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United States Nuclear Modernization Update, April 2019

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As far as can be discerned given classification barriers, US nuclear weapon modernization is largely proceeding as planned, with what appear to be minor delays so far. The first visible exception may come in the Columbia-class submarine program; congressional auditors now see the \$115 billion budget for this program as “overly optimistic” [9]. In addition to Obama’s extensive modernization program, the Trump Administration now seeks at least two additional nuclear weapon capabilities. The first is a low-yield submarine-launched ballistic missile (SLBM) warhead (the W76-2). The W76-2 began formal production in February and will be completed this fiscal year [6,15]; funds for its deployment could still however be blocked by Congress. The second is a sea-launched cruise missile (SLCM), which is undergoing an Analysis of Alternatives (AoA) and has no defined schedule as yet [14]. The Navy may resist this weapon [15].

Tests of two intermediate-range missiles – a ground-launched cruise missile (GLCM) and an intermediate range ballistic missile (IRBM) – are expected in August and November of this year respectively. GLCM deployment reportedly could occur as soon as 18 months if based on the existing Tomahawk system; IRBM deployment would require at least five years [16]. The choice and status of warheads for these proposed missiles is not known. Twelve years ago, the US possessed more than 2,000 intact W80-0 and W80-1 cruise missile warheads [12]; the Long Range Stand Off (LRSO) cruise missile warhead (W80-4) will be a variant of these designs. Any SLCM, if pursued, may use a similar warhead [4,6], and so may any GLCM.

In yet another change, the B83-1 high-yield gravity bomb is now being retained “until a suitable replacement is identified” [14].

Meanwhile the warhead labs, test facilities, and warhead production sites now have parallel operations underway, often in aging legacy facilities which themselves are undergoing extensive modernization (or not), a new and challenging management development that will intensify dramatically in the early 2020s even without the proposed additional weapons. Across the warhead complex, thousands of new technicians are being hired. Some production lines at the Kansas City Plant, where a half million additional square feet of space is being leased, are working around the clock [15].

New scope has been added to (or filled into) existing modernization programs, notably in nuclear command, control, and communication (NC3), in the Ground Based Strategic Deterrent (GBSD) program (including a new reentry vehicle, the Mark21A), in plutonium warhead core (“pit”) production (now at two proposed sites instead of one), in maintenance of existing warheads, and for strategic bombers (new engines for the existing B52s) [4,14,17].

Projected warhead and delivery system schedules appear more or less unchanged from last year, though the provision of new plutonium warhead core (“pit”) production capacity has been delayed 1-2 years for additional studies [13]. Completion of the full scope of NC3 upgrades for silo-based missiles, a high priority for Congress, is now expected only by 2037 [5]. The W76-1 Life Extension Program (LEP), which uses a new fuze to enable greater accuracy and an implied expanded target set for these submarine-launched warheads [10] – and makes the low-yield W76-2 warhead feasible -- was completed in late 2019. The new fuze technology will be added to higher-yield W88 submarine-launched warheads during maintenance operations starting in 2020. It has been procured for existing Minuteman missiles; installation is advanced or complete [5].

Current-year costs and estimated future costs have both risen significantly. In this fiscal year (FY2019), overall nuclear weapons expenditures have risen to about \$34 billion (B) per year [4], up 13% from FY2018. Nuclear weapons now comprise about 4% of \$892 B in overall US defense account spending, a figure expected to rise to 6-7% by the late 2020s [2,4]. Congress’ estimates for nuclear weapons outlays over the coming decade (\$494 B) are 24% higher than they were 2 years ago (\$400 B) [4], not only because the decade ahead now includes more production but also because costs have risen and more modernization elements are included. If production of a SLCM or either of the two proposed intermediate-range missiles are funded they will add to these totals.

The expected overall 30-year cost of US nuclear weapons now exceeds \$2 trillion, if Department of Energy (DOE) estimates of its environmental liabilities and updated weapon costs are used [1,3,8,14], without however including the proposed intermediate-range missiles and their warheads. This year's DOE budget request for nuclear warheads is 12% greater than FY2019's in constant dollars – the 7th year of cost escalation in this work and another all-time US warhead spending record [6,11]. Late 2018 DOE warhead cost estimates imply 25-year costs roughly \$45 B greater than estimated in 2017 [14]. Rapidly-rising deficits and interest payments, and possible implementation of spending limits under the Budget Control Act, or other deficit-limiting initiatives, add to fiscal uncertainty and program competition.

The Trump Administration replaced the Obama “interoperable” warhead (IW) program with an Air Force-only warhead (the W87-1) for GBSB [6]. The W87-1, which like IW would provide multiple-warhead upload capability, requires all new components including the Mark 21A reentry vehicle, and would use new pits, which requires operational pit facilities of sufficient capacity. Acquisition of the B61-12 gravity bomb, the LRSO with its W80-4 warhead, and the B21 “Raider” bomber fleet are for the moment more or less on schedule, as far as can be seen. [5,6,14] There is some visible risk of delay in the Columbia-class ballistic missile submarine program [7].

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