NORTHROP GRUMMAN

Discussion of the Unique and Complementary Characteristics of the ICBM and SLBM Weapon Systems

Project On Nuclear Issues (PONI)

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Northrop Grumman

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Purpose

> ➤ High level decisions will be made in the near future regarding the nuclear posture of the U.S.
>
> - Proposed Strategic Arms Reduction Treaty replacement
> - Nuclear Posture Review
> - Quadrennial Defense Review
>
> ➤ It is important to understand the characteristics of the U.S. strategic systems in order to make informed decisions on U.S. nuclear posture requirements
>
> ➤ Briefing's purpose is to:
>
> - Discuss background on the current U.S. strategic missile systems
> - Summarize and discuss the characteristics of each of the U.S. strategic missile systems
>   - Emphasize how the systems are similar to, differ from, and complement each other
> - Discuss the value of the two missile systems

Background on Strategic Missile Systems

ICBM – Minuteman III
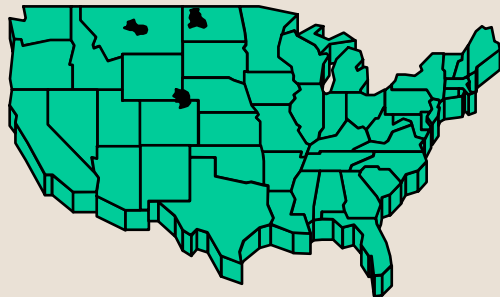
- **Land Based**
- **450 Missiles in 3 Wings**
  - Malmstrom, Montana
  - Minot, North Dakota
  - F.E. Warren, Wyoming
- **1 – 3 Reentry Vehicles (RV)**

- **History**
  - Go-ahead – 1966
  - 1st launch - 1968
  - IOC – 1970
  - Modernization – 1992- Present
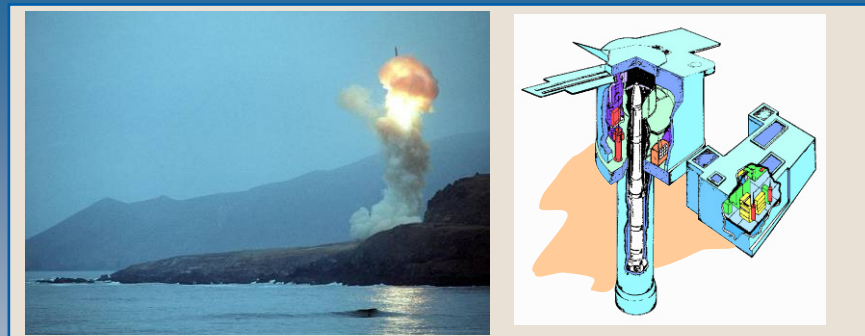
SLBM – Trident II (D-5)

- **Sea Based**
- **288 Missiles in 12 subs**
  - 2 additional subs in dry dock
  - 8 based in Atlantic
  - 6 based in Pacific
- **4 – 6 Reentry Bodies (RB)**
  - Max capability 12 RBs

- **History**
  - Go-ahead – 1981
  - 1st launch - 1987
  - IOC – 1990
  - Life Extension – 2002- Present

Availability - What portion of the missile force is available for use

ICBM – Minuteman III

➢ **High alert rate**

- Minuteman alert rate is >90% (405-450 missiles)
  - Remove and replace repair concept
  - Minimal scheduled maintenance
- Missiles on alert are ready to launch 24/7
  - Launch crews have 24 hour alert shifts

SLBM – Trident II (D-5)

➢ **Portion of force on hard alert**

- 4 subs are on continual "Hard Alert" (86-96 missiles with 90% alert rate)
- 4-5 additional subs are on patrol at any given time (86-120 additional missiles available)
  - Patrols last 70+ days
  - Subs on patrol able to go on alert if required
- 3-4 subs are docked undergoing maintenance that lasts ~25 days
- 2 subs are in dry-dock at any given time
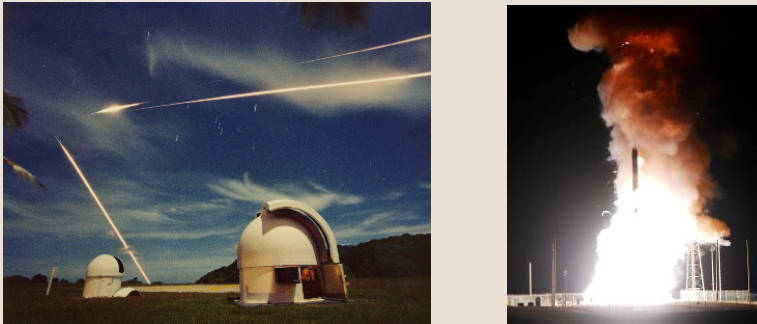 - Every 9 years subs undergo a 12 month refurbishment

Reaction Time – How fast the missile can execute a mission
Target Coverage –Ability to hold targets at risk
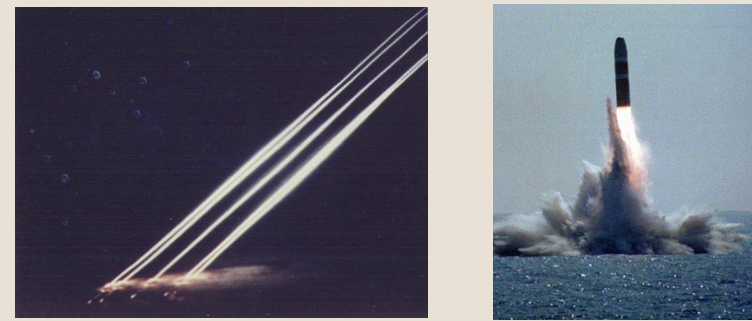
ICBM – Minuteman III

> **Reaction time**
> - Missiles can be launched within minutes after receipt of order
> - Time to target is ~30 minutes

> **Target Coverage**
> - Accuracy similar to Trident II
> - Fixed launch site
>   – Near global targeting capability
>   – Known launch/attack location
>   – Any launch would cause an overfly of U.S and other nation(s)
> - Able to constantly hold 405-450 target regions at risk

SLBM – Trident II (D-5)

> **Reaction time**
> - Missiles on hard alert can be launched within minutes after receipt of order
> - Time to target is 15-30 minutes

> **Target Coverage**
> - Accuracy similar to Minuteman III
> - Mobile launch site
>   – Global targeting capability
>   – Unknown launch location
>   – Some over-flight flexibility
> - Able to constantly hold 86-96 target regions at risk
>   – Subs on patrol could hold another 86-120 target regions at risk (with additional reaction time)

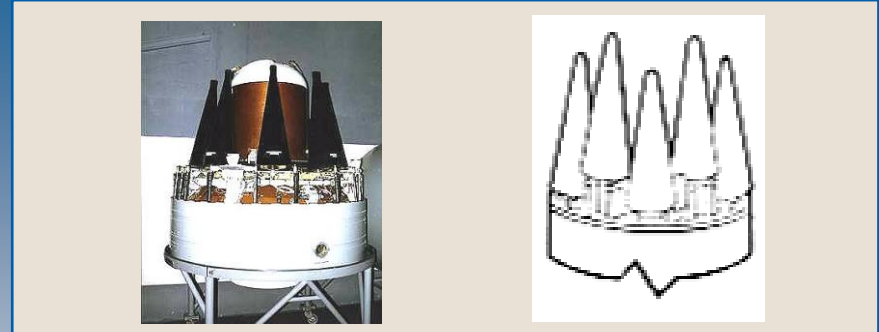# Payload – What the missile can carry

ICBM – Minuteman III

Minuteman III MIRV

> **1-3 Warheads/Missile**
- Approximately 550 deployed warheads
- Single missile capable of attacking one to three targets within a target region (within footprint limitations)
  - Greater MIRV footprint than D-5
- Capability of limited strike missions (Single RV to single target)

## SLBM – Trident II (D-5)

> **4-6 Warheads/Missile**
- Approximately 1,200 deployed warheads
- Single missile capable of attacking multiple targets within a target region (within footprint limitations)

- Max capability 12 RBs
  - Limited to 8 by START
  - Currently equipped with 4-6
  - Potential for single RB modification

Survivability - Ability to survive attack

ICBM – Minuteman III

SLBM – Trident II (D-5)
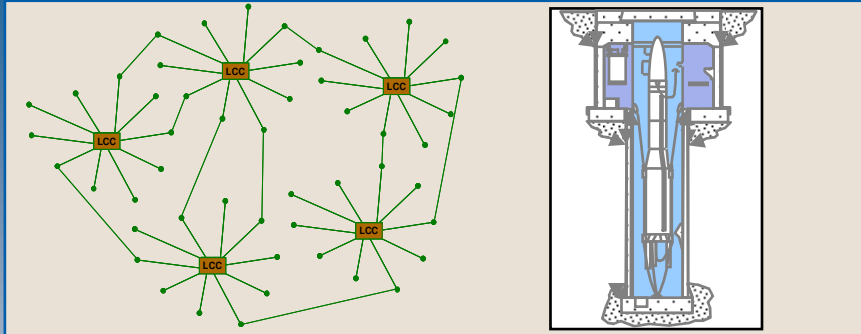
➤ **Silo based (450 silos)**

- 1 missile per silo

- Hardened against nuclear environments
- Geographically separated
- Redundant command and control
  – LCC redundant C^2, ALCS
- Essentially invulnerable with the exception of full scale nuclear war with Russia
  – 2 warheads likely have to be used to ensure destruction of 1 silo
- Large nuclear strike required to defeat ICBM force
  – Could serve as 450 targets away from population centers
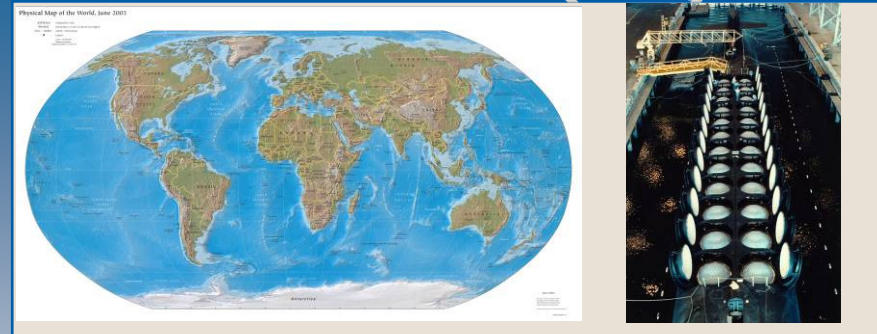
➤ **Submarine based (14 submarines)**

- 24 missiles per submarine
  – Creates a high value target
- Subs on patrol are stealthy
  – Subs at port are vulnerable to attack
- Geographically dispersed
- Redundant communications
- Essentially invulnerable with the exception of a breakthrough in submarine tracking capability

- Nuclear strike not required to defeat SLBM force
  – Submarine has some armament to defend itself

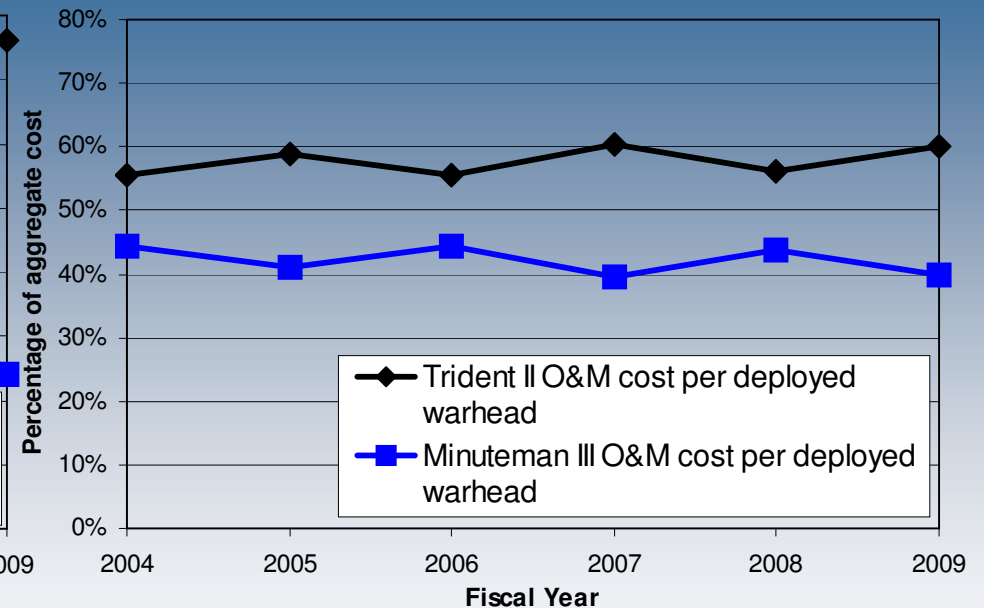# Cost – Yearly Operations and Maintenance (O&M) cost

MM III and D-5 O&M Costs
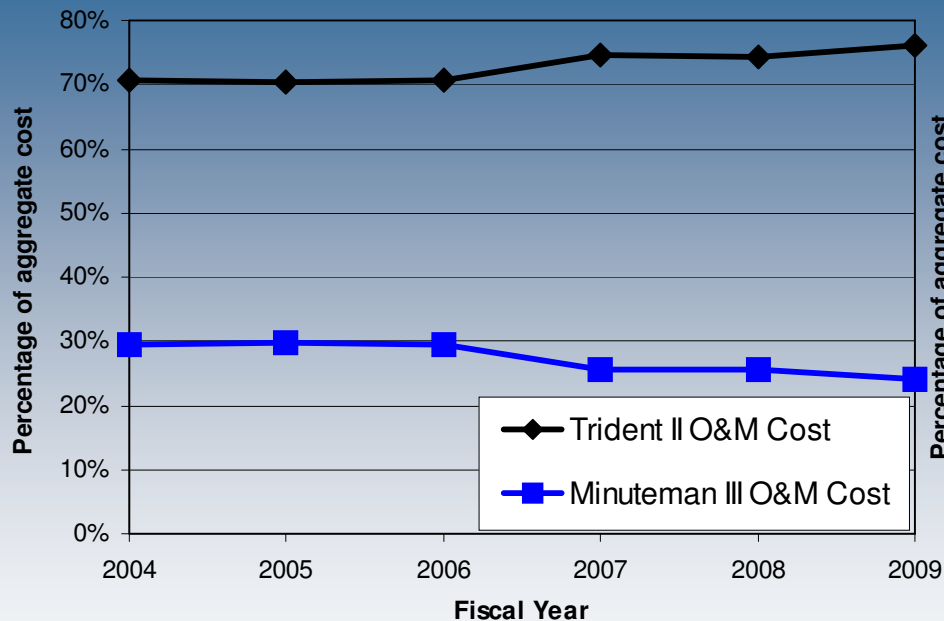
MM III and D-5 O&M Cost per Deployed Warhead

(Trident II O&M Cost, Minuteman III O&M Cost; Trident II O&M cost per deployed warhead, Minuteman III O&M cost per deployed warhead)

(D-5 cost does not include cost of SSBN force)

➤ **Minuteman III year to year O&M cost is ~ 40% of Trident II**

➤ **Per deployed warhead, Minuteman III year to year O&M cost is ~75% of Trident II**

Summary of Unique Characteristics

	Availability	Reaction Time	Target Coverage	Payload	Survivability	Cost
Minuteman III	>90%	Launch within minutes, ~30 minutes to target	Constantly hold 405-450 targets groups at risk	1 to 3 RV	Large number of dispersed, hardened silos	Less costly than D-5
Trident II (D-5)	65% on patrol 30% on alert	Launch within minutes, 15-30 minutes to target	Can hold any target at risk. Constantly holding 86-96 target groups at risk	4-12 RB Current 4-6 RB	Stealth and vast ocean area	Does not include SSBN cost
Comparison	MM III provides 405-450 missiles on hard alert, D-5 provides 86-96 missiles on hard alert and an additional 86-120 on patrol	Both systems have comparable time from receipt of order to target	D-5 offers global coverage, MM III provides near global coverage of dispersed targets	MM III provides single strike, D-5 provides for greater MIRV capability	The systems have different vulnerabilities	MM III is less costly than D-5

Complimentary Characteristics

ICBM – Minuteman III
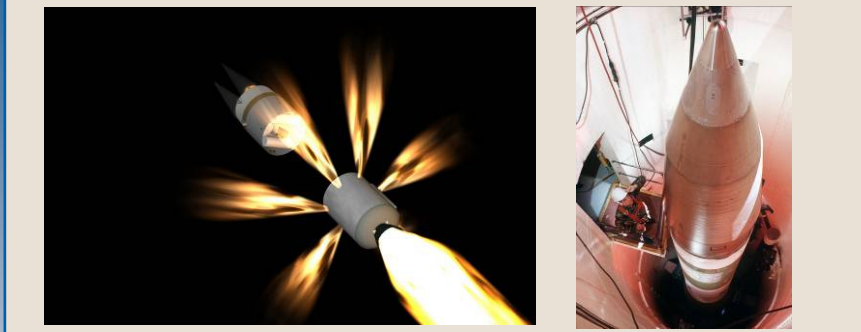
SLBM – Trident II (D-5)

➢ **The risk of losing both systems is low due to different vulnerabilities**
- The basing concept and CONOPS is different between the two systems
- It would be difficult for an adversary to attempt to defeat both systems simultaneously
  - Large scale assault on silos
  - Finding and engaging each submarine

➢ **The adversary will have to account for both types of threats**
- Large number of missiles coming from ICBMs
- Unknown launch location/MIRV for SLBMs
- Does not allow adversary to concentrate on only defeating one system

➢ **A technical problem with one system will not likely affect the other**
- Minimizes the risk of a single point of failure

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Conclusions

➢ **Technical performance of ICBMs and SLBMs is similar**
  - **Target coverage, availability, reaction time, survivability are similar**
➢ **Due to differences in payload:**
  - **ICBMs better suited to single strike or widely dispersed targets**
  - **SLBMs better suited to MIRV missions to grouped targets**
➢ **Minuteman III has lower O&M costs than Trident II**
➢ **Due to differences in basing/CONOPS:**
  - **Each system hedges against the vulnerabilities of the other**

➢ Force structure decisions are not strongly driven by technical performance but are driven by:
  - Survivability and risk
  - Budget constraints
  - Mission options provided by each system and the combined systems vs. required missions
  - Politics