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FUNDAMENTALS OF NUCLEAR OPERATIONS

Last Updated: 14 December 2011

The end of the Cold War has had a major impact on the perceived utility and role of [nuclear weapons](#) in the United States. Force reductions have reduced the specter of a large-scale, Cold War-type nuclear exchange; however, as long as nuclear weapons exist, the possibility of their use remains. This risk is aggravated as potential adversaries seek to acquire nuclear weapons and other [weapons of mass destruction](#) (WMD). This continuing [proliferation](#) places US forces, allies, and civilians around the world at greater risk. Thus, while nuclear operations are not as visible a component of national security as they were during the Cold War, they continue to underpin US [deterrence](#).

US nuclear policy is not static and is shaped by numerous considerations. As the civilian leadership changes US policy due to new threats or technologies, the Air Force will need to develop new concepts, systems, and procedures. For instance, the concepts of “mutual assured destruction” and “flexible response” required different types of weapons, different plans, and different degrees of survivability for [command and control](#) systems. Stated policies also affect the ability to deter an enemy. As an example, US policy on using nuclear weapons to respond to an adversary’s battlefield use of WMD is purposely vague. The ambiguous nature of US policy makes it impossible for an enemy to assume such a response would not be forthcoming. Even though there is no guarantee nuclear force would be used to respond to a WMD attack, planners are responsible for making alternative options available for civilian policymakers.



DETERRENCE

Last Updated: 14 December 2011

Deterrence is fundamental to national security. Per Joint Publication 3-0, [Joint Operations](#), deterrence is “the prevention of action by the existence of a credible threat of unacceptable counteraction and/or belief that the cost of action outweighs the perceived benefits.” For a nation whose security is predicated on an enduring strategy of dissuasion and deterrence, a failure of deterrence is a fundamental risk.

Although nuclear forces are not the only factor in the deterrence equation, our nuclear capability underpins all other elements of deterrence. The fundamental purpose of the US nuclear arsenal is to deter adversaries from attacking the US and its interests with their nuclear arsenals or other [weapons of mass destruction \(WMD\)](#); dissuade competitors from developing WMD; and assure allies and partners of the US' ability and determination to protect them. Additionally, our nuclear forces assure allies of our continuing commitment to their security, dissuade potential adversaries from embarking on programs or activities that could threaten our vital interests, and defeat threats that are not deterred.

Deterrence requires the United States to maintain the ability to use force, which means having trained, capable, ready, and survivable forces; robust [command and control \(C2\)](#) and [intelligence, surveillance, and reconnaissance](#) structures; and timely, flexible, and adaptive planning capabilities. The second critical element of deterrence is the will to use [nuclear weapons](#). If an enemy believes these tools will not be used, then their deterrent value is zero.

The cumulative effects of deterrence and assurance stem from the credibility of our nuclear capabilities in the minds of those we seek to deter, dissuade, or assure. To achieve its psychological and political objectives of deterring opponents and reassuring allies, deterrence requires visible and credible nuclear capabilities. This credibility is attained through focused day-to-day training, periodic exercises, and regular inspections which ensures precise, reliable nuclear forces that prove our capability and will to use them if the situation warrants.

Extended Deterrence

During the Cold War the United States provided for the security of its allies by threatening a nuclear response in the event of an attack on them by the Soviet Union.

Deterrence and Escalation Control: The Yom Kippur War

Following a three-week assault by Egypt and Syria in 1973, Israel Defense Forces (IDF) pushed Arab forces back beyond the original lines due in large part to US resupply. The US perception of the threat of unilateral Soviet action, including a communiqué from Soviet leader Leonid Brezhnev and the alerting of Soviet airborne divisions, led President Nixon to reposition bombers and tankers and raise the nuclear and conventional alert forces posture to DEFCON 3. The US administration called Brezhnev's communiqué, which threatened unilateral action, "a matter of gravest concern" and decried its likely "incalculable consequences." In fact, President Nixon's response to the Soviets, in the form of a note drafted by Secretary of State Kissinger, posited that "Should the two great nuclear powers be called upon to provide force, it would introduce an extremely dangerous potential for great-power rivalry in the area." In the end, this language, the US DEFCON 3 posture, and Kissinger's steadfast resolve during the press conference at the State Department demonstrated the US's commitment to preserving its strategic objectives and balance of power in the Middle East. The US actions and statements proved to be successful in defusing the conflict.

-- "Effects-Based Operations: The Yom Kippur War Case Study"

This policy, based on the threat of retaliation, served as the foundation for what is now called extended deterrence. Extended deterrence remains an important pillar of US policy; however, its application in the context of the 21st century is very different from the Cold War. Today, extended deterrence is less about retaliation and more about posturing to convince an enemy that they are unlikely to achieve the political and military objectives behind any attack on the United States or one of our allies. Through alliances and treaties, our extended deterrence strategy provides a nuclear umbrella to friendly and allied nations. Our nuclear umbrella assures allies of our commitment to their security and serves as a nonproliferation tool by obviating their need to develop and field their own nuclear arsenals.

In the case of the North Atlantic Treaty Organization (NATO), the deployment of nuclear weapons in Europe is not a Service or regional command issue—it is an Alliance issue.

Moreover, actions concerning nuclear posture in NATO have an impact on the perceptions of our allies elsewhere.

Dissuasion

Through a cohesive strategy of political, economic, diplomatic and military capabilities, adversaries are discouraged from competing with US strategic nuclear forces militarily because consequences are severe and restraint is rewarded.



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STRATEGIC EFFECTS

Last Updated: 14 December 2011

Effect is defined as “The physical or behavioral state of a system that results from an action, a set of actions, or another effect; the result, outcome, or consequence of an action; a change to a condition, behavior, or degree of freedom.” It is the convincing and widely recognized ability to execute and influence the perceptions, plans, and actions of one’s adversaries that constitutes the essence of **deterrence**, which is the cornerstone of our nation’s strategic effects. Our day-to-day precise, reliable nuclear operations, underpinned by the unquestionable credibility of being prepared and able to execute a nuclear strike, are the heart of US Air Force responsibility and accountability for the nuclear deterrent mission.

The physical employment of **nuclear weapons is a form of **strategic attack**.**

Strategic attack is defined as “offensive action specifically selected to achieve national strategic objectives. These attacks seek to weaken the adversary’s ability or will to engage in conflict, and may achieve strategic objectives without necessarily having to achieve operational objectives as a precondition.” It is an offensive operation intended to accomplish national, multinational, or theater strategic-level objectives without necessarily engaging an enemy’s fielded military forces. However, this does not preclude operations to destroy the enemy’s fielded forces if required to accomplish strategic national objectives.

The nature of nuclear weapons is such that their use can produce political and psychological effects well beyond their actual physical effects. The employment of nuclear weapons may lead to such unintended consequences as escalation of the current conflict or long-term deterioration of relations with other countries. For this reason above all others, the decision whether or not to use, or even threaten to use, nuclear weapons will always be a political decision and not a military one, and will be made by civilian leaders. Additionally, the viability of deterrence relies on credible nuclear forces whose value resides in achieving national security goals through daily deterrent operations without the physical employment of nuclear weapons.

The physical employment of nuclear weapons at any level requires explicit orders from the President. Nuclear weapons are unique in their destructive power and psychological impact. The use of nuclear weapons represents a significant escalation from conventional warfare. The decision to employ nuclear weapons is a political decision and will only be made by national leadership to support national objectives. In the United States, the President retains sole authority for the execution and termination of nuclear operations.

Does the United States Still Need Nuclear Weapons?

The world has changed a great deal in the last decade and a half. The Cold War stand-off with the Soviet Union is over, and Russia is no longer an ideological adversary. The United States has made historic reductions in its operationally deployed strategic nuclear forces and plans to reduce them to a level of 1,700 to 2,200 by 2012, as called for by the Moscow Treaty. The U.S. has also greatly reduced its non-strategic nuclear forces and the total nuclear warhead stockpile. These significant nuclear reductions are fully warranted in the new security environment.

The United States continues to maintain nuclear forces for two fundamental reasons. First, the international security environment remains dangerous and unpredictable, and has grown more complicated since the dissolution of the Soviet Union. Political intentions can change overnight and technical surprises can be expected. Second, nuclear weapons continue to play unique roles in supporting U.S. national security. Although not suited for every 21st century challenge, nuclear weapons remain an essential element in modern strategy.

**-- DOE/DOD White Paper
“National Security and Nuclear Weapons in the 21st Century”
September 2008**



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NUCLEAR OPERATIONS IN SUPPORT OF THEATER OBJECTIVES

Last Updated: 14 December 2011

The US employs extended [deterrence](#) on a daily basis to project deterrent [effects](#) in key regions across the globe. These forward-deployed assets combined with the global reach of continental United States (CONUS)-based nuclear forces provide theater-level assurance to allies abroad and deterrence to adversaries. Should deterrence fail, Air Force forces operating in a theater environment may be called upon to use [nuclear weapons](#) in order to obtain theater-level objectives. Though often referred to as “tactical” weapons, the designation is misleading. Terming the effect “tactical” implies attaining only limited military objectives. Activities at the tactical level of war focus on the arrangement and maneuver of combat elements in relation to each other and the enemy. While the use of nuclear weapons will affect an ongoing engagement between friendly and enemy forces, their use should also be designed to help achieve the political goals of the operation. Such use will additionally have an impact on the US’s long-term relations with other countries.

In order to achieve theater-level objectives, [combatant commanders](#) (CCDRs) may request the use of CONUS-based [intercontinental ballistic missiles](#) or theater-level nuclear weapons using either long-range bombers or fighters designated as “dual-capable;” i.e., capable of both nuclear and conventional operations. [Cruise missiles](#) allow for standoff attack which puts crew members at minimal risk and may deny an adversary significant [tactical warning](#). Gravity bombs allow more flexibility in employment but put crew members at direct risk in a high-threat environment. Their delivery platforms, whether bombers or fighter aircraft, may require significant support in the form of [air refueling](#) or [electronic warfare](#) escort.

Units supporting the nuclear mission must be appropriately trained on the full spectrum of nuclear support to include [safety](#), [security](#), and handling of nuclear weapons and components. Generation to cover a nuclear tasking is a significant paradigm shift for those operating and supporting these forces; nuclear generation also removes assets from conventional tasking. Due to the operational tempo of such forces, training should be carefully balanced between the competing conventional and nuclear demands. Readiness and training requirements for Air Force nuclear forces in support of geographic combatant commands are determined by the respective CCDR with advice from the Air Force component commander.

Since the United States is unlikely to engage in a major conflict unilaterally, the use of theater-level nuclear weapons would presumably occur while working in conjunction with other nations’ militaries. When operating with members of treaty organizations,

standardized nuclear policies may already exist. When functioning as part of a short-term coalition, however, common procedures for coalition forces should be developed during that conflict.



NUCLEAR FORCE STRUCTURE

Last Updated: 14 December 2011

The US nuclear force structure consists of [intercontinental ballistic missiles](#) (ICBMs), bombers and [dual-capable aircraft](#), and submarine-launched ballistic missiles ([SLBMs](#)). Each nuclear-capable asset offers distinct advantages. SLBMs are the most survivable. ICBMs offer a prompt, on-alert response capability plus dispersed fielding and numbers that deter attack. Bombers and dual-capable aircraft offer unique mission flexibility and distinct signaling in crisis. This variety of nuclear forces provides a deterrence posture suitable for the contemporary environment, credible to adversaries and reassuring to allies.

US nuclear [command and control](#) (C2) systems and effective capabilities for real-time [indications and warning](#), in concert with [active](#) and [passive defenses](#), secure and reinforce the credibility of US nuclear forces.

Additionally, the US nuclear stockpile enabling this force structure is supported by a physical infrastructure comprised of the national security laboratories and a complex of supporting facilities and equipment where modernization efforts remain essential. Equally imperative is the responsibility to maintain a highly capable workforce with the specialized skills needed to sustain the nuclear enterprise. A modern infrastructure coupled with expert human capital enhances nuclear credibility and fortifies strategic [deterrence](#) at its foundation.

In summary, as long as [nuclear weapons](#) exist, the United States will maintain safe, secure, and effective nuclear forces, including deployed and stockpiled nuclear weapons, highly capable nuclear delivery systems and C2 capabilities, and the physical infrastructure and expert personnel needed to sustain them.



ANNEX 3-72 NUCLEAR OPERATIONS

EMPLOYMENT (NUCLEAR OPS)

Last Updated: 14 December 2011

Different targeting strategies can enhance deterrent capability and, if employed, successfully achieve warfighting objectives. Changing circumstances will also affect the conditions under which the United States should be prepared to employ nuclear weapons. An understanding of these issues is critical for the nuclear planner or commander at the global or theater level of conflict.

Targeting

Understanding the current strategic environment is essential to the development of a comprehensive nuclear employment strategy. Whether the enemy consists of a nation-state, rogue state, or is a non-state actor helps define the nature of the strategy. Regardless, deterrence, the ability to discourage enemy attack, is still a foundational concept in nuclear operations. Understanding the nature of deterrence, including the requirements to act if it fails, helps commanders and planners develop effective targeting strategies for nuclear employment.

As stated in Annex 3-60, Targeting, targeting is “a central component of Air Force operational art.” A targeting strategy allows commanders and planners to choose the best ways to attain desired outcomes by melding ends (objectives and end states), ways (actions and effects of actions leading to the ends), and risk (the probable “cost” of attaining the ends in terms of lives, equipment, effort, time, and opportunities). Since joint and Air Force targeting doctrine encompasses both kinetic and non-kinetic employment to achieve desired effects, a complete nuclear targeting strategy must include a thorough understanding of the role of deterrence.

In order to accomplish objectives using non-kinetic means, deterrence focuses on preventing an actual exchange through demonstrating the commitment to employ weapons when required. The deterrence effort should be a clearly visible part of the strategy employed on a continuous basis through all instruments of national power. Examples include clear diplomatic and informational efforts including declaratory statements involving US nuclear posture and the commitment to act when required, military preparedness demonstrated through exercises and daily training, and economic incentives toward nonproliferation efforts.

If a nuclear option is chosen, ending a conflict as soon as possible and on terms favorable to the United States and/or its allies will help determine the level and scope of employment. Limiting unintended or collateral effects, consistent with Annex 3-60 and

JP 3-60, [Joint Targeting](#), can help minimize and mitigate enemy reactions such that they pursue a quick cessation of hostilities as well. Careful consideration should be given to containing effects to the maximum extent possible. Although there will undoubtedly be longer-term effects from nuclear employment, commanders and planners should develop consequence management into their strategies and remain consistent with law of armed conflict principles.

Law of Armed Conflict

The [law of armed conflict](#) is not based on a single treaty but is instead grounded in various treaties, customs, and national practices regarding the conduct of armed conflict. This body of international law protects combatants and noncombatants, safeguards human rights, and facilitates the achievement of peace by limiting the amount of force and the manner in which it can be applied. While there is a connection between the destruction of life and property and the defeat of enemy armed forces, neither the law of armed conflict nor US policy sanction devastation as an end unto itself. That having been said, **the law of armed conflict does not expressly prohibit the possession or use of nuclear weapons**. Under international law, the use of a nuclear weapon is based on the same targeting rules applicable to the use of any other lawful weapon, i.e., the counterbalancing principles of military necessity, proportionality, distinction, and unnecessary suffering.



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WEAPON EFFECTS

Last Updated: 14 December 2011

The destruction wrought by **nuclear weapons** can be immense, or it can be tailored and limited for a particular scenario. The physical impact of a nuclear strike includes both short- and long-term effects. Beyond the physical repercussions are significant psychological and political effects, which may lead to unintended consequences.

The physical effects of nuclear weapons are pronounced. The degree of destruction depends upon a number of factors such as weapon design and yield, location and **height of burst**, weather, and others. Planners must consider the political and military objectives and the desired degree of destruction as well as the local conditions, available weapons, and delivery systems. The immediate operational impact of a nuclear detonation varies and may come from blast and heat, the subsequent **electromagnetic pulse** (EMP), or more far-reaching effects, depending on the variables discussed above. This will have an immediate effect on enemy forces, logistics, and **command and control**. Communications and computer capability will be severely impacted by EMP, which is an operational effect that may lead to a long-term, strategic impact if the enemy is unable to completely restore those capabilities. Another operational effect with strategic implications is radiation, which will limit the effectiveness of enemy forces as they take protective measures but may also render enemy territory uninhabitable for a long period of time. Other significant effects may include extreme overpressure, dust, and debris.

Theater commanders and planners must consider that the operating environment after a nuclear exchange can be equally inhospitable for friendly forces. Movement through an area that has experienced a nuclear detonation will be slow because significant protective measures are required. Nuclear hardened communications and information systems are designed to be survivable in a nuclear environment and are expected to be available. The use of nuclear weapons to repel enemy forces in friendly territory will lead to long-term effects that may be unacceptable.

There are psychological effects associated with nuclear weapons that go beyond physical destruction. Notwithstanding the stark difference in physical effects between nuclear and conventional weapons, the use of nuclear weapons will have additional implications. It is difficult to determine exactly what that effect might be. A limited use of nuclear weapons may convince an enemy that the United States is committed to using whatever degree of force is required and encourage them to cease and desist. It may have the opposite effect, enraging the enemy to the point where it escalates the

conflict. When planning a nuclear option, it is important to consider the potential psychological impact as well as the enemy's ability to escalate.

Nuclear weapon use may also have short- and long-term negative effects on relations with other countries. The use of such weapons may be unacceptable to allies or other friendly nations. Their support for the conflict may be lost, and long-term relations may be damaged. It also has the potential to spur other nations to develop nuclear weapons. The President will make the ultimate decision, and he or she will have to consider all of these factors. Military planners and commanders should understand these factors, too, so they can present military options in the full context of their effects rather than in isolation.



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WAR TERMINATION

Last Updated: 14 December 2011

The goal behind using [nuclear weapons](#) is to achieve US political objectives and resolve a conflict on terms favorable to the United States. Nuclear operations, like all military operations, should use the minimum force necessary and should be terminated once the objectives have been attained. This requires that decisive targets be struck first, mandating the need for effective [intelligence](#) and targeting capabilities. While nuclear operations are in progress, a reliable [command and control](#) system is essential if operations are to be terminated when no longer needed or continued if required. Finally, the United States must maintain forces in reserve which will continue to protect against coercion following a nuclear strike, convincing the adversary that further hostilities on its part will be met by a swift response.

[Assessment](#) is a critical tool for understanding when to terminate and when to continue the attack. Assessment is defined in part as “a continuous process that measures the overall effectiveness of employing joint force capabilities during military operations. It is also the determination of the progress toward accomplishing a task, creating an effect, or achieving an objective.” Assessment supports the commander’s decision making process by providing insight into the validity of the [strategy](#) and accompanying plans. In terms of nuclear operations, it is thus a critical tool for understanding whether national objectives have been achieved, as well as when to terminate and when to continue an attack.

Refer to Annex 3-0, [Operations and Planning](#), for more discussion on establishing [assessment criteria](#).



ANNEX 3-72 NUCLEAR OPERATIONS

ADDITIONAL CONSIDERATIONS

Last Updated: 14 December 2011

The day-to-day purpose of [nuclear weapons](#) is to deter; to create desired political effects without actually employing nuclear weapon kinetic effects. [Deterrence](#) is a political tool which can be postured to affect the desired outcome. Civilian leadership can send strong messages to assure our allies and dissuade our adversaries through strategic messaging, generation of forces, posturing the forces, deployment of forces, and limited strikes to show our resolve and/or provide escalation control.

The decision to use nuclear weapons is one made only after careful consideration of all relevant factors. One issue which should be addressed is whether the objectives may be achieved through other means, either those offered by non-nuclear, long-range strike capabilities or by other conventional capabilities. The use of nuclear weapons carries with it the potential for undesirable political consequences. There also may be additional logistical requirements associated with employing such weapons. Commanders and planners should consider exactly what effects they are trying to produce and consider non-nuclear alternatives as well.

If the focus of operations is on physical impact, other munitions may provide the degree of limited or widespread destruction desired without the long-term effects that would result from nuclear weapons. [Precision-guided munitions](#) may allow for destruction of hardened facilities without excessive collateral damage. Cluster munitions may be used to destroy or deny a wide area.

Psychological effects can also be achieved with conventional munitions, if the goal is to strike fear in an adversary's leadership or fielded forces. Operations DESERT STORM in 1991 and IRAQI FREEDOM in 2003 demonstrated that a combination of heavy aerial bombardment and [military information support operations](#) can severely degrade an enemy's operational effectiveness.

Planners should fully understand the political and military objectives before advocating the use of nuclear weapons. Depending upon the goal of the attack, it may be possible and preferable to use conventional weapons to achieve the desired effects.



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ANNEX 3-72 NUCLEAR OPERATIONS

COMMAND AND CONTROL OF NUCLEAR OPERATIONS

Last Updated: 14 December 2011

Effective **command and control (C2)** is critical for the proper employment of **nuclear weapons**. C2 is defined as “the exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission.” A strong C2 capability allows for employment of the proper force against a target in a timely manner. It also provides the means to order the termination of a conflict and avoid further escalation. C2 is a vital component of United States deterrent capability, as it guarantees the ability of the US to respond even after suffering an attack. C2 systems should be designed to operate vertically and horizontally to allow effective control of nuclear assets and forces by the President at all affected levels. Proper planning and implementation will ensure that C2 systems are interoperable, secure, timely, efficient, and survivable. Nuclear C2 is a vital aspect of our nuclear deterrent capability. Visible worldwide exercises must routinely highlight capabilities to our allies and adversaries.



ANNEX 3-72 NUCLEAR OPERATIONS

AUTHORIZATION FOR USE OF NUCLEAR WEAPONS

Last Updated: 14 December 2011

The decision whether or not to use **nuclear weapons** will always be made by **civilian leaders**. The President of the United States is the only person with the authority to order their use. Working with the Secretary of Defense (SecDef), the President may determine nuclear weapons are required to resolve a situation. The President will issue the execution order through the Chairman of the Joint Chiefs of Staff to the **combatant commander** and, ultimately, to the forces in the field exercising direct control over the weapons.

To allow for the timely execution of this order, a series of emergency action procedures (EAP) allow for a quick response to an authentic execution message. EAP should be simple enough to allow for rapid action while at the same time ensuring that an execution order is valid and authentic. Personnel involved in the actual employment of nuclear weapons must be intensively trained and certified in these procedures so they can respond quickly while at the same time resolving any problems that might occur in the transmission of the order.

Positive Release Orders

To prevent unauthorized employment of nuclear weapons, certain code systems are used to validate the authenticity of nuclear orders. Access to these systems and codes are tightly controlled to ensure unauthorized individuals are not permitted to gain access to the means to order or terminate nuclear weapons employment. Conversely, once appropriate orders have been sent, weapon system operators must respond in a timely manner if weapons are to be employed effectively before the situation changes. This requires a standard set of procedures for initiating or terminating operations. Knowledge of these procedures could allow an adversary to determine the time required to conduct operations and the methods crew members will use to accomplish them, allowing that adversary to take more effective measures to counter or limit a nuclear strike. Though CONUS-based nuclear weapon systems have an information security structure in place, theater commanders need to consider how best to protect information in a forward-deployed location. They may turn to supporting commands and agencies for assistance, such as United States Strategic Command, the National Security Agency, and the Air Force Office of Special Investigations. Allowing unauthorized persons to have knowledge of nuclear procedures can sharply reduce operational effectiveness. As with all components of [force protection](#), information security and [operations security](#) are critical to mission success.



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COMMUNICATION SYSTEMS

Last Updated: 14 December 2011

The nuclear environment can seriously degrade the ability of the civilian leadership to communicate with forces in the field. If [nuclear weapons](#) have already been employed by the United States or an adversary, an [electromagnetic pulse](#) may have damaged communication systems, command centers may have been destroyed, and essential links may no longer be effective. The means must exist to exercise positive control over nuclear forces. Therefore, [command and control](#) (C2) systems supporting nuclear operations should be survivable, redundant, secure, and interoperable.

Survivability

C2 links should be able to survive in a [chemical, biological, radiological, or nuclear](#) environment. A conventional conflict can also interfere with US ability to exercise control over dispersed forces. While some systems are “soft” by their nature, and will probably not be usable after an initial exchange of weapons, other systems must be able to survive. Airborne or mobile command posts and space-based communication links can allow C2 elements to be removed from the direct conflict. Certain types of radio systems will be able to operate in a degraded environment and must be made available for nuclear C2.

Redundancy

The effects of nuclear weapons on communications will vary by system. To ensure communications are available, redundant systems are in place in the event one or more lose their effectiveness. Use of redundant systems also enhances [deterrence](#) by denying an enemy the opportunity to destroy friendly C2 capability with a single blow.

Secure Versus Nonsecure Communications Systems

Secure communications systems afford friendly forces the ability to issue orders while denying valuable [intelligence](#) to an enemy. They can also help ensure messages passed to nuclear forces are authentic and not part of enemy deception operations. However, encryption systems by their nature may garble messages or slow their transmission rates, the possibility of which may not be acceptable. The use of code systems with nonsecure communications may be more appropriate than encryption and decryption, though they do not have all of the same capabilities. C2 personnel should

strike the appropriate balance between security, timeliness, and accuracy, depending on the contingency and the enemy intelligence threat.

Interoperability

C2 communications systems need to be interoperable so critical information can be exchanged following a nuclear attack. Communications systems that use proprietary information technology standards are closed systems, and their value will be severely limited if they do not interoperate with other proprietary systems. At a minimum, these systems should employ information technology standards from the Joint Technical Architecture.



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ANNEX 3-72 NUCLEAR OPERATIONS

INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE

Last Updated: 14 December 2011

Robust [intelligence, surveillance, and reconnaissance](#) (ISR) assets are critical to planning, conducting, and assessing nuclear operations. ISR assets provide commanders with the ability to gather information and make timely decisions while supplying planners with information needed to identify decisive targets and determine weapons selection. Additionally, multiple source ISR assets enable civilian leaders with the ability to send timely and targeted deterrent signals to our adversaries and assurance to our allies as well as providing essential post-strike [assessment](#) of both friendly and enemy situations to determine follow-on operations.

Space assets provide essential information for [early warning](#) and [attack assessment](#), as well as enemy strike or nuclear detonation detection. Airborne assets are also critical for target detection and damage assessment. Nuclear planners and commanders should have easy access to the information gathered from appropriate ISR sources.



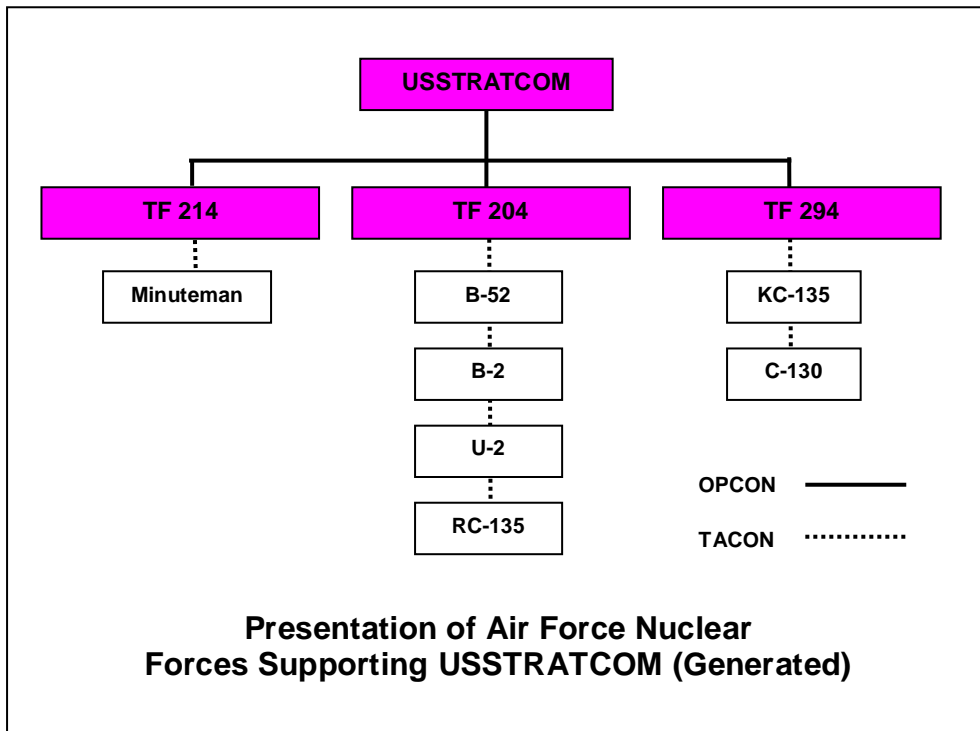
[ANNEX 3-72 NUCLEAR OPERATIONS](#)

AIR FORCE ORGANIZATION FOR CONUS-BASED NUCLEAR OPERATIONS

Last Updated: 14 December 2011

The Air Force is responsible for organizing, training, and equipping [intercontinental ballistic missile](#) (ICBM), bomber, [reconnaissance](#), and [air refueling](#) forces for nuclear combat operations. Air Force major commands (MAJCOMs) and numbered Air Forces oversee the day-to-day operations of these forces. The Air Force contribution to nuclear operations includes ICBMs, nuclear-capable bombers and fighters, tankers, and reconnaissance and surveillance aircraft. Today, except for ICBMs, these forces have conventional missions in addition to their nuclear role.

Rather than organizing with individual Service components, nuclear forces within [US Strategic Command](#) (USSTRATCOM), when generated, are organized by functional task forces. For example, Task Force 214 consists of ICBMs; Task Force 204 includes nuclear-capable bombers and airborne reconnaissance; and Task Force 294 includes air refueling aircraft and [airlift](#) support. See figure, Presentation of Air Force Nuclear Forces Supporting USSTRATCOM. Comparable task forces exist for the Navy's submarines and for airborne communications. Each task force may have its own commander. Within each task force, forces are arrayed internally into wings, groups, and squadrons as necessary to provide internal span of control. When forces are engaged in nuclear operations, the Commander, USSTRATCOM exercises [operational control](#) (OPCON) of assigned and attached nuclear forces and delegates [tactical control](#) (TACON) to the task force commanders for mission accomplishment. It is important to note that the task force commanders are not joint commanders within the normal constellation of joint force commanders. The task force commanders also have [administrative control](#) (ADCON) responsibilities for organizing, training, and equipping through their owning MAJCOMs. The roles and responsibilities of the senior Air Force commanders should be clearly delineated in writing.



This structure deviates from standard Air Force organizational doctrine. Under normal conditions Air Force units [assigned](#) or [attached](#) to a joint force commander at any level should be organized along the lines of an [air expeditionary task force](#) and commanded by a single [commander, Air Force forces](#) (COMAFFOR). This individual would typically exercise OPCON and specified ADCON over the assigned and attached Air Force forces. However, there is not normally a COMAFFOR or [joint force air component commander](#) in the USSTRATCOM nuclear command structure. This unique organizational structure is due to the political and military aspects of nuclear force daily alert posture and the highly centralized [command and control](#) requirements of a nuclear strike.



[ANNEX 3-72 NUCLEAR OPERATIONS](#)

**AIR FORCE ORGANIZATION FOR
THEATER-BASED NUCLEAR OPERATIONS**

Last Updated: 14 December 2011

Geographic [combatant commanders](#) (CCDRs) may be tasked to develop and execute nuclear operations in their [areas of responsibility](#) using their assigned and attached forces. When so postured, the process for [command and control](#) (C2) of Air Force theater nuclear forces should be similar to that of CONUS-based forces:

- ★ Theater nuclear forces are under the [operational control](#) of the CCDR.
- ★ Nuclear execution and termination authority rests with the President.

Nuclear C2 requires implementation of stringent emergency action procedures to ensure positive authentication, validation, and release of nuclear weapons. The levels of security and integrity in these procedures are no less than for CONUS-based nuclear forces.

As with CONUS-based nuclear forces, Air Force Service component commanders in theaters have no part in nuclear execution; execution authority remains vested with national leadership. Most importantly, Air Force commanders at all levels (e.g., wing, group, and squadron) remain responsible for the [security](#), [safety](#), and handling of nuclear weapons and materials regardless of where they may be in the generation or employment process. For additional discussion on surety, see [related discussion](#).



ANNEX 3-72 NUCLEAR OPERATIONS

PLANNING (NUCLEAR OPS)

Last Updated: 14 December 2011

As with all military operations, nuclear operations may be carried out against an enemy's military, political, economic, and information targets. The goal is to achieve national objectives by neutralizing or destroying the enemy's war-making capabilities and will to fight.

Plans for nuclear operations are prepared by [US Strategic Command](#) (USSTRATCOM) and the geographic combatant commands, in accordance with guidance provided by the President, Secretary of Defense (SecDef), and the Chairman, Joint Chiefs of Staff (CJCS). These plans respond to threat assessments, targeting directives, and policy requirements. Accurate and timely [intelligence](#) is critical to planning nuclear operations.

PLANS

Nuclear operations can either be preplanned against specific targets using planned routing or adaptively planned against emerging targets. Preplanning provides the opportunity to conduct detailed planning and analysis against targets without the time pressures normally associated with a crisis action scenario. Preplanned options maintain centralized control while minimizing response time. Plans provide a variety of targeting options, which allow national leadership the flexibility to achieve objectives. As circumstances change during a conflict, adaptive planning allows leadership to retarget and strike emerging, mobile, or previously unknown targets. Quick reaction by nuclear forces can prevent enemy leadership from using resources to its advantage. Planning for theater-level nuclear operations should be integrated into the [combatant commander's](#) (CCDR's) operational plans. This will maximize the desired [effects](#), identify and prioritize intelligence, planning, and force requirements, and ensure proper levels of coordination and support necessary for successful mission operations. USSTRATCOM is tasked by the Joint Strategic Capabilities Plan to provide specific support to geographic CCDRs for their nuclear planning. Liaison teams are assigned to work with the joint force commander and the components in the development of nuclear options.

Planners may integrate nuclear options with conventional or non-kinetic operations to enhance effectiveness and minimize collateral effects. In some scenarios, the delivery of a single or a few [nuclear weapons](#) may require conventional support in the form of [air superiority](#), [defense suppression](#), [air refueling](#), and post-strike [assessment](#). In other scenarios, theater nuclear weapons may be integrated within a larger strike that also includes delivery of conventional ordnance. In other scenarios, CONUS-based

bombers or submarine-launched cruise or ballistic missiles may support theater operations. All scenarios require careful planning to ensure integration of all capabilities, beyond simple deconfliction of weapons effects.

Given the fluid nature of the modern security environment, the need for strategic intelligence may be greater than ever. For planning to be effective, emerging threats should be identified long before they pose a significant danger to US interests. A strong link between intelligence and planning allows for the recognition of threats in advance and enables the United States to take steps to deter or prevent their emergence and defend against them when required. Successful planning requires more than just an understanding of today's environment; it demands a forward-thinking paradigm that is proactive, rather than reactive, in nature.



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ANNEX 3-72 NUCLEAR OPERATIONS

TIMING AND DECONFLICTION

Last Updated: 14 December 2011

Nuclear employment is closely coordinated to combine targeting, mutual support, and defense, as well as national strategies and objectives. The options contained therein provide sufficient detail to ensure mutual support and defense suppression. Of particular concern is the timing and deconfliction of weapons. Fratricide, or the destruction of one weapon by another, will reduce the effectiveness of the nuclear strike. Planners coordinate between different weapons to ensure they do not conflict. Air Force planners and [US Strategic Command](#) liaison teams in a [theater of operations](#) must also ensure that weapons are deconflicted before being employed.

Another issue of particular concern is the risk of friendly casualties. Planners should fully understand the effects of the weapons, applicable meteorological data, and location of US or allied forces. The impact to the US Government will be far greater than anticipated if it should turn out that US or allied forces are killed by their own [nuclear weapons](#).



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ANNEX 3-72 NUCLEAR OPERATIONS

AIR, SPACE, AND CYBERSPACE SUPERIORITY

Last Updated: 14 December 2011

As with most Air Force operations, nuclear operations rely on and complement actions conducted across all domains. Despite the unique nature of [nuclear weapons](#), operations must still be integrated to achieve assigned objectives. As articulated in Air Force doctrine, success in air, land, sea, space, and cyberspace operations depends upon [air superiority](#), [space superiority](#), and [cyberspace superiority](#). They provide freedom to attack as well as freedom from attack. This is as true for nuclear missions as it is for any other form of attack.

Air, space, and cyberspace superiority strongly enhance nuclear operations by protecting manned systems and space assets. They deny enemy access to space for purposes of surveilling and targeting US forces, as well as inhibiting enemy nuclear [command and control](#). In addition, control of these domains allows US forces to be warned of and assess ballistic missile attacks, target enemy locations, exercise positive control of nuclear systems, conduct damage assessment, and plan follow-on operations. For more discussion on the various aspects of superiority, Annex 3-01, [Counterair Operations](#); Annex 3-14, [Space Operations](#); Annex 3-13, [Information Operations](#); and Annex 3-12, [Cyberspace Operations](#).



ANNEX 3-72 NUCLEAR OPERATIONS

COMBAT SUPPORT

Last Updated: 14 December 2011

Effective support is critical for Air Force nuclear forces to be successful. Nuclear support structures must be organized, sized, and maintained to support all likely nuclear operations. Nuclear support includes such things as scheduled maintenance and support of current operations; generating bombers and [intercontinental ballistic missiles](#) for nuclear alert in a crisis; deployment into a [theater of operations](#), as required; and dispersal and reconstitution actions (before and after hostilities). Support structures should operate effectively throughout the range of military operations, including nuclear operations. When considering the possibility of nuclear options, planners must review the support issues involved and ensure all support requirements are met before moving weapons to new locations.

[Security](#) is an important concept in day-to-day support, as well as in dispersal and deployment operations. Weapons are particularly vulnerable when in transit or deployed under ad hoc field conditions, so appropriate measures must be taken to protect them. Planners and commanders should consider, among other things, the current threat level and local community concerns.

Maintenance for [nuclear weapons](#) and their delivery systems requires specially-trained personnel. The decision to deploy or disperse nuclear weapons also requires the deployment or mobilization of maintenance personnel, who typically require their own facilities separate from conventional munitions. Planners need to incorporate such unique support requirements when planning for nuclear operations away from an established infrastructure.

Because nuclear systems and facilities are lucrative targets, air base personnel may encounter chemical, biological, radiological, and nuclear (CBRN) weapons effects. US forces should be capable of responding to and executing operations in a CBRN environment with minimal degradation of force effectiveness. Implementing the principles of CBRN defense—avoidance, protection, and decontamination— will help preserve the fighting capability of the forces. Annex 3-40, [Counter-Chemical, Biological, Radiological, and Nuclear Operations](#), JP 3-11, [Operations in Chemical, Biological, Radiological, and Nuclear \(CBRN\) Environments](#), and JP 3-41, [Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives Consequence Management](#), provide additional guidance.



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ANNEX 3-72 NUCLEAR OPERATIONS

NUCLEAR SURETY

Last Updated: 14 December 2011

“The goal of the Air Force Nuclear Weapons Surety Program is to incorporate maximum nuclear surety, consistent with operational requirements, from weapon system development to retirement from the inventory” (AFI 91-101, [Air Force Nuclear Weapons Surety Program](#)). This program applies to materiel, personnel, and procedures that contribute to the safety, security, and control of nuclear weapons, thus assuring no nuclear accidents, incidents, loss, or unauthorized or accidental use. The Air Force continues to pursue safer, more securable and more reliable [nuclear weapons](#) consistent with operational requirements.

Adversaries and allies should be highly confident of the Air Force’s ability to secure nuclear weapons from accidents, theft, loss, and accidental or unauthorized use. This day-to-day commitment to precise and reliable nuclear operations is the cornerstone to the credibility of our nuclear [deterrence](#) mission.

Whether working with CONUS-based nuclear forces or conducting theater nuclear operations, commanders must ensure the safety, security, and reliability of their weapons and associated components. While the appropriate infrastructure already exists at CONUS bases with nuclear forces, geographic combatant commanders should consider the additional needs incurred if they are going to have nuclear weapons deployed into their [area of responsibility](#).

Two events that occurred in 2006 and 2007 alerted senior Department of Defense (DOD) officials to unacceptable practices in the handling of nuclear weapons and nuclear weapons-related materiel within the U.S Air Force. One incident was the unauthorized weapons transfer from Minot Air Force Base (AFB) in North Dakota to Barksdale AFB in Louisiana in August 2007, which was due to a breakdown in procedures in the accounting, issuing, loading, and verification processes.

The other incident involved the misshipment of four forward-section assemblies used on the Minuteman III intercontinental ballistic missile (ICBM). The assemblies are sensitive missile components and, as such, require special handling. Owing to errors and omissions in inventory control and packaging, on two separate occasions in October and November 2006, assemblies were sent to Taiwan. These shipments were intended to fulfill a foreign military sales order for helicopter batteries. Because of subsequent deficiencies in supply chain management, the components were not properly recovered until March 2008.

Despite the decreased inventory of nuclear weapons, there has never been a stated or implied willingness on the part of national leaders to permit, allow, or tolerate a lessening of the “zero-defects” standard regarding the safety, security, and reliability of U.S. nuclear forces or weapons. Yet, the investigations that followed each of these incidents revealed a serious erosion of expertise and discipline related to the nuclear weapons enterprise within the Air Force.

**-- Report of the Secretary of Defense Task Force on
DOD Nuclear Weapons management
Phase I, September 2008**



ANNEX 3-72 NUCLEAR OPERATIONS

SAFETY

Last Updated: 14 December 2011

All individuals involved with nuclear weapons are responsible for the safety of those devices. Because of the destructive potential of these weapons, and the possibility that their unauthorized or accidental use might lead to war, safety is paramount. Per Department of Defense (DOD) Directive 3150.02, *DOD Nuclear Weapons Surety Program*, four specific nuclear surety standards must be met.

- ✦ There shall be standards, plans, procedures, and other positive measures to prevent nuclear weapons involved in accidents or incidents, or jettisoned weapons, from producing a nuclear yield.
- ✦ There shall be standards, plans, procedures, and other positive measures to prevent deliberate prearming, arming, launching, or releasing of nuclear weapons, except upon execution of emergency war orders or when directed by competent authority.
- ✦ There shall be standards, plans, procedures, and other positive measures to prevent inadvertent prearming, arming, launching, or releasing of nuclear weapons in all normal and credible abnormal environments.
- ✦ There shall be standards, plans, procedures, and other positive measures to ensure adequate security of nuclear weapons.

These measures include inherent warhead design features that prevent accidental or unauthorized nuclear yields, delivery platform design features, and operational procedures that prevent accidental or unauthorized use. The positive measures may take the form of mechanical systems, such as permissive action links that do not allow the arming or firing of a weapon until an authorized code has been entered. They may also involve personnel monitoring systems, such as the Personnel Reliability Program or the Two-Person Concept. Commanders are responsible for ensuring that appropriate systems are in place, as described by appropriate Air Force policies. To track the implementation of these positive measures, the Air Force certifies its nuclear weapons systems. The Air Force's Nuclear Certification Program includes safety design, weapon compatibility, personnel reliability, technical guidance, specific job qualifications, inspections, and Weapons System Safety Rules (WSSR). Refer to AFI 63-125, [Nuclear Certification Program](#), and AFI 91-101, [Air Force Nuclear Weapons Surety Program](#), for more specific guidance.

Weapon System Safety Rules

Weapon system safety rules (WSSR) ensure that nuclear weapons are not detonated, intentionally or otherwise, unless authorized. Safety rules apply even in wartime. While commanders may deviate from a specific rule in an emergency, they may not expend a nuclear weapon until an authentic execution order has been received. This has led to the so-called “usability paradox.” Nuclear weapons must be “usable enough” so an enemy is convinced they may be rapidly employed in the event of an attack. They must not be so “usable,” however, as to allow for the unauthorized use due to individual action or mechanical error.

WSSR are implemented through a combination of mechanical means, security procedures, flying rules, and personnel programs. Different weapon systems will have different rules based on their capabilities. Storage and movement of weapons must also be consistent with WSSR. Commanders and operators must follow applicable Air Force policies for their weapon system and must ensure that non-US personnel adhere to applicable Air Force and multinational requirements. One key component of WSSR is that, while preventing the unauthorized use of nuclear weapons, they allow for timely employment when ordered. To this end, all personnel involved in the command, control, and support of nuclear weapons must be familiar with WSSR for their system.



ANNEX 3-72 NUCLEAR OPERATIONS

SECURITY

Last Updated: 14 December 2011

Nuclear weapons and their components must not be allowed to become vulnerable to loss, theft, sabotage, damage, or unauthorized use. Nuclear units must ensure measures are in place to provide the greatest possible deterrent against hostile acts. Should this fail, security should ensure detection, interception, and defeat of the hostile force before it is able to seize, damage, or destroy a nuclear weapon, delivery system, or critical components.

Commanders are accountable for the safety, training, security, and maintenance of nuclear weapons and delivery systems, and reliability of personnel at all times. Whether on a logistics movement or during an airlift mission, commanders should limit the exposure of nuclear weapons outside dedicated protection facilities consistent with operational requirements. Commanders must ensure that nuclear weapons and nuclear delivery systems are maintained according to approved procedures. Commanders are responsible for considering the additional needs incurred if nuclear capabilities are deployed into their operational area.

A security infrastructure exists at bases that routinely handle nuclear weapons. However, weapons and their delivery systems may be moved to other bases to enhance survivability or may be deployed into a theater. Commanders at such locations must ensure appropriate storage facilities are established and proper security measures are in place. The storage of nuclear weapons on a base not only requires a secure location and additional security personnel, but also impacts other areas such as driving routes, local flying area restrictions, aircraft parking areas, the use of host-nation or contract personnel, and other aspects of day-to-day operations. Note, too, that weapons are most vulnerable in transit or when deployed for use, so special care must be taken at those times. Commanders and, in fact, all individuals have a responsibility for force protection, and the security of nuclear weapons is a key component of that concept. Air Force policies which outline security requirements must be understood by all affected personnel.

Airmen should neither confirm nor deny the presence or absence of nuclear weapons at any general or specific location. This US policy applies even if a particular location may reasonably be assumed to contain nuclear weapons, such as a missile launch facility or a bomber base. The goal of this policy is “to deny militarily useful information to potential or actual enemies, to enhance the effectiveness of nuclear deterrence, and contribute to the security of nuclear weapons, especially against the threats of sabotage and terrorism.” (DOD Directive 5230.16, *Nuclear Accident and Incident Public Affairs Guidance*)



RELIABILITY

Last Updated: 14 December 2011

The Air Force employs positive measures to ensure the reliability of its [nuclear weapons](#) systems and personnel to accomplish the mission. Reliability is also a product of the system's safety features, including safety design, weapon compatibility, personnel reliability, technical guidance, specific job qualifications, and nuclear technical inspections. Independent inspections and staff assistance visits are also an integral part of maintaining [nuclear surety](#).

Weapon System Reliability

Through sustainment, testing, and modernization, the Air Force ensures the reliability of nuclear weapon systems. The Air Force engages the Department of Energy's National Nuclear Security Administration and other government agencies to ensure nuclear warheads and related interfaces continue to meet Air Force warfighting requirements. The Air Force continues to provide essential leadership of interagency reliability groups to include test planning, interface requirements and performance, and warhead design reviews.

Individual Reliability

Commanders ensure that only trained, certified, and reliable people have access to nuclear weapons, delivery systems, and [command and control](#) systems. The Personnel Reliability Program (PRP) is used to initially qualify, certify, and then monitor personnel assigned to nuclear operations tasks throughout their assignment. The PRP ensures that only those persons whose behavior demonstrates integrity, reliability, trustworthiness, allegiance, and loyalty to the United States shall be allowed to perform duties associated with nuclear weapons. The Air Force also employs techniques such as the Two-Person Concept in all nuclear operations to ensure compliance with established procedures. The Two-Person Concept requires the presence at all times of at least two authorized persons, each certified under the PRP, knowledgeable in the task to be performed, familiar with applicable [safety](#) and [security](#) requirements, and each capable of promptly detecting an incorrect act or improper procedure with respect to the task to be performed.