An Analysis of

U.S. NUCLEAR WEAPONS MODERNIZATION PROGRAMS

for the Ploughshares Fund

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Executive Summary

The Nuclear Budget Campaign initiated by the Ploughshares Fund was prescient in recognizing the opportunity to cut defense budgets, leading to some impressive victories. Today, those smaller defense budgets look locked in, even though the specific decisions necessary to live within them have not been made either in the Pentagon or NNSA. Yet, counter intuitively, since the smaller defense budgets were achieved more precipitously than anyone expected, the defense budget is likely to start increasing in maybe only a few short years.

This strange moment presents a unique opportunity for the Ploughshares Fund's Nuclear Budget Campaign and the broader arms control community to have both an immediate impact, as well as lay the groundwork for even greater impact in the coming years.

We recommend seizing this moment by adopting both a near- and long-term approach to attacking nuclear weapons programs. The following recommended priorities outline how today's fiscal environment can best be leveraged to fundamentally change the U.S.' nuclear weapons programs, and therefore the world's nuclear future.

Recommended Campaign Priorities

• The SSBN(X) program for new strategic submarines should be downsized from 12 boats to 8, potentially saving ~$25 billion without sacrificing national security. This relies on the argument that since a reduced fleet can still assure nuclear security, development of the new submarine can be delayed today, thus easing current budget pressures.

LEFT: a B61 nuclear bomb at the Pantex Plant.

RIGHT: Artist's rendition of the Uranium Processing Facility at the Y-12 Plant.

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• The longevity of current bombers and the recapitalization of an air-launched cruise missile and B61 gravity bomb mean the future long-range strike bomber can be delayed, and certainly the decision to make it nuclear can be delayed. As with the submarine, this argument will be reinforced as the Pentagon and Congress look for near-term savings to meet existing budget pressures.

• The B61 Life Extension Program should remain as the highest priority, focused on high cost, excessive complexity, and increased military capabilities. However, our efforts should be broadened to campaign against other proposed LEPs, particularly "interoperable" warheads and a possible air-launched cruise missile warhead.

• A new air-launched cruise missile should be vigorously opposed if it appears in DoD's FY 2015 budget request on the grounds of costs, redundancy, and new military capabilities.

• Existing delivery platforms should be reduced, including the Ohio SSBN force downsized to 8 boats to match the future SSBN(X) fleet and the ICBM force reduced to 300 missiles.

• The Chemistry and Metallurgy Research Replacement Project at the Los Alamos Lab should be put on a watch list because "son of CMRR" may be in NNSA's 2015 budget request. Stopping expanded plutonium pit production is paramount.

• The MOX program should remain an interim priority until the FY 2015 budget request. It can be downgraded if its proposed funding is $250 million or under.

• The Uranium Processing Facility at the Y-12 Plant should be a top priority. It is growing vulnerable because of exploding costs, design mistakes, no role in dismantlements and lack of clear mission need for production of nuclear weapons secondaries.

• Because of budget constraints and NNSA's continual failures, the time is ripe to push for a fundamental shift away from multi-billion dollar Life Extension Programs (LEPs) and research and production facilities. The antidote is simple "curatorship" which conservatively maintains the nuclear weapons stockpile. Curatorship is technically less risky, will save 100's of billions of dollars, will not create new military capabilities like present LEPs, and better aligns with achieving global nuclear nonproliferation goals.

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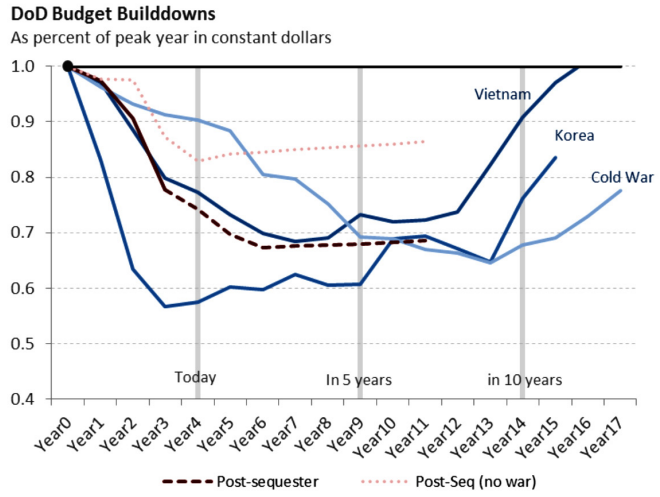
The US Defense Budget: a Five to Ten Year Outlook

Russell Rumbaugh

Not only has the US defense builddown begun, it's backdated. US defense spending has been declining since FY 2010, well before the early observers suggested it would decline and years before there was consensus on it declining. This decline is true whether including war costs or not.

Yet we are likely already halfway through the current defense budget decline. The defense budget has cycled up and down with some regularity since the United States embarked on a national security state around the time of the Korean War. The three previous down cycles lasted only six, seven and ten years respectively (see Chart 1). Since we are already four years into this downturn, it is likely that in five years, and almost certainly within 10 years, the defense budget is going to start increasing.

No one has ever demonstrated the defense budget is cyclical. It does not display any mathematical regularity. Nor does it correspond to any economic or business cycle. And neither does it map to any political dynamic, such as the political party in control of the presidency, the chambers of Congress, or any other combination. Nevertheless, the broad trends over time seem obvious, and there seems no reason to doubt the downturn we are in today belongs to a similar cycle.



Compared to previous build-downs, this defense downturn had been relatively mild so far. The base budget has been flat in nominal terms, holding at about $530 billion each year. But because inflation erodes the value of each dollar, those flat budgets in retrospect represent a downturn. Even with war costs, which have dropped more sharply than the base budget, the downturn was not initially steep. [1] In real terms, the total defense budget declined by 2.7 and 6.7 percent in the first two years since FY 2010.

But with the activation of the enforcement measures in the Budget Control Act (BCA), the defense budget is now dropping sharply, putting it on a path parallel to the builddown following the Vietnam War. In line with the BCA's initial caps, the President submitted a defense budget request for FY 2013 that was nominally lower than the previous year for the first time since FY 1997. War costs also dropped by about 30 percent for the second year in a row. The FY 2013 budget then had $30 billion sequestered, producing a total drop of 12.8 percent from FY 2012. Finally, the FY 2014 caps require a defense budget $20 billion lower than the FY 2013 level.

These new levels seem to be holding. Despite many calls for easing the BCA enforcement measures, the only successful relief has come from the New Year's deal at the start of 2013, which only eased the FY 2013 cut. Since then, all efforts to raise the spending caps have failed. After the House delayed consideration of the debt ceiling until spring, sequester still went into effect on March 1st and was left in place by omission in the final FY 2013 appropriations bills. The debt ceiling debate was further

1 War costs are particularly difficult to forecast. In the enclosed chart, FY 2014 contains the $80 billion requested in the President's budget, FY 2015 is half that, and FY 2016 and on has an assumption of $20 billion each year to reflect both the President's commitment to exit Afghanistan and the apparent normalcy of some war costs for various contingencies.

delayed until this fall by the Treasury's use of extraordinary measures, only to have the government shut down without new appropriations just as the debt ceiling came due. Importantly, both the House and Senate-approved versions of a continuing resolution wrote in the FY 2013 post-sequester level of funding and did nothing to relieve the further sequester mandated by the FY 2014 caps, which - again - are even lower than FY 2013 levels.

In total, the defense budget by FY 2014 will be 30 percent smaller than its FY 2010 peak, already achieving the average drop of the previous three builddowns.

However, this steep drop suggests the defense budget is close to reaching its lowest levels in this cycle and may begin to grow within another year or two. The BCA caps always allowed for the defense budget to keep up with inflation once the initial cut was taken. The post-sequester caps dramatically deepened that initial cut but still allowed the remaining years to rise with inflation. If there remains at least some war funding and inflation is lower than BCA projections, the defense budget could start growing slightly in both nominal and real terms.

There is a chance that Congress could further curtail defense spending below BCA levels. Congress's reductions or additions to the president's budget request have traditionally been a leading signal of the direction of the defense budget. If Congress maintains a focus on austerity, it might trim each year's budget slightly below the caps or even below inflation, leading to more cuts. But even that restraint is likely to last only a couple more years.

Moreover, even if Congress becomes increasingly reliant on continuing resolutions to fund the federal government, defense spending should be protected by the privileged position it has traditionally enjoyed in the Congressional authorization and appropriations processes. In the 21st century, the Department of Defense has never lived under a full-year continuing resolution. In fact, in FY 2011, DoD was the only federal agency that received a full appropriations bill instead of a full-year continuing resolution. Such a privileged position suggests defense spending will soon settle into a more stable funding process. Within five to ten years, the defense budget is likely to begin increasing, which it is likely to do for almost a decade after, easing many decisions about the allocation of resources within DoD.

Changes Not Made Yet

Though an increasing defense budget may be only a few years away, there is still significant programmatic pain to come. The Departments of Defense and Energy and the military services have not yet made the structural changes necessary to live under the post-sequester budget levels.

The cuts in the FY13 budget request required some structural changes. Most notably, the ground forces accepted significant endstrength reductions that have not been eased. Of course, the ground forces are largely irrelevant to the nuclear budget.

In contrast, the Air Force's proposed adjustments are not reliable signals of its future priorities. Or rather, the Air Force's adjustments do reflect its priorities but run so afoul of Congressional preferences that they are essentially meaningless. The Air Force attempted to meet lowered budget levels through force structure reductions that overwhelmingly concentrated on the Reserves and National Guard. Out of 60 affected units, 50 were in the reserve component. Congress, however, disproportionately favors the reserve component, which can be a potentially valuable ally in elections due to its close ties with communities across the country. Confronted with such a stark rejection of its own priorities, Congress roundly rejected the Air Force's proposals, forced a com-

promise deal, and set up a commission to review future force structure decisions.[2]

Still, we can reasonably assume the Air Force will prioritize modernization programs over force structure. Leaks about the Air Force's FY 2015 budget plan have suggested it is debating between cutting entire fleets of existing aircraft or only cutting enough aircraft to free up funding to recapitalize the remaining inventory. In other words, the Air Force is choosing between cutting force structure to increase modernization funding or cutting some force structure to recapitalize existing aircraft without dipping into modernization funds. In either case, modernization funding is prioritized.

The Navy also made a conscious choice in the FY 2013 budget to favor modernization over force structure, choosing to retire seven active cruisers and several amphibious ships. Congress also overruled these changes, but likely did so in hope that total defense spending would resolve higher than it did, not because it rejects the Navy's priorities. The Navy has long prioritized its future investments, and Congress has usually acceded.

There are even fewer signals about the future of the National Nuclear Security Administration. Even in the BCA-constrained FY 2013 budgets, the NNSA was favored, requiring additional sacrifices from the budgets of other national defense programs. All atomic energy defense-related activities grew by 3.8 percent, before sequestration. This favoritism likely stems from deals on nuclear modernization that were cut to secure ratification of New START. Those deals no longer look binding, and, NNSA continues to offer a very expansive future program disconnected from fiscal realities.

The FY 2013 defense budget was only a $5 billion reduction. The FY 2015 defense budget faces a $50 billion reduction. Such a shift will require dramatic structural change within the services' programs. Yet the nuclear modernization programs are likely to avoid this crunch.

Nuclear Modernization Programs

Nuclear modernization programs are likely to be service priorities, even within the already prioritized modernization programs. The Air Force continues to tout the long-range strike penetrating bomber as one of its top modernization programs. As the only major aircraft program under development, it likely bears the expectations of not only the bomber community but also the broader pilot community, which remains dominant within the Air Force. While the bomber itself may not be at risk, its nuclear role and composition of its payload are potentially vulnerable or subject to delay. The Navy's next-generation ballistic missile submarine (SSBN-X) also continues to be a top priority, although it so far has faced much greater internal competition than the Air Force's bomber program.

The submarine and bomber will likely avoid the immediate budget crunch caused by post-sequester funding limits. Both programs are still in their early stages and will not reach peak funding levels for several years, at which point pressures on the defense topline will probably be be easing. The bomber program is receiving only $267 million in FY 2013. Though large, this sum is only 26 percent of what the program is to receive in a year and less than 10 percent of what it is to receive annually by FY 2018. Similarly, the submarine program is receiving only $860 million in FY 2014 or 6 percent of its eventual annual procurement funding. As high priorities within their respective services that are early in their funding profiles, both programs are unlikely to be affected significantly by the structural changes coming in FY 2015, although both could be subject to overall program reduction or delay.

2 For more information, see Russell Rumbaugh, "The Battle Between the Air Force and the Air National Guard," DefenseOne, August 29, 2013, http://www.defenseone.com/ideas/2013/08/battle-between-air-force-and-air-national-guard/69647/?oref=d-river

The one exception among nuclear modernization programs is the next-generation ICBM, which remains a mere concept with little internal Air Force support. Current conceptual plans span a wide range, from extending the exiting Minuteman III to the least politically viable options, like underground and rail-based mobile ICBMs. For the next several years, focus will be on design development and not require significant funding. If forced to choose between a new ICBM and a bomber—or any of its conventional priorities, the Air Force would likely chose against the new ICBM program.

Congressional Considerations

Although defense spending trends will probably not directly affect the survival of nuclear modernization programs, the services may delay full-scale production of the bomber and submarine to insulate them from political attack in Congress. The survival of any acquisition program depends on a broad consensus of actors across the executive and legislative branches, and this consensus is particularly vulnerable at key program decision points and in periods of heightened budgetary pressure. The Navy and Air Force may therefore delay development and production milestones.

Acquisition programs are vulnerable to criticism from dissenters within the services, who can raise their concerns during the Office of the Secretary of Defense (OSD) review of service budgets and at any stage of the Congressional review of the defense budget. Both reviews present plenty of opportunities to casually express concern, which in turn allows independent actors within OSD or Congress to exploit the lack of consensus. This vulnerability is especially heightened at key moments in a program that require a decision to commit substantially increased funds, like when a program is transitioned from development to procurement.

Internal budget pressures also increase this vulnerability. When funds are scarce, advocates of any particular acquisition program are more likely to view other programs as competitors for funds and threats to their favored projects. In the Navy, for example, surface warfare officers are more likely to oppose the SSBN(X) if building it requires cutting deeply into shipbuilding funds for surface combatants.

The military services, therefore, are likely to delay both the bomber and submarine program in order to avoid bringing them to a decision at a particularly vulnerable time. This delay is particularly easy to implement at this stage, as the programs do not yet need to move forward. More work can be done in the research and development stage, which has the added advantage of being less scrutinized. Such a strategy keeps a program alive and moving while also freeing up some resources.

This course is most likely for the bomber, which remains less developed. The submarine program is more developed and has a relatively more inflexible external timeline tied to the end of the service life of Ohio-class submarines.

This strategy does not mean either of the two programs are in fundamental danger from internal pressures, as each year of delay allows the program to mature and gain greater consensus while topline pressures ease. It does, however, present an opportunity for outside groups to fan the internal tensions.

Congress is unlikely to buck the services on the overall prioritization of either the bomber or submarine, but its predilections will reinforce a delaying strategy. Congressional appropriators must make each year's budget numbers add up, and a few hundred million dollars in annual savings from a program delay would make appropriators inclined to accept, if not encourage, the services' delay.

Congress is also likely to reinforce protecting the non-modernization parts of the budget, encouraging a delaying strategy. Since the "training revolutions" of the 1980s, the military services have ensured the accounts that support readiness, like operational, maintenance, and personnel funding, are not cut too deeply. But the services are still sometimes inclined to cut these accounts, whose value is in the short-term, to protect their long-term interests represented by modernization accounts. Congress, however, resists such cuts because the readiness dollars often flow more directly into the bases and communities represented by individual congress members.

That is what happened in the 1990s. After the services initially cut the readiness accounts, Congress resisted further cuts and turned the issue into the "readiness crisis" that dominated the defense debate for almost the entire decade.

Congress is unlikely to part ways with the Air Force and Navy on the importance of their two primary modernization programs. But the dynamics of Congress are also likely to further encourage the services to delay these programs. Though Congress's preferences are not likely to be decisive on their own, they create the space for critics to exploit flaws within the nuclear modernization programs.

US Nuclear Delivery Systems: a Five to Ten Year Outlook

Hans M. Kristensen

What is the 5-10 year outlook (cost, schedule, etc.) for programs to modernize U.S. strategic nuclear delivery vehicles?

All three legs of the strategic triad are slated for modernizations that require costly decisions within the next 5-10 years. The Department of Defense (DoD) has said it plans to spend more than $200 billion on sustaining and modernizing its strategic nuclear delivery systems over the next decade. The fiscal constraints imposed by the budget crisis, sequestration, and program cost overruns create inherent internal competition between the individual programs. The modernization will extend the strategic triad past the middle of the 21st century.

SSBN(X)

The Navy plans to replace its current fleet of 14 Ohio-class ballistic missile submarines (SSBNs) with a new class of 12 submarines, the so-called SSBN(X). Design and construction of lead items (reactor/fuel/engine) is already well underway and purchase of the first boat is scheduled for FY 2021 with a delivery in FY 2028 and first patrol in FY 2031. Each SSBN(X) will be equipped with 16 SLBMs, a reduction of eight missiles compared with the Ohio-class SSBN. Yet each SSBN(X) will be 2,000 tons heavier than the Ohio-class submarine and include a new nuclear-electric drive propulsion system to make the submarine quieter. The design was approved in January 2010, three months before the Nuclear Posture Review was completed.

Although the first boat will not be purchased until 2021, significant program costs are already accumulating. More than $1.5 billion was spent in FY 2011-2012 on design and development and another $4.6 billion is scheduled for FY 2013-FY2018. Many SSBN(X) costs are invisible in the budget because they are part of general submarine programs.

US Nuclear Delivery Modernization 2013-2023

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Ohio SSBN*			24 to 20 tubes		D5LE	refuel SSBN-742/743					
SSBN(X)									procure 1st boat		
ICBM		AoA									
Bomber			?**								
ALCM	AoA	Milestone A									IOC
F-35A***			NCI						IOC		

Key: ALCM = Air-Launched Cruise Missile; AoA = Analysis of Alternatives; D5LE = Trident II Life Extension; ICBM = Intercontinental Ballistic Missile; IOC = Initial Operational Capability; NCI = Nuclear Capability Integration; SSBN = Nuclear-Powered Ballistic Missile Submarine.
* The Ohio-class SSBN is included here because upgrades and modification are relevant for options to reduce the size and nuclear armament of the SSBN fleet.
** The FY2014 budget request does not include a description of the next-generation bomber program activities. However, a significant cost increase in FY2015 indicates a possible production start.
*** The F-35A is a so-called tactical fighter-bomber but is included here because it is being used to justify the need for B61 LEP.

The Navy estimates that the SSBN(X) program will cost approximately $75 billion, including $12 billion for the lead ship and about $6 billion for each of the remaining 11 boats. The Navy hopes to eventually reduce the unit cost to around $5 billion, but it more likely that the cost will increase. In contrast, the Congressional Budget Office predicts the program will cost $100 billion to $110 billion, including $13.3 billion for the lead boat, an average of $7 billion for the second and subsequent boats, and $10 billion to $15 billion for research and development.

ICBM

In January 2013, the Air Force issued an invitation to industry for a proposal for a new ICBM that range from extending life of the current Minuteman III to producing a new missile for a mobile or tunnel-based launcher. The invitation followed the May 2012 Air Force Requirements Oversight Council approval of an "Initial Capabilities Document" for a future ICBM. Approximately $20 million is budgeted for FY 2013 – FY 2014 to complete a formal Analysis of Alternatives (AoA) in late FY 2014. With Minuteman III retirement scheduled for 2030, an ICBM replacement decision would have to be made no later than 2020.

Long-Range Bomber

The Air Force plans to acquire a fleet of 100 new stealthy long-range bombers (LRSB) at a cost of approximately $55 billion. The LRSB program, intended to replace the B-1 and B-52 (and eventually the B-2) bombers, was established in 2012 and envisions delivery of the first aircraft in the mid-2020s. The new bomber will be nuclear-capable from Initial Operational Capability around 2025 but not nuclear certified until two years later. Since only 60 bombers will be nuclear under the New START Treaty, the number of new bombers with nuclear capability will probably not exceed 60. Nearly $290 million spent in 2012 and more than $9 billion is budgeted for FY 2013 – FY 2018. Despite the significant costs, there is still no public program plan. Annual costs for the LRSB could reach $10 billion by 2021. The Air Force argues that the bomber is mainly a conventional weapon and that nuclear costs will be minor. Although nuclear hardening, weapons integration, and certification costs constitute a relatively modest part of overall bomber program costs, the nuclear payloads needed to give the bomber nuclear capability will be very expensive and the combined nuclear costs of payloads and integration will increase fiscal pressure on the bomber program.

Cruise Missile

Coinciding with the schedule of the long-range bomber, the Air Force is also pursuing a new air-launched cruise missile under the LRSO (Long-Range Stand-Off) program. An AoA is scheduled for completion in late-2013 and FY 2014 funding supports program office standup, Milestone A activities, and Request For Proposal release. From $5 million in FY 2014, funding increases to $40.5 million in FY 2015 and $203.6 million in FY 2016, with more than $1 billion projected through FY 2018 and delivery of the first weapon around 2024. The new ALCM will have enhanced military capabilities compared with the current ALCM and be capable of penetrating and surviving advanced integrated air defense systems from significant stand-off range to hold at risk strategic targets. The new ALCM will use either a life-extended version of the W80-1 warhead used in the current ALCM or a modified B61 or W84.

F-35A

The Air Force plans to equip an unknown number of F-35A Block IV with nuclear capability between 2015 and 2021. The cost of nuclear integration is unknown but $339 million has been rumored. Although described as a tactical aircraft, the F-35A extended range, stealth capability, and the fact that it will carry the same nuclear weapon (B61-12) as the B-2 and next-generation long-range bomber, make

the F-35A much more than just another F-15. The F-35A's role in providing extended nuclear deterrence to allies is a central part of the justifications for the B61 LEP.

What DoD nuclear modernization decisions are expected to take place within the next 5 years?

• In late 2013 the Air Force will complete an Analysis of Alternatives (AoA) for the new ALCM that will lead to a Milestone A decision in 2014 with standup of program office and formal request to industry for proposals.

• In 2014 the Air Force will complete an AoA for a replacement ICBM (Ground-Base Strategic Deterrent) that will lead to program office standup and formal requests to industry for proposals, probably in 2015.

• Although there is no detailed program plan in the budget for the new long-range bomber, the program is already accruing significant expenses. A tripling of costs in 2015 indicates significant new program activity.

• In 2015 the Air Force will begin nuclear equipment integration of F-35A Block IV.

Although not considered nuclear modernizations, the Navy is planning several activities on the Ohio-class fleet over the next five years that are important for short- and medium-range force structures options:

• In 2015-2016, four missile tubes on each boat will be inactivated.

• In 2017 deployment of the life-extended Trident II D5 will begin.

• In 2017-2020 the last two reactor refueling overhauls of Ohio-class submarines are scheduled.

Potential implications of the Ohio-class activities are described in the next section.

How might probable force posture changes affect DoD modernization programs?

Since the Administration and Congress seem to agree on one thing – that a triad will be retained and modernized – probable posture changes seem unlikely to significantly change the modernization programs. Yet, reductions and delays are likely:

ICBMs

The New START Treaty and the decision to de-MIRV the ICBM force are unlikely to significantly affect the modernization programs. New START does not explicitly limit the ICBM force and the U.S. has only committed to reduce the ICBM force to "up to 420 missiles." And despite de-MIRVing, the ability to re-MIRV will be retained. The next ICBM seems intended to carry 1-2 warheads.

A consistent rumor is that the ICBM force might be reduced from 450 to 300 missiles. That could terminate one ICBM base or one squadron at each of the three bases. A base closure could be Minot AFB, since it is the only base that has both ICBMs and bombers. Therefore, eliminating the ICBM mission would not close the base, which would ease the financial effect on the local community. Such a reduction would reduce deployed warheads by 150 and hedge warheads by 300.

If the Air Force were to choose a mobile system for its next ICBM (which is highly unlikely), then that posture change would significantly increase the cost of the modernization program by requiring development of a new mobile launcher, a new missile, a modified base structure, and probable modifications to the reentry vehicles.

Bombers

Assuming that no more than 60 of the next-generation bombers would be nuclear certified, that will probably affect the inventory and composition of the air-delivered weapons. Since

the B-52H bombers are no longer assigned gravity bombs under normal circumstances – leaving this mission for only 18 B-2 bombers, that suggests that the gravity bomb requirement under the strategic warplan may be significantly smaller than today's inventory. The B83-1 is in any case scheduled for retirement in 2030, leaving only B61-12 and ALCM on the bombers. That will probably mean retirement of about half of today's gravity bomb inventory, leaving 400-500 B61-12 and a similar number of new ALCMs. Since the current nuclear aircraft are expected to remain operational until 2040 (B-52s) and 2050 (B-2s), planning to equip the next-generation bomber with nuclear capability by the mid-2020s is premature.

ALCM

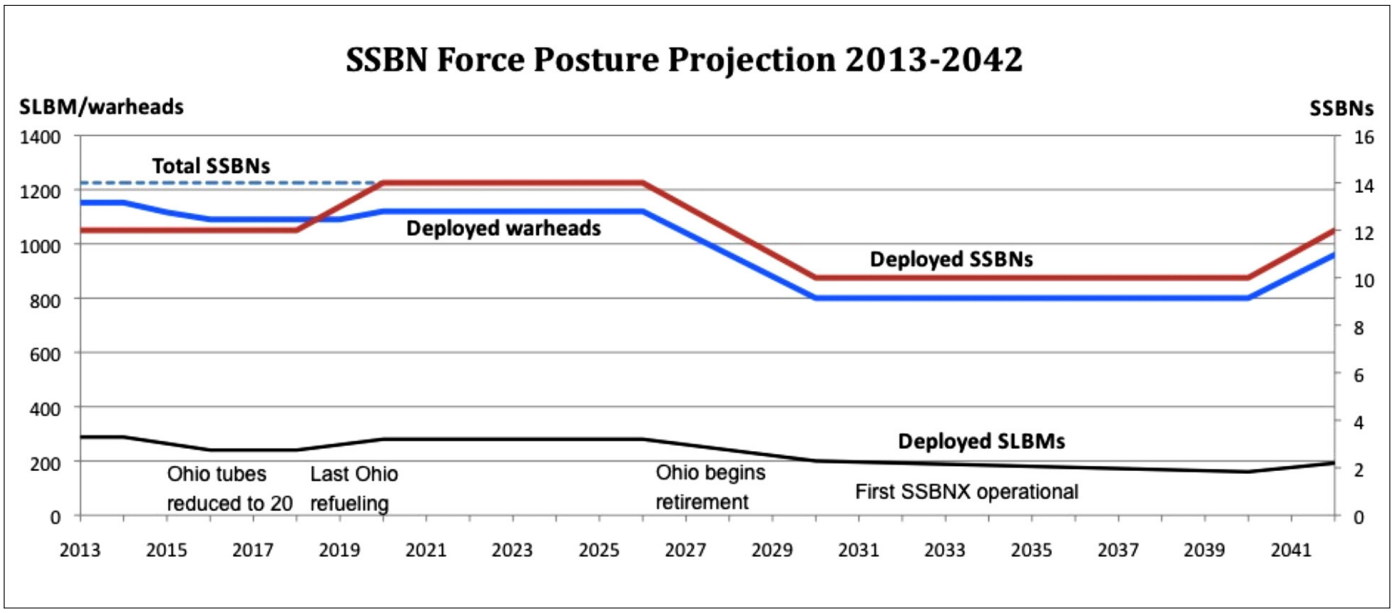
The plan for the new air-launched cruise missile envisions delivery of the first weapon in 2024. However, the NNSA's FY 2012 Stockpile Stewardship and Management Plan showed delivery of the ALCM nuclear warhead in 2031, seven years later. This suggests that the new air-launched cruise missile timeline is more tied to the introduction of the new bomber than to warhead aging issues. Consequently, the Air Force could probably delay the ALCM program by at least seven years.

SSBNs

The decision to change the SSBN force from 14 boats with 336 tubes (24 each) to 12 boats with 192 (16 each) will significantly reduce the size of the stockpile and therefore the size of missile and warhead modernization programs. That development is already in progress with only about 38 percent of the original W76 warhead inventory being life-extended. According to STRATCOM commander General Robert Kehler, that reduction "did not assume any specific changes to targeting or employment guidance." If so, this transition could and should be implemented now rather than later. How could the Navy do that?

The first step could be to increase the reduction of the missile tube inactivation scheduled for 2015 - 2016 so that each submarine would only retain 16 missile tubes instead of the 20 currently planned. That would reduce the total D5LE missiles production by an additional 56 missiles worth about $3.64 billion (additional savings would come from reduced numbers of test missiles).

The second step would be to cancel the last two Ohio-class refueling overhauls scheduled for 2017 - 2019 and 2018 - 2020 and retire the SSBN-742 and SSBN-743 immediately. Doing



so would save an estimated $500 million. The short-term saving in reduced D5LE missile production would be about $2.6 billion. Combined, these two steps could probably save over $6.7 billion over the next decade.

A more drastic option would be to reduce the SSBN fleet to 10 boats now (to have 8 operational), each with 16 SLBMs, and reduce the SSBN(X) program to 8 boats. Doing so would allow cancelation of 4 Ohio refueling overhauls (~$1 billion) and reduce D5LE SLBM production by 112 missiles (~$7 billion).

The combined effect of reducing the number of SSBN tubes and ICBMs would reduce the warhead requirement for the W78 life-extension program and the number of potential Interoperable Warheads.

Which DoD modernization programs have the most risk, in terms of management and keeping to schedules and costs?

All of the delivery modernization programs are at risk at some level or another, if not from direct cancelation then certainly from being scaled back due to projected costs and likely budget overruns. Some more than others:

ALCM

The cost of the new ALCM warhead is currently projected at approximately $12 billion. Development and production of the missile itself will add billions to the overall cost. A first production date of 2024 seems premature given the previous schedule of 2031. Since all targets that can be reached with an ALCM presumably also can be reached by a gravity bomb delivered by a stealth bomber or a warhead launched by a ballistic missile, a new ALCM seems redundant and an unnecessary expense. Moreover, the new ALCM would also raise serious questions about introducing new military capabilities in violation of the 2010 Nuclear Posture Review pledge not to do so.

Bomber

The Air Force's promise to build 100 "affordable" stealthy long-range bombers for $550 million apiece seems highly unrealistic and a fiscal accident waiting to happen. In context, the F-22 stealth fighter originally estimated at $149 million per aircraft now costs $412 million. Even though the bomber itself is not exclusively a nuclear platform, its very expensive payloads (B61-12 and ALCM) make the nuclear role vulnerable. Moreover, the fact that the existing nuclear bombers will remain in service until 2040 (B-52s) and 2050 (B-2s) calls into question the need to add nuclear capability to the new bomber by the mid-2020s.

ICBM

The replacement ICBM is vulnerable because it is nuclear-only and not mission flexible (it can only be used against Russia). But it will probably remain in the arsenal as long as Russia has a sizeable ICBM force. A mobile ICBM is probably too expensive to be seriously considered as a replacement, which is more likely to be another life-extension of the existing Minuteman III.

SSBN

The replacement SSBN is very expensive, and therefore potentially vulnerable, but its perceived importance to national security makes it unlikely that the program would be cancelled. Yet the high cost could mean that the program is scaled back to fewer boats, and as mentioned above, transition to the smaller fleet with fewer missiles sooner that could avoid at least some of the costs. Moreover, the existing Ohio-class SSBN program should immediately be scaled back to the force level already decided for the SSBN(X).

For all of these programs, the NNSA vision of building interoperable warheads can significantly increase the cost of the overall triad modernization and also introduce technical risks that the military services will oppose. That could create new opportunities for critiquing the programs.

F-35A

The increasing program costs (unit cost is now twice the original estimate) and the additional costs associated with adding nuclear capability makes the nuclear mission potentially vulnerable to delay, reductions, or cancellation. The increasing cost of the overall F-35 program will increasingly be seen as competing with the more important next-generation bomber.

Which program(s) are the most concerning from an arms control perspective?

Although the Prague speech and the Nuclear Posture Review that followed it both pledged to maintain a safe, secure, and effective arsenal as long as nuclear weapons exist, their main international impact was the perception of an increased US commitment to deep nuclear cuts, a reduction in the role of nuclear weapons, and taking concrete steps towards a world without nuclear weapons. Yet the effect of the broad nuclear modernization of delivery systems across the board combine to diffuse arms control momentum and confuse the perception of what is the focus of U.S. nuclear policy.

The four program characteristics that are the most concerning from an arms control perspective are those that: 1) retain a large force structure; 2) introduce new military capabilities into the arsenal; 3) retain and modernize forward-deployed nuclear weapons; and 4) introduce new technical risks that would increase the need to return to nuclear testing.

The problem of a large force structure includes the retention of an ICBM force that is significantly bigger than that of any other nuclear weapon state, and deploying 20 percent too many SLBMs throughout the 2020s, with both of these delivery systems backed up by a significant upload capability of non-deployed warheads. This slows the arms reduction process and makes it easier for hardliners in other nuclear weapon states to justify large nuclear programs.

The problem of introducing improved military capabilities is illustrated by the addition of a guided tail kit to the B61 bomb, the planned deployment of a new and improved ALCM, and the improved kill-capability of the W76-1 warhead. This directly conflicts with the pledge to reduce the role of nuclear weapons and not introduce new military capabilities.

The problem of forward-deployed nuclear weapons is illustrated by the plan to modernize and continue deployment of the B61 bombs in Europe. This stalls the process of reducing nuclear weapons in Europe, continues the questionable practice of providing a nuclear strike role to non-nuclear NATO countries, and surrenders the arms reduction initiative to hardliners in NATO and the Kremlin.

Finally, the problem of increasing the risk of nuclear testing is illustrated by the plans to develop new interoperable warheads for US delivery systems, thereby undermining the confidence in tested nuclear designs by potentially introducing unknown technical risks into the stockpile.

NNSA's Nuclear Weapons Modernization Programs

Jay Coghlan

What is the 5-10 year outlook (cost, schedule, etc.) for programs to modernize U.S. nuclear warheads and the weapons complex?

The time is propitious for at least the next few years for achieving continued success in cutting funding for the nuclear weapons programs of the National Nuclear Security Administration (NNSA). This analysis is essentially a call to "make hay while the sun shines", that is to make as much progress as we possibly can while NNSA's nuclear weapons programs are subject to fiscal constraints. We are further helped by current politics, in which the Republican Party that demanded increased funding for nuclear weapons modernization as a condition for New START ratification is now generally in retreat because of the government shutdown. This is not to excuse the conflicted behavior of the Obama Administration, which declared global abolition to be a paramount long-term national security goal, but at the same time was all too eager to concede to Republican demands for increased NNSA nuclear weapons funding. But unquestionably the Ploughshares Fund's Budget Campaign would have far greater difficulty if the Republicans captured majority control of the Senate, a threat that is now receding.

The greater threat to our budget campaign is if the Budget Control Act was to be repealed, which Congress may be inclined to do since sequestration has reduced defense spending much more quickly and dramatically than ever consciously considered. The BCA requires sequestration of funding and is in effect for another eight years. It will generally give NNSA nuclear weapons programs up to an 8% "haircut" (pending OMB guidance should give the exact rate under the current CR soon). If the BCA is repealed, NNSA nuclear weapons programs could again be awash in increased funding. But until that happens our prospects for significantly cutting NNSA nuclear weapons programs are very good.

At this writing these programs are experiencing a triple whammy, consisting of the disruptive effects of the federal government shutdown, funding under a Continuing Resolution(s), and the longer-term impacts of sequestration. All of these individually cause delay, which is the enemy of NNSA programs. Any delay inevitably causes total program costs to further rise, when exploding costs have made these programs highly vulnerable to begin with.

With the government just reopening, we can expect longer term significant cuts because of the combination of 1) funding by CR(s) at typically the previous fiscal year's level, and a prohibition against new program starts; and 2) automatic "sequester" cuts pursuant to the BCA. Even flat funding is a win for us, given that NNSA nuclear weapons programs require increased funding to sustain forward momentum, while in real terms flat funding is actually a cut because of inflation.

To illustrate by important example, one key congressional staffer has explained that one of our top priorities, the ~$10.4 billion B61 Life Extension Program (LEP), is in increasing trouble because:

• The sequester in FY 2013 caused a $30 million cut to the program, resulting in a 6 month slip to the schedule and therefore added $230 million to the total cost of the program. [Only in government can you cut 10's of millions and end up adding 100's of millions.]

• Even as short as it was, the government shut down curtailed B61 LEP activities, causing additional delay and therefore increasing costs.

• Regardless of the difference in current House and Senate appropriations, the B61 LEP faces a $60 million cut in FY 2014 from sequestration and management efficiencies that cut 5% from the needed budget request.

• At this point an omnibus appropriations bill for FY 2014 is unlikely, and therefore NNSA will be stuck with Continuing Resolutions. Under the CRs, since nuclear weapons activities did not get an anomaly, the B61 program cannot spend beyond FY 2013 levels. This will cause serious delay to the program, since the Administration's FY 2014 request was 45% above FY 2013, causing yet more escalating costs.

• Because of all this and other factors, NNSA and the nuclear weapons labs may be forced to consider cheaper alternatives to the B61 LEP, which we have argued for all along.

Nationally, because of the CR and sequester, the NNSA's FY 2014 budget request of $7.9 billion for Total Weapons Activities could be rolled all the way back to ~$7.0 billion, a level last seen in 2009. This begins to achieve the original objective of the Ploughshares Fund budget campaign, which is to roll back the increases that NNSA nuclear weapons programs extracted as part of the "deal" for New START ratification. Ultimately, NNSA and the labs may be forced to put less emphasis on large nuclear weapon design and remanufacturing projects (LEPs) and multi-billion production facilities (CMRR and the Uranium Processing Facility). Whereas in the past few years Congress has protected NNSA nuclear weapons programs from sequestration cuts, this does not seem to be the case for FY 2014. All current versions of the proposed CR keep spending at FY 2013 levels, and impose automatic sequester cuts on top of them.

Again, delay is the enemy of NNSA nuclear weapons programs, which causes program costs to rise when the programs are already in jeopardy because of rising costs. The budget forecast is for flat funding or actual cuts until such time as the economy significantly improves and/or the BCA is repealed. Therefore our prospects for success are quite good, and we should make hay while the sun shines.

What DOE nuclear modernization decisions are expected to take place within the next 5 years?

• NNSA will reportedly complete its plutonium disposition strategy assessment before the end of CY 2013, which is suppose to consider alternatives to the Mixed Oxide (MOX) Program and its estimated life cycle costs of >$20 billion. A final supplemental environmental impact statement will follow in Spring 2014, and what the formal Record of Decision will be is in play. Perhaps the most important "decision" for the MOX Program will be in the FY 2015 budget request. MOX will likely wither and die if the Administration again requests $330 million (down from $438 million in FY 2013) or under, which is probable.

• The "son of CMRR" may appear as a line item in NNSA's FY 2015 budget request.[3] It will reportedly be a smaller, modular version of the ~$6 billion Chemistry and Metallurgy Research Replacement Project-Nuclear Facility. More broadly, NNSA will want to make decisions concerning the mix of facilities and upgrades necessary to achieve the production of 30 pits per year by 2021. Plutonium pit production decisions will be deeply intertwined with LEPs decisions.

• As previously discussed NNSA will probably have to make a decision to pursue a cheaper alternative to the B61 LEP, which will be tantamount to victory for us. However, the B61-12 as currently planned is in development and production engineering, with its First Production Unit (FPU) scheduled for FY 2019.

3 In fact, Senate Armed Services Committee staff told this writer that had NNSA and LANL got language to him he would have included "son of CMRR" in the FY 2014 Defense Authorization Act.

• NNSA is conducting a feasibility study on a ~$14 billion W78/W88 LEP that includes an "interoperable" warhead. The agency expects to make a decision to go into development and production engineering in 2017, and its FPU is scheduled for 2025.

•NNSA is beginning to prioritize a cruise missile warhead LEP ahead of the W78/88 LEP. The agency expects to make a decision to go into development and production engineering in 2018, with a FPU as early as FY 2024.

•NNSA is suppose to establish a performance baseline for the out-of-control Uranium Processing Facility (UPF) this fiscal year, which would then lead to a Critical Decision-3 to begin construction in FY 2015. However, this project has been plagued with design problems and a ten-fold increase in costs to $6 billion or more.

How might probable force posture changes affect DOE modernization programs?

First, quantitative reductions to the stockpile are unlikely to impact NNSA's modernization programs, either for the better or for the worse. Force posture changes that would significantly impact NNSA's modernization programs would be decisions to replace a large fraction of the stockpile with "interoperable" warheads and to pursue a new air-launched cruise missile (ALCM), requiring an ALCM warhead life extension program. The first decision (if not the second as well) would also set in motion renewed NNSA efforts to expand plutonium pit production.

Which DOE modernization programs have the most risk, in terms of management and keeping to schedules and costs?

All current programs discussed in this analysis have already exceeded costs and schedules, and will almost certainly continue to do so. The future W78/88 and ALCM warhead life extension programs will no doubt do the same. This is all symptomatic of NNSA's well-established track record of management failure. These programs are further discussed below.

Which program(s) are the most concerning from an arms control perspective?

All of these modernization programs cause great concern from an arms control perspective, and are being increasingly noticed by the international community. Some major concerns are as follows:

• The MOX Program intentionally seeks to introduce plutonium to the global market, while diverting 2/5's of NNSA's Nonproliferation budget from worthy programs that we support, such as the Global Threat Reduction Initiative.

• "Son of CMRR" (or whatever NNSA's plutonium strategy will be) is linked to expanded plutonium pit production. U.S. nuclear weapons production has been severely constrained ever since a FBI raid investigating environmental crimes shut down the Rocky Flats Plant in 1989. It is imperative that we keep plutonium pit production limited to the currently sanctioned cap of 20 pits per year (in reality no stockpile pits are currently being produced or are scheduled to be produced). This choke point constitutes a very real arms control measure that keeps U.S. nuclear weapons production limited, therefore providing a less provocative global example.

• All of the proposed Life Extension Programs seek to extend the service lives of existing nuclear weapons by at least three decades. Further, the B61 LEP will clearly create new military capabilities, contrary to U.S. policy as declared in Obama's Nuclear Posture Review and repeated at the 2010 NPT Review Conference. Moreover, these LEPs could undermine confidence in stockpile reliability because of the major changes they will introduce, which could potentially prompt the U.S. to resume full-scale nuclear weapons testing.

• Pursuit of a new U.S. air-launched cruise missile and related warhead life extension program would indeed be very costly, introduce new military capabilities in violation of the 2010 Nuclear Posture Review, and help give momentum to nuclear ALCM development in other countries as well. Nuclear-armed cruise missiles can be very destabilizing because of their dual-capability.

• New interoperable warhead designs would violate the spirit if not the letter of the Administration's pledge to not develop new nuclear weapons and send the wrong message to the rest of the world.

• The Uranium Processing Facility (UPF) is provocative from an arms control perspective because its first phase is solely dedicated to the production of canned subassemblies for nuclear weapons (AKA "secondaries", which put the "H" in H-bomb). The UPF's mission originally included dismantlements (often used to justify the facility), but that was thrown overboard to save production because of exploding costs. UPF will not have dismantlement capability until 2030, if then, and is expected to operate as a nuclear weapons production facility until 2075. This is provocative in and of itself since the U.S. has told the rest of the world that global nuclear disarmament is a long-term national security goal.

Some Additional Analysis

The Chemistry and Metallurgy Research Replacement (CMRR) Project

The CMRR Project should be put on a watch list as "son of CMRR" may surface in the pending 2015 budget request (scheduled for release in February 2014). At that point it should be evaluated as a priority or not. The follow-on project may be quite modest compared to the original version, and therefore not merit being ranked as a formal priority for the entire budget campaign. However, caution is required, as the future project has been described as "modular" and may therefore be inherently designed for possible rapid expansion. The ultimate goal is to block plutonium pit production from ever being expanded, irrespective of however NNSA and the nuclear weapons labs try to achieve that.

The fate of the whole CMRR project is intertwined with life extension programs, particularly the W78/88 LEP for an interoperable warhead. This LEP proposes to use a W87 pit, some reused and some newly produced. As congressional staff has observed to us, if the W78/88 LEP goes away, then the need for the whole CMRR permanently goes away. But the converse can also be true. Without the full CMRR and related expanded plutonium pit production the aggressive scope of proposed future LEPs is likely not possible. Thus, if "son of CMRR" is in NNSA's FY 2015 budget request it may well deserve priority treatment.

A sub issue concerning plutonium pit production at the Los Alamos National Laboratory (LANL) is proposed upgrades to the 60-year old Radioactive Liquid Waste Treatment Facility (RLWTF). This antiquated, low-tech facility is a single point of failure for LANL's entire nuclear weapons plutonium program. It sits near a seismic fault line, has seriously contaminated Mortandad Canyon, and is the subject of numerous Defense Nuclear Facilities Safety Board concerns. In keeping with NNSA's and LANL's terrible track record of project management, its estimated costs jumped 10-fold while the final design is still not finished. The Lab puts the cart before the horse pushing for additional plutonium facilities before ensuring safety and environmental protection at the RLWTF. While this is clearly a local issue, it can be exploited as a crucial choke point in LANL's plutonium programs.

The Mixed Oxide (MOX) Program

MOX is currently on a downhill spiral, owing its remaining life support to primarily Senator Lindsey Graham. In the name of saving taxpayers money and not throwing good money

after bad, the Budget Campaign should seek to encourage open opposition in the Senate to the program. Needless to say, a visible champion would be good. It would also behoove the Budget Campaign to begin to point out alternatives to MOX, such as immobilization to achieve the laudable goal of disposing of 34 metric tons of weapons-grade plutonium.

The Uranium Processing Facility

The Uranium Processing Facility (UPF) is increasingly vulnerable, mostly because of cost overruns from an original estimate of $600 million to $6.8 billion, while the Army Corps of Engineers has estimated more than $11 billion. These cost increases occurred despite the fact that the UPF's mission was reduced to nuclear weapons secondaries production only, delaying dismantlement capabilities into the indefinite future at additional cost. It has gotten to the point where even Lamar Alexander (R.-TN), ranking minority member of the Senate Energy and Water Appropriations Subcommittee, has said that the UPF cannot expect a blank check.

The UPF was just beginning to regain some momentum after a huge "space-fit" design fiasco that cost an additional half-billion dollars and consumed a third of the facility's contingency fund before ground is even broken. The government shut down interrupted that momentum, probably causing yet more increased costs.

Other UPF vulnerabilities are:

• Continuing questioning by the Defense Nuclear Facilities Safety Board that safety is truly being incorporated into the UPF's design. DNFSB concerns caused dramatic cost escalations for the CMRR project.

• Senator Alexander may feel constrained from offering too vigorous a defense for UPF funding given that he is facing a primary election challenge from the Tea Party.

• There is increased questioning over the claimed need for the production of up to 80 secondaries per year. A preliminary Livermore Lab study reportedly found favorable indications that existing secondaries could be re-qualified and reused. That could possibly be done without ever leaving the Pantex Plant, thereby decreasing transportation and security costs and risks.

• UPF mission need is directly linked to life extension programs that may or may not go forward. But even if LEPs do proceed UPF operations will not start until 2025 at the very earliest, when the proposed life extension programs are suppose to be already substantially underway. This further undermines the claimed need for the UPF.

We need to be clear about our UPF objectives. It may not be possible to kill the project outright, due to the politics of having deferred the CMRR project. Downsizing the facility and redirecting its mission toward dismantlements and possible downblending of Y-12's immense inventory of highly enriched uranium would be laudable goals. However, we shouldn't underestimate NNSA's ability to shoot itself in the foot. If costs continue to escalate and schedules are missed (as they inevitably will be), the more likely it is that the project could collapse of its own weight.

The B61 Life Extension Program

Key Senate staff informs us that there is already infighting within the Air Force about the future of the B61 and whether the cruise missile is more important to themThis may be a productive issue to exploit if budget constraints continue, as is likely. However, care must be taken to not inadvertently argue for the ALCM warhead, which would be a more capable and militarily useful nuclear weapon than the B61-12.

As a subset to this point, there has been some talk about making the B61-12 the warhead for the new cruise missile, but the Senate staffer says

that is very preliminary and wishful thinking. The B61 is not well suited for the environmental conditions and loads of a cruise missile. Additionally, he argues there needs to be sufficient diversity in the stockpile -- you can't make everything a B61. Thus the B61 and a cruise missile warhead should remain two separate issues, hopefully in strong competition with each other.

Defense Appropriations nearly zeroed out the Pentagon's program for a new tail fin guidance kit for the B61-12. This calls into question the combined goals of the two programs, perhaps further undermining NNSA's LEP as proposed. If they don't get the tail kit, then they would not be able to use the B61-4 warhead for the upgrade; in fact, that would strengthen our argument for a cheaper LEP of the B61-7 only.

If NNSA's B61 LEP and DoD's tailfin guidance kit program were to go forward, it would increase the accuracy of the B61-12 bomb compared with current B61 versions and also provide a limited stand-off capability. In addition, the B61-12 will be integrated with the new F-35 fighter-bomber that unlike current nuclear-capable fighter-bombers has stealth capability.

These are new military capabilities that should be made an international issue, especially given their slated forward deployment in Europe. The Budget Campaign should reach out to and inform potential European NGO allies, the New Agenda Coalition, and international delegations in advance of the 2015 Non-Proliferation Treaty (NPT) Review Conference. Instead of being an isolated case, new military capabilities for existing nuclear weapons are becoming the rule, contrary to official U.S. policy. The current LEP for the W76 transforms it into a hard target killer, and a 1997 modification to the B61 bomb created an earth-penetrator. These three cases collectively document a well-defined pattern of new military capabilities. Implicit in many of the planned LEPs are increased performance margins with reductions in yield that STRATCOM believes are enabled by increased accuracy.

The W78/W88 interoperable warhead

The "interoperable" warhead Life Extension Program would be a massive re-design of both the Air Force's W78 warhead for Minuteman III ICBMs and the Navy's SLBM W88 warhead, using elements of both nuclear weapons. As conceived, this warhead "mash up" would include the plutonium pit (core) of a third warhead type, the W87. The NNSA FY 2014 Stockpile Stewardship and Management Plan estimates the cost at $14 billion. However, knowledgeable congressional committee staff estimates its development and production at $28 billion or more. Moreover, because the technologies that the weaponeers propose to put inside the W78/88-1 warhead are themselves "immature" (i.e., not ready for engineering or use), this LEP may easily triple (or more) in cost.

To add to this a recent GAO report has noted that "the Navy has not fully engaged in the effort because (1) other, ongoing modernization programs are higher Navy priorities, and (2) it has concerns about changing the design of the warhead." [4] We understand this understates the Navy's concerns, when the service is actually very skeptical about so-called interoperable warheads. The Navy's lack of keen endorsement can be enough to kill this concept, especially in combination with inevitably exorbitant costs.

This may also be the key to defeating the NNSA's "3+2" strategy, which is a plan "to consolidate the stockpile to three ballistic missile warheads and two airÐdelivered systems." [5] That plan will be astronomically expensive, involving two more interoperable warheads after the W76/W88 LEP. The "3+2" strategy is really a perpetual cycle of life extension programs that will enrich

4 "ICBM Modernization: Approaches to Basing Options and Interoperable Warhead Designs Need Better Planning and Synchronization," GAO-13-831, Sep 20, 2013.

5 NNSA FY 2014 Stockpile Stewardship and Management Plan, page iii.

the nuclear weapons contractors, while possibly undermining confidence in reliability while further straying from the tested pedigree of the stockpile. This should be watched very carefully, as the future of the nuclear weapons labs and the production complex likely rides on the question of whether the "3+2" strategy is implemented or not.

Because of all these vulnerabilities the W78/W88 LEP is an issue in which we can possibly win early and win big. Moreover, this victory could be magnified many times over because it may well bring an end to the NNSA's and labs' pipe dream of two follow-on interoperable warheads. Thus to prevail in the short-term against the interoperable concept could have profound positive impacts on the future of the nuclear weapons complex.

Curatorship of the Nuclear Weapons Stockpile

Which brings us to putting forward something positive, instead of always being against something. Given the current budget crunch and our common desire to prevent what are in effect new nuclear weapons, it is critical to build upon the escalating costs of the increasingly bloated LEPs that are becoming a real threat to responsible maintenance and management of the enduring U.S. stockpile without nuclear testing.

The antidote to Life Extension Programs is simple "curatorship" that seeks to conservatively maintain the nuclear weapons stockpile. Curatorship is technically less risky, will save 100's of billions of dollars, will not create new military capabilities like present LEPs, and better aligns with achieving global nuclear nonproliferation goals.

Curatorship is not a pipe dream. In a 1993 study the Sandia Labs emphatically declared, "It is clear that, although nuclear weapons age, they do not wear out; they last as long as the nuclear weapons community (DoD and DOE) desires. In fact, we can find no example of a nuclear weapons retirement where age was ever a major factor in the retirement decision… Missions, policy, standards, delivery systems, and state-of-technology change; however, nuclear weapons do not wear out." [6]

The loss of underground testing ensuring stockpile reliability was the grand justification for the Stockpile Stewardship Program to begin with, and the necessary lavish appropriations. But all that was essentially built upon a lie. The Sandia Stockpile Life Study explicitly stated, "The Stockpile Evaluation Program does not include underground nuclear testing" and "No defects were discovered in "Stckpl Confid UGT" [Stockpile Confidence Underground Tests]. The Study also found a steep downward curve in the first five years of 28 years' data, in which the overwhelming majority of discovered nuclear weapons defects were design and initial production flaws that were detected and corrected in the first 2 to 5 years of production. In effect, the older nuclear weapons got, the better they were.

This fundamental finding that nuclear weapons do not wear out was reinforced in 2006 when eminent scientists called the JASONs found that plutonium pit cores last at least 85 years, more than double NNSA's previous estimates.[7] This helped lead to congressional rejections of new-design Reliable Replacement Warheads and related expanded plutonium pit production. Subsequent Lawrence Livermore National Laboratory studies found that the plutonium in pits is good for 150 years, without proscribing any end date.

In 2009 the JASONs completed a report on Life Extension Programs that found "no evidence that accumulation of changes incurred from ag-

6 Stockpile Life Study Summary, Sandia National Laboratories, 1993, authors not listed, parenthesis in the original. This quote is from the Summary's only narrative page, which is then followed by 32 viewgraphs. No public electronic copy of the Stockpile Life Study exists other than a scanned version by Nuclear Watch New Mexico at http://www.nukewatch.org/facts/nwd/Sandia_93_StockpileLife.pdf

7 The 2006 JASON Pit Life Study was prompted by a Nuclear Watch NM request to Sen. Jeff Bingaman to legislatively require it, which he successfully did as a floor amendment to the FY 2004 Defense Authorization Act.

ing and LEPs have increased risk to certification of today's deployed nuclear warheads."[8] Our point in including the quote here is to emphasize the lack of changes due to aging, while observing that changes proposed under LEPs have grown dramatically more aggressive since 2009.

Because of the above, NNSA and the labs quit using alleged aging effects in plutonium pits as the primary driver for Life Extension Programs, and instead switched to hinted-at aging effects in nuclear weapons secondaries. However, as previously mentioned, an initial Livermore Lab study reportedly indicates that many secondaries can be re-qualified and/or reused, lessening the need for Life Extension Programs (we are attempting to make that study publicly available).

Curatorship is highly focused on scrupulous stockpile surveillance, maintenance and already well-understood exchange of limited life components (e.g., batteries, neutron generators and tritium reservoirs). In contrast, NNSA has historically under prioritized and chronically underfunded routine stockpile evaluation and maintenance programs. We would change that and give them top priority.

In short, curatorship is the technically correct and surest way to maintain stockpile safety and reliability. On the way to what may be a decades long trajectory toward nuclear disarmament, basic nuclear deterrence can be more than adequately preserved through continuing evaluation and maintenance of the stockpile as it is progressively reduced. Curatorship would be a disciplined approach to genuine "Stockpile Stewardship." This is in sharp contrast to today's corrupted version that intentionally introduces increasing changes morphing into complete new designs, sadly to an extensively tested existing stockpile known to be more reliable than originally thought.

8 http://www.fas.org/rlg/JASON_LEP[1].pdf

Recommended advocacy of curatorship would be an attempt to fundamentally change the way that the nuclear weapons labs and production complex do business.

Various issues to exploit while addressing our NNSA priorities

Addressing our priorities through fiscal issues is always our foundation, and has already brought us more success than expected. Key to further success is funding sequestration and making as much progress as we possibly can before the Budget Control Act is repealed and/or the economy significantly improves. Fortunately we are helped by the fact that the NNSA is so often its own worst enemy, with its terrible track record of project management.

However, there are many others issues that can and should be exploited. They have merit in their own right, but can also be used to undergird our work on our shared top priorities. To list a few, they include:

• Combating unnecessary secrecy, in large part through aggressive use of the Freedom of Information Act;

• Promoting greater contractor accountability, particularly through publicizing the Performance Evaluation Plans and Reports by which they get paid; and

• Debunking the value of nuclear weapons programs for jobs, which at least in name is what drives congressional delegations and local politicians to support those programs. The perceived need for nuclear weapons jobs in relatively poor areas of the country is the glue that holds these programs together at the local level. We will never be able to dramatically shrink nuclear weapons research and productions programs until we are able to effectively counter the "jobs, jobs, jobs" argument. For example, Tom Udall is on record as saying he opposed the Senate Energy and Water cut to the B61 Life Extension Programs because

he wanted to save 200 jobs in New Mexico. That is no way to formulate nuclear weapons policy.

It may be obvious, but we also point out that certain temporal events should be used as focal points, such as annual budget releases, key congressional hearings, the 2014 NATO summit (date TBD), and particularly the Non-Proliferation Treaty Review Conference in May 2015.

Finally, the Ploughshares Fund Budget Campaign has been demonstrably successful in reducing the nuclear weapons budget for its targeted NNSA programs (CMRR-Nuclear Facility, MOX, B61 LEP) by fostering cooperation between well-regarded organizations in the field and those based in Washington, DC. Knowledge and strategy is shared between groups whose focus and membership "watchdog" the nuclear weapons complex and its activities and those whose location and focus is inside the beltway. The Budget Campaign has and should continue to augment and leverage grassroots lobbying from key groups and locations in the field along with that of the DC arms control community. Especially important is the ability to muster a wave of constituent concerns delivered to congressional offices when needed.

The combined efforts of grassroots and DC-based groups creates a synergy that is greater than the sum of its parts. Honing it should be a "process" or capability-building target of the budget campaign during its next phase. This "process" goal will concretely contribute to the Budget Campaign's continuing success in achieving its budget cutting goals for its prioritized NNSA nuclear weapons programs.