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The Two-Hundred Billion Dollar Boondoggle

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COVER IMAGE: “SENTINEL – THE GROUND BASED STRATEGIC DETERRENT” VIA NORTHUP GRUMMAN.

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Nearly one year after the Pentagon certified the Sentinel intercontinental ballistic missile program to continue after it incurred critical cost and schedule overruns, the new nuclear missile could once again be in trouble.[1]

An April 16th article from Defense Daily broke the news that the Air Force will have to dig new holes for the Sentinel silos.[2] The service had been planning to refurbish the existing 450 Minuteman silos but recently discovered, as noted in a follow-up article from Breaking Defense, that the silos will "largely not be reusable after all."[3] Brig. Gen. William Rogers, the Air Force's director of the ICBM Systems Directorate, cited asbestos, lead paint, and other issues with the existing silos that make refurbishment difficult.[4] Air Force officials also stated that an ongoing study into missileer cancer rates played a role in the decision to build new silos.[5]

This news comes shortly after reports that the Air Force is planning to extend the life of the currently deployed Minuteman III ICBMs until "at least" 2050—roughly 20 years beyond their intended service lives—due to delays in the Sentinel program.[6]

For those who have been tracking the Sentinel development since the Air Force first conceptualized a new ICBM in the early 2010s, the reports of Minuteman life-extension likely made them pause and recall the common refrain from Sentinel proponents over the years that life-extending Minuteman III missiles would be too expensive or even impossible. "You cannot life-extend Minuteman III," then-commander of US Strategic Command Adm. Charles Richard told reporters in 2021.[7] In 2016, the Air Force told Congress that the Minuteman III was aging out, therefore the "GBSD solution" was necessary to ensure the future viability of the ICBM force (GBSD is short for Ground-Based Strategic Deterrent, the programmatic name for the ICBM before Sentinel was chosen in 2022). Air Force officials still maintain that a life-extension program for Minuteman is not possible. In their words, Minuteman will be "sustain[ed] to keep it viable until Sentinel is delivered."[8] Regardless of how the Air Force refers to the effort, it appears that Minuteman III will be made to operate well beyond its planned service life.

For some, like our team at the Federation of American Scientists' Nuclear Information Project, Sentinel's newest struggles came as no surprise at all. For years, it has been clear to observers that this program has suffered from chronic unaccountability, overconfidence, poor performance, and mismanagement. Project benchmarks were cherry-picked, viable alternatives were prematurely dismissed, competition was discouraged, and goalposts were continuously moved. Ultimately, it will be U.S. taxpayers who pay the increasingly rising costs, and other—more critical—priorities will suffer as Sentinel continuously sucks money away from other programs.

It comes as no surprise that Sentinel was specifically named in the White House's recent memo requiring all Major Defense Acquisition Programs more than 15% over-budget or behind schedule to be "reviewed for cancellation;"

1 U.S. Department of Defense, "Department of Defense Announces Results of Sentinel Nunn-McCurdy Review," 8 July 2024, https://www.defense.gov/News/Releases/Release/Article/3829985/department-of-defense-announces-results-of-sentinel-nunn-mccurdy-review/ ; Mackenzie Knight-Boyle, "'Critical' Overrun of Sentinel ICBM Program Demands Government Transparency" *Federation of American Scientists* (2 February 2024), https://fas.org/publication/critical-sentinel-overrun/

2 Frank Wolfe, "Sentinel To Have New Silos, Air Force Leaders Tell Town Halls," *Defense Daily* (16 April 2025), https://www.defensedaily.com/sentinel-to-have-new-silos-air-force-leaders-tell-town-halls/nuclear-modernization/

3 Michael Marrow, "Air Force now expects Sentinel ICBMs will 'predominantly' need new silos," *Breaking Defense* (5 May 2025), https://breakingdefense.com/2025/05/air-force-now-expects-sentinel-icbms-will-predominantly-need-new-silos/

4 Jenn Rowell, "Sentinel design progressing; Air Force decides on new silos for new missile," *The Electric* (15 May 2025), https://theelectricgf.com/2025/05/15/sentinel-design-progressing-air-force-decides-on-new-silos-for-new-missile/

5 Rowell, "Sentinel design progressing."; U.S. Air Force Medical Service, "Missile Community Cancer Study," *U.S. Air Force*, https://www.airforcemedicine.af.mil/Resources/Missile-Community-Cancer-Study/

6 Sarah Salem, "Last Minuteman III Decommissioned 2050 or Later, W87 Non-Sentinel Test Within Year," *Defense Daily* (27 January 2025), https://www.defensedaily.com/last-minuteman-iii-decommissioned-2050-or-later-w87-non-sentinel-test-within-year/

7 Valerie Insinna, "US Strategic Command chief defends ICBM replacement program," *Defense News* (6 January 2021), https://www.defensenews.com/air/2021/01/06/us-strategic-command-head-defends-icbm-replacement-program/

8 Greg Hadley, "USAF 'Absolutely Committed' to Keep Minuteman Going While Sentinel Is Delayed," *Air & Space Forces Magazine* (15 July 2024), https://www.airandspaceforces.com/usaf-absolutely-committed-minuteman-iii/

Sentinel is the poster-child for inefficiency, which the administration claims to be obsessed with eliminating.[9] In order to prevent this type of mismanagement for future programs, we must first understand how Sentinel went so wrong.

How We Got Here

The Federation of American Scientists has been intensively tracking the progress of the Sentinel program for years. Throughout the acquisition process, the Air Force clung to its fundamental and counterintuitive assumption that building an entirely new ICBM from scratch would be cheaper than life-extending the current system. We now know that this assumption was wildly incorrect, but how did it reach this point?

Cherry-picked project benchmarks

When seeking to plug a capability gap, the Pentagon is required to consider a range of procurement options before proceeding with its acquisition. This process takes place over several years and culminates in an "Analysis of Alternatives"—a comparative evaluation of the operational effectiveness, suitability, risk, and life-cycle costs of the various options under consideration. This assessment can have tremendous implications for an acquisition program, as it documents the rationale for recommending a particular course of action.

The Air Force's Analysis of Alternatives for the program that would eventually become Sentinel was conducted between 2013 and 2014, and concluded that the costs of pursuing a Minuteman III life-extension would be nearly the same as those projected for Sentinel.[10] Crucially, this cost comparison was pegged to a predetermined requirement to continue deploying the same number of missiles until the year 2075.[11]

These benchmarks, despite having no apparent inalterable national security imperative, appear to have played a significant role in shaping perceptions of the two options. While it is now clear that Minuteman III could be—and likely will be—life-extended for several more decades, the Air Force does not have enough airframes to keep at least 400 of them in service through 2075 and maintain the testing campaign needed to ensure reliability. As a result, in order to push the ICBM force beyond 2075, the Air Force would need to life-extend Minuteman III and pursue a follow-on system after that point.

This was reportedly reflected in the Air Force's cost analysis, which explains why the cost of the Minuteman III life-extension option was estimated by the Air Force to be roughly the same as the cost of building an entirely new ICBM.[12] The service was not simply comparing the costs of a life-extension and a brand-new system; it was instead comparing the costs of pursuing Sentinel immediately on the one hand, versus a Minuteman III life-extension and development of a follow-on system on the other hand.

Of course, policymakers require benchmarks in order to make estimates: it would not be reasonable to analyze the feasibility of a particular system without considering how long and at what level that system needs to perform.

9 The White House, "Fact Sheet: President Donald J. Trump Modernizes Defense Acquisitions and Spurs Innovation in the Defense Industrial Base," 9 April 2025, https://www.whitehouse.gov/fact-sheets/2025/04/fact-sheet-president-donald-j-trump-modernizes-defense-acquisitions-and-spurs-innovation-in-the-defense-industrial-base/

10 United States Air Force, "Cost Comparison of Extending the Life of the Minuteman III Intercontinental Ballistic Missile to Replacing it with a Ground-Based Strategic Deterrent," Department of Defense (July 2016), p. 7.

11 Todd Harrison, "Options for Ground-Based Leg of the Nuclear Triad," Center for Strategic & International Studies (September 2017), p. 19, https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/170921_Harrison_OptionsGroundBasedLegNuclearTriad.pdf?_q2TQEeJsoYEGK0hBv.6Nm6kHAiWq2nx

12 Todd Harrison, "Options for Ground-Based Leg of the Nuclear Triad," Center for Strategic & International Studies (September 2017), p. 19, https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/170921_Harrison_OptionsGroundBasedLegNuclearTriad.pdf?_q2TQEeJsoYEGK0hBv.6Nm6kHAiWq2nx

However, in the case of the Sentinel, selecting those particular benchmarks at the beginning of the process essentially pre-baked the analysis before it even began in earnest.

Let's say a different evaluation benchmark had been selected—2050, for example, rather than 2075.

In January 2025, Defense Daily reported that the Air Force would likely have to keep portions of the Minuteman III fleet in service until 2050 or later.[13] This may require altering certain aspects of the Minuteman III's deployment—such as reducing the number of deployed ICBMs or annual test launches in order to preserve airframes. While no final decisions have been made, the Air Force is clearly evaluating continued reliance on Minuteman III as a potential option, despite years of high-ranking military and political officials stating that doing so was impossible.[14]

Benchmarking the cost analysis at 2050 rather than 2075 would have thus yielded wildly different results. In 2012, the Air Force admitted that it cost only $7 billion to modernize its Minuteman III ICBMs into "basically new missiles except for the shell."[15] While getting those same missiles past 2050 would certainly add additional cost and complexity—particularly to replace parts whose manufacturers no longer exist—it is unfathomable that the costs would come anywhere close to those of the Sentinel program, which was estimated by the Pentagon's Director of Cost Assessment and Program Evaluation (CAPE) in 2020 (before the critical cost overrun) to have a total lifecycle cost of $264 billion in then-year dollars.

It is particularly troubling that very few public or independent government-sponsored analyses were conducted to look into the Sentinel program's flawed assumptions, nor the realistic possibility of a Minuteman III life-extension. Countless congressional and non-governmental attempts to push for one were stymied at every turn. In 2019, for example, dozens of lobbyists from the Sentinel contract bidders successfully helped to eliminate a proposed amendment to the National Defense Authorization Act calling for an independent study on a Minuteman III life-extension program.[16]

The most comprehensive public study on this issue was a 2022 report published by the *Carnegie Endowment for International Peace* under contract from the Pentagon; however, the study noted that "the iterative process through which we received information, the unclassified nature of our study, and the limited time available for investigating DOD conclusions left us unable to assess the DOD's position regarding the technical and cost feasibility of an extended Minuteman III alternative to GBSD;" the authors ultimately concluded that a more detailed technical analysis was required in order to answer these questions.[17]

While the findings of such a study will never be known, it is likely that they would have supported what was clear to government watchdogs at the time and has been validated in spades since then: the assumptions baked into this program were flawed from the start, and the system's costs would be significantly larger than initially expected. Given that the Pentagon ultimately went in the opposite direction, taxpayers are now on the hook for both a de facto Minuteman III life-extension program as well as the substantial costs associated with acquiring Sentinel—with limited further possibilities for near-term cost mitigation.

13 Salem, "Last Minuteman III."

14 Sandra Erwin, "Head of U.S. Strategic Command blasts GBSD critics: 'Minuteman 3 cannot be life-extended'," *Space News* (5 January 2021), https://spacenews.com/head-of-u-s-strategic-command-blasts-gbsd-critics-minuteman-3-cannot-be-life-extended/; Mike Rogers, "Rogers: We Need to Replace Aging Minuteman III Icbms," *U.S. House Armed Services Committee* (3 November 2023), https://armedservices.house.gov/news/documentsingle.aspx?DocumentID=1769

15 Carla Pampe, "Life Extension Programs modernize ICBMs," *U.S. Air Force Global Strike Command Public Affairs* (25 October 2012), https://www.af.mil/News/Article-Display/Article/110241/life-extension-programs-modernize-icbms/

16 William Hartung, "Inside the ICBM Lobby: Special Interests or the National Interest?" Center for International Policy (March 2021), https://3ba8a190-62da-4c98-86d2-893079d87083.usrfiles.com/ugd/3ba8a1_89fe183f8a164e22a2fa29d4d6381d7b.pdf; U.S. House of Representatives, "FINAL VOTE RESULTS FOR ROLL CALL 454," 11 July 2019, https://clerk.house.gov/evs/2019/roll454.xml

17 Toby Dalton, et al., "Assessing U.S. Options for the Future of the ICBM Force," *Carnegie Endowment for International Peace* (7 September 2022), https://carnegieendowment.org/research/2022/09/assessing-us-options-for-the-future-of-the-icbm-force?lang=en

Failure to predict the true costs and needs of the program

In addition to the cherry-picked benchmarks that tipped the scales towards a brand-new ICBM, when comparing costs the Air Force made a key error in its assumptions: it assumed that the Sentinel would be able to reuse much of the original Minuteman launch infrastructure.

Some level of infrastructure modernization for the Sentinel was always planned, including building entirely new launch control centers and additional infrastructure for the launch facilities.[18] However, the original plans called for reusing existing copper command and control cabling and the refurbishment—not reconstruction—of 450 silos. Both assumptions have proven incorrect, and perhaps more than anything else, now represent the single greatest driver of Sentinel's skyrocketing costs.

While both the current cabling and launch facilities work fine for the existing Minuteman III and would presumably function similarly following a life-extension, they are apparently incompatible with Sentinel's increasingly complex design.

The Air Force must now dig up and replace 7,500 miles of cabling with the latest fiber optic cables. Much of these cables are buried underneath private property, meaning that local landowners must lease 100-foot-wide lines on their property to the Pentagon to be dug up for multi-year periods.[19]

In addition, both the Air Force and Northrop Grumman have now recognized that it will take more than simple refurbishments to make the existing Minuteman III launch facilities compatible with Sentinel. Both the service and the contractor have stated that several of the assumptions regarding the conversion process that went into the 2020 baseline review have now proved to be incorrect.[20]

As a result, the Air Force is apparently now planning to build entirely new launch facilities to house the Sentinel, most of which will require digging new holes in the ground.[21] As one Northrop Grumman official explained, "When you multiply that by 450, if every silo is a little bit bigger or has an extra component, that actually drives a lot of cost because of the sheer number of them that are being updated."[22] It is unclear whether the costs will increase beyond the new estimate released with the Nunn-McCurdy decision, but the program is clearly trending in the wrong direction.

The Air Force had been publicly teasing the prospect of digging new holes for nearly a year. At the Triad Symposium in Washington, D.C., in September 2024, Maj. Gen. Colin Connor, director of ICBM Modernization at Barksdale Air Force Base, responded to an audience question about the new silos rumor by saying, "we're looking at all of our options." Despite the noncommittal answer, the decision to dig new silos seems to have already been made by the time of Connor's statement.

Firstly, it has since been revealed that the estimated costs of the new silos were included in the Nunn-McCurdy review process which concluded in July 2024. Additionally, although the decision was not made public until the April 16 Defense News article, Northrop Grumman may have inadvertently revealed the news much earlier. Included in the gallery of images of the Sentinel program on Northrop's website is a digital mockup of a Sentinel launch facility. The first version of the image (see Figure A below) illustrates the Air Force's original plan to refurbish the Minuteman III silos for Sentinel, with a key indicating the silo and silo lid as "Reclaimed MMIII Facilities." A newer version of the image (see Figure B below) was uploaded to the gallery as early as February 2024 and shows the entire launch facility—including the silo and silo lid—as "New Sentinel Facilities."

18 Stephen Losey, "Northrop says Air Force design changes drove higher Sentinel ICBM cost," *Defense News* (28 March 2024), https://www.defensenews.com/industry/2024/03/28/northrop-says-air-force-design-changes-drove-higher-sentinel-icbm-cost/; Northrop Grumman, Sentinel Photo and Video Gallery, "Future Sentinel Launch Facility."

19 Noah Zahn, "Landowners seek answers on impacts of Sentinel project," *Buffalo Bulletin* (4 April 2025), https://www.buffalobulletin.com/news/landowners-seek-answers-on-impacts-of-sentinel-project/article_95e69e29-b1dd-4bf9-920d-772f03178636.html

20 Losey, "Northrop says."

21 Wolfe, "Sentinel to Have New Silos."

22 Losey, "Northrop says."

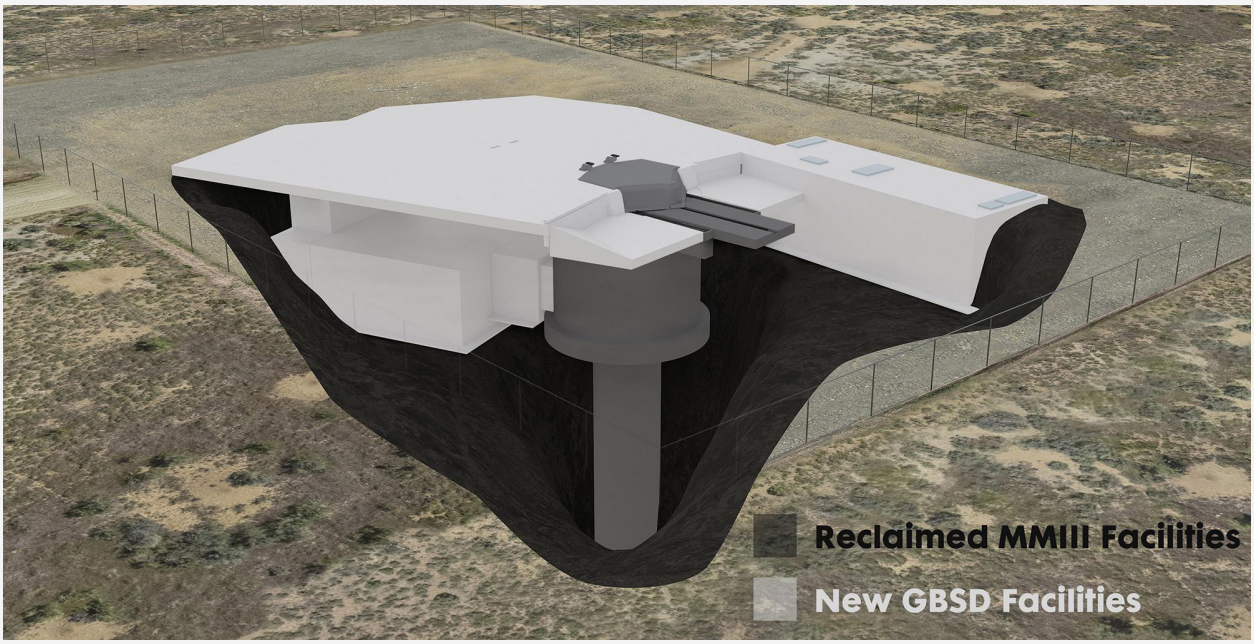

FIGURE A: ORIGINAL RENDERING OF SENTINEL LAUNCH FACILITY. (SOURCE: NORTHROP GRUMMAN)

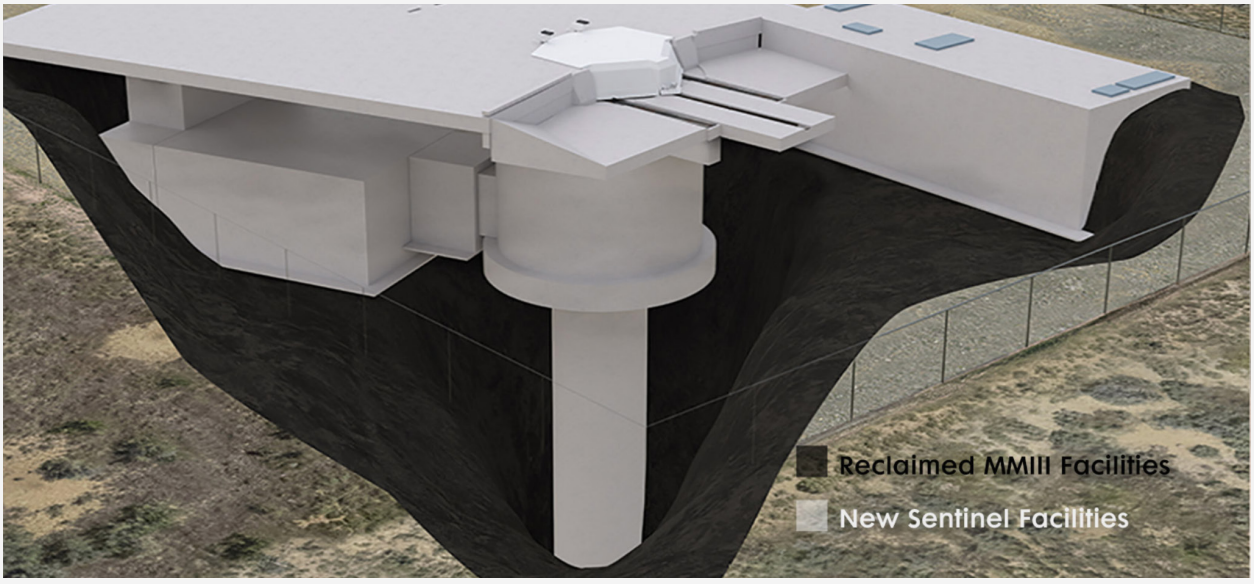

FIGURE B: NEW RENDERING OF SENTINEL LAUNCH FACILITY. (SOURCE: NORTHROP GRUMMAN)

Unwarranted overconfidence

Despite the clear concerns outlined above, the Pentagon was remarkably confident in its and Northrop Grumman's abilities to deliver the Sentinel on-time and on-budget.

In September 2020, the Pentagon delivered its Milestone B summary report to Congress—a key decision point at which acquisition programs are authorized to enter the Engineering and Manufacturing Development phase,

considered to be the official start of a program. The Milestone B report included an estimate of $95.8 billion in then-year dollars to acquire the Sentinel—a significant increase from previous estimates, but not yet the dire situation that we find ourselves in today (Figure C).

DoD's Estimates of Total Costs of the Sentinel Program, by Appropriation Title

Millions of 2020 dollars

	Program baseline (2020)	FY2024 SAR	FY2025 SAR	Post-NM
		Total program costs		
RDT&E	22,978	21,235	28,894	N.A.
Procurement	47,858	43,546	57,665	N.A.
MILCON	6,904	6,342	18,950	N.A.
Acquisition O&M	0	0	918	N.A.
Total	**77,740**	**71,123**	**106,427**	**140,900**
		Increase relative to program baseline		
Amount	n.a.	-6,617	28,687	63,160
Percent	n.a.	-9	37	81
		Unit costs and quantities		
Total quantity	659	659	659	659
Procurement quantity	634	634	634	634
Program average unit cost	118	108	161	214
Average procurement unit cost	75	69	91	N.A.

Source: Congressional Budget Office, using data from the Department of Defense and the Department of Energy. See www.cbo.gov/publication/61224#data.

DoD = Department of Defense; FY = fiscal year; MILCON = military construction; NM = Nunn–McCurdy; O&M = operation and maintenance; RDT&E = research, development, test, and evaluation; SAR = Selected Acquisition Report; n.a. = not applicable; N.A. = not available.

FIGURE C: THE ABOVE TABLE FROM THE CONGRESSIONAL BUDGET OFFICE SHOWS THE COST GROWTH FOR THE SENTINEL'S ACQUISITION PROGRAM BETWEEN THE SENTINEL'S MILESTONE B ASSESSMENT IN 2020 AND THE POST-NUNN-MCCURDY REVIEW PROCESS IN 2025. ALL COSTS ARE REFLECTED IN FY2020 DOLLARS TO ALLOW FOR AN ACCURATE COMPARISON BETWEEN YEARS.

We now know, however, based on recent statements from Pentagon and Air Force officials, that there were "some gaps in maturity" in the Milestone B report.[23] Specifically, "in September of 2020, the knowledge of the ground-based segment of this program was insufficient in hindsight to have a high-quality cost estimate." What this means is that at the most consequential stage of the program to-date, it was approved without a comprehensive understanding of the likely cost growth.

Furthermore, the Air Force was heavily delayed in creating an integrated master schedule for the Sentinel program. An integrated master schedule includes the planned work, the resources necessary to accomplish that work, and the associated budget; from the government's perspective, it is considered to be the keystone for program management.[24] Although the Under Secretary of Defense for Acquisition and Sustainment testified to Congress that "By the time you're six months after Milestone B, you should have an integrated master schedule," the Air Force had not met this mark.[25] If the Air Force did manage to create such a schedule, it became obsolete with the Nunn-McCurdy Act's requirement to restructure the program and rescind its Milestone B approval.

23 U.S. Department of Defense, "DOD Press Briefing Announcing Sentinel ICBM Nunn-McCurdy Decision," 8 July 2024, https://www.defense.gov/News/Transcripts/Transcript/Article/3830251/dod-press-briefing-announcing-sentinel-icbm-nunn-mccurdy-decision/

24 U.S. Government Accountability Office, Report GAO-16-89G, "Schedule Assessment Guide: Best Practices for Project Schedules," December 2015, https://www.gao.gov/assets/d1689G.pdf

25 U.S. House Armed Services Committee, "20240430 STR Hearing: FY25 Budget Request for Nuclear Forces and Atomic Energy Defense Activities," Youtube (30 April 2024), https://wwwyoutube.com/watch?v=dtJKialms0s

During that same hearing, the Air Force's Deputy Chief of Staff for Strategic Deterrence and Nuclear Integration also admitted that at that time, the service had been experiencing poor communication with Northrop Grumman, the primary contractor for the ICBM.

Performance issues also appear to have had an impact on the program. In June 2024, the Air Force removed the colonel in charge of its Sentinel program—reportedly for a "failure to follow operational procedures"—and replaced him with a two-star general, with the rank change indicating a need for greater high-level attention.[26]

Throughout this time, the Air Force remained overconfident in its abilities to deliver the program; in December 2020, the Assistant Secretary of the Air Force for Acquisition, Technology, and Logistics told reporters that the Air Force had "godlike insight into all things GBSD."[27] And in September 2022, the Air Force Major General responsible for Sentinel's strategic planning and requirements said in a Breaking Defense interview that the program was "on cost, on schedule, and the acquisition program baseline is being met."[28]

Given everything we now know about the state of the Sentinel program, these statements were either clear obfuscations or just pure fantasy.

Non-competitive disadvantages

When addressing concerns about the rising projected costs of the Sentinel program, Air Force leaders were confident that a competitive and healthy industrial base would be able to keep the overall price tag down. As Gen. Timothy Ray, then-Commander of Air Force Global Strike Command, told reporters in 2019, "our estimates are in the billions of savings over the lifespan of the weapon."[29]

These expected savings clearly never materialized, however, nor did the Pentagon help facilitate the conditions for them to be realized. In March 2018, the Air Force Nuclear Weapons Center submitted a document justifying its intention to restrict competition for the Sentinel contract to just two suppliers—Boeing and Northrop Grumman—stating that this limitation would still constrain costs because the two companies would be in competition with one another.[30]

However, this specter of competition evaporated when Boeing withdrew from the competition following Northrop Grumman's acquisition of Orbital ATK—one of two independent producers of large solid rocket motors left in the US market.[31] As these motors are necessary to make ICBMs fly, the merger put Northrop Grumman in the driver's seat: it could restrict access to those motors from Boeing, thus tanking its competitor's chances at the Sentinel bid.

Doing so would not have been allowed by the terms of the Federal Trade Commission, which pernmitted the merger in 2018 but subsequently investigated it in 2022 under the Biden administration, and also subsequently

26 Anthony Capaccio, "Air Force Ousts Head of Its Troubled $131 Billion ICBM Program," *Bloomberg* (25 June 2024), https://www.bloomberg.com/news/articles/2024-06-25/air-force-ousts-head-of-its-troubled-131-billion-icbm-program; Armed Services Committee, "20240430 STR Hearing."

27 John Harper, "Next-Gen Nuclear Missile Viewed as Pathfinder," *National Defense* (4 December 2020), https://www.nationaldefensemagazine.org/articles/2020/12/4/next-gen-nuclear-missile-viewed-as-pathfinder

28 Barry Rosenberg, "Sentinel and Raider: Where these two legs of the nuclear triad stand today," *Breaking Defense* (21 September 2022), https://breakingdefense.com/2022/09/sentinel-and-raider-where-these-two-legs-of-the-nuclear-triad-stand-today/

29 Valerie Insinna, "Air Force's next-gen ICBM program takes another step forward," *Defense News* (17 July 2019), https://www.defensenews.com/2019/07/17/air-forces-next-gen-icbm-program-takes-another-step-foward/

30 "Justification and Approval (J&A) for Other Than Full and Open Competition," GBSD program document approved by William B. Roper, Jr., Assistant Secretary of the Air Force for Acquisition, Technology & Logistics (26 February 2019), p. 5

31 U.S. Department of Defense, "Fiscal Year 2019 Industrial Capabilities Report to Congress," 23 June 2020, https://www.businessdefense.gov/docs/resources/USA000954-20_RPT_Subj_FY19_ICR_07092020.pdf

blocked a similar attempted merger between Lockheed Martin and Aerojet Rocketdyne that same year.[32] However, the Pentagon, which had initially included non-exclusionary and pro-competition language in its requirements for an earlier phase of the Sentinel contract, removed that language from future phases.[33] By refusing to wield its own power to preserve competition—initially a key driver for promoting Sentinel over a Minuteman III life-extension—the Air Force essentially left the state of the competition in Northrop Grumman's hands. According to Boeing's CEO, Northrop Grumman subsequently slow-walked the process of hammering out a competition arrangement with Boeing—apparently not leaving enough time for Boeing to negotiate a competitive price for solid rocket motors before the Sentinel deadline.[34]

As a result, Boeing pulled out of the competition altogether, and the Air Force awarded the Sentinel engineering and manufacturing development contract to Northrop Grumman through an unprecedented single-source bidding process. As the Under Secretary of Defense for Acquisition and Sustainment admitted during 2024 testimony to Congress, what this amounted to was that "effectively there was not, at the end of the day, competition in this program."[35]

Reflecting on the Sentinel procurement process, House Armed Services Committee chairman Adam Smith—who has a sizable Boeing presence in his home state of Washington—suggested in October 2019 that the Air Force is "way too close to the contractors they are working with," and implied that the service was biased towards Northrop Grumman.[36]

Predictably, the evaporation of competition has coincided with skyrocketing Sentinel acquisition costs. In July 2024, the Air Force's acquisition chief Andrew Hunter reportedly told reporters that the Air Force was considering reopening parts of the Sentinel contract to bids. "I think there are elements of the ground infrastructure where there may be opportunities for competition that we can add to the acquisition strategy for Sentinel," Hunter said.[37]

The Nunn-McCurdy Saga

In January 2024, the Air Force notified Congress that the Sentinel program had incurred a critical breach of the Nunn-McCurdy Act, legislation designed to keep expensive programs in check.[38] One week after notifying Congress of the breach, the Air Force fired the head of the Sentinel program, but said the move was "not directly related" to the Nunn-McCurdy breach.[39]

32 Federal Trade Commission, Decision and Order Docket No. C-4652 [Public Record Version], https://www.ftc.gov/system/files/documents/cases/181_0005_c-4652_northrop_grumman_orbital_atk_modified_decision_and_order_12-4-18.pdf; Josh Sisco and Lee Hudson, "FTC turns up the heat on Trump-era defense merger," *Politico* (22 July 2022), https://www.politico.com/news/2022/07/22/ftc-turns-up-the-heat-on-trump-era-defense-merger-00047452; Holly Vedova, "Statement Regarding Termination of Lockheed Martin Corporation's Attempted Acquisition of Aerojet Rocketdyne Holdings Inc.," Federal Trade Commission (15 February 2022), https://www.ftc.gov/news-events/news/press-releases/2022/02/statement-regarding-termination-lockheed-martin-corporations-attempted-acquisition-aerojet

33 Aaron Mehta, "Labor Costs, Data Questions Driving ICBM Replacement Cost Estimate," Defense News (4 November 2016), https://www.defensenews.com/space/2016/11/04/labor-costs-data-questions-driving-icbm-replacement-cost-estimate/; Sara Sirota, "DOD will not require use of both LSRM providers for GBSD," *Inside Defense* (4 June 2019), https://insidedefense.com/daily-news/dod-will-not-require-use-both-lsrm-providers-gbsd

34 Valerie Insinna, "Boeing drops from next-generation ICBM competition," Defense News (25 July 2019), https://www.defensenews.com/space/2019/07/25/boeing-drops-from-next-generation-icbm-competition/

35 Armed Services Committee, "20240430 STR Hearing."

36 Joe Gould, "House Armed Services chairman takes aim at Air Force's handling of ICBM replacement program," *Defense News* (24 October 2019), https://www.defensenews.com/congress/2019/10/24/hasc-chair-takes-aim-at-air-forces-handling-of-icbm-replacement-program/

37 Audrey Decker, "ICBM cost overrun a 'collective failure' of USAF, Northrop, DOD: Air Force's chief buyer," *Defense One* (5 September 2024), https://www.defenseone.com/threats/2024/09/icbm-cost-overrun-collective-failure-usaf-northrop-dod-air-forces-chief-buyer/399315/

38 John A. Tirpak, "New ICBM Has 'Critical' Cost and Schedule Overruns, Needs SecDef Certification to Continue," *Air & Space Forces Magazine* (18 January 2024), https://www.airandspaceforces.com/new-icbm-critical-cost-schedule-overruns/

39 Capaccio, "Air Force Ousts Head."

At the time of the notification, the Air Force stated that the program was 37% over budget and two years behind schedule. Six months later, after conducting the cost reassessment mandated by Nunn-McCurdy, the Pentagon announced that the Sentinel program would cost 81% more than projected and be delayed by *several* years.[40] Nevertheless, the Secretary of Defense certified the program to continue.

Per the requirements of the Nunn-McCurdy Act, the Under Secretary of Defense for Acquisition and Sustainment, who serves as the Milestone Decision Authority for the program, rescinded Sentinel's Milestone B approval, which is needed for a program to enter the engineering and manufacturing development phase.[41] The Air Force must restructure the program to address the root cause of the cost growth before receiving a new milestone approval, a process the service has said will take approximately 18 to 24 months.[42]

Where Sentinel Stands Now

Work on the Sentinel program has continued while the Air Force carries out the restructuring effort, but the government can't seem to decide whether things are going well or not.

On February 10, the Air Force told Defense One that parts of the Sentinel program had been "suspended."[43] Due to "evolving" requirements related to Sentinel launch facilities, the Air Force instructed Northrop Grumman to halt "design, testing, and construction work related to the Command & Launch Segment." There has been no indication of when the stop work order will be lifted. Nevertheless, during an April 10 Air Force town hall on Sentinel in Kimball, Nebraska, Wing Commander of F.E. Warren AFB Col. Johnny Galbert told attendees that Sentinel "is not on hold; it is moving forward."[44]

Just under one month after the stop work order was made, the Air Force announced that the Sentinel program had achieved a "modernization milestone" with the successful static fire test of Sentinel's stage-one solid rocket motor.[45] The test marked the successful test firing of each stage of Sentinel's rocket motor after the second and third stages were tested in 2024.

On March 27, the same day Bloomberg reported that the Air Force was considering a life-extension program for Minuteman III missiles, President Trump's nominee for Secretary of the Air Force (confirmed by the Senate on May 13), Troy Meinke, committed in his testimony to pushing Sentinel over the finish line, calling the program "foundational to strategic deterrence and defense of the homeland."[46] During the same hearing, Trump's nominee for undersecretary of Defense for acquisition and sustainment, Michael P. Duffey, also shared his support for the Sentinel program, saying "nuclear modernization is the backbone of our strategic deterrent," and endorsing Sentinel as "critical." Yet, two weeks later, on April 9, President Trump signed an executive order to address defense acquisition programs that mandates, "any program more than 15% behind schedule or 15% over cost will be

40 U.S. Department of Defense, "DOD Press Briefing."
41 U.S. Department of Defense, "Department of Defense Announces."
42 U.S. Department of Defense, "DOD Press Briefing."
43 Audrey Decker, "Air Force has halted work on parts of its ICBM program," *Defense One* (10 February 2025), https://www.defenseone.com/defense-systems/2025/02/air-force-halted-work-parts-new-icbm-program/402897/
44 Daria Anderson-Faden, "Sentinel 'Not On Hold,' Moving Forward," *Western Nebraska Observer* (10 April 2025), https://www.westernnebraskaobserver.net/story/2025/04/10/news/sentinel-not-on-hold-moving-forward/10025.html
45 U.S. Air Force, "Sentinel ICBM achieves modernization milestone with stage-one solid rocket motor test," *Air Force Nuclear Weapons Center* (7 March 2025), https://www.af.mil/News/Article-Display/Article/4112318/sentinel-icbm-achieves-modernization-milestone-with-stage-one-solid-rocket-moto/
46 U.S. Air Force, "Senate confirms Meink to be nation's 27th Air Force Secretary," *Secretary of the Air Force Public Affairs* (13 May 2025), https://www.af.mil/News/Article-Display/Article/4184545/senate-confirms-meink-to-be-nations-27th-air-force-secretary/; Greg Hadley, "SECAF Nominee Meink Pledges Support for Sentinel ICBM," *Air & Space Forces Magazine* (27 March 2025), https://www.airandspaceforces.com/air-force-secretary-nominee-sentinel-icbm/

scrutinized for cancellation."[47] This places Sentinel well beyond the threshold for potential cancellation, and the White House fact sheet detailing the order explicitly called out Sentinel's cost and schedule overruns.

The next day, the Air Force announced that another "key milestone" for the Sentinel program had been met with the stand-up of Detachment 11 at Malmstrom AFB, which will oversee implementation of the Sentinel program at the base.[48] But of course, less than thirty days later, Sentinel took a major blow with the Air Force's admittance that hundreds of new silos would have to be dug up and constructed for the new ICBM.

The Government Accountability Office's (GAO) latest Weapon Systems Annual Assessment from June 11 reports that Sentinel's costs "could swell further" as the Air Force "continues to evaluate its options and develop a new schedule as part of restructuring efforts." The assessment also notes that the Sentinel program alone accounted for over $36 billion of the $49.3 billion increase from 2024 to 2025 in GAO's combined total estimate of major defense acquisition program costs, and noted that the first flight test now would not take place until March 2028.[49] In a sweeping criticism of the program, the GAO report notes that the continued immaturity of the program's critical technologies more than 4 years into its development phase "calls into question the level of work required to mature these technologies and the validity of the cost estimate used to certify the program."[50]

450 Money Pits

We probably will never know how much money could have been saved if the Air Force had elected from the beginning to life-extend the existing ICBMs rather than build an entirely new system from scratch. The opportunity to have a proactive, independent cost comparison and corresponding public debate was eliminated through intense rounds of Pentagon and industry lobbying. But we certainly now know that the Air Force's assertion—that the Sentinel would be cheaper and easier than a life-extension—was wrong, and that the suppression of an independent review contributed to these rising costs.

The Sentinel saga, with its seemingly unending series of setbacks and continued uncertainties, begs a crucial question: what incentives exist for the Air Force to get it right? That the program, along with numerous other nuclear modernization programs, was green-lighted to continue despite ever-increasing cost and schedule delays exposes a major flaw in U.S. nuclear weapons acquisition programs—they are too big to fail. The government, evidently, will always write a bigger check, will always move the goalposts, because the alternative is either failing to maintain the U.S. strategic deterrent or admitting that U.S. nuclear strategy and force structure is not as immutable and unquestionable as the public has been made to believe. In such a system of blank checks and industry lobbying, what incentivizes the Pentagon to ensure programs are as cost efficient as possible? The only mechanism for oversight and accountability is Congress. Congress must increase oversight of nuclear modernization programs like Sentinel to ensure a limit is placed on how much taxpayer money can be spent on failing programs in the name of national security.

47 The White House, "Fact Sheet."
48 U.S. Strategic Command, "Sentinel Site Activation Task Force, Detachment 11 stood up at Malmstrom," *341st Missile Wing Public Affairs* (10 April 2025), https://www.stratcom.mil/Media/News/News-Article-View/Article/4152643/sentinel-site-activation-task-force-detachment-11-stood-up-at-malmstrom/
49 U.S. Government Accountability Office, GAO-25-107569, "Weapon Systems Annual Assessment: Report to Congressional Committees," June 2025, https://www.gao.gov/assets/gao-25-107569.pdf
50 U.S. Government Accountability Office, "Weapon Systems Annual Assessment."

Appendix: Sentinel ICBM Milestone B Summary, Retrieved through Freedom of Information Act

DEPARTMENT OF DEFENSE
FREEDOM OF INFORMATION DIVISION
1155 DEFENSE PENTAGON
WASHINGTON, DC 20301-1155

Ref: 21-F-0065
November 24, 2020

Matt Korda
Federation of American Scientists

Dear Mr. Korda:

This is a final response to your October 15, 2020 Freedom of Information Act (FOIA) request, a copy of which is enclosed for your convenience. We received your request on October 15, 2020, and assigned it case number 21-F-0065. We ask that you use this number when referring to your request.

The Office of the Under Secretary of Defense for Acquisition & Sustainment, a component of the Office of the Secretary of Defense, conducted a search of their records systems and provided the enclosed document, totaling 13 pages. Mr. Dyke D. Weatherington, Deputy Assistant Secretary of Defense, Information and Integration Portfolio Management, in his capacity as the Initial Denial Authority, has determined these 13 pages to be responsive to your request and are appropriate for release in their entirety, without excision.

This constitutes a full grant of your request and closes your case file in this office. There are no assessable fees associated with this response.

If you have any questions or concerns about the foregoing or about the processing of your request, please do not hesitate to contact Vivian Gales-Wilkes at Vivian.d.gales-wilkes@mail.mil or (571) 372-0436. Our FOIA Public Liaison is also available to assist you and may be reached at 571-372-0464.

Sincerely,

for Pamela Andrews
Stephanie L. Carr
Chief

Enclosures:
As stated

THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

ACQUISITION
AND SUSTAINMENT

SEP 21 2020

The Honorable Nita M. Lowey
Chairwoman
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Madam Chairwoman:

Pursuant to section 2366b(c)(1) of title 10, United States Code, I am submitting the enclosed Milestone B Report for the Ground Based Strategic Deterrent program. Milestone B for Ground Based Strategic Deterrent was approved on September 4, 2020. I am sending identical letters to the other congressional defense committees.

Sincerely,

Ellen M. Lord

Enclosure:
As stated

cc:
The Honorable Kay Granger
Ranking Member

THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

ACQUISITION
AND SUSTAINMENT

SEP 2 1 2020

The Honorable Richard C. Shelby
Chairman
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

Pursuant to section 2366b(c)(1) of title 10, United States Code, I am submitting the enclosed Milestone B Report for the Ground Based Strategic Deterrent program. Milestone B for Ground Based Strategic Deterrent was approved on September 4, 2020. I am sending identical letters to the other congressional defense committees.

Sincerely,

Ellen M. Lord

Enclosure:
As stated

cc:
The Honorable Patrick J. Leahy
Vice Chairman

THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

ACQUISITION
AND SUSTAINMENT

SEP 21 2020

The Honorable Adam Smith
Chairman
Committee on Armed Services
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

Pursuant to section 2366b(c)(1) of title 10, United States Code, I am submitting the enclosed Milestone B Report for the Ground Based Strategic Deterrent program. Milestone B for Ground Based Strategic Deterrent was approved on September 4, 2020. I am sending identical letters to the other congressional defense committees.

Sincerely,

Ellen M. Lord

Enclosure:
As stated

cc:
The Honorable William M. "Mac" Thornberry
Ranking Member

THE UNDER SECRETARY OF DEFENSE
3010 DEFENSE PENTAGON
WASHINGTON, DC 20301-3010

ACQUISITION
AND SUSTAINMENT

SEP 2 1 2020

The Honorable James M. Inhofe
Chairman
Committee on Armed Services
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

Pursuant to section 2366b(c)(1) of title 10, United States Code, I am submitting the enclosed Milestone B Report for the Ground Based Strategic Deterrent program. Milestone B for Ground Based Strategic Deterrent was approved on September 4, 2020. I am sending identical letters to the other congressional defense committees.

Sincerely,

Ellen M. Lord

Enclosure:
As stated

cc:
The Honorable Jack Reed
Ranking Member

(U) Ground Based Strategic Deterrent Milestone B Summary

Report to Congress

September 2020

Under Secretary of Defense for Acquisition and Sustainment

(U) The estimated cost of this report or study for the Department of Defense is approximately $3,960 for the 2020 Fiscal Year. This includes $10 in expenses and $3,950 in DoD labor. Cost estimate generated on September 10, 2020 / RefID: 5-4A35508

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(U) Ground Based Strategic Deterrent Milestone B Summary Report

1.0 (U) Reporting Requirement

(U) This report is provided to the congressional defense committees as directed in section 2366b(c)(1) of title 10, United States Code (10 U.S.C. §2366b(c)(1)). This report was prepared by the Under Secretary of Defense for Acquisition and Sustainment (USD(A&S)), in consultation with the Director, Cost Assessment and Program Evaluation, Under Secretary of Defense for Research and Engineering (USD(R&E)), and the Secretary of the Air Force.

(U) Section 2366b(c) Submissions to Congress on Milestone B. —

(1) (U) Brief summary report.-Not later than 15 days after granting Milestone B approval for a major defense acquisition program, the milestone decision authority for the program shall provide to the congressional defense committees and, in the case of intelligence or intelligence-related activities, the congressional intelligence committees a brief summary report that contains the following elements:

(A) (U) The program cost and fielding targets established under section 2448a(a) of this title.

(B) (U) The estimated cost and schedule for the program established by the military department concerned, including-

(i) (U) the dollar values estimated for the program acquisition unit cost, average procurement unit cost, and total life-cycle cost; and

(ii) (U) the planned dates for each program milestone, initial operational test and evaluation, and initial operational capability.

(C) (U) The independent estimated cost for the program established pursuant to section 2334(a)(6) of this title, and any independent estimated schedule for the program, including-

(i) (U) the dollar values and ranges estimated for the program acquisition unit cost, average procurement unit cost, and total life-cycle cost; and

(ii) (U) the planned dates for each program milestone, initial operational test and evaluation, and initial operational capability.

(D) (U) A summary of the technical and manufacturing risks associated with the program, as determined by the military department concerned, including identification of any critical technologies or manufacturing processes that have not been successfully demonstrated in a relevant environment.

(E) (U) A summary of the independent technical risk assessment conducted or approved under section 2448b of this title, including identification of any critical technologies or manufacturing processes that have not been successfully demonstrated in a relevant environment.

(F) (U) A statement of whether a modular open system approach is being used for the program.

(G) (U) An assessment of the sufficiency of developmental test and evaluation plans, including the use of automated data analytics or modeling and simulation tools and methodologies.

(H) (U) Any other information the milestone decision authority considers relevant.

2.0 (U) Brief Summary Report

(U) The following information is provided to the congressional defense committees in accordance with the requirements of section 2366b(c)(1) of title 10, United States Code (10 U.S.C. §2366b(c)(1)), as enumerated below:

(A) *(U) The program cost and fielding targets established by the Secretary of Defense under section 2448a(a) of this title.*

(U//FOUO) Program cost and fielding targets were not statutorily required as the program achieved Milestone A (MS A) on August 23, 2016, before the October 1, 2017, effective date specified in section 807(a)(2) of the National Defense Authorization Act for Fiscal Year (FY) 2017 (Public Law 114-328). However, the Milestone Decision Authority (MDA) established the program cost targets in the Acquisition Decision Memorandum for 634 Air Vehicle Equipment (AVE) units and the sustainment period of FY 2036-2040, not including indirect costs, as shown (base year 2020 dollars):

(U//FOUO) Average Procurement Unit Cost: $75.5M
(U//FOUO) Average Annual Steady-State Operating and Support Costs: $1.3B

(U) The MDA established the program fielding target in the Acquisition Program Baseline for Initial Operational Capability (IOC) in third quarter (Qtr) FY 2029.

(B) *(U) The estimated cost and schedule for the program established by the military department concerned, including: (i) the dollar values estimated for the program acquisition unit cost, average procurement unit cost, and total life-cycle cost; and (ii) the planned dates for each program milestone, initial operational test and evaluation, and initial operational capability.*

(i) (U//FOUO) The Air Force prepared a Service Cost Position (SCP) validated by Deputy Assistant Secretary of the Air Force for Cost and Economics (SAF/FMC), dated August 6, 2020, which established the following estimated costs.

UNCLASSIFIED//FOUO

Table 1. GBSD SCP Estimated Costs (TY $B)	
RDT&E	$25.0
Procurement	$60.3
MILCON	$7.8
Acquisition Total	$93.1
O&S	$165.0
Disposal	$1.4
Total Life-cycle Cost	**$259.6**

UNCLASSIFIED//FOUO

(U//FOUO) The following SCP Program Acquisition Unit Cost (PAUC) and Average Procurement Unit Cost (APUC) estimates are based on the quantities of 748 and 723 booster stacks, respectively (constant year 2020 dollars).

(U//FOUO) Program Acquisition Unit Cost: $100.9M
(U//FOUO) Average Procurement Unit Cost: $64.4M

(U//FOUO) For Independent Cost Estimate (ICE) comparison, if the SCP PAUC and APUC were estimated based on 659 and 634 AVE units respectively, the following are the PAUC and APUC estimates (constant year 2020 dollars).

(U//FOUO) Program Acquisition Unit Cost: $114.5M
(U//FOUO) Average Procurement Unit Cost: $73.5M

(ii) (U) The SCP estimated schedule milestones are:

UNCLASSIFIED//FOUO

Table 2. GBSD SCP Estimated Schedule Milestones	
Event	**Estimated Date***
Milestone B	4th Qtr FY 2020
Milestone C	3rd Qtr FY 2027
Initial Operational Capability	3rd Qtr FY 2031

UNCLASSIFIED//FOUO

** (U//FOUO) The SCP analyses of risks and activities project an additional 24 months of EMD schedule duration is likely to occur relative to the Air Force's planned schedule for the GBSD program (MS C planned for third Qtr FY 2026 and IOC planned for third Qtr FY 2029). However, the SCP funding profile phased procurement funding so as not to preclude success if the program executes to the planned schedule. The MDA elected to establish the program fielding target and funding profile to the Air Force's planned schedule.*

(U) The SCP did not estimate a date for initial operational test and evaluation.

(C) *(U) The independent estimated cost for the program established pursuant to section 2334(a)(6) of this title, and any independent estimated schedule for the program. including: (i) the dollar values and ranges estimated for the program acquisition unit cost, average procurement unit cost, and total life-cycle cost; and (ii) the planned dates for each program milestone, initial operational test and evaluation, and initial operational capability.*

(i) (U//FOUO) The Director of Cost Assessment and Program Evaluation (D, CAPE) conducted an Independent Cost Estimate (ICE) for the program, dated August 22, 2020, and established the following estimated costs.

UNCLASSIFIED//FOUO

Table 3. GBSD ICE Estimated Costs (TY $B)	
RDT&E	$25.5
Procurement	$61.6
MILCON	$8.7
Acquisition Total	$95.8
O&S	$166.6
Disposal	$1.4
Total Life-cycle Cost	**$263.9**

UNCLASSIFIED//FOUO

(U) The following ICE PAUC and APUC estimates are based on the quantities of 659 and 634 AVE units, respectively (constant year 2020 dollars).

(U//FOUO) Program Acquisition Unit Cost: $118.0M
(U//FOUO) Average Procurement Unit Cost: $75.5M

(ii) (U) The ICE estimated schedule milestones are:

UNCLASSIFIED//FOUO

Table 4. GBSD ICE Estimated Schedule Milestones	
Event	**Estimated Date***
Milestone B	4th Qtr FY 2020
Milestone C	4th Qtr FY 2027
Initial Operational Test & Evaluation	4th Qtr FY 2029
Initial Operational Capability	3rd Qtr FY 2031

UNCLASSIFIED//FOUO

** (U//FOUO) The ICE analyses of risks and activities project an additional 24 months of EMD schedule duration is likely to occur relative to the Air Force's planned schedule for the GBSD program (MS C planned for third Qtr FY 2026 and IOC planned for third Qtr FY 2029). However, the ICE funding profile phased procurement funding so as not to preclude success if the program executes to the planned schedule. The MDA elected to establish the program fielding target and funding profile to the Air Force's planned schedule.*

(D) *(U) A summary of the technical and manufacturing risks associated with the program, as determined by the military department concerned, including identification of any critical technologies or manufacturing processes that have not been successfully demonstrated in a relevant environment.*

(U//FOUO) The Air Force identified no critical technologies and manufacturing processes that have not been successfully demonstrated in a relevant environment with the exception of the integrated Inertial Measurement Unit (IMU).

The program is mitigating risk by carrying an adaptable IMU with alternative instruments into Engineering and Manufacturing Development (EMD).

(E) *(U) A summary of the independent technical risk assessment (ITRA) conducted or approved under section 2448b of this title, including identification of any critical technologies or manufacturing processes that have not been successfully demonstrated in a relevant environment.*

(U) Section 807(a) of the National Defense Authorization Act for Fiscal Year 2017 (Public Law 114-328) established the requirement to prepare an ITRA for all Major Defense Acquisition Programs (MDAPs) that achieve MS A after October 1, 2017. Because GBSD achieved MS A before that date (August 23, 2016), the Department was not statutorily required to prepare an ITRA. However, the Department conducted an ITRA in accordance with the "Policy Memorandum for Independent Technical Risk Assessments for Major Defense Acquisition Programs (MDAPs)", signed by the Deputy Secretary of Defense on December 3, 2018, which requires an ITRA for all MDAPs as a matter of policy.

(U) A USD(R&E) independent review team (IRT) assessed program plans, strategies, documentation, technical reports, and other available information that the program provided.

(U//FOUO) The IRT assessed high technical risk of the program meeting planned schedule and performance goals. The analysis, to include historical program performance, indicates the program is likely to need up to two additional years to complete development, integration, and certification of system software. The IRT identified additional technical risk areas where the Air Force has agreed to develop and implement risk mitigation strategies as EMD progresses.

(U//FOUO) The USD(R&E) IRT assessed that during the Technology Maturation and Risk Reduction phase the program-identified critical technology elements and manufacturing processes were demonstrated in a relevant environment. However, the program has not yet demonstrated the integrated inertial measurement unit (IMU) in a relevant environment. The program is mitigating risk by carrying an adaptable IMU with alternative instruments into EMD.

(F) *(U) A statement of whether a modular open system approach is being used for the program.*

(U) The GBSD program uses a modular, open system approach within the constraints of nuclear surety. A flexible system architecture supports technology insertion to address both enduring and evolving requirements driven by both adversarial capability development and for Operations and Support throughout the GBSD weapon system lifecycle.

(G) *(U) An assessment of the sufficiency of developmental test and evaluation plans, including the use of automated data analytics or modeling and simulation tools and methodologies.*

(U//FOUO) The senior official responsible for developmental test and evaluation (DT&E) in the Department of Defense provided a DT&E sufficiency assessment to the Milestone Decision Authority in accordance with section 838 of the National Defense Authorization Act for FY 2018 (Public Law 115-91). The assessment concluded that the DT&E plans are sufficient to support Milestone B. DT&E schedules and planned resources support the program's acquisition strategy through the EMD Phase, including Modeling and Simulation, and criteria established for transition to operations. The program has developed sufficient mitigation plans for known risk of developmental test and production concurrency and DT&E entrance criteria for the production phase are sufficient.

(H)*(U) Any other information the Milestone Decision Authority considers relevant.*

(U) The information provided in this report is sufficient for fulfilling the summary report to Congress in accordance with section 2366b(c)(1) in title 10, U.S.C..

FAS FEDERATION OF AMERICAN SCIENTISTS

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