

Nuclear Modernization and National Security

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Reducing the Dangers of Nuclear War

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- Why is Russia so worried about missile defense?
- Why are we arming on such a scale?
what is the message, what are the consequences?
- Ballistic missile defense
- Increasing missile accuracy
- our interdependent MAD world
the more we spend the less secure we are

Why are the Russians afraid of US missile defense?

- started in the Star Wars era “space strike weapons”
- Overlooked fear of high tech developments in surveillance, command, and control
- US spending large sums in high tech weaponry
Russia cannot/does not want to compete
- their fear is important today
- they fear a decapitating first strike
- a major impediment to progress in stability, arms control

Nuclear Weapons Maintenance

- Last US test 1992 (No. 1132)
- 1994 Science Based Los Alamos Stockpile Stewardship maintains weapons without exploding them: experiments test components, supercomputers model weapons
- enhanced safety, reliability
- Life extension, annual assessment

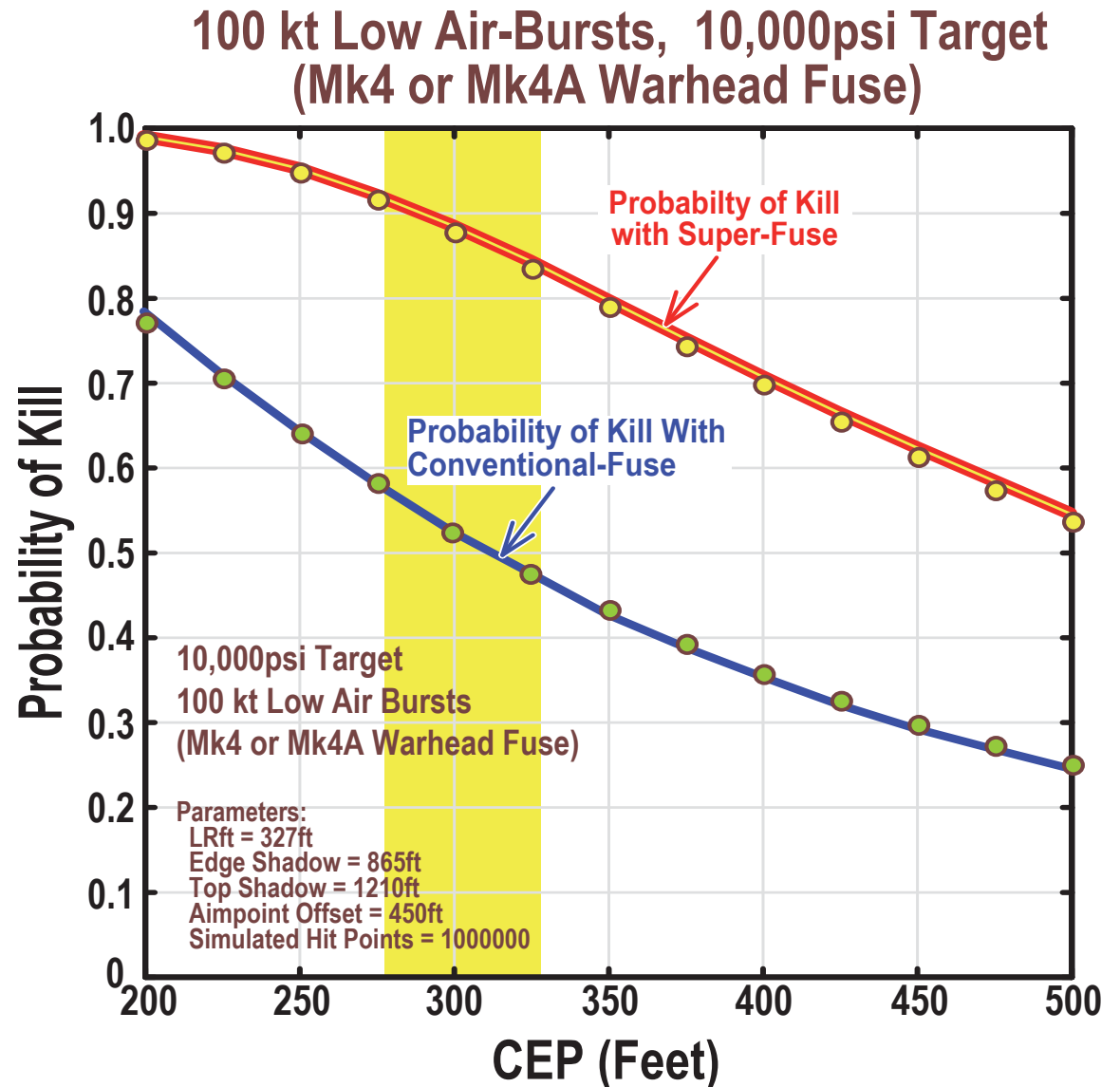
Modernization

- 30 to 50 year plans to modernize all strategic delivery systems
- new Start level-although Pentagon certified 1/3 reduction OK
- cost ~ \$18b/y 2021 to 2035 in FY 2016 dollars,
increase from ~ 3% to 7% military budget
- total cost of ~ \$1T over the next 30 years
- improve missile accuracy: advanced fusing
- improved accuracy: B61-12 bomb
- ~ 1000 cruise missiles

Modernization: Improving missile accuracy burst height compensation fuse

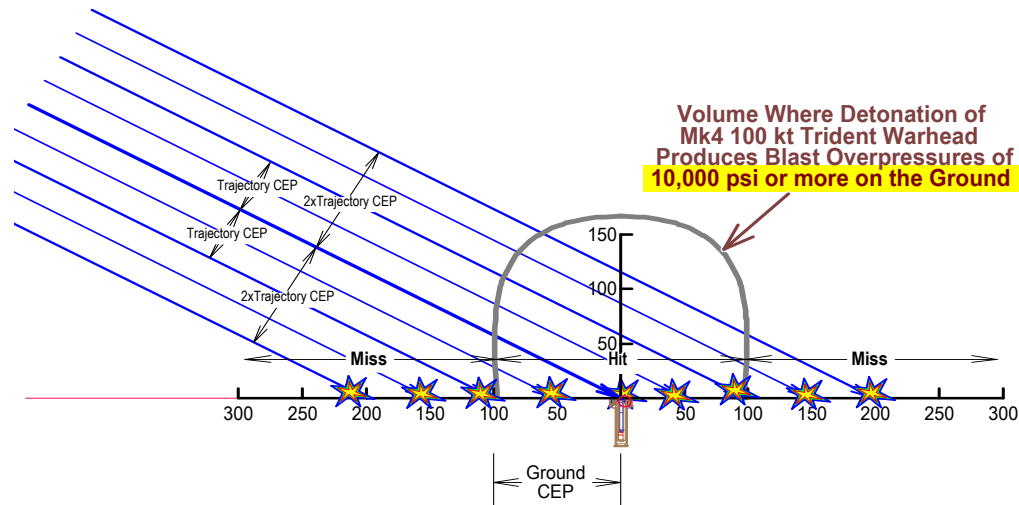
Destructive power
 $\sim Y(kT) / CEP^2$

slide from T. Postel

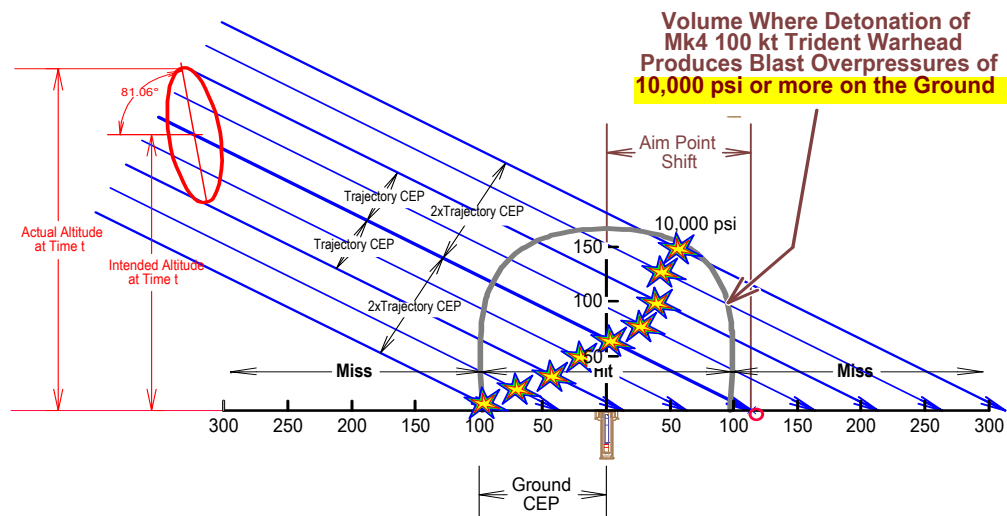


how does it work?

conventional
fuse



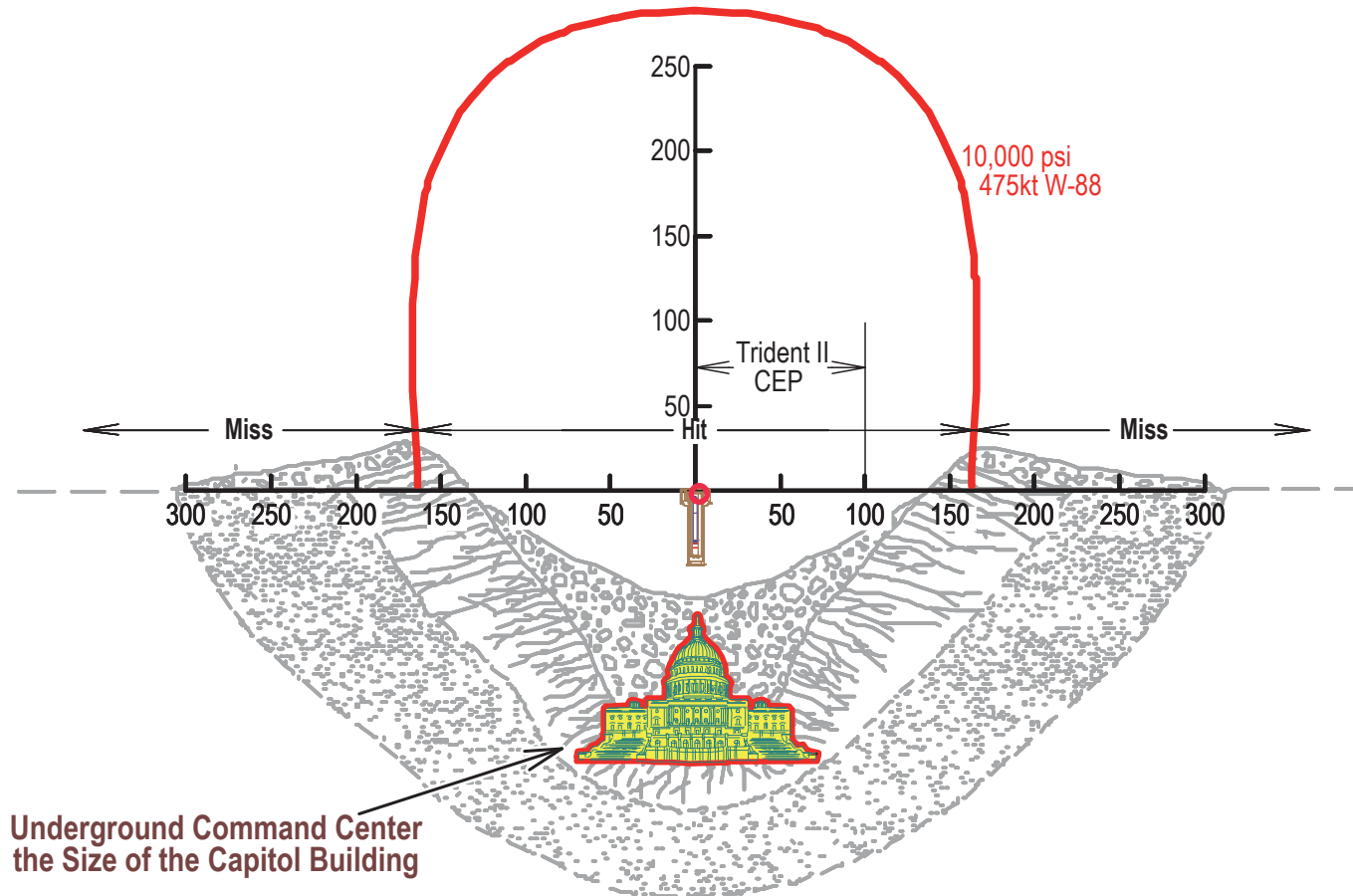
burst height
compensation
fuse



slide from T. Postel

Crater Dimensions from a 475kt W-88 Near-Surface Nuclear Explosion

Trident II W88 475 kt Warhead Against a Deeply Buried Underground Command Post



slide from T. Postel

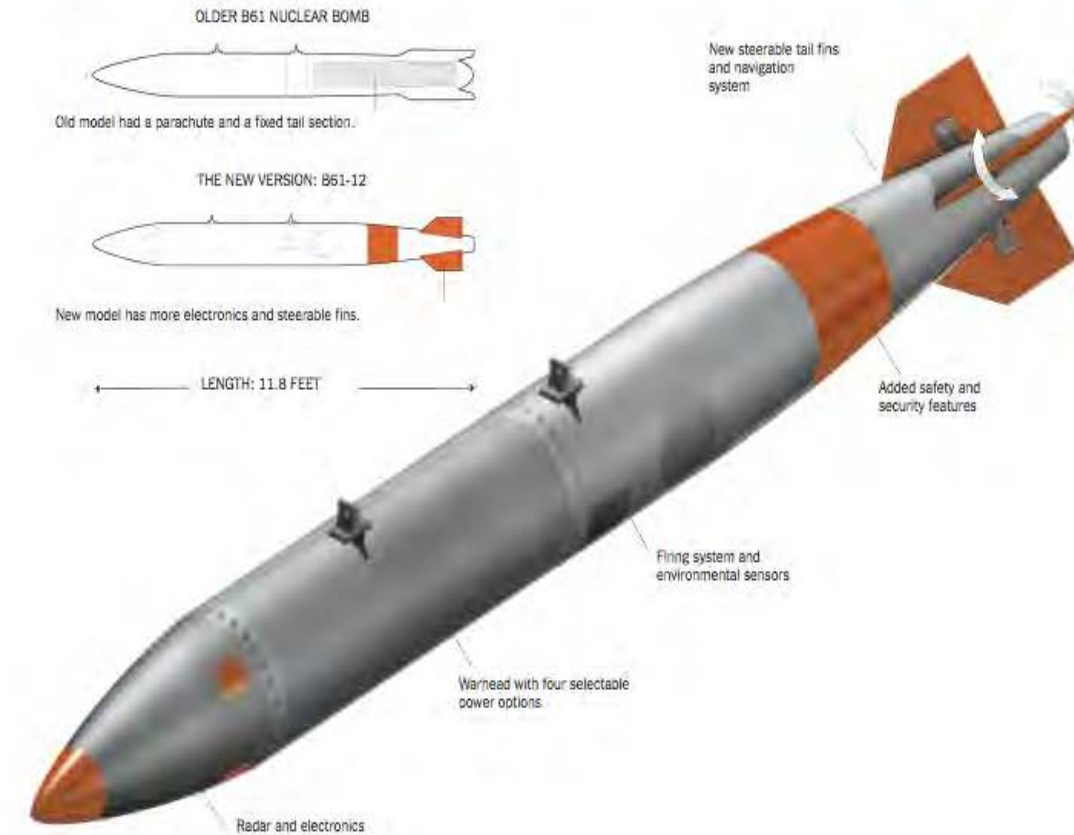
Accidental Nuclear War

- US- Russia have ~900 missile on Launch on warning
- flight times are ~ 30 min for ICMB, ~ 15 min for SLBM
US SLBM systems are now first strike capable
ICBM more vulnerable – Russian reliance
- decision times are shorter
- Russian early warning system antiquated
- as tensions rise these could be automated
leading to crisis instability
- combination of all factors including US modernization ⇒
greater danger, perhaps than during the cold war

B61-12 improved accuracy CEP 100m -> 30 m
standoff firing from bomber variable yields 0.3 -> 50kT

A More Accurate Atom Bomb

The United States military is replacing the fixed tail section of the B61 bomb with steerable fins and adding other advanced technology. The result is a bomb that can make more accurate nuclear strikes and a warhead whose destructive power can be adjusted to minimize collateral damage and radioactive fallout.



Source: Federation of American Scientists

🔍 (no view/lock) 🔍

We live in an interconnected MAD world

- Russian early warning system error→ mutual annihilation
fire, blast, radiation; nuclear winter
- probability increases with rising tension, suspicion
- we need appropriate levels of defense, not offense
- At this time less military spending leads to a safer world