



***NORTHROP GRUMMAN***



# **Intrinsic Benefits of ICBMs to U.S. Nuclear Posture and Global Stability**

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# History

- Atlas, Thor and Titan paved the way for the Minuteman ICBM
- In 1958, Air Force was approved to develop a solid propellant ICBM (Minuteman I)
- In 1963, approval for a more advance ICBM (MMII)
- In 1965, 800 missiles were declared operational and MMIII started development

	ATLAS D	ATLAS E/F	TITAN I	TITAN II	MINUTEMAN			PEACEKEEPER
					I	II	III	
LENGTH (FT)	82	85	98	105	56	57	60	71
DIA (FT)	10	10	10	10	5.5	5.5	5.5	7.7
WEIGHT (LBS)	269,000	280,000	220,000	330,000	65,000	70,000	76,000	195,000
DEPLOYED (MAX #)	30	72	54	50	800	500	550	50
DATES	1959-64	1962-65	1962-65	1963-87	1962-74	1966-96	1970-?	1986-2006

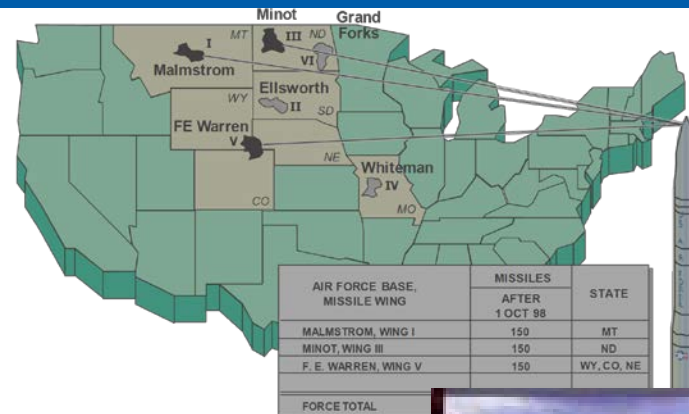
- In 1969 there were 1000 missiles on alert
- Today the ICBM force stands at 450 MMIII missiles
- Per New START the U.S. will be limited to 1550 warheads and 700 deployed ICBMs, SLBMs, and heavy bombers

MM has provided over 50 years of deterrence

- The cost of developing Minuteman is estimated at \$100 billion and has provided unsurpassed deterrence since the 1960's
- Yearly maintenance and operational costs are approximately \$1.3 billion
- Approximate \$8 billion has been spent on incremental upgrades and re-procurements to extend the life of the system to 2030
- It is expected that the system can be extended beyond 2030 at similar costs

# Background

- Availability - Launch ready 24/7
- Reliability – Over 50 years of demonstrated deterrence
- Accuracy – Precision targeting
- Safe and Secure
  - Proven physical security
  - Only the President is authorized to launch
- Survivability
  - Dispersed – Unable to defeat multiple sites with one weapon
  - Hardened – Difficult to destroy
- Location - Provides targets away from civilian infrastructure and other legs of the triad



MMIII capability deters aggression towards the US and allies



# A Nuclear World

- The advent of the nuclear weapon changed the world
- It was hoped that nuclear weapons would end the WWII conflict
- An unintended benefit of a nuclear world is that there has been no large scale conventional wars since

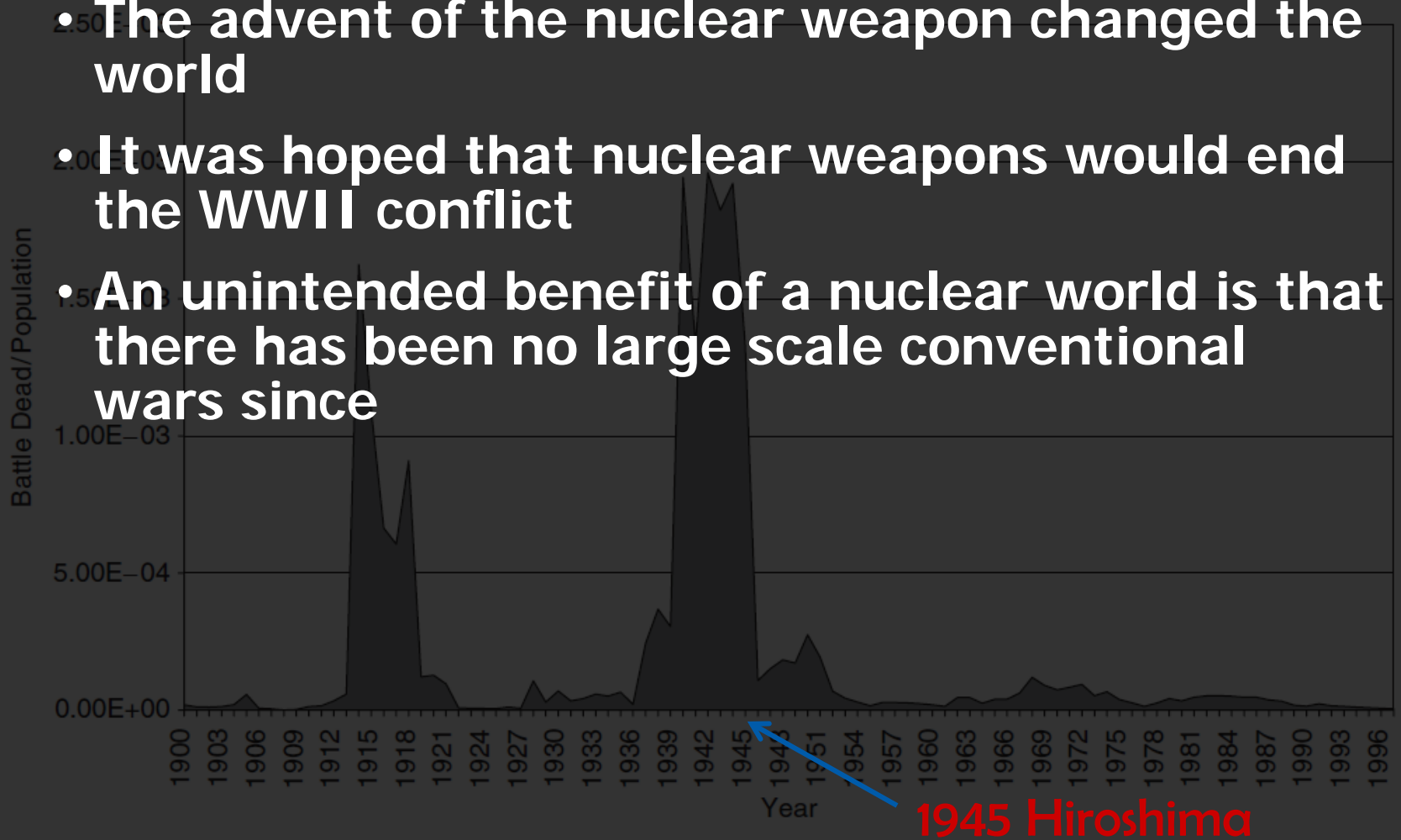
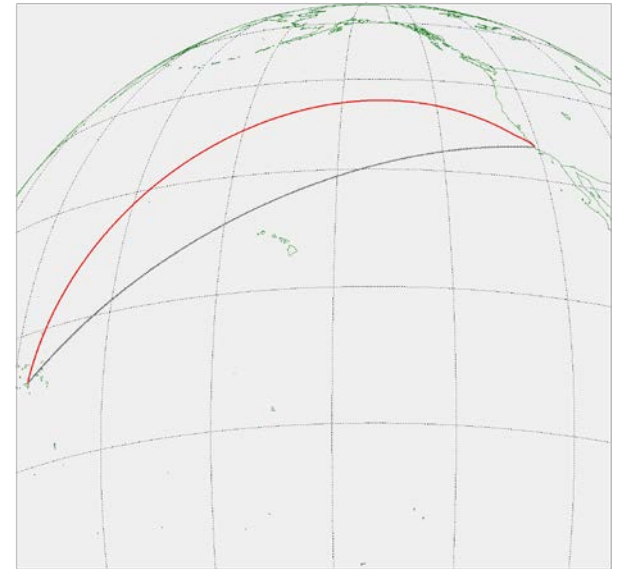


FIG. 2. The Risk of Death in Battle Worldwide, 1900–1997

Source: Conflict events defined by COW data set (Sarkees 2000); battle deaths data from Lacinda and Gleditsch (2005). See authors note for website.

# Demonstrated Capability

- Two fold purpose
  - External - Demonstrates MMIII capability to the world
  - Internal - Provides engineering assessment and verifies modifications
- The full system is tested 3 times a year
- There have been 425 MM flight tests since 1965



**“The Minuteman III Intercontinental Ballistic Missile force is the most stabilizing leg of the American nuclear triad.”**

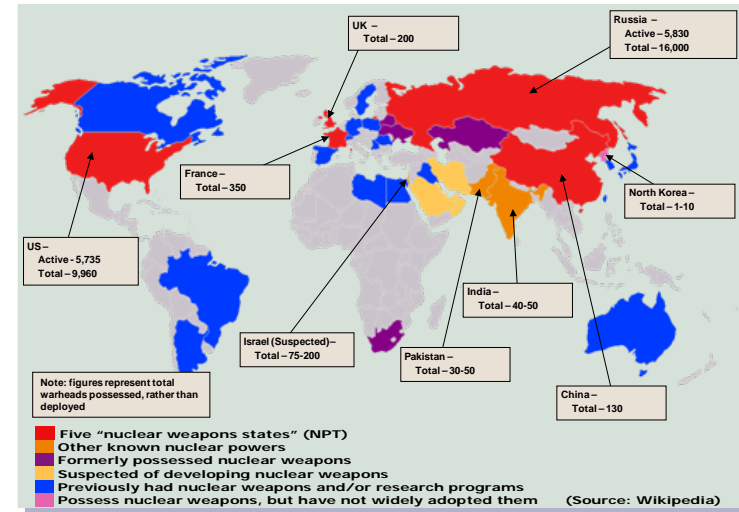
The Long Pole in the Nuclear Umbrella, Senate ICBM Coalition, Nov. 2009

**MMIII, The world knows its capability and knows it is ready**



# Is Zero Achievable?

- Pandora's Box was opened and nuclear technology can't be un-invented
- There will be a need for a U.S. nuclear deterrent as long as:
  - There are those seeking or possessing nuclear arsenals
  - Nations desire to harm the USA's way of life
  - The system is not rendered obsolete by technological advancements
- Reverting to conventional war is not the answer
  - Possible WWI or WWII type conflict?
- A nuclear-free world is predicated on the evidence that all nations have complied
  - Evidence of compliance will be difficult to achieve
  - Cheating may be used to gain advantage



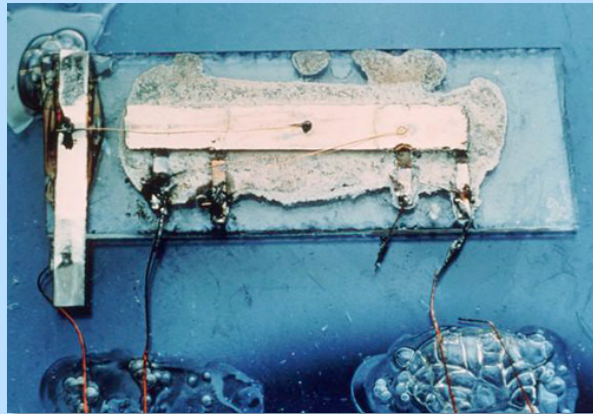
A monumental global transformation would have to occur to even begin to think of a nuclear-free world

- Incremental improvements that will benefit the MMIII deterrent:
  - Accuracy - Upgrade guidance instruments to maintain damage expectancy while possibly lowering required yield
  - Range – Propulsion advancements that could increase targeting options
  - Reliability – Technological advancements to:
    - Increase component longevity
    - Replacements of aged out assets
  - Maintainability – Reduce costs on operations as well reducing future investment requirements
- With a modest investment the MMIII weapon system can maintain its capability and meet mission requirements indefinitely



# Benefits of ICBM development

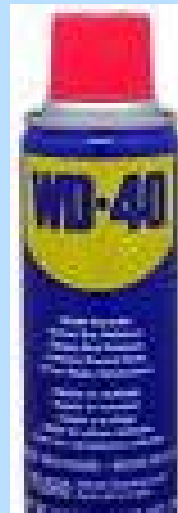
- Integrated circuits (Apollo and MMII were first major users)



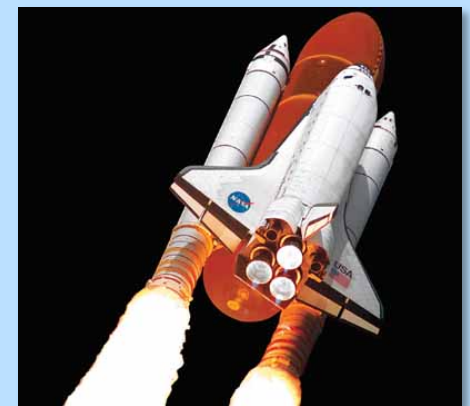
- More affordable access to space (reuse)



- WD-40 (Atlas missile corrosion prevention)



- Solid Rockets, modern embedded systems, etc.



- The world is more stable with this known deterrent
- The MMIII makes the possibility of attack on the continental U.S. extremely expensive for adversaries, in both a preemptive and a retaliatory scenario
- MMIII continues to be a survivable, reliable, and accurate deterrent against possible large scale aggressors
- The weapon system does not require recapitalization and has a proven track record of successful incremental upgrades/modifications
- MMIII is safe, secure, and a reliable asset in the U.S. nuclear force structure

**DETER**

**DISSUADE**

**DEFEAT**