

# Conventional Counterforce Strike: An Option for Damage Limitation Operations against Medium-Sized Nuclear-Armed Adversaries?

Tong Zhao

Sam Nunn School of International  
Affairs, Georgia Institute of  
Technology

# Damage Limitation in Conflicts

- Damage limitation
  - Preemptive strike
  - Strike after being attacked to prevent further offensives
- Nuclear option
- Conventional option
  - Conventional weapons will permit the U.S. to “conduct a counterforce strike without crossing the nuclear threshold, and without killing millions”. (Keir A Lieber and Daryl G Press)
  - The risks associated with such conventional strike are “sufficiently low and manageable”, and “they do not constitute a reason to forgo acquiring the capability”. (National Research Council: U.S. Conventional Prompt Global Strike: Issues for 2008 and Beyond)

# Is Conventional Counterforce Strike Feasible?

- Research question: Is conventional counterforce strike feasible (against a sophisticated medium-sized nuclear-armed state)?
- Previous studies about conventional counterforce strike
  - Lieber and Press
  - ICBM (Inter-Continental Ballistic Missile)
- Theater nuclear forces vs. strategic nuclear forces
- Hypothetical scenario: U.S.-China conflict over Taiwan
  - Chinese theater nuclear forces

# Chinese Theater Nuclear Forces

Type/Chinese designation (US designation)	No. deployed	Year first deployed	Range (km)	Warhead loading	No. of warheads
<i>Land-based missiles with limited mobility</i>	24				24
DF-3A (CSS-2)	12	1971	3100	1 × 3.3 Mt	12
DF-4 (CSS-3)	12	1980	5500	1 × 3.3 Mt	12
<i>Land-based missiles with high mobility</i>	75				75
DF-21 (CSS-5)	60	1991	2100	1 × 200–300 kt	60
DF-31 (CSS-10 Mod 1)	~15	2006	>7200	1 × ..	15
<i>SLBMs</i>	(36)				(36)
JL-1 (CSS-N-3)	(12)	1986	>1770	1 × 200–300 kt	(12)
JL-2 (CSS-NX-14)	(24)	(2010)	>7200	1 × ..	(24)
<i>Aircraft</i>	>20				(40)
H-6 (B-6)	20	1965	3100	1 × bomb	(20)

# Precision-Guided Weapons in the U.S. Inventory

Type	Weight (kg)	Penetrating Munitions	Range (km)	Guidance Systems	CEP (m)	Delivery Systems
Guided air bombs						
MOP (Massive Ordnance Penetrator)	13600	9000 kg Warhead		INS, GPS		B-52, B-2
GBU-15	1125	BLU-109	8 - 25	Teleguidance system, INS, GPS	~ 3	F-15E
GBU-31 (JDAM)	1070	BLU-109	25	INS, GPS	< 6	B-1, B-2, B-52, F-14, F-15E, F-16, F-22, F/A-18
GBU-32 (JDAM)	450	BLU-110	25	INS, GPS	< 6	
GBU-38 (JDAM)	225	BLU-111	25	INS, GPS	< 6	
GBU-28	2115	BLU-122, BLU-113	5 - 40	Laser, GPS	< 10	B-2, F-15E
GBU-27	1070	BLU-116, BLU-109	5 - 40	Laser, GPS	< 10	F-15E, F-16
GBU-24	1070	BLU-116, BLU-109	5 - 40	Laser, GPS	< 10	F/A-18, F-14
GBU-10 (EGBU-10)	1070	BLU-109	3 - 25	Laser, GPS	< 10	B-52, F-14, F-15E, F-16, F/A-18
AGM-154B (JSOW)	450	BLU-108	< 130	INS, GPS		
Guided missiles						
AGM-130	1300	BLU-109	> 65	INS, GPS, Teleguided	< 3	F-15E
SLAM-ER	230	WDU-40?B	< 280	INS, GPS, Teleguided	~ 2.5	
JASSM	450		> 320	INS, GPS		
JASSM-ER	450		> 800	INS, GPS		
Long-rang cruise missiles						
TLAM	340	WDU-43/B	1600	INS, GPS, Automatic self-guided warhead	~ 5	
Tact Tomahawk	450	WDU-43/B	1600	INS, GPS, Automatic self-guided warhead	~ 5	
CALCM	1430	AUP	> 1000	INS, GPS	~ 2.5	

# Survivability of Land-Based Missiles (Limited Mobility)

- DF-3, DF-4
- Great Wall Project
- Maximum Destruction Ranges for Conventional Precision-Guided Weapons in Granite

<b>Weapon</b>	<b>Explosive Weight (kg)</b>	<b>Yield (kg, TNT equivalent)</b>	<b>Range of Destruction (m)</b>
BLU-109	243	365	14.7
BLU-116	243 or less	365 or less	14.7 or less
BLU-113	N.A.	304	13.8
SLAM-ER (AGM-84H)	230	345	14.4
JASSM (AGM-158A)	450	675	18
TLAM	450 or less	675 or less	18 or less
CALCM (AGM-86C/D)	N.A.	1,300	22.4
MOP (Massive Ordnance Penetrator)	3,500	5,250	35.7

# Survivability of Land-Based Missiles (High Mobility)

- DF-21,DF-31
- Transporter-erector-launcher (TEL)
- GPS jamming during final phase of reentry
- Problem with barrage strategy
  - Lethal radius is smaller than CEP

Weapon	Guidance system	CEP (m)	LR (m)	SSPK	P(2)	P(3)	P(4)	P(5)	P(6)
BLU-109	INS	~ 30	14.29314	0.146	0.270	0.376	0.467	0.545	0.611
BLU-116	Laser	~ 50	14.29314	0.055	0.107	0.156	0.203	0.247	0.288
BLU-113	Laser	~ 50	13.4479	0.049	0.095	0.140	0.182	0.222	0.260
SLAM-ER (AGM-84H)	INS, Teleguided	~ 12.5	14.02716	0.582	0.825	0.927	0.970	0.987	0.995
JASSM (AGM-158A)	INS	~ 12	17.54411	0.773	0.948	0.988	0.997	0.999	1.000
TLAM	INS, Automatic self-guided warhead	~ 25	17.54411	0.289	0.495	0.641	0.745	0.819	0.871
CALCM (AGM-86C/D)	INS	~ 12.5	21.82786	0.879	0.985	0.998	1.000	1.000	1.000
MOP (Massive Ordnance Penetrator)	INS	~ 25	34.76027	0.738	0.931	0.982	0.995	0.999	1.000

# Survivability of SLBM and Nuclear-Capable Bomber

- SLBM
  - JL-1, JL-2
  - Underground submarine facilities
  - Submerged tunnels and entrances
    - Problem of tracking submarines
- Nuclear-capable bomber
  - H-6
  - Runways



# Functional Defeat

- Damage limitation operation
- Chinese countermeasure
  - Redundant entrances
  - Camouflage
  - Decoys
- Historical record of identifying WMD facilities
  - Gulf War: facilities unidentified
  - Iraq War: facilities misidentified

# Future U.S. Conventional Prompt Global Strike Capability

<b>Weapon Systems</b>	<b>Launch Vehicles</b>	<b>Combat Range (nm, nautical mile)</b>	<b>Munitions Payload Capacity (lb)</b>	<b>Accuracy (meter)</b>	<b>Earliest Initial Operational Capability (IOC)</b>
Conventional Trident Modification (CTM)	Trident: D5	> 4,000	> 1,000	3-5	2011
Submarine-Launched Global Strike Missile (SLGSM)	2-stage rocket booster	3,000	2,000	3-5	2014-2015
Conventional Strike Missile (CSM)	Minotaur II and III	> 6,000	2,000	3-5	2016-2020
Hypersonic Cruise Missile	Launched on land, from aircraft, or from ships	2,000-3,000	1,000-2,000	3-5	2020-2024
Space Operations Vehicle	Trans-atmospheric Vehicle	Global coverage	1,000	~3	Later than 2020
Space-Based Launch Platform	Rockets	Global coverage	> 2,000	~3	Later than 2020

# Conclusion and Policy Implication

- **Conclusion**
  - The option of conventional counterforce strike
  - Ineffective (current and future capabilities)
  - Countermeasures
    - Robust underground facility
    - Early warning, air defense, missile defense
  - Uncertainty of intelligence
  - Inadvertent escalation
- **The way forward**
  - Drop the option and make it public
  - Clearly define Global Strike
  - Encourage China to stick to NFU
  - Study the possibility of regulating conventional weapons that have strategic significance