China's Nuclear Forces and Potential Vulnerabilities: Potential Implications for Posture and Strategy

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Overview

- Nuclear history and status
- New Deployments (DF-21, DF-31/31A, SSBN)
- Vulnerability Drives Modernization
- Targeting and Command-and-Control
- Conclusions

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Estimated Chinese Nuclear Forces 2012						
Type	**NATO Designation**	**Number**	**Year Deployed**	**Range (km)**	**Warhead x yield**	**Number of warheads**
Land-based ballistic missiles						
DF-3A	CSS-2	16	1971	3,000+	1 x 3.3 MT	16
DF-4	CSS-3	12	1980	5,400+	1 x 3.3 MT	12
DF-5A	CSS-4	20	1981	13,000+	1 x 4-5 MT	20
DF-21*	CSS-5 Mod 1/2	60*	1991	2,150	1 x 200-300 kt	60
DF-31	CSS-10 Mod 1	12	2006	7,200+	1 x 200-300 kt	12
DF-31A	CSS-10 Mod 2	20	2007	11,200+	1 x 200-300 kt	20
Submarine-launched ballistic missiles						
JL-1	CSS-NX-3	(12)	1986	1,000+	1 x 200-300 kt	(12)
JL-2	CSS-NX-4	(36)	(2013)	7,400+	1 x 200-300 kt	(36)
Aircraft						
H-6	B-6	~20	1965	3,000+	1 x bomb	~20
Fighters ?	?	?	1972-	-	1 x bomb	~20
Other						
DF-15	SRBM	350-400	1990	600	1 x ?	?
DH-10	LACM	200-500	2006	1,500+	1 x ?	?
Total						**~180****

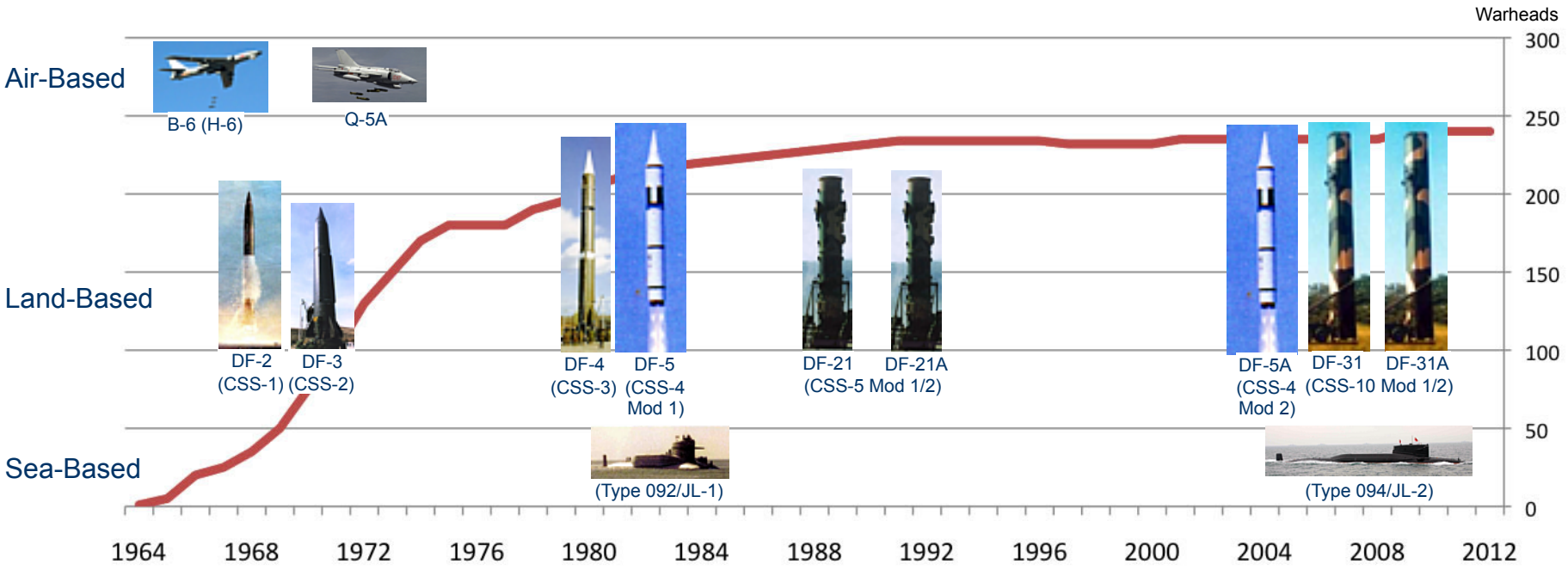
•Of 75-100 medium range ballistic missiles, the two nuclear types (DF-21/CSS-5 Mod 1 and DF-21A/CSS-5 Mod2) are counted here. Conventional versions include the DF-21C and DF-21D.
** Together with warheads assigned to operational forces, new warheads and spares make up a total stockpile of an estimated 240 warheads.

Status of Nuclear Forces

- Limited stockpile for diverse force of ICBMs, SLBM, aircraft, and possibly cruise missiles
- Old liquid-fuel land-based systems replacing with solid-fuel missiles
- SSBN force not yet operational but growing
- Probably bombs for H-6 aircraft; possible capability for other aircraft
- Possible nuclear capability for DF-15 SRBM
- Potential nuclear capability for DH-10 land-attack cruise missile

History of Nuclear Forces

- 3-4 periods of new introductions
- Mobility has always been key feature
- After build-up in 1970s, relatively stable stockpile size. Some increase expected over next decade



DF-21 (MRBM)

- Initial deployment 1988; in earnest from 1992
- Most numerous nuclear system: 75-100 missiles and launchers
- 4 types reported:
  - DF-21 / CSS-5 Mod 1 (nuclear)
  - DF-21A / CSS-5 Mod 2 (nuclear)
  - DF-21C (conventional)
  - DF-21D / CSS-5 Mod 5 (anti-ship)

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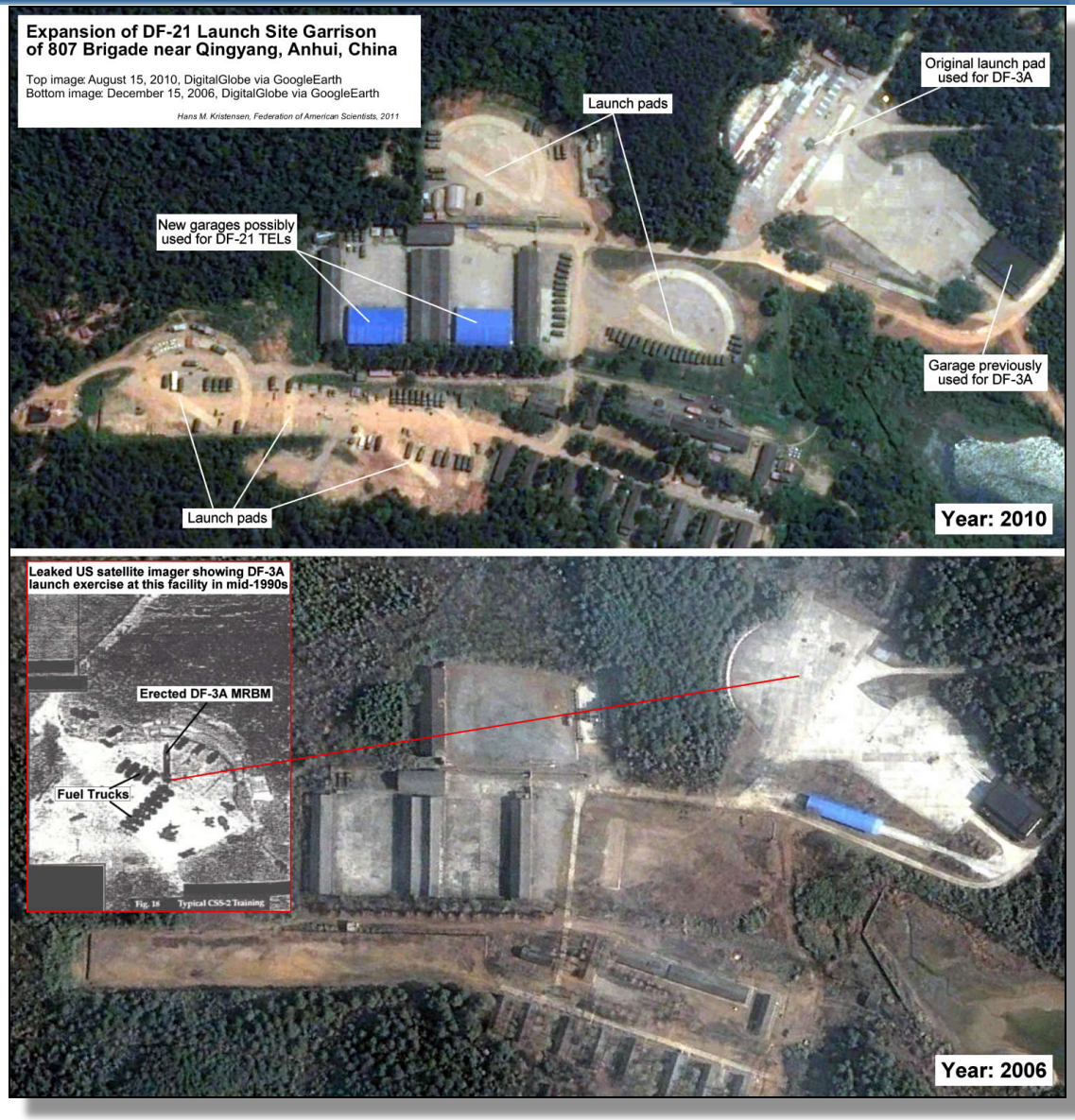
DF-21 (MRBM)

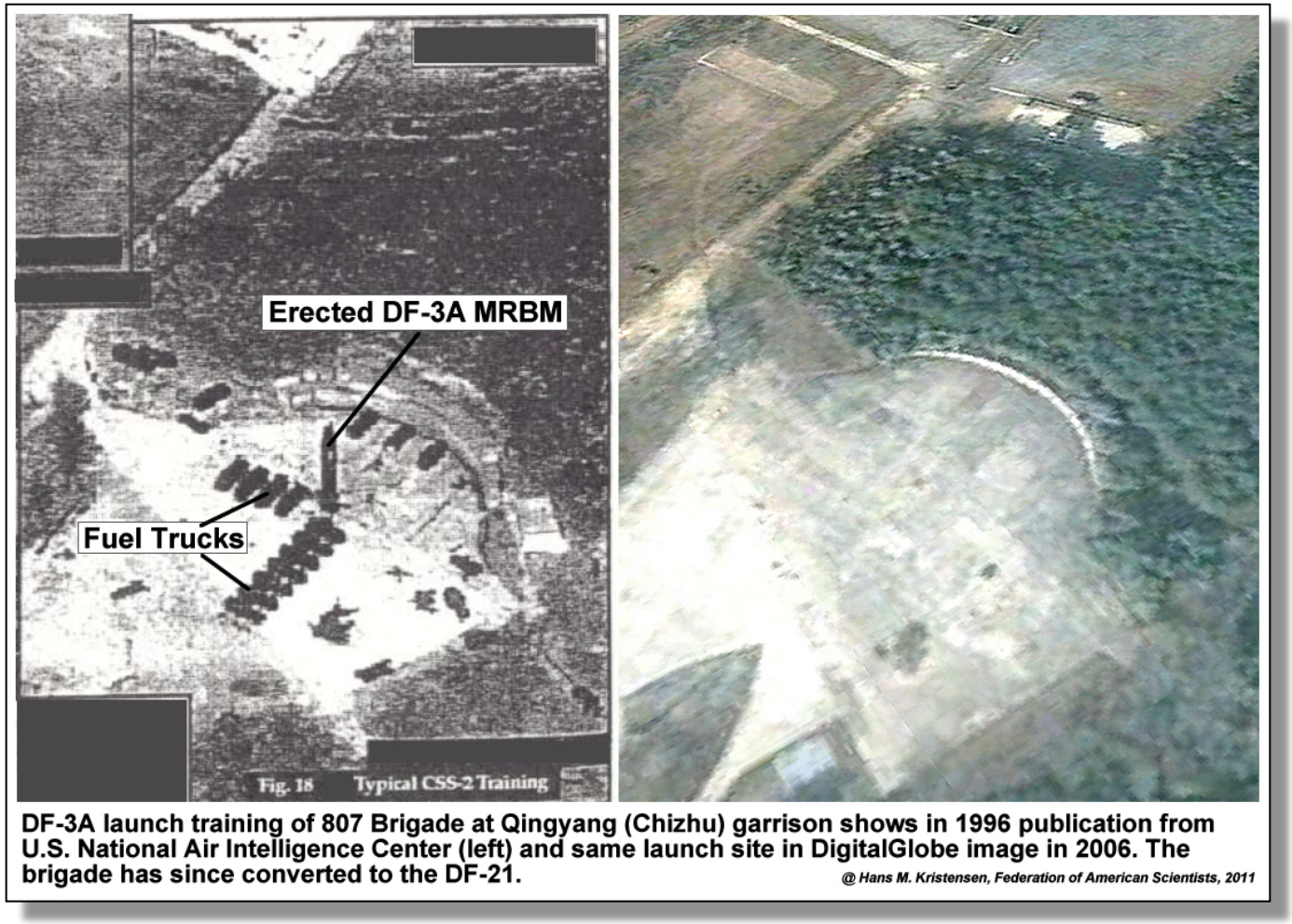
- 2005/2006: First public images of launch training near Dalingha(below)
- 2008: Description of large exercise area (Delingha/Da Qaidam)
- 2010: Detection of first DF-21C version in area (right)



DF-21 MRBM

- Monitoring deployment at Qingyang (Anhui) in eastern China
- 2006-2010: Upgrade from DF-3A to DF-21
- 2011: Identification of site as the one described in leaked U.S. intelligence document from 1996 (see next slide for comparison)

DF-21 MRBM: Identification of Qingyang Launch Site



DF-3A launch training of 807 Brigade at Qingyang (Chizhu) garrison shows in 1996 publication from U.S. National Air Intelligence Center (left) and same launch site in DigitalGlobe image in 2006. The brigade has since converted to the DF-21.

DF-31 and DF-31A ICBM

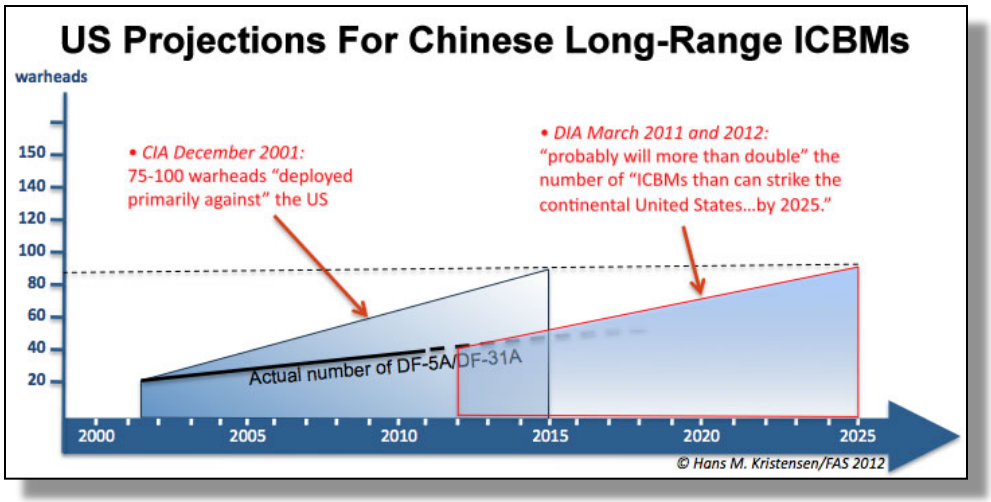
First true road-mobile ICBMs (single warhead)

DF-31A can target continental United States; DF-31 can not

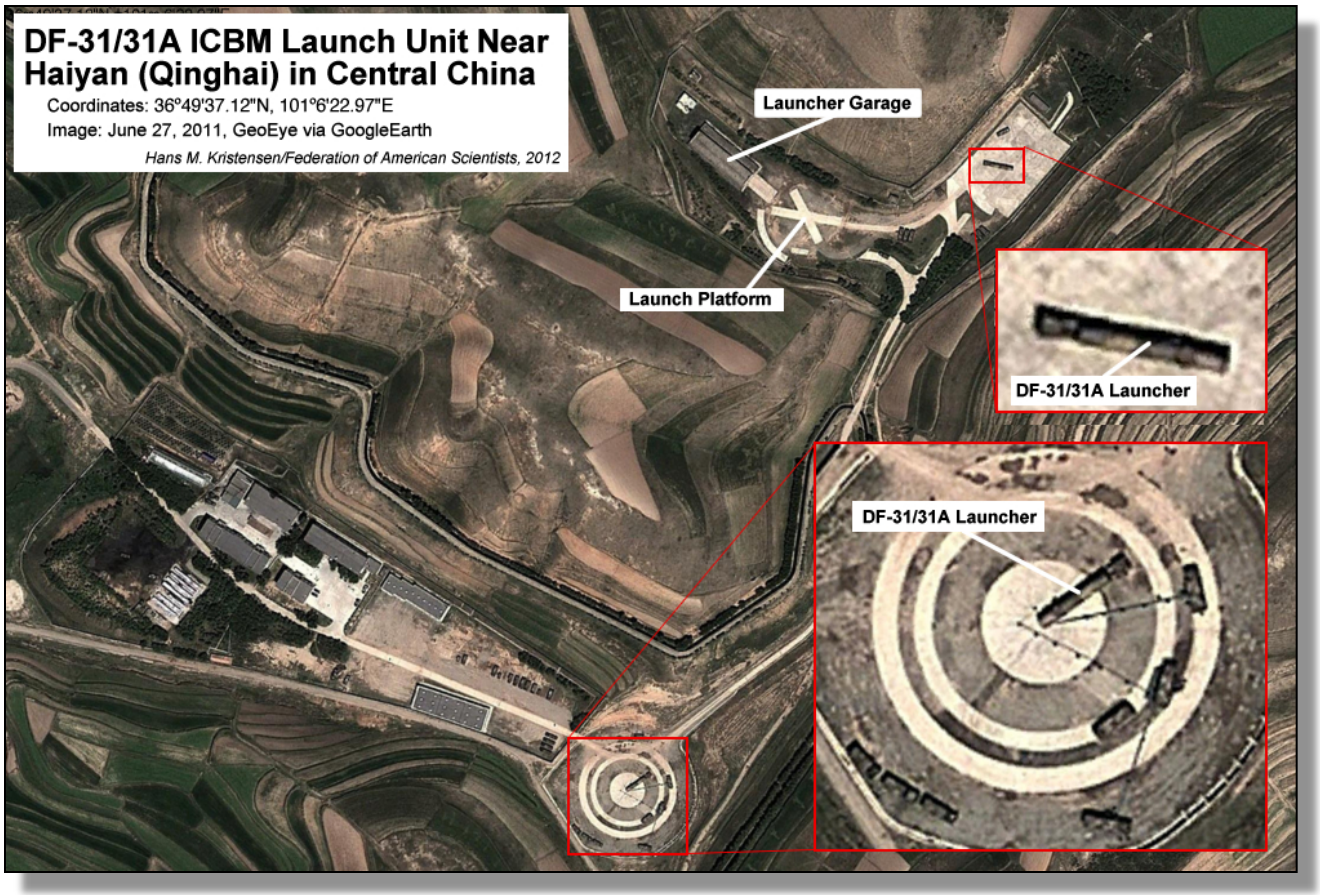
But which one is which (2009 top and 1999)?

DF-31A is key to U.S. projected increase of Chinese strategic nuclear capability against the continental United States by 2025:

Type	2012	2025
DF-5A	20	20
DF-31A	25	50-80+



DF-31 and DF-31A ICBM



2011: First DF-31(A) deployment seen at Haiyan (Qinghai)

Small launch unit possibly forward deployed from 812 Brigade base at Tianshui (Gansu)

Alignment of launcher points in direction of Russian SSBN base on Kamchatka

DF-31 and DF-31A ICBM

Deployment of DF-31 (A) at Haiyan coincides with DF-31 (A) visit to Datong garrison in June 2011

Datong is home to 809 Brigade with DF-21

The display gives an idea of the large number of support vehicles needed to operate the DF-31(A)

Jin-class SSBN

2007: Identified first new Jin-class (Type 094) SSBN on commercial satellite image (left)

Equipped to carry 12 Julang-2 SLBMs, a sea-based version of DF-31 ICBM, with a range of some 7,200 km

First-generation SSBN (Xia, Type 092) also had 12 SLBMs but with shorter range of approximately 1,700 km

Two Jin-class SSBNs seen at the Huludao shipyard

Jin-class SSBN

Two SSBN bases: North Fleet (Jianggezhuang near Qingdao) and South Fleet (Hainan Island)

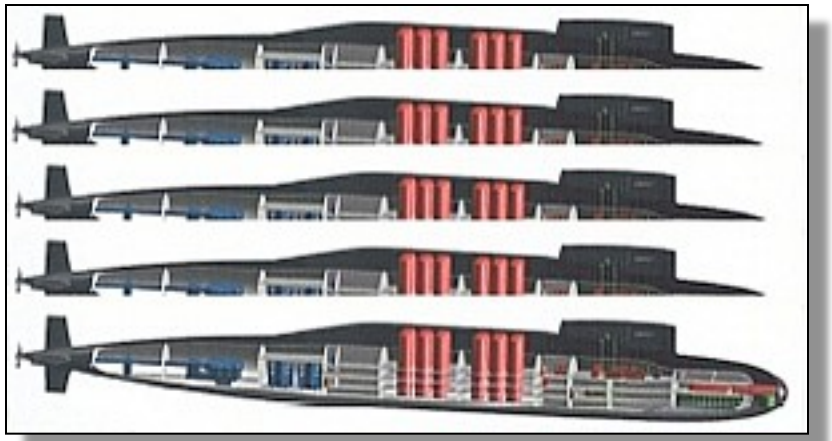
2006: Described Southern Fleet base expansion near Yulin on Hainan Island

2008: Described first Jin-class deployment to Hainan Island (image)

Also described first Chinese demagnetization facility

Jin-class SSBN

How Many Will China Build?



US Naval Intelligence projects China will build "probably five" Jin-class SSBNs. But how many have we seen so far?

October 2006: First Jin seen at Xiaopingdao

May 2007: Two Jins seen at Huludao shipyard

October 2007: Two Jins still at Huludao shipyard

February 2008: First Jin seen at Hainan Island

March 2009: Jin flashes missile tubes Xiaopingdao

January 2010: Two Jins still at Huludao shipyard

August 2010: Jin at Jianggezhuang

March 2011: Two Jins at Xiaopingdao

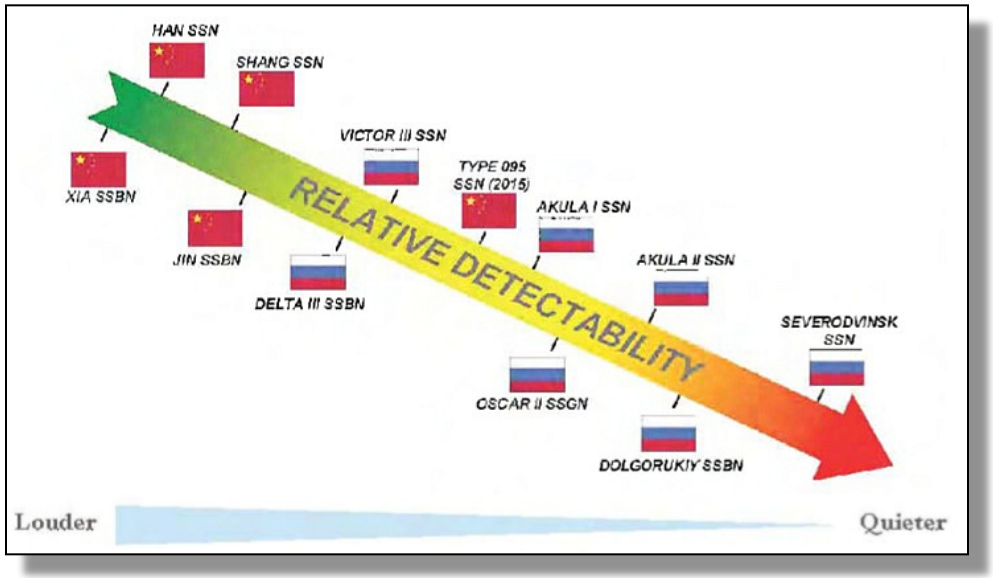
March 9, 2012: One Jin at Huludao shipyard

March 30, 2012: One Jin at Xiaopingdao

September 5, 2012: One Jin at Jianggezhuang (left)

Conclusion: Possibly 2-3 Jin SSBNs built so far

Jin-class SSBN



US Navy intelligence information indicates that Chinese Jin-class SSBNs are more noisy than Russian Delta III SSBNs developed in the early 1970s

Will China shift to building Type 096 SSBN?

What is the mission? The Pentagon says China is developing a "near-continuous" at-sea strategic deterrent

Chinese SSBNs have conducted a strategic deterrent patrol

PLA Navy has essentially no experience in operating SSBNs

PLA Navy has only limited capacity to communicate with SSBNs at sea

Chokepoints limit operational freedom; highly vulnerable to SSN/ASW

Chinese leadership unlikely to authorize deployment of nuclear weapons on SSBNs in peacetime

Jin-class SSBN

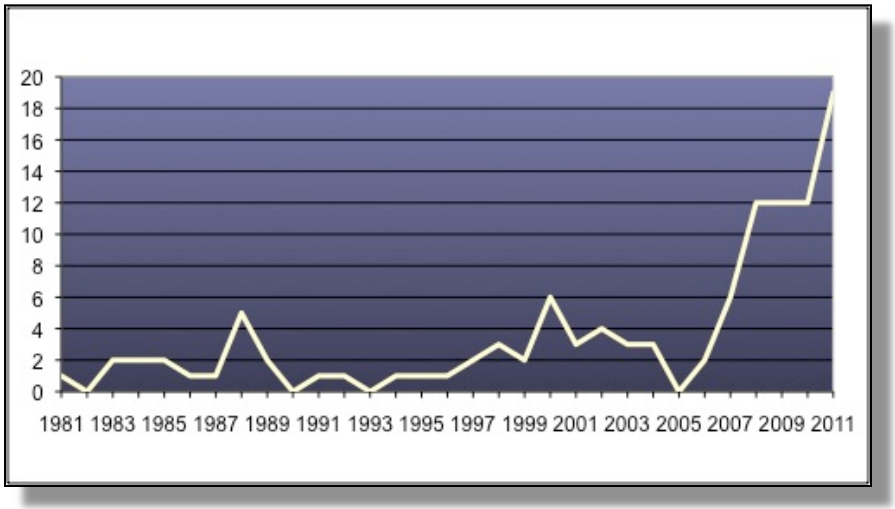
Chinese submarines don't sail a lot, but operations are increasing. SSBNs have never sailed on deterrence patrol: essentially no operational experience

Office of Naval Intelligence FOIA releases:

Patrol Year	SSBN	SSN/SS
2009	0	12
2010	0	11-13
2011	0-4	17-21

ONI deliberately increasing uncertainty from zero in 2009, to three in 2010, to five in 2011

The SSBN uncertainty of 0-4 means 0, because they have to have five-number uncertainty but obviously can't list "-1-2"



The data shows that Chinese submarines generally do not sail far or long. Over the past decade, however, the number of patrols has increased from less than 5 to nearly 20. Even so, that only averages one patrol every three years for each of China's 50 submarines. In reality, most patrols are probably done by a smaller group of the more advanced submarine types.

Vulnerability Drives Modernization

(and modernization drives modernization)

"China feels [its retaliatory nuclear] deterrent is at risk over the next decade because of U.S. targeting capabilities, missile accuracy, and potential ballistic missile defenses. Beijing is, therefore, modernizing and expanding its missile force to restore its deterrent value."

DIA 1999

"Sen. Cochran. The estimate that you have described to us today says that China is modernizing its strategic missile forces. Can you tell us how long this modernization effort has been underway?

Mr. Walpole. Yes, since the mid-1980s. China became concerned about the survivability of its silos when the U.S. deployed the Trident II-D5 because you could hit those silos.

Sen. Cochran. What do you think are the factors that are behind China's desire to modernize its military forces, and strategic military forces?

Mr. Walpole. Largely to move to mobile, more survivable systems."

CIA testimony 2002

"The new generation of mobile missiles is intended to ensure the viability of China's strategic deterrent in the face of continued missile defense advances in the United States and, to a lesser extent, Russia."

DOD 2012

Nuclear Alert Levels

Five-step nuclear readiness level from peacetime to launch order.

Launch Order	Employment of nuclear weapons in regional and strategic strike scenarios.
Class 1 Operational Preparations Alert	Politburo decides on nuclear response and transfers National Command Authority to CMC, which issues formal order to Second Artillery to move bases to highest alert. Base commanders get permission to launch a nuclear counterattack upon receipt of a formal launch order from the CMC.
Class 2 Operational Preparations Alert	Intelligence that enemy attack is underway. No CMC decision on response. Encoded preparatory order issued. Bases shift to maximum readiness. Air defense and ground units assigned to bases become fully activated.
Class 3 Operational Preparations Alert	Intelligence that enemy attack is probable. Second Artillery orders bases to upgrade security, accelerate preparations for launching missiles, and prepare to go to higher alert.
Standing War Preparations Alert	Day-to-day readiness level. No heightened threat level.

Source: John Lewis and Xue Litai, "Making China's Nuclear War Plan," *Bulletin of the Atomic Scientists*, September 2012.

Nuclear Targets

China widely seen to have countervalue strategy of focusing strikes against cities as opposed to a counterforce strategy of targeting other nuclear and military forces. Yet a new study appears to portray targeting plans as counterforce in nature.

Strategic Targets	Tactical (Regional) Targets
Strategic missile launch bases, naval and air bases, central military and political headquarters, political and economic centers, industrial bases, and vital communications hubs.	Presumed tactical nuclear weapons sites, tank formations, massed troops, and regional command-and-control centers.

Source: John Lewis and Xue Litai, "Making China's Nuclear War Plan," *Bulletin of the Atomic Scientists*, September 2012.

Tens of operational plans for CMC's use in crisis or war contingencies ranging from warnings and alerts to escalation scenarios and full-scale war. Launch orders apparently are issued as typed cards (!).

Command and Control Challenges

Nuclear warheads are not thought to be mated on missiles under normal circumstances but stored in separate facilities under control of the CMC. In a crisis, warheads would be released Second Artillery units, the Navy's SSBNs, bombers, and other systems that might have nuclear role.

China is upgrading command-and-control procedures and capabilities but inherent limitations exist:

> The Chinese "Navy has only a limited capacity to communicate with submarines at sea, and the PLA Navy has no experience in managing an SSBN fleet that performs strategic patrols with live nuclear warheads mated to missiles. Land-based mobile missiles may face similar command and control challenges in wartime."
>
> *DOD 2012*

Nuclear-Conventional Mix

Add to command-and-control limitations the mix of nuclear and conventional missiles and operations in China's posture: significantly complicates crisis stability and escalation management.

Inherent potential for misunderstandings in crisis and war. Readying of conventional DF-21 could be misinterpreted as preparations for nuclear attack and lead to escalation.

Mix is also issue for potential U.S. options against Chinese forces.

Conventional strikes against Chinese ASAT or conventional DF-21 launchers could escalate to nuclear use.

Decreasing Transparency

After complaining for years about Chinese lack of nuclear transparency, the Pentagon is now indirectly aiding Chinese secrecy by reducing what it says about Chinese nuclear forces

DOD Annual Report to Congress on China's military capabilities (2010):

China's Missile Force			
China's Missile Inventory	Ballistic and Cruise		*Estimated Range*
	Missiles	*Launchers*	
CSS-2	15-20	5-10	3,000+ km
CSS-3	15-20	10-15	5,400+ km
CSS-4	20	20	13,000+ km
DF-31	<10	<10	7,200+ km
DF-31A	10-15	10-15	11,200+ km
CSS-5	85-95	75-85	1,750+ km
CSS-6	350-400	90-110	600 km
CSS-7	700-750	120-140	300 km
DH-10	200-500	45-55	1,500+ km
JL-2	Developmental	Developmental	7,200+ km

DOD Annual Report to Congress on China's military capabilities (2012):

China's Missile Force			
System	Missiles	Launchers	Estimated Range
ICBM	50-75	50-75	5,500+ km
IRBM	5-20	5-20	3,000-5,500 km
MRBM	75-100	75-100	1,000-3,000 km
SRBM	1,000-1,200	200-250	< 1,000 km
GLCM	200-500	40-55	1,500+ km

Information about individual missile types deleted and replaced with estimates for overall categories of missiles. This makes it harder to verify the Pentagon's projection for Chinese nuclear missiles targeted against the continental United States

Conclusions

- While not an arms race in the sense of the U.S-Soviet Cold War competition, China and the United States are in a military competition with a cycle that drives modernizations on both sides
- China is in the middle of a third wave of nuclear modernization involving deployment of three – possibly more – new nuclear missile systems
- Modernization appears to be motivated by fear that older systems became vulnerable to U.S. (and Russian) offensive capabilities; mobile ICBMs are invulnerable if hidden but more vulnerable than silo ICBMs if found
- Development and deployment of U.S. missile defense and conventional global strike capabilities will further drive Chinese sense of vulnerability and need to deploy countermeasures; multiple warhead loading looms on horizon
- Inherent command-and-control limitations present significant challenges for crisis stability and escalation control; ICBM response and interpretation of loss of SSBN in crisis/war
- Growing mix of nuclear and conventional increases risk misunderstanding and escalation