

## U.S. Intercontinental Ballistic Missiles

The land-based leg of the [U.S. nuclear triad](#) is currently composed of 400 deployed Minuteman III Intercontinental Ballistic Missiles (ICBMs) based out of Malmstrom, Minot, and Warren Air Force bases in underground silos stretching across Montana, North Dakota, Wyoming, Nebraska and Colorado. Each ICBM carries one warhead — either the W87 or the W78 — but could theoretically hold two or three warheads each. In 2015, the Air Force completed a decades-long, \$7 billion program to extend the life of the Minuteman III through at least 2030. At the time of refurbishment, the Air Force [referred](#) to the refurbished stock of ICBMs as “basically new missiles except for the shell.”

### Ground Based Strategic Deterrent

As a part of the \$1.5 trillion [nuclear modernization](#) plan, the Air Force plans to replace the Minuteman III with a completely new ICBM, the Ground Based Strategic Deterrent (GBSD), now called Sentinel; a new ICBM warhead, the W87-1; and modernized launch facilities. The Sentinel is expected to be capable of carrying single or multiple warheads and will likely have a greater range than existing ICBMs, though it is unlikely to be able to target countries like China, North Korea and Iran without flying over Russia.

Northrop Grumman, which was the eventual sole bidder for the Sentinel and also has the contract to build the Air Force’s new B-21 nuclear bomber, was awarded an initial \$13.3 billion engineering and manufacturing development (EMD) contract in September 2020 for the Sentinel. The Air Force plans to buy 659 missiles from the defense contractor, 400 of which would be deployed and the rest used for testing and spares, at a cost of at least \$95 billion. When accounting for total life-cycle costs, the Department of Defense [projected](#) the total cost of the Sentinel could be as high as \$264 billion in 2020. This number does not include costs for the W87-1, which the Government Accountability Office [estimated](#) would cost up to \$14.8 billion in 2020.

In early 2024, the Air Force reported to Congress that the Sentinel program will cost 37 percent more than originally expected and is at least two years behind schedule. The report was made under the [Nunn-McCurdy Act](#) which requires notification of Congress if a program is over cost or behind schedule more than 15 percent. A 37 percent overrun is considered a “critical” breach. It is important to note that this cost overrun only covers the so-called “Program Acquisition Unit Cost” [defined](#) as “the total cost of development, procurement, and construction divided by the number of units procured.” This does not include possible cost overruns to the warhead program or the overall lifecycle cost of the program.

As of July 8, 2024, the estimated cost of the Sentinel program will cost [81 percent](#) more than originally expected.

The Biden administration previously considered additional service life extension for the Minuteman III as an alternative to Sentinel. However, as recently as 2021, Air Force Global Strike Command [asserted](#) that the new program would be \$38 billion cheaper than a life extension of the Minuteman. The Biden administration’s [2022 Nuclear Posture Review](#) indicates that the “Sentinel will replace Minuteman III one-for-one to maintain 400 ICBMs on alert.” Accordingly, the DOD [requested](#) \$4.3 billion for the Sentinel program in FY 2024.

### The Future of ICBMs

One rationale for maintaining silo-based ICBMs is to complicate an adversary’s nuclear strategy by forcing them to target 400 missile silos dispersed throughout the United States to limit a retaliatory nuclear strike, which is why ICBMs are often referred to as the “[nuclear sponge](#).” The improvement of sea-based nuclear weapons, which are essentially undetectable, and air-based nuclear weapons, which provide greater flexibility, has led to questions about the continuing value of ground-based ICBMs.

Furthermore, U.S. ICBMs are constantly held in a state of high alert. This could increase the risk of accidental war over a false alarm from the United States’ missile detection system. For these reasons, there have been calls to reexamine the future of the ICBM leg of the triad to determine when advancing technology will allow for adequate deterrence in its absence.