

**REPORT OF THE
DEFENSE SCIENCE BOARD
TASK FORCE**

ON

NUCLEAR DETERRENCE

October 1998



**OFFICE OF THE UNDER SECRETARY OF DEFENSE
FOR ACQUISITION & TECHNOLOGY
WASHINGTON, D.C. 20301-3140**

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DEFENSE SCIENCE
BOARD

OFFICE OF THE SECRETARY OF DEFENSE

3140 DEFENSE PENTAGON
WASHINGTON, DC 20301-3140

MEMORANDUM FOR UNDERSECRETARY OF DEFENSE (ACQUISITION &
TECHNOLOGY)

SUBJECT: Final Report of the Defense Science Task Force on Nuclear Deterrence

I am forwarding the final report of the Defense Science Board Task Force on Nuclear Deterrence

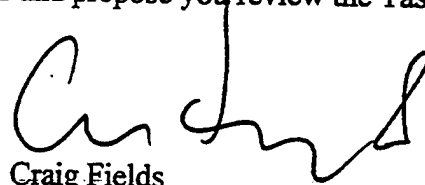
This report examines potential measures that DoD should take to sustain nuclear forces, nuclear weapons capabilities, and supporting infrastructure. The Terms of Reference specified that emphasis be placed on 1) Sustaining nuclear weapons stockpile and developing needed capabilities, including delivery system capabilities, in light of arms control agreements, 2) the adequacy of the DOE Stockpile Stewardship for meeting future DoD requirements, 3) the adequacy of the nuclear technical base, 4) future industrial base capability for nuclear deterrent forces and weapons, 5) options for future nuclear deterrent forces and stockpile, acquisition strategies, R&D timelines, manufacturing and production capabilities, common systems and/or subsystems.

The report includes a number of specific recommendations in each of six key areas. A summary of recommendations follows.

1. DoD needs to establish a cell of professionals at a suitable location to provide a long term focus.
2. DoD needs to reverse the decline in the value accorded nuclear experience. DoD needs to develop an overarching Nuclear Mission Management Plan and a formal mechanism to ensure that appropriate issues impacting sustaining the nuclear deterrent are brought to the senior leadership on a regular and timely basis.
3. The Services need to establish and maintain a long-range plan for sustaining nuclear delivery platforms – looking out to at least 50 percent longer than development lead time.
4. All theater CINCs need to ensure war plans provide contingency planning for nuclear capabilities and operations in a nuclear or potentially nuclear environment.
5. DoD and DOE need to come to a common understanding and set of requirements for the Stockpile Stewardship Program. They also need to increase their mutual efforts to educate the Congress and other national security decision makers on the imperative of success in the Stockpile Stewardship Program.

6. Future arms control should focus on the most useful next step – dealing with total deployable warheads and must deal with important asymmetries in U.S. – Russian nuclear weapons infrastructure.

I endorse the Task Force's recommendations and propose you review the Task Force Chairman's letter and report

A handwritten signature in black ink, appearing to read 'Craig Fields', written in a cursive style.

Craig Fields
Chairman



**DEFENSE SCIENCE
BOARD**

OFFICE OF THE SECRETARY OF DEFENSE

**3140 DEFENSE PENTAGON
WASHINGTON, DC 20301-3140**

July 23, 1998

Memorandum for the Chairman, Defense Science Board

Subject: Final Report of the Defense Science Task Force on Nuclear Deterrence

Attached is the report of the Defense Science Board Task Force on Nuclear Deterrence. This study was requested by Assistant to the Secretary of Defense for Nuclear, Chemical and Biological Matters.

The Terms of Reference directed an examination of potential measures that DoD should take to sustain nuclear forces, nuclear weapons capabilities, and supporting infrastructure. Specifically, the Task Force was asked to examine: 1) Sustaining nuclear weapons stockpile and developing needed capabilities, including delivery system capabilities, in light of arms control agreements, 2) the adequacy of the DOE Stockpile Stewardship for meeting future DOD requirements, 3) the adequacy of the nuclear technical base, 4) future industrial base capability for nuclear deterrent forces and weapons, 5) options for future nuclear deterrent forces and stockpile, acquisition strategies, R&D timelines, manufacturing and production capabilities, common systems and/or subsystems.

The report includes a number of specific recommendations in each of six key areas. A summary of recommendations follows.

1. To address the increasingly complex subject of nuclear deterrence, DoD needs to establish a cell of professionals at a suitable location to provide a long term focus.
2. To maintain nuclear competence, expertise and attention DoD needs reverse the decline in the value accorded nuclear experience. DOD needs to develop an overarching Nuclear Mission Management Plan and a formal mechanism to ensure that appropriate issues impacting sustaining the nuclear deterrent are brought to the senior leadership on a regular and timely basis.
3. The Services need to establish and maintain a long-range plan for sustaining nuclear delivery platforms – looking out to at least 50 percent longer than development lead time.
4. To maintain operational readiness all theater CINCs need to ensure war plans provide contingency planning for nuclear capabilities and operations in a nuclear or potentially nuclear environment.
5. DoD and DOE need to come to a common understanding and set of requirements for the Stockpile Stewardship Program. They also need to increase their mutual efforts to

educate the Congress and other national security decision makers on the imperative of success in the Stockpile Stewardship Program.

6. Future arms control should focus on the most useful next step – dealing with total deployable warheads and must deal with important asymmetries in U.S. – Russian nuclear weapons infrastructure.

The Task Force is especially appreciative of the support provided by its advisors, and of the generous contribution of time and intellectual input from the many briefers and senior DoD and DOE leadership knowledgeable of Nuclear sustainment, weapons design and arms control issues.

I thank the Task Force members and the talented group of government advisors for their hard work and valuable insights.



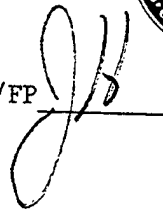
Gen Larry Welch, Task Force Chairman



ACQUISITION AND
TECHNOLOGY

THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, D.C. 20301-3010



Coord: OSD/ISP/FP 

MEMORANDUM FOR CHAIRMAN, DEFENSE SCIENCE BOARD

SUBJECT: Terms of Reference—Defense Science Board Task Force
on Nuclear Deterrence

You are requested to establish a Defense Science Board (DSB) Task Force to address the U.S. capability to sustain into the foreseeable future strategic nuclear forces and the enduring nuclear stockpile in order to maintain nuclear deterrence. The nations to be deterred include current nuclear weapons states, evolving peer competitors, and proliferating rogue states. The problem of deterring terrorist use is not included in this study.

The terms of reference that follow are intended to provide a basis to look into potential measures that DoD can take to sustain our nuclear forces, nuclear weapons capabilities, and supporting infrastructure. The Task Force should conduct its review in the context of the recent Quadrennial Defense Review, constrained by current arms control agreements, and with careful attention to the fiscal consequences of alternative acquisition strategies. The study should include an examination of the contribution to this sustainment effort that the Department of Energy will provide through its stockpile management program. The study will be governed by the following guidelines:

- The study should consider issues associated with sustaining the nuclear weapons stockpile and with developing needed capabilities, including delivery system capabilities, in light of arms control agreements, such as CTBT, a possible START III Treaty, and any nuclear warhead/fissile material-related agreements.
- The Task Force should look into the new DoE Science Based Stockpile Stewardship program and assess its adequacy to meet future DoD requirements. It should explicitly examine, in the context of a future without nuclear test explosions, ways in which DoE can demonstrate to DoD that the enduring stockpile remains safe and reliable. The Task Force should recommend whether and, if so, how DoD should change the nature of its interface with DoE or the specific guidance with respect to the future nuclear weapons stockpile.
- Adequacy of nuclear technical base activities should be evaluated since the supply of knowledgeable personnel is a critical resource in managing the acquisition of nuclear forces.



- Consideration should be given to the industrial base necessary to support future nuclear deterrent forces, and whether or not a majority of needs might be met by the same industrial base that meets other defense requirements.
- Given the need to plan within tight fiscal constraints, the Task Force should identify the options for future nuclear deterrent forces and the nuclear weapons stockpile which could offer effective capabilities at reduced levels of annual expense. In this connection, the Task Force shall assess alternative acquisition strategies for potential follow-on delivery systems. Among other things, it should consider timelines for initiating research and development, means to assure that required manufacturing capabilities are available when needed for system production, and whether common systems and/or subsystems could meet future requirements at reduced cost.

The Task Force should begin by June 1997 with a goal of producing an interim report by 31 October 1997.

The Assistant to the Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs will sponsor this Task Force. Dr. Donald M. Kerr will serve as the Task Force Chairman. Col William R. Smith from the Office of the DATSD (Nuclear Matters) will serve as Executive Secretary and Commander David T. Norris will serve as the Defense Science Board Secretariat representative.

The Task Force will be operated in accordance with the provisions of P.L. 92-463, the "Federal Advisory Committee Act," and DoD directive 5105.4, the "DoD Federal Advisory Committee Management Program." It is not anticipated that this Task Force will need to go into any "particular matters" within the meaning of Section 208 of Title 18, U.S. Code, nor will it cause any member to be placed in the position of acting as a procurement official.



R. Noel Longuemare
Acting Under Secretary of Defense
(Acquisition and Technology)



*Defense Science Board
Task Force on
Nuclear Deterrence*

-- FINAL REPORT --

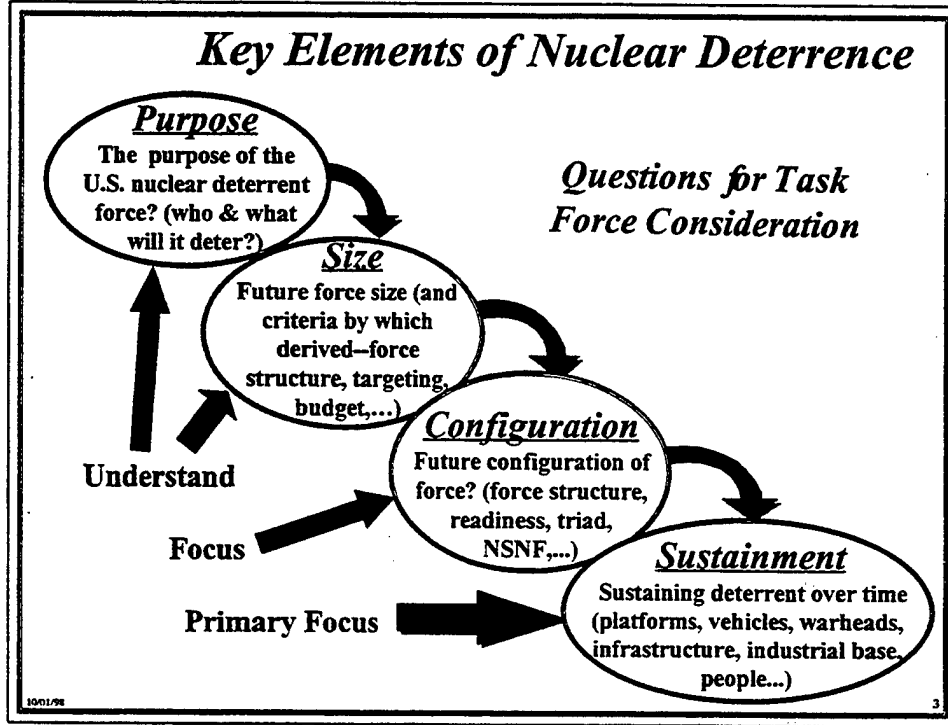
October 1, 1998

Gen Larry Welch (Ret), Chairman
Col William Smith, Executive Secretary

Outline

- **Introduction** p. 3
- **Some bottom lines** p. 6
- **Deterrence context and guidance** p. 9
- **DOD nuclear management and focus** p. 17
- **Sustaining the force and the stockpile** p. 32
- **Arms control considerations** p. 54
- **Summary of recommendations** p. 59
- **Appendices** p. 70

The Task Force's work and this report follows this outline.



Sustaining nuclear deterrence requires attention to the four elements illustrated here. The Task Force set out to better understand current decisions and policies defining the purpose of the nuclear deterrent and spent enough effort on the force size issues to ensure that the rest of our focus would be in context. We examined the configuration of the deterrent force in more depth but the bulk of the focus was on activities to sustain the configuration and size of the force that the nation has decided is needed to serve the purposes of the nuclear deterrent.

Terms of Reference

TOR intended to provide a basis to look into potential measures that DOD can take to sustain nuclear forces, nuclear weapons capabilities, and supporting infrastructure – governing guidelines and issues DSB should examine:

- Sustaining nuclear weapons stockpile and developing needed capabilities, including delivery system capabilities, in light of arms control agreements (e.g., CTBT, possible START III, warhead/fissile material-related agreements)
- Adequacy of the DOE Stockpile Stewardship for meeting future DOD requirements
- Adequacy of nuclear technical base
- Future industrial base capability for nuclear deterrent forces and weapons
- Options for future nuclear deterrent forces and stockpile, e.g., effective deterrent force at reduced annual expense – acquisition strategies, R&D timelines, manufacturing and production capabilities, common systems and/or subsystems

More specifically, the terms of reference included tasking to examine weapons stockpile issues, delivery system capabilities, and the effect of arms control.

We were also asked to examine the Stockpile Stewardship Program and the adequacy of the nuclear technical base and the wider industrial base.

On a broader scale, the Task Force was invited to make recommendations on more cost effective approaches to maintaining deterrent forces and the stockpile. While we provide some observations and recommendations in this area, given the major efficiencies already realized in strategic forces spending, we did not find major additional opportunities for reducing the DOD budget committed to nuclear deterrent forces.

Task Force Membership

Gen Larry Welch, USAF (Ret.) - Chairman

Dr. Jeffrey Cooper

Dr. John Foster

Dr. Donald Hicks

Maj Gen Ralph Jacobson, USAF (Ret.)

Dr. John Nuckolls

Dr. Michael Pillsbury

GEN Jack Vessey, USA (Ret.)

Dr. Richard Wagner

Dr. George Whitesides

**Col William Smith, USAF - Executive
Secretary**

Government Advisors

**USD(A&T)/NCB,
USD(A&T)/S&TS,
USD(P), DSWA, NSS,
JS, STRATCOM, USA,
USN, USAF**

Task Force membership provided an array of technical, concept and operational expertise and was well supported by government participants.

Outline

- **Some bottom lines**
- **Deterrence context and guidance**
 - Context, policy and strategy
 - Special issues
 - The future threat
- **DOD nuclear management and focus**
 - Senior leader focus on nuclear matters
 - Service focus
 - Operational units
 - Intelligence Community's attention to strategic nuclear matters
- **Sustaining the force and the stockpile**
 - Nuclear delivery systems and forces
 - Long Term and the industrial base
 - Maintaining the stockpile
- **Arms control considerations**
- **Summary of recommendations**

The Task Force's work and this report follows this outline.

Important Support for the Deterrent

- **President and Secretary of Defense have clearly articulated the continuing importance of the nuclear deterrent**
 - Presidents May 1997 National Security Strategy
 - SecDef's May 1997 Report to the Congress
 - SecDef's 1998 Annual Report
- **DOD has greatly reduced the incremental cost of maintaining the nuclear deterrent while maintaining a high state of capability in the forces**
- **The Navy's nuclear specialty personnel tracking and assignment system assures a continuing high level of competence in the force and in support activities**
- **The stockpile stewardship strategy, DOE/DP focus, and National Laboratory programs are well conceived for probability of success**

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This chart lists some ongoing activities that provide important support for maintaining the nuclear deterrent. They include very clear declaratory policies from the President and the Secretary of Defense.

It is also noteworthy that DOD has taken important steps to maintain the current deterrent force at minimum cost. Further, the focus on readiness of the current force continues to provide reliable and robust capabilities.

The Navy has continued to pay close attention to tracking and effectively employing people with nuclear forces and systems experience.

While it will take years of effort to bring stockpile stewardship to fruition, the current focus of the DOE/DP organization and the National Laboratories is well directed and seems to be on the right track to provide the highest probability of success.

Some Key Needs

- Senior DOD management activity matching the declaratory policy support
 - Need an end-to-end roadmap for maintaining the nuclear deterrent
- A formal program of long term research on deterrence
- Restore the value accorded nuclear experience and expertise
- Revitalize the Nuclear Weapons Council
- Increase the demand for intelligence focus on worldwide nuclear issues
- Long range planning to maintain deterrent systems
- Planning guidance on the stockpile size for credible DOD and DOE planning and budgeting of production capacity and tritium requirements
- DOD/DOE mutual agreement and support for the demands of stockpile stewardship
- Increased and long term focus on START III and beyond issues
- Better DOD nuclear technical expertise to support OSD and JCS

In contrast, this chart lists a number of areas needing immediate attention.

While the declarations of senior DOD leaders are very positive, the management attention to planning to sustain the nuclear deterrent does not match the declaratory policy.

The Cold War approach to thinking about deterrence is inadequate for the much more complex situation now and in the future. It will take sustained, quality intellectual effort to better relate the concept of deterrence to new situations.

It is imperative that the general decline in the value accorded nuclear expertise be reversed now. Without a sharp reversal in the decline, there will be little incentive for the best and brightest to enter this key field.

The Nuclear Weapons Council still has key roles to play and needs to be significantly more active in those roles.

Better intelligence support is needed for rational long range nuclear deterrent planning.

While current systems are well supported with coherent programs, there also needs to be long-range planning for this force.

There is a lack of coherent guidance to size the stockpile.

The START III will open issues not addressed in previous negotiations.

The new DTRA will need to fill an important technical support role for OSD and the JCS.

Outline

- **Some bottom lines**
- ➔ • **Deterrence context and guidance**
 - Context, policy and strategy
 - Special issues
 - The future threat
- **DOD nuclear management and focus**
- **Sustaining the force and stockpile**
- **Arms control considerations**
- **Summary of recommendations**

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In this section, we examine some issues in the context of current deterrent policy and guidance.

We also include some special continuing issues in this discussion . . .
. . . and some thoughts about the future threat.

The Context

“The United States must continue to maintain a robust triad of strategic forces sufficient to deter any hostile foreign leadership with access to any nuclear forces and to convince it that seeking a nuclear advantage would be futile.”



***President Clinton
May 1997***

***A National Security Strategy for
a New Century, May 1997***

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National Security Environment

- Weapons
 - No new weapons production
 - Warheads serving well beyond design life
 - Ban on further nuclear testing
- No new strategic delivery system development
- Erosion in nuclear expertise
- Continued pressure on defense spending

The US commitment to maintaining an effective nuclear deterrent and the purpose of that deterrent are reiterated in the President's May 1997 statement.

While the official declaration is clear enough, the national security environment presents some special challenges in translating this policy statement into continuing capabilities to maintain the nuclear deterrent.

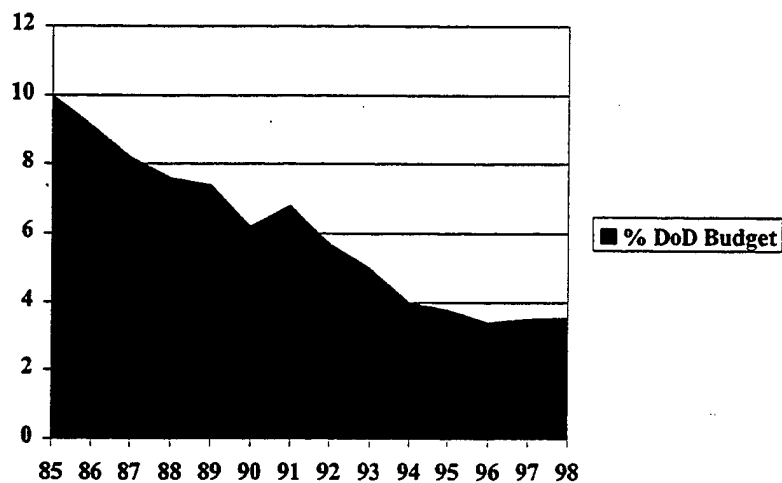
There has been much focus on the special challenges and approaches to those challenges associated with no new weapons production and the need to maintain weapons currently in the stockpile indefinitely without testing.

There has been much less focus on the challenge of maintaining expertise and focus on operational forces and production capabilities for weapons delivery systems with virtually no current or projected production of these systems beyond completing D-5 production.

In the face of these very complex challenges, the Department is suffering from a general erosion in nuclear expertise at multiple levels.

All this is exacerbated by the continuing demand for across the board reductions in defense spending to include spending on nuclear forces and on maintaining weapons in the stockpile.

Strategic Offensive Forces Funding Percentage of Total DOD



The pressures for reductions in spending on nuclear forces continue in spite of the record of reductions over the past decade that have far outpaced reductions in other segments of the defense budget. As a percent of a declining total DOD budget, spending on strategic forces is at less than 40% of the most recent peak year for the defense budget -- 1985.

Cost Reduction

- **Use of Dual-Capable cost sharing**
 - **Current dual-capable forces**
 - **Bombers**
 - **Tactical aircraft**
 - **TLAM/N capable attack submarines**
 - **Possible long-term future**
 - **Next SSBN**
- **Life extension of SSBNs, ICBMs**
- **Reduced dedicated strategic C3**
- **Common component development**
 - **Commercial rocket engine technology for ballistic missiles**
 - **Reentry Systems Applications Program**
 - **Guidance Applications Program**
- **Right-sizing the weapons stockpile planning factor**

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A number of efficiencies are already in place or well underway to reduce the cost of maintaining a reliable, robust deterrent. A significant part of the force is dual capable, sharing the cost with conventional force capabilities.

In the long-term future, the SLBM leg could also reside on a variant of the new attack submarine. However, given the 42 year life of the Ohio class, that is not a near term prospect.

There is little prospect for dual-capable ICBMs. At the same time, the ICBM force is of continually increasing deterrent value as the nuclear force becomes smaller. This subject is discussed later in the report.

Still to be done is right-sizing the weapons stockpile. However, this is a cost avoidance issue rather than cost reduction since the budget consequences of the current hedge are not included in either the DOD or the DOE budget.

Policy and Strategy

- **Credible deterrence requires that policy and strategy be underpinned by ready forces (trained and exercised) and national leaders' confidence in the forces**
- **New PDD guidance sends important message that nuclear roles and responsibilities remain vital to US national security**
- **Difficult to articulate the end-state for nuclear deterrent**
 - Need to understand the deterrent strategy with deeper reductions
 - Policy based on hedging complicates force planning
 - Threat evolution complex and uncertain
 - Difficult to plan to ambiguous requirements
- **Need to engage now in a comprehensive process to plan the future US deterrent force**

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This chart addresses some of the policy and strategy complexities impacting the task of maintaining the nuclear deterrent.

The first complexity is continuing to define concepts of deterrence relevant to the changing world. A constant is that deterrence depends on credibility -- the assurance that no rational adversary could believe they could gain by employing nuclear weapons (or other weapons of mass destruction) against the US or an ally under the US nuclear umbrella.

The most recent Presidential Decision Directive on this subject reiterates the importance of robustly underwriting the concept of deterrence and its application to deterring the use of the range of weapons of mass destruction.

Beyond this general commitment to the concept of deterrence, there is a need for far more attention to defining the end-state (or a series of end-states) for the nuclear deterrent and the path and consequences associated with those states.

The issues are clearly different than those associated with underwriting the concept in the face of Cold War conditions. While Russia continues to maintain the capability for a massive nuclear attack on the US, there is little concern, at present, over the possibility of their doing so. Still, there is an unquestioned need to hedge against that capability, whatever the current intention. Further, while the threat of a massive attack is near zero at present, the range of other threats involving WMD increases with the continuing proliferation of technologies and knowledge required to produce such weapons.

In short, these issues are more, not less, complex than the classic Cold War issues and require far deeper and broader intellectual focus than is evident at present.

The Triad Issue

- **Diversity is important**
 - Triad is stabilizing
 - Provides a hedge against technological failure
 - Insures against a disabling attack on nuclear forces generation
- **SLBMs**
 - 2/3 of the strategic nuclear warheads
 - Most survivable when on patrol
 - Large capability on small number of platforms
- **ICBMs**
 - Single-warhead ICBMs of increasing value with declining numbers
 - Removes temptation for limited or piecemeal strategic attack
- **Bombers**
 - Low incremental costs for nuclear mission
 - Little opposition
 - Stabilizing when on alert

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While the benefits of diversity in the nuclear deterrent force and the President's 1997 statement clearly support the need for a robust Triad of nuclear forces, there are continuing challenges to supporting that policy declaration with capabilities as the nation looks towards lower numbers of deliverable nuclear weapons.

The Task Force concluded that even at the lowest level contemplated for the next step beyond START II (START III?) a triad is essential to a stabilizing and effective deterrent. Each leg of the Triad is of increasing importance as the numbers are reduced.

The SLBM leg remains the most survivable leg in the day-to-day posture. Still, the small number of platforms makes it unwise to vest an ever larger percent of the declining force in this leg of the Triad. Doing so could lead an adversary to seek an advantage by focusing intently on means to attrit this force over time, particularly since it might be done without attribution and would take years for the US to recover with new production.

The Task Force believes that the change in the relative value of the ICBM force is important and not adequately understood. This is the leg whose value increases the most with declining forces. As the total numbers on both sides moves the situation from warhead rich to target rich, the single warhead silo-based ICBM becomes highly stabilizing. It requires more than a 1:1 ratio for the attacker to attrit this force and that changes the correlation of forces against the attacker without commensurate impact on the broader target set.

Further, significant numbers of ICBMs denies any adversary the benefit of a limited attack. Without the ICBMs, surprise attacks against a handful of bomber bases and SSBN facilities, with plausibly deniability, could drastically alter the correlation of forces.

The Triad remains highly stabilizing and is well worth the price.

The De-Alerting Issue

- **Perceived reasons for de-alerting**
 - Danger of response to false warning
 - Danger of unauthorized use
 - Minimize temptation to launch under attack
- **Realities**
 - US strategic systems are the least susceptible to the stated concerns. The real concern is about the security of others' forces
 - De-alerting is no cure for a lack of trust in the National Command Authorities and associated safeguards – implied by concern about an ill-considered launch.
 - START II had as a high priority goal increasing stability by reducing the vulnerability of strategic nuclear forces
 - Schemes for de-alerting advanced to date increase the vulnerability of forces. Some could be highly destabilizing
- If the concern is reliability of the Russian System, then need to engage Russia in ensuring operability of its warning and C² systems
- Before any additional de-alerting, need a carefully defined set of objectives that improves stability and negotiations for agreed mutual actions – unilateral US actions counterproductive

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The on-going de-alerting discussion needs to be in far more depth before decisions are made.

The Task Force found the current set of arguments for further US de-alerting difficult to understand. The arguments stress potential weaknesses in the Russian command and control system as a source of danger of unauthorized or accidental use. A frequently suggested fix is for the US, with a very secure and reliable command and control system, to take the initiative to de-alert weapons without addressing core negotiation and verification issues.

The central issue must be stability. This was the central issue guiding US START II goals and the principal driver of the outcome. Hence, to do violence to the stability of the force over a perceived danger not addressed by de-alerting US systems seems unwise in the extreme.

A more rational approach to addressing concerns about the quality of the warning system available to the Russians would be to explicitly address that issue.

If, after considering the full implications, US leaders are convinced there are ways to increase stability through mutual de-alerting, then we should undertake a serious effort to define a negotiating position and then enter into such negotiations with the Russians. The Task Force was unable to find any such defined positions or plans for negotiations.

Future Threats

- **Uncertain and potentially dangerous future threat environment**
 - Russian nuclear forces remain large and capable
 - Increase in others' strategic nuclear capability – i.e., China
 - Proliferant nations with NBC capability – what deters?
 - Question of whether US nuclear policy and forces (type and mix) provide credible deterrent against these emerging threats

- **US policy remains ambiguous on whether US nuclear deterrence extends to chemical and biological threats**
 - Declaratory policy addresses chemical and biological weapons attacks in regional war
 - Steps are needed to underwrite policy with operational steps
 - Need formal direction to plan for active counter-proliferation
 - Implications for crisis stability
 - Suggests specialized weapons/tailored effects for our nuclear deterrent in the long term

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As to the future threat, there is near certainty that, wherever arms control efforts take us, Russia will continue to be a nuclear superpower and China will continue to evolve to more capable nuclear forces.

More complex is the issue of deterring the broader use of weapons of mass destruction by nations whose behavior is less predictable.

On this last point, US public declaratory policy remains more ambiguous than the Task Force believes useful. US policy statements vary from declaring that we will not use nuclear capabilities against non-nuclear nations to declarations that US nuclear forces are a deterrent to the use of other WMD. Our declaratory policy needs to be less ambiguous and backed by defined requirements and focused operational readiness.

Outline

- Deterrence context and guidance
- ➔ • DOD nuclear management and focus
 - Nuclear competence
 - Senior leader focus on nuclear matters
 - Service focus
 - Operational units
 - Intelligence Community's attention to nuclear matters
- Sustaining the force and stockpile
- Arms control
- Summary of recommendations

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Maintaining the nuclear deterrent in the face of the complexities of the world environment, the comprehensive test ban, and conflicting demands for resources demands extraordinary management focus, robust staff and technical support, careful attention to operational unit capabilities and focused support from the intelligence community.

Nuclear Competence

- **Declining base and competence in support functions**
- **Strong perception that nuclear expertise is of declining value in the DOD**
- **DOD organization**
 - Acquisition of DOD systems
 - OSD oversight organization has continuity and expertise
 - Service programs sustaining current systems well defined
 - Nuclear warhead oversight needs to be more active
 - Policy responsibilities divided – need clear coherence
 - Need for technical expertise at multiple levels
 - Defense Threat Reduction Agency charter clearer than that available to the subsumed DSWA – needs continuing support
 - Connection to the National Labs
 - USSTRATCOM filling in as “nuclear marshal” – needs clear charter

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The Task Force saw and heard much evidence of a continuing decline in the nuclear expertise available to senior decision makers and of a strong perception in the nuclear operational and support community that such expertise is considered of declining value.

The level of attention and expertise varies widely across DOD. At the OSD level and in the Navy and Air Force, the acquisition oversight function continues with a high degree of expertise.

In contrast the policy functions are fragmented with responsibilities divided between various offices in USD(Policy) and USD(A&T) and with reduced senior-level attention in the Services.

There is a need for technical expertise at multiple levels. Over the past several years, there has been an effort to fashion the needed support in the Defense Special Weapons Agency. However, DSWA was not given the charter and control of resources needed to fill this role. There is continuing uncertainty about the future of nuclear expertise available to senior DOD leaders as this function is being assigned to the newly organized and more diverse Defense Threat Reduction Agency (DTRA). DTRA appears to have the charter in this area but will need strong support to meet the need.

Part of the DSWA focus was to be a closer connection to the National Laboratories. Progress towards this objective has been disappointing. Hopefully DTRA will do better.

US Strategic Command has stepped into the vacuum to perform some functions neglected during the general drawdown of nuclear forces and reduced interest in nuclear matters. But again, they have done so on a piecemeal basis, without a corresponding clear charter. A more comprehensive charter would provide better assurance of comprehensive coverage of the needs.

Nuclear expertise in the remaining operational units assigned nuclear readiness tasks continues at a high level. The situation in the service staffs is less positive though the Air Force has initiated important steps to restore focus on this need and the Navy SSP continues to provide focused attention to nuclear systems.

Roadmaps for Sustaining Nuclear Deterrence

- 1950s-1990
 - Senior leadership (President, Congress, NSC, SecDef, Joint Chiefs) deep involvement in review and decisions on major programs assures a well understood “virtual” roadmap
 - 1986-1993
 - Arms control efforts keep the senior leadership deeply involved in sustaining nuclear deterrence
 - Continued efforts to produce a longer range plan for maintaining the deterrent
- 1993-1998
 - Implicit assumption that nuclear deterrent will remain robust beyond the planning horizon?
 - Lack of a compelling mechanism for wide involvement of senior leadership in issues of sustaining nuclear deterrence
 - Countervailing pressures
 - Arms reduction pressures, Alert status, Use control, etc.
- Need a more formal process and “roadmap” in absence of major systems acquisition forcing function to regularly involve senior decision makers and guide effort to maintain nuclear deterrent

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While the Department has operated effectively in the past without a formal written roadmap for sustaining the nuclear deterrent, there have been powerful driving forces that created a virtual roadmap well understood across the senior leadership.

From 1981 to 1988, the deep involvement of the senior leadership in major strategic nuclear acquisition programs ensured a shared understanding that amounted to a virtual roadmap.

From about 1961 to 1991, attention to arms control issues served the same purpose.

With an extended period of force drawdown, there was an implicit assumption that the nuclear deterrent would meet the need with minimum attention. At the same time, the balance of attention shifted from ensuring that the nuclear deterrent is based on robust capability to more robust assurance against unauthorized or even hasty authorized use.

All these trends lead the nuclear community to be concerned about the mechanism that ensures that nuclear issues are brought to the attention of senior leaders in DOD.

There is a need for a more formal process to ensure adequate attention to nuclear matters in the absence of the compelling drivers of past eras.

***Conditions for Successful Sustainment
May 1997 SecDef Report to the Congress****

Sustainment is most likely to be successfully accomplished . . . if a set of interrelated conditions are achieved

- The capability is clearly and consistently given priority by the Department's senior leaders
- All of the physical components that make up the capability are regarded as limited-life . . .
- Career paths exist for both military and civilian personnel that attract and retain sufficient numbers of personnel with appropriate qualifications
- The program involves a complete end-to-end capability (development-deployment-operations) . . .
- The magnitude of the activity is sufficient to support achievement of the preceding conditions

* The Department of Defense Nuclear Weapons Systems Sustainment Programs Report

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The need for such attention, as an essential condition for success in sustaining the nuclear deterrent, is clearly stated in the May 1997 Report to Congress from the Secretary of Defense.

The statement calls for high priority, support for continuing expertise, an end-to-end focus, and a robust sustainment activity.

The challenge is to ensure there is a system in place to translate this policy statement into needed attention and action.

Senior Leadership Involvement Some Trends

- **Some policy declarations acknowledge the continuing, long-term importance of nuclear deterrence**
 - President's National Security Strategy of the US
 - SECDEF & USD(Policy) Congressional testimony
- **Some minimum emphasis examples -- noted in the nuclear forces and supporting community**
 - Joint Vision 2010 - passing reference
 - 1997 and 1998 CJCS Posture Statements to Congress - passing reference
 - USAF Global Engagement: A Vision for the 21st Century - no mention

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Some indications of the current state of attention are shown here.

Some important policy declarations have the right tone with strong verbal support for maintaining the nuclear deterrent -- from the President, The Secretary of Defense and in the Quadrennial Defense Review.

In contrast, Joint Vision 2010, the guiding vision for US military capabilities in the 21st century barely mentions nuclear forces. The same is true of the Chairman, JCS posture statements and even the USAF Global Engagement document -- the basic vision statement for the USAF in the next century.

This apparent lack of emphasis on the nuclear deterrent has been oft noted in nuclear forces and support activities.

***Senior Leadership Involvement
The Nuclear Weapons Council (NWC)***

- **By law, focal point for DOD/DOE nuclear weapons**
 - Presidential documents
 - Nuclear stockpile oversight
- **Charter does not include a management plan -- additional mechanism needed**
- **Low level of activity since 1994**
 - 1 meeting per year vice 9 in 1994
 - Important issues needing NWC action

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The Nuclear Weapons Council is charged by law to be the focal point for joint DOD/DOE nuclear weapon activities, to prepare Presidential documents, and to oversee the nation's nuclear stockpile. Because it is a joint DOD/DOE body, its charter does not encompass DOD-only weapon system management plans and a mechanism beyond even an active NWC is needed.

Further, the NWC has been relatively inactive. It has met only one time each year since 1994, when it met nine times. From 1995 until the present, the NWC has been characterized by a minimum of activity. There are important weapons stockpile issues that need NWC attention and action.

Senior DOD Leadership Involvement Roadmap and Emphasis Needed

- **Starting point could be expanding the annual report to the President required by PDD-60 to include the state of the nuclear deterrent**
- **Standing body to build and maintain a nuclear forces master plan -- Nuclear Mission Management Plan (NMMP)**
 - **Charter**
 - **Conduct a broad examination of DOD's near- and long-term (20+ years) capability and plans to support nuclear missions**
 - **Address readiness, modernization, support forces, personnel, infrastructure**
 - **Examine PPBS support for agreed plans and programs and make recommendations to the Steering Committee**
 - **An oversight entity -- Steering Committee**
 - **Senior Independent Advisory Group**

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To provide a mechanism to bring important nuclear issues to the right level of timely attention, the Task Force recommends an expansion of the current system.

The starting point could be the requirement in PDD-60 for the Secretary of Defense to render an annual report to the President expanded to include the current state of the nuclear deterrent and a long-range sustainment forecast.

To insure appropriate attention to all the elements of the nuclear deterrent, the DOD needs an end-to-end nuclear forces plan that provides guidance to all elements of the DOD nuclear deterrent -- a Nuclear Mission Management Plan.

A standing body is needed to undertake this effort. Their charter needs to provide for an end-to-end plan for DOD's responsibilities for maintaining the nuclear deterrent.

A Steering Committee is needed to provide guidance.

A Senior Independent Advisory Group, made up of members and former members of the wider nuclear community can provide the Department with a rich source of expertise and experience not now available within the Department. The Nuclear Mission Management Plan would provide an end-to-end coverage of the needed elements of the nuclear deterrent.

The Department of Energy has developed such a plan for their functions. There was initial resistance in parts of DOE to such a comprehensive planning document. It is now widely regarded as essential to planning and executing DOE's responsibilities for maintaining the nuclear deterrent.

Focusing Institutional Attention
Build a DOD Master Plan - Working Group Membership

- **Chaired by DDR&E**
- **Expertise from:**
 - USD(A&T)/Nuclear Matters (NM)
 - USD(A&T)/Strategic and Tactical Systems (S&TS)
 - USD(Policy)/ASD (Strategy and Threat Reduction) (S&TR)
 - USD(Comptroller/CFO)/Program Analysis & Evaluation (Strategic & Space Forces)
 - Defense Threat Reduction Agency (DTRA)
 - Defense Intelligence Agency
 - Joint Staff
 - USSTRATCOM (US Strategic Command)
 - AF/XON (Air Force Nuclear & Counterproliferation Directorate)
 - AF/ACC (Air Force Air Combat Command)
 - AFSPC (Air Force Space Command)
 - Navy N87 (Deputy Chief of Naval Operations/Submarine Warfare)
 - Navy/SSP (Strategic Systems Programs)
 - USN/Atlantic Fleet/Pacific Fleet

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This chart provides a more comprehensive recommendation for the working group. The group needs to benefit from the expertise of the listed organizations.

Service Focus -- Air Force

- **Strategic Air Command disestablished and nuclear forces responsibilities transferred to three separate commands**
 - The nuclear forces responsibility is not the major focus of any of these commands
 - Followed by a rapid decline in management attention to readiness
 - No Nuclear Operational Readiness Inspections (NORI) for 3 years
- **To address the problem, the AF Chief of Staff re-established the NORI requirement and established a directorate in the Air Staff to focus on nuclear issues – XON**
- **Still concern about lumping counter-proliferation focus and maintaining the nuclear deterrent at the staff action level**
 - Joint Strike Fighter to address concern about long term plans for non-strategic forces
 - Still need more comprehensive long-range plans and program

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Air Force Headquarters (and Air Combat Command Headquarters) attention to nuclear issues suffered a precipitous decline immediately following the end of the Cold War with the emphasis on downsizing and dismantling nuclear forces.

The major Air Force nuclear modernization programs were terminated or sharply curtailed. Strategic Air Command was disestablished and its Air Force responsibilities divided among Air Force Space Command for ICBMs, Air Combat Command for Bombers, and Air Mobility Command for Tankers. Responsibility for weapons went to an Air Logistics Center under the newly combined Air Material Command.

Hence, Air Force nuclear forces responsibilities were subsumed in commands where the nuclear deterrent was not a major part of the day-to-day focus of the command. In the case of the bombers, this was exacerbated by the increasing focus on the non-nuclear mission of the bomber force. The resulting decline was graphically illustrated when the responsible command stopped nuclear operational readiness inspections for a period of three years.

The Air Force Chief of Staff, responding to this problem, established a special directorate (AF/XON) to focus attention on nuclear issues. Progress is evident since AF/XON was established.

At present AF/XON is focused on the nuclear deterrent and on operating with the reality of proliferation. Still, there is concern about lumping counter-proliferation and maintaining the nuclear deterrent as a single set of responsibilities -- one is to deal with illegitimate activities, the other is dedication to maintaining a legitimate, valuable contribution to national security.

The non-strategic forces are meeting readiness needs and the longer range plan is for some part of the Joint Strike Fighter fleet to be nuclear capable.

Further, there is still a need for a more comprehensive set of plans and programs to sustain a robust deterrent capability over the long term.

Competence in the Forces and Field Support

- **Nuclear forces continue to meet readiness requirements with high degree of professionalism**
- **Consolidating Navy support at two locations helps sustain support competence**
- **Air Force support forces necessarily dispersed -- significant problems surfaced and being addressed -- some consolidation of storage sites may be desirable**
- **Declining perception of career prospects in forces and support organizations**

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At the operational level, operational units continue to meet all readiness requirements. The Air Force reinstated nuclear ORIs in 1996 and results indicate a high degree of professionalism. The Navy SSBN forces maintain an intense focus little changed from the cold war. Several tests of TLAM/N/attack submarine reconstitution indicates adequate readiness to meet the required time lines.

Consolidation of Naval nuclear support at the two SSBN support bases helps ensure a high degree of professionalism in the support forces.

In contrast, Air Force support forces are necessarily much more diverse and global and the Air Force has identified some important deficiencies that show a need for increased personnel tracking and revised assignment policies. There is also the potential for some consolidation of AF munitions storage sites overseas.

The most difficult issue and the one with the most long term implications is the widespread perception in both the Navy and Air Force that a nuclear forces career is not the highly promising opportunity of the past era.

Tracking Military Nuclear Expertise

- **Navy - continues to track and manage nuclear expertise and billets**
- **Air Force**
 - Tracking system deteriorated with the end of the Cold War
 - AF Institutional Support Review identified urgent need to reestablish the tracking system
 - Status of corrective actions – May 1998
 - Record search to identify the pool of nuclear experienced people nearly complete
 - Identify critical billets requiring nuclear experience
 - Complete at units
 - Nearing completion for staff billets

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The Navy has significantly downsized nuclear capability but has maintained a strong program of managing nuclear experienced personnel. There are programs to train, track, and provide career growth to officer, enlisted and civilian personnel with nuclear expertise.

While the level of expertise in Air Force nuclear capable operational units remains robust, the Air Force has been through a serious bathtub of focus on managing, tracking and nurturing nuclear qualification in support forces and staffs.

Following some problems surfaced by inspections, the AF Institutional Support Review identified an urgent need for attention to personnel matters for nuclear experienced people.

At the time of this report, corrective actions were moving forward with the status indicated.

Service Focus - Navy

- **SSBNs only sea-based ready nuclear force -- still well focused**
- **TLAM/N can be regenerated on attack submarines -- exercised regularly**
 - Questions about long term plans for non-strategic forces
- **SSP continues to provide strong program focus**

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The demands on the SSBN force and their focus have changed little since the end of the Cold War other than some reduction in patrol rates.

At the same time, the Navy is not tasked for day-to-day tactical nuclear forces. TLAM/N can be regenerated within 30 days on attack submarines. The Navy's Pacific forces command structure depends on the US Strategic Command for nuclear command and control and support coordination. Through the SACLANT in Norfolk, the US provides naval support to NATO.

As in the case of Air Force DCA, the long term rationale and support for TLAM/N capabilities is uncertain at best.

In coordination with the Navy Staff/N87, the Navy's Strategic Systems Program office continues to provide strong continuity and professional expertise to manage Navy nuclear programs.

Tracking Military Nuclear Expertise Air Force -- To Be Done

- **Assign experienced individuals to critical billets**
- **Develop career paths to ensure future experience**
- **Nuclear science and engineering track**
 - Small, critically important, scientifically oriented
 - First assignment experience in nuclear systems
 - Select for MS/PhD-level education
 - Career development in DOE labs, DTRA, STRATCOM, MAJCOMs
 - Available for key assignments at Hq/AF, POGs, etc.
- **Nuclear operations track**
 - First assignment in ICBM, space, aircraft nuclear systems
 - Broaden in key billets in Hq/USAF, OSD, Joint Staff, STRATCOM

Still, much remains to be done to complete the process in the Air Force. Next steps are to complete the process of matching experienced individuals to critical billets.

In addition, there are proposals in work to provide a pyramid of career opportunities for nuclear experienced people -- both the small, but important cadre of nuclear science and engineering people and the larger corps of nuclear operations people.

At the time of this report, these are proposals in the approval process. It will be important to track them to adequate implementation with significantly more urgency than has been the case in recent years.

Training, Exercises, & Operations

- **Global Guardian – USSTRATCOM’s annual exercise**
 - Exercises end-to-end nuclear capability
 - Strategic nuclear systems, plus DCA and TLAM/N
- **Global Archer exercises – USSTRATCOM**
 - Narrower in scope
 - Good training vehicle
- **Air Force and Navy regularly exercising readiness**
- **Air Force and Navy earning good inspection ratings overall**
 - Air Force Nuclear Operational Readiness Inspections
 - Navy Technical Proficiency Inspections
 - Nuclear Surety Inspections

Operational units are benefiting from a significant increase in training exercises. The annual Global Guardian series has been reinstated and is exercising most aspects of nuclear force generation.

There has also been an increase in the Global Archer series.

After a post-Cold War hiatus, the inspection programs have been revitalized and are producing positive results.

Intelligence Community's Attention to Strategic Nuclear Matters

- **Strategic nuclear-focused offices within the Intelligence Community (IC) reduced and dispersed to respond to higher priorities**
- **Need to understand and project nuclear threat with enough lead to serve timely planning and programming**
 - **Requires analytic framework for understanding potential adversary's intent and security interests; nuclear doctrine and concept of operations; trends in production capacity, infrastructure, resources (10-15-20+ years future)**
 - **Needs demanding customers asking the right questions**
 - **DTRA focus and work on NMMP should help provide better basis for intelligence requirements**

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During the Cold War the Intelligence agencies were populated with Russian nuclear experts with longevity and expertise. Like much of the defense establishment the intelligence community has seen dramatic reductions in personnel focused on strategic nuclear matters. Expertise has been dispersed and offices consolidated as the community responds to higher priority demands from the customer.

Still, there is a continuing need for the best possible long range intelligence projections to support planning and programming with long lead times.

The intelligence community needs an increased impetus for increased attention to support for strategic forces planning. The DOD needs to be a demanding customer according higher priority. The DTRA charter and the Nuclear Mission Management Plan should help provide a better basis for intelligence requirements.

Outline

- **Deterrence context and guidance**
- **DOD nuclear management and focus**
- ➔ • **Sustaining the force and stockpile**
 - Nuclear delivery systems and forces
 - Long term and the industrial base
 - Maintaining the stockpile
- **Arms control considerations**
- **Summary of recommendations**

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Turning now to more specific issues in sustaining the force and the stockpile, this section discusses the delivery systems, the stockpile, arms control impacts and the industrial base.

The only current nuclear system production program is completing D-5 production. Other nuclear delivery system programs are upgrade and life extension programs.

Sustaining Current Systems

Navy

- **SLBM Warhead Protection Programs (SWPP) -**
 - Navy/DOE effort to maintain the capability to jointly develop replacement nuclear warheads for the W76/MK4 and W88/MK5
 - One near-term, one long-term design
- **Trident D-5 Backfit Program**
 - Update 4 C-4 platforms to the D-5
 - FY2000 to FY2006

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Navy sustaining hardware programs are focused on assured capability to provide warheads for the D-5 and on the D-5 backfit.

Sustaining Current Systems Air Force

- **Nuclear Weapons Capabilities Protection Assessment (NWCPA)**
 - NWCPA for each deployed nuclear weapons type
 - Build priority list at the subsystem and component level and identify design and acceptance criteria for all replacement parts

- **Bomber Technologies**
 - B-52H & B-2 (Block 30 Upgrades)

- **Minuteman III Technologies**
 - Guidance Replacement Program (GRP) – electronics replacement; 1998 through 2005
 - Propulsion Replacement Program (PRP) – remanufacture booster stages; extends life through 2020; production complete by 2008

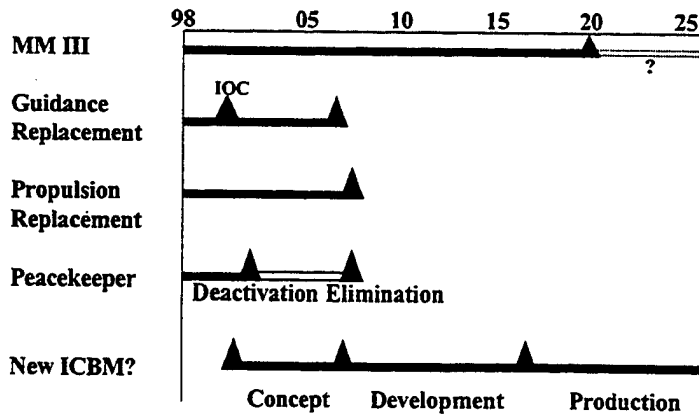
The Air Force programs include assessments of support for each system and sub-system.

There are programs to upgrade all B-2 aircraft to the Block 30 configuration and continuing upgrades for the B-52H. The B-52H has an expected remaining life of more than 30 years.

Minuteman upgrades extend its life through at least 2020. There may be industrial base issues associated with the propulsion sector with completion of the Minuteman Propulsion Replacement Program in 2008 and D-5 propulsion production, still uncertain, but possibly in 2005.

The System Path Ahead -- ICBMs

- Programs to sustain current forces coherent and on-track



- Need long range plan for next ICBM

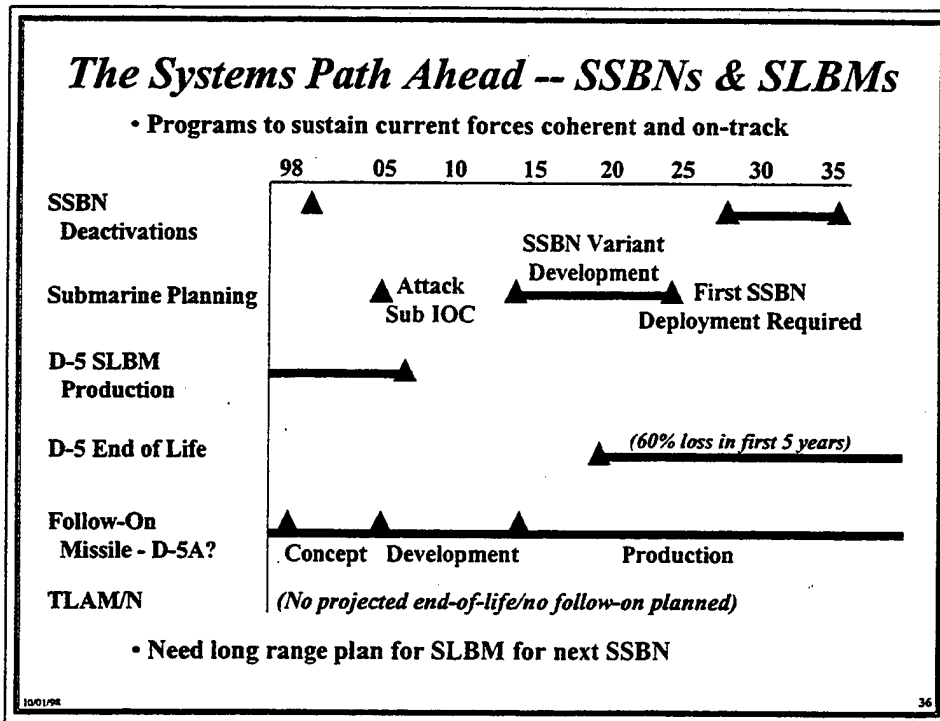
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Turning to industrial base issues, the Minuteman III service life is extended through 2020 with a possibility of further extension, although there is no firm plan for further extension. There are both guidance replacement and propulsion replacement programs for the MMIII, with the guidance replacement scheduled for IOC by early 2000 and production and deployment through 2007. Propulsion replacement is planned for completion by 2008.

The Peacekeeper is scheduled for deactivation in 2003 under START II planning, with elimination in 2008. Peacekeeper is currently being funded for minimal sustainment on a year-by-year basis due to START II uncertainties.

Planning for a new ICBM would need to begin around the year 2000 for production to begin around 2017. The Task Force could find no long range plan for the next ICBM.



Under START II, the first of four Trident SSBNs will be deactivated in late 2002.

The New Attack Submarine (NSSN) is scheduled for initial operational capability in 2005. The Navy says development (i.e., funding) for a SSBN variant must begin by 2014, with first deployment required in 2025.

The D-5 production line is to close in 2007 with the first missile retiring from the inventory in 2019. A variant of the D-5 (not a new missile), the D-5A, appears in the Navy's FY00 POM, but there is no funding until 2005. The Navy believes production should start in 2015. Approximately, three hundred missiles is the projected production.

The Navy has made no decision for a follow-on to the TLAM/N and projects no-end-of-life for the nuclear cruise missile. The missile continues to function with no degradation in performance.

The D-5A could extend the life of the SLBM for the Ohio class boats but would probably not be the solution for the next SSBN.

The Path Ahead -- Bombers & Dual Capable Aircraft

- **B-52**
 - Service life program through 2040
 - Attrition reserve to beyond 2030 if adequate numbers retained
- **B-2**
 - Service life program to beyond 2042
 - No attrition reserve – attrition rates unknown
- **Cruise Missiles**
 - Program to extend cruise missile service life to around 2030
- **DCA – next generation plan includes nuclear capable Joint Strike Fighter**
- **Need a long-range plan to sustain the bomber force – see report of Panel to Review Long Range Air Power, April 98**

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The B-52 service life is planned to extend through 2040 and the B-2 beyond 2042. The B-1 as of Oct 1997 does not carry a nuclear mission.

The Department needs a long-range plan for bomber force sustainment. The April 1998 report of The Panel to Review Long-Range Air Power includes recommendation to develop an investment plan to upgrade and sustain the future force structure.

Industrial Base

<i>System</i>	<i>System Life</i>	<i>Issues/Concerns</i>
Bombers/Cruise Missiles	2031 <i>(represents B1)</i>	<ul style="list-style-type: none"> • Continuous upgrade strategy of existing force • No real industrial issues given significant conventional activity in aeronautics, stealth, integration & manufacturing, etc. • Need to ensure nuclear capability/adaptability in new conventional aircraft/systems
SSBN/SLBM	2035/2015	<ul style="list-style-type: none"> • Need new generation SSBN/SLBM, especially with 14 SSBN force: 13-14 year design cycle means by Year 2012-2013 design initiation required • 30-year life of D-5 falls short of SSBN 42-year full life with long-lead times for propellant, post-boost control system, process integration systems, RV technology • D-5A variant intended to extend life of D-5 force at reduced cost • Could pursue NSSN derivative for SSBN function - e.g., module insert with new SLBM follow-on
ICBM	2020	<ul style="list-style-type: none"> • No new bottom-up design/development effort since SICBM • GRP for MMIII does not provide accuracy update to state of the art • Combat Aerial Vehicle (CAV) in 2000 POM might maintain reentry engineering skills

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Industrial base issues are considered in three areas. In the bomber area, the extensive upgrades over the life of a bomber and a robust aerospace industry producing a wide variety of other types of aircraft should provide an adequate industrial capability for the long term future.

In the SSBN/SLBM area, there will be significant gaps in upgrade and production activities for both the platform and the missile. A possible solution to the platform is a variant of the next generation attack submarine as the new SSBN design. Still, there needs to be planning underway with some timelines and milestones established.

With the end of D-5 production, there would be a significant gap in SLBM production needed to extend the D-5 to the life of the Trident submarine. The D-5A variant is to extend the missile force life to match the platform life.

There are also technology programs designed to help address future needs in guidance and RV design. However, there are concerns about the robustness of work on future upgrades in both areas for SLBMs and ICBMs. The principal issue is propulsion.

The Minuteman propulsion replacement program is to be complete in 2008. There is no planned solid rocket production beyond that for either SLBMs or ICBMs.

The US Strategic Command Strategic Advisory Group is, at the request of CINCUSSTRATCOM, conducting a more detailed assessment of this issue.

Industrial Base Weapon System Hardware Technology

- **Reentry Systems Applications Program (RSAP) -- supports service life extension for deployed systems and addresses potential future requirements**
- **Guidance Applications Program -- evaluates new guidance technologies**
- **Radiation Hardened Microelectronics -- both natural and weapon-induced environments**
- **Strategic Technology Initiatives and IPTs**
 - **Missile solid propulsion**
 - **Post Boost Control System Components**
 - **Solid rocket motor aging and surveillance**
 - **Underwater launch systems**
 - **Submarine navigation**
 - **Missile flight sciences**

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To help ensure a continuing capability, there is significant ongoing technology work -- in reentry systems, guidance systems, and microelectronics. Strategic Technology and IPT Initiatives cover the range of subjects shown.

Propulsion Technology

- **Minuteman propulsion replacement completion - 2008 - extends life beyond 2020**
- **D-5A propulsion buy begins about 2010 - 2012**
- **No other sustaining base for ICBM/SLBM solid rocket industrial base**
- **Defense/industry sponsored program proposed to use commercial (space launch) propellants for follow-on solid rocket needs**
 - **First test (D-5 third stage) on 17 June 1998**
 - **Proposed in Navy FY00 POM**
 - **Will need continuing DOD/industry R&D support**

Propulsion industrial capability is a potential concern since the Minuteman Propulsion Replacement Program is completed in 2008 and the planned purchase of the D-5A motors is 2010 to 2012. Hence there is the potential for significant gaps in propulsion buys.

An approach to this issue, that can also be cost saving is to convert to the commercial propellants used in solid rocket space launch vehicles. Industry is currently investing in some R&D efforts and has tested a version of a rocket motor for the third stage of D-5 in June 1998. The Navy is planning to support this program in future POMs.

The Task Force did not examine the future of the commercial solid rocket industry.

Stockpile Stewardship -- the Situation

- **During the Cold War, the US benefited from a robust production complex and underground nuclear testing which provided confidence in US nuclear deterrent capability**
- **Regular modernization of the stockpile**
- **Ability to fix flaws quickly**
- **None of these operating conditions exist today**
 - **Warheads assumed to have no end-of-life**
 - **Production complex dismantled**

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For the US, the two pillars for stockpile stewardship during the Cold War were a robust nuclear weapon production complex and underground nuclear testing. These two pillars supported confidence in the safety and reliability of the US nuclear deterrent. The US deterrent benefited from testing to verify flaws and certify fixes and production capacity to quickly replace flawed weapons or weapon components in the inventory.

Today the US has dismantled and restructured to a minimum production capability and imposed a moratorium on underground testing. Given these conditions, the DOE has established a philosophy for warhead sustainment that assumes no end-of-life for nuclear warheads based on a multi-faceted stockpile stewardship program.

Stockpile Stewardship Strategy

- **Baselining the enduring stockpile -- improved surveillance and life extension planning**
 - Dual Revalidation -- W76 completed in 2000
- **Demonstration-based assessment and certification**
- **Capability to refurbish the stockpile**
- **Transitioning the manufacturing enterprise**
- **Restoring tritium production**
- **Maintaining DOE and National Laboratory expertise**
(Commission on Maintaining Nuclear Expertise)

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This multi-faceted Stockpile Stewardship Strategy is maturing and moving the program forward.

Enhanced surveillance is designed to identify potential problems early. The demonstration-based certification program is to provide the capabilities needed to refurbish the stockpile as necessary.

The production complex is being designed to reconstitute the capabilities lost with the closure of Rocky Flats, the shutdown of uranium work at Oak Ridge and the consolidation of other component production.

The funding in 1998 to restore tritium production will not support the dual-track approach but is adequate if the decision is to buy services from existing reactors. Further, the timing of the need for tritium production is dependent on a set of variables driving the size of the stockpile, discussed with the next chart.

The broader issue of maintaining nuclear expertise in DOE and the supporting National Laboratories deserves much attention. This is the subject of the Commission on Maintaining Nuclear Expertise in the United States and is not addressed in this report although the Task Force considers it a key subject and did give it some attention.

New Facilities Essential for Stockpile Stewardship

- **New Facilities**
 - Dual Axis Radiographic Hydrodynamic Test (DARHT)
 - National Ignition Facility (NIF)
 - Enhanced LANSCE
 - Atlas Pulsed Power Facility
- **Advanced Strategic Computing Initiative**
 - 100-fold improvement in computations
 - Provides for 3-D, higher fidelity physics modeling
 - Greatly expands first principles of critical weapon performance physics
 - Programmed and on track
- **Advanced Hydrotest Facility – a key facility not yet programmed**

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The ambitious program to provide the needed capabilities for enhanced surveillance and certifying changes is well defined and moving forward and includes upgrades and better use of current facilities and an array of new capabilities.

These new capabilities include significantly better radiography, other improvements in subcritical experiments and high energy pulse power capabilities. These capabilities will add significantly to understanding and assessing the impact of changes on the very complex implosion and boost phases of primary pit performance, radiation flow to the secondary, and secondary performance.

However, this combination of capabilities will require more than a decade of sustained resource support.

Of particular concern is the delay in programming resources for the Advanced Hydrotest Facility. One of the critical needs in building and demonstrating confidence in the stockpile without nuclear tests is to be able to observe, in detail, the configurations and densities of materials during implosions of weapon primaries. This is essential to adequately assessing the impact on weapon performance of changes due to aging or re-manufacturing variations.

The AHF will use the most advanced accelerators to produce intense short pulses of x-rays to take a sequence of x-ray snapshots, closely spread in time and from several directions, at critical stages of the implosion. This can then be compared with data from past nuclear tests to assess whether the implosion is significantly different. AHF is important to complete as soon as possible so that its information can be applied to certify near-term weapon remanufacturing, and so that its initial use can be assessed by weapons designers experienced in nuclear tests.

Stockpile Confidence

- **How will we know the Stockpile Stewardship Program's (SSP's) analytical tools give valid answers?**
- **How does confidence in individual warheads degrade with time and experience? Nuclear community has no experience with degraded confidence.**
- **Need for a Stockpile Confidence Independent Review Group**
 - **Technical experts, not tied to programatics of SSP at labs, "current" on SSP**
 - **Purpose to provide independent review of SSP and perform "sanity check" on DOE stockpile confidence -- safety, security and reliability**
 - **Possibly STRATCOM SAG's "Green Group" with enhanced membership--chemists, metallurgists**
 - **Group to meet frequently**
 - **Reports to DOE/DP and USD(A&T)**

Even with all the planning and effort directed at ensuring success in Stockpile Stewardship, fundamental uncertainties remain. High on the list is the basic question in the first bullet on this chart.

An additional question is how confidence degrades with the uncertainties inherent in absence of what has been the final proof of performance -- nuclear testing. The only accepted standard for confidence in the nuclear community has been in the high nineties. If it proves impossible to maintain that standard, there will need to be careful thought given to this issue.

In any case, it seems prudent to form an independent review group with the needed expertise to assist the senior leadership in the national security community in understanding and assessing confidence in the Stockpile Stewardship Program.

The Stockpile Need for DOD/DOE Guidance

- **Major uncertainties**
 - Timing of START II ratification and START III agreement and needed hedges for reconstitution
 - Progress in stockpile stewardship and needed hedges against reliability failures
 - Probable useful life of the physics package components especially PU pits
 - Adequate multi-year funding for stockpile stewardship
- **Need for guidance**
 - DOE needs to right-size the production complex based on DOD planning factors for stockpile size and composition
 - DOD needs judgement on capacities for remanufacture and new production of key warheads to size the inactive segment of the stockpile
 - Need best-guess guidance now – iterate as the future unfolds
 - Nuclear Weapons Council responsibility
 - Plan realistically against the guidance

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There is encouraging progress in the Stockpile Stewardship Program. Still, there remain major uncertainties that are hampering the detailed planning needed to maintain the stockpile for the long term.

The uncertainty of the timing for ratifying START II and negotiations for START III, the need to maintain an inactive stockpile that hedges against reliability failures, and the unknown lifetime of plutonium pits aggregates to a range of uncertainty that greatly complicates stockpile stewardship planning. Regardless of the complexities, DOD and DOE need to balance the risks and provide usable planning factors to size the stockpile and the DOE production complex.

It will be difficult, in any case, to sustain support for the required funding for more than a decade in absence of a well-defined threat. Adding to the cost with larger than needed hedges will make it even more difficult to justify the continuing funding.

Best estimates are needed now with the full understanding they will be adjusted as the uncertainties on arms control are reduced and confidence grows in success in the Stockpile Stewardship Program.

Stockpile Management and Restructuring Initiative (SMRI)

- **Non-nuclear component fabrication – LANL, SNL and downsized Kansas City Plant (KCP) – complete restructuring in 2005**
- **High Explosives production – downsized Pantex Plant – complete restructure in 2006**
- **Assembly/disassembly – downsized Pantex Plant**
- **Pit assembly requalification and reuse – Pantex Plant**
- **Tritium recycle and fill site – Savannah River Site (SRS) – 2004**
- **Secondary fabrication – downsized Y-12 Plant – 2003 – need guidance on size of the production task**

A fundamental change is the assumption regarding the useful life of warheads in the stockpile -- from a 20 year life to no end-of-life.

The no end-of-life assumption means that, over time, virtually every component must be replaced in every warhead that remains in the stockpile.

The restructuring, as currently defined, for all but pit production is to be completed by 2006.

With exception of KCP and Pantex, production is embedded in a larger complex which is focused on more than production -- with the inevitable division of management attention.

Stockpile Management and Restructuring Initiative (Cont'd)

- **Pit fabrication – re-establish capability and appropriate capacity at LANL (TA55) – 2001 initial, 2007 full up?**
 - Definition of “full up” is highly uncertain
 - Current plan is a capacity to produce 20 pits/year in 2007 moving to a capacity of 50/year
- **The current plan will meet R&D needs for process development, certification, etc.**
- **Meeting the stockpile requirement, even with the most optimistic assumptions, will require a larger capacity than envisioned at TA55**

Pit production presents a particularly complex set of issues. The current range of estimates of the size of the needed stockpile range from about 5,000 with optimistic assumptions about START III warhead requirements (strategic + tactical + quality assurance test + a reliability hedge) to current levels. The useful life of plutonium pits ranges from about twice design life to four times design life.

While the current plan to produce pits for R&D purposes at Los Alamos TA55 facility is sound, there is an urgent need to address the larger stockpile sustainment issues. Until better guidance is provided on assumptions for planning, there is little basis for realistic planning for pit production.

Inactive Stockpile and Weapons Production

- **Inactive Stockpile (IS) created in early 1990s for Quality Assurance & Reliability Testing (QART) Replacement, augmentation, reliability replacement, and reconstitution**
- **IS and the Pit Production Linkage**
 - IS serves as a hedge against: Russian failure to ratify and comply with START II; Emerging/re-emerging superpower adversary, Failure of a US system
 - Differences in Russian and US pit production capacity
 - IS also serves as a hedge against US pit production uncertainties
- **Cost of the hedge**
 - Not a substitute for Stockpile Stewardship Program
 - Competes for funding (particularly Tritium production) with essential long-term needs

A major issue in sizing the production complex is the needed inactive stockpile.

The major purposes of the inactive stockpile are to provide warhead replacements for those destroyed in QART, reliability replacements, and to hedge against the need to reconstitute part of the force in case arms control expectations fail to materialize.

Over time, as arms control agreements reduce the active stockpile needed, the inactive stockpile grows significantly as a part of the total stockpile. Before START I, about 5% of the total stockpile was in the "inactive" category. Present plans for the START II stockpile could increase that to about a 1:1 ratio with the active stockpile.

Further, there is a complex linkage between the inactive stockpile, Stockpile Stewardship and the warhead production complex. Since Russian warheads were designed for a short life that probably cannot be significantly increased, the Russians will maintain a far larger production capacity than that of the US (probably in excess of 1,000/year). This Russian capacity provides a substantial break-out potential.

Hence, the US inactive stockpile will probably continue to serve the three current purposes -- QART replacements, reliability hedge, and hedge against the need to reconstitute to deal with the Russian capacity for break-out.

Still, while these are legitimate needs, the cost of the hedge needs to be carefully weighed against the risks and some decisions on the approach made in the near future.

Pit Production Capacity -- An Approach

- Acknowledge major uncertainties
- Some useful starting assumptions for sizing pit production could be:
 - Sometime over the next 15 years, we will be at a ratified START III level
 - The level of US tactical weapons will not be significantly reduced given the much larger inventory of Russian weapons and their declared dependence on them
 - As treaties are ratified, we can accept the risk of using a reliability hedge (keeping directly substitutable warheads) as an adequate reconstitution hedge
 - Pit life estimates range between 2 and 4 x design life
- A best-case minimum pit production planning factor might be:
$$\frac{(\text{Start III deployed warheads} + \text{current tactical} + \text{hedge} + \text{QA})}{((2 \text{ to } 4 \times \text{pit design life}) - \text{average age})} > 100/\text{year}$$
- An alternative approach that sizes to deal with failure of a major warhead produces higher numbers – see STRATCOM LEP Study.
- Unlikely that even highly optimistic estimates can be met with maximum capacity of TA-55 (Los Alamos)

In spite of the uncertainties impacting the size of the stockpile, the Task Force suggests a set of planning assumptions that can, at least, provide some sizing guidance for the weapons production complex that will be more useful than the current void. The list of assumptions are shown here.

The challenge for DOD/DOE decision makers is to balance risks so that resource demands are bearable and production capacity can be close enough to adjust up or down as the range of uncertainty narrows.

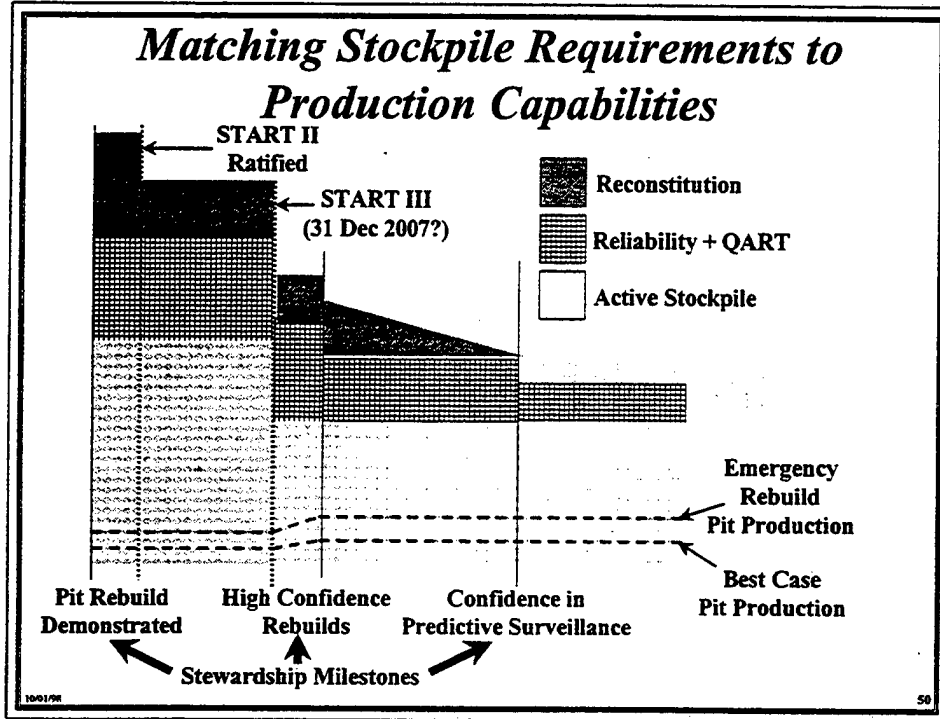
The Task Force recommends that the initial planning factors for the production complex be based on optimistic, but supportable, assumptions about the success of START II and START III implementation and estimates of useful pit life.

As arms control realities emerge and on-going research reveals more about the effects of plutonium aging, these planning factors will very likely have to be adjusted and translated into requirements. Still there is a critical need for guidance now.

An alternative approach of calculating the production capacity needed to hedge against the failure of a single major warhead would yield a requirement even larger than the steady state requirement used on the slide. However, knowing the reluctance to commit resources to what-ifs, the Task Force suggests that meeting the steady state need reduces the risk to an acceptable level. At the same time, the Task Force recognizes that the maximum capacity at TA-55 is unlikely to meet the need.

Hence there is a need for a plan that ensures the flexibility needed to meet both steady state needs and/or hedging against a major warhead failure.

A USSTRATCOM study on the Life Extension Program addresses in more detail the pit and other component production needs.



This chart illustrates an approach to right-sizing the inactive segment of the stockpile in the face of the wide range of uncertainties.

The first two key milestones are START II ratification and demonstrating the capability for certified pit rebuild. The latter is to occur in FY99 with the W88 warhead. The timing on the former is less certain. When these two events occur, the inactive stockpile could be significantly reduced. Even though at START II levels, the US with an unquestioned capability to deter a nuclear attack regardless of the size of the Russian stockpile, some reconstitution might be needed.

As confidence in pit build increases and the capacity is brought to the needed level as confidence is gained in predictive surveillance, there could be further reductions in the reliability and reconstitution hedge. Still, it may be necessary to maintain a reconstitution hedge until there is some resolution of the difference between Russian and US warhead production capacity.

The lower line for pit production assumes steady state production to account for aging. The upper line is just to make the point that hedging against a failure of a quantitatively large warhead could demand a significantly larger capacity. The numbers required in this case depend on the acceptable recovery period.

***The Imperative of Stockpile Stewardship
The Need for Unquestioned Capability***

- **Uncertainty in the mind of a potential adversary can be a useful additive to deterrence – cannot be the basis**
- **Underlying assumption must be that an adversary who is completely knowledgeable about US capability would be unquestionably deterred**
- **US National Command Authorities must have high confidence in the real capability of US deterrent forces**
- **Relying on a bluff far too risky for the stakes involved**
 - **Must have the capability to identify problems and fix problems**

The long-term support essential to success in the Stockpile Stewardship Program will need the underpinning of more in-depth understanding of the imperatives surrounding this need.

At one end of the scale, the Task Force heard from some who doubt that we need high confidence in the performance of the stockpile since no adversary can know or count on massive failure in our stockpile. Taken to the extreme, this attitude could lead to a quest for ignorance regarding the condition of the stockpile.

While there is a certain strained logic to this position, it violates the long-standing basic underpinning of robust, reliable deterrence. Deterrence is based on known capability, not on bluff, and certainly not on planned ignorance of capabilities.

There can be no dependable deterrent without a successful stockpile stewardship program.

The Imperative of Stockpile Stewardship The Hedge of a Return to Testing?

- **Could be a hedge against gaps in stewardship capability (some failures requiring fixes beyond certifying)**
 - **Cannot be a hedge against substantial failure of Stockpile Stewardship Program**
- **Past approach depended on limited testing and large scale replacement of aging or failed warhead designs with a large capacity to replace with new warheads and designs**
- **Virtually no prospect of restoring production on the scale needed to return to the past paradigm**
- **Have to commit to making Stockpile Stewardship work**

The Task Force also heard from some who would rely on a return to testing as a lower cost substitute or at least as a hedge against failure of the planned Stockpile Stewardship Program. The Task Force acknowledges that even with full commitment to stockpile stewardship and substantial success, there may be failures in the stockpile calling for fixes that cannot be certified without testing. Even so, limited testing could only be a hedge against gaps.

A return to the Cold War or pre-test ban approach to maintaining the stockpile would require more than just a decision and capability to return to limited testing. It would also require a massive expansion of the planned plutonium and uranium processing (primary and secondary production) capability that went with limited, underground testing.

There is no practical substitute for success in Stockpile Stewardship.

Sustaining Support for Stockpile Stewardship

- **Will require a solid front in DOD and DOE**
- **Needs better planning and programming communication between the two departments**
- **Probably demands a more comprehensive programming and budgeting approach (or at least more comprehensible) for DOE defense programs**
- **Pilot programs established for cooperative DOE/DOD review**

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Given the imperative of at least substantial success in stockpile stewardship, sustaining the needed funding support for the period needed will require strong DOD and DOE support.

An underlying prerequisite for DOD support will be a more comprehensive understanding of the DOE program. This may require more detailed and transparent programming and budgeting than has been the culture dealing with DOE defense programs and the National Laboratories work in support of defense programs.

As a result of recent OMB, DOD, and DOE funding discussions, four pilot programs have been established for DOD and DOE to cooperatively review planned expenditures.

Outline

- **Deterrence context and guidance**
- **DOD nuclear management and focus**
- **Sustaining the force and stockpile**
- ➔ • **Arms control considerations**
- **Summary of recommendations**

There are a number of arms control issues that can impact maintaining the nuclear deterrent.

Relevance of Strategic & Non-Strategic Systems Labels

- **Decreasing relevance to today's issues**
- **More properly a description of missions than of systems**
- **Has been a useful arms control distinction but;**
 - Numbers of tactical warheads may dominate the equation for key allies
 - Cannot be the basis for multi-lateral discussions if arms reductions reach that point

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The relevance of the distinction between strategic and non-strategic systems will become a central issue beyond START II.

That distinction lost its relevance in conventional attack operations some time ago. In both the Vietnam War and Desert Storm, "strategic" bombers were, with few exception, used to attack "tactical" targets while "strategic" targets were attacked by "tactical" aircraft.

While, the distinction applied to nuclear systems has been useful for arms control purposes in the past, it has little relevance for the future.

Future Directions -- Some Options?

- **Continued focus on US and Russian deployed strategic warheads**
 - START III takes strategic warheads to a fraction of the total deployable warheads
 - Deployable strategic warheads a shrinking fraction of reconstitutable warheads
- **Turn attention to US and Russian total deployed warheads**
 - What does US bring to the table?
 - Russia probably has legitimate claim to present use of decades of NATO strategy
 - Most useful focus, but difficult and lengthy path
- **Enter multi-lateral negotiations**
 - UK, France, China not likely to negotiate their total warheads against US and Russian strategic warheads?
- **Expand to US and Russian total warheads**

The relevance of the distinction between strategic and tactical will be a basic issue in any meaningful future negotiations and will impact maintaining the nuclear deterrent.

Beyond START II, deployed strategic warheads will constitute a shrinking fraction of the total Russian deployed warheads -- probably less than 25%. The inactive stockpile adds to the disparity between deployed strategic warheads and total deployed warheads that must be considered in defining an adequate program to maintain the nuclear deterrent.

A useful next step is to consider all deployed warheads. However, the small numbers of deployed US non-strategic warheads provides little incentive for Russian negotiations. Further, the Russian leadership has declared an increasing dependence on these nuclear forces using the classic NATO argument of the need for these weapons to deal with neighboring conventional capabilities that can threaten the Russian homeland.

In any case, any prospects for meaningful reductions beyond START III must include multi-lateral negotiations with nuclear powers that are not likely to accept an arbitrary US-Russian definition of "strategic" and "non-strategic."

Beyond these issues is the prospect of dealing with total warheads to include the inactive stockpile and with nuclear materials.

Deployed strategic warheads, as the goal for arms control, had the advantage of verification regimes acceptable in intrusiveness and in likely effectiveness. Moving beyond that greatly complicates the challenge and will require a very large increase in both the intellectual and technological resources dedicated to this challenge.

Reversibility

- **Helsinki Joint Statement (HJS) calls for transparency and irreversibility in a START III agreement. START III should include:**
 - “Measures relating to the transparency of strategic nuclear warhead inventories and the destruction of strategic nuclear warheads and any other jointly agreed technical and organizational measures, to promote the irreversibility of deep reductions including prevention of a rapid increase in the number of warheads”
 - How does US compensate for Russian production and infrastructure capacity and modernization plans/activity?
- **How does US compensate for large asymmetry between US and Russian non-strategic nuclear forces/stockpiles?**
 - This asymmetry leads to a complex set of issues that needs to be explored

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The issue of reversibility also has important implications for decisions on maintaining the nuclear deterrent.

Both the US and Russia have declared irreversibility as a basic goal for START III. Still, the entire concept of hedging against reconstitution assumes reversibility.

A major complication arises from the asymmetry in US and Russian reversibility. Since production capability -- platforms or warheads -- has not previously been a subject for arms control negotiations, introducing warhead production capacity as an element of reversibility will be difficult but essential to the concept.

Again, the set of issues associated with the combination of commitment to irreversibility and asymmetry demands intense focus to sort out the issues and to prepare to negotiate.

In the meantime, it has the direct implications for the stockpile already discussed.

Future Arms Control Cautions

- **Warhead accountability and verification represent new territory for arms control**

- **Proceed cautiously in negotiations on warhead issues – warhead asymmetries problematic**
 - **Production and infrastructure**
 - **Numbers and types**
 - **Interchangeability between strategic and non-strategic**

- **Maintain flexibility in US stockpile because of limited production capability and long-lead times for US**

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Given the complexities discussed to this point, this chart summarizes a handful of important cautions to help ensure that we can sustain an adequate nuclear deterrent while moving forward with continuing mutual reductions.

Outline

- **Deterrence context and guidance**
- **DOD nuclear management and focus**
- **Sustaining the force and stockpile**
- **Arms control considerations**
- ➔ • **Summary of recommendations**

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The following slides summarize the Task Force's recommendations across all areas reviewed.

Summary of Recommendations
Thinking About Deterrence

- **USD/Policy support continuing work by a cadre of professionals at suitable institutions outside the government and at the National Defense University to focus on concepts of deterrence relevant to the changing world and on related nuclear concepts**

***Summary of Recommendations
Some Special Issues***

- **Maintain the proven and still essential triad of nuclear forces**
- **Before moving to additional de-alerting, the National Security Council should require in-depth, convincing rationale on how such measures benefit stability**

Summary of Recommendations
Competence, Expertise and Attention
Value of Nuclear Experience

- **DoD leadership take positive actions to reverse the decline in the value accorded nuclear experience (in fact and in perception)**
- **Services track nuclear experience in the personnel system**
 - **Accord special attention to career paths for people with this special experience.**
 - **A force and support issue -- need high competence in both kinds of activities -- to include maintaining the security of weapons**

Summary of Recommendations
Competence, Expertise and Attention
Focus on Nuclear Issues

- **USD(A&T) take the lead in establishing a formal mechanism that helps ensure that nuclear issues are surfaced to the right level with the right staff support**
- **Defense to render an annual report to the President on the state of the nuclear deterrent**
 - **Starting point could be requirement in PDD for Secretary to issue a DOD Directive that establishes this formal mechanism**
 - **A standing DOD body that develops and maintains an end-to-end Nuclear Mission Management Plan**
 - **A Steering Committee to oversee the standing body**
 - **An Independent Advisory Group to help ensure continuity of experience & focus**

***Summary of Recommendations
Competence, Expertise and Attention
Intelligence Community***

- **The National Security Council and the Secretary of Defense should raise the priority for Intelligence Community attention on collection and analysis in support of nuclear policies and force planning**

Summary of Recommendations
Service Issues

- **Air Force and Navy should establish and maintain a long-range plan for sustaining nuclear delivery platforms – looking out to at least 50% longer than development lead time (more than 20 years)**

- **Air Force establish and maintain personnel systems that:**
 - **Ensure tracking of nuclear experience and training of all kind**
 - **Identifies billets requiring the expertise and appropriate personnel**

Summary of Recommendations
Operational Readiness Issues

- **USSTRATCOM, theater CINCs and the Services should continue to emphasize operational exercises for nuclear forces**
- **The Air Force, Navy and DTRA should continue rigorous operational inspections of nuclear capable units**

Summary of Recommendations
Stockpile Stewardship Program Definition & Support

- **DOD/USD(A&T) and DOE/DP develop a comprehensive mutual understanding of the demands of the Stockpile Stewardship Program as a basis for reliable long-term DOD support**
- **DOD and DOE need a concerted effort to educate the Congress and other national security decision makers on the imperative of success in the Stockpile Stewardship**
- **The Secretary of Defense direct work to decide on the stockpile size planning factor to guide DOE planning**

Summary of Recommendations
Stockpile Stewardship Program Definition & Support
(Cont'd)

- **DOE/DP, with DOD support, formulate a weapons production plan and complex that can satisfy the need based on at least a minimal set of assumptions and planning factors**

- **DOE/DP form an independent review group, with DOD participation, with the needed expertise to assist the senior leadership in the national security community in confidence in the developing SSP**

***Summary of Recommendations
Future Arms Control***

- **Beyond START III (preferably for START III) focus on the most useful next step – total deployable warheads**
- **For negotiations involving total warheads, account for the asymmetries in production capacity – a new arms control issue requiring concerted attention**

Outline

- **Introduction**
- **Some bottom lines**
- **Deterrence context and guidance**
- **DOD nuclear management and focus**
- **Sustaining the force and stockpile**
- **Arms control considerations**
- **Summary of recommendations**
- **Appendices**
 - **Acronyms**
 - **Terms of Reference**



Acronyms

A	
ACC	Air Combat Command (USAF)
AFSPC	Air Force Space Command (USAF)
AHF	Advanced Hydrotest Facility
ASCI	Advanced Strategic Computing Initiative
ASD	Assistant Secretary of Defense
ATSD(Atomic Energy)	Assistant to the Secretary of Defense (Atomic Energy)
ATSD(NCB)	Assistant to the Secretary of Defense (Nuclear & Chemical & Biological Defense Programs)
C	
C-4	TRIDENT I SLBM
CAV	Combat Aerial Vehicle
CFO	Chief Financial Officer
CINCUSSTRATCOM	Commander-in-Chief, US Strategic Command
CJCS	Chairman, Joint Chiefs of Staff (DoD)
CTBT	Comprehensive Test Ban Treaty
D	
D-5	TRIDENT II SLBM (USN)
DARHT	Dual Axis Radiographic Hydrodynamic Test
DCA	Dual Capable Aircraft
DDR&E	Director, Defense Research & Engineering
DIA	Defense Intelligence Agency
DNSI	Defense Nuclear Surety Inspections
DoD	Department of Defense
DOE	Department of Energy
DOE/DP	Department of Energy, Defense Programs
DSB	Defense Science Board
DTRA	Defense Threat Reduction Agency
D TSA	Defense Technology Security Administration
DSWA	Defense Special Weapons Agency

Acronyms

F	
FXR	Flash X-ray
G	
GRP	Guidance Replacement Program (USAF)
H	
HEPPF	High Explosive Pulse Power Facility
HJS	Helsinki Joint Statement
I	
IC	Intelligence Community
ICBM	Intercontinental Ballistic Missile
ICF	Inertial Confinement Facility
IPT	Integrated Product Team
IS	Inactive Stockpile
J	
JCS	Joint Chiefs of Staff
JS	Joint Staff (JCS)
K	
KCP	Kansas City Plant (DOE)
L	
LANL	Los Alamos National Laboratory
LANSC	Los Alamos Neutron Scattering Center
M	
MIRV	Multiple Independently-Targetable Reentry Vehicle

Acronyms

N	
N-87	Deputy Chief of Naval Operations (Resources, Warfare Requirements & Assessments)/Submarine Warfare Division
NATO	North Atlantic Treaty Organization
Navy/SSP	Strategic Systems Programs (USN)
NCB	Nuclear Chemical & Biological Defense Programs
NIF	National Ignition Facility
NMMP	Nuclear Mission Management Plan
NORI	Nuclear Operational Readiness Inspection
NSC	National Security Council
NSI	Nuclear Surety Inspection
NSS	Nuclear C ² System Support Staff
NSSN	New Attack Submarine
NTPI	Navy Technical Proficiency Inspection
NWCPA	Nuclear Weapons Capabilities Protection Assessment (USAF)
Q	
ORI	Operational Readiness Inspection
OSD	Office of the Secretary of Defense (DoD)
OSIA	On-site Inspection Agency (DoD)
P	
PDD	Presidential Decision Directive
PHERMEX	Pulsed High-Energy Radiographic Machine Emitting X-rays
PK	PeaceKeeper ICBM
PK	Probability of Kill
POM	Program Objective Memorandum (DoD)
PPBS	Planning, Programming & Budgeting System (DoD)
PRP	Propulsion Replacement Program

Acronyms

Q	
QART	Quality Assurance & Reliability Testing Replacement
R	
R&D	Research & Development
RMA	Revolution in Military Affairs
RSAP	Reentry Systems Applications Programs
S	
SecDef	Secretary of Defense
SICBM	Small ICBM
SLBM	Submarine-Launched Ballistic Missile
SMRI	Stockpile Management & Restructuring Initiative
SNL	Sandia National Laboratory (DOE)
SRS	Savannah River Site (DOE)
SSBN	Nuclear Powered Ballistic Missile Submarine
SSP	Stockpile Stewardship Program (DOE)
SSP	Strategic Systems Programs office (USN)
START	Strategic Arms Reduction Talks/Treaty
STRATCOM	Strategic Command [Offutt AFB, NE] (DoD)
STRATCOM SAG	US Strategic Command's Strategic Advisory Group
SWPP	SLBM Warhead Protection Program
T	
TA-55	Plutonium Facility at Los Alamos
TLAM/N	Tomahawk Land-Attack Missile, Nuclear
U	
USA	United States Army (DoD)
USAF	United States Air Force (DoD)
USCINCPAC	US Commander-in-Chief, Pacific Command
USDA&T	Under Secretary of Defense (Acquisition & Technology)
USD(A&T)/NM	Under Secretary of Defense (Acquisition & Technology)/Nuclear Matters

Acronyms

USD(A&T)/S&TS	Under Secretary of Defense (Acquisition & Technology)/Strategic & Tactical Systems
USD(P)	Under Secretary of Defense (Policy)
USD(Policy)/ASD/S&TR	Under Secretary of Defense (Policy)/Assistant Secretary of Defense/Strategy & Threat Reduction
USN	United States Navy (DoD)
USSTRATCOM	US Strategic Command (Offutt AFB, NE) (DoD)
<u>V</u>	
VCJCS	Vice Chairman, Joint Chiefs of Staff
<u>W</u>	
W76	Warhead for TRIDENT I/C4 SLBM
W76/MK4	Warhead for TRIDENT I/C4 SLBM & Reentry Vehicle
W88/MK5	Warhead for TRIDENT II/D5 SLBM & Reentry Vehicle
WMD	Weapons of Mass Destruction
<u>X</u>	
XON	Nuclear & Counterproliferation Directorate, Office of the Chief of Staff of the Air Force (USAF)
<u>Y</u>	
Y-12	Y-12 Facility (Oak Ridge, TN) (DOE)