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Chinese Nuclear Forces and U.S. Nuclear War Planning



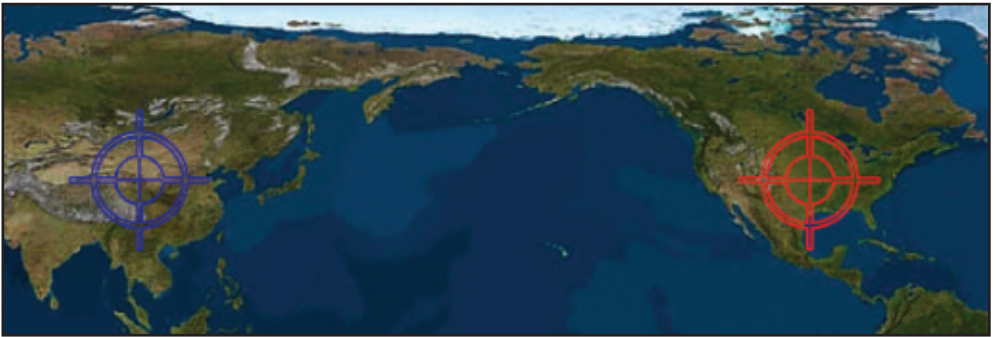
Hans M. Kristensen
Robert S. Norris
Matthew G. McKinzie

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Dedicated to Sally Lilienthal

ABOUT THE AUTHORS

Hans M. Kristensen is Director of the Nuclear Information Project at the Federation of American Scientists. He is co-author of the Nuclear Notebook column in the Bulletin of the Atomic Scientists and the World Nuclear Forces overview in the SIPRI Yearbook. His research focuses on the evolution of nuclear strategy and operations in the post-Cold War era, and his disclosure of preemptive nuclear strike options in the revised Doctrine for Joint Nuclear Operations in 2005 caused the Pentagon to cancel the document (see: <http://www.nukestrat.com/us/jcs/canceled.htm>). Contact: hkristensen@fas.org, (202) 454-4695.

Robert S. Norris is a senior research associate with the NRDC nuclear program and director of the Nuclear Weapons Databook project. He is co-editor of the Nuclear Weapons Databook series, the five-volume definitive encyclopedia of the nuclear weapons of the United States, Soviet Union/Russia, Britain, France and China. He is also the author of *Racing for the Bomb* (2002), a biography of General Leslie R. Groves, the head of the Manhattan Project, which built the atomic bomb during World War II. Contact: rnorris@nrdc.org, (202) 289-2369.

Matthew G. McKinzie is currently a scientific consultant to the Nuclear Program at the Natural Resources Defense Council. Since obtaining his Ph.D. in experimental nuclear physics, he has worked in the areas of nuclear non-proliferation, the environmental impacts of nuclear weapons production, homeland security and the application of satellite imagery and Geographic Information Systems (GIS) to human rights. Contact: mmckinzie@nrdc.org, (202) 299-4393 (cell).

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Federation of American Scientists
1717 K. Street, NW, Suite 209
Washington, D.C. 20036
Phone: 202-454-3300
Fax: 202-675-1010
Web: www.fas.org

Natural Resources Defense Council
1200 New York Avenue, NW, Suite 400
Washington, D.C. 20005
Phone: 202-289-6868
Fax: 202-289-1060
Web: www.nrdc.org

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ABBREVIATIONS

BAO.....	Basic Attack Option	MRBM.....	Medium-Range Ballistic Missile
CEP.....	Circular Error Probable	MRV.....	Multiple Reentry Vehicle
CINC.....	Commander in Chief	Mt.....	Megaton
CINCPAC.....	Commander in Chief U.S. Pacific Command	NIE.....	National Intelligence Estimate
CIA.....	Central Intelligence Agency	NMD.....	National Missile Defense
CISAC.....	Center for International Security and Cooperation (Stanford University)	NPR.....	Nuclear Posture Review
CNO.....	Chief of Naval Operations	NUWEP.....	Nuclear Weapons Employment Policy
CONPLAN.....	Concept Plan or (if put into effect) Contingency Plan	OPLAN.....	Operations Plans
DEFCON.....	Defense Condition	OSD.....	Office of the Secretary of Defense
DF.....	Dong Feng	PACOM.....	U.S. Pacific Command
DOD.....	Department of Defense	PLA.....	People's Liberation Army
DOE.....	Department of Energy	PRC.....	People's Republic of China
DIA.....	Defense Intelligence Agency	QDR.....	Quadrennial Defense Review
FOIA.....	Freedom of Information Act	RNO.....	Regional Nuclear Option
HF.....	High Frequency	RV.....	Reentry vehicle
HOB.....	Height Of Burst	SAC.....	Strategic Air Command
HPAC.....	Hazard Prediction Assessment Capability	SAM.....	Surface-to-Air Missile
ICBM.....	Intercontinental Ballistic Missile	SAO.....	Selected Attack Option
IRBM.....	Intermediate-Range Ballistic Missile	SIOP.....	Single Integrated Operational Plan
JL.....	Julang	SLBM.....	Sea-Launched Ballistic Missile
JSCP.....	Joint Strategic Capabilities Plan	SLCM.....	Sea-Launched Cruise Missile
km.....	Kilometer	SRF.....	Strategic Reserve Force
kt.....	kiloton	SRBM.....	Short-Range Ballistic Missile
LACM.....	Land-Attack Cruise Missile	SSBN.....	Nuclear-Powered Ballistic Missile Submarine
LAO.....	Limited Attack Option	SSGN.....	Nuclear-Powered Guided Missile Submarine
LEP.....	Life-Extension Program	SSN.....	Nuclear-Powered Attack Submarine
LF.....	Low Frequency	SS.....	Diesel-Powered Submarine
LNO.....	Limited Nuclear Option	STRATCOM.....	U.S. Strategic Command
LRBM.....	Long-Range Ballistic Missile	TACAMO.....	Take Charge And Move Out
MAO.....	Major Attack Option	TEL.....	Transporter Erector Launcher
Mk.....	Mark	VLF.....	Very Low Frequency
MIRV.....	Multiple Independently-Targetable Reentry Vehicle		



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Executive Summary

An incipient nuclear arms race is emerging between the United States and China. The two nations have been aiming their nuclear weapons at each other for decades, but now – with the absence of a definitive enemy such as the Soviet Union – the United States has elevated China to fill the void to help justify modernizing its armed forces in general, and its nuclear forces in particular. China, too, uses the United States as a rationale for modernizing its forces, and the two nations are becoming increasingly locked into a pattern of action-and-reaction reminiscent of the Cold War.

The U.S.- Chinese nuclear arms race is not on the scale of that between the United States and the Soviet Union that threatened the world with peril for four decades, but it shows worrisome signs of intensifying. This wasteful and potentially dangerous competition still can be avoided if wiser heads on both sides prevail and ensure that military competition and worst-case planning do not undermine and complicate the far more extensive and important economic, political, and cultural relationship between the two giants.

To better understand the nuclear relationship between China and the United States, the dynamics that drive it, and its potential consequences, we first examine Chinese nuclear forces in some detail, including their past development, their current status, and what future programs are underway according to the U.S. government's assessments and other sources. We then provide a history of U.S. nuclear targeting of China – although much is still shrouded in secrecy, and conclude by simulating two hypothetical nuclear strike scenarios that are likely to be close approximations of actual war plans: a U.S. strike against Chinese intercontinental ballistic missile silos and a Chinese strike against U.S. cities.¹

The United States Has Overpowering Superiority

Our principal finding is that the Chinese-U.S. nuclear relationship is dramatically disproportionate in favor of the United States and will remain so for the foreseeable future.² Although the United States has maintained extensive nuclear strike plans against Chinese targets for more than a half century, China has never responded by building large nuclear forces of its own and is unlikely to do so in the future. As a result, Chinese nuclear weapons are quantitatively and qualitatively much inferior to their U.S. counterparts:

- China's total stockpile numbers around 200 warheads; the United States has nearly 10,000. By 2015, after China deploys a new generation of ballistic missiles and the United States has completed its planned reductions, China may have some 220 warheads and the United States more than 5,000.
- China has about 20 intercontinental ballistic missiles (ICBMs) capable of reaching the continental United States; the United States has more than 830 missiles – most with multiple warheads – that can reach China. By 2015, when the U.S. intelligence community projects China will have 75 missiles primarily targeted against the United States, the U.S. force will include 780 land- and sea-based missiles.
- None of China's long-range nuclear forces are believed to be on alert; most U.S. ballistic missiles are on high alert ready to launch within minutes after receiving a launch order. By 2015, unlike today, some of China's long-range missiles presumably might deploy with their warheads mated but be incapable of quickly launching on warning.
- China's sole nuclear ballistic missile submarine (SSBN) has never gone on patrol. As a result, the crews of the new Jin-class (Type 094) SSBNs currently under construction will need to start almost from scratch to develop the operational and tactical skills and procedures that are essential if a sea-based deterrent is to be militarily effective and matter strategically. In comparison, U.S. SSBNs have conducted more than 3,600 deterrent patrols over the past 55 years. In 2005, the United States conducted 44 patrols, more than four times the number of SSBN patrols conducted by all other nuclear weapon states combined.
- China may be able to build two or three new SSBNs over the next decade, but they would be highly vulnerable to U.S. anti-submarine forces; the

U.S. Navy has 14 SSBNs and has moved the majority of them into the Pacific, where they operate with impunity.

- China may have a small number of aircraft with a secondary nuclear capability, but they would be severely tested by U.S. and allied air defense systems or in air-to-air combat. The United States operates 72 long-range bombers assigned missions with nuclear gravity bombs and land-attack cruise missiles.
- China does not have nuclear cruise missiles, although the U.S. intelligence community suspects it might develop such a capability in the future. The United States has more than 1,000 nuclear cruise missiles for delivery by aircraft and attack submarines.

The main reason for this disparity is the United States once deployed tens of thousands of warheads aimed at the Soviet Union during the Cold War, and although many have been retired, a substantial number remain today. Russia continues to be a primary driver for sustaining high U.S. warhead levels simply by virtue of the number of nuclear weapons and facilities it retains. Some portion of the U.S. force, however, is used to target China. We found China to have a larger than expected role in U.S. nuclear war planning activities and targeting strategy. We examined many declassified documents and were surprised to discover the extensive role China has played in U.S. nuclear planning over the years and by the large number and types of U.S. nuclear forces that have been assigned to hold targets in China at risk.³

The disparity also is evident in the weapons acquisition process in both countries. China, unlike the United States or Russia, has taken extraordinarily long periods of time to field new weapon systems. Due to a combination of policy decisions and technological deficiencies, China has not pursued these programs on a “crash” basis and in many instances the weapons were obsolete when they were finally deployed. Even after initial deployment, China’s build-up of additional forces has been slow. It is true that the Chinese have been working on improving their missiles and submarines for the past 15 to 20 years, but the pace of modernization grinds on and each annual Pentagon projection pushes the operational dates further into the future.

During our examination of the many unclassified and declassified U.S. government documents referenced in this report, we were struck by how exaggerated and often self-contradictory U.S. predictions of Chinese nuclear weapons and delivery systems have been throughout the decades. Estimates about the size of the

Chinese nuclear arsenal were grossly overstated, sometimes by several hundred percent, and timelines for when new systems would come on line were almost always too much too soon. The reasons for these misjudgments include China's ability to keep its capabilities hidden, a tendency among some U.S. intelligence analysts to overstate their conclusions, and the Pentagon's general inclination to assume the worst. This predisposition to exaggerate the Chinese threat unfortunately remains evident today.

To take one example, the U.S. intelligence community's core projection that the Chinese nuclear missile force will include 75 to 100 warheads primarily targeted against the United States by 2015 appears to be too high. The projection rests on very premature assumptions about the scale of the deployment of the DF-31A, one of three new long-range ballistic missiles China is developing. The intelligence community estimates that China will deploy some 40 to 55 of these missiles by 2015, all with single warheads, and 20 older DF-5A possibly with multiple warheads. U.S. nuclear prognosticators anticipated the Chinese would deploy the first 10 DF-31A by 2005, but that did not happen, and it is hard to envision that the prediction will be realized – especially since the missile has yet to be flight-tested.

Whatever the future Chinese nuclear posture will look like, the way these two nuclear powers choose to co-exist and influence one another in the next decade will have far-reaching implications for security in the Asian Pacific region. Some signs point to increased tensions, although recent efforts have sought to increase the direct military contacts between the two countries.⁴

China's No-First-Use Policy

Beyond the uncertainty of how many missiles China might build is the question of the evolution of its nuclear policy and whether it will maintain a no-first-use policy. A decade ago, several Western analysts suggested that Chinese thinking about nuclear strategy might be moving toward limited deterrence, which would mean a more dynamic targeting policy with the potential of using nuclear weapons first.⁵ Since then however, Chinese nuclear policy does not appear to have changed noticeably, nor has it affected operational nuclear weapons deployment in any important way. Chinese declaratory policy has always been one of “no first use” with a retaliatory minimum deterrent force aimed at countervalue (i.e., population centers) targets with forces maintained on very low alert or no alert at all.

Official statements continue to ascribe to a no-first-use policy. For example, a 2005 Chinese Foreign Ministry white paper refers to U.S. policy and to Chinese policy:

The [U.S.] nuclear deterrence strategy based on the first use of nuclear weapons has yet to be abandoned. The trend toward lowering the threshold for the use of nuclear weapons and developing new nuclear weapons is worrisome.

[The] nuclear weapon states should commit themselves to no first use of nuclear weapons and undertake unconditionally not to use or threaten to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones.

[The] Chinese government has solemnly declared that it would not be the first to use such weapons *at any time* and *in any circumstance*. Whether confronted with the nuclear threat and nuclear blackmail during the Cold War, or faced with the great changes that have taken place in the international security environment after the Cold War, China has always stayed true to its commitment. China's policy in this regard will remain unchanged in the future.⁶ (Emphasis added.)

A literal reading of the phrase “in any circumstance” suggests that even if Russia or the United States invaded China and threatened the political survival of the country, China would not resort to using nuclear weapons as long as the invader refrained from using nuclear weapons. This seems unlikely. China, like the other nuclear powers, probably would resort to the use of nuclear weapons in such an extreme situation. Its declaratory policy in fact does seem to influence acquisition and employment policies, with the result that the country keeps its forces relatively small. A more ambitious strategy would require larger forces. But words mean little to U.S. nuclear war planners, who deploy forces and aim warheads at China's actual capabilities.

Some Pentagon analysts fear that China's improved next-generation land- and sea-based ballistic missiles and cruise missiles may result in more ambitious and extensive deployment patterns and even some counterforce (e.g., opposition nuclear forces) targeting.⁷ Increased accuracy brings with it the possibility of more flexible strategies, and some U.S. analysts anticipate that China may alter its policy. For example, a recent Pentagon report stated: “As China improves its strategic forces, despite Beijing's ‘no-first-use’ pledge, there are indications that some strategists are reconsidering the conditions under which Beijing would employ theater nuclear weapons against U.S. forces in the region.”⁸

This theme was echoed in a 2005 RAND study prepared for the U.S. Air Force: “Some in China may also be contemplating the shift to a ‘limited nuclear deterrent’ capability that would allow China to target military sites as part of a damage limitation strategy – as opposed to a nuclear strategy that simply seeks to provide a secure second-strike capability.”⁹

The 2006 Department of Defense (DOD) annual report significantly expands on this theme by dedicating almost a full page to discussing possible changes to China’s employment policy.

“[T]he circle of military and civilian national security professionals discussing the value of China’s current ‘no-first-use’ nuclear policy is broader than previously assessed,” the report states. Scenarios where change could occur, DOD explains, involve cases where the use of force by China involves core interests, such as sovereignty or territorial claims, (including Taiwan). In such cases, “Beijing could claim military preemption as a strategically defensive act [and thereby] add ambiguity to the dimension of China’s policy of ‘no first use’ of nuclear weapons.”

According to the report, it appears that “this policy may be under discussion,” and it “remains to be seen . . . how the introduction of more capable and survivable nuclear systems in greater numbers will shape the terms of this debate or affect Beijing’s thinking about its nuclear options in the future.”¹⁰

In a prepared testimony before the House Armed Services Committee on June 22, 2006, Peter W. Rodman, the assistant secretary of defense for international security affairs, toned down the extent to which that debate may influence Chinese policy, though he concluded that it is still going on:

We see discussions, albeit limited, beneath the surface in China over the future of its nuclear doctrine, including a July 2005 statement by Major General Zhu Chenghu of the People’s Liberation Army National Defense University. The Chinese reassured Secretary [Donald] Rumsfeld that China’s ‘no-first-use’ policy remains unchanged and emphasized to me in Beijing earlier this month that there is no debate in China over the policy. We take China at its word on this point. However, the comments suggest Chinese specialists may be exploring internally the implications of China’s evolving force structure, and the inherent options that that force structure provides.¹¹

Of course, China already deploys theater nuclear weapons against U.S. forces in the region and has done so for four decades. It has been using liquid- and solid-

fueled missile forces on low or no alert without officially changing its no first use policy. These theater forces play a deterrent role vis-a-vis the U.S. military bases in the region, and are important elements in China's thinking about the role of their nuclear weapons. The U.S. nuclear posture, by contrast, is counterforce with highly accurate and flexible weapons maintained on high alert and capable of conducting decapitating first strikes on short notice with little or no warning.¹²

A Rationale for Spending and Operations

Military planners always need a rationale – a real or potential danger – for why they must have new weapons or new strategies and plans. With the dissolution of the Soviet Union, which occupied that role for almost 50 years, the United States has turned its attention to China to help fill the vacuum.¹³ The Chinese military likewise uses a similar dynamic to justify its actions, pointing to the capabilities and strategies of the United States. Militaries, it should be emphasized, are conservative institutions that try to think of every contingency that they may face in the future, remembering every battle of the past. That is their job, and it does not come cheap. No military, from Albania's to Zambia's, is ever satisfied with its current inventory of weapons or the training and competence of its personnel. Conditions can always be better and military establishments never tire of detailing how men and materiel can be improved.

The United States has by far the largest military budget in the world. It spends more per year than the defense budgets of the next 15 countries combined.¹⁵ It is difficult to obtain accurate figures for the Chinese military budget since the official People's Liberation Army (PLA) figures do not capture all of the costs. The official Chinese defense budget for 2006 is approximately \$30 billion.¹⁶ But that amount does not include several significant programs, the DOD says, including China's strategic forces. If everything is included, the Pentagon estimates, the total Chinese military budget is in the \$75 billion to \$105 billion range.¹⁷ A 2005 RAND study estimated that China spends \$69 billion to \$78 billion (in 2001 dollars), which is 2.3 percent to 2.8 percent of its gross domestic product.¹⁸ For comparison, the U.S. GDP percentage for the \$465 billion 2007 defense budget is 3.9 percent. In February 2006, the U.S. Defense Information Agency stated that China's defense budget had reached approximately \$82 billion.¹⁹ As for the future, DOD projects that China's defense budget "could rise three-fold or more by 2025" by some \$164 billion to at least \$246 billion.²⁰

Even if using the most extreme DOD estimate for China's defense budget (\$105 billion), which is probably too large, the U.S. defense budget is still at least four times larger than China's, and no doubt the proportion

“You look at the Air Force’s briefings, and they are all China, China, China.”

Senior U.S. defense official involved in the 2006 Quadrennial Defense Review

spent on nuclear weapons is probably even greater. Although the U.S. government provides far more information about its spending than China does, the United States – rather surprisingly – does not aggregate its budget to isolate nuclear weapons costs and it is difficult to estimate how much was spent throughout the Cold War.²¹ With much reduced forces from Cold War levels, current U.S. spending on nuclear weapons and their delivery systems is probably in the 5 percent to 7 percent range of the total budget, or about \$22 billion to \$30 billion. With a stockpile 50 times smaller than that of the United States and a much more basic infrastructure, the Chinese probably spend proportionally less of their total budget on nuclear weapons programs.

The Pentagon's preoccupation with China is evident in its most recent long-range planning document, the Quadrennial Defense Review (QDR), published in February 2006. “Of the major and emerging powers, China has the greatest potential to compete militarily with the United States and field disruptive military technologies that could over time off set traditional U.S. military advantages absent U.S. counter strategies.”²²

The tone of the QDR's warning is a significant change compared with 1997, when the Pentagon stated in its “Proliferation: Threat and Response” report that “China's resource allocation for overall defense and modernization for nuclear, chemical and missile forces is not expected to increase significantly. Current defense expenditures total approximately 5 percent of China's total GDP [double the subsequent RAND figure from 2005]. It is estimated that actual military spending will increase at a rate similar to China's economic growth.”²³ Three years later, shortly before the Bush administration took over, the Pentagon described China's modernization and intentions this way:

[B]y even the most generous accounts, they're spending only a fraction of what we're spending on an annual basis on defense, to support a military that is much larger and a military that is much more primitively equipped than our military. So they have a very significant way to go by Western standards.

They are far away from having air superiority over the Taiwan Straits, which they need if they were to contemplate military action.... [T]hey have a relatively slow modernization program for their tactical air force, and they have what appears to be a plan to modernize their fleet air defenses, but there again, it's not a dramatic program.

In terms of strategic buildup, they don't seem to have aspirations for a large strategic force. Their strategic force is really quite small. They do have plans to enlarge it, but they don't seem to be break-neck plans at this stage.²⁴

The earlier QDR did not mention China at all, while the 2006 QDR mentions China a dozen times and dedicates more than a full page to describing the country's military modernization. That modernization, the 2006 QDR explained, "has accelerated since the mid-to-late 1990s in response to central leadership demands to develop military options against Taiwan scenarios." The "pace and scope of China's military build-up already puts regional military balances at risk." China's large-scale investments in offensive capabilities such as ballistic and cruise missiles, more advanced submarines, and "strategic nuclear strike from modern, sophisticated land and sea-based systems" directly affect U.S. military force requirements and "place a premium on forces capable of sustained operations at great distances into denied areas."²⁵

Part of China's motivation to modernize comes from observing U.S. capabilities during the 1991 Gulf War, the 1995 bombing of Yugoslavia, and the 2003 invasion of Iraq. These events were earthshaking for Chinese officials and planners for they revealed how inadequate the PLA would be against high-tech, integrated, accurate U.S. forces. Even so, despite China's build-up of short-range ballistic missile forces across from Taiwan and large-scale military exercises in 1996, China still does not possess sufficient forces to conquer Taiwan.

Yet in terms of nuclear forces, both countries point to what the other is doing as a justification to modernize. China is about to deploy three new long-range ballistic missiles that the U.S. intelligence community says were developed in response to the U.S. deployment of more accurate Trident sea-launched ballistic missiles in the early 1980s. The United States has increased its capability to target Chinese (and Russian) mobile missiles and the Pentagon is arguing that the long-term outlook for China's long-range ballistic missile force requires increased targeting of Chinese forces. U.S. military planners say ballistic missile defense system planning will include Chinese long-range missiles, and China may equip older missiles with multiple warheads or deploy more missiles than

otherwise to compensate for the effect of a U.S. missile defense system. The pattern is familiar from the U.S.-Soviet arms race during the Cold War.

The Consequences of a Nuclear Strike

We conclude the report with a section that describes two nuclear strike scenarios (and several potential Chinese options) and calculates the casualties that both sides would suffer as a result. The simulations show with chilling clarity that while the nuclear capabilities of the two countries are quite different, the civilian casualties resulting from the use of just a small part of either country's nuclear arsenal would be overwhelming. Whether the strategy is one of "countervalue" or "counterforce," and whether the missiles are inaccurate or accurate, tens of millions of innocent people would die and more would suffer in a nuclear attack against either country.

Our first scenario concludes that 1.5 million to 26 million casualties would result from a U.S. attack on Chinese ICBMs, depending upon the type and number of warheads used. Strike plans maintained by the Pentagon probably include options for significantly larger attacks. The declassified documents we examined reveal that nuclear war planning against China traditionally has involved much larger strikes against a broad range of facilities. Even so, the Pentagon has advocated – and the White House has authorized – additional nuclear planning against China. It is hard to see where deterrence ends and nuclear warfighting begins, but with U.S. planners pursuing "more discriminate capabilities for selected target types through lower yields, improved accuracy, and enhanced penetration," the quest of the never sufficiently "credible deterrent" seems to be entering its next phase.²⁶

Our second scenario concludes that 15 million to 40 million casualties would result from a Chinese attack on 20 populous U.S. cities. As if that is not enough, China is in the final phase of a nuclear facelift that the U.S. intelligence community has predicted will result in 75 to 100 warheads "primarily targeted" against the United States by 2015. Whether this projection will come true is not certain, but Chinese leaders apparently have decided that its antiquated long-range ballistic missile force is becoming vulnerable and a new generation of ICBMs is needed to ensure the credibility of China's minimum deterrent. Our calculations show that the increase in warheads anticipated by the U.S. intelligence community could potentially hold as many as 75 major U.S. cities at risk and inflict more than 50 million casualties.

Whatever number of ICBMs China eventually decides to deploy, the new situation will alter the deterrent relationship, but in ways not normally considered in the public debate. A “several-fold” increase in the number of warheads “primarily targeted” against the United States would not necessarily result in a “several-fold” increase in the number of casualties that China could inflict in the United States.

Our calculations show that if China decided to deploy 100 warheads, the maximum envisioned by the U.S. intelligence community, it would result in a nearly 70 percent *reduction* in megatonnage due to the replacement of large-yield warheads with smaller-yield warheads. This, in turn, would result in a 25 percent to 50 percent *reduction* in the number of potential casualties that would result from a Chinese countervalue strike against the continental United States.

If China instead decides to deploy 75 warheads against the United States, including the 4 megaton warheads on 20 DF-5A ICBMs, it could potentially cause an additional 10 million casualties in the continental United States. But in the arcane world of nuclear war planning, 50 million casualties are not that much different than 40 million casualties. Since the United States would probably be equally deterred by either one, it begs the question to the Chinese: Why the extra 10 million? Or to put it another way, why does the Pentagon imply that a China that can inflict 50 million casualties rather than 40 million is a greater threat?

Of course there are many nuances to answering those questions, but since the ability to inflict casualties is fundamental to the Chinese countervalue strategy, it strongly suggests that the primary objective of the current Chinese modernization is to ensure the effectiveness of its deterrent rather than to increase its ability to inflict casualties and destruction.

Whatever the Chinese nuclear arsenal may be in 2015, the nuclear war scenarios we describe vividly show how destructive even relatively small-scale attacks would be. They are a stark reminder to policymakers and military planners that a modest-sized arsenal can suffice as a deterrent and that more capability does not necessarily mean more security, and in many cases results in less security. The additional nuclear capabilities that advocates in both countries argue are necessary to ensure a “credible” deterrent add nothing to either side’s security, but would, if ever used, only increase insecurity.

Conclusions and Recommendations: We Don't Need Another Cold War

The Pentagon often depicts the Chinese military in general – and their nuclear forces in particular – as looming threats and uses those threats to justify its own programs and plans. This is similar to the approach used with the Soviet Union during the Cold War, but it might prove counterproductive in this case. The U. S. relationship with China is vastly different. Economically, China supplies the United States with an enormous array of goods and holds billions of dollars of its debt. The countries are bound together in ways that were inconceivable in the U.S.-Soviet relationship.

Neither the United States nor China would benefit from an arms race that would only heighten tensions, fuel animosity, harm both economies, and increase the chance of a military confrontation.

It is true that China is modernizing its conventional military forces and its nuclear systems. This is hardly surprising given it is every military's goal to improve itself. What is evident in the Chinese case is that the pace of the effort is taking a long time, and will not significantly affect the disproportionate relationship that has characterized two nations' nuclear forces for 40 years. Once China's current upgrade of long-range missiles is completed, the Chinese nuclear arsenal will not be significantly bigger than it is today.

The predictions by the U.S. intelligence community and the Pentagon about the size of the Chinese nuclear arsenal need to be improved. They have traditionally been inaccurate, and the estimated timelines for introducing new systems have been almost consistently wrong. Likewise, private institutions and certain news organizations frequently inflate the Chinese threat even beyond the estimates made by the Pentagon, which poisons the atmosphere.

Inflated and worst-case descriptions of China's nuclear programs feed on the lack of information. The Chinese could counter this process by being more open and transparent about their military budget and the scale and scope of their programs. For its part, the United States must precisely define what China's legitimate roles are as a regional power. Thus far it seems that the United States considers anything China does to be illegitimate.

In the nuclear strike scenarios we analyzed, we saw how potentially destructive even a small scale Chinese attack could be on the United States. Chinese war planners have no doubt done similar calculations and have presumably answered the question of “how much is enough” to their satisfaction. Whether it is two dozen warheads capable of hitting the United States or two or three times that many makes little real difference given the catastrophic nature of the weapons. Those in the Pentagon and elsewhere who bang the drum about how additional Chinese weapons constitute a grave “threat” might want to examine our scenarios.

Finally, the United States should show leadership in advancing disarmament and nonproliferation goals by diminishing the role of nuclear weapons in its security policy. An important first step would be to take its weapons off high alert and make additional deep reductions in the numbers of strategic nuclear weapons. Rather than letting nuclear deterrence determine how U.S.-Chinese relations evolve in the future, both countries need to constrain their nuclear force deployments and modernizations and begin direct discussions on how to limit the role and numbers of nuclear weapons.

The Debate Over China's Nuclear Modernization

China, like the other nuclear weapon states, is modernizing, upgrading and improving its nuclear forces. The debate about this modernization has been largely one-sided, with the U.S. government offering a steady refrain that it indicates aggressive intentions, sprinkled with selective highlights of what those developments are. Outside cheerleaders from the rightwing media and conservative think tanks chime in with fervid predictions about the future threat and what it means. The Chinese government has not directly countered this campaign. Rather, it has retreated into its own world of state secrecy, concealing the scale, scope and purpose of its military modernization, and finger-pointed at the United States. Over the past decade, the debate has centered on the following claims about Chinese nuclear forces:

- China is modernizing its nuclear forces.
- The number of warheads targeted primarily against the U.S. mainland will increase “several-fold” in the next decade.
- Three new solid-fuel ballistic missiles under development will be mobile, harder to locate, more accurate, and have greater range.
- Some missiles may be equipped with multiple warheads (the U.S. government does not believe the new missiles will have this capability but an older missile may be equipped with them).

**Figure 1:
Man to Man**



U.S. Secretary of Defense Donald Rumsfeld shakes hands with Chinese Defense Minister Gao Gangchuan in Beijing in October 2005. The two officials are responsible for nuclear strike plans that would kill tens of millions of civilians in China and the United States if carried out.

Image: DOD

- A new strategic submarine is under development with a new ballistic missile. The submarine will be quieter and more reliable than the first generation SSBN (Xia) and may be able to target some parts of the United States.
- Land-attack cruise missiles are under development, some of which may have nuclear capability.

China is clearly modernizing its nuclear forces (it is also modernizing its much larger conventional forces). Modernization does not occur in a vacuum, however, but within political and military relationships with other major powers. Context and explication is needed. Moreover, important questions need to be addressed without resorting to worst-case thinking: How fast are the programs proceeding? Are they changing in qualitative ways? What will be the eventual size of the forces? How is the modernization related to China's emerging status as a major regional power? In what ways is Chinese nuclear modernization influenced by past and present U.S. military posturing against China? To what extent do U.S. military programs and operations trigger Chinese moves that are not in the interest of the United States or its allies? Is capability-based military planning counterproductive and out of sync with long-term aspirations for a non-contentious relationship with China?

Whatever else one might say about Chinese nuclear efforts, they clearly are not "crash" programs. The characteristic feature of Chinese military modernization has been how long it has taken them to research, design, develop, deploy and operate a new system. The Chinese have been engaged for years and years in developing new nuclear systems, but compared with the United States and Russia their efforts have been modest.

A central question that must be asked with regard to China has to do with its intentions. Admittedly, these are difficult to infer. The Chinese government is notoriously secretive about its nuclear weapons programs, and in the minds of some U.S. government officials, suspicion abounds.

As Secretary of Defense Donald Rumsfeld said in a speech about the Asian security situation, "China appears to be expanding its missile forces, allowing them to reach targets in many areas of the world, not just the Pacific region, while expanding its missile capabilities within this region. China is also improving its ability to project power, and developing advanced systems of military technology."

With words that must have caused bewilderment in Beijing, Rumsfeld went on to say, “since no nation threatens China, one must wonder: Why this growing investment? Why these continuing large and expanding arms purchases? Why these continuing robust deployments?”²⁷

Figure 2: Wondering About Chinese Motivations:	
Question:	Answers:
<p>“[S]ince no nation threatens China, one must wonder: Why this growing investment? Why these continuing large and expanding arms purchases? Why these continuing robust deployments?”</p> <p style="text-align: right;"><i>Donald H. Rumsfeld, Secretary of Defense, June 4, 2005</i></p>	<p>“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.”</p> <p style="text-align: right;"><i>Defense Intelligence Agency, July 1999</i></p>
	<p>“China became concerned about the survivability of its silos when the U.S. deployed the Trident II-D5 because you could hit those silos.”</p> <p style="text-align: right;"><i>Robert D. Walpole, Central Intelligence Agency, March 11, 2002</i></p>

As the official who resides over a large U.S. military reorganization partly directed toward China, Rumsfeld’s question seems disingenuous not least because estimates made by the U.S. intelligence community plainly have stated that China’s nuclear modernization is driven – at least in part – by U.S. actions and deployments (see Figure 2).²⁸ A RAND Corporation report funded by the Pentagon and published in 2005 provides additional details about the PLA’s threat perceptions and its assessment of the international security environment:

The most important threats for the PLA currently include:

- U.S. military and foreign policies (especially those related to Taiwan)
- Japan’s reemergence as a regional power
- India’s growing military power and regional influence
- Border and coastal defense
- Defending territorial waters and airspace.²⁹

Another important factor in China’s nuclear modernization, according to the U.S. intelligence community and the Pentagon, is the U.S. ballistic missile defense system. Although Under Secretary of Defense for Policy Douglas J. Feith played down the impact of a ballistic missile defense system on China nuclear

modernization by stating before the Senate Foreign Relations Committee in July 2001 that China “will continue this modernization whether or not we build missile defenses,”³⁰ the office of the secretary of defense knew very well that that characterization was both disingenuous and misleading. In the report it delivered to Congress the following year, the DOD said it anticipated China would take “measures to improve its ability to defeat the defense system in order to preserve its strategic deterrent. The measures likely will include improved penetration packages for its ICBMs, an increase in the number of deployed ICBMs, and perhaps development of a multiple warhead system for an ICBM, most likely for the CSS-4.”³¹

Moreover, in July 2005, Air Force Lt. Gen. Henry A. Obering III, the director of the Missile Defense Agency responsible for developing U.S. missile defense systems, plainly stated that U.S. missile defense planning should take China into consideration. “What... we have to do is, in our development program, be able to address the Chinese capabilities, because that’s prudent,” Obering said.³²

This brief background helps provide context and may explain why China is doing some of the things it is doing. Rumsfeld acknowledges some of this in his own 2004 report on Chinese military forces, where five pages are dedicated to describing China’s many external national security concerns.³³ Although the United States is not likely to attack China tomorrow, Beijing must base its military planning on the capabilities that potential adversaries have, not on their statements, the same standard that Rumsfeld insists the U.S. military must follow in its planning.

That planning has, in turn, prompted the White House to warn Beijing that its non-transparent expansion of military capabilities is inherently contradictory to peace in East Asia because it creates mistrust. The Bush administration’s policy, as expressed in the *National Security Strategy*, therefore is to “encourage China to make the right strategic choices for its people, while we hedge against other possibilities.”³⁴

The Office of the Secretary of Defense

Hedging means planning for the worst, however, and the offensive U.S. posture this strategy spawns is what Beijing sees as the real expression of U.S. intentions toward China. Prudent military planning on both sides therefore feeds a vicious

cycle that drives the very posture it is said to hedge against. On the U.S. side, the guidance that directs this planning primarily comes from the Office of the Secretary of Defense (OSD). One example of this is the 2001 Nuclear Posture Review (NPR), part of which was leaked to the public, which concluded:

Due to the combination of China's still developing strategic objectives and its ongoing modernization of its nuclear and non nuclear forces, China is a country that could be involved in an immediate or potential contingency.³⁵

The "immediate" contingency referred to is a potential conflict over Taiwan, which is what most analysts fear could trigger a U.S.- Chinese military clash. As the NPR was nearing completion, the Pentagon wrote up a new war plan (Operations Plan (OPLAN) 5077) for defending Taiwan against a Chinese attack. Between 2003 and 2005, the Pentagon fine-tuned OPLAN 5077 to include maritime interception operations in the Taiwan Straits, attacks on targets on the Chinese mainland, information warfare and non-kinetic options, and even the potential use of U.S. nuclear weapons.³⁶ In February 2006, for the first time OSD elevated China to the top of the list (above Russia) of large-scale military threats facing the United States. According to the QDR:

Of the major and emerging powers, China has the greatest potential to compete militarily with the United States and field disruptive military technologies that could over time offset traditional U.S. military advantages absent U.S. counter strategies.³⁷

The QDR noted that "China continues to invest heavily in its military, particularly in its strategic arsenal and capabilities designed to improve its ability to project power beyond its borders." This "military modernization has accelerated since the mid-to-late 1990s," the QDR stated.³⁸ At the same time that the Office of the Secretary of Defense under Donald Rumsfeld has curtailed the information provided in the Annual Report to the President and the Congress to an absolute minimum,³⁹ the QDR complained (justifiably) that secrecy "envelopes most aspects of Chinese security affairs," and that the "outside world has little knowledge of Chinese motivations and decision-making or of key capabilities supporting its military modernization."⁴⁰

An important source of information about what China is doing is a series of reports to Congress by the Pentagon that are required by law. The FY2000

National Defense Authorization Act (Section 1202) directed the secretary of defense to submit a report "... on the current and future military strategy of the People's Republic of China. The report shall address the current and probable future course of military-technological development on the People's Liberation Army and the tenets and probable development of Chinese grand strategy, security strategy, and military strategy, and of the military organizations and operational concepts, through the next 20 years."⁴¹

Known as the *Military Power of the People's Republic of China*, the reports resemble the Reagan administration's *Soviet Military Power* series, albeit in a much less glossy or dramatic format, and have become a principal source to follow Chinese military developments and understand Pentagon thinking.

The OSD describes the *Military Power of the People's Republic of China* as "a product of intensive interagency coordination" with the State Department, the National Security Council and the intelligence community. The OSD says the report describes "the military component of China's rise based on the best available information," and presents "our findings in a factual, descriptive, analytical, and detailed way. We are not attempting to prove or disprove a China 'threat.' Our goal is to let the facts speak for themselves, and to contribute useful information to the public discussion."⁴²

The tone of the reports, however, has changed considerably during the current Bush administration. The 1997 report during the Clinton era described significant developments in China's modernization, but made a cautious overall projection:

Evidence suggests ... that China will develop her military strength at a measured pace. A more rapid or large-scale military build-up is seen by the Chinese leadership as unnecessary and detrimental to continued economic growth.... China's nuclear strategy probably will continue to emphasize the development of a nuclear retaliatory capability as a deterrent against the potential use of nuclear weapons by existing nuclear weapons states. Ongoing ballistic missile modernization encompasses a shift from liquid to solid fuel missiles.⁴³

The 2005 report, in contrast, portrayed a more dynamic modernization of "survivable" forces with a "counterstrike" capability against a wide range of specific countries:

China is qualitatively and quantitatively improving its long-range nuclear missile force. China is pursuing strategic forces modernization to provide a credible, survivable nuclear deterrent and counterstrike capability in response to its perception of an increasingly complex nuclear security environment. The PLA Second Artillery is fielding mobile, more survivable missiles capable of targeting the United States, Japan, India, Russia, and other targets in Asia and the rest of the world.⁴⁴

Estimates From the Intelligence Community

A second major source of U.S. government estimates about Chinese nuclear forces comes from the director of central intelligence's annual briefings to Congress and reports published by the Central Intelligence Agency (CIA) and the Defense Intelligence Agency (DIA). In the aftermath of the reorganization of the intelligence community, the overall intelligence responsibility now falls to the director of national intelligence.

Director of national intelligence, John D. Negroponte, warned of China's military ambitions before the Senate Select Committee on Intelligence on February 2, 2006. "China's military is vigorously pursuing a modernization program: a full suite of modern weapons and hardware for a large proportion of its overall force structure; designs for a more effective operational doctrine at the tactical and theater level; training reforms; and wide-ranging improvements in logistics, administration, financial management, mobilization, and other critical support functions."⁴⁵ China's increased wealth has "fueled a military modernization program that has steadily increased Beijing's force projection capabilities," and the country "may become a peer competitor to the United States at some point," Negroponte warned. (Emphasis added.) The "rise of emerging powers like China" is one of the threats that "demand heightened vigilance from our intelligence community."⁴⁶

Some of the most important elements of the U.S. claims about Chinese nuclear weapons modernizations come from the CIA's National Intelligence Estimates (NIEs), which occasionally are published in unclassified versions. The most important of these is the *Foreign Missile Developments and the Ballistic Missile Threat Through 2015*, published in December 2001, which contained what has since become the standard projection for the future size of Chinese nuclear forces:

The intelligence community projects that Chinese ballistic missile forces will increase several-fold by 2015, but Beijing's future ICBM force deployed primarily against the United States – which will number around 75 to 100 warheads – will remain considerably smaller and less capable than the strategic missile forces of Russia and the United States.⁴⁷

The director of the Defense Intelligence Agency also presents a briefing to Congress titled *Current and Projected National Security Threats to the United States*. On February 28, 2006, Lt. Gen. Michael D. Maples presented DIA's estimates to the Senate Armed Services Committee. About China he said:

One of China's top military priorities is to strengthen and modernize its strategic nuclear deterrent force by increasing its size, accuracy and survivability. It is likely the number of deployed Chinese nuclear-armed theater and strategic systems will increase in the next several years. China currently has more than 100 nuclear warheads. We believe China has sufficient fissile material to support this growth.⁴⁸

The estimate of "more than 100 nuclear warheads" and sufficient fissile material for more is consistent (although less detailed) with previous statements made by the intelligence community over the past decade. DIA's briefing also echoed DOD's assessment of a more dynamic emerging Chinese nuclear doctrine:

China continues to expand and modernize its ballistic missile forces to increase their survivability and warfighting capabilities, enhance their coercion and deterrence value and overcome ballistic missile defenses.⁴⁹

The intelligence that forms the basis of these claims is not normally disclosed but occasionally finds its way into the public domain via leaks. Excerpts from a DIA document titled *A Primer on the Future Threat* (July 1999) and stamped "SECRET NOFORN" were reproduced as an appendix in a book written by a *Washington Times* reporter, Rowan Scarborough.⁵⁰ The *Washington Times* in general, and Scarborough's colleague Bill Gertz in particular, are notorious for publishing leaked classified information, funneled to them by intelligence officers who apparently feel that not enough is being done to address this "threat" or that. Unlike some of the more excitable public statements, the classified DIA versions often are muted. The 1999 DIA report, for example, stated that China is modernizing but is doing so because it feels its deterrent is at risk "because of U.S.

targeting capabilities, missile accuracy, and potential missile defenses.” Survivability will improve through mobility and adding penetration aids, or possibly multiple warheads, will increase its ability to penetrate missile defenses. These are all logical responses to perceived threats on the Chinese part though U.S. public intelligence briefings never highlight and only rarely mention such motivations.

Congress and the 1999 Cox Report

Hearings held by congressional committees provide an important – although sometimes one-sided – record of government statements and estimates about the status of Chinese nuclear forces. In addition to hearings, the committees occasionally will conduct specific studies that provide more in-depth analysis and information.

One congressional study that has left an enduring mark on the debate over China's nuclear modernization was the so-called Cox report, named for Representative Christopher Cox (R-Calif.) who chaired the House Policy Committee. Cox led the work of the Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China, which was tasked to investigate allegations that China had stolen nuclear weapons secrets and other knowledge from the United States to improve its own military forces.⁵¹ A series of hearings culminated in the Cox report in January 1999, a three volume opus that caused quite a commotion. Five basic allegations were made in the Cox report about nuclear weapons and China:

1. China has stolen design information on the United States' seven most advanced thermonuclear weapons.
2. The stolen secrets have enabled China to design, develop and successfully test modern strategic nuclear weapons sooner than would otherwise have been possible.
3. China's next generation of smaller thermonuclear weapons, currently under development, will use elements of stolen U.S. design information and be “on par with our own.”

4. Small warheads based on information stolen from the United States could be ready for deployment by 2002 and will make it possible for China to develop and deploy multiple reentry vehicles on its next general missiles.
5. The theft is the fruit of several decades worth of pervasive and successful penetration of U.S. nuclear weapon laboratories, an activity that likely continues today.

The report also used what later turned out to be incorrect claims about the capability of China's new missiles as the basis for far-reaching predictions about Chinese nuclear policy and intentions. One example concerned the mobile missile force. Cox told the *Washington Times* after China test-launched the DF-31 that it "will give the PRC a first-strike capability against every country in the region except Russia, while limiting U.S. options, were we to intervene against aggression."⁵²

Another exaggerated claim was that the JL-2 missile under development for a new ballistic missile submarine would have a range of 7,400 miles (nearly 12,000 km) and be capable of striking targets throughout the United States. Based on this information, the authors of the Cox report speculated about developments in China's nuclear policy:

The deployment of the PRC's new nuclear-powered ballistic missile submarine *could also lead to a shift in PRC doctrine*, as these submarines will likely be deployed with their nuclear warheads already mated to the missiles. The long range of the JL-2 submarine-launched intercontinental ballistic missile will allow the PRC to conduct patrols close to its base, and under the protective cover of the PLA Navy and Air Force. This would provide the PLA submarine fleet with a more survivable nuclear force.

The fact that these new nuclear weapons will be far more survivable than the PRC's current silo-based forces *could signal a major shift in the PRC's current nuclear strategy and doctrine*.⁵³ (Emphasis added.)

Apart from the fact that the Cox report elsewhere listed the JL-2 range as only 4,900 miles (about 8,000 km),⁵⁴ the number normally used by the U.S. intelligence community, such a nuclear policy shift would require two things: first, that

China actually begins to deploy its SSBNs on deterrent patrols (something it has never done; see submarine section below); and second, that China changes its practice of not deploying nuclear weapons “outside its own territories.”⁵⁵

Given the highly classified nature of the issue investigated by the Cox report, especially those related to nuclear weapons, the main allegations and even the methodology are impossible to verify. Moreover, the public Cox report was published as a redacted version of a larger secret report, and therefore a significant amount of information that may or may not substantiate the allegations and conclusions was deleted.

Despite its strong and specific allegations and the spying that China – like all major powers – may be conducting, the Cox report came across as a politically motivated effort to paint China as an aggressive menace.

The serious allegations triggered a CIA-lead intelligence community damage assessment under the leadership of Admiral David Jeremiah (U.S. Navy, Ret.) that in April 1999 undercut the Cox report's central claim that stolen information had been used to develop or modernize Chinese missiles or warheads. “To date, the aggressive Chinese collection effort has not resulted in any apparent modernization of their deployed strategic force or any new nuclear weapons deployment,” Jeremiah's report concluded.⁵⁶

Others criticized the Cox report for hyping the Chinese threat while ignoring other relevant information. The “dirty little secret” of the report, wrote Jonathan D. Pollack, a senior advisor for international policy at the RAND Corporation, was that it completely ignored that “successive Republican and Democratic administrations” from the very onset of the Sino-U.S. relationship in the early 1970s, “believed that the enhancement of Chinese power – as a counterbalance to Soviet power – was in the national security interest of the United States, and persistently sought to advance this goal in the ensuing two decades.... The Chinese may well have exploited these opportunities by all available means, but they were walking through a door that the U.S. government had long since decided to open.”⁵⁷

Richard L. Garwin, a former U.S. nuclear weapons designer and long-term government advisor, challenged the report's central claim that theft of specific U.S. nuclear warhead secrets had aided China's development of small nuclear warheads for its new generation of ballistic missiles. In fact, “the alleged

acquisition by the Chinese of the particular nuclear weapon information in regard to the W-88 and W-70 would not appear to directly impair U.S. security,” Garwin stated. “To build nuclear weapons on the basis of this information, China would need to make massive investments and acquire a capability not particularly helpful to “them.””⁵⁸

In addition, a team of scholars and physicists from Harvard University, Stanford University and Lawrence Livermore National Laboratory further undercut the Cox report’s conclusions and methodology. Their review was published by the Stanford University Center for International Security and Cooperation (CISAC) in December 1999:

A problem with the Cox Commission report is that the authors provide little context for their allegations, leaving the reader with no way to judge their importance, aside from whether the allegations are true. Thus it is never made clear how much the Chinese learned on their own and from publicly available information. The report makes broad accusations against the Chinese with little or no support or comparison with other states’ practices. The impact of losses is either overstated or not stated.... No information is given that traces China’s nuclear weapons to U.S. sources. There is no way to judge whether a “next generation of thermonuclear weapons” would be based on such theft or earlier Chinese knowledge. *It is extremely unlikely that, absent nuclear testing, theft of information could lead to any such new generation.* (Emphasis added.)

On Chinese nuclear doctrine issues, the report is exceedingly unclear about the actual state of development in Chinese nuclear weapons capabilities.... In addition, the report mischaracterizes Chinese nuclear doctrine, claiming that its announced doctrine is one of limited deterrence. In fact, China has no announced doctrine, and the few comments that Chinese leaders have made over the years indicate an operational doctrine that to this point is more akin to a minimum deterrence doctrine than a limited deterrence doctrine.... It also misstates China’s position on no first use of nuclear weapons and Taiwan. In short, the discussion of Chinese politics, economic modernization, and nuclear doctrine lacks scholarly rigor, and exhibits too many examples of sloppy research, factual errors, and weakly justified inferences.⁵⁹

The CISAC assessment included individual analysis by each of the four co-authors that refutes or questions all the five major conclusions of the Cox report. The CISAC assessment showed that the authors of the Cox report did not understand Chinese decision-making. “The Cox report description of how actual policy is made in China is surprisingly inaccurate,” the CISAC report concluded.⁶⁰

These problems were ignored by some news media that continued to report the inaccuracies even after the central allegations of the Cox report had been refuted. The new Julang-2 SLBM to go on the next-generation ballistic missile submarine, the *Washington Times* reported in December 1999, “is expected by Pentagon officials to carry China’s newest small warhead that is believed to be copied from the U.S. W-88 warhead.”⁶¹ (Emphasis added.)

Despite its serious shortcomings, the Cox report managed to deepen the hostile perception that China cannot be trusted and that the United States needs to adjust military planning against China accordingly.⁶² To that end, the timing was impeccable. As we illustrate (Chapter III: China in U.S. Nuclear War Planning), the allegations about Chinese nuclear spying surfaced at a time when U.S. nuclear planners were busy trying to convince the Clinton administration to reinstate China at the center of U.S. nuclear planning. After President Clinton was informed of the suspected Chinese spying, the planners had their way in November 1997 when the new Presidential Decision Directive (PDD-60) ordered the military to broaden the list of Chinese facilities to be held a risk by U.S. nuclear forces.

Traditional congressional committee hearings are another source of information about China. Often the information presented depends upon who the committee chairman decides to invite to give testimony. By favoring witnesses they agree with, the unfortunate result may be that important foreign policy and military issues do not get a balanced hearing. One recent example of this is the House Armed Services Committee’s hearing on China’s military power that was held one week after the Pentagon published its 2005 report on that issue. Rather than inviting witnesses who might critique the DOD report, committee chairman Duncan Hunter (R-Calif.) invited three witnesses who were either in the government or at conservative think tanks that were unlikely to disagree with the Pentagon (Figure 3).

While the congressional hearings often fail to provide balanced and critical reviews of the Pentagon’s planning and policies against China, they are venues

for official military and civilian statements. The statements sometimes offer surprising admissions that are at odds with the main thrust of warnings about the Chinese threat. One example is the testimony by commander of U.S. Pacific Command, Admiral William J. Fallon, before the Senate Armed Services Committee in March 2006. He said that although China’s military modernization concerns him, China predominantly has a “legacy” force that is “not particularly well equipped” and that the numbers “are not yet anywhere near the kinds of numbers that I believe truly can threaten this country.”⁶³

The example reveals that opinions about China inside the Pentagon are not unanimous or that they cannot change. More moderate language surrounded the July 2006 of Gen Guo Boxiong, vice-chairman of the Central Military Commission. He spent a week in the United States visiting an aircraft carrier, West Point, the Pentagon and the National Defense University. Both countries seemed interested in improving confident-building measures, including more frequent contacts between senior military leaders, exchanges of personnel between the respective military academies, reciprocal visits of mid-level officers, and consultations about maritime safety, humanitarian rescue and environmental protection.⁶⁴

Congressional Research Service

A more balanced contribution to the debate over U.S.-Chinese nuclear relations comes from the Library of Congress’ Congressional Research Service (CRS), which periodically publishes informative reports about various aspects of U.S.-

Figure 3:
House Armed Service Committee
Witnesses on China

The image is a screenshot of a webpage from the House Armed Services Committee. At the top, it reads "HOUSE ARMED SERVICES COMMITTEE" in a red banner. Below that, the text says "SCHEDULES AND TRANSCRIPTS" and "Wednesday, July 27, 2005 - 10:00am - 2118 Rayburn - Open". A small icon of a microphone is next to the text "The House Armed Services Committee met to receive testimony on China military power." Below this, it says "Chairman Hunter's Opening Statement: (pdf)". Under the heading "Witnesses:", there is a list of three individuals: "Honorable Franklin Kramer, Former Assistant Secretary of Defense, International Security Affairs (pdf)", "Richard D. Fisher, Vice President, International Assessment and Strategy Center (pdf)", and "John Tkacik, Jr., Senior Research Fellow, The Heritage Foundation (pdf)". At the bottom of the screenshot, there is a text box containing the following text: "The only witnesses giving testimony to the July 27, 2005, House Armed Services Committee hearing on Chinese military power were either in government or conservative think tanks with views close to or more hawkish than the Pentagon. No 'independent' testimonies were invited to present a critical review of the Pentagon's annual report on China's military forces."

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Chinese relations.⁶⁵ One of these reports reviewed the debate over China's alleged acquisition of U.S. nuclear weapons information.⁶⁶ Another, published in August 2006, discussed U.S. conventional forces and nuclear deterrence, and how they relate to China. Specifically, the report examined three potential scenarios in which U.S. conventional and nuclear forces might be involved in a war with China:

1. Chinese Special Operations Forces infiltration of Taiwan
2. Maritime conflict between China and Taiwan
3. Full-scale, combined Chinese attack on Taiwan
4. Pre-emptive attack by Taiwan on Chinese forces⁶⁷

U.S. deterrence objectives in these illustrative scenarios, CRS estimated, may be to deploy nuclear and conventional weapons that 1) are more capable than the Chinese forces, 2) are postured in a way that makes their use appear credible, and 3) cast doubt on whether China would be able to satisfy its military or political objectives at an acceptable cost.⁶⁸

Yet the CRS report painted an ambivalent role for nuclear weapons and in several places directly challenged claims about their contribution to U.S.-Chinese relations. In an apparent rebuke of those who suggest that nuclear weapons have prevented an open, armed conflict between China and the United States in the past, the CRS report stated that this is a “too narrow” conclusion.⁶⁹ In three of the four scenarios examined, CRS concluded that nuclear weapons may have no role at all or that their contribution is dubious. Even in the type of scenario that is most frequently cited as most likely to escalate to use of nuclear weapons (a Chinese attack on Taiwan), the CRS report concluded that “it is unlikely that nuclear forces would either exacerbate or calm the crisis.” Although superior U.S. nuclear forces clearly are capable of punishing China for attacking Taiwan, CRS argued, China's ability to respond with a limited nuclear attack on the United States “could be sufficient to deter the United States from threatening a nuclear response to China's conventional attack.”⁷⁰

This conclusion is supported by our simulations of the effects of a potential Chinese nuclear attack on the continental United States (see Chapter IV), which vividly illustrate the considerable destruction that even a few warheads from Chinese long-range missiles could cause in the United States. The United

States civilian and military leaders would have to be prepared to give the impression that they are willing to accept very high numbers of civilian casualties for U.S. deterrence against China to work. It illustrates an inherent dilemma for the U.S. nuclear policy against China: Either develop a very aggressive, capable, prompt and decapitating posture that can ensure near invulnerability, but risks triggering a Chinese build-up; or expect a high level of vulnerability, but with a relaxed posture on each side.

The CRS report also suggested, surprisingly, that China currently does not deploy its long-range nuclear forces in ways that would leave it vulnerable to a first strike. China would not, CRS claimed, “experience pressure to use these weapons before losing them.” That is a surprising conclusion given that current Chinese modernization of its long-range ballistic missiles is widely said – including by the U.S. intelligence community – to be motivated by precisely that: fear that the existing missiles are too vulnerable to a first strike.

China’s Nuclear Weapons Policy

How China’s nuclear policy will evolve in the future, and particularly whether it will maintain a no-first-use policy, is a recurring yet elusive element of the debate. A decade ago some Western analysts suggested that Chinese thinking about nuclear strategy might be moving from a minimum deterrence posture toward limited deterrence, which would mean a more dynamic targeting policy with the potential of using nuclear weapons first.⁷¹ Since then, however, Chinese nuclear policy does not appear to have changed noticeably nor has it affected operational nuclear weapons deployment in any important way.⁷² Chinese declaratory policy has always been one of “no first use” with a retaliatory minimum deterrent force aimed at countervalue (i.e., population centers) targets with forces maintained on very low alert or no alert at all.

Official Chinese statements continue to ascribe to a no-first-use policy, but leave some confusion about the scope of the policy and its conditions. A 2005 Chinese Foreign Ministry white paper reiterated the pledge by stating that the “Chinese government has solemnly declared that it would not be the first to use such weapons at any time and in any circumstance,” and that this policy “will remain unchanged in the future.” In addition, the paper reiterated that “China has committed unconditionally not to use or threaten to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones.”⁷³

This language is consistent with earlier declarations made by China, including the security assurances statement issued at the Non-Proliferation Treaty (NPT) Review and Extension Conference in April 1995 and the working paper issued to the Conference on Disarmament in August 1981. Interestingly, in the 1995 statement China appears to have avoided the temptation to place conditions on its security assurances by saying that the “commitment naturally complies” to members of the NPT or others that have made similar binding commitments.⁷⁴ Yet the Chinese policy raises several questions.

First, a literal reading of the phrase “in any circumstance” suggests that even if the United States (or Russia) invaded China and threatened the political survival of the country, China would not resort to using nuclear weapons as long as the U.S. refrained from using them. This seems unlikely. China, like the other nuclear powers, probably would resort to the use of nuclear weapons in such an extreme situation where the survival of the nation was a stake.

Second, since China does not consider Taiwan to be an independent “country” or a “state” but a part of China, the stated policy appears not to cover Taiwan. That raises other issues, of course, including whether Chinese leaders would ever use nuclear weapons against their own people.

Third, the “unconditional” pledge not to use nuclear weapon against any non-nuclear weapon states appears to commit China not to use or threaten to use nuclear weapons against U.S. bases that are located on the territories of non-nuclear weapons states including Japan and South Korea. India used to be covered by this pledge, but the Indian government’s decision to officially make India a nuclear weapon state means that China’s planning against India is no longer constrained – if one believes it ever was – by this part of its security assurances.

Whether or not the policy would constrain China in a war, the declaratory policy in fact does seem to influence China’s acquisition and employment policies, with the result that the country keeps its nuclear forces relatively small. A more ambitious strategy would require larger forces as well as much improved command and control and early warning capabilities. But words mean little to U.S. nuclear war planners, who are tasked to plan and deploy forces based on China’s actual capabilities (the so-called capability-based planning).

Some Pentagon analysts fear that China’s improved next-generation land- and sea-based ballistic missiles (and possibly also cruise missiles) may result in more

ambitious and extensive deployment patterns and even some form of counterforce (e.g., opposition nuclear forces) targeting.⁷⁵ Increased accuracy brings with it the possibility of more flexible strategies and some U.S. analysts anticipate that China may alter its policy. For example, a 2003 Pentagon report stated: “As China improves its strategic forces, despite Beijing’s ‘no-first-use’ pledge, there are indications that some strategists are reconsidering the conditions under which Beijing would employ theater nuclear weapons against U.S. forces in the region.”⁷⁶

This theme was echoed in a 2005 RAND study prepared for the U.S. Air Force: “Some in China may also be contemplating the shift to a ‘limited nuclear deterrent’ capability that would allow China to target military sites as part of a damage limitation strategy – as opposed to a nuclear strategy that simply seeks to provide a secure second-strike capability.”⁷⁷ The 2006 DOD annual report significantly expands on this theme by dedicating almost a full page to discussing possible changes to China’s employment policy.

“[T]he circle of military and civilian national security professionals discussing the value of China’s current ‘no first use’ nuclear policy is broader than previously assessed,” the report states. Scenarios where change could occur, DOD explains, involve cases where the use of force by China involves core interests, such as sovereignty or territorial claims, including Taiwan. In such cases, “Beijing could claim military preemption as a strategically defensive act [and thereby] add ambiguity to the dimension of China’s policy of ‘no first use’ of nuclear weapons.”⁷⁸

According to the report, it appears that “this policy may be under discussion,” and it “remains to be seen ... how the introduction of more capable and survivable nuclear systems in greater numbers will shape the terms of this debate or affect Beijing’s thinking about its nuclear options in the future.”⁷⁹

In a prepared testimony before the House Armed Services Committee on June 22, 2006, Peter W. Rodman, the assistant secretary of defense for international security affairs, toned down the extent to which that debate may influence Chinese policy, though he concluded that it is still going on:

We see discussions, albeit limited, beneath the surface in China over the future of its nuclear doctrine, including a July 2005 statement by Major General Zhu Chenghu of the People’s Liberation Army National Defense

University. The Chinese reassured Secretary [Donald] Rumsfeld that China's 'no-first-use' policy remains unchanged and emphasized to me in Beijing earlier this month that there is no debate in China over the policy. We take China at its word on this point. However, the comments suggest Chinese specialists may be exploring internally the implications of China's evolving force structure, and the inherent options that that force structure provides.⁸⁰

It seems there is no public evidence that China's nuclear policy is evolving significantly beyond its minimum deterrent and no-first-use pledge. The U.S. intelligence community appears to conclude that it is not sure either, but that it is monitoring the nuclear debate very closely. What adds to the confusion is that China does not publish a doctrinal statement equivalent to the U.S. National Military Strategy, but uses what it calls the "National Military Strategic Guidelines for the New Period" as its national military strategy. Just like detailed U.S. military guidance documents, the specific content of the Chinese "guidance" is not publicly known, but the intelligence community says that it includes two primary components: an operational component ("active defense") and an organizational component ("new-period army building"). According to the 2006 DOD report:

The 'active defense' guideline posits a defensive military strategy and asserts that China does not initiate wars or fight wars of aggression, but engages in war only to defend national sovereignty and territorial integrity.... Beijing's definition of an attack against its territory, or what constitutes an initial attack, is too vague to clarify matters to outsiders, however. In cases where Chinese use of force involves core interests, such as sovereignty or territorial claims (including Taiwan), Beijing could claim military preemption as a strategically defensive act. For example, China refers to its intervention in the Korean War (1950-1953) as the War to Resist U.S. Aggression and Aid Korea. Similarly, border incursions and conflicts against India (1962), the Soviet Union (1969), and Vietnam (1979) are referred to in authoritative texts as 'Self-Defense Counter Attacks.' This logic could also add ambiguity to the dimension of China's policy of 'no first use' of nuclear weapons.⁸¹

The logic of this hypothesis seems to be that because China considers Taiwan to be a part of China, the no-first-use policy does not apply to a Taiwan scenario. This logic is poor analysis, however, because it ignores the fact that China has deployed theater nuclear weapons against U.S. forces in the region for four decades without changing its no-first-use policy. Besides, the logic ignores the important question of whether China would be willing to risk a much wider nuclear war with the United States over Taiwan. China's extensive deployment of short-range conventional ballistic missiles in the Taiwan region suggests an effort to avoid escalation to nuclear war.

To what extent China's nuclear modernization and U.S. offensive and defensive capabilities will influence the evolution of China's nuclear policy remains to be seen. So far, however, there is little concrete evidence that a change has happened or is underway. Yet it is possible that a change could happen in the future if both countries get further entangled in an adversarial relationship with increasingly capable nuclear forces poised to overcome the other side. The trap of ensuring a credible deterrent is that it may increase insecurity for both countries.

Estimates of Chinese Nuclear Forces

The Chinese government has not disclosed the size of its nuclear stockpile, nor does it normally provide information about the composition of its nuclear forces. The Chinese nuclear stockpile is composed primarily of warheads for ballistic missiles of different ranges and some bombs for aircraft, and estimates of the stockpile and operational warheads vary considerably depending upon the source (see Appendix A for our estimate). Past predictions by the U.S. intelligence community of the growth of the Chinese nuclear arsenal have proven to be highly inaccurate and even contradictory. Many of the forecasts have overestimated the future size of the force, the timing of when certain weapons systems will become operational, and the pace of their deployment. This trend began decades ago and appears to continue today.

In the 1960s, U.S. Pacific Command (PACOM) estimated that China could have 435 nuclear warheads by 1973, or more than three times as many as China is thought to have produced by that time. By 1972, the DIA's assessment of the capability of China's fissile material production facilities resulted in the estimate that "the Chinese could have as many as 120 thermonuclear warheads and 260 fission nuclear weapons in the stockpile..."⁸² Yet at about that time China probably only had about 130 weapons, and the *New China News Agency* carried an official statement by the Chinese government that claimed that China was "not yet a nuclear power" because its "nuclear weapons are still in the experimental stage..."⁸³

By 1981, the Joint Chiefs of Staff reported that China had more than 100 DF-2 and DF-3 missile launchers with a possible missile reload capability. Newspaper columnist Jack Anderson reported in 1984 that Pentagon reports stated that China had 137 to 199 ballistic missiles.⁸⁴ In April of that year, the DIA repeated its 1972 estimate by stating in a paper that China had 360 nuclear warheads. In

the paper the DIA also provided its “best estimate” for the future number of Chinese nuclear warheads at 586 in 1989 and 818 in 1994.⁸⁵ (Table 1)

Type	1984	1989	1994
CSS-1	25	5	0
CSS-2	110	120	120
CSS-3	8	31	32
CSS-4	2	9	16
SLBM	0	24	48
Solid-fuel ICBM	0	0	2
MR/IRBM follow-on	0	17	28
Bombs	165	200	230
ADMs	50	50	50
SRBM	0	0	12
ASM	0	130	250
Follow-on Systems	0	0	30
TOTAL	360	586	818

DIA cautioned that its estimates were based on projections for delivery systems and that “[n]o direct evidence exists on the actual size of China’s present nuclear stockpile.” Instead, the DIA explained, its assignment of nuclear warheads for Chinese delivery systems was based on a correlation of information from three main categories:

1. The nuclear testing sequence;
2. Analysis of the nuclear test device characteristics; and
3. The technical characteristics and deployment of delivery systems.

Also included, but not listed, must have been an estimate of the amount of fissile material produced by China over the years. Combined, this methodology lead to a highly inflated estimate, and it is noteworthy that the DIA in the same paper contradicted the 360 warheads estimate by stating in the summary that “[b]etween 150 and 160 warheads are estimated to be in the PRC nuclear stockpile.”⁸⁷ Why the same agency in the same paper made two such different and contradictory estimates of the size of the Chinese nuclear stockpile is unclear.

Later in 1984, the DIA published the *Handbook of the Chinese People's Liberation Army*, which provided yet another estimate by stating that “China now has between 225 and 300 nuclear warheads.” This arsenal was said to include “fission warheads ranging from 20 to 40 kilotons and thermonuclear warheads ranging from 3 to 5 megatons.” DIA also suggested that China had managed to build a nuclear Triad where the “warheads can be delivered by both land- and sea-based missiles, as well as by conventional bomber aircraft.”⁸⁸

In hindsight, the 150 to 160 warhead estimate may have been the more accurate, and public U.S. intelligence estimates made since have put the size of the Chinese *deployed* nuclear arsenal in the 100-plus warhead range. Indeed, sometime between the mid-1980s and mid-1990s, the U.S. intelligence community appears to have obtained new information about China’s nuclear stockpile that resulted in a very different estimate. China’s “inventory of nuclear weapon systems,” the Pentagon stated in 1996, “now includes over a hundred warheads *deployed operationally* on medium range ballistic missiles (MRBMs), intermediate range ballistic missiles (IRBMs), and intercontinental ballistic missiles (ICBMs).”⁹⁰ The following year, the DOD clarified that “China has over 100 nuclear warheads *deployed* on ballistic missiles,”

Country	Stockpile
Russia	16,000
United States	10,000
France	350
United Kingdom	200
China	200
Israel	100
Pakistan	60
India	50

China has declared that it possesses “the smallest nuclear arsenal” among the (five original) nuclear weapon states.⁸⁹

and that “*additional* warheads are in storage.” DOD also said that China had “a stockpile of fissile material sufficient to increase or improve its weapon inventory.”⁹¹ This assertion was repeated in February 2006, when the DIA director told Congress:

One of China’s top military priorities is to strengthen and modernize its strategic nuclear deterrent force by *increasing its size, accuracy and survivability*. It is likely the number of deployed Chinese nuclear-armed theater and strategic systems will increase in the next several years. China currently has *more than 100 nuclear warheads*. We believe China has sufficient fissile material to support this growth.⁹² (Emphasis added.)

Estimating the size of the Chinese nuclear arsenal has always relied almost exclusively on U.S. intelligence estimates, while Chinese government information about the size or composition of its nuclear forces has been almost non-existent. In the Chinese view, secrecy increases the potential adversaries’ uncertainty about Chinese capabilities and therefore increases the deterrent effect, although it may also – as in the case of the United States – cause that adversary to assume the worst. Perhaps in recognition of this dilemma, the Chinese Foreign Ministry in April 2004 published a fact sheet that included the statement: “Among the nuclear-weapon states, China ... possesses the smallest nuclear arsenal.”⁹³ Since Britain has declared that it has less than 200 operationally available warheads, and the United States, Russia and France have more, the Chinese statement could be interpreted to mean that China’s nuclear arsenal is smaller than Britain’s.⁹⁴

Not surprisingly, the devil is in the details. When the Chinese statement uses the word “arsenal,” does that mean the entire stockpile or just the portion of it

**Table 3:
Pentagon Overview of China’s
Missile Forces 2006 ⁹⁵**

China’s Missile Inventory	Launchers	Missiles	Estimated Range
DF-5/CSS-4 ICBM	20	20	8,460+ km
DF-4/CSS-3 ICBM	10-14	20-24	5,470+ km
DF-3/CSS-2 IRBM	6-10	14-18	2,790+ km
DF-21/CSS-5 MRBM Mod 1/2	34-38	19-50	1,770+ km
JL-1 SLBM	10-14	10-14	1,770+ km
DF-15/CSS-6 SRBM	70-80	275-315	600 km
DF-11/CSS-7 SRBM	100-120	435-475	300 km
JL-2 SLBM	DEVELOPMENTAL		8,000+ km
DF-31 ICBM*	DEVELOPMENTAL		7,250+ km
DF-31A ICBM	DEVELOPMENTAL		11,270+ km
TOTAL	250-296	793-916	

* China defines the DF-31 as a long-range ballistic missile, not an intercontinental ballistic missile (see Figure 13).

DF stands for Dong Feng which means “east wave.” The U.S. designation CSS stands for Chinese Surface-to-Surface. Color codes: Red (nuclear), Blue (possibly nuclear), Black (not nuclear).

that is operationally deployed? To add to the confusion, Britain has not disclosed the size of its *stockpile* but only declared that “less than 200 warheads” are “operationally available.” This strongly suggests that there may be additional British warheads in storage.

The Chinese statement was followed in July 2005 by the DOD report on Chinese military capabilities that for the first time provided a breakdown of China’s ballistic missile forces. The breakdown, which was updated in the 2006 report, showed that the DOD believes that China has some 793 to 916 ballistic missiles of various types (see Table 3). Of these, some 83 to 126 are thought to be nuclear-capable.

As for the future development of China’s nuclear forces, the DIA told Congress in 2005 that it anticipates that China’s overall nuclear weapons inventory will increase.⁹⁶ DIA provided no specific numbers in the unclassified testimony, but a leaked DIA estimate from 1999 shows the agency then believed that China’s total nuclear inventory would increase to some 358 to 464 warheads by 2020. This projection included a quadrupling of the number of ICBM warheads to 180 to 220 and nearly a doubling of SRBM warheads.⁹⁷ Some of the ICBM warheads would primarily be targeted at the United States, and the U.S. intelligence community has predicted that this portion of the arsenal might increase from 20 today to 75 to 100 warheads in 2015.⁹⁸

This warhead forecast, which was first made in the 2001 National Intelligence Estimate *Foreign Missile Developments and the Ballistic Missile Threat Through 2015* shortly after the DIA estimate, has been repeated many times since by several agencies and appears to be the most consistent U.S. estimate. It appears to depend upon the expectation that the number of Chinese ICBMs primarily targeted against the United States will increase from 20 today to 60 in 2010.⁹⁹ Past inflated and inaccurate estimates by official sources should be kept in mind when considering this prediction. Its most controversial element is that it assumed China will be able to produce and deploy 40 DF-31A missiles by 2010 – only four years from now – and possibly another 15 missiles by 2015 if the DF-5As remain with single warhead. The DF-31A has not yet been flight tested.

True to form, the U.S. projection has already slipped, as the number of ICBMs primarily targeted against the United States did not reach 30 in 2005 (or 2006) as predicted but has remained at about 20. And it seems very unlikely that China will be able to field enough DF-31A missiles in only four years to meet

the high projection set by the U.S. intelligence community. Perhaps in reflection of these realities, this projection was not included in the DOD's 2005 and 2006 reports on Chinese military capabilities.¹⁰¹

Not surprisingly, some private analysts have made even bigger projections for the development of China's ballistic missile forces. "By 2010," Richard

Fischer of the International Assessment and Strategy Center recently wrote in the *Wall Street Journal*, "China is also likely to add up to 100 land-based and 24 submarine-based missiles armed with nuclear warheads, more than enough to overwhelm planned U.S. missile defenses."¹⁰² Such a development would exceed the Pentagon's worst-case scenario and also require China to build and deploy two SSBNs. The U.S. intelligence community estimates that only one may become operational by then.

Beyond estimating the number of missiles is the question of whether China will deploy multiple warheads on some of its ICBMs. Unlike claims made by many private organizations and news media, the U.S. projection does *not* envision multiple warheads on the new DF-31, its longer-range DF-31A modification, or the submarine-based JL-2. The official U.S. estimate has low and high numbers. The lower number envisions single warheads on the DF-5A and a larger number of DF-31A missiles. If three warheads were placed on each DF-5A, fewer single warhead DF-31As would be required (see Table 4).¹⁰³

To reach the 1999 DIA projection of 180 to 220 ICBM warheads by 2020 (assuming the same number of DF-5A and DF-31A missiles as in Table 4 above, and using the U.S. range definition for an ICBM, Figure 13), China would have to deploy *an additional* 80 to 140 single-warhead DF-31s (see Table 5), or more than double its entire current land-based ballistic missile force. The alternative would be to develop a much smaller warhead that would allow the DF-31 and

Table 4:
Estimates For Chinese Warheads
Primarily Targeted Against the United
States in 2015

Missile Type	Without DF-5A MRV	With DF-5A MRV
DF-5A	20	60
DF-31A	55	40
TOTAL	75	100
Estimates based on CIA/DOD prediction of "about 75 to 100 warheads deployed primarily against the United States" by 2015, with 75 being more DF-31A missiles with no DF-5A MRVs, and 100 being fewer DF-31A missiles with MRV on DF-5A. ¹⁰⁰		

DF-31A to carry multiple warheads, but that would probably require additional nuclear weapons testing.

To the best of our knowledge, there is no evidence that China has embarked upon such an aggressive ICBM build-up. We think the number of DF-31s required to meet the DIA estimate is much too high and more realistically will

Table 5:
Possible Missile Composition With DIA Projection
For Chinese ICBM Warheads by 2020¹⁰⁴

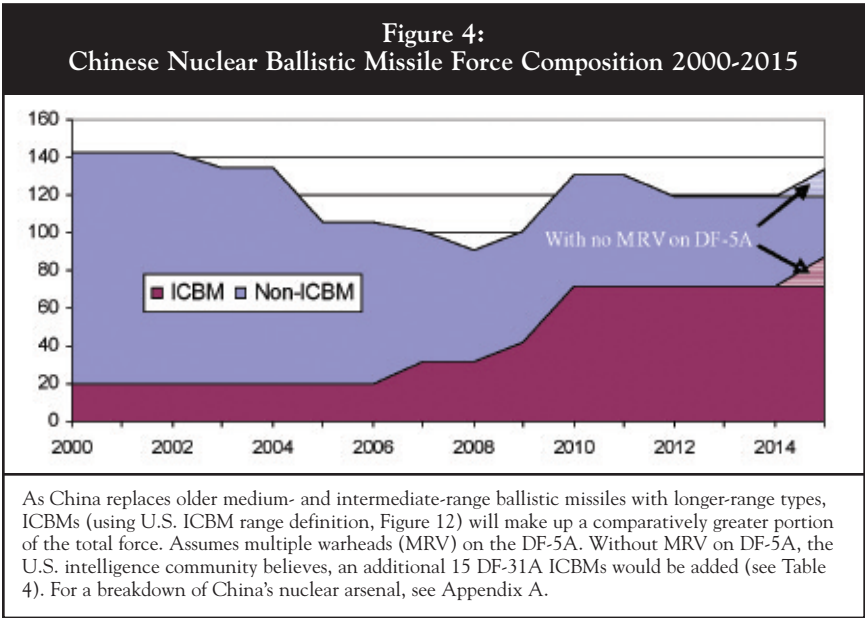
Missile Type	Warheads (Low)		Warheads (High)	
	Without DF-5A MRV	With DF-5A MRV	Without DF-5A MRV	With DF-5A MRV
DF-5A	20	60	20	60
DF-31*	105	80	145	120
DF-31A	55	40	55	40
Total	180	180	220	220

* Although an ICBM by U.S. definitions, the 4,500+ miles (7,250+ km) range of the DF-31 means that it can not be used to “primarily” target the United States but will likely be used for regional targeting. China defines the DF-31 as a LRBM, not an ICBM (see Figure 13).

The estimate is based on CIA/DOD prediction of “about 75 to 100 warheads deployed primarily against the United States” by 2015, with 75 being more DF-31A missiles with no MRVs on DF-5A, and 100 being fewer DF-31A missiles with MRV on DF-5A (see Table 4).¹⁰⁵

include only a couple of dozen missiles. Instead, based on the above information and using the U.S. range definition for ICBMs, we cautiously estimate that the number may reach 70 to 85 ICBMs by 2015 and 85 to 100 ICBMs by 2020 from 20 ICBMs today. This increase appears larger than it is because it includes replacement of the DF-3 and DF-4 with the longer-range DF-31, a weapon that, like its predecessors, will not be primarily targeted against the United States but is nonetheless counted as an ICBM. Combined with the other elements of the missile force, using assumptions from the 2001 National Intelligence Estimate, the result is a missile force that overall is about the same size as today but includes more ICBMs (Figure 4).

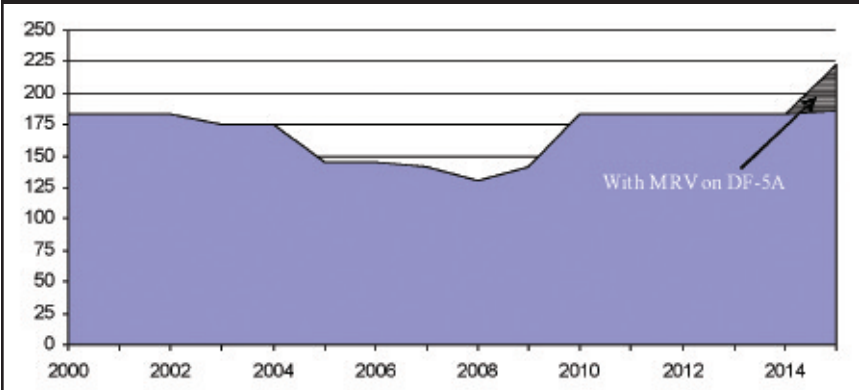
Under the U.S. intelligence community’s “worst-case” scenario, with as many as 100 warheads primarily targeted against the United States, China’s total nuclear weapons arsenal would increase from approximately 145 warheads today to 220



warheads by 2015. If the DF-5A is not upgraded and the number of ICBM warheads primarily targeted against the United States only reaches 75, the total arsenal would level out at almost 190 warheads (Figure 5). These projections assume that China will be able to deploy a sizeable number of DF-31A, an assumption we believe may be overblown.

Because the deployment of the DF-31A (and DF-31/JL-2) will coincide with the retirement of the antiquated DF-3A and DF-4, the overall size of the Chinese arsenal can be expected to remain at about the same level it has been for the past decade (140 to 180 warheads). To that end there is a certain irony in the fact that the central factor that could lead to an increase in the size of the Chinese nuclear arsenal is the impact that China believes a U.S. ballistic missile defense system will have on the effectiveness of its ballistic missile force. This could lead to an increase of the Chinese arsenal to nearly 225 warheads (Figure 5).

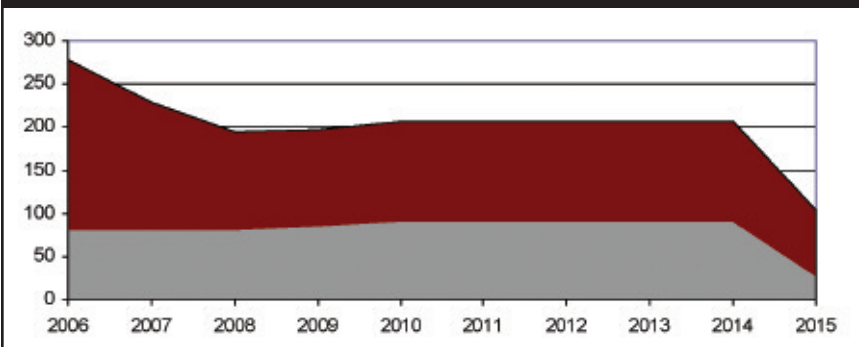
Figure 5:
Chinese Deployed Nuclear Warhead Estimates 2000-2015



If the projections made by the U.S. intelligence community about the future deployment of Chinese ballistic missiles are correct, the total size of the Chinese arsenal may increase from 145 warheads today to 186 to 223 warheads by 2015. The total primarily depends on how many new ICBMs China will deploy and how many of the existing DF-5As will be equipped with multiple warheads. See Appendix A for a breakdown of the arsenal.

These developments would significantly *decrease* the overall explosive power of the Chinese arsenal. Depending on the precise mix of missiles and warheads under the Pentagon’s projections, we estimate that the overall megatonnage of the arsenal will decrease by 37 percent to 60 percent over the next 10 years (Figure 6).

Figure 6:
Estimated Megatonnage Of China’s Nuclear Arsenal 2006-2015



Assumes China will deploy 250 kiloton (kt) single-warheads on DF-31, DF-31A, JL-2, and three 250 kt multiple-warheads (MRV) on DF-5A ICBMs by 2015.

The primary reason for this dramatic development is that the new DF-31 and DF-31A missiles carry much smaller warheads than the DF-3As and DF-4s they are expected to replace. In addition to this replacement, the question of whether China will deploy multiple warheads on its DF-5As will, not surprisingly, have a significant impact on how powerful China’s deterrent against the United States will be.

The multiple-warhead force that some lawmakers and private analysts most frequently warn against would result in a significantly less powerful deterrent than if China kept the current warheads on the DF-5As. The reason is that multiple warheads will need to be much smaller than the current 4 Megaton (Mt) warhead, probably in the range of 250 kiloton (kt) each. The difference in megatonnage is dramatic.

If China decides *not* to deploy multiple warheads on its DF-5A missiles, but retains the single 4 Mt warhead currently carried on each missile, and complement this force with DF-31As (as many as 55 missiles under the DOD scenario), the total megatonnage aimed against the United States could increase by 14 Mt (nearly 18 percent) from 80 Mt today to 94 Mt in 2015 (Table 6).

**Table 6:
Estimates for Chinese Megatonnage On Missiles
Primarily Targeted Against the United States in 2015**

Missile Type	Currently (2006)			2015 (Without DF-5A MRV)			2015 (With DF-5A MRV)		
	Missiles	Warheads	Mt	Missiles	Warheads	Mt	Missiles	Warheads	Mt
DF-5A	20	20	80	20	20	80	20	60	15
DF-31A	0	0	0	55	55	13.8	40	40	10
TOTAL	20	20	80	75	75	93.8	60	100	25

Estimates based on CIA/DOD prediction of “about 75 to 100 warheads deployed primarily against the United States” by 2015, with 75 being more DF-31A missiles with no DF-5A MRVs, and 100 being fewer DF-31A missiles with MRV on DF-5A.¹⁰⁶ Megatonnage (Mt) assumes 250 kt warhead on DF-31A and multiple-warhead DF-5A.

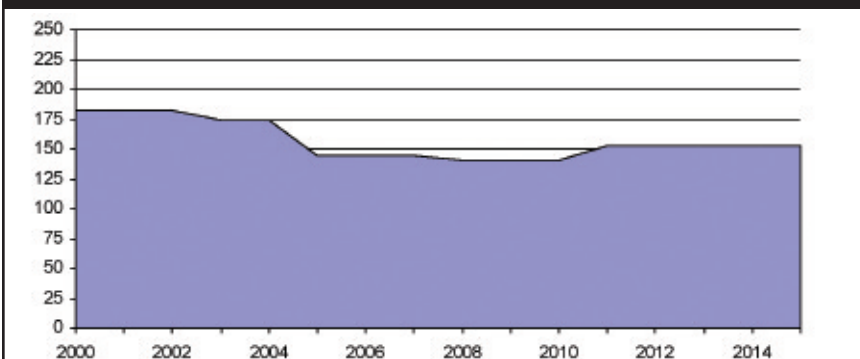
On the other hand, if China decides to deploy multiple warheads on the DF-5A missiles, the total megatonnage primarily targeted against the United States would be reduced by nearly 70 percent from 80 Mt today to some 25 Mt in 2015 (Table 6). If the number of casualties and fatalities that can be inflicted upon the United States in a war is any measure, then it would clearly be in the national security interest of the United States that China deployed multiple warheads on its DF-5As.¹⁰⁷

As mentioned, these projections obviously are fraught with many uncertainties and unknowns. Not only is the precise size of the current Chinese nuclear arsenal still a mystery, but we have no idea how many DF-31A missiles China plans to deploy (and perhaps the Chinese do not know yet either). The U.S. intelligence community assumes that China plans to deploy a considerable number of the still-untested DF-31As. The projections also assume that China will be able to deploy at least two Jin-class SSBNs, something that remains to be seen given the difficulties in operating the Xia-class SSBN. Nor is it known whether China will deploy multiple warheads on its DF-5A missiles and how many; in fact, China could decide to retire the old missile instead once the more survivable DF-31A comes online and continue with an all single-warhead missile force of roughly the same size as today.

Given the shaky record of past U.S. intelligence community projections for Chinese nuclear force developments, we must of course also consider the possibility that China will not deploy 75 to 100 warheads primarily targeted against the United States in 2015, but significantly less. This core projection for China's nuclear future dates back to the 1990s, well before the 2003 Iraq invasion and the subsequent lessons learned about inaccurate intelligence assessments about weapons of mass destruction.

China may decide instead that the increased survivability of the DF-31 (and DF-31A) over the existing DF-3, DF-4 and DF-5As means that fewer warheads will be needed overall. If we assume that the DF-3A and DF-4 are replaced with the DF-31 and the DF-5A replaced with the DF-31A on a one-for-one basis, the size of the Chinese arsenal will remain largely unchanged (Figure 7). But in such

Figure 7:
Low Estimate For Chinese Nuclear Arsenal 2000-2015



Assumes DF-31 will replace DF-3A and DF-4 and the DF-31A will replace the DF-5A on a one-for-one basis with single warhead loading.

an estimate – as in the larger estimate presented by the U.S. intelligence community – China’s perception of the lethality of U.S. nuclear forces and the effectiveness of the ballistic missile defense system likely will be prominent factors in determining the size of its arsenal.

Nuclear Ballistic Missiles

China currently deploys approximately 105 nuclear ballistic missiles of five different types (Table 7). This force includes four land-based missiles (DF-3A, DF-4, DF-5A, and DF-21 (Mods 1/2) and a single sea-based missile (JL-1). Whereas the land-based missiles are considered operational, the JL-1 is not thought to have achieved full operational capability due to persistent technical difficulties on its launch platform, the Xia-class submarine.

**Table 7:
Chinese Nuclear Ballistic Missiles 2006**

China Name	U.S. Name	Year deployed	Range	Warheads	Yield	Missiles	Warheads
<i>Land-based</i>							
DF-3A	CSS-2	1971	3,100	1	3.3 Mt	16	16
DF-4	CSS-3	1980	5,500	1	3.3 Mt	22	22
DF-5A	CSS-4	1981	13,000	1	4-5 Mt	20	20
DF-21A	CSS-5	1991	2,150	1	200-300 kt	35	35
DF-31	CSS-X-10	2006?	7,250+	1	? kt	0	0
DF-31A	?	2007-2009?	11,270+	1	? kt	0	0
Subtotal						93	93
<i>Sea-based</i>							
JL-1	CSS-NX-3	1986	1,770+	1	200-300 kt	12	12
JL-2	CSS-NX-4?	2008-2010?	8,000+	1	? kt	0	0
TOTAL						105	105

^a In kilometers.
See Appendix A for a breakdown of China’s entire estimated nuclear weapons arsenal.

How many nuclear missile China will produce and deploy in the future is hard to predict. The Pentagon predicted in 1997 that “China probably will have the industrial capacity, though not necessarily the intent, to produce a large number, perhaps as many as a thousand, new missiles within the next decade.”¹⁰⁸ This has partially come true, but mainly in the form of production of short-range ballistic missiles deployed off Taiwan.

As for longer-range missiles, three are in various stages of development (DF-31, DF-31A, and JL-2). The DF-31A and JL-2 are variations of the DF-31, which the DOD for the last several years has predicted was about to be deployed. Development of the DF-31 began in the early 1980s, and this new generation of mobile ballistic missiles forms the core of the Pentagon’s warnings about China’s strategic modernization.

The Issue of Mobility

The 2006 DIA threat assessment warns that “China continues to expand and modernize its ballistic missile forces to increase their survivability and warfighting capabilities, enhance their coercion and deterrence value and overcome ballistic missile defenses.”¹⁰⁹ Notwithstanding this warning, it is important to keep in mind that China’s ballistic missile force has been predominantly mobile since the 1960s, and that more than half of China’s long-range missile force is mobile today. This includes the land-based DF-3A, the DF-4, the DF-21, and the sea-based JL-1. The new DF-31, its longer-range modification DF-31A, and the sea-based JL-2 will continue this mobile tradition. Because the DF-31 and DF-31A are solid-fueled missiles, they will be simpler to operate and take less time to ready for launch than the liquid-fueled DF-3A and DF-4 missiles they will replace, but mobility and the concealment capability have been factors that U.S. targeteers have had to deal with for decades. Back in 1976, when China was deploying the then new DF-3, for example, the CIA warned in a National Intelligence Estimate:

The Chinese have enhanced the deterrent value of their IRBMs and MRBMs by means of concealment and field site deployment. Such measures have not only increased the likelihood of post-strike survival but also have decreased the potential attacker’s confidence that he has detected and targeted the entire force.¹¹⁰

**Figure 8:
DF-21 Missile Launcher On Narrow Road**



The Second Artillery Corps conducts “Red vs. Blue confrontation exercises” where missile launchers disperse from their bases to predesignated launch points hundreds of miles away. This image shows a TEL (Transporter Erector Launcher) for the DF-21 medium-range ballistic missile passing cars on a narrow road.

Image: China-Defense.com

**Figure 9:
Mobile Missile Communication**



Deployment of Chinese mobile missile units requires extensive logistical support, including communication with other units and central command authorities, which is vulnerable to technical problems and jamming.

Image: PLA Daily

Little is known in public about how Chinese mobile missile regiments deploy and what their tactics are for concealment and launching. Descriptions of exercises are rare and vague when they happen. The *PLA Daily* of the People's Liberation Army occasionally publishes news reports about Second Artillery Corps exercises. Although the reports are unspecific, and highly glorifying, they do provide some insight. One example includes a Second Artillery Corps "Red vs. Blue confrontation exercise" held in January 2005, which was said to have covered nearly 620 miles (1,000 kilometers). The scenario envisioned deployment under frequent Blue attack, in response to which the brigade "employed flexible tactics, such as cross-attacks, to swiftly develop its attack into the defensive depth of the Blue Army." While this may sound impressive, the exercise was held online, according to the battalion commander, partly because "the special characteristics of the Second Artillery Force make it very difficult to conduct actual-troop training."¹¹¹

The Second Artillery Corps held another exercise in March 2005 that involved several launching units of a missile brigade that after the "firing of three red signal flares" deployed to their "battling positions hundreds of kilometers away."¹¹² The deployment to positions hundreds of kilometers away suggests that the Second Artillery Corps, at least in this case, believed it would receive advanced warning of an attack. The use of red flares suggests that concealment and surprise was not a high priority.

Deployment of mobile missile units comes with considerable operational and logistical challenges. The Pentagon is well aware of the Chinese military's difficulties in conducting realistic exercises, and also of the special

Communication and Command and Control (C3) complications that come with operating mobile forces. The Second Artillery Corps acknowledged such complications in October 2004 in a blunt description of a signal regiment that had conducted a “field mobility communication support and survival exercise under complex weather conditions in deep mountains.” Once the missile launchers deploy into the field, the signal regiment is responsible for providing emergency communication support to troops posted along the large deployment area. Although the exercise was said to have improved the signal regiment’s “all-weather mobility communication support capabilities,” including the establishment of field operation command posts and jamming systems, the report bluntly admitted that signal regiments “often [sic] always [run] into various difficulties in [their] mobile communication support.”¹¹³

Whether involvement of all support elements is typical for Second Artillery Corps missile launch exercises is not known, but a *PLA Daily* description of an exercise conducted on July 18, 2006, suggests that it may not be typical. The “operational combined missiles exercise” was said to have involved “over 20 operational elements and over 100 specialties.” In addition to the missile launchers themselves, this included a communication element, the meteorological element, a survey element, and others. The exercise was portrayed by the *PLA Daily* as a unique event that upgraded the overall combat effectiveness “by making all elements take part in training,” as if such “combined” training is not a normal part of Second Artillery Corps exercises.¹¹⁴

Mobile missile launchers, according to the Second Artillery Corps, are known as the “three extras”: extra height, extra width and extra length. This means that personnel training takes longer and that support vehicles are essential. Missile bases have built training

Figure 10:
Chinese Missiles On the Move



China has operated mobile ballistic missiles (like this DF-2) for four decades. Most of China’s current missile force is mobile, and most of the future force will be mobile.

Image: China.Military.com

grounds for large-scale vehicles where the drivers practice driving on narrow roads, bridges, in tunnels, and on steep mountains. This further increases the visibility of mobile missiles.

Ensuring that equipment vehicles are capable of driving and keeping in touch with each other “is an important condition for the troops to accomplish their missile launch tasks.” During an exercise in July 2005, for example, “several vehicles mounted with special equipment [probably missile launchers] broke down after encountering the enemy’s air or surprise attack. Then three military transport vehicles arrived at the accident site. The maintenance personnel immediately changed tires and check[ed] the oil circuit. Several minutes later, the malfunctions were removed and the three damaged vehicles were back on the journey again.”¹¹⁵

Now, increased mobility of a modernized Chinese missile force is once again a central theme in the threat briefings from the Pentagon and various think tanks that see it as a worrisome new development. When the United States increases the survivability of its highly offensive nuclear forces, these institutions say it enhances stability. But when China improves the survivability of its minimum nuclear deterrent, it causes great concern.

Yet mobility also can enhance stability in two ways. Most important, mobile missiles are less likely to be destroyed in a first strike and therefore are less likely to be launched first or early in an impending crisis. For the Chinese, increased mobility increases the survivability of their deterrent and strengthens their adherents of a no-first-use policy. Some in the Pentagon, however, see increased mobility as a sign that China is moving away from a no-first-use policy toward a more threatening doctrine of nuclear war fighting.

The motivation for increasing mobility can be interpreted in opposite ways and in certain instances both explanations can be true. While the primary reason for China’s current nuclear modernization seems to be to safeguard the survivability of a continued minimum nuclear deterrent – in response to enhanced U.S. forces including Trident and a future ballistic missile system – it is also true the missiles will have improved capabilities in accuracy and readiness.

The U.S. intelligence community occasionally acknowledges that deployment of more capable U.S. offensive forces and development of an anti-ballistic missile defense system may have helped provoke a Chinese response we now see emerging as a new generation of mobile missiles. One has to look long and hard

to find such an acknowledgement, but they do exist. One acknowledgement – and a very clear one – was provided by Robert Walpole of the CIA during a Senate hearing in 2002:

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?

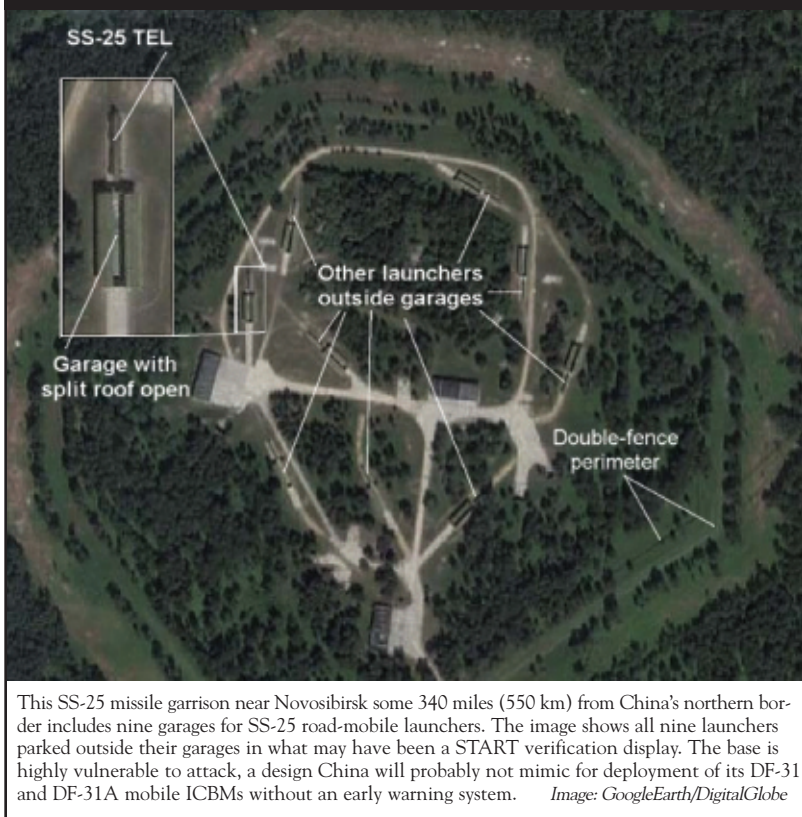
Mr. Walpole. Largely to move to mobile, more survivable systems.¹¹⁶ (Emphasis added.)

How China plans to base the road-mobile DF-31 and DF-31A is not known. One possibility may be that China chooses to base the road-mobile missiles in caves like some of the current DF-3As and DF-4s. Several Chinese airbases that we examined with satellite images also have large underground facilities that may be used to hide aircraft and weapons, but could potentially also serve as shelters for mobile missile launchers. Another possibility is that the quicker launch capability of solid-fueled missiles over the current liquid-fueled missiles makes Chinese planners confident enough to deploy the launchers in garages inside missile garrisons. China's northern neighbor, Russia, deploys road-mobile SS-25 missile launchers in groups of nine on easily identifiable bases that are highly vulnerable to attack (Figure 11). However, since China does not have an effective early warning system or a robust command and control system that can detect and respond to attacks, underground facilities may be the most likely deployment option.

As noted, a mobile Chinese missile force is far from a new phenomenon and one that U.S. targeteers are familiar with from several decades of targeting Chinese (and Soviet/Russian) mobile missiles. In fact, U.S. nuclear strike plans have formally targeted mobile missile forces for two decades. Until the mid-1980s, Single Integrated Operational Plan (SIOP) targeting was directed against only stationary, point targets, but after the Soviet mobile SS-25 ICBM became operational and China first began deployment of the mobile DF-21 in 1985, new U.S. national guidance directed in 1986 that Relocatable Targets (RTs) be placed at risk and established a requirement to develop a flexible and responsible

targeting system to do so.¹¹⁷ At that point all legs of the Triad were tasked to strike various categories of “predictable” relocatable targets, but a Strategic Air Command (SAC) working group produced an implementation plan that “holds a limited number of [unpredictable] relocatable targets (RTs) at risk in SIOP-6C.” At first only SAC forces were involved but with the SIOP-6D plan in October 1987, the Navy’s strategic nuclear submarines also began holding “unpredictable Relocatable Targets” at risk. The plan for holding mobile targets at risk was called the Strategic Relocatable Target Attack (SRTA) tactic.¹¹⁸

Figure 11:
Russian SS-25 Road-Mobile Missile Base at Novosibirsk



The Navy developed a new retargeting system to allow Trident SLBMs to quickly be aimed at mobile or emerging targets. After more than a decade in development, deployment of the Strategic Retargeting System (SRS) began in October 2003 to “provide the increased flexibility and capability required by the [1994] Nuclear

Posture Review for our offensive strike platform.” Specifically, the new targeting system enables SSBNs “to quickly, accurately, and reliably retarget missiles to targets” to “allow timely and reliable processing of an increased number of targets,” ... “reduce overall SIOP processing” time and “support adaptive planning.”¹¹⁹

Whether Chinese planners were aware of these programs is not known, but the capability of the Trident SLBM, according to the CIA, convinced China that its strategic missile force was too vulnerable. As China takes its next step in the nuclear arms race by deploying the DF-31 and DF-31A mobile missiles, U.S. planners will respond by trying to overcome the ploy through additional flexibility and responsiveness of their nuclear forces and intelligence assets. Some of the next steps were described in the 2001 Nuclear Posture Review:

One of the greatest challenges today is accounting for the location and uncertainty of mobile and relocatable targets.... To respond to this challenge, collection systems and techniques that defeat adversary relocation capabilities must be developed. Sensors must also be capable of defeating camouflage and concealment efforts and detecting and exploiting new command and control systems....

To locate successfully and maintain track on mobile targets until a weapon can be planned and executed, several enhancements need to be made to the current collection capability. Today’s satellite constellation is not optimized for the current and developing mobile target challenge. Planned improvements to this constellation would provide the capability to rapidly and accurately locate and track mobile targets from the time they deploy from garrison until they return. Sensors with rapid revisit or dwell capability over deployment areas combined with automated exploitation sides are required to provide this capability.¹²⁰

This qualitative and operational arms race will continue as long as both sides decide that it must respond to the other to shore up nuclear battle plans.

The Issue of Multiple Warhead Payloads

Unclassified U.S. government publications do not credit current Chinese nuclear missiles with multiple warheads,¹²¹ yet media reports and publications by non-governmental analysts and organizations frequently claim that China

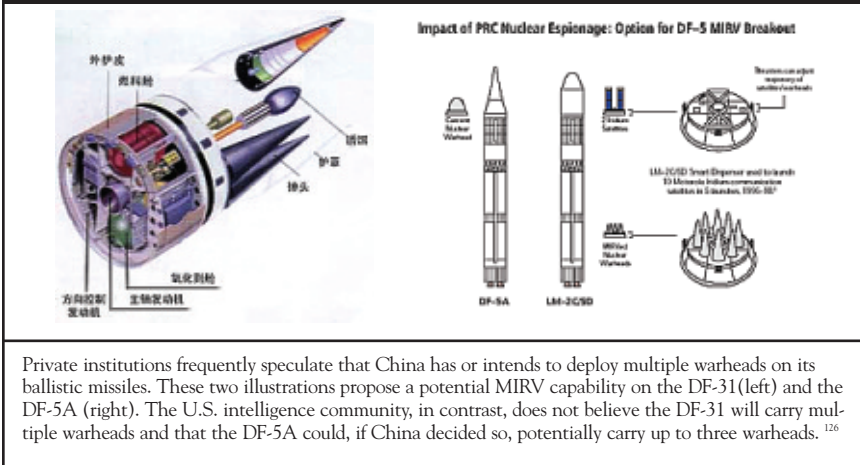
already has multiple warhead payloads deployed on some of its ballistic missiles, or will soon deploy multiple warheads on the DF-31 and its two derivative versions, the DF-31A and the JL-2.

A prominent source for this claim appears to be the 1999 Cox report. Although the report cautioned that the “Select Committee has no information on whether the PRC currently intends to develop and deploy multiple independently targetable reentry vehicle systems,” it nonetheless stated that “[e]xperts also agree that the PRC could have this capability for its new mobile intercontinental ballistic missiles within a reasonable period of years that is consistent with its plans to deploy these new mobile missiles.” Moreover, if China decided to pursue an “aggressive development of a MIRV system,” the report predicted, such a program “could permit the deployment of upwards of 1,000 thermonuclear warheads on ICBMs by 2015.”¹²²

Some experts and journalists used these exaggerated claims to portray a worst-case example of Chinese missile developments.¹²³ The Heritage Foundation, for example, published a “backgrounder” shortly after the Cox report came out, claiming that the DF-5 could be equipped with as many as eight warheads each, and that “[b]oth the DF-31 and DF-41 [DF-31A] ICBMs are expected to incorporate multiple independently targeted reentry vehicle (MIRV) warheads.”¹²⁴ These claims were echoed by the Institute for Foreign Policy Analysis in a study in 2000: “In fact, it is generally understood that China is equipping its future missile systems with MIRVed warheads.” The DF-31 might carry as many as three warheads, the Julang-2 three (perhaps even six), and the DF-31A as many as 10 warheads, the institute speculated.¹²⁵

In stark contrast to such claims, the U.S. intelligence community has consistently stated that it does not believe China has deployed multiple warheads on any of its ballistic missiles and that the three versions of the DF-31 are not likely to be so equipped either. “China has had the capability to develop and deploy a multiple reentry vehicle system for many years, including a MIRV system,”¹²⁷ but has not done so, the CIA stated in December 2001. The U.S. anti-ballistic missile system, however, may prompt China to change its mind, according to the Pentagon.¹²⁸

Figure 12:
Speculations About Chinese Multiple Warhead Capabilities



“Chinese MIRVing of a future mobile missile would be many years off,” the CIA told Congress in 2000. If China wanted to deploy multiple warheads on a missile, rather than deploying multiple warheads on the DF-31 and DF-31A, it “could use a DF-31 type RV for a multiple-RV payload for the CSS-4 in a few years,” the CIA explained.¹²⁹ (Emphasis added.) The DOD echoed this conclusion in 2002, when it stated that any Chinese multiple warhead capability will “most likely [be] for the CSS-4.”¹³⁰ The CIA’s Robert Walpole also addressed this issue in testimony before Congress in 2002:

Sen. Cochran. How many missiles will China be able to place multiple reentry vehicles on?

Mr. Walpole. In the near term, it would be about 20 CSS-4s that they have, the big, large ICBMs. The mobile ICBMs are smaller and it would require a very small warhead for them to put multiple RVs on them.

Sen. Cochran. ... [D]o you think that China will attempt to develop a multiple warhead capability for its new missiles?

Mr. Walpole. Over time they may look at that. *That would probably require nuclear testing to get something that small, but I do not think it is something that you would see them focused on for the near term.*¹³¹ (Emphasis added.)

So even if the Cox report's allegations of Chinese theft of U.S. warhead design were true, the CIA believes that China would still have to conduct additional nuclear tests to be able to build warheads sufficiently small to be able to deploy multiple warheads on the DF-31, DF-31A, and JL-2. The primary reason the intelligence community believes a potential multiple warhead capability would be deployed on the DF-5 and not on any of the new missiles is that deployment on the mobile systems "would encounter significant technical hurdles and would be costly," according to the CIA.¹³² It is important to note that this conclusion was made in December 2001, *after* the intelligence community determined in April 1999 that "U.S. information acquired by the Chinese could help them develop a MIRV for a future mobile missile."¹³³ Apparently, they are still a long way away – if developing such a capability is their intention at all.

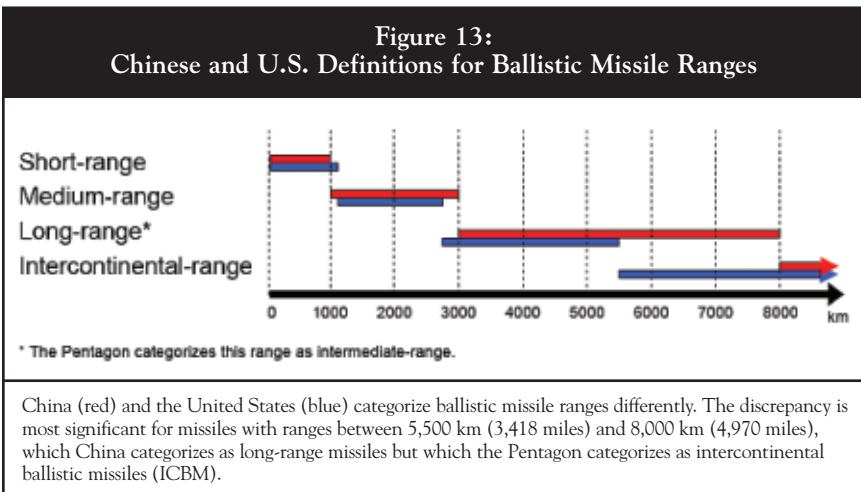
Beyond the technical constraints and opportunities, however, China may not be interested anyway in equipping too many of its new missiles with multiple warheads because placing "too many eggs in one basket" would increase the vulnerability of its ICBMs to a first strike. Reducing the vulnerability of the force is thought to be the main objective of the transition to solid-fueled mobile missiles, but MIRVing would contradict that objective. Keeping most of the mobile missiles with single-warheads (although likely with penetration aids), in contrast, would give China's force maximum security, flexibility and range.

The Issue of Missile Ranges

In addition to mobility, increased missile range is another capability that is used to paint a grim picture of a more threatening China. It is the expectation that China will be able to reach the United States with more warheads in the future that has reinstated China at the center of U.S. nuclear planning. When the DOD report on Chinese military forces was published in 2005, the *Washington Times* reported that the report "stated that China *now* can reach almost all of the United States with its small arsenal of nuclear missiles."¹³⁴ (Emphasis added.) The word "now" suggested a new development, but the DOD report did not say that China had acquired a *new* capability to target almost all of the United States. On the contrary, the report showed that China has had such a capability for more than two decades.

Adding to the confusion about China's missile force is that China and the United States use different definitions for the ranges of the various missiles. For

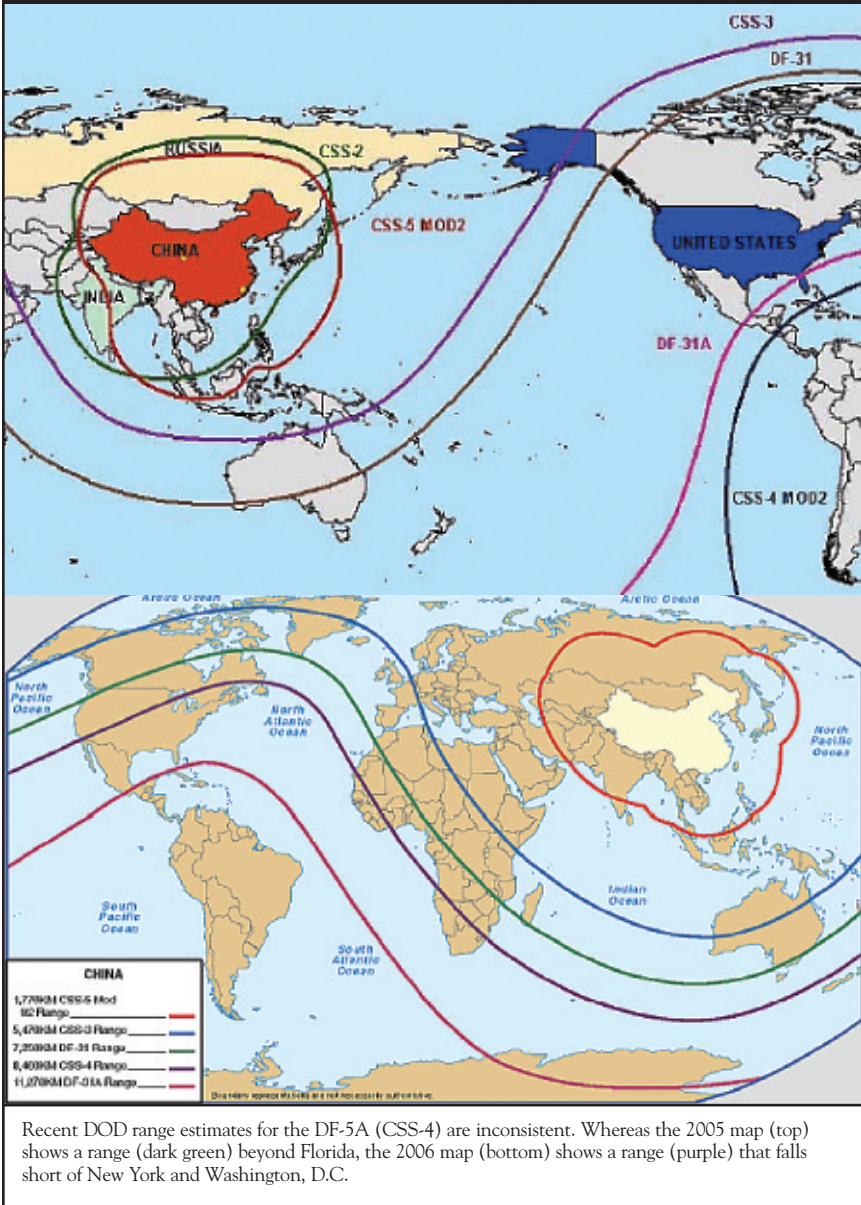
example, the new DF-31 is reported by the DOD to have a range of 4,500+ miles (7,250+ km), which would make it an ICBM according to U.S. definitions.¹³⁵ But according to Chinese definitions, a range of 4,500+ miles (7,250+ km) does not make it an ICBM, but a long-range missile. The U.S. definitions appear to be determined largely by the increased range of newer missiles: The DF-3A is medium-range, the DF-4 is intermediate-range (or long-range by Chinese standards), whereas anything above the range the DF-4 (3,418 miles (5,500 km) is an ICBM. See Figure 13 for comparison of Chinese and U.S. missile range definitions.



To add to greater confusion, the Pentagon has used different ranges for China's long-range missiles. The 2005 DOD report on China's military forces contains a map showing the ranges of, among other missiles, the DF-5A (CSS-4 Mod 2) and the DF-31A. These are the two missiles that are most central to the Pentagon's warnings about China's future offensive nuclear capabilities. The map shows the DF-5A with a range reaching beyond Florida, whereas the range of the future DF-31A is shown as a little less, reaching to the northern parts of Florida. The DOD's report from 2006, however, shows the range of the DF-31A extending beyond Florida while the DF-5A is shown to have a range that doesn't even allow it to hit Washington, D.C. (Figure 14).

This range-confusion led to a front-page report in the widely read *Defense News* in 2006 that claimed that the DF-31A will have a longer range than China's current ICBM, "making it the first Chinese ICBM that could hit Washington, D.C., Paris or Madrid."¹³⁶

Figure 14:
Inconsistent DOD Range Estimates For DF-5A



Recent DOD range estimates for the DF-5A (CSS-4) are inconsistent. Whereas the 2005 map (top) shows a range (dark green) beyond Florida, the 2006 map (bottom) shows a range (purple) that falls short of New York and Washington, D.C.

Land-based Ballistic Missiles

Currently, China is estimated to deploy approximately 90 nuclear-armed land-based ballistic missiles of four types: DF-3A, DF-4, DF-5A, and DF-21 (Mods 1 and 2).¹³⁷ All carry single nuclear warheads. Two land-based missiles, the DF-31 and its extended-range modification the DF-31A, are under development (Table 8). Operational deployment of DF-31 has slipped repeatedly over the past few years, compared with Pentagon predictions.

**Table 8:
Chinese Land-Based Nuclear Ballistic Missiles 2006**

China Name	U.S. Name	Year deployed	Range	Warheads	Yield	Missiles	Warheads
DF-3A	CSS-2	1971	3,100	1	3.3 Mt	16	16
DF-4	CSS-3	1980	5,500	1	3.3 Mt	22	22
DF-5A	CSS-4	1981	13,000	1	4.5 Mt	20	20
DF-21A	CSS-5	1991	2,150	1	200-300 kt	35	35
DF-31	CSS-X-10	2006?	7,250+	1	? kt	0	0
DF-31A	?	2007-2009?	11,270+	1	? kt	0	0
TOTAL						93	93

^a In kilometers.

There are many rumors about where China's ballistic missiles are deployed, but very little is known about the actual locations. China does not provide such information and U.S. intelligence doesn't say much about what it knows. The better unofficial sources identify more than a dozen locations in nine provinces (see Table 9) and leaked documents provide some additional information. Satellite images of three of those locations are included in this report, but only one (Delingha) has enough features to be positively identified as an operational launch site. Images of other areas as well as higher resolution would undoubtedly make it possible to identify additional sites.

Reports about China's nuclear forces published by the Pentagon and private research institutions such as the International Institute for Strategic Studies indicate that China over the past five years has decreased its land-based nuclear missile force by more than 20 percent. The decline may not have happened and may have to do with differences in counting launchers and missiles. But if correct,

**Table 9:
Rumored Nuclear Missile Bases and Brigades¹³⁸**

Missile	Location	Province	Base Number	Unit
DF-3A	Datong	Qinghai	56 Base	?
	Dengshahe ¹³⁹	Liaoning	51 Base	810 Brigade
	Jianshui ¹⁴⁰	Yunnan	53 Base	802 Brigade
	Lianxiwang ¹⁴¹	Anhui	52 Base	807/811 Brigade
	Liujihou	Qinghai	56 Base	?
	Quaotou	Qinghai	56 Base	809 Brigade
	Tonghua ¹⁴²	Jilin	51 Base	818 Brigade
	Yidu ¹⁴³	Shandong	?	?
DF-4	Delingha ¹⁴⁴	Qinghai	56 Base	812 Brigade
	Da Qaidam	Qinghai	56 Base	?
	Sundian	Henan	54 Base	804 Brigade
	Tongdao	Hunan	55 Base	805 Brigade
DF-5A	Luoning	Hunan	54 Base	801 Brigade
DF-21	Chuxiong	Yunnan	53 Base	808 Brigade
	Jianshui ¹⁴⁰	Yunnan	53 Base	
	Tonghua	Jilin	51 Base	818 Brigade
DF-31	n.a.	n.a.	n.a.	n.a.
DF-31A	n.a.	n.a.	n.a.	n.a.

it appears to have been caused by the retirement of approximately 20 DF-3A (CSS-2) IRBMs and the conversion of part of the DF-21 (CSS-5) force from nuclear to conventional missions. This reduction has affected the portion of the missile force that has theater range and resulted in a decreased nuclear posture against countries on China's periphery. The fact that part of this reduction may come from converting some of China's most modern medium-range, solid-fuel, mobile DF-21 to conventional capability suggests an important new focus on non-nuclear missions. The DOD acknowledges such a Chinese interest:

Beijing's growing conventional missile force provides a strategic capability without the political and practical constraints associated with nuclear-armed missiles. The PLA's short-range ballistic missiles (SRBMs) provide a survivable and effective conventional strike force, as will future procurement of conventionally armed ballistic missiles and land-attack cruise missiles.¹⁴⁵

Medium-Range Ballistic Missiles

Most of China's land-based nuclear ballistic missiles (55 percent) are medium-range missiles. This includes the old DF-3A and the more recent DF-21. These weapons are likely used to target India and Russia and U.S. military bases in the region.

DF-3A (CSS-2) MRBM

Figure 15:
DF-3A (CSS-2) Medium-Range Ballistic Missile



A DF-3 medium-range ballistic missile being prepared for elevation as part of a launch exercise. The white-painted warhead section is clearly visible.

Images: Military.China.com

The DF-3A is “China’s primary regional missile system,” the DOD stated in 2000. Today however, more than half of the missiles have been withdrawn from service and the weapon system is undergoing retirement. The DF-3A is a road-mobile, liquid-fueled IRBM that can be launched from either a permanent launch pad or portable launch stand.¹⁴⁶ It carries a 3.3 Mt warhead and has a range of up to 1,925 miles (3,100 km).¹⁴⁷ The weapon is most likely used to target Russia, India, and U.S. bases in Japan.

Deployment began in 1971 and reached a peak of 110 missiles by 1984¹⁴⁸ before declining to about 50 in 1993¹⁴⁹ and some 16 missiles on eight launchers today.¹⁵⁰ The Air Force’s National Intelligence Center predicted in 1996 that China would remove the DF-3 completely from service in 2002,¹⁵¹ but as with so many other predictions from the intelligence community, that did not happen. Instead, presumably due to the delay of the DF-31, the “Second Artillery is continuing to supplement its aging inventory of liquid-propellant [DF-3]

Figure 16:
DF-3A (CSS-2) Twin Launch Exercise



Recent image of a double DF-3A launch exercise at an unknown location. The white-painted warhead section of the DF-3A is clearly visible. The image gives a vivid impression of the large number of service trucks that are needed to support the weapon in the field. Apart from fuel trucks, this includes command and control vehicles, cranes, emergency vehicles, personnel carriers, etc. This makes the weapon more visible to detection by foreign intelligence assets.

Images: China.Defense.com

intermediate-range ballistic missiles with the solid-propellant, road-mobile [DF-21A] MRBM,” according to the DOD.¹⁵² Once the DF-31 enters service, however, the cumbersome DF-3A is likely to disappear quickly from operational service and its warheads probably scrapped. Today the DF-3A is rumored to be deployed at eight locations in six provinces (Table 9). China may have converted several of these sites to the newer DF-21 missile.

One of the rumored locations for the DF-3A is Yidu in the Shandong district in eastern China. The precise locations are unknown but approximately five miles (eight km) south of Yidu are two sites that might be launch facilities. One site

Figure 17:
Possible Yidu DF-3 Launch Facility



This facility south of Yidu in the Shandong province ($36^{\circ}36'09.29''\text{N}$ $118^{\circ}28'48.63''\text{E}$) might be a DF-3 launch site. The site is adjacent to another facility with a smaller potential launch pad. The site may have been converted to DF-21. It should be emphasized that there is no official confirmation that this facility is a launch site.

Image: GoogleEarth/DigitalGlobe

(Figure 17) has a 265-foot (80-meter) wide concrete pad adjacent to a 131 x 40 feet (40 x 12 meters) building large enough to house two DF-3A missiles. The second site (not shown) has a smaller 131-foot (40-meter) pad adjacent to a 115 x 56 feet (35 x 17 meters) building. It should be emphasized that it is not known whether these two sites are indeed launch facilities, but their layout suggest that they might serve such a role.

DF-21 (CSS-5) MRBM

The DF-21 is China's first land-based solid-fuel missile and similar to the JL-1 sea-launched ballistic missile. The missile was completed between 1985 and 1986, but deployment apparently did not get underway until 1991 and then at a modest pace. Today, the Pentagon says that 19 to 50 missiles are deployed.

The DF-21 is a road-mobile missile carried in and launched from a launch canister mounted on a towed transporter-erector-launcher (TEL). The DOD says that China deploys two versions (Mod 1 and Mod 2), designated as DF-21 and DF-21A, respectively. The weapon system continues to supplement the aging inventory of liquid-fueled DF-3As.¹⁵³ The missile's range is normally listed as 1,100+ miles (1,770+ km), but the classified range for DF-21 Mod 1 appears to be 1,340 miles (2,150 km).¹⁵⁴ A variant of the DF-21 is the submarine-based JL-1 developed for the Xia-class submarine.

Figure 18:
DF-21 (CSS-5) Launchers



The DF-21 is China's first solid-fueled ballistic missile. Some have been converted to non-nuclear missions.

Image: U.S. Air Force

U.S. Air Force intelligence predicted in 1996 that once DF-21 deployment was adequately underway, the DF-3A “will likely be removed completed from service, perhaps by 2002,”¹⁵⁵ but this did not happen. Yet there is considerable confusion about the number of DF-21 missiles deployed. The 2006 DOD report lists 19 to 50 missiles of both modifications on 34 to 38 launchers.¹⁵⁶ The 2005 report, however, listed only 19 to 23 missiles on 34 to 38 launchers,¹⁵⁷ while Air Force intelligence in 2006 listed “fewer than 50” DF-21 (CSS-5 Mod 1) launchers as well as “fewer than 50 DF-21 (CSS-5 Mod 2) launchers.”¹⁵⁸

Figure 19:
DF-21 (CSS-5) Missile Calibration



This image of a calibration of a DF-21 missile clearly shows the stump warhead section with access hatches opened. The missile appears to be marked DF-21M.

Image: Military.China.com

Part of the confusion may come from sources citing launchers instead of missiles. Another explanation may have to do with the conversion of a number of the DF-21s to conventional missions. The conventional version, apparently known as DF-21C, raises important questions about China’s regional targeting priorities as well as about crisis stability. Launch (or preparation for launch) of several DF-21Cs in a crisis or war might be misinterpreted as an impending nuclear strike and trigger U.S. preemptive nuclear action which in turn could result in Chinese nuclear retaliation.

The DF-21 is rumored to be deployed in at least three locations in three provinces (see Table 9), but nothing is known for sure and other locations may be used as well. If so, one potential other location may be the Suixi (Liancheng) airbase in southern China. A satellite image from 2005 (Figure 20) shows a large rectangular area with an assembly of dozens of vehicles. Although the relatively poor resolution of the image makes identification of the vehicles difficult, 22 of the vehicles appear to be approximately 34 to 46 feet (13 to 14 meters) long and consist of a truck with a 33 to 36 feet (10 to 11 meters) long trailer. The DF-21

Figure 20:
DF-21s or SAMs at Suixi Airbase



This image of Suixi Airbase (21°23'45.54"N 110°11'58.83"E) taken in 2005 shows a large concentration of long vehicles in a rectangular area (insert left). The largest vehicles are similar in size to DF-21 launchers, although it should be emphasized that it is unknown whether the vehicles are indeed DF-21 launchers. At the southern end appears to be a SAM site, which may be a temporary setup while a more permanent site is completed in what appears to be a SAM construction area next to the northern part of the area with the trucks. Rather than DF-21 launchers, the large vehicles may be used to transport surface-to-air missiles. Note that the tilted insert (right) makes the vehicles appear flatter than they actually are.

Image: GoogleEarth/DigitalGlobe

reportedly is 35 feet (10.7 meters) long.¹⁵⁹ The surface of the launch canister that contains the DF-21 missile is not smooth but has several large protrusions and other features that might account for the uneven appearance of the large vehicles in the image. But it should be emphasized that it is by no means certain that the vehicles identified on the satellite image are indeed DF-21 launchers; they may simply be trucks transporting surface-to-air missiles for a SAM site at the base.

Deployment of DF-21s at Suixi Airbase would, if true, raise some interesting questions. First, since the Pentagon estimates that China has only 34 to 38 DF-21 launchers, the relatively large number of possible DF-21 launchers visible in the satellite image would make Suixi one of the major deployment areas. Second, with a range of approximate 1,330 miles (2,100 km), DF-21s would not be able to target India from Suixi. They would, however, be in striking range of the Philippines and the Taiwan area.

Long-Range Ballistic Missiles

The long-range ballistic missile category is one area where different Chinese and U.S. range definitions create confusion. China categorizes missiles with a range of 1,860 to 4,970 miles (3,000 to 8,000km) as long-range, which includes the DF-4 and the new DF-31. The U.S. government categorizes the DF-4 as an intermediate-range missile (1,700 to 3,420 miles (2,750 to 5,500 km) but counts the DF-31 as an ICBM. For consistency, we have included the DF-31 in the ICBM section below.

DF-4 (CSS-3) LRBM

Initially deployed in 1980, the DF-4 was the first Chinese ballistic missile capable of hitting Guam, a base used for forward deployment of U.S. nuclear bombers and submarines since the early 1960s. The decision to develop the missile was made in May 1965,¹⁶⁰ shortly after the U.S. Navy began strategic deterrent patrols in the Pacific with ballistic missile submarines from Guam.

Figure 21:
DF-4 (CSS-3) Missile



DF-4 rollout-to-launch version in launch exercise. The missile garage is visible to the right. The DF-4 will likely be replaced by the DF-31.

Image: U.S. Air Force

The DF-4 is rumored to be deployed at three, possibly four, locations in three provinces (see Table 9). One location (Delingha, Qinghai) has been identified via satellite images for the report (see Figures 22 and 23).

The DF-4 was built in two configurations: a rollout-to-launch version housed in garages or caves; and an elevate-to-launch version based in silos.¹⁶¹ Only the rollout-to-launch version is thought to be operational today. With a range of more than 3,420 miles (5,500 km), the DF-4 is probably used to target Russia, India and Guam. The DF-4 is estimated to carry a single 3.3 Mt warhead.

The CIA predicted in 1976 that the DF-4 force would level out at less than five launchers by 1978,¹⁶² but more than double the number apparently were deployed.¹⁶³ The 2001 National Intelligence Estimate stated that about a dozen

DF-4 would probably remain in service through 2015,¹⁶⁴ and the DOD has stated since that the weapon likely will remain in service through 2009 for regional deterrence missions until they can be replaced by the DF-31.¹⁶⁵ Today there are thought to be 10 to 14 launchers with 20 to 24 missiles.¹⁶⁶

One of the rumored deployment areas for the DF-4 is the Delingha area in the Qinghai province in central China where the 414th Brigade is believed to be based. At least two launch sites appear to be operational approximately 17 miles (27 km) (Figure 22) and 19 miles (30 km) (Figure 23), respectively, west of the town of Delingha. Both launch sites have the same basic layout: A 230-foot (70-meter) wide concrete circle, a large garage that is large enough to



contain two or more DF-4 missiles mounted on their erect launchers, half a dozen fuel trucks, one to two dozen cabins and a couple of office buildings.

Figure 23:
Delingha DF-4 Launch Facility



This DF-4 launch site (37°24'27.47"N, 97° 1'40.70"E) is located in central China near Delingha (see map insert). The site includes a 194 x 30 feet (59 x 9 meters) missile garage, barracks, fuel and service trucks, and an underground garage next to a 230-foot (70-meter) wide launch pad. The site is at an elevation of 10,050 feet (3,064 meters) above sea-level. The DF-4s are within reach of almost all of Russia, India and Guam.

Image: GoogleEarth/DigitalGlobe

Approximately 10 miles (17 km) further to the west are what may be five additional, but apparently abandoned, launch sites. They may have been operational in the 1980s when China's nuclear deterrent was principally focused against the Soviet Union, but were abandoned either because the targets shifted and/or the missile force was reduced. A possible location for the 414th Brigade Headquarters is Delingha Nongchang, approximately halfway between Delingha and the launch sites. The site includes what might be a launch site, including three missile garages, a launch pad, and a number of service vehicles (Figure 24).

For all of the (possibly) identified DF-4 launch sites, it is striking how vulnerable they are to attack. Their small size and the apparent storage of the missiles in garages on the surface makes it unnecessary to even resort to nuclear weapons use in a counterforce attack on these facilities. A single successful bomber sortie with a precision bomb (even a Special Operations Forces unit on the ground) would be sufficient to put a launch site out of operation.

Figure 24:
Possible Delingha DF-4 Launch Facility Headquarters



This possible but unconfirmed DF-4 launch site headquarters (37°18'37.94"N, 97°12'27.71"E) is located in Delingha Nongchang approximately 10 miles (15 km) southwest of the town of Delingha in central China (see map insert). The site includes what might be three missile garages in front of a launch pad inside a fenced enclosure with service trucks. It must be emphasized that the site has not been confirmed as a missile related facility.

Image: GoogleEarth/DigitalGlobe

Approximately 115 miles (185 km) further to the west from Delingha is another rumored DF-4 site: Da Qaidam. The town is said to be the location of the 412 Missile Brigade, and a satellite image taken in 2005 (not shown) shows a busy town with what appears to be industry and military facilities. Two sites immediately south of Da Qaidam may be dismantled launch pads, but the available satellite images do not reveal possible launch sites, although a small fenced facility approximately 22 miles (36 km) south of Da Qaidam near Xiao Qaidam have some interesting features but no visible launch pad.

Intercontinental Ballistic Missiles

China's ICBM force includes the modified DF-5, which is the only missile capable of targeting all of the United States. The DF-31 and DF-31A are under development and expected to supplement or replace the DF-3/DF-4 and eventually the DF-5, respectively.

DF-5A (CSS-4 Mod 2) ICBM

Approximately 20 silo-based DF-5A (CSS-4 Mod 2) make up China's "primary nuclear deterrent," according to the DOD,¹⁶⁷ a statement that reflects that this is the only Chinese missile that can reach targets in all of the continental United States. First deployed in August 1981, the DF-5 has a throw-weight of approximately 7,000 lbs (3,100 kg) and is capable of delivering a 4-5 Mt warhead more than 8,100 miles (13,000 km).

While the DF-5's role is normally described in a China-U.S. deterrence relationship, the DIA concluded in 1985 that although the missile was "originally envisioned by Beijing as providing a deterrent against the United States, [it] now has a primary role for use against Soviet targets, especially Moscow." DIA derived this conclusion from the DF-5 "flight test program and other information we have on this missile [that] suggests that it is intended to be used against targets defended by an unsophisticated, first generation anti-ballistic missile defense. Moscow remains the only city with an ABM system." DIA also

Figure 25:
DF-5A (CSS-4) Reentry Vehicle?



A possible reentry vehicle is loaded atop a DF-5A prior to a test launch from the Jiuquan Space Launch Center. The missile is normally deployed in silos with the warhead stored separately. A modified version of the DF-5 has also been used for space launches.

Image: Military.China.com

concluded that “some CSS-4s might have secondary targets in the United States,” but added that U.S. plans to build a missile defense system would likely lead to additional improvements to the DF-5.¹⁶⁸

China is in the last phase of replacing all original DF-5s with a modified and longer-range version (DF-5A), a replacement that is frequently misrepresented. One of the few “experts” that the House Armed Services committee in 2005 invited to brief it on the Chinese military mistakenly told the committee that the 1999 Cox report “for the first time revealed that the PLA was replacing its 13,000-km-range, liquid-fueled DF-5 Mod 1 ICBMs with a longer range DF-5 Mod 2.”¹⁶⁹

On the contrary, the replacement program had been reported on for more than a decade. The decision to extend the range reportedly was made in November 1983,¹⁷⁰ shortly after the so-called “Star Wars” speech by President Ronald Reagan. The DOD predicted in 2002 that all DF-5s would be replaced by DF-5A by mid-decade,¹⁷¹ but the 2005

report states that the upgrade is still in progress.¹⁷² The modification appears to have been minor,¹⁷³ increasing the range by about 620 miles (1,000 km) to approximately 8,100 miles (13,000 km).¹⁷⁴

While normally credited with a range of approximately 8,100 miles (13,000 km), DIA reported in 1984 that two flight tests of the DF-5 took place “from central China to the vicinity of the Fiji Islands about 15,000 kilometers [9,320 miles] away.”¹⁷⁵ The 2006 DOD report adds further confusion to the capability of the DF-5A by listing its range as 8,460+ km (5,257+ miles) and showing a map with a range only reaching halfway across the United States, significantly shorter than the DF-31A.¹⁷⁶ The 2005 DOD report, in

Figure 26:
DF-5 (CSS-4) Silo Launch



A DF-5 is launched from a silo. China is thought to have about 20 operational DF-5A silos and also some decoy silos.

Image: Military.China.com

contrast, included a map that showed the range to reach beyond Florida and further than the DF-31A.¹⁷⁷ (See Figure 14)

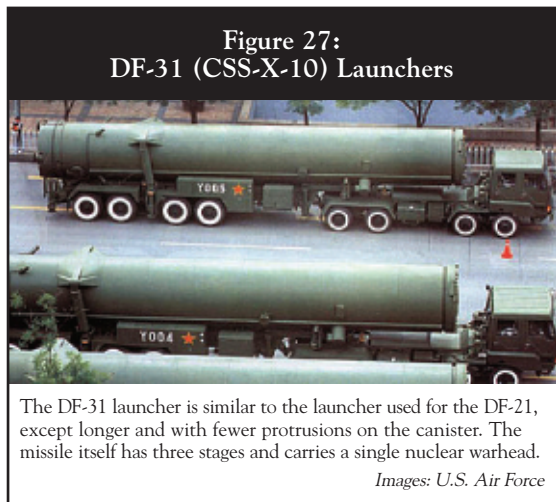
The Cox report claimed that the DF-5 is “based in significant part on U.S. technologies illegally obtained by the PRC in the 1950s” for the Titan missile and that this “information formed the basis for the [DF-5s] that are currently targeted on the United States.”¹⁷⁸ This claim was discredited by the CISAC assessment of the Cox report.¹⁷⁹

The U.S. intelligence community anticipates that China may begin to deploy multiple warheads on part of its ballistic missiles in response to the U.S. deployment of ballistic missiles defense systems, and that the DF-5A in that case would be the weapon of choice. Private “experts” invited to testify before Congress have speculated that the DF-5A could carry five to eight multiple warheads,¹⁸⁰ but the 70 to 100 range for warheads primarily targeted against the United States that has been projected by the CIA and repeated by other agencies since only envisions three warheads.¹⁸¹

DF-31 (CSS-X-10) ICBM

The DF-31 forms the core of China’s long-range ballistic missile modernization program. Deployment of the new missile has been expected for many years but DOD’s predictions have continued to slip. The DF-31 was first displayed publicly at the National Day parade in 1999, and has been photographed at several places including on airport runways. The DOD predicted in 2002 that deployment would “begin before mid-decade,”¹⁸² but this did not happen, and although the Internet is full of pictures and claims that the DF-31 has already been deployed, the 2006 DOD report says it may happen in 2006.¹⁸³

The range of the DF-31 has been the subject of much speculation. Most sources claim a range of around 4,934 miles



(8,000 km). In 1987, the Pentagon stated that the range would be “at least” 4,970 miles (8,000km),¹⁸⁴ but after monitoring additional flight tests, the Pentagon in its 2006 report reduced the range estimate to 4,500 miles (7,250+ km), or less than the 4,970+ miles (8,000+ km) estimate for the JL-2.¹⁸⁵ Adding to the confusion is that China and the United States define the DF-31 differently as a long-range missiles and an ICBM, respectively. We include the missile in the ICBM section for consistency.

With a range of more than 4,500 miles (7,250+ km), but apparently less than 4,970 miles (8,000km), the DF-31 will be China’s first solid-fueled ICBM. The three-stage missile is carried by an eight-axle transporter-erector-launcher (TEL) (Figure 27). Once deployed, it will be able to reach targets throughout Asia and Europe, but not the U.S. mainland except for Alaska and the most northwestern states. The missile will probably replace the DF-3 and DF-4 entirely, although the U.S. intelligence community expects some DF-4s may be retained through 2009 and possibly until 2015. At that time, the 2001 National Intelligence Estimate predicted, China may have about two dozen DF-31s and DF-4s.¹⁸⁶

Unlike certain private analysts and reporters who speculate that the DF-31 will be equipped with multiple warheads, the U.S. intelligence community believes the

missile will carry a new small warhead tested in the 1990s as well as an advanced package of penetration aids against U.S. and Russian ballistic missile defense systems. Chinese television in 2004 carried pictures of what allegedly was said to be the warhead section for the DF-31 being rolled out on a dolly (Figure 28).



Figure 29:
DF-31 Missile On Fixed Launch Pad



An image allegedly showing the DF-31 missile positioned on a fixed launch pad. The missile, which has been under development since the 1980s, is expected to replace the DF-3A and DF-4 in regional targeting.

Image: SinoDefence.com

DF-31A ICBM

The DF-31A is a modified version of the DF-31 with a longer range of more than 7,000 miles (11,270+ km). With such a range the missile will be able to reach targets throughout the United States, Europe and Russia. The DOD expects the DF-31A will be primarily targeted against the United States, and together with the DF-5A the DF-31A form the basis for the U.S. intelligence community's projection of 75 to 100 Chinese warheads "primarily targeted against the United States" by 2015.

This warhead estimate assumes that China will be able to produce and deploy 40 to 55 DF-31As by 2015, a questionable assumption given that the missile has yet to be flight tested. DOD projections for initial deployment have continued to slip over the years, and the DOD now believes the missile will be deployed in

2007.¹⁸⁷ A more likely date is toward the end of the decade. The DF-31A may previously have been confused with the DF-41, an earlier attempt to design a solid-fueled ICBM which has now been abandoned (Figure 30).

Figure 30:
Alleged DF-41 (Abandoned) ICBM



This image is said to show the DF-41, China's earlier attempt to develop a solid-fueled ICBM capable of targeting all of the United States. The authenticity of the image has not been confirmed and the design appears more Russian than Chinese.

Image:bbs.news.163.com

Despite frequent claims by media and private organizations that the DF-31A will carry multiple warheads, the U.S. intelligence community does not believe the missile will be so equipped. The DF-31A will likely carry a single warhead, perhaps in the 200 to 300 kiloton range, plus an advanced package of penetration aids.

Other Nuclear Ballistic Missiles

The 2006 DOD report provides the new information that “China will deploy several new conventional and nuclear variants of MRBMs and IRBMs for regional contingencies and to augment its long-range missile forces.”¹⁸⁸ According to the report, China currently has one MRBM (DF-21) and one IRBM (DF-3). Of these, it is known that a conventional variant of the DF-21 (DF-21C) is deployed, but it is

Figure 31:
Alleged “New” Missile Launcher



This image of an alleged new five-axle missile launcher was recently posted on the Web site Military.China.com.

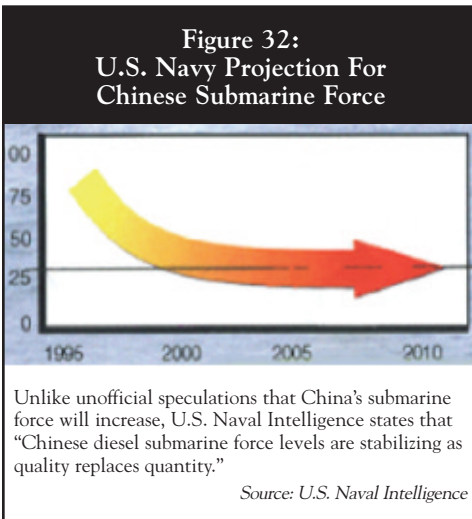
Image:Military.China.com

unclear what the new nuclear variant is. A photograph of a new five-axle mobile launcher was recently posted on the Internet (see Figure 31).

The Chinese Submarine Force

As of early 2006, the Chinese submarine force consisted of approximately 56 operational submarines, including 50 diesel-powered submarines, five nuclear-powered Han-class attack submarines, and a single Xia-class ballistic missile submarine.¹⁸⁹ This force is less than half of what China had in the mid-1980s, a dramatic reduction caused mainly by the retirement of older Whiskey-class and Romeo-class diesel attack submarines. New classes of submarines are under

construction but production is unlikely to offset the decline as the remaining Romeo-class submarines are retired. The DOD predicts that all Romeo-class submarines will have been withdrawn from service by 2010, and that China's non-nuclear powered (i.e., diesel) submarine inventory by 2020 will consist of Ming-, Song-, and Kilo-class submarines.¹⁹⁰ The size of the submarine force is expected to stabilize around 40 boats (Figure 32).

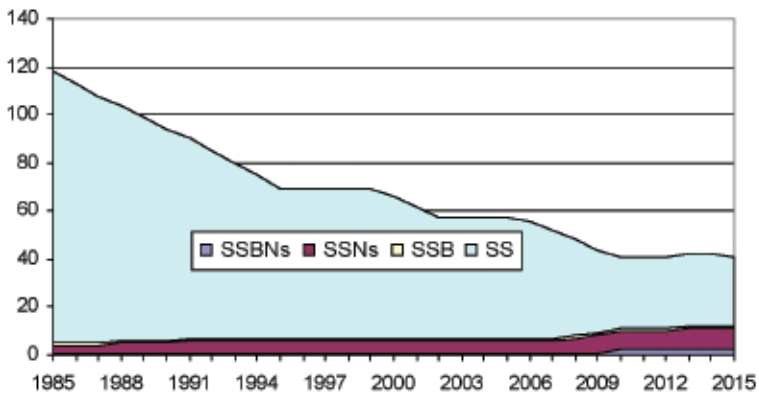


As with many other aspects of China's military modernization, the future development of the submarine force is frequently misreported or exaggerated in the news media and in publications by private organizations. An article in the *Wall Street Journal* in April 2006, for example, quoted "military analysts" speculating that "China could have as many as 85 submarines in the Pacific by 2010," and that "Beijing's fleet of attack subs could outnumber the U.S. fleet by five to one by 2025."¹⁹¹ A Heritage Foundation article published only two days before the *Wall Street Journal* article claimed that the Chinese submarine fleet is "growing prodigiously,"¹⁹² and another article in March 2006 described "China's rapidly expanding submarine force."¹⁹³ The shipbuilding industry is also prone to exaggerate the Chinese submarine force, with the American Shipbuilding Association claiming in 2005

that China's submarine force by 2010 "will be nearly double the size of the U.S. submarine fleet."¹⁹⁴

Such claims are well in excess of the projections made by the U.S. intelligence community, however, which anticipates a much smaller Chinese submarine fleet. Like other maritime nations in the Pacific region, China is modernizing its submarine force by retiring older models and replacing them with newer submarines, but in smaller numbers. Production of Song-class and Yuan-class diesel submarines, purchases of Russian Kilo-class diesel submarines, and production of Type 093-class nuclear-powered attack submarines and Type 094-class nuclear-powered ballistic missile submarines will likely result in a fleet of approximately 40 submarines by 2015 (Figure 33). If China wanted to, it could obviously easily increase its submarine force beyond that level. "One of the top priorities" for the Chinese Navy during the 10th Five-Year Plan, according to the DOD, is manufacturing submarines.¹⁹⁵ Yet the unclassified intelligence estimates we have seen do not anticipate an increase at this point.

Figure 33:
Chinese Submarine Force 1985-2015



The Chinese submarine fleet has been cut in half since 1985 and likely will continue to drop to roughly 40 submarines by 2015, according to U.S. Naval Intelligence.

The development and operations of the submarine force are important because they form a central component of the Pentagon's claim that China is expanding its military reach in the region. According to the DOD, the Chinese Navy's maritime mission in recent years "has evolved from a static coastal defense into

an ‘active offshore defense,’” resulting in newer, more modern warships and submarines capable of operating at greater distances from China’s coast for longer periods.¹⁹⁶ If equipped with land-attack missiles in the future, the submarine mission will evolve further.

Unlike U.S. submarines, however, Chinese submarine officers have very limited experience in offensive submarine operations far from the Chinese coast. Each U.S. attack submarine sails on an extended patrol once or twice each year and six to 16 submarines are constantly forward-deployed lurking off foreign coasts – no doubt including China’s. The entire Chinese submarine force, by contrast, conducted no patrols at all in 2005.

Nuclear-Powered Ballistic Missile Submarines

The expectation that China will be able to develop a credible sea-based nuclear deterrent is another key component of the warnings that are made about China’s military modernization. If (and *if* is the operative word here) Chinese ballistic missile submarines were equipped with a long-range missile that could reach the United States, the 1999 Cox report warned, this “would allow a significant change in the operation and tactics of the PRC’s nuclear-powered ballistic missile submarines. Instead of venturing into the open ocean to attack the United States [something the Chinese probably have never envisioned for their single Xia-class SSBN], the Type 094-class submarines could remain near PRC waters, protected by the PLA Navy and Air Force.”¹⁹⁷ The Type 094 class SSBN, the latest 2006 DOD report states, “will provide China with an additional, survivable nuclear option.”¹⁹⁸ By 2025, the Heritage Foundation prognosticated that “several Chinese nuclear ballistic missile submarines will be capable of patrolling America’s West Coast,”¹⁹⁹ apparently imagining how the Soviet’s operated their SSBNs during the Cold War.

But before the Chinese get to that stage, if they ever do, they must first demonstrate that they can build a reliable SSBN force and operate it successfully. In the past, China has experienced considerable technical difficulties in developing and deploying a sea-based nuclear ballistic missile force. According to information obtained from the Office of Naval Intelligence, moreover, China’s single Xia-class SSBN has never conducted a deterrent patrol. This fact may be a result of technical problems that have prevented the submarine from becoming fully operational, or less likely it may reflect the Chinese government’s policy that “China...

never deploys any nuclear weapons beyond its borders.”²⁰⁰ An operational SSBN force, and certainly one that would patrol America’s West Coast, would require a dramatic change of policy, capability, and operations.

The Xia-class (Type 092), or Daqingyu-class, was launched from the Bohai shipyard in April 1981 after more than 25 years of design and development work. The nuclear propulsion design was based on the reactor developed for the Han-class (Type 091) nuclear-powered attack submarine first launched in 1971. The Xia hull appears to be a modified Han hull, with the ballistic missile compartment added to the mid-section with a characteristic hump to cover the top of the missile tubes, an approach also used by the United States and the Soviet Union in designing their first SSBNs back in the 1960s.

**Table 10:
Chinese Sea-Based Nuclear Ballistic Missiles**

Type	Name	Year deployed	Range*	Warheads	Yield	Missiles	Warheads
JL-1	CSS-NX-3	1986	1,770+	1	200-300 kt	12	12
JL-2	CSS-NX-4?	2008-2010?	8,000+	1	? kt	0	0
TOTAL						12	12

* Range in kilometers.

Past projections by the U.S. intelligence community about the Chinese SSBN force have proven to be highly inaccurate and inflated. The DIA projected in 1984 that four Xia-class SSBNs would be operational by 1994.²⁰¹ This never happened indicating either that DIA’s prediction was wrong or that something was wrong with the design. Whatever the reason, it seems unlikely that China would have gone to the great expense and the mobilization of its resources to just build one submarine. Up until late-1999, U.S. media reports continued to say that a second Xia-class submarine was under construction. The *Washington Times* even reported that the submarine was being modified to carry the new JL-2.²⁰²

Again in 2002, after the Xia underwent an overhaul from 1995 to 1998, the DOD predicted that “China is expected to deploy a medium-range SLBM aboard the XIA SSBN before the end of the year,” and that the service life of Xia “most likely will be extended through at least 2011.”²⁰³ The medium-range SLBM was the JL-1 but the 2002 deployment did not materialize and it remains to be seen if Xia will continue to operate as an SSBN or be used as a SLBM test

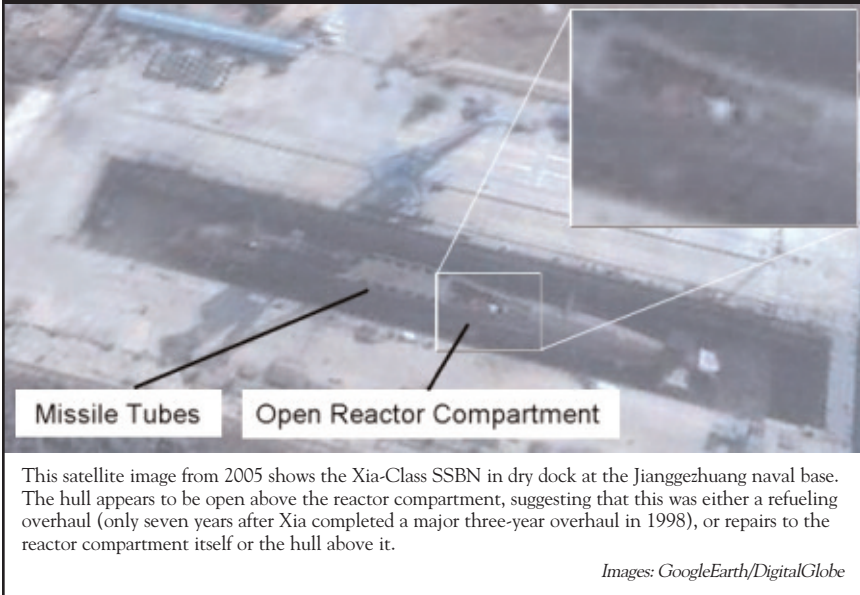
platform to replace the old Golf-class SSB if and when the Type-094 becomes fully operational. The Xia appears to continue to be hampered by technical issues as it moved into dry dock again in 2005 for what appears to have been either a refueling overhaul or repairs to the reactor compartment (Figures 34 and 35).

Figure 34:
Xia-class SSBN in Dry Dock 2005



The Xia was designed to carry 12 Julang-1 (JL-1, or CSS-N-3) missiles, a two-stage solid-fueled missile equipped with a single 200 to 300 kt warhead to a range of 1,100+ miles (1,770+ km). The JL-1, which is similar to the DF-21, was completed in 1986 but is not thought to have been fully operational and may be stored on land in the underground submarine cave at Jianggezhuang approximately 15 miles (24 km) east of Qingdao on the Yellow Sea. Another possibility is that the warheads may be stored further inland at a central storage location.

Figure 35:
Xia-class SSBN In Dry Dock 2005



The 2006 DOD report lists 10 to 14 JL-1 missiles for 10 to 14 launchers, a curious number because the Xia is known to have 12 launch tubes (see also Figure 36 below). Yet the DOD report indicates that China only produced one load of JL-1 missiles, insufficient to arm any additional boats that were once rumored.

One reason the JL-1 is often listed as CSS-NX-3 is that China may be working on upgrading the missile. According to U.S. Naval Intelligence, in order to “give the XIA more capability, the Chinese may elect to develop, test, and equip it with an improved version of the JL-1 SLBM.” Initial operational capability of the improved version might be 2004, Naval Intelligence predicted,²⁰⁴ but no such deployment has been announced.

Several media reported in 2004 that the first Type 094 SSBN, known as the Jin-class, had been launched in late July 2004,²⁰⁵ but this may have been the lead hull of the Type 093 SSN.²⁰⁶ How many Jin-class SSBNs will be built is unknown, but two or three is often suggested (as was the case with the Xia).²⁰⁷ Only the future will tell how many will actually be built. The Jin-class submarine will carry 12 Julang-2 SLBMs (Figure 36), a modification of the land-based DF-31. The JL-2 will be solid-fueled like the JL-1 but with three stages.

Figure 36:
Type 094 Class SSBN Missile Configurations



Earlier descriptions (left) of the Type 094 showed 16 launch tubes for ballistic missiles, but a 2004 outline published by U.S. Naval Intelligence shows 12 tubes arranged in two groups (right).

Images: DefenceTalk.com/U.S. Naval Intelligence

The JL-2 has already been the subject of much speculation with the 1999 Cox report claiming the missile will have a range of 7,200 miles (11,590 km) that would “allow it to be launched from the PRC’s territorial waters and to strike targets throughout the United States.” Confusingly, the reports main missile chart listed a much shorter range of 4,900 miles (7,880 km), a little more than the DF-31.²⁰⁸ Some news media only reported the longer estimate, however, and the *Washington Times* quoted “one official” saying that the JL-2 and the DF-31 “will be able to hit any place in the United States, not just the Western states. It is a significant new capability.”²⁰⁹ This mistake was repeated by *Air Force Magazine* in 2005 when it reported that the 2005 DOD report on China’s military forces stated that the DF-31 and Julang-2 “can strike anywhere in the United States except southern Florida.”²¹⁰

What the DOD report stated, however, was that the DF-31 has a range of 4,500+ miles (7,250+ km) and that a future version (DF-31A) will have an extended range of

Figure 37:
Julang-1 SLBM



The 1,100-plus mile range Julang-1 is China’s only sea-launched ballistic missile. First deployed in 1986, the weapon has never been on a strategic deterrent patrol. U.S. Naval Intelligence says China may be upgrading the missile.

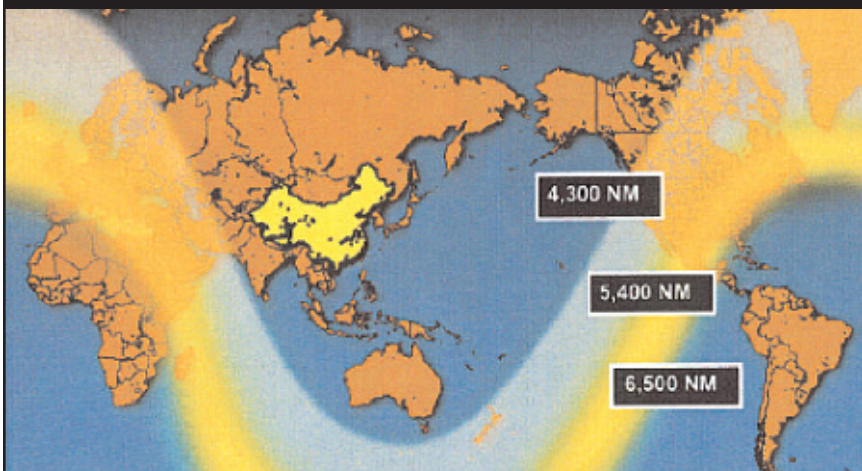
Source: U.S. Air Force

more than 7,000 miles (11,270 km). The range of JL-2 was not identified in the report but was described in the 2006 report as more than 4,970 miles (8,000+ km).²¹¹ This estimate roughly matches the estimate most commonly used by the intelligence community, but some confusion remains.

In a publication titled *Worldwide Maritime Challenges* published in 2004, U.S. Naval Intelligence set the JL-2 range at “over 5,000 nautical miles” (over 5,750 miles or 9,260 km). This estimate apparently was from a range of different assessments of launch close to China (not on distant patrol) “potentially putting all of the continental United States at risk,” according to the Navy. The statement accompanied a map (Figure 38) showing three range estimates: 4,300 nautical miles (4,950 miles or 7,960 km), 5,400 nautical miles (6,210 miles or 10,000 km), and 6,500 nautical miles (7,480 miles or 12,040 km).²¹² Only the shortest of these ranges match the estimate in the 2005 DOD report whereas the longest range matches the 1999 Cox report.

Of course, any long-range submarine ballistic missile can target all of the United States if the submarine just sails close enough, but at best the inconsistent estimates indicate that the U.S. intelligence community just does not know what the JL-2

Figure 38:
U.S. Navy Range Estimates For Julang-2 SLBM



The Office of Naval Intelligence stated in 2004 that “JL-2 range assessments extend to over 5,000 nautical miles (over 5,00 miles or 9,260 km), potentially putting all of the continental United States at risk.” Only the shortest of those assessments, however, match statements made by CIA and DOD.

Image: U.S. Naval Intelligence

range will be. Even with a possible range of 5,095 miles (8,200 km), the JL-2 would not be able to target the continental United States from the Bo Hai Bay, which sometimes is described as a protected sanctuary for China's future SSBN fleet. The North Korean Bay would also be too far away, and the SSBNs would have to sail through the narrow straits between South Korea and Japan and into the Sea of Japan for its JL-2 missiles to reach targets in the continental United States. For Bo Hai Bay to be used as launch area, the range of the JL-2 will need to be well over 5,130 miles (8,260 km). Since China is only 2,800 miles (4,500 km) wide and the JL-2 has not been test launched into the Pacific Ocean, it is difficult to accurately estimate the range.

Another confusing issue surrounding the JL-2 is whether the missile will carry multiple warheads, even MIRVs as some experts claim. An article in *U.S. Naval Institute Proceedings* in 2003 titled "China's Subs Lead the Way," for example, claimed that the JL-2 will be equipped with "three to six warheads."²¹³ Similarly, after China in June 2005 successfully test launched a JL-2 (after a previous failed attempt in 2004), an article in the Naval Submarine League magazine, *The Submarine Review*, stated:

With the *successful implementation* of the JL-2 onboard the Type-094, China now possesses a weapon capable of reaching *any target in the world*. When loaded to capacity with JL-2 missiles, the Type-094 would contain *48 separate 90-kiloton warheads*.

It is not currently known whether the JL-2 is ready for full-scale deployment, but according to a report issued by the Pentagon regarding China's nuclear forces in May 2004, *the number of SLBMs could increase to 30 by next year and 60 by 2010*.²¹⁴ (Emphasis added.)

In contrast to such claims, the U.S. intelligence community has consistently stated that the JL-2 "is expected to carry a single warhead" with "a sophisticated penetration aids suite"²¹⁵ to overcome U.S. and Russian anti-ballistic missile systems. The JL-2 is not yet deployed because the weapon is not finished and the Type 094 class SSBN that is supposed to carry it has yet to be commissioned. In fact, the DOD expects that the JL-2 may be last of the three DF-31 versions to become operational "by the end of the decade."²¹⁶ Finally, the JL-2 will not be capable of "reaching any target in the world" even with a range of 7,450 miles (12,000 km), unless it went on patrol far from Chinese waters.

Nuclear-Powered Attack Submarines

Chinese attack submarines do not carry nuclear weapons, but the submarines are central to the Pentagon's warnings of China's increasing military reach. Moreover, the U.S. intelligence community asserts that at least one of the land-attack cruise missiles under development by China may be or could be equipped with a nuclear capability.²¹⁷ The Chinese Navy currently has approximately 55 operational attack submarines, of which all but five old nuclear-powered Han-class submarines (Figure 39) are diesel-powered. A new class of nuclear-powered attack submarines (Type 093) is under construction.

Figure 39:
Han-class (Type-091) Nuclear-Powered Attack Submarine

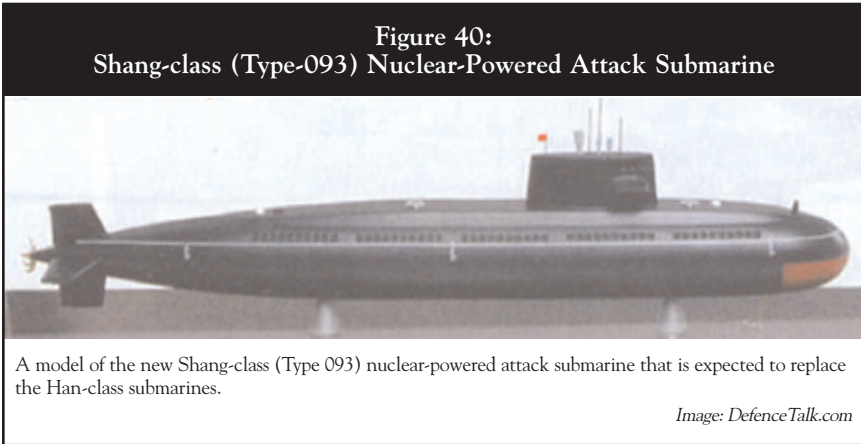


A Han-class nuclear-powered attack submarine with outlines of tiles covered by snow. All five units were commissioned between 1974 and 1991 and are based at Jianggezhuang approximately 15 miles (24 km) east of Qingdao on the Yellow Sea.

Image: DefenceTalk.com

The first Han-class (Type 091) unit became operational in 1974 after years of construction, and it took 20 years to build four more boats for a total of five. The Han boats are often showcased as examples of China's naval might, but their capability is limited and the boats are thought to be extremely noisy compared with U.S. nuclear-powered attack submarines. U.S. Naval Intelligence anticipates that China will overhaul the Han submarines.²¹⁸

As with most other Chinese weapon systems, DOD's projection for when the new Type 093 (Shang-class) nuclear-powered attack submarine (Figure 40) will enter service has slipped. In 2003, the expectation was that it would happen in late 2004 or early 2005,²¹⁹ but in 2005 the date had slipped to sometime in 2005.²²⁰ Finally, in May 2006, the DOD finally reported that the first boat “is now entering the fleet.”²²¹



Two more units may be under construction, and by 2010, the DOD predicts, the Shang-class will form the “backbone” of China’s future forward anti-carrier warfare capability and eventually replace the Han-class. The DOD says that the Shang-class compares to the technology of the Russian Victor III SSN,²²² a capability U.S. attack submarines have considerable experience in operating against.

The Shang-class “is intended primarily for anti-surface warfare at greater ranges from the Chinese coast than the current diesel force,” according to U.S. Naval Intelligence. “China looks at SSNs as a primary weapon against aircraft carrier battle groups and their associated logistics support.”²²³

Submarine Operations

Like other naval powers, China cloaks its submarine operations in great secrecy, and other navies generally do not want to say very much about what they know the Chinese might be doing. As a result, it is difficult to have a substantial debate based upon facts – but easy to make exaggerated claims – about the capabilities and implications of the Chinese submarine fleet.

While the DOD currently warns about China's submarine modernization and operations, the tone was more cautious in 1997. Back then, the DOD said that the Chinese nuclear submarine "operations have been limited and they have never sailed beyond their regional waters." The DOD also cautioned that although the nuclear submarines "have a potential for operations in the Pacific Ocean, their capabilities would be very limited against modern Western or Russian ASW [Anti-Submarine Warfare] capabilities."²²⁴ Even back in 1972, the DIA noted China's desire for a "blue water" capability, but 30 years later it still has not happened:

The augmentation of the fleet with guided missile destroyers and destroyer escorts and with an increasing number of new attack submarines provides the Chinese with a blue water operational potential and the capability of seeking out and attacking enemy strategic naval at increasing distances from the Chinese mainland.²²⁵



With the arrival of the Bush administration in 2001, the assessments of Chinese submarine operations changed significantly. The 2002 DOD report warned that the Chinese navy "is making efforts to improve its force-projection options by improving the capability to deploy submarines on extended patrols."²²⁶ The 2006 DOD report claimed that China was trying to establish a "first" or "second island chain" strategy for its naval forces (Figure 41), and that "Chinese forces have increased operations

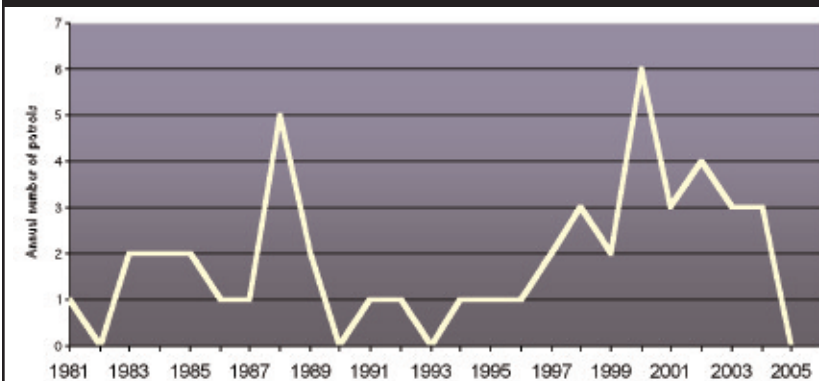
beyond China's borders and coastal waters, most notably the highly publicized 2004 intrusion of a HAN-class nuclear submarine in Japanese territorial waters during operations far into the western Pacific Ocean.²²⁷

Using the 2004 Han-class incident as an example of such a development appears to be cherry-picking. Indeed, information recently obtained under the Freedom of Information Act from U.S. Naval Intelligence reveals that Chinese attack submarines—a primary capability if such a Chinese expansion into the Pacific is

to be successful—conduct very few patrols. The data does show a slight increase between 1999 and 2002, but the patrols have since declined and stopped completely in 2005 (Figure 42). Over the full period for which data is available (1981 through 2005), the trend is that patrols have only increased from one per year to 2.8 patrols per year for the entire Chinese submarine fleet. The data also reveals that China's single SSBN has never conducted a deterrent patrol. The DOD reports from 2005 and 2006 do not mention this important development, only the intrusion.

The implications to be drawn from the data are significant. Basically, it means that the Chinese submarine force has very little operational experience in conducting extended submarine operations away from its coastal waters. As a result, for example, the crews of the new Jin-class ballistic missile submarines currently under construction will need to start almost from scratch to develop the operational and tactical skills and procedures that are essential if a sea-based deterrent is to be militarily effective. By comparison, U.S. SSBNs have conducted over 3,600 deterrent patrols over the past 55 years. In 2005 alone, the U.S. SSBN force conducted 44 patrols (21 patrols in the Pacific), or more than four times the number of SSBN patrols conducted by all other nuclear weapon states combined.

Figure 42:
Chinese Submarine Patrols 1981-2005



Chinese attack submarine (SSN/SS) patrols. China's single SSBN has never conducted a patrol. Data is not available from prior to 1981.²²⁸

The patrol data shows a total absence of Chinese general purpose submarine patrols in 2005, and a very low number of patrols (an average of less than two per year) conducted by this force since 1981. In the most recent period (2000

through 2005) less than six percent of China's submarine fleet has gone on patrol in any given year. In 2000, with an all time high of six patrols, operational experience was limited to 10 percent of the submarine fleet.²²⁹

Given the concern over China's intentions and capabilities in the Taiwan Strait, this operational history is important. Any cross-strait naval assault with surface ships and subsequent supplies would be impossible to protect or sustain without significant submarine forces well-versed in sustained operations far from home. Even if the mission was only defense against U.S. aircraft carrier battle groups operating in the Taiwan Strait, the limited Chinese submarine patrol experience may limit Chinese capabilities.

If China's intentions were to project a credible military influence in the Sea of Japan and South China Sea, one would expect to see a much higher degree and more consistent pattern of submarine operations in those areas than appears to be the case. Overall, the data suggests thus far that the Chinese submarine force's mission is not force projection but coastal defense and sea denial near China and Taiwan.

How to interpret this information obviously depends on what U.S. Naval Intelligence means by the term "patrol." In response to a follow-up question about the declassified submarine patrol data, U.S. Naval Intelligence refused to define what constitutes a "patrol," arguing that it "cannot release specific criteria for determining what a 'patrol' is as it would divulge methods and sources."²³⁰ The Defense Department's unclassified Dictionary of Military Terms (JP 1-02) provides some help by making the following five definitions available:²³¹

antisubmarine patrol: The systematic and continuing investigation of an area or along a line to detect or hamper submarines, used when the direction of submarine movement can be established.

inshore patrol: A naval defense patrol operating generally within a naval defense coastal area and comprising all elements of harbor defenses, the coastal lookout system, patrol craft supporting bases, aircraft, and Coast Guard stations.

offshore patrol: A naval defense patrol operating in the outer areas of navigable coastal waters. It is a part of the naval local defense forces consisting of naval ships and aircraft and operates outside those areas assigned to the inshore patrol.

patrol: A detachment of ground, sea, or air forces sent out for the purpose of gathering information or carrying out a destructive, harassing, mopping-up, or security mission.

submarine patrol area: A restricted area established to allow submarine operations: a. unimpeded by the operation of, or possible attack from, friendly forces in wartime; b. without submerged mutual interference in peacetime.

Assuming that U.S. Naval Intelligence's use of the term "patrol" follows the DOD's definitions, the declassified patrol data suggests that Chinese strategic and general purpose submarines in 2005 did not conduct investigations to detect other submarines, did not participate in naval defense operations in coastal or outside coastal areas, and were not deployed for the purpose of gathering information or harassing.

Reports of Chinese submarine patrols are scattered and vague, probably because they are so few. Historically, Chinese submarines first began to undertake extended patrols in the mid-1970s by sailing away from China's shoreline.²³² During those patrols, when Han-class submarines entered the fleet, the submarines would sail beyond the first island chain (the line from the Philippine Islands through Taiwan to the Ryukus), and even the second island chain (Indonesia, the Marianas Archipelago, and the main islands of Japan).²³³

Sometime between 1985 and 1986, according to articles in *Ta Kung Pao*, a Chinese SSBN (the Xia) was rumored to have navigated more than 37,000 km and "broke the 84-day record of continuous underwater navigation set by an American submarine." Also, in the spring of 1988, a Chinese nuclear submarine reportedly navigated the Taiwan Strait into the South China Sea and conducted "a successful test voyage at extreme depths."²³⁴ The report that the Xia conducted such an operation between 1985 and 1986 appears to be incorrect since the Xia has never conducted a patrol. Instead, these two operations may have involved Han-class submarines. The 1988 voyage coincided with the fourth Han boat (hull no. 404) becoming operational.²³⁵ Five patrols were conducted in 1988.

During the Taiwan Strait crisis in 1994, an S-3 anti-submarine aircraft from the USS Kitty Hawk (CV-63) reportedly detected and trailed a Chinese Han-class submarine while operating in the Sea of Japan. The submarine was said to have operated near, and even shadowed, the carrier over a period of three days within a distance of 18 to 24 miles.²³⁶ This may have been the single patrol conducted by Chinese general purpose submarines in 1994.

In June 2001, the *Washington Times* quoted unnamed U.S. military officials saying that a Chinese submarine had departed the Qingdao Naval Base without being detected by U.S. intelligence agencies. The submarine was said to have sailed underwater for more than a month in what was described as an “undetected SSN deployment,” possibly to trail the U.S. Oceanographic Survey Ship USS Bowditch (T-AGS-62) operating in the Yellow Sea.²³⁷ This may have been one of the three Chinese general purpose submarine patrols conducted in 2001.



Two years later, in November 2003, a Japanese P-3C anti-submarine aircraft detected a Chinese Ming-class diesel submarine on the surface in the Osumi Strait some nine miles outside Japanese territorial waters approximately 25 miles from the Japan’s coastline (Figure 43). A Chinese Foreign Ministry spokesperson said the submarine was on a “routine maritime training,”²³⁸ one of only three patrols conducted by general purpose submarines that year.

Again, on November 10, 2004, Japanese forces detected and chased what was said to be a Chinese Han-class nuclear powered attack submarine after it allegedly entered Japanese territorial waters some 250 miles southwest of Okinawa where it sailed submerged between Miyako and Ishigaki islands near Taiwan. The Japanese government complained to China and said Beijing subsequently admitted it was their submarine, apologized, and explained that it had been on a training mission and for “technical reasons” had entered Japanese waters.²³⁹

The Pentagon said the submarine had conducted “operations far into the western Pacific Ocean,” and used the incident to warn that the “Chinese forces have increased operations beyond China’s borders and home waters.”²⁴⁰ In reality, however, the Chinese submarine force had not increased such operations but remained at the same patrol level as the previous year and with only half as many patrols as during the peak in 2000.

In May 2005, various private Web sites carried reports and pictures of a Chinese Han-class submarine allegedly conducting a visit to a naval base on the Hainan Island on the South China Sea (Figure 44). This cruise apparently was not considered a patrol by U.S. Naval Intelligence, which reported zero Chinese submarine patrols in 2005 – the fourth time since 1981 that the Chinese submarine fleet has not conducted any patrols consistent with it not falling under any of the five definitions of “patrol” given above.

Figure 44:
Han-Class SSN On Hainan Island?



In May 2005, various private Web sites carried reports about a Han-class SSN that reportedly had been spotted at a naval base on Hainan Island on the South China Sea.

Image: DefenceTalk.com

Medium-Range Bombers

China operates a force of about 120 aging H-6 intermediate-range bombers of which a couple of dozen may have a secondary nuclear strike mission. Although seen increasingly obsolescent as a modern strike bomber, the H-6 is not as old as the U.S. B-52 and may gain new life as a platform for China’s emerging cruise missile capability. China is thought to be close to introducing the YJ-63 first-generation land-attack cruise missile for delivery by the H-6. We estimate that China maintains a small inventory of nuclear bombs for these aircraft.

Bombers were China’s first nuclear strike platform. Only three years after China’s first nuclear test, the CIA concluded in 1967 that “China probably now has a few fission weapons in stockpile deliverable by bomber.”²⁴¹ Prior to that, three nuclear tests had been carried out at Lop Nur using the Soviet-produced Tu-16 Badger medium-range bomber.

The first Chinese produced H-6 was completed in 1968, and CIA estimated in 1969 that the “Chinese initially will probably look to the Tu-16 primarily as a

means for carrying nuclear weapons,” but would probably also have other roles.²⁴² The first confirmation of H-6 bombing training was provided by U.S. satellite photography on August 13, 1971, when an H-6 was photographed leaving the Hsingjenpao bombing range. By March 1972, DIA estimated that China had 32 H-6 with an additional 19 awaiting completion.²⁴³

Figure 45:
Hong-6 Intermediate-Range Bombers



The Hong-6 bomber has dropped several nuclear devices in Chinese nuclear tests and a small number of aircraft may still have a nuclear strike mission. Like the U.S. B-52, the H-6 was produced in the 1960s.

Image: Military.China.com

The National Security Council concluded in January 1972 that the Chinese “probably now have the capability to respond to a bomber attack by launching their bombers on receipt of warning.”²⁴⁴ This included “a few” H-6 bombers with nuclear capability, according to the DIA,²⁴⁵ which at this point began to include thermonuclear bombs. Until November 1976, H-6 aircraft were used to drop a total of nine nuclear devices in Chinese nuclear tests at Lop Nur. Five of these tests were very-high yield weapons in the 2 to 4 Megaton range. Two had yields in the hundreds of kilotons, and two with yields from 15 to 35 kilotons.²⁴⁶

Due to the limited penetration capability of the H-6 and lack of a low-level capability, however, DIA concluded that the aircraft was not intended for strategic use. “Rather,

these aircraft appear intended for an essentially tactical role, directed at an invader’s rear areas or supply routes,” DIA estimated and concluded that it was “improbable that China’s air forces have a strategic nuclear delivery mission.”²⁴⁷

This conclusion contradicted somewhat an earlier DIA report from 1972, which states that “recent intensification of [H-6 bombing training] coupled with the highest noted altitude for BADGER activity – 41,000 feet – confirms China’s serious intent to develop a strategic strike capability.”²⁴⁸

As production of ballistic missiles progressed, however, the importance of the H-6 as a nuclear strike platform probably decreased, and the CIA concluded in 1976 that China's intermediate range bombers "probably do not have a primary mission of strategic attack." Instead, the "organization, deployment, and training" of the bomber force "suggests that it has a dual role of conventional and nuclear bombing."²⁴⁹ This situation has probably continued until today, with a couple of dozen of the approximately 120 H-6 bombers probably having a secondary nuclear mission.

China is in the process of introducing several land-attack cruise missiles, a development that may boost the importance of the H-6. One example is the YJ-63 (Figure 44), a first-generation cruise missile that can deliver a 500 kg warhead to a range of 249 to 310 miles (400 to 500 km). Another example is the DH-10, a second generation cruise missile which reportedly has a range of more than 930 miles (1,500 km). The Pentagon says there are "no technological bars to placing on these systems a nuclear payload, once developed,"²⁵⁰ and Air Force Intelligence says the DH-10 will carry "conventional or nuclear" warhead.²⁵¹

Figure 46:
YJ-63 Land-Attack Cruise Missile



The YJ-63 is a first-generation land-attack cruise missile for delivery by the Hong-6 bomber (background). The subsonic weapon, which can carry a 500 kg warhead to a range of 249-310 miles (400-500 km), is may be deployed within a few years.²⁵² The second-generation land-attack cruise missiles, the Pentagon says, may be nuclear armed.

Image: Military.China.com

Using satellite images purchased from DigitalGlobe or freely available via GoogleEarth, we studied Chinese bases and detected 124 H-6 bombers at six bases (Anqing, Danyang, Leiyang, Nanjing, Wugong, and Xian). Five of the bases had 18 to 34 H-6 bombers present, while Leiyang only had five H-6s.

A satellite image taken on May 7, 2005 (Figure 47), showed 23 H-6s present at the Anqing Airbase in eastern China, sufficient for one or two squadrons. The bombers are lined up on the tarmac at both ends of the 1.74 miles (2.8 km) runway. The western end of the runway is connected to a loop 0.6 miles away that may be a service area for the bombers. At the eastern end of the loop is a tunnel entrance that appears to connect to an underground facility inside the adjacent mountain. The tunnel is not wide enough (only 16 meters) for a bomber to enter, but might instead be used to store weapons for the bombers. Anqing Airbase does not appear to have an external weapons storage area.

Figure 47:
Anqing H-6 Bomber Airbase



Anqing Airbase (30°34'N 117°02'E) is located north of Anqing in the Nanjing military region (see map insert). This satellite image, which was taken on May 7, 2005, shows 23 H-6 bombers and a tunnel entrance to an underground facility (see enlarged insert).

Image: GoogleEarth/DigitalGlobe

The Xian Airbase, photographed in April 2005, was found to have 18 H-6 bombers. The image showed 17 bombers lined up on the tarmac and one bomber taxiing. Unlike Anqing, Xian does not have underground facilities and instead included what appears to be an external weapon storage facility with about a dozen buildings located approximately one mile to the east of the base. Most of the buildings appear to be surrounded by soil barriers (Figure 48).



A similar layout was found at the Wugong Airbase located approximately 35 miles west of Xian. A satellite image taken on February 2, 2003, shows 34 H-6 bombers, half of which appear to be in some form of maintenance. A remote weapon storage area appears to be located approximately 1.3 miles south-west of the base (Figure 49).

Figure 49:
Wugong H-6 Bomber Airbase



Wugong Airbase (34°16'33"N 108°15'57"E) is located in central eastern China (see map insert). This satellite image, which was taken on February 2, 2003, shows H-6 bombers a remote weapon storage area.

Image: GoogleEarth/DigitalGlobe

Tactical Nuclear Weapons

As a measure of how effectively the Chinese keep even the most basic facts about their nuclear stockpile secret, we have been unable to determine from Chinese and U.S. statements or unclassified sources whether China has tactical nuclear weapons or not. Without hard evidence, though, we estimate that China maintains a small inventory of tactical bombs for a couple of dozen fighter-bomber aircraft. Several reports and certain events strongly suggest that China may have developed a modest tactical nuclear weapons capability, but exactly what it is or was or when it was extant is uncertain. The U.S. intelligence community also has indicated, although dubiously, that China may have developed warheads for short-range ballistic missiles and possibly nuclear land mines.

In the early 1970s, the production of plutonium by the Jiuquan (or Yumen) reactor triggered speculations that China was developing tactical nuclear weapons.²⁵³ According to a RAND study, “plutonium offered the Chinese the technologically feasible option of shifting to ADMs [(atomic demolition munitions) and] tactical nuclear weapons” and “tactical nuclear weapons might make up for weakness in conventional arms, especially artillery.”²⁵⁴ Plutonium, of course, also can be used in strategic nuclear weapons, but the DIA stated in March 1972 that the “Chinese appear to be on the brink of establishing a tactical nuclear capability.”²⁵⁵

Tactical use of nuclear missiles and bombers was seen by the Chinese as a means of responding – short of the strategic level – to an invader’s use of tactical nuclear weapons, according to 1976 CIA analysis. Aircraft delivered bombs

were more accurate than ballistic missiles at the time, although the aircraft were susceptible to air defense systems.²⁵⁶ By 1984, the DIA concluded that such use of strategic assets in tactical scenarios was “unlikely.”²⁵⁷ Yet there was “circumstantial evidence,” the CIA concluded in 1976, “that China seeks to develop a tactical nuclear force as well.”²⁵⁸

Part of this circumstantial evidence was several military exercises that China held in the early 1980s that simulated the use of tactical nuclear weapons. In June 1982, a joint service exercise was held in the Ningxia Hui Autonomous Region that “included a simulated tactical nuclear detonation,” according to the DIA.²⁵⁹ In the exercise, both sides simulated the use of tactical nuclear weapons, and the defender’s counterattack was described as follows: “Our troops’ nuclear strike capability zeroed in on the targets, took the enemy by surprise and dealt his artillery positions and reserve forces a crushing blow.” The local newspaper carried a photo with the caption “An ‘atomic bomb’ exploding deep in the ranks of the ‘enemy.’”²⁶⁰

Defending against a nuclear-armed invader was a serious challenge to Chinese military planning and several exercises conducted during the 1980s seemed to be intended to train Chinese troops to fight under nuclear battlefield conditions.²⁶¹ Earlier the CIA had concluded that Chinese forces were not organized, equipped or trained to conduct operations successfully in a nuclear war environment.²⁶²

The simulation of tactical nuclear weapons employment, of course, did not prove that China had developed or intended to develop tactical nuclear weapons. Strategic weapons also can be used in a tactical manner. Yet the CIA said at the time that although the Chinese “have not deployed a tactical nuclear force per se,” their “fissile material production capabilities [deleted][are in] excess of what they appear to need for their strategic programs” so “design and production of tactical nuclear weapons is not constrained.” Based on its analysis of Chinese nuclear capabilities, the CIA said it “would not be surprised” if the following weapons were begun or were deployed by the early 1980s:

- Small tactical bombs and warheads;
- A nuclear-armed cruise missile;
- A nuclear depth charge; and
- Atomic demolition munitions.²⁶³

At the same time, based on its knowledge of warhead designs, the CIA judged that China would be unlikely to develop certain tactical weapons, “such as a nuclear artillery round, nuclear-armed [anti-air missiles] for fighters, and possibly nuclear torpedoes for submarines.”²⁶⁴ These three types did not materialize, but the DIA concluded in 1984 that “a small number of the nuclear-capable aircraft probably have nuclear bombs, even though we are unable to identify airfield storage sites” at the air bases. The DIA also concluded that “the Chinese maintain ADMs [atomic demolition munitions] in their inventory, although there is no evidence confirming their production or deployment.”²⁶⁵ While it is puzzling how DIA could reach such a conclusion without any evidence, the agency described its predicament:

We know very little... about the extent of tactical or theater nuclear weapons for use by the Chinese People’s Liberation Army (CPLA). A lack of basic doctrine or training may indicate that the Chinese only recently considered integrating nuclear weapons into ground force operations. The Chinese nuclear weapons technological capability would limit the current ground force nuclear support to atomic demolition munitions (ADMs), bombs, and missiles such as the CSS-1; it would not include artillery-fired nuclear projectiles.²⁶⁶

Nevertheless, the DIA predicted, China in the following decade would produce a sizeable non-strategic nuclear force consisting of bombs, ADMs, short-range ballistic missiles, and air-to-surface missiles (Table 11). In hindsight, as with many of DIA’s projections, those about Chinese tactical nuclear weapons turned out to be inaccurate, exaggerated and contradictory.

**Table 11:
DIA Projection For Chinese
Non-Strategic Nuclear Weapons
1984-1995²⁶⁷**

Weapon	1984	1989	1995
Bombs	165	200	230
ADMs	50	50	50
SRBMs	0	0	12
ASMs	0	130	250
Follow-on Systems	0	0	30
TOTAL	215	380	572

Yet in November 1984, only seven months after it made this prediction, the DIA published another projection of Chinese military capabilities: *Handbook of the Chinese People’s Liberation Army*. This publication, which was said to be “based on known Chinese practice and publications up to 1 August 1984,” reached a completely different conclusion about China’s tactical nuclear weapons:²⁶⁸

There is no evidence that China possesses a tactical nuclear weapons stockpile or that the CPLA has developed any coherent doctrine for tactical nuclear fire support of ground forces.... Although China is assessed as having the capability to produce tactical nuclear weapons and has successfully tested nuclear devices in the 20-kiloton range, there is no evidence that it has yet produced or deployed such weapons.²⁶⁹

The *Handbook* described that China's lack of a non-strategic nuclear arsenal may have resulted from Chairman Mao Zedong's conviction that tactical nuclear warfare would quickly escalate to the strategic level. Yet the DIA also remarked that Chinese defense literature "has reflected a more receptive attitude toward the advantages of tactical nuclear weapons since the death of Mao." Despite this development, the *Handbook* reemphasized, "China is not now assessed as having any stockpile of tactical nuclear rockets, guided missiles, or atomic munitions."²⁷⁰

It is unclear (and certainly confusing) why the same agency came to two so contradictory conclusions within a time span of just seven months. One answer may be that handbooks are not highly classified and appear to rely to a large extent on publicly available information.²⁷¹ Another answer may depend upon definitions. Whereas the *Handbook* contained an overall rejection of Chinese tactical nuclear weapons, the section ends with a description of what is meant by tactical: "rockets, guided missiles, or atomic munitions." The April 1984 estimate (Table 11) also did not list rockets or guided missiles, but it did include ADMs albeit with the caveat that "there is no evidence confirming their production or deployment."²⁷² The existence of tactical bombs was not explicitly excluded.

Likewise, although the *Handbook* dismissed the existence of tactical nuclear weapons, it did conclude: "There are indications that China *may develop* tactical nuclear delivery systems."²⁷³ (Emphasize added.) As mentioned above, several of China's nuclear tests were low-yield, possibly indicative of an effort to develop tactical nuclear weapons. For example, the 12th Chinese nuclear test was conducted on November 18, 1971, and involved a relatively low-yield (15 kt) device. Debris analysis indicated that the device used a boosted plutonium primary (2 kg Pu) which contained no more than 0.5 kg of oralloy. The DIA concluded that this "may be indicative of PRC interest in developing all plutonium primaries or pure fission weapons for tactical uses."²⁷⁴

Two months later, on January 7, 1972, a modified A-5 fighter-bomber (Q-5A) dropped a low-yield (8 kt) nuclear bomb in a nuclear test at Lop Nur. The

employment reportedly used the loft bombing technique.²⁷⁵ The test was the first – and apparently only – time a Chinese fighter-bomber has been used to deliver a live nuclear weapon and, according to the DIA, “may have been a proof test of a tactical weapon.”²⁷⁶ A few months after the test, the DIA estimated that China possessed “0-25 tactical bombs for delivery by F-9 [Q-5] or IL-28” aircraft.²⁷⁷ By 1984, the DIA estimated that China had a total inventory of 165 nuclear bombs.²⁷⁸

**Figure 50:
Qian-5 With Hydrogen Bomb?**



The Qian-5A delivered the nuclear bomb in China's 13th nuclear test on January 7, 1972. These two unofficial images claim to show the “Qian-5 airplane with hydrogen bomb” (left) and a hydrogen bomb with the inscription “strong bomb no. 1” (right). The claims have not been verified.

Images: DefenseTalk.com

Since then, the Q-5A may have been retired, and there have been no reports that other Q-5s were modified to deliver nuclear weapons. Given its age and short range of only 400 km,²⁷⁹ any reason to keep the Q-5 with a nuclear strike capability is questionable. If China had wanted to retain a tactical nuclear air strike capability, one option could have been to convert a limited number of modern aircraft such as the Russian-supplied Su-27 or Su-30. The DOD says that Chinese aircraft's land-attack capabilities are improving in general due to development and acquisition of guided munitions, and specifically highlights anti-radiation missiles and laser- and TV-guided Air-to-Surface Missiles and bombs for the Su-30MKK. With its greater range, this aircraft might be a logical choice for a regional tactical nuclear strike capability, although it should be emphasized that no known source credits the Su-30KK with a nuclear capability.

It is also possible that one or more of China's short-range ballistic missiles may have nuclear capability. The DIA stated in 1987 that the DF-15 (CSS-6) (Figure 51) had a nuclear capability,²⁸⁰ and the National Security Council told Congress in July 1993 that "work is underway on warheads for... tactical missiles."²⁸¹ Air Force Intelligence in 1996 described that the DF-15 was taking over regional targeting of the old nuclear DF-3,²⁸² which might suggest a nuclear capability. Furthermore, the 1999 Cox report stated that the DF-15 "may be fitted with nuclear warheads or with an enhanced radiation weapon (neutron bomb)."²⁸³



In addition, a DIA report from 1999 stated that China had roughly 100 nuclear short-range ballistic missiles,²⁸⁴ with a range of less than 621 miles (1000 km).²⁸⁵ This estimate is suspicious because the report did not include medium-range 621 to 1,864 miles (1000 to 3000 km) or long-range 1,864 to 4,971 miles (3000 to 8000 km) ballistic missiles, which China are known to have. It is possible, therefore, that the report may incorrectly have used "SRBM" to refer to all missiles other than ICBMs and SLBMs.²⁸⁶

Since the early 1990s, however, DOD and CIA publications have focused on the conventional capabilities of Chinese short-range ballistic missiles, and the question of a potential nuclear capability for these weapons has faded. The DOD described in 2000 that the DF-15 has the capability to deliver "a 500-kg conventional payload to a maximum range of 600 km [373 miles]." The report explicitly stated that the "PLA's 2nd Artillery has incorporated a new conventional mission with the addition of CSS-6 and CSS-7 SRBMs to its inventory."²⁸⁷ As of March 2006, Air Force Intelligence estimated that "fewer than 150" DF-15 launchers were deployed, doubling of the estimate from 2003,²⁸⁸ and the May 2006 DOD report listed some 70-80 launchers with 275-315 missiles.²⁸⁹

Although the DIA in the 1980s speculated that China had Atomic Demolition Munitions (ADM) and might develop other tactical nuclear weapons systems, none of this appears to have materialized and few today mention Chinese tactical nuclear weapons. One exception, however, is the Congressional Research Service (CRS), which in a 2006 report speculates that China “could put nuclear warheads on weapons such as ... ASCMs, torpedoes, and naval mines.”²⁹⁰ Another exception is the Lexington Institute, a private think-tank that advocates larger U.S. military forces, which stated in a 2004 report that:

there is some evidence the PLA considers nuclear weapons to be a useful element of an anti-access strategy. In addition to the nuclear-capable [ballistic] missiles ... China has nuclear bombs and aircraft to carry them, and is reported to have nuclear mines for use at sea and nuclear anti-ship missiles. At the very least, China would expect the presence of these weapons and the threat to use them to be a significant deterrent to American action.²⁹¹

The Lexington report was cited by the CRS, but neither provided any evidence to back up these claims.

Nuclear Cruise Missiles

China does not now have nuclear cruise missiles, but the Pentagon speculates that such a capability may be on the horizon. This assessment has evolved over the last five years. In 2001, the DOD stated that China “produces several types of land-, sea-, and air-launched cruise missiles, which are potential means of delivery for NBC [Nuclear, Biological and Chemical] weapons.”²⁹² The 2005 DOD report portrayed the “first- and second-generation” land-attack cruise missiles under development as “conventionally-armed,” but added that there are “no technological bars to placing on these systems a nuclear payload, once developed.”²⁹³

The 2006 report brings the assessment one step further by concluding that “China is ... developing air- and ground-launched cruise missiles [such as the DF-10] that *could have* a nuclear capability.”²⁹⁴ (Emphasis added.) The DH-10 land-attack cruise missiles (Figures 52 and 53) reportedly will have a range over 932 miles (1,500 km),²⁹⁵ and Air Force Intelligence stated in March 2006 that a new cruise missile under development will have a “conventional or nuclear” warhead.²⁹⁶

**Figure 52:
Chinese Cruise Missile Under Development**



China is developing two land-attack cruise missiles, which the DOD could say “could have” nuclear capability. This unofficial picture may be the DH-10 which reportedly will have a range of over 932 miles (1,500 km).

Image: SinoDefense.com

Taipei Times reported in April 2005 that an unidentified Taiwanese intelligence source expected the first Chinese land-attack cruise missile would become operational in 2005 and that as many as 200 missiles could be deployed by late 2006.²⁹⁷ Some private analysts were quick to jump on the bandwagon and make the worst-case scenario even worse. One analyst speculated that as many as 1,000 land-attack cruise missiles could be deployed by 2010 with “pin-point strike accuracy comparable to the U.S. Tomahawk.” Some of the missiles, this source explained, “can be expected to be armed with ... tactical nuclear warheads,” have a range of 621 to 2,485 miles (1,000 to 4,000 kilometers), and “eventually be carried to distant operating areas by Type 093 nuclear attack submarines,” where they will threaten Japan, India, Guam, Hawaii and the U.S. West Coast. Indeed, Chinese submarines armed with nuclear cruise missiles might even threaten the U.S. East Coast, the analyst speculated, if “PLA Navy supply ships gain access to Cuban ports – as did former Soviet Navy ships – or even to other South American ports.”²⁹⁸

Figure 53:
Chinese Ground-Launched Cruise Missile



China is developing air- and ground-launched land-attack cruise missiles, which the DOD says “could have” nuclear capability. These images, which may show the 932+ miles (1,500 + km) range DH-10, shows a missile in flight (left) that strongly resembles the U.S. Tomahawk cruise missile, and a missile with similar features displayed on what appears to be a mobile launcher (right).

Images: ChineseMilitaryForum/DefenceTalk

The prediction by the DIA in 2005 was considerably more tempered, saying that China by 2015 “will have hundreds of highly accurate air- and ground-launched” land-attack cruise missiles.²⁹⁹ Regardless of what number might be deployed or when, the Pentagon believes that the land-attack cruise missiles have a high priority and are being developed “for theater and *strategic* missions.”³⁰⁰ (Emphasis added.) The new weapons “probably will also be used to bolster the viability of Chinese military deterrence,” according to DOD.³⁰¹

Ballistic Missile Test Launch Facilities

Reports about Chinese ballistic missile tests are sketchy and normally limited to what U.S. intelligence officials leak to the media, occasional announcements by Chinese authorities, and rumors. As a result, it is difficult to make a reliable overview of what China has launched over the years. Based on what scholars and private researchers have assembled from various official and unofficial sources over the years, Table 12 lists 48 Chinese ballistic missile tests conducted between 1960 and 2006. The United States and Russia, by comparison, have conducted several hundred ballistic missile tests collectively.

**Table 12:
Reported Chinese Ballistic Missile Tests³⁰²**

Date	Missile	Comments
September 1960	R-2	Launch of Soviet supplied missile.
November 5, 1960	DF-1	First successful launch of short-range ballistic missile, copied from Soviet design R-2/SS-2).
December 1960	DF-1	Two launches from Jiuquan.
March 21, 1962	DF-2	First DF-2 test ends in failure. Possibly from Jiuquan.
June 29, 1964	DF-2	First successful DF-2 launch; from Jiuquan.
July 9, 1964	DF-2	From Jiuquan.
Jul 11, 1964	DF-2	From Jiuquan.
November 1965	DF-2A	First successful launch of DF-2A; from Jiuquan.
October 27, 1966	DF-2A	Fully armed missile launched from Jiuquan. The 20-30 kt warhead detonates over the Lop Nur nuclear test site 800 km away.
December 26, 1966	DF-3	First successful DF-3 launch. From Jiuquan.
1969	DF-3	Launch from Harbin.
January 30, 1970	(DF-3)	First successful launch of a "China-made long-distance missile." Possibly DF-3 or DF-4. From Jiuquan.
October 1970	(DF-3)	A ballistic missile traveling 2,000 miles (3,219 km) within China's borders.
September 10, 1971	DF-5	Experimental from Jiuquan.
June 1, 1976	DF-4	First test of DF-4. From Jiuquan.
January 7, 1979	DF-5	Partial-range test launched from Wuzhai or Jiuquan.
July 15, 1979	DF-5	Partial-range test. From Wuzhai or Jiuquan.
August 21, 1979	DF-5	Partial-range test. From Wuzhai or Jiuquan.
September 4, 1979	DF-5	Partial-range test. From Wuzhai or Jiuquan.
October 15, 1979	DF-5	Possible partial-range test. From Wuzhai or Jiuquan. Some say November 26.
February 15, 1980	DF-5	Partial-range test. From Wuzhai or Jiuquan.
May 18, 1980	DF-5	First full-range test from Jiuquan to impact site some 6,000 miles (9,656 km) away in the Pacific Ocean.
May 21, 1980	DF-5	Second long-range test. Fell about 800 miles (1,287 km) short of observation vessels. Launched from Jiuquan.
August 15, 1980	DF-4	From Jinhyu center.
October 15, 1980	DF-4	From Jinhyu center.
December 7, 1981	DF-5	From Wuzhai center. Some say Jiuquan.
April 30, 1982	JL-1	Rumored launch from Yellow Sea. Uncertain.
October 12, 1982	JL-1	First underwater launch. From Golf-class sub.
May 1985	DF-21	Launch from Wuzhai.
September 28, 1985	JL-1	Rumored test. Uncertain.
October 15, 1985	JL-1	First launch from the Xia-class SSBN. May have been partial failure.
September 27, 1988	JL-1	First successful launch from Xia-class SSBN.
April 29, 1992	DF-21	Test from Wuzhai. Failure.
May 1992	DF-21	Test from Wuzhai. Failure.
1993?	DF-21	Test from Wuzhai. Failure.
July 1995	DF-21	Launch from Wuzhai.
November 10, 1995	DF-21	Launch from Wuzhai.
January 10, 1996	DF-21	Launch from Wuzhai.
December 28, 1996	DF-21	Launch from Wuzhai.
August 2, 1999	DF-31	First successful DF-31 test. From Wuzhai. Decoys possibly used.
Spring 2000	DF-31	Rumored.
November 4, 2000	DF-31	Partial-range test with decoys from Wuzhai.
December 16, 2000	DF-31	Launch from Wuzhai.
August 21, 2002	DF-4	Launched from site in southern China. Some say August 21.
(August 16, 2004)	(DF-31)	A new guided missile test rumored to have been launched "a few days ago." Said to be a complete success that hit its target "with extreme precision."
(June 12, 2005)	JL-2	Launched from Gulf-class submarine near Qingdao with an impact point in western China several thousand miles away.
September 5, 2006	DF-31	Launched from Wuzhai. Flew about 2,500 km into the Takla Makan Desert.

The Chinese test launches have been carried out from a small number of facilities. The two primary ones are the Wuzhai Missile and Space Test Center and the Jiuquan Space Launch Center, which are used to test-launch the majority of China's long-range ballistic missiles.³⁰³ The chronology above indicates that ballistic missile flight testing increasingly has shifted from Jiuquan to Wuzhai.

The Wuzhai Missile and Space Test Center is located approximately 12 miles (20 km) west of the city of Wuzhai in the northwestern part of the Shanxi province some 267 miles (430 km) southwest of Beijing. Although sometime also confusingly referred to as the Taiyuan Space Facility, the Wuzhai Missile and Space Test Center is 83 miles (134 km) northwest from Taiyuan.

Figure 54:
Wuzhai Missile and Space Test Center



The Wuzhai Missile and Space Test Center (38°50'31"N, 111°36'22"E) is located approximately 12 miles (20 km) west of the city of Wuzhai in the northwestern part of the Shanxi province. This satellite image from 2005 clearly shows the two main launch pads. Other smaller potential launch pads are located outside the frame.

Images: GoogleEarth/DigitalGlobe

Wuzhai includes two primary launch pads, a rail storage area, and what appear to be several smaller remote launch platforms. The satellite image shown above (Figure 54) clearly shows details of each major pad. The northern pad has a high launch tower and an exhaust duct. The southern pad has what appears to be a crane on rail possibly used to lift the missile off the transport. The southern pad also includes what appears to be a launch pad for use by mobile missile launchers.



Ballistic missiles are also test-launched from the Jiuquan Space Launch Center in the western part of the Nei Mongol district (Figure 55). This is China's main space port that is primarily used for space launches such as the Long March rockets, but it is also where the majority of the DF-5 launches took place.

The center includes several launch sites that are used to test launch military ballistic missiles. The primary one appears to be a twin-launch pad facility with rail access located approximately 24 miles (39 km) north of the main Long March launch center. A satellite image from 2005 shows that the facility has two launch towers located some 430 meters apart on 50x60-meter launch pads, and connected by a rail system for a mobile tower that may be used to assemble the missile and move it to the launch towers. Exhaust ducts are clearly visible behind each tower. Railheads end next to each launch pad, and two 10-meter vehicles appear to be making their way to the western launch tower.

Underground Facilities

China has a large number of underground facilities. Neither the Chinese nor the U.S. intelligence community will say how many, but during examination of many dozens of satellite images in preparation for this report we found that many military bases indeed have underground facilities. They may not all be “hard and deeply buried,” but placing important assets underground in some form seems to be a common element of China’s military planning.

Underground facilities suggest an intention to protect vulnerable assets or hide them from view. Whereas Chinese airbases typically include one or more underground facilities, U.S. airbases generally do not have underground facilities for aircraft. Conversely, whereas the United States deploys its entire land-based ballistic missiles force in hardened silos, China only has 20 of its longer-range missiles in silos. In the future, it is possible that none of China’s missile force will be silo-based. Other missiles may be hidden in caves, a type of deployment not used by the United States. One of the Chinese long-range missiles rumored to be deployed in caves is the DF-4, and while that may be true for some, we found at least two surface launch sites near Delingha that appear to be operational. A new feature of Chinese airbases also appears to be climate shelters on the tarmac to protect aircraft against rain and sun and from spy satellites.

To effectively target and destroy underground facilities is a central part of the Pentagon’s justification for new types of weapons. The 2001 Nuclear Posture Review described the problem and proposed a solution:

More than 70 countries now use underground facilities (UGFs) for military purposes. In June 1998, the Defense Science Board Task Force on Underground Facilities stated that there are over 10,000 UGFs

worldwide. Approximately 1,100 UGFS were known or suspected strategic (WMD, ballistic missile basing, leadership or top echelon command and control) sites. Updated estimates from DIA reveal this number has now grown to over 1,400. A majority of the strategic facilities are deep underground facilities. These facilities are generally the most difficult to defeat because of the depth of the facility and the uncertainty of the exact location. At present the United States lacks adequate means to deal with these strategic facilities....

In general, current conventional weapons can only “deny” or “disrupt” the functioning of HBDTs and require highly accurate intelligence and precise weapon delivery – a degree of accuracy and precision frequently missing under actual combat conditions. Similarly, current conventional weapons are not effective for the long term physical destruction of deep, underground facilities.... One effort to improve the U.S. capability against HBDTs is a joint DoD/DOE phase 6.2/6.2A study to be started in April 2002. This effort will identify whether an existing warhead in a 5,000 pound class penetrator would provide significantly enhanced earth penetration capabilities compared to the B61 Mod 11.³⁰⁴

Between 1964 and the mid- to late-1970s, China carried out a massive construction program, in effect building a duplicate industrial base in the remote regions of China to serve as a strategic reserve in the event of war, initially foreseen with the United States and later with the Soviet Union.³⁰⁵ This project, called the “Third Line,” encompassed mining, energy production, railways, hydroelectric power, steel factories, and machine building. Many of the new sites were concentrated in the western and southwestern provinces of Sichuan, Yunnan, Guizhou, Gansu, Ningxia and Qinghai, as well as parts of Shaanxi, Henan, Hubei and Hunan, away from the more vulnerable coastal cities and provinces. In general, the Chinese tried to use topography for protection, building in narrow valleys or near mountains. The scale of the undertaking was enormous, much larger than Roosevelt’s New Deal or Stalin’s Five-Year Plan, and probably had a negative impact on China’s economic development.³⁰⁶ The Third Line was accomplished in great secrecy and even today it is not well known or discussed.

The overall effort had a strong military bias and was aimed at shielding airplanes, and at least since 1963, China has built underground facilities at naval bases. By March 1972, according to the DIA, at least 16 bases had underground facilities in various stages of completion that could be used by boats or

submarines. DIA estimates that the facilities have two purposes: storage of missiles, ammunition and logistics; and protection against a preemptive nuclear strike.³⁰⁷

One of these underground facilities is located at the Jianggezhuang base approximately 15 miles (24 km) east of Qingdao on the Yellow Sea (Figure 56). The base, which appears to be the homeport for China's single Xia-class ballistic missile submarine, spans an entire bay 1.2 miles (1.9 km) across, and includes six piers, a dry dock, numerous service facilities, and the underground submarine facility. The base is also used by Han-class nuclear-powered attack submarines.

Figure 56:
Underground Submarine Facility at Jianggezhuang



Underground submarine facility at the Jianggezhuang Naval Base near Qingdao. The facility is used by the Xia-class ballistic missile submarine.

Image: GoogleEarth/DigitalGlobe

The underground facility consists of a large submarine entrance from the harbor, a pier side entrance to the south, and a land entrance to the east (see Figure 57). The sea entrance is approximately 43 feet (13 meters) wide and appears to be arched by a large concrete structure. Both of the land entrances are approximately 33 feet (10 meters) wide and have what appears to be a railway system connected to the interior of the facility. Construction of the underground facility at

Jianggezhuang, which began in 1968 and was completed in the mid-1970s,³⁰⁸ is described in *China's Strategic Seapower*:

In February 1966, Mao, ever concerned to protect the country's defenses from air raids, urged the navy to "build more shelters" for its ships in man-made caves. "In building [such] shelters you do not have to adopt underwater operations," he wrote. "You can begin by digging a vertical shaft just like the miners do. Then dig through the rock horizontally to let seawater in. After that, add a hardened cover over the shaft." At this, the navy embarked on a search for a place where the nation might "shelter its submarines."

About two years later, Mao approved the navy's choice of an inlet near Qingdao and ordered the building to commence. The navy immediately transferred several engineering regiments to work on the project's first phase, and they proceeded to remove 810,000 cubic meters of rock and to pour 200,000 cubic meters of concrete. The gigantic sea cave completed, construction crews then installed 17,000 pieces of equipment and laid 220 km of pipeline, much of it related to maintaining nuclear power plants. By the mid-1970s, the concealed base was camouflaged and hardened against attack and made ready to receive the first nuclear boat, nuclear boat No. 401. In 1975, the navy authorized the North China Sea Fleet to form the Nuclear Submarine Flotilla.

The base comprises multiple shelters, each of which has a number of facilities to load and unload nuclear fuel rods, move supplies, monitor the performance of various subsystems, repair breakdowns, and conduct demagnetization. The cavernous shelter where the boats are docked is as high as a 12-story building. Large-sized cranes in this shelter can load or off-load the JL-1 missiles. Partially protected against nuclear or chemical attack as well as conventional air raids, the shelters can maintain communication and independent operations under combat conditions. The base commander can conduct effective command and control of his submarines for extended periods even when cut off from all outside support.³⁰⁹

The size and layout of the Jianggezhuang cave is not known, but the location and angle of the entrances give some idea of a possible outline (Figure 57). The sea entrance likely extends at least a full Xia-class submarine length plus some more into the mountain. The two land-entrances located at the northeast and southwest corners have what appears to be a rail system connecting to outside buildings.

Various private Web sites occasionally post unique images from Chinese military facilities. The original source of the images is not always identified, but may be Chinese news papers, television stations, the Chinese military itself, or individuals using their digital camera during a vacation. The following unique image originally posted on *DefenceTalk.com* shows a Han-class nuclear-powered attack submarine inside a large unidentified underground facility (Figure 58).

The Chinese Air Force also uses underground facilities extensively to protect aircraft, ammunition and personnel. One example of this is the Feidong Air Base which includes a long taxiway that connects the main base and runway with a large underground facility inside a nearby mountain (Figure 59).

Although hiding military equipment such as aircraft in tunnels may seem logical for protection, it also makes it much easier for a capable adversary to neutralize significant portions of the Chinese military with relatively limited effort. Instead of requiring several dozen bombs to destroy a squadron of aircraft, only a couple of precision weapons are needed to seal the entrances or exits to a tunnel trapping all the aircraft inside.

Regardless, we found underground facilities at many of China's bomber and fighter bases. A rule of thumb seems to be that if the base is near a mountain, then there likely will be some form of underground facility. There are too many examples to include in this report, so here we will just mention a few.

One example is the Urimqi Airbase in the northern part of the Xinjiang province. Approximately two miles from the base is what appears to be a remote weapon storage area, but the runway is also connected with a taxiway to an underground facility two miles south of the base. A satellite image clearly shows two entrances into the mountain (Figure 60).

Figure 57:
Possible Outline of Underground Submarine Facility at Jianggezhuang



Based on the location and angle of the entrances, the probably size of the underground submarine facility at the Jianggezhuang Submarine Base is marked with red lines. In addition to a large submarine pool, the facility may house storage and loading facilities for ballistic missiles and nuclear warheads for the Xia-class submarine.

Source: GoogleEarth/DigitalGlobe

Figure 58:
Han-Class Submarine Inside Underground Facility



A nuclear-powered Han-class attack submarine inside underground facility at undisclosed Chinese naval base. Such as cave is known to exist at Jianggezhuang northeast of Qingdao, although it is unknown if this image shows the inside of Jianggezhuang. By 1972, at least 16 naval bases had underground facilities in various stages of completion.

Image: DefenceTalk.com

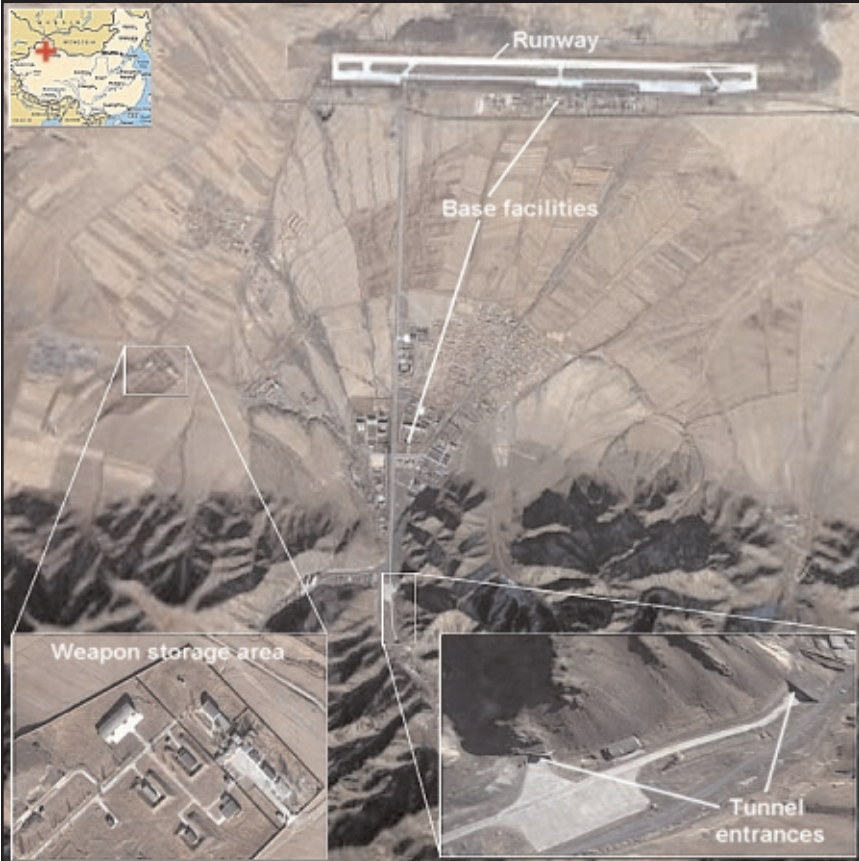
Figure 59:
Underground Facility at Feidong Air Base



The Feidong Air Base (31°54'35.61"N, 117°39'29.99"E) near Dianbu in the Anhui province includes a large underground facility at the end of what appears to be an alternate runway that connects to the main base. Two entrances to the underground facility are clearly visible in this satellite image. Road maintenance appears to be in progress.

Image: GoogleEarth/DigitalGlobe

Figure 60:
Urumqi Airbase With Remote Underground Facility



Urumqi Airbase (43°27'59.45"N 87°31'49.58"E), which is located in the north-central part of the Xinjiang province, has a 2-mile (3.2 km) connection to a remote underground storage facility in a nearby mountain. This satellite image clearly shows two entrances (right insert) to an underground facility as well as a remote weapons storage area (left insert).

Image: GoogleEarth/DigitalGlobe

Below follows a selection of images of various underground facilities:

Figure 61:
President Jiang Zemin Inspects Underground Aircraft Facility



Chinese President Jiang Zemin inspects an aircraft cave in the Ningxia region on June 19, 1991. The name of the base is not known, but it may have been Helanshan west of Yinchuan.

Image:China-Military.org

Figure 62:
J-8 Aircraft Moved Into Underground Facility



Chinese J-8 fighters are rolled into an underground facility at an unknown air base.

Image: Chinese Military Forum

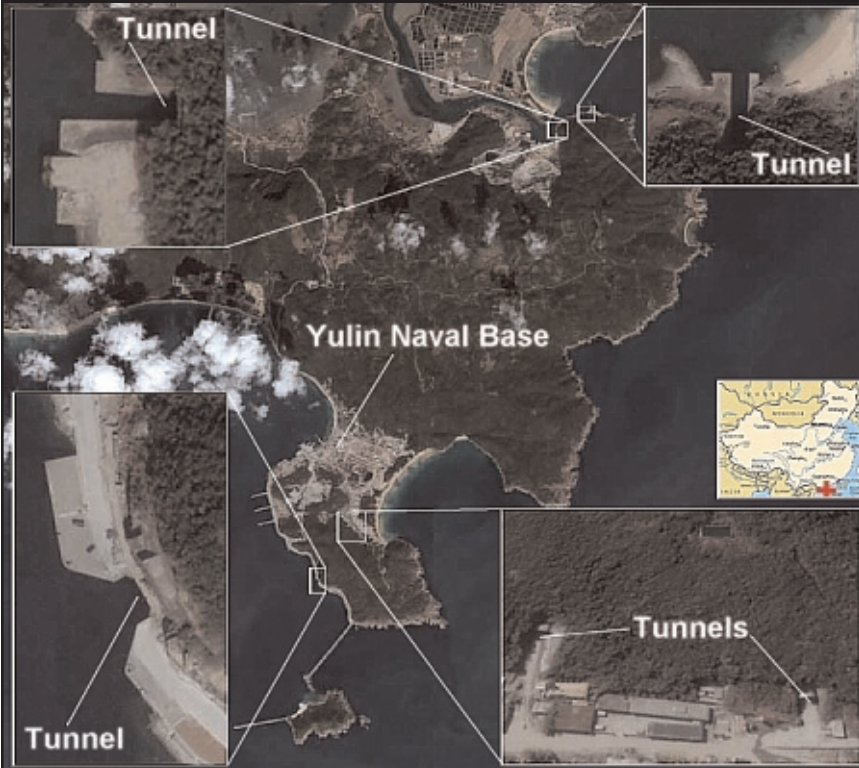
Figure 63:
Underground Facility at Guangzhou Shadi Air Base



A squadron of Chinese MIG fighters lined up inside an underground tunnel allegedly at the Guangzhou Shadi airbase.

Image:China-Military.org

Figure 64:
Underground Facilities at Yulin Naval Base



Yulin naval base ($18^{\circ}12'30.06''\text{N}$, $109^{\circ}40'48.62''\text{E}$) on Hainan Island has several underground facilities. This satellite image shows what appear to be tunnels to underground facilities. In the main base area (bottom left), a tunnel ($18^{\circ}12'9.75''\text{N}$, $109^{\circ}41'40.54''\text{E}$) in the harbor may lead to an underground facility for submarines or ships. Two tunnels appear to lead to an underground facility ($18^{\circ}12'36.26''\text{N}$, $109^{\circ}41'51.18''\text{E}$) on land (bottom right) near other potential tunnels not shown here. Outside the main base, a remote underground facility has been dug into the mountain ($18^{\circ}15'34.82''\text{N}$, $109^{\circ}43'36.98''\text{E}$) with two tunnels providing access from the sea. With a width of 33 feet (10 meters), the entrances would be a tight fit for Han-class submarines, but diesel submarines and small surface combatants could potentially enter.

Image:GoogleEarth/DigitalGlobe

Figure 65:
Underground Aircraft Facility at Yangcun Airbase



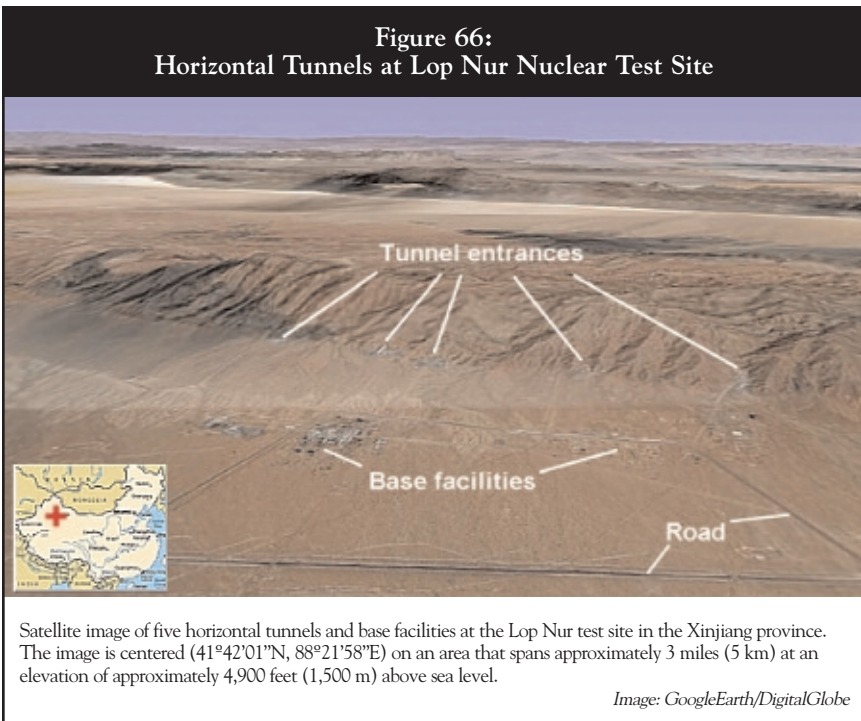
The Yangcun Airbase (39°22'27.70"N, 117° 5'34.05"E) in the Tianjin province includes a small underground aircraft facility near the southern end of the runway. This satellite image clearly shows the two entrances, 406 feet (124 meters) apart. Several other Chinese airbases have similar underground facilities.

Image: GoogleEarth/DigitalGlobe

Nuclear Weapons Testing

Since China conducted its first nuclear test explosion on October 16, 1964, it has carried out a total of 45 known nuclear test explosions to develop and refine its stockpile of nuclear bombs and warheads. The tests had explosive yields between “low” kt (1 to 10 kt) and 4 Mt. The last atmospheric test took place on October 16, 1980, and the two last underground test were conducted in 1996.

As part of the research for this report, we examined satellite images from the Chinese nuclear test site at Lop Nur, where several different locations for vertical and horizontal tests have been reported. We discovered at least one area that appears to be active approximately five miles (eight kilometers) north of Po-cheng-tzu in the Xinjiang province (Figure 66).



The site includes a large number of facilities along a side road and has five access roads that lead north to the base of the mountain ridge and what appear to be five horizontal tunnels dug into the mountain (Figure 67).

Figure 67:
Details of Horizontal Tunnels at Lop Nur Nuclear Test Site



Close-ups of entrances to five horizontal tunnels at the Lop Nur test site in the Xinjiang province. Centered at 41°42'01"N, 88°21'58"E, the satellite image reveals various levels of activities at all five entrances. Trucks are visible at four of the five tunnel entrances, particularly the eastern (bottom; see Figure 68 for more details), and one entrance is covered with a roof.

Image: GoogleEarth/DigitalGlobe

Various buildings are located outside each tunnel entrance and one of the entrances appears to be covered with a roof. Each site also clearly shows an area where rock excavated from the mountain has been dumped. Trucks are visible at all entrances except one. One site appears to be more active than the others, with several trucks operating near the tunnel entrance (Figure 68).

It is not possible to determine from the available satellite image if the tunnels are associated with underground nuclear weapons testing, but it is a possibility given their location in the Lop Nur area. Nor is it possible to determine from the

Figure 68:
Activity at Horizontal Tunnel at Lop Nur Nuclear Test Site



This satellite image taken in 2005 shows what appears to be the most active horizontal tunnel (41°42'15.66"N, 88°23'24.15"E) at the Lop Nur test site. Several 20-foot (6-meter) trucks are visible amongst the buildings. What appears to be the dumping area for rock excavated from the tunnel is visible in the left side of the image.

Image: GoogleEarth/DigitalGlobe

available satellite image whether the tunnels are new or were constructed years ago. If the tunnels are indeed horizontal tunnels used in the underground nuclear testing program, the activity may indicate that China is conducting hydrodynamic tests or maintaining the site in a state of readiness – much like the the United States does with the Nevada Test Site – in case of a decision to resume nuclear testing.

China in U.S. Nuclear War Planning

China has been a target for U.S. nuclear forces beginning soon after the founding of the People's Republic of China in 1949. During the Korean War, after Chinese forces entered the conflict in October 1950, President Harry Truman considered using nuclear weapons against China, and even deployed nuclear-capable B-29 bombers and nine non-nuclear components to Guam in 1951 to be within range of key targets. President Dwight D. Eisenhower had his own series of crises with China in 1954 and 55 and in 1958 in the Taiwan Strait area, and the United States contemplated using nuclear weapons. These actions surely spurred Mao to decide to build a bomb.

Until 1960, however, nuclear war planning against China was mainly an ad hoc, contingency-based effort. Throughout the late-1950s regional commanders sought to incorporate many of their new nuclear weapon systems into a growing number of contingency plans. Beginning in 1960 the Pentagon attempted to assemble the various strike plans under a coordinated execution planning system so as to avoid duplication. The result was the Single Integrated Operational Plan (SIOP). The first SIOP, dated December 1960, contained only one "plan," under which the United States would launch all of its strategic nuclear delivery vehicles immediately upon the initiation of general war with the Soviet Union. Although the Soviet Union was the main focus, the single target list also included Chinese and Soviet satellite state cities, as well as airfields and other military bases and facilities within or on the outskirts of these cities. Under this first war plan there was no provision for an attack on the Soviet Union that did not also involve attacks on China and the satellite states. No strategic reserve forces were held back; everything was used.³¹⁰

For U.S. Pacific Command (PACOM), this development meant incorporating its existing regional war plans into the larger SIOP.³¹¹ *General War Plan Number*

1-61 was the first PACOM general war plan to include directives that supported the SIOP. Work began in July 1960,³¹² six months before the first SIOP took effect, and construction of Command and Control (C2) facilities needed to support the new requirements included an alternate communications link between Clark Air Force Base (AFB) in the Philippines and Taiwan “to ensure adequate back-up to facilities serving ‘Quick Strike’ and Single Integrated Operations [sic] Plan (SIOP) forces.”³¹³



But intertwining Soviet and Chinese nuclear strikes soon proved to be impractical. During the 1961-1962 revisions of the SIOP, the war planners separated attacks on China and Soviet satellite states for targeting purposes from strikes against the USSR.³¹² Strike forces were divided into alert and non-alert forces, and the targeting of China gradually became more complex. The SIOP-62 that went into force on April 1, 1961, for example, called for the destruction of 78 urban industrial complexes in China. Of these 49 were assigned to the alert force,³¹⁴ and would have been destroyed in the first wave.

Once the basic SIOP organization was established, analysts and targeteers began the exhaustive and meticulous process of identifying suitable targets, calculating the force needed to destroy them, assessing U.S. capabilities to deliver nuclear warheads onto the targets, designating individual warheads to the aimpoints, and assigning forces for follow-up attacks to ensure pre-determined levels of destruction. This target- focused planning process resulted in inflating the number of

targets and as a consequence the number of warheads that would be needed to ensure their destruction, with improved platforms to deliver them.

At this early stage China did not have a nuclear weapons capability, but a 1963 a *Special National Intelligence Estimate* from the CIA reassessed the predictions about China's nuclear future. Based upon new evidence, mainly from photographs, the SNIE concluded that the Chinese had embarked on "a more ambitious advanced weapons program than we had earlier thought likely." China probably would have enough fissile material to conduct a nuclear detonation in early 1964, and might be capable of producing one or two crude weapons a year by 1965. It estimated that medium-range ballistic missiles (MRBMs) probably would not be ready for deployment before 1967, and added that "China is not likely to develop [a missile-compatible] warhead until 3 or 4 years after a first detonation."³¹⁶ The predictions were partially met in October 1964, when China detonated its first nuclear device.

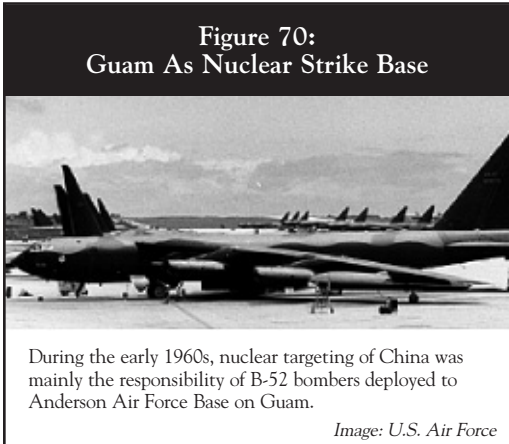
The nuclear explosion underscored U.S. concern over a new member of the nuclear club and solidified China's status as an adversary to the United States in the region. A comparison of China's nascent nuclear capability with that of the United States was totally one-sided. Not counting weapons at sea or in the United States, the Pentagon had some 2,400 nuclear weapons deployed in Asia, specifically in Guam, South Korea, Okinawa, the Philippines and Taiwan.³¹⁷

A RAND study conducted shortly before the first Chinese explosion concluded that U.S. theater forces augmented by a wing of B-52s on Guam and a single Polaris equipped strategic submarine "could virtually eliminate China's offensive air and missiles capability while incurring very small losses." Even if China managed to attack U.S. and allied bases in the Far East first with aircraft and missiles, the augmented forces which survived the attack would be capable of "substantial destruction of Chinese offensive air and missile capability."³¹⁸

U.S. targeting requirements during the first part of the 1960s were met mainly by deploying long-range bombers with nuclear weapons to bases in the Pacific within range of mainland China.³¹⁹ Although bombers and nuclear weapons had been sent to the region on an ad hoc basis in the mid- and late-1950s, SIOP planning resulted in more permanent forward deployments. The SIOP-63 plan that took effect in August 1963 included the forward deployment of 12 B-47 bombers to Anderson Air Force Base (AFB) on Guam,³²⁰ with 10 more bombers

added that fall because of the Cuban Missile Crisis.³²¹ SIOP-64 in January 1964 replaced the B-47s with the new B-52 bombers³²² with much longer range. By April 1, 1964, coinciding with Change 1 to SIOP-64, the B-52s assumed permanent alert status on Guam.³²³

In the first half of the 1960s, the individual aircraft and crews deployed in three-month cycles under the so-called Reflex program. After completing a cycle they returned to their main bases in the United States and a new squadron would



take over alert status in the area. After the Reflex program was discontinued in July 1965, the Strategic Air Command (SAC) forward deployed a “dual contingency/SIOP force” of 20 alert aircraft to Guam,³²⁴ apparently tasked to cover both “pure” strategic targets under the SIOP and any regional contingencies such as North Korea and Taiwan. This

arrangement was continued in Revision 8 to SIOP-64, which was introduced in April 1966. This plan not only included the 20 B-52 alert bombers on Guam but also an additional 10 bombers flying on the new Far East Airborne Alert route fully loaded with nuclear weapons, providing “improved coverage of Chinese targets.”³²⁵

This evolution in the Chinese target coverage coincided with a fundamental shift in the U.S. targeting philosophy for China. The Joint Long-Range Strategic Study FY 77-86, prepared by the Joint Chiefs of Staff (JCS) in 1966, identified concerns about “uncertainties” in U.S.-Soviet or Soviet-China relationships in a possible U.S.-China confrontation. The study concluded that uncertainties “required a China-oriented strategic nuclear deterrent and ICBM defense that would pose no threat to the USSR.”³²⁶ In other words, any targeting of China should be undertaken on its own merits and not as an appendage to targeting the Soviet Union.

The recommendation was incorporated into the Joint Strategic Objectives Plan (JSOP) the following year stating that U.S. strategy should “focus increasingly on China itself” as opposed to “the peripheral manifestations of the threat.”

According to the Commander of Chief, U.S. Pacific Command (PACOM), the JSOP stated:

Notwithstanding the value of a strong, flexible force disassociated with specific threats, the U.S. force, particularly the nuclear force, targeted against deterrence of Communist China, and particularly China's nuclear capability, should be distinguishable from that against the USSR and it should have maximum flexible nuclear and non-nuclear capabilities in response to the overall threat.³²⁷

This new China-focus was based on the principle of targeting facilities that the Chinese leadership valued most, essentially mirroring the well-established practice of how to target the Soviet Union. China's growing nuclear weapons program resulted in numerous important facilities that U.S. planners soon identified and targeted. CINCPAC estimated that by targeting the Chinese leadership they would be better deterred. The 1967 Joint Intelligence Estimate for Planning (JIEP), which covered the period through June 1977, predicted that while China might engage in smaller contingencies against neighboring areas, its leaders were unlikely to initiate any action that could result in major confrontation with the United States if it risked significant destruction of mainland China. At least until 1977, the JIEP concluded, Chinese vulnerabilities to nuclear attack would "make it infeasible for the Chinese to initiate a major war with a major power."³²⁸

By 1967 the State Department's intelligence branch stated that the United States had increased its targeting of China. "China also has become a factor in the strategic equation, causing us to earmark a larger portion of our force against PRC [People's Republic of China] targets,"³²⁹ according to the study. This was evident from the SIOP war plan at the time, which included significant targeting of China.³³⁰ Yet despite the recommendation to make targeting of China "distinguishable from that against the USSR," the SIOP that entered in effect in November 1969 (SIOP-4F) still appeared to contain joint Soviet and Chinese targeting in its three target destruction tasks:

- ALPHA: To destroy Sino-Soviet strategic nuclear delivery capabilities located outside urban areas. As part of this task, the highest Soviet and Chinese political and military control centers would be attacked – the Moscow-Peking Missile Packages (MPMP).
- BRAVO: To destroy other elements of the Sino-Soviet military forces and military resources not included in ALPHA which are located outside the major urban centers.

- CHARLIE: To destroy Sino-Soviet military forces and military resources which were excluded from ALPHA and BRAVO because of their location within urban centers and at least 70 percent of the urban industrial bases of the USSR and Communist China.

These three tasks were further subdivided into five attack options, of which the “smallest,” a pre-emptive strike on the ALPHA targets, involved 58 percent of all U.S. SIOF committed forces.³³¹ The basic attack options are shown on Table 13.

	Attack Options	Tasks Normally Included	Tasks Withholdable
Pre-emptive	1	A	(MPMP)
	2	A, B	-
	2X	All	-
Retaliatory	3	A, B, C	B & C, or C
	4	All	-

^a The SIOF in effect in November 1969 was the SIOF-4E, which went into effect July 1, 1969.³³²

During a National Security Council meeting on U.S. defense strategy in August 1971, Secretary of State Henry Kissinger explained how the mission of U.S. strategic forces included “some counterforce capability (particularly against Communist China).” Although the United States at the time did not possess a disarming capability against the Soviet Union, Kissinger said that, “we do have some against China.” He explained further that, “as long as we have a disarming capability we can use it to regulate their actions in local situations.” But the geographic location of China “behind” the Soviet Union meant that ICBMs could not be used in this mission. We “cannot use our land-based missiles against China (over USSR); we have to use our bombers and submarines.”³³³

By January 1972, according to a unique National Security Council study obtained by the independent National Security Archive, the SIOF contained the same three options but further explained that SIOF attacks against China and North Korea could be carried out without also ordering SIOF attacks against the Soviet Union or other communist nations.³³⁴ At the same time President Richard was attempting to normalize relations with Beijing, China had become an independent strategic target for U.S. nuclear war planning.

The study explained that U.S. operational capabilities against China were different from those against the Soviet Union. “In particular, destroying large percentages of the population is much more difficult, destroying industry is much easier, and limiting damage is substantially easier than is the case against the Soviets.” The reason it was difficult to destroy China’s population was that only 11 percent lived in cities. But 80 percent of China’s industry was in the cities. Therefore, “an essential element of U.S. deterrence policy is a capability to destroy PRC cities.” The study used the following overview (Table 14) to illustrate “the relative vulnerability of China’s industry and the effects on her dispersed population” compared with the Soviet Union and the United States:³³⁶

Table 14:
Damage From 100 Arriving Warheads (1 MT)³³⁵

	United States	Soviet Union	China
% Population	21	17	6
% Industry	19	32	42
Population (millions)	49	43	51
%Urban population	35	34	70

In January 1972, approximately 600 SIOB warheads were targeted on China. Employment of these weapons in accordance with the strike plans would have destroyed about 70 percent of the industry and 70 percent of the urban population (about 60 million people or seven percent of the total population). It would also have destroyed most soft military targets (nuclear and conventional) and hardened, non-time-urgent targets.³³⁷

According to the report, at the time the United States had a “disarming strike capability against known Chinese nuclear threats” but future deployment of mobile missile systems and development of a launch-on-warning capability would “seriously erode” that capability.³³⁸

The Role of Non-Strategic Nuclear Weapons

Normalization with China required the United States to remove its nuclear bombs from Taiwan, a demand that Mao forced upon Nixon. The bombs were first deployed at Tinan Air Base in January 1960. During the peak years of 1967 to 1969 there were about 55 nuclear bombs, which decreased to about 25 by 1973.

The last bombs were removed in 1974 and moved to Clark Air Base in the Philippines. The move also forced the Joint Chiefs of Staff to drop a requirement to forward deploy SIOP bombers at Tinan Air Base.³³⁹

While the removal of nuclear bombs from Taiwan satisfied Mao and led to improved relations with the United States, it also forced nuclear war planners to compensate for the loss and find substitutes. By the early 1970s, the United States deployed some 1,700 non-strategic nuclear bombs in the Pacific, many of which directly supported SIOP targeting against China. In fact, tactical delivery systems

covered a higher percentage of strategic targets in China than against the Soviet Union. As of January 1972, as many as 32 percent of all SIOP weapons planned against targets in China were non-strategic nuclear weapons.³⁴⁰

The non-strategic SIOP force included nuclear fighter bombers deployed in Japan, South Korea and the Philippines. Combined, the 3rd Tactical Fighter Wing at Clark Air Base in the Philippines, the 8th Tactical Fighter Wing at Kunsan Air Base in South Korea, and the 18th Tactical Fighter Wing at Kadena Air Base in Okinawa, formed a nuclear strike force against China.

At Kunsan Air Base, only 240 miles from China and 620 miles from Beijing, four F-4D Phantom jets of the 8th Tactical Fighter Wing (TFW) were parked at the end of the runway loaded with nuclear

bombs under their wings as the U.S. Pacific Air Forces' SIOP Quick Reaction Alert commitment.³⁴¹ The 8th TFW also had a non-SIOP role, presumably against targets in North Korea.

The United States deployed nuclear weapons at Kadena Air Base in Okinawa until June 1972, when the island reverted to Japanese control. CINCPAC subsequently concluded that by 1974 the island “for all practical purposes has been

Figure 71:
Kadena Air Base



Kadena Air Base on Okinawa increased its nuclear strike mission *after* the island was reversed to Japanese control in 1972.

Image: U.S. Air Force

lost as a bomber operating base and as a weather evacuation base for WestPac [Western Pacific] bombers.” Even so, the 18th TFW at Kadena continued a nuclear SIOB strike role after 1972 and actually *increased* its SIOB commitment in 1974.³⁴² The weapons for the F-4Ds likely were stored at other bases (presumably in South Korea, the Philippines, or Guam) and would have been airlifted to Kadena in a crisis. The 3rd Tactical Fighter Wing at Clark Air Base continued its nuclear strike commitment until June 1977, when the last nuclear bombs were withdrawn from Philippines.³⁴³ Kunsan Air Base continued nuclear operations until December 1991, when the last nuclear weapons were withdrawn from South Korea.

Sea-Launched Ballistic Missile Submarines

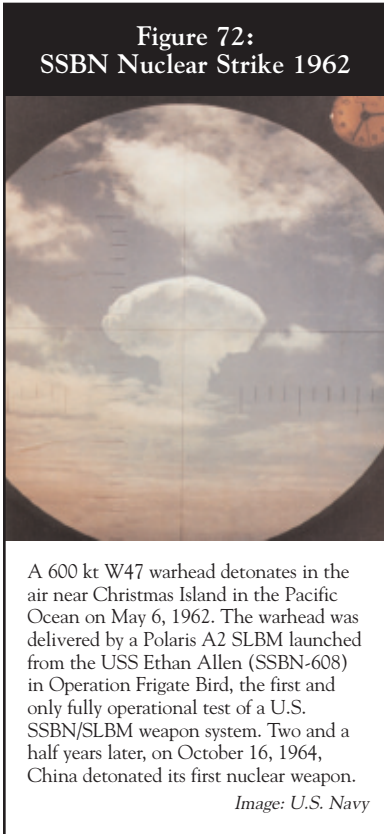
The reduction of non-strategic weapons and China’s emergence as a more independent nuclear target coincided with the introduction of U.S. ballistic missile submarines to the Pacific. Over the next few years, the nuclear-powered ballistic missile submarines (SSBNs) would become a main element in U.S. nuclear war plans against China.

Official preparation for a Pacific SSBN force got underway on April 23, 1962, when the Department of Defense announced that it had selected three facilities in the Pacific to support Polaris operations: Puget Sound Naval Shipyard at Bremerton, Washington, for submarine overhauls; the Naval Ammunition Depot at Bangor, Washington, as a Polaris missile assembly facility (POMF-PAC); and Pearl Harbor, Hawaii, as crew-training facility.³⁴⁴

By that time, SSBNs had been conducting strategic deterrent patrols in the North Atlantic and Mediterranean for two and a half years. But on May 6, 1962, the Navy provided a blunt demonstration of the emerging capabilities in the Pacific when it sent the USS Ethan Allen (SSBN-608) into the waters near Christmas Island to launch a Polaris A2 missile with a live nuclear warhead in a fully operational test demonstration of the weapon system (see Figure 72). The 600 kt warhead detonated approximately 1,200 miles (1,930 km) east of Christmas Island near the equator.³⁴⁵

PACOM’s analysis in support of the annual *Nuclear Weapons Requirements Study* from April 1962 for the Fiscal Year 1965 called for a “greater recognition of the Allied nuclear capable delivery vehicles to give fire support in the Taiwan and Korean area.”³⁴⁶ When asked by the Joint Chiefs of Staff in January 1963 about the need for medium-range ballistic missiles (MRBM) in the Pacific, CINCPAC

replied that a mixture of Polaris-equipped submarines and land-based MRBMs would be better than either of the two systems alone. CINCPAC's recommendation for the JSOP-68 stated a requirement for as many as 16 SSBNs and three



MRBM squadrons. The justification for this requirement was an estimated 212 high-threat targets in the region during the 1965 to 1970 period, consisting of missile sites, air bases and air defense headquarters. The unique capability that CINCPAC was looking for was the short flight time that sea-launched ballistic missiles (SLBMs) and MRBMs could provide compared to intercontinental ballistic missiles (ICBMs) and bombers. Using these forward-based systems with relatively lower yields, CINCPAC explained, would free up SAC aircraft and ICBMs to be retargeted against targets that required the higher-yield weapons.³⁴⁷

Only four months after CINCPAC's reply, in May 1964, the USS Daniel Boone (SSBN-629) arrived at Pearl Harbor, as the first strategic submarine assigned to the Pacific Fleet.³⁴⁸ As the crew of the USS Daniel Boone was preparing the submarine for its first deterrent

patrol, China detonated its first nuclear bomb on October 16, 1964. The U.S. nuclear war plan at the time (SIOP-64 Revision 3 from October 1, 1964) emphasized using Polaris-equipped submarines in the Pacific to "cover new threat targets."³⁴⁹ To reach the Chinese targets, the submarine would have to patrol close to China, so Guam was established as Submarine Replenishment Site III to service the SSBNs from this forward location.

On December 25, 1964, only two months after the Chinese nuclear test, the USS Daniel Boone departed Guam for the first SSBN deterrent patrol in the Pacific Ocean. Within the next four months, four more SSBNs joined the USS Daniel Boone in the Pacific,³⁵⁰ providing CINCPAC with its first short-flight-time

long-range nuclear strike capability in the region. To hold Beijing at risk with the Polaris A3 missile, the SSBNs would have to conduct their patrols in the Sea of Japan and the East China Sea. PACOM never got the 16 SSBNs it wanted, but the SSBN fleet gradually increased from a single SSBN in late 1964 to eight submarines by 1969. The 100th SSBN deterrent patrol in the Pacific was completed on April 5, 1969, when the USS Stonewall Jackson (SSBN-634) returned to Guam.³⁵¹

The introduction of the Poseidon C3 missile in 1971 prompted the Navy to reorganize the distribution of SSBNs between the Atlantic and Pacific oceans. Because of the missile's longer range, the Poseidon C3 was deployed on Atlantic-based SSBNs to cover targets in Eastern Europe and western parts of Russia. All George Washington class SSBNs with shorter-range Polaris A3 missiles were transferred to the Pacific in 1973.³⁵²

By 1975, 10 SSBNs were assigned to CINCPAC and for the next five years these Polaris-equipped SSBNs provided soft-target coverage in the Pacific region while the more capable Poseidon SLBMs covered European and Soviet targets from the Atlantic and Mediterranean. Despite their lesser capability, the Pacific SSBNs were a powerful force against China. Together with long-range bombers, National Security Adviser Henry Kissinger remarked in 1971, the submarines "will be able to pre-empt [China] for perhaps the next 10 to 15 years."³⁵³

SSBN Command and Control

Three U.S. bases in East Asia played vital roles in the SSBN operations against China: Clark Air Base in the Philippines, Yokota Air Base in Japan, and Kadena Air Base in Okinawa. To enable communication with the submarines, specially configured C-130 Hercules aircraft were forward-deployed to serve as airborne relay stations in case the National Command Authority had to transmit launch orders to the submarines.

These three bases also were designated as dispersed operating sites for the Blue Eagle airborne command post (ABNCP) aircraft, intended to serve as an alternate command post for CINCPAC in case of war. To establish a secure capability to transmit launch orders to all nuclear forces in the Pacific, a network of mobile Ultra High Frequency (UHF) transmitter vans were deployed to these and other bases. In 1965, shortly after the first SSBN patrols were conducted in the Pacific,

Figure 73:
Blue Eagle Airborne Command Post



Although mostly known for broadcasting radio and television during the Vietnam War, the NC-121J Super Constellation also served as an Airborne Command Post for transmitting launch orders to nuclear forces. Airbases in Japan, South Korea, and the Philippines were designated as dispersed operating sites for Blue Eagle.

Image: U.S. Department of Defense

the UHF vans were exercised during nine Blue Eagle deployment exercises to the bases.³⁵⁴

The exercises revealed that the capability to provide the National Command Authority a secure ability to transmit launch orders to the SSBNs was not reliable. As a result, Defense Secretary Robert McNamara in 1967 established the Navy's Special Communications Project Office to develop programs to ensure "effective communications at all times from the National Command Authorities

and Commanders in Chief to the deployed [SSBNs] ... during and after heavy nuclear and electronic jamming attack."³⁵⁵

One attempted solution was the TACAMO (Take Charge And Move Out) III system, which became operational in 1969 with 12 EC-130Q aircraft (four in the Pacific and eight in the Atlantic). Yet the system had significant limitations. Equipped with a single wire antenna and 25 kilowatt VLF (Very Low Frequency) transmitter, TACAMO III only provided "respectable SSBN patrol coverage" in most cases and had known limitations in "some potential stressed environments." The modest capability was underlined by an effective transmission range of only a couple of hundred miles,³⁵⁶ severely constricting the patrol area for the submarines if secure launch order transmission was to be ensured.

The challenges facing airborne command and control was compounded by the fact that most fixed communications facilities that they depended upon on the ground were located near high-priority targets for Soviet and Chinese nuclear missiles. In a nuclear war it was highly unlikely that these facilities would survive for very long, so Defense Secretary Robert McNamara approved a "communication restoration plan" in September 1968 that involved relocating the minimum essential satellite and high frequency capabilities from target areas to "safe havens." This plan, which would be initiated under DEFCON 2,

assumed a massive Chinese Communist/Soviet nuclear attack with severe damage to much of the Defense Communication System.³⁵⁷

Both TACAMO and CINCPAC's Blue Eagle aircraft were hampered by inadequate satellite access due to overloading of frequencies. In late 1971, the Defense Communications Agency tested CINCPAC's ability to relay launch orders from Blue Eagle through TACAMO to the strategic submarines. Lessons learned were incorporated into an exercise in May of 1972 where a Blue Eagle aircraft took off from Hickam Air Force Base for an orbit near Wake Island north of the Marshall Islands. From this position the Blue Eagle aircraft conducted VLF tests with an EC-130Q TACAMO aircraft operating near Guam almost 1,400 miles (2,250 km) away. A second Blue Eagle aircraft would loiter near Hawaii 2,200 miles (3,540 km) to the east to relay communication to the Naval Communications Station in Honolulu. Maintaining the Blue Eagle airborne for an extended period of time was essential so for the first time ever the aircraft was refueled during the exercise. After 14 hours on station, the Blue Eagle returned to Hawaii, marking the longest single Blue Eagle sortie ever.³⁵⁸

The ranges of the Blue Eagle and TACAMO were gradually extended from 1,400 miles to 2,300 miles (3,700 km).³⁵⁹ CINCPAC conducted three airborne exercises in 1973 for the Defense Communications Agency under the Minimum Essential Emergency Communications Plan Test Program.

Surprisingly, the Navy allowed the TACAMO aircraft in the Pacific to almost disappear in the early 1970s.³⁶⁰ In 1975, only one EC-130Q aircraft remained. The reasons were confidence in new land-based transmitters, and priority for TACAMO coverage of SSBN operations in the Atlantic.

In response, CINCPAC developed a new alert concept for the Blue Eagle aircraft in 1974 to augment TACAMO declining role. Since CINCPAC was prevented from deploying an actual airborne alert, a

**Figure 74:
EC-130 TACAMO**



Between 1964 and the late 1970s, the EC-130 TACAMO (Take Charge And Move Out) aircraft served as the Navy's primary communications link with SSBNs operating in the Pacific. In 1989, the E-6A took over the TACAMO mission.

Image: U.S. Navy

“deployed ground alert” concept allowed Blue Eagle aircraft to initiate random 24 to 28 hour ground alert watch periods in conjunction with bimonthly deployments to the Western Pacific. The ground alert periods were randomly scheduled among Clark Air Base in the Philippines, Ching Chuan Kang Air Base in Taiwan,³⁶¹ and the Kadena (Okinawa) and Yokota air bases in Japan.³⁶²

The forward bases were selected because they bordered waters where U.S. strategic submarines patrolled. Once an order was given, the Blue Eagle aircraft could quickly reach an operational orbit within range so that its VLF/LF (Very Low Frequency/Low Frequency) and HF (High Frequency) equipment could relay an emergency action message to the submarines. Testing CINCPAC Blue Eagle VLF/LF operations commenced early in 1973 when it became clear that the Pacific EC-130Q TACAMO aircraft would be transferred to the Atlantic. Between February 1973 and January 1974, CINCPAC Blue Eagle aircraft flew 21 test missions, and an analysis of 40 SSBN reports indicates that they received and copied 21 emergency action messages. The objective was to test a range of up to 2,300 miles (3,700 km), but the Navy found that the best reception was 1,380 miles (3,700 km).³⁶³

With this range, ABNCP aircraft deployed on ground alert at the forward bases could transmit emergency action messages to submerged SSBNs operating in an area west of Guam covering the South China Sea, Philippine Sea, East China Sea, Sea of Japan, and most of the Sea of Okhotsk. When airborne, the communications area would theoretically extend as far as the aircraft’s range. Each year, Blue Eagle aircraft forward deployed to Kadena and Yokota air bases in Japan, Clark Air Base in the Philippines, Kunsan and Kimbo air bases in South Korea, and Richmond Royal Australian Air Force Base in Australia, would practice their ability to get airborne within the 15 minutes required for nuclear warning time. Normally, it took seven to nine minutes to get all Blue Eagle aircraft in the air.

Getting airborne quickly was essential if communications were to be ensured in a crisis. In briefings to the unified commands in 1974 and 1975, the Joint Chiefs of Staff made it clear that fixed land-based communication sites intended for SSBN communication would be some of the first to be attacked in a nuclear war. Nuclear effects and Soviet attempts to catch up with the U.S. MIRV build-up meant that fixed systems were simply too vulnerable, unlikely to survive long enough in a war to be able to relay retaliatory launch messages to the strategic submarines.³⁶⁴

When the land-based Sanguine communications facility failed to deliver the promised advantages in the late 1970s, the planners looked to TACAMO again

and officially upgraded the aircraft from an interim system and designated as the primary survivable submarine communication system.³⁶⁵ Moreover, the Air Force and Navy agreed in July 1976 that one channel of the 500 kilohertz bands on the Atlantic and Pacific satellites would be reserved for use by the Blue Eagle to provide more reliable communications with TACAMO.³⁶⁶

In addition to TACAMO, development of an effective Extremely Low Frequency (ELF) system continued. In 1982, the Navy informed Congress that some U.S. strategic submarines routinely had been patrolling with prototype ELF receivers for several years.³⁶⁷ A land-based test facility was built at Clam Lake in Wisconsin comprising 28 miles (45 km) of antenna, which was upgraded and Electromagnetic Pulse (EMP)-hardened in 1985. Another site at Republic, Michigan, was equipped with a transmitter and 56 miles (90 km) of antenna and was fully operational in 1987. The combined Michigan-Wisconsin system provided ELF communications coverage for most of the Northern Hemisphere.³⁶⁸ Although said to provide worldwide coverage, important patrol areas such as the Western Pacific between Japan and the Philippines were not covered, and neither were the East and South China Seas, important areas for SSBNs targeting China. The Indian Ocean and Arabian Sea were also out of reach.

“Layer Upon Layer of Options”³⁶⁹

The maturing of the SSBN force and the changes of non-strategic nuclear weapons in the Pacific came as the Nixon administration was increasing the flexibility of the nuclear strike plans. Until this point, U.S. nuclear policy sought to win a nuclear war by destroying the enemy’s forces and military capabilities. But a new policy developed in 1972 to 1974 sought to stop the war at lower levels of destruction. It was thought that damage to the United States could be reduced by controlling escalation and by increasing the number of limited strike options short of all-out nuclear war. The new policy emerged initially as an inter-agency study (National Security Study Memorandum (NSSM)-169) and was eventually published as National Security Decision Memorandum (NSDM)-242 and signed by President Gerald Ford on January 17, 1974.³⁷⁰ It was nicknamed the Schlesinger Doctrine after James Schlesinger, the secretary of defense who oversaw much of its preparation.

NSDM-242 directed the secretary of defense to produce new guidance to the military for the employment of U.S. nuclear weapons. This guidance was Nuclear Weapons Employment Policy (NUWEP) 74, published on April 3, 1974,

which directed the military to formulate a wide range of nuclear strike plans to give the president additional options for responding to aggression. While the Soviet Union was the main focus of NUWEP 74, China was a prominent number two (Table 15).³⁷¹

Henry Kissinger informed President Nixon in January 1974 that the Soviet Union and China “of course cannot be expected to respond favorably” to the new nuclear strike planning against them, “but neither is the new policy likely to harm our improving relations with either country.”³⁷² A subsequent CIA analysis of Soviet and Chinese reactions to the new policy partially agreed with Kissinger’s conclusion but pointed to some important nuances.

As of August 1974, Soviet and Chinese reactions to the new policy had been limited. In fact, Chinese reactions appeared to be “generally favorable,” the CIA concluded. “The Chinese interpret the U.S. policy as having little direct impact on their own nuclear posture or on overall Sino-American relations,” the CIA said. “Instead, they see the policy as designed to strengthen the U.S. military position against” the Soviet Union. “Because China sees the USSR as posing the principle threat to its security,” CIA predicted, “the Chinese leaders can be expected to read the new U.S. strategy as indirectly furthering, or at least not opposing, Chinese aims.”³⁷³

What the Chinese leaders apparently did not realize was that although the Soviet Union was the focus of the new policy, NUWEP 74 also required U.S. nuclear planners to incorporate a very wide range of Chinese facilities into the nuclear strike plans. Two of four Major Attack Options (MAOs) were directed entirely against China (Table 15), and three of the 11 new Selected Attack Options (SAOs) covered virtually all elements of Chinese military and industrial facilities (Table 16).

Another possible explanation for the low-key Chinese reaction to the new policy may have been not to disturb the U.S.-Sino “front” against the Soviet Union. Whatever the reason, CIA cautioned that over time “the Chinese are likely to be concerned that the new concept and the military capabilities implicit in it may make the U.S. more willing to employ nuclear weapons against China....” Indeed, the new concept “will probably enhance ... Chinese incentives to consider similar policies,”³⁷⁴ CIA warned.

Table 15:
“Schlesinger Doctrine” Nuclear Targeting (1974)³⁷⁵

Category	Targets
Major Attack Options	M1: A “comprehensive military target system in the Soviet Union and its Eastern European allies,” including “a) nuclear and conventional threats to the United States and its allies world-wide, and b) the national and intermediate military controls over these forces.”
	M2: The first option (M1) plus “urban, industrial, political, economic and military resources in the Soviet Union necessary to post-war recovery”.
	M3: A “comprehensive military target system in the People’s Republic of China and its Asian allies,” including “a) nuclear and conventional threats to the United States and its allies world-wide, and b) the national and intermediate military controls over these forces.”
	M4: The third option (M3) plus “urban, industrial, political, economic and military resources in the People’s Republic of China necessary to post-war recovery”.
Selected Attack Options	S1: Soviet nuclear threat to the United States.
	S2: Soviet nuclear threat to major urban NATO areas other than U.S. and Canada.
	S3: Soviet nuclear and conventional air threat to NATO other than U.S. and Canada.
	S4: Soviet conventional ground force threat to NATO.
	S5: Soviet and Warsaw Pact naval threat to NATO.
	S6: Nuclear missiles and associated storage sites, and targets in S3, S4 and S5 options, for defense of NATO, except U.S. and Canada, without using forces based in the continental United States.
	S7: Soviet nuclear threat (generally based east of 55°E) to U.S. forces and allies in Asia.
	S8: Soviet conventional threat (generally based east of 55°E) to U.S. forces and allies in Asia.
	S9: Chinese operational nuclear threat to U.S., forces, and allies in Asia, and means for rebuilding threat.
	S10: Chinese national civilian and military controls.
	S11: Chinese and its allies’ conventional threat to U.S. forces and allies in Asia.
Limited Nuclear Options	Smaller strikes with targets drawn from selected parts of the above options. Objectives include “provide response to limited nuclear attacks by the Soviet Union or the People’s Republic of China on the United States, its allies, or its forces.”
Regional Nuclear Options	Options in which threats to a region are counted by limited strikes from U.S. nuclear forces deployed in that region. Targets included “deployed enemy combat and service units, reserves, reinforcements, tactical nuclear delivery systems, local controls and field logistics facilities.”
Emphasis added. Note: Major Attack Options and Selected Attack Options were “encompassed in one integrated plan [SIOP] of which individual options cover sub-sets of targets.”	

**Table 16:
Chinese Targets In U.S. Selected Attack Options (1974)³⁷⁶**

Attack Option	Targets Categories
S9	<ul style="list-style-type: none"> a) submarine related facilities; b) bomber bases; c) land-based ballistic missiles; d) nuclear production and storage facilities; e) research, development and testing facilities for aircraft, missiles, nuclear weapons, and chemical, biological, and radiological warfare.
S10	<ul style="list-style-type: none"> a) national command centers, alternates thereto, regional military headquarters, and control centers, and communications facilities related to control over nuclear delivery forces, but which are not collocated with these forces; b) sensors and associated communication that allow the People's Republic of China leaders to discern the nature of nuclear attacks on the People's Republic of China and its allies.
S11	<ul style="list-style-type: none"> a) port facilities; b) major ground force installations; c) airfields.

Implementing NUWEP 74 required regional commanders such as CINCPAC and Command of U.S. Forces Korea (COMUSFK) to prepare new and more limited strike options. Increased tension on the Korean Peninsula – which by extension also involved China – apparently became a test case for the new flexible planning concept. A small but fatal skirmish between U.S. and North Korean checkpoint personnel over a U.S. decision to trim a tree caused the Pentagon to raise the readiness level to DEFCON 3 and deploy extensive ground, air, and naval forces with nuclear weapons in an apparent attempt to enforce the tree-trimming job. In addition to moving nuclear and other weapons forward to unit bunkers near the De-Militarized Zone (DMZ), F-4s fighters were ordered to Osan Air Base, B-52s on Guam and F-111s at Mountain Home Air Force Base were deployed, and the USS Midway carrier battle group in Yokosuka was rushed to sea.³⁷⁷ Although the chief of staff for U.S. Forces Korea estimated that the operation had a fifty-fifty chance of starting a war, six batteries of heavy artillery were deployed with loaded ammunition to attack if the North Koreans interfered with the tree-trimming and ignored the following display of force:

[A] reinforced composite rifle company ... would be orbiting aboard 20 Huey helicopters a few hundred meters south of the DMZ, supported by 12 AH-1G Cobra gunships. Tank-busting F-4 Phantoms would be prowling at a slightly higher orbit. F-111 medium strategic bombers would orbit still higher, and be clearly visible to Korea radar.... At the

precise moment of the tree chopping ... B-52 bombers from Guam would be moving ominously north up the Yellow Sea on a vector directly to ... Pyongyang. In the Sea of Japan ... [the aircraft carrier] Midway would launch 40 aircraft that would vector north above international waters."³⁷⁸

North Korea did invade, so one lesson learned was that flexible options appeared to work. Two months after the 1976 DEFCON 3, or the second Korean War as it has been called,³⁷⁹ was canceled on September 8, the new SIOP-5A war plan entered into effect with three new Regional Nuclear Options (RNO) for the defense of South Korea. The three RNOs (down from eight initially proposed by COMUS Korea) were designed to signal U.S. resolve, enhance the U.S. tactical position in the region, and were mainly focused on destruction of a large number of fixed targets. In addition to the RNOs, PACOM's Nuclear Planning Group drew up a number of Limited Nuclear Options (LNO) for Korea that were intended "to signal U.S. resolve and ranged in number from a choice of one target to as many as 10 or more." Through destruction of a small number of carefully selected targets the United States hoped to demonstrate restraint in an attempt to avoid escalation, yet still inflict sufficient damage to the enemy in an attempt to persuade him to cease hostilities and seek a political solution to the conflict.³⁸⁰

Little is known about the role that the SSBNs played in the new flexible posture or how the task of holding North Korean and Chinese targets at risk was coordinated between the individual boats. Information released under the Freedom of Information Act (FOIA) suggests that each submarine on patrol was responsible for holding a "target package" at risk and that the submarines took turns covering each target package as they relieved each other in the patrol area.

In July 1976, for example, the USS Thomas Jefferson (SSBN-618) arrived in Pearl Harbor following an overhaul at Mare Island Naval Shipyard in California. Four days after arriving at the base, the submarine "assumed Single Integrated Operational Plan (SIOP) Target Package SB85" and departed Pearl Harbor for a patrol in the Western Pacific. After a little over two months on station, USS Thomas Jefferson returned to port after being relieved on station by another SSBN. In December, the USS John Marshall (SSBN-611) took over USS Thomas Jefferson's target package as it "assumed coverage of Target Package SB85."³⁸¹ In between these two patrols, a third SSBN presumably was on station covering the same target package.

Each target package presumably consisted of a preplanned collection of Desired Ground Zeros (DGZs, or aimpoints) where the coordinates corresponded to a group of individual Chinese facilities selected for destruction under specific strike options in the SIOP. With 16 Polaris A3 missiles each armed with three Multiple Reentry Vehicles (MRVs), an SSBN could probably cover as many as 16 individual targets depending on its hardness and the number of reentry vehicles used.

On December 19, 1976, only a few weeks after SIOP-5A entered into effect, the USS Sam Houston (SSBN-609) arrived in Chinhae in South Korea for a four-day visit. This was the first time an SSBN on patrol had visited a foreign Pacific port, and only the second time ever that a U.S. SSBN had visited a foreign port. The next five years saw nine different SSBNs make 35 port visits to Chinhae.

The visits meant breaking deterrent patrols up into two phases in between which the SSBN would visit a foreign post or conduct an exercise. During Flex-Ops, as the concept was known, the port visit also served

**Table 17:
U.S. SSBN Visits to South Korea***

Dates of Visit	Submarine (hull number)
1976	
19-22 Dec ³⁸²	USS Sam Houston (SSBN-609)
1978	
3-5 Jun	USS Abraham Lincoln (SSBN 602)
3-5 Jun	USS Ethan Allen (SSBN-608)
1979	
1-3 Feb	USS Thomas Edison (SSBN 610)
21-23 Feb	USS John Marshall (SSBN 611)
10-14 Jul	USS Thomas Jefferson (SSBN 618)
30 Jul-3 Aug	USS Patrick Henry (SSBN 599)
13-15 Aug	USS Thomas Edison (SSBN 610)
6-10 Sep	USS George Washington (SSBN 598)
17-21 Sep	USS Sam Houston (SSBN 609)
3-7 Oct	USS Robert E. Lee (SSBN 601)
8-12 Oct	USS Ethan Allen (SSBN 608)
16-20 Oct	USS Thomas Jefferson (SSBN 618)
22-26 Nov	USS Thomas Edison (SSBN 610)
15-19 Dec	USS John Marshall (SSBN 611)
24-28 Dec	USS Sam Houston (SSBN 609)
31 Dec-	USS Robert E. Lee (SSBN 601)
1980	
-4 Jan	USS Robert E. Lee (SSBN 601)
12-16 Feb	USS Thomas Jefferson (SSBN 618)
29 Feb-4 Mar	USS Thomas Edison (SSBN 610)
27 Mar-31 Mar	USS George Washington (SSBN 598)
11-14 Apr	USS Sam Houston (SSBN 609)
24-27 Apr	USS Ethan Allen (SSBN 608)
26-30 May	USS Patrick Henry (SSBN 599)
2-5 Jun	USS Thomas Edison (SSBN 610) ³⁸³
9-12 Jun	USS John Marshall (SSBN 611)
23-29 Jun	USS George Washington (SSBN 598)
19-21 Aug	USS Thomas Jefferson (SSBN 618)
15-17 Sep	USS Patrick Henry (SSBN 599)
5-8 Oct	USS John Marshall (SSBN 611) ³⁸⁴
10-13 Oct	USS George Washington (SSBN 598)
4-9 Nov ³⁸⁵	USS Robert E. Lee (SSBN 601)
29-31 Dec	USS Patrick Henry (SSBN 599)
1981	
12-16 Jan	USS George Washington (SSBN 598) ³⁸⁶
8-11 Mar	USS Robert E. Lee (SSBN 601) ³⁸⁷
35 visits	by 9 SSBNs
* All visits were to Chinhae.	

a deterrence purpose because the SSBN carried a full load of nuclear armed missiles. The concept also affected SSBNs operating in the Atlantic and Mediterranean, where the Flex Ops port visits continued through the 1980s even after the non-Ohio class SSBNs had been phased out in the Pacific.

During 1979 and 1980, as many as 14 SSBN visits took place. Less than a week after the visit by the USS Thomas Jefferson (SSBN 618), South Korean President Park Chung Hee was assassinated on October 26, 1979. That same day the Pentagon declared DEFCON 3 and dispatched the nuclear-armed USS Kitty Hawk carrier battle group to the waters south of South Korea to deter North Korea or others from trying to take advantage of the situation.³⁸⁸ Seventeen days after DEFCON was lowered again on November 5, the USS Thomas Edison (SSBN 610) arrived in Chinhae for a five-day visit, and throughout the rest of 1979 and 1980, visits were so frequent that an SSBN was in port at least once a month, and often two or three times per month (see Table 17).

Port visits to South Korea had become an integral part of deterrent patrols in the Pacific. In fact, the visits became so routine that they were exempt from the normal port clearance procedures. Port visits by a SSBN to a foreign port normally required the direct involvement of the Chief of Naval Operations (CNO), but this requirement did not apply for visits to South Korea. Moreover, visits to Chinhae took place without clearance from the South Korean authorities.³⁸⁹ Three months after completing its final visit to South Korea, the USS George Washington (SSBN 598) collided with the Japanese freighter Nissho Maru in April 1981 while operating submerged in the East China Sea about 110 miles south southwest of Sasebo, Japan. The collision, which took place less than 20 miles outside the 12 mile territorial limit, sank the Nissho Maru, killing two of the 15 Japanese crewmen.³⁹⁰

The new flexible nuclear targeting that the SSBNs operated under was further refined by the Nuclear Targeting Policy Review under Secretary of Defense Harold Brown from 1978 to 1979. This review resulted in an additional increase in the number of targeting options. To implement the new changes, President Jimmy Carter signed Presidential Directive (PD) 59 on July 25, 1980, which authorized Brown to issue a new NUWEP (designated NUWEP 80) in October 1980. The new guidance de-emphasized targeting intended to impede economic recovery in favor of greater emphasis on hitting targets that were likely to achieve more short-term effects.³⁹¹

James Schlesinger thought that PD-59 was less revolutionary in defining new employment plans than in its declaratory policy. According to him, PD-59 and the vast increase in the numbers of warheads added since the early 1970s changed the thrust from “selectivity and signaling to that of victory.” Secretary Brown reportedly changed “counterforce” in the directive to “countervailing,” because, as he explained: “A countervailing strategy is a strategy that denies the other side any possibility that it could win – but it doesn’t say that our side would win.”³⁹²

The PD-59 re-emphasized limited strike options and flexible nuclear forces with one result being the creation of a Secure Reserve Force (SRF),³⁹³ a group of SSBNs and long-range bombers not tasked in the initial strike but which would remain safe and available for use in subsequent attacks. While the focus was on the Soviet Union, the SRF also was intended to ensure that secondary powers such as China could not take advantage of a situation where the United States had depleted its nuclear forces in a war with the Soviet Union. Of the weapons that would be affected the most by the new tasking, an Air Force point paper “especially” highlighted the cruise missile,³⁹⁴ which had begun limited production in a Navy version in October 1979.³⁹⁵ The rapid retargeting that was required to support the new plans, and the need to be able to monitor the trans- and post-war situation, increased the need for real-time intelligence capabilities. PD-59 ordered the development of new reconnaissance systems, as well as improvements to the Command, Control and Communication (C3) systems to ensure that there would be secure communication with the nuclear forces throughout a prolonged nuclear war.³⁹⁶

A New Deterrent in the Pacific

Amidst these dramatic changes the U.S. Navy announced in April 1980 that all remaining Polaris-equipped SSBNs operating in the Pacific would be withdrawn over a 15-month period beginning in July 1980.³⁹⁷ Instead of replacing Polaris-submarines with Poseidon submarines, however, the Pacific SSBN fleet would be phased out all together and gradually replaced by the new Trident weapon system. On October 1, 1981, the last three Polaris submarines were withdrawn from service as Submarine Squadron 15 was deactivated at Guam.³⁹⁸

The SSBN force in the Pacific had been a countervalue force capable of destroying soft surface targets but unable to destroy underground or hardened facilities. Once China began deploying missiles in silos, however, the accuracy of the SLBMs in the Pacific would need to be improved to be able to hold the targets

at risk. In August 1981, China's first two silos became operational with the DF-5 (CSS-4) missile.³⁹⁹ Fourteen months later, on October 1, 1982, the USS Ohio (SSBN-726), the first boat of a new class of SSBNs designed for extended patrols and longer-range and more accurate missiles, sailed on its first deterrent patrol in the Pacific, lasting 71 days, until December 10, 1982.⁴⁰⁰

Figure 75:
USS Ohio (SSBN-726) At Bangor, Washington



The first Ohio-class ballistic missile submarine USS Ohio (SSBN-726) armed with Trident missiles sailed on its first deterrent patrol in the Pacific on October 1, 1982, only 14 months after China's first silo-based ICBM capable of striking the United States became operational. The deployment of the Trident, in turn, made China decide to make its land-based missile force more mobile to decrease its vulnerability, according to the CIA.

Image: U.S. Navy

The significantly greater range of the Trident I C4 SLBM compared with the Polaris A3 (4,600 miles (7,400 km) versus 2,870 miles (4,620 km)), the increased payload of eight MIRVs (compared with three MRVs on the Polaris A3), and the improved accuracy of 0.3 miles (0.5 km) (versus 0.6 miles (0.9 km)) resulted in a “moderate hard” target (military bases and industry) capability in the Pacific for the first time. All Chinese targets and almost all Soviet targets would be in range from SSBNs operating in the Pacific, and the longer range eliminated the need for forward basing of submarines in Guam. Instead, all Ohio-class SSBNs were based at Bangor, Washington.

Yet China at the time seemed less of an adversary to the United States and more focused on its own Cold War with the Soviet Union. How to adjust targeting of China in this context was the subject of a Defense Nuclear Agency (DNA) study in February 1981. The study, which examined U.S. nuclear weapons policy toward China for the period 1985 to 1995, concluded that the concepts used for targeting China were “almost exclusively the product of the U.S.-Soviet relationship” rather than China specific.⁴⁰¹

In an attempt to develop recommendations of how to target China in case of war, the study identified three hypothetical scenarios for a U.S.-Chinese nuclear confrontation and generated target categories for each. The three scenarios were not portrayed as being official or the ones actually used by U.S. nuclear targeteers – although the target lists that resulted from the scenarios were close to the actual ones used. The three scenarios – none of which envisioned a crisis over Taiwan or a direct U.S.-Chinese continent-to-continent confrontation – were:

First Scenario: Korean War Revisited: Involves a possible replay of the Chinese decision to intervene in the 1950-53 Korean War. The fact that Korea remains divided and that the long-range prospects for reunification do not appear particularly high, according to the study, “suggests the possibility of U.S.-Chinese conflict in the future patterned after events which took place 30 years ago, including the possible use of U.S. nuclear weapons against installations on mainland China.”⁴⁰²

Second Scenario: Proxy-State Crisis: Concerns the possible development of a client or proxy state of China in the Third World or perhaps even in a more developed region analogous to the client/proxy status of Albania with respect to China after the Sino-Soviet rupture in the early 1960s. Proxy wars are not an unusual feature of contemporary international relations and there is no reason to believe they will not continue to be a prominent aspect of world politics in the next 20 years.⁴⁰³

Third Scenario: Catalytic War: The premise here is that, under certain circumstances the Chinese may be convinced that their single best option in a deteriorating political or military situation would be to incur the risks attendant to trying to precipitate a U.S.-Soviet nuclear exchange. This scenario assumes a deteriorating Chinese relationship with either the Soviet Union or the United States, one in which the Chinese were expecting intervention or armed conflict.⁴⁰⁴

The implication of these scenarios for U.S. nuclear policy, the study concluded, was that the assured destruction doctrine – with its policy of deterrence and retaliation – “may not be suitable with regard to China because of its large population and the dispersion of industrial and agricultural capacity at least through the mid 1990s.”⁴⁰⁵ This point was also made by the targeting studies in the early

1970s (see above). Yet the DNA study also made the point that China was changing and that its drive to attain superpower status would mean that it would be more “vulnerable” to strategic attack by doing away with the inefficient and decentralized economic planning mode and replacing it with more high-value and centralized facilities.⁴⁰⁶ This development, coupled with China’s “doctrinal and pragmatic inability to engage in sophisticated ‘limited strategic’ warfare planning,” should dictate what the “most threatening targeting option” for the United States should be.⁴⁰⁷

To that end the study concluded that it would “not be difficult to meet” the hard-target-kill requirements for U.S. nuclear targeting of China in the period between 1981 and 1995. While no new U.S. modernization or acquisition programs were necessary to deal with Chinese target categories, the study recommended that there could be “more than a few score targets” that may require weapons with very high accuracy and, in some cases, earth-penetrating capability.⁴⁰⁸

U.S. spending was overwhelmingly focused on containing and deterring the Soviet Union, and China’s own Cold War with the Soviet Union complicated target selection for U.S. war planners. The study even went so far as to suggest that the United States should refrain from targeting those Chinese weapons that were thought to be aimed at Soviet forces⁴⁰⁹ to assist the United States in a war with the Soviet Union.

These findings echoed similar assessments made by other branches of the U.S. military at the time. CINCPAC concluded in 1976 that China “no longer opposed U.S. presence in East Asia” but instead saw it as “a stabilizing influence and a counter to the Soviet Union and North Korean adventurism.” Indeed, CINCPAC saw China as “a restraining force on North Korea,” and although there were signs of impatience in Peking over the Taiwan issue, there was “no indication” that China would attempt to use force against the island, CINCPAC concluded. Similarly, in a report from July 1977, Commander of the U.S. Taiwan Defense Command Vice Admiral E. K. Snyder stated that China “could not, for the foreseeable future, invade Taiwan successfully.”⁴¹⁰ Confident that there was no immediate threat, the United States withdrew its military forces from Taiwan in 1979 as part of its effort to normalize relations with China.

Deterring China seemed to have been overtaken by more pressing political realities. Both countries saw a benefit in replacing their former rivalry with an implied partnership against the Soviet Union in the evolving triangular relationship.

While the Soviet Union regarded the United States as its major competitor in the world, CINCPAC said in 1980, it viewed China as its “most intractable opponent.”⁴¹¹

Pacific Command planners were keenly aware of the beneficial role that China played in tying down Soviet forces in the Far East that would otherwise have to be countered by U.S. and Japanese forces. By 1984, CINCPAC estimated, approximately 90 percent of Soviet ground forces in the Far East were directed against China and preoccupied with the “growing Chinese nuclear capability.”⁴¹² China on the other hand maintained about 50 percent of its ground forces along the Soviet border.⁴¹³ The Soviet-Chinese stand-off had resulted in “the largest single concentration of forces along any binational border.”⁴¹⁴

The new Reagan administration embraced the idea of China as a partner in containing of the Soviet Union. On October 1, 1981, President Reagan signed National Security Decision Directive (NSDD) 13, which differed from PD-59 by reintroducing the notion of “prevailing” in a nuclear war and extending the period of time over which such a war might have to be fought. A nuclear war may go on for months or even years and had to end in a U.S. victory.⁴¹⁵

NSDD-13 led to an updated Nuclear Weapons Employment Policy in July 1982 (NUWEP-82), which deleted the Major Attack Options against China. Instead of being a part of SIOP planning, a separate and smaller war plan was prepared for nuclear war with China.⁴¹⁶ In response to NUWEP-82, the Joint Chiefs of Staff published an update of the nuclear annex to the Joint Strategic Capabilities Plan (JSCP FY82-83). This annex (Annex C) ordered PACOM and SAC to prepare a Concept Plan (CONPLAN) for the employment of nuclear weapons against the “power projection capabilities” of China.⁴¹⁷

As a result of the new guidance, the SIOP-6 war plan that went into effect on October 1, 1983, was a “major plan revision” that focused entirely on the Soviet Union. The plan contained four SSBN target packages for the Pacific Command: Two were “time-shared” with SSBNs operating in the Atlantic and Mediterranean under the command of Atlantic Command, and probably covered targets in the Soviet Union. The other two target packages were unique for the Pacific Command⁴¹⁸ and probably covered targets in the Soviet Far East. Targets in China were covered by Strategic Reserve Force submarines when they were not on Hard Alert against the Soviet Union under SIOP as well as by bombers.

Only two SSBNs operated in the Pacific at the time: The USS Ohio (SSBN-726) sailed on its first patrol on October 1, 1982; and USS Michigan (SSBN-727) sailed on its first patrol in mid-August 1983 “as part of the SIOP force in the PACOM.”⁴¹⁹ While the SLBMs were within range of Soviet Far Eastern targets as soon as the SSBN departed Bangor, Washington, targeting China and North Korea without overflying the Soviet Union required the submarines to sail further to the southwest to a patrol area north and west of Hawaii.

The CONPLAN ordered for China, however, was short lived and dropped from the JSCP in 1984.⁴²⁰ Instead of targeting the country for nuclear annihilation, China was encouraged to provide overflight rights to U.S. aircraft and support its efforts to “preclude Soviet hegemony in Asia.” The new JSCP even directed that “the United States was to be prepared to provide security assistance to China in the event of Soviet aggression,”⁴²¹ a remarkable pledge given that considerable nuclear forces had been earmarked to destroy Chinese targets only a few years before.

Chinese Premier Zhao Ziyang’s visited Washington in 1984. In preparing his reciprocal visit President Ronald Reagan set objectives for a new relationship. These included:

- To promote a China that remains independent of the Soviet orbit;
- To encourage China’s efforts to modify and liberalize its totalitarian system, introduce incentives and market forces in its economy, and continue expanding its ties with the major industrialized democracies;
- To help China modernize, on the grounds that a strong, secure and stable China can be an increasing force for peace, both in Asia and in the world, if the two objectives above are realized.⁴²²

Furthermore, Reagan wanted a discussion of the situation on the Korean Peninsula, military-to-military exchanges, and military assistance to upgrade China’s defensive capabilities with the purpose of strengthening a partnership against the Soviet Union:

Explore possibilities for raising the level of strategic dialogue and expanding U.S.-PRC cooperation against the common threat posted by the USSR. We should discuss with Chinese leaders Soviet military expansion in Asia, their likely future weapons development, Soviet efforts to expand their influence throughout the world, and arms control matters.⁴²³

Yet even with this new conciliatory emphasis nuclear planning against China continued using weapons in the Strategic Reserve Force (SRF). The SRF (sometimes called the Nuclear Reserve Force) was formally part of forces committed to the SIOP mission, but consisted of SLBMs and bombers that were excluded from a Major Attack Option (MAO). Generally this meant weapons not on alert and some non-strategic weapons.⁴²⁴ The SRF could be used at any time before, during, or after a MAO strike and involve either SIOP/NSNF (non-strategic nuclear forces) or Reserve Forces.⁴²⁵

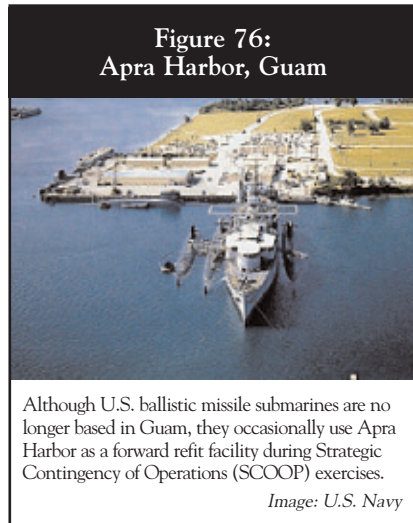
During the period when Pacific-based SSBNs were phased out in the early 1980s, B-52 bombers took over SRF targeting responsibility in the Pacific. But as new Ohio class submarines armed with Trident I C-4 missile joined the Pacific fleet, SSBNs once more took a central role vis-à-vis China. Those SSBNs patrolling in the Pacific on Hard Alert had as their primary mission an attack on the Soviet Union. When not on Hard Alert, they had a secondary mission to destroy Chinese targets as part of the SRF. The SIOP-6C war plan that entered into effect on October 1, 1986, contained four MAOs and six Selected Attack Options (SAO). There were also three Basic Attack Options (BAO), which were subplans to the MAOs and SAOs.⁴²⁶

Even with their longer-range Trident I C4 missiles, Ohio-class SSBNs continued to patrol as far west as Guam. In April 1986, the USS Georgia (SSBN-729) arrived in Guam to test a new operational concept called “forward refit.” The refit lasted 11 days and involved “cosmetic repairs” from the submarine tender USS Proteus (AS-19), troubleshoot and repair or a gyroscope, and maintenance of Mk 48 torpedo, and a crew exchange. This was the first-ever forward refit of a Trident submarine in Guam and the first time ever that an Ohio-class submarine had been refitted alongside an afloat tender. Because the draft of the USS Georgia was too deep to allow the submarine to fully enter Apra Harbor, the USS Proteus was moved to the outer section of the harbor to accommodate the USS Georgia. Despite this limiting factor, the commander of Submarine Group 7 concluded that “the overwhelming success of the Trident refit has set the stage for possible future forward refits.”⁴²⁷

The Guam visit was part of a Strategic Continuity of Operations (SCOOP) exercise designed to practice use of alternative refit sites in case the SSBNs homeport was destroyed. Some of the SCOOP exercises included remote site replenishments,

refits, crew exchanges, open-ocean torpedo reload from an anchored tender, at-sea replenishment by helicopter, and port ingress/egress security exercises.⁴²⁸

USS Georgia's visit to Guam took place one year after China in May 1985 had test-launched its first solid-fueled mobile ballistic missile, the DF-21 (CSS-5). The new missile took a much shorter time to prepare for launch than the DF-2 (CSS-3), and could reach U.S. forces in Okinawa and South Korea (but not Guam). This marked the beginning of a Chinese transition to a more mobile and flexible land-based missile force. The Soviet Union also had begun deployment of its first mobile solid-fueled missiles, and these developments influenced U.S. nuclear planning in the Pacific.



The updated JSCP issued in 1986 (JSCP/Annex C FY 87) directed that Soviet relocatable targets be held at risk and established a requirement to develop a flexible and responsible system to hold relocatable targets at risk.⁴²⁹ At the time, all legs of the Triad tasked under SIOP-6B were targeted at various categories of predictable relocatable targets, but the planners wanted the new SIOP to hold a limited number of unpredictable relocatable targets at risk. SAC forces would be required to do so in SIOP-6C, while SLBMs would begin holding unpredictable relocatable targets at risk in SIOP-6D in October 1987.⁴³⁰

Another SCOOP exercise was conducted in December 1986, when the USS Alabama (SSBN-731) interrupted its third deterrent patrol for a tactical weapons loadout at Pearl Harbor. After completing the first Trident Service Weapons Test (SWT), USS Alabama returned to sea to complete its patrol. During its fourth patrol, following a crew exchange in Bangor, Washington, USS Alabama returned to Pearl Harbor in March 1986 amid Patrol Four for another tactical weapons loadout.⁴³¹ Trident port visits to Hawaii had become routine as part of deterrent patrols. San Diego also started receiving port visits, and in addition to Guam, strategic submarines occasionally visit Alaska as part of acoustic operations (Figure 77).

**Figure 77:
US SSBN Pacific Port Visits**



U.S. ballistic missile submarines operating in the Pacific conduct port visits to three U.S. ports: Apra Harbor in Guam, Pears Harbor in Hawaii, and San Diego in California. Alaska occasionally receives visits as well. The visits take place under the Strategic Continuity of Operations (SCOOP) exercise program and occur during strategic deterrent patrols.

Deployment of the Trident I C4 in the Pacific was completed in August 1987, when the USS Nevada (SSBN-733) sailed on its first patrol.⁴³² This brought the Pacific-based SSBN force to eight boats with 192 SLBMs armed with more than 1,500 W76 warheads, a dramatic increase of the 480 warheads on 10 Polaris-equipped subs in the late 1970s. One year later, on September 1, 1988, the 100th Trident submarine deterrent patrol was completed when the USS Alabama returned to Bangor, Washington.⁴³³

Like its predecessor, the SIOP-6D war plan also had four MAOs, but in an effort to simplify strategic war planning the smaller attack options were reorganized. The SAOs were reduced from six to five and the number of

BAOs was increased from three to five. The BAOs were separated from the MAOs and the SAOs. “This separation permitted the use of BAOs to control conflict escalation and enabled the enemy to clearly perceive the limited nature of such attacks,” according to SAC. “In short, emphasis on BAO and SAO attacks had shifted to convey political rather than strictly military messages, thus enhancing the ability to limit conflict and end it as expeditiously as possible.”⁴³⁴

The new plan “required consideration of targets of changing value,” i.e. targets that might increase or lose value during SIOP operations. Although SIOP-6D did not identify increasing-value targets, targets that might *lose* value as SIOP operations continued figured prominently in the new plan.⁴³⁵ This requirement was a product of the increased focus on more limited and flexible strike options against more mobile forces. In previous SIOPs, targeting had been designed to commit forces against only stationary, point targets. But the Soviet Union’s increased reliance on mobile forces led to development of a Strategic Relocatable Target Attack (SRTA) tactic in SIOP-6D, which required SAC and the Navy to begin holding (unpredictable) Relocatable Targets (RT) at risk.⁴³⁶

Although the Soviet Union was the primary driver for this development at the time, the new capability later became an important tool for targeting Chinese mobile missiles.

The Denuclearization of South Korea

For decades nuclear war on the Korean Peninsula meant Chinese involvement. But during the 1980s, China's support of North Korea lessened and CINCPAC concluded that North Korea would be able to sustain "an extended conflict" against the south for a period of "several months, virtually independent of outside assistance."⁴³⁷

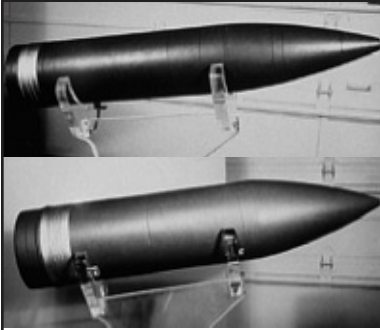
As the likelihood of direct Chinese military involvement in a Korean conflict decreased and the South Korea capabilities increased, the need for U.S. reinforcement of South Korea also declined. General Louis Menetry, the U.S. commander in Korea, stated in August 1989 that he anticipated that South Korea by the mid-1990s would be able to stand on its own feet. A residual U.S. force might stay in South Korea, he said, but more for "symbolic" reasons.⁴³⁸

The Joint Chiefs of Staff annual Joint Military Net Assessment for March 1991 only mentioned in general terms that U.S. forces in the Pacific region would "continue to support deterrence on the Korean Peninsula while balancing Soviet and Chinese influence in the area." Its assessment of nuclear forces was focused on the Soviet Union and the threat from China was not mentioned directly.⁴³⁹

A consensus was emerging that the presence of U.S. nuclear weapons on the Korean Peninsula had outlived their usefulness. In the aftermath of the collapse of the Soviet Union, President George H.W. Bush ordered the withdrawal of all non-strategic nuclear weapons from South Korea.⁴⁴⁰

On September 9, 1991, the commander of U.S. Forces Korea received a telegram from CINCPAC in Hawaii that directed him to evaluate the contribution of non-strategic nuclear forces as they related to deterrence and war-fighting strategy in Pacific Command. The telegram, which all component commanders in the region received as well, was sent in anticipation of President Bush's unilateral disarmament initiative that was to be announced later that month. In a telegram, CINCPAC noted that non-strategic nuclear forces had played an important role in the U.S.-Soviet Cold War confrontation over the past 35 years, but that the dramatic international changes required that the commanders reassess whether the weapons were still required, and if so, in what role.⁴⁴¹

**Figure 78:
Nuclear Artillery Shells**



Transport of the Mk33 (bottom) and Mk48 (top) Artillery Fired Atomic Projectiles had first priority in the U.S. nuclear withdrawal from South Korea in 1991.

Images: U.S. Department of Defense

For the commander of U.S. Forces Korea, “the status of nuclear weapons located in Korea, became moot on 27 September 1991,”⁴⁴² when President Bush ordered that all non-strategic naval and ground-launched nuclear weapons be returned to the United States. These involved approximately 5,000 tactical nuclear weapons in Europe, South Korea, and aboard dozens of warships and attack submarines deployed around the world.

Preparations in Pacific Command involved drawing up a plan for the removal of all Artillery Fired Atomic Projectiles (AFAPs), Tomahawk land-

attack missiles, nuclear strike bombs and nuclear depth bombs. While the weapons on the vessels would be offloaded when the ships next returned to the United States as part of their normal cycle, transport of the ground-launched weapons would begin immediately. A first priority was the return of the nuclear artillery (Figure 78) from South Korea, and Chairman of the Joint Chiefs of Staff General Colin Powell informed CINCPAC that the withdrawal of all weapons from Korea had highest priority for transportation aircraft. Powell wanted weapon movements to commence before the next meeting of the U.S.-South Korean military and security committees scheduled for November 20-22, 1991.⁴⁴³

To ease South Korean concern of being left vulnerable to North Korean attack, Bush’s initiative initially did not include approximately 60 air-delivered nuclear bombs at Kunsan Air Base, but only the 40 or so nuclear artillery shells.⁴⁴⁴ At the same time, U.S. officials went public with assurances about U.S. non-nuclear capabilities to deter Pyongyang. “If it comes to military capability, to deter an attack on South Korea,” Under Secretary for Defense Paul Wolfowitz told reporters three days after President Bush’s announcement, “I think we demonstrated amply in the Persian Gulf that we have extraordinary means, including extraordinary conventional means.... I hope the North Korean leadership, isolated though it may be, has noticed that kind of American strength and is not going to try any aggressive actions.”⁴⁴⁵

Figure 79:
USAF F-16 at Kunsan Air Base, South Korea



Kunsan Air Base stored U.S. B61 nuclear bombs until December 1991 when the weapons were withdrawn to the United States ending 43 years of U.S. nuclear weapons deployment in South Korea. The 8th Fighter Wing retained a nuclear strike role till the end after passing its last nuclear weapons certification inspection during the first half of 1991.

Image: U.S. Air Force

Throughout the period, U.S. officials went to great lengths to signal North Korea that the U.S. nuclear umbrella over South Korea remained intact and would be maintained with other nuclear forces.⁴⁴⁶ With South Korean concerns eased, the full withdrawal was finally implemented when President Bush signed National Security Directive 64 (NSD-64) on November 5, 1991, which ordered the removal of *all* nuclear weapons (ground- and air-launched) from South Korea.⁴⁴⁷

On December 18th, South Korean President Roh Tae Woo declared on national television: “As I speak, there do not exist any nuclear weapons whatsoever anywhere in the Republic of Korea.” In Washington, State Department spokesman Richard Boucher echoed Roh's call for a “non-nuclear peninsula,” and said the United States would cooperate in mutual inspections “to verify the absence of nuclear weapons”⁴⁴⁸ on the peninsula.

Now, without nuclear weapons in South Korea, the United States would maintain the nuclear umbrella over Seoul with SSBNs and long-range bombers.⁴⁴⁹ SSBN deterrent operations in the Pacific continued virtually unchanged, and although the Navy in February 1991 ordered TACAMO aircraft to cease 100 percent airborne operations and assume ground alert operations at Travis Air Force Base in California instead,⁴⁵⁰ the eight SSBNs based at Bangor mustered 29 deterrent patrols during 1991, a near all-time high in the Pacific.⁴⁵¹

China Back in the Crosshairs

The demise of the Warsaw Pact, the collapse of the Soviet Union, and the Tiananmen crisis of 1989 prompted the United States to re-examine the long-term strategic threat and the strategic assumptions underlying U.S.-Chinese relations.⁴⁵² As nuclear planners began to examine the role of nuclear weapons in the post-Cold War era, the crosshairs quickly focused on China once again.

In January 1992, a Pentagon study on the new role of nuclear weapons characterized China as “a wild card” for U.S. security interests. The study pointed out that China “has a nuclear arsenal that continues to grow and which is capable of striking the U.S. and its friends and allies,” and also expressed concern over China’s leadership and its future control of the nuclear forces. The study predicted that China might adopt “new aggressive policies, especially with respect to outstanding problems like Taiwan,” and it warned about a potential nuclear confrontation between China and India. Faced with these realities, the study concluded, U.S. strategic nuclear weapons should continue to serve a “moderate role” in deterring a Chinese nuclear attack on the United States and its allies. Although U.S. non-strategic nuclear weapons had just been withdrawn from South Korea and warships, the study concluded that both strategic and tactical nuclear weapons would continue to deter China from trying to coerce the United States and its allies.⁴⁵³

Notwithstanding the civilian status of the authors, the study was the product of a Strategic Deterrence Study Group within the Joint Strategic Targeting Planning Staff (JSTPS),⁴⁵⁴ the body responsible for maintaining the SIOF at the time. The authors and virtually all of the contributors to the study came from the JSTPS itself or its affiliates that advised the Commander-in-Chief of Strategic Air Command, the Joint Chiefs of Staff, and the secretary of defense about the future development of the U.S. nuclear posture. Perhaps not surprisingly, many of the study’s findings and its underlying philosophy were echoed in subsequent nuclear planning documents and policy papers about China.

The formation of Strategic Command (STRATCOM) in June 1992 established control of all U.S. strategic nuclear weapons under a single commander. STRATCOM initiated a number of force structure studies to determine the best composition of U.S. nuclear forces in the future in light of the reductions caused by new arms control agreements. During these reviews – which took place during several U.S.-Chinese clashes over Taiwan, arms sales to proliferating countries,

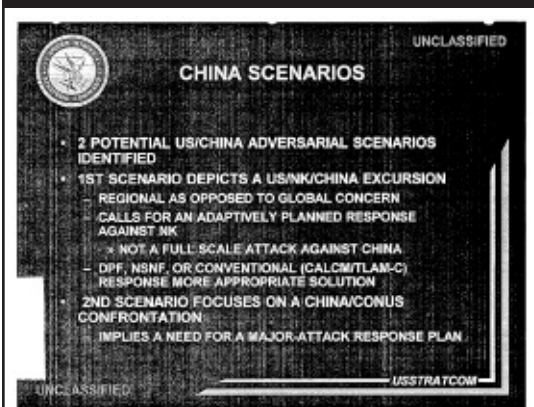
military espionage, and human rights issues – China’s status in U.S. nuclear planning gradually increased.

One of the studies STRATCOM produced was known as *Sun City Extended*. Completed in early 1994, it contained an extensive analysis of various nuclear strike options against China. The earlier *Sun City* study from 1993 had focused on U.S.-Russian nuclear relations and only mentioned China in passing, but *Sun City Extended* dedicated a total of 13 pages to examining various “China Scenarios.” Although most of the details were deleted from the declassified version (obtained under the FOIA), two specific “potential U.S./China adversarial scenarios” were described, one evolving from a conflict over North Korea and the other being a purely U.S.-Chinese confrontation.⁴⁵⁵ (Figure 80)

China’s prominent status in the study was important for several reasons. First, the China factor had played no apparent role in the decision to denuclearize South Korea, but *Sun City Extended* reaffirmed that STRATCOM believed China would play a role in a Korea scenario and that U.S. nuclear weapons were needed in response. Second, and more significant, while China had been removed from the

SIOP in 1982 and nuclear planning reduced to a couple of limited attack options for the Strategic Reserve Force, the need to develop a “major-attack response plan” in anticipation of a possible direct U.S.-Chinese confrontation reflected the U.S. intelligence community’s concern over China’s increasing (albeit slowly evolving) capability to reach targets in North America with long-range missiles.⁴⁵⁶ This growing capability, some military planners argued during the 1994 Nuclear Posture

**Figure 80:
STRATCOM:
More Options Needed Against China**



The nuclear force structure study *Sun City Extended* published by U.S. Strategic Command in February 1994 identified two potential U.S.-Chinese scenarios that could lead to the use of nuclear weapons. One was a clash over North Korea, involving a limited attack against North Korea and potentially also China. The second involving a direct Chinese-U.S. confrontation which required “a major-attack response plan” against China.

Review process, necessitated a more focused U.S. nuclear planning against China and *Sun City Extended* appeared to present the justifications for doing so.

STRATCOM did not get approval to draw up a major plan against China at the time, but efforts to bring China firmly into mainstream nuclear planning were aided by intelligence reports about Chinese nuclear modernization and China's saber rattling against Taiwan. The crisis in the Taiwan Strait in March 1996 heated up when China conducted several ballistic missile tests from the mainland into the waters north and south of Taiwan. Three M-9 short-range ballistic missiles were launched on March 8 – two to the southern and one to the northern impact areas, and a fourth missile was fired into the southern area on March 13. The northern impact area was only 19 miles from Chilung. The exercise was the latest and largest in a series of what U.S. Naval Intelligence considered to be rehearsals of a contingency scenario for invading Taiwan, a scenario the United States first detected in 1994. China had held two similar exercises in 1995.⁴⁵⁷

The United States responded to the 1996 exercise by sending two aircraft carrier battle groups to the area: The USS Nimitz and USS Independence along with several nuclear-powered attack submarines.

Despite the potential treat, the U.S. military was not impressed with what it saw in the 1996 Taiwan crisis. After China conducted a large-scale exercise that tested new equipment, the U.S. Air Force concluded that to the extent the exercise sought to demonstrate joint capability of Chinese military forces, it failed. The Chinese military “demonstrations were set pieces and lacked realism, and very little inter-service cooperation was in evidence,” the Air Force concluded and discounted any negative impact on Taiwan's internal affairs or independence. The Air Force predicted that China would “now need to factor in a U.S. military response in its further development of [its] war plans.”⁴⁵⁸

Even during the much less demanding territorial dispute between China and Vietnam and the Philippines over the Spratly Islands in 1996, U.S. Naval Intelligence concluded that China's inadequate military capability prevented it from taking any aggressive action. In a secret special report from July 1996, the U.S. Navy's Joint Intelligence Center in the Pacific (JICPAC) concluded that one reason China did not force the issue was “the fact that it does not now have the power projection capability to establish control over Spratly Islands.” Even for the foreseeable future, JICPAC predicted, “China will probably allocate just enough naval forces to support its claims, but not enough to provoke an engagement into an international dispute.”⁴⁵⁹

While its “relatively small nuclear forces are intended for retaliation rather than a first strike,” as the Pentagon later concluded,⁴⁶⁰ concern over China’s long-term strategic modernization significantly contributed to President Bill Clinton signing Presidential Decision Directive 60 (PDD-60) in November 1997 – the first new comprehensive presidential guidance issued for U.S. nuclear forces in 16 years. PDD-60 reportedly deleted “all previous references to being able to wage a nuclear war successfully or to prevail in a nuclear war.” Robert Bell of the National Security Council explained that the “emphasis in this PDD is therefore on deterring nuclear wars or the use of nuclear weapons at any level, not fighting [with] them.”⁴⁶¹

Nevertheless, nuclear deterrence still required credible strike options capable of holding valued targets at risk. Thus the nuclear guidance continued to emphasize the need for secure command and control capabilities to ensure effective operations of nuclear forces in pre-, trans-, and post-nuclear scenarios. If deterrence failed, the Pentagon clearly intended to win a nuclear war. The more moderate language of PDD-60 probably reflected the fact that a nuclear war in Europe was no longer likely, that most non-strategic nuclear weapons had been withdrawn or destroyed, and that the United States and Russia were no longer poised to strike one another as they had been during the Cold War. To that end, PDD-60 trimmed targeting of superfluous Russian facilities and focused the strike plans on nuclear forces and command facilities.

As for China, PDD-60 directed the military to *broaden* the list of facilities that might be struck in a nuclear war. Robert Bell declined to give any details about what those facilities were, but a source told the *Washington Post* that there was “no debate with respect to the targeting of China” as such.⁴⁶² What triggered this shift was not so much China’s nuclear capabilities at the time, but the potential for what China could become in the future. China was seen as expanding its nuclear arsenal and increasing the number of missiles capable of reaching the U.S. mainland. In its report from December 1997 on national security in the 21st century, the National Defense Panel, which was established by Defense Secretary William Cohen in consultation with Congress to review and make recommendations on the DOD’s Quadrennial Defense Review (QDR) and assess alternative forces structure for the U.S. military through 2010, concluded that China has the capability to be a more significant nuclear power by 2010-2020.” One of the considerations the panel highlighted as “critical” to shaping future U.S. nuclear policy was “possible shifts in China’s nuclear policy.”⁴⁶³

Rather than wait for these concerns to materialize, the language in PDD-60 was vague enough to permit STRATCOM to formally bring China back into SIOP planning with the completion of SIOP-99 in October 1998. As a result, a couple of LAOs, each involving a handful of Trident and bomber weapons, were available to the president to attack Chinese nuclear targets, critical industries and leadership. In addition to these LAOs in the SIOP (which has since been renamed OPLAN 8044), dozens of non-SIOP targets in China may be assigned to SSBNs and bombers in the Strategic Reserve Force.⁴⁶⁴

One of STRATCOM's first efforts was an attempt to create the Chinese Integrated Strategic Operations Plan (CHISOP), a computer simulation that used available intelligence information about Chinese nuclear weapon systems, strategy and policy to design a hypothetical war plan for how China might use its nuclear weapons in various situations. STRATCOM used CHISOP in "war games" to measure the effectiveness of U.S. nuclear strike plans against China. For many years a similar hypothetical war plan existed for the Soviet Union called the RISOP (Red Integrated Strategic Operations Plan). Due to changes in strategic planning, however, CHISOP was not finished and RISOP was cancelled in 2005.

The Nuclear Non-Targeting Agreement

The return of China to SIOP planning, curiously, coincided with the completion of a U.S.-Chinese agreement in June 1998 not to target nuclear missiles at each other. Beijing had wanted the non-targeting agreement as part of an agreement on no-first-use of nuclear weapons, but shortly before the non-targeting agreement was signed, National Security Advisor Samuel Berger publicly rejected a no-first-use deal and explained how Washington viewed the agreement:

On the issue of detargeting, ... the Chinese traditionally have linked that issue to our unwillingness to accept a doctrine of no-first-use of nuclear weapons. That is not something that we're prepared to do. And we continue to discuss this with them I think such an agreement would be useful in two respects. Number one, it would be a commitment by the Chinese to us that they would not target our cities and, therefore, would preclude the danger of an accidental launch, which is not insubstantial. There was a time when entire movies were based on swans going across radar screens. And second of all, I think it would be an important statement

about – a confidence-building measure and a statement about the evolution of our relationship since adversaries point their missiles against each other and not countries that are working to build a better relationship.”⁴⁶⁵

Shortly before the non-targeting deal was closed, the *Washington Times* – true to its normal style – reported that a “top secret” CIA document sent to top policy-makers in advance of Secretary of State Madeleine K. Albright’s visit to Beijing concluded that China’s 13 DF-5 missiles were “aimed” at the United States.⁴⁶⁶ Presumably intended to show that the Chinese couldn’t be trusted, the leak failed to derail the agreement. The ink was barely dry on the agreement, however, before the *Washington Times* followed up with another article quoting anonymous intelligence officials at the Pentagon saying that China had produced six more DF-5 missiles and would add two more missiles before the end of the year. “The production of eight new ICBMs represents a dramatic increase in the number of long-range missiles in China’s arsenal,” one official told the *Times*. “This is missile production far beyond anything we have seen from the Chinese in recent years.”⁴⁶⁷

Neither the *Washington Times* nor Berger mentioned that the DF-5s – unlike the dozens of forward-deployed Trident missile in the Pacific – were deployed without their nuclear warheads installed. So the agreement did not change the part of China’s posture most directly affecting the United States. Nor did it result in any changes on the part of the United States, which had already adjusted its missiles four years earlier when a similar deal was reached with Russia, according to the Pentagon:

Q: ... With regard to the detargeting arrangement that was announced a week ago by the president ... is [sic] the United States nuclear forces, especially the missile forces, are they currently de-targeted completely and would it be necessary for the U.S. to do anything at all to meet the detargeting agreement with the Chinese?

A: Our forces have been detargeted since 1994. They have not been aimed at any country. That was the – we detargeted our forces after our agreement with the Russians in 1994.⁴⁶⁸

For this reason, the deal with China was called a “non-targeting” agreement rather than a “detargeting” agreement.⁴⁶⁹ Regardless of the name used, the U.S. non-targeting was “entirely cosmetic and symbolic,” according to former

Minuteman III launch control officer Bruce Blair. In testimony before the House Subcommittee on Military Research and Development in 1997, Blair explained that the agreement did not result in the removal of “wartime aim points from [the] missiles portfolios of preprogrammed targets,” nor did it lengthen the amount of time needed to initiate a nuclear strike.⁴⁷⁰ In an op-ed in the *Washington Post*, Blair further explained:

[T]he United States sets its missiles on a trajectory that ends in the ocean, while preserving, just as the Russians did, the previous wartime aim points in the missiles’ memory banks. A few strokes on a computer keyboard are all it would take for launch officers to redirect the missiles to their wartime targets. Time required to retarget the entire U.S. missile force for Russian destinations: 10 seconds.⁴⁷¹

Current Nuclear Planning Against China

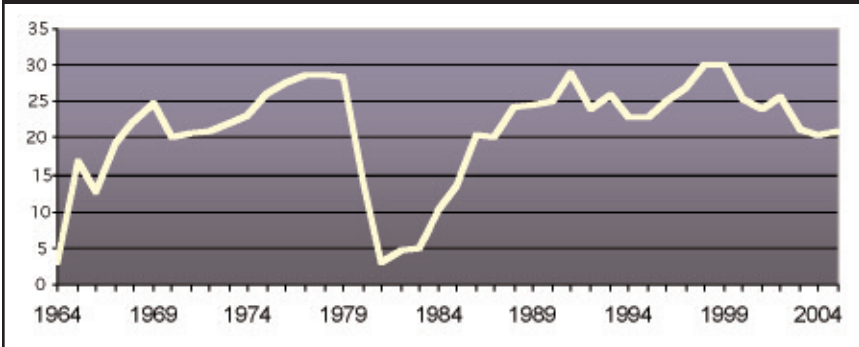
Current U.S. nuclear planning against China builds on the experience and assumptions from the history described above, but also introduces important new elements. Unlike Russia, according to the 2001 Nuclear Posture Review, “China is a country that could be involved in an immediate or potential contingency.”⁴⁷²

Day-to-day targeting against Chinese targets is mainly the responsibility of the SSBNs on patrol in the Pacific. Bombers with cruise missiles and bombs also are assigned targets in China, but are not forward-deployed with their nuclear weapons. Two (of eight) submarines are thought to be on so-called Hard Alert at any given time in the Pacific, with others in transit to and from their patrol areas, participating in exercises, or at their homeport in Bangor, Washington. The missiles on the two alert submarines are within range of their targets and ready for launch with short notice. The warheads on the other SSBNs are part of the Strategic Reserve Force (along with bomber warheads).

Between 1964 and 2005, U.S. SSBNs conducted approximately 860 deterrent patrols in the Pacific Ocean, corresponding to an average of 19 patrols per year (see Figure 81). There has been considerable fluctuation in the number, however, ranging from three in 1981 to a peak of 30 patrols in 1998 and 1999. The low number was due to the retirement of the Polaris submarines in 1980, and the peaks followed the completion of the Trident force in the Pacific. The conversion of four SSBNs to cruise missiles and special forces submarines (SSGNs) and the conversion of four others from Trident C4 to Trident D5 SLBM capability

caused a decrease in the number of patrols between 2000 and 2005 to about 20 per year. The rate has once again increased because of the transfer of SSBNs from the Atlantic to the Pacific and completion of two of the four D5 upgrades. By 2008, the annual number of SSBN patrols in the Pacific should increase to approximately 27.

Figure 81:
U.S. Pacific SSBN Deterrent Patrols 1964-2005

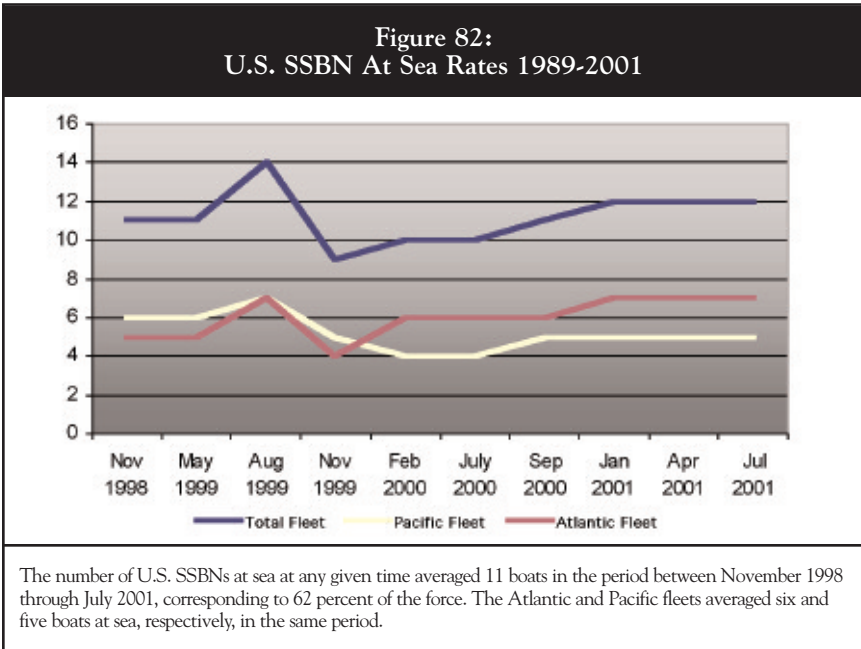


U.S. ballistic missile submarines conducted more than 860 nuclear deterrent patrols in the Pacific Ocean between 1964 and 2005, or an average of 19 patrols per year.

The total number of Pacific patrols is far less than the number of Atlantic patrols (some 860 versus 2,800) because most SSBNs have historically been deployed in the Atlantic to be able to target the Soviet Union and defend NATO. With the dissolution of the Soviet Union, the collapse of the Warsaw Pact, and the retirement of all Poseidon submarines, the annual number of Atlantic SSBN patrols plummeted from 79 in 1990 to 16 in 1991. As mentioned above, after 2004 the number of patrols has increased in the Pacific, and dropped in the Atlantic due to the transfer of five SSBNs from the Atlantic to the Pacific. As the D5 upgrade is completed in the Pacific, most of future SSBN patrols likely will be conducted in the Pacific.

Estimates of the number of SSBNs at sea at any given time fluctuate considerably depending upon the source. Former Commander-in-Chief of STRATCOM, General Eugene E. Habiger, wrote in late 1996 that “eight boats usually [are] at sea”⁴⁷³ in both oceans. Data published by the Office of Chief of Naval Operations (CNO) in 10 issues of *Undersea Warfare* between November 1998 and July 2001⁴⁷⁴ showed an average of 11 SSBNs at-sea during that period (approximately

62 percent of the total force). This data also revealed some fluctuations in the number of SSBNs at sea any given time, ranging from 14 (nearly 78 percent) to as low as nine boats (50 percent of the fleet) (see Figure 82).



The at-sea rates in the Atlantic and Pacific SSBN fleets for the same period differed slightly. In the Atlantic an average of six of 10 SSBNs were at sea at any given time, or 60 percent. In the Pacific, the submarines were able to generate a slightly higher at sea rate of 65 percent, with an average of five SSBNs being at sea at any given time.

These fluctuations are significant because the Navy often equates the at-sea rate with the time each SSBN is on station. The charts used by the Chief of Naval Operations (CNO) in *Undersea Warfare* to depict the “forward presence” of SSBNs, for example, include all the submarines at sea. The CNO also used this equation of at-sea days with on-station time when describing the completion of the 500th deterrent patrol of the Trident program in April 1998, saying “this equates to over 105 years of on-station strategic deterrent for the entire Trident fleet” with an “average patrol length of 77 days.”⁴⁷⁵ In other words, while strategic submarines of previous classes had to transit for several days to get to their patrol area within range of assigned targets, Ohio-class submarines are considered on-station and available for some missions essentially as soon as they leave port.⁴⁷⁶

Rather than indicate significant changes in the target coverage of at-sea SSBNs (five SSBNs now carry an estimated 720 warheads), the fluctuations instead reflect that only a portion of the SSBNs at sea at any given time are needed on station to provide continuous coverage of specific target packages in the war plans. At least four (two to three in each ocean) of the submarines at sea normally are maintained on 15-minute launch readiness (Hard Alert).⁴⁷⁷ An exercise conducted in the Pacific on June 4, 1991, for example, included three alert SSBNs.⁴⁷⁸ The SSBNs that are at sea but not on Hard Alert are maintained on what is called modified alerts, which allows the submarines to participate in other operations such as exercises with other naval forces.

According to Captain William Norris, the former chief of the Joint Staff's Nuclear Policy Branch (J5), "the daily at sea total in today's [1997] nominal patrol cycle varies between about 570 and 650" warheads,⁴⁷⁹ corresponding to three to four submarines each loaded with 24 missiles with eight warheads. With 10 SSBNs at sea as of February 2000, the implication is that although 70 percent of the submarines at sea at the time were on station, this amounted to less than 40 percent of the total SSBN force. Yet this is still a higher on station ratio than estimates normally offered by unclassified sources.⁴⁸⁰

The at-sea data released by the Department of Defense for the period 1998-2000 also reveals significant differences in the performance of the submarine fleets on each coast. While there were more strategic submarines home-ported on the Atlantic Coast compared with the Pacific at the time (10 versus eight), the data shows that the Pacific fleet based at Bangor, Washington, typically managed to keep at least 20 percent more of its submarines at sea than the fleet at Kings Bay, Georgia. At one point, in November 1999, Kings Bay only had four (40 percent) of its 10 SSBNs at sea. Only in February 2000, as the number of Trident boats increased, did King's Bay surpass Bangor in the number of submarines at sea (see Figure 82).

After the completion of the Nuclear Posture Review in December 2001, the Navy began to move more SSBNs into the Pacific to increase the nuclear forces available for targeting China. This process began in 2002 when the USS *Pennsylvania* (SSBN-735) and USS *Kentucky* (SSBN-737) were moved from Kings Bay to Bangor. USS *Nebraska* (SSBN-739) followed in 2004, and USS *Maine* (SSBN-741) and USS *Louisiana* (SSBN-743) transferred in 2005. This shift brought the number of SSBNs based in Bangor to nine with only five remaining in Kings Bay, although the Navy announced in July 2006 that USS *Alaska* (SSBN-732) would transfer to Kings Bay for a refueling overhaul at Norfolk Naval Shipyard.⁴⁸¹

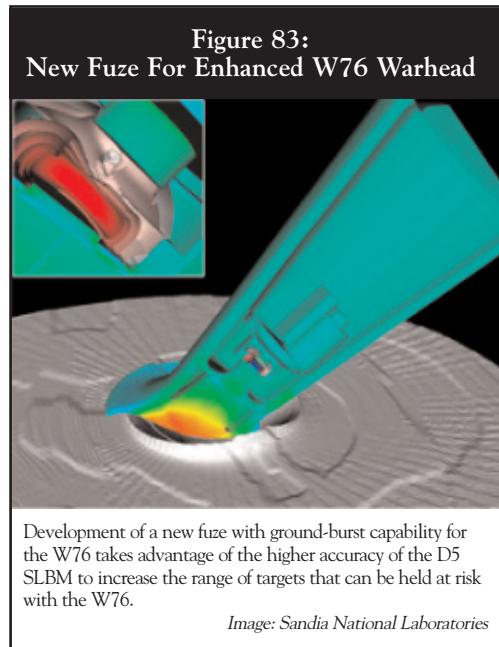
Recent Upgrades to Weapons and Plans

Pacific-based SSBNs have begun an upgrade from the Trident I C4 to the newer and more accurate Trident II D5 SLBM. This modernization will have considerable implications for targeting of China and others because it “enhances system accuracy, payload and hard target capability, thus improving our available responses to existing and emerging Pacific theater threats,” according to the U.S. Navy.⁴⁸² Some of the Trident II D5s carry the W88 warhead, which with a yield of 455 kt is the most powerful ballistic missile warhead in the U.S. arsenal.

The D5 equipped with the W88 is capable of holding the full range of targets at risk.

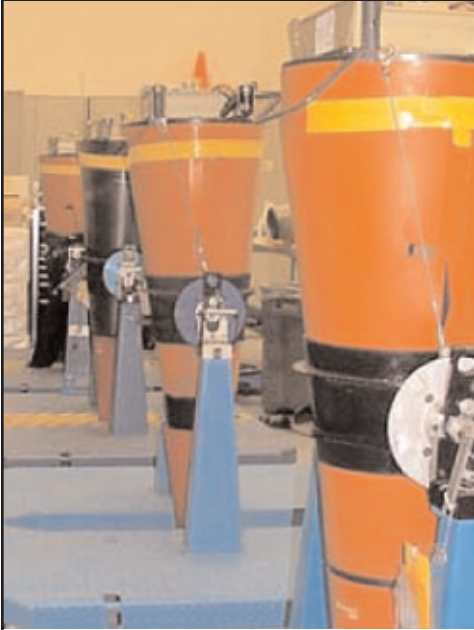
The United States has also begun an upgrade of the W76, the other warhead carried on the Trident II D5. This is the most numerous warhead in the U.S. stockpile, and most of the warheads aimed at Chinese targets in the future likely will be W76s. With a yield of 100 kt, the W76 deployed on earlier Trident II C4 could not hold hardened targets at risk, but was intended to be used in an airburst delivery mode against soft and area targets. Nine months after Presidential Decision Directive (PDD) 60 was signed in November 1997, however, the joint DOD-DOE Nuclear Weapons Council in August 1998 authorized a Phase 6.2/2A study to upgrade the W76.

While formally known as a Life Extension Program, the W76 upgrade includes significant improvements to both the Mk4 reentry vehicle and the W76 warhead package. One of the most important improvements is a new fuze with more options (including ground burst) to give the warhead a capability against a wider range of targets (Figure 83). The official purpose of the new fuze is to “enable W76 to take advantage of [the] higher accuracy of the D5 missile.”⁴⁸³ The upgraded weapon is so different that it has been given a new designation: W76-1/Mk4A (Figure 84).



Warhead design options were complete in February 2000, and the following month the Nuclear Weapons Council approved the Block 1 refurbish plan for the W76 involving about one-quarter of all W76 warheads (800).

Figure 84:
New Modification of W76 Warhead



The first four new W76-1/Mk4A reentry vehicles with a new ground-burst fuze are displayed at Sandia National Laboratory. The modernization will increase the types of targets that can be held at risk with the W76.

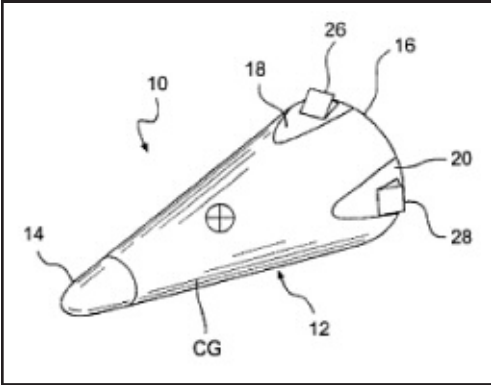
Image: Sandia National Laboratories

On November 10, 2004, the nuclear-powered ballistic missile submarine USS Nevada (SSBN-733) launched two Trident II D5 missiles from the waters off Southern California equipped with four W76-1/Mk4A dummy reentry vehicles. This was the first development test of the new fuze. The four reentry vehicles impacted on Kwajalein Atoll in the Pacific Ocean, marking the return of SLBM flight testing to the Pacific after a hiatus of 11 years. The third and final development flight test is scheduled for November or December 2006 coinciding with delivery of the First Production Unit W76-1 in September 2007. Completion of the Block 1 program is scheduled for 2012.

An “accuracy adjunct” also has been developed for the W76-1/Mk4A, designed to give the reentry vehicle Geo-Positioning System (GPS)-like accuracy. A full-scale flight test of the “three-axis flap system,” which enables the reentry vehicles to make course adjustments during reentry, was test-flown on a D5 launched from the USS Tennessee (SSBN-734) on March 1, 2005. A top Navy official involved in the test told us: “I had GPS signal all the way down and could steer it.”⁴⁸⁴

Although developed for the W76-1/Mk4A, the accuracy adjunct also is part of an effort to deploy conventional warheads on SLBMs. Yet if the accuracy adjunct is combined with the new fuze on the more accurate D5 missiles being

Figure 85:
W76-1/Mk4A Accuracy Adjunct



Three-axis flap system designed for and test flown on the enhanced W76-1/Mk4A reentry vehicle is intended to provide "GPS-like" accuracy to the SLBM warhead.

Image: Lockheed Martin

deployed in the Pacific, it will significantly enhance the capability of the already lethal strategic submarine force against Chinese targets in a potential war.

Finally, in May 2006, it was reported that the Pentagon has put a new war plan in effect for defending Taiwan against a Chinese attack. The new plan, known as Pacific Command OPLAN 5077-04, reportedly includes maritime interception operations in the Taiwan Straits, attacks on Chinese targets on

the mainland, information warfare and "non-kinetic" (cyber-attack) options, even the potential use of U.S. nuclear weapons.⁴⁸⁵

Simulated U.S. and Chinese Nuclear Strikes

The analysis of the numbers, characteristics and deployment of the strategic nuclear forces of China and the United States presented in this study raises the question of what would be the consequences if these forces were ever used. A nuclear exchange between the United States and China is clearly a remote possibility – a situation would have to arise that exceeded any crisis of the Cold War. Ironically, success of a nuclear deterrent strategy is measured by the fact that weapons are never used in the first place. Nevertheless, the nuclear capabilities of China and the United States are assessed by their respective political and military leadership in part by the measures of targeting and how effectively targets are destroyed. This chapter explores the consequences of two nuclear strike scenarios: An attack by U.S. submarine-launched ballistic missiles on China's long-range ICBMs (DF-5A/CSS-4 Mod 2), and a strike by Chinese forces on cities in the continental United States.

Even a rough comparison of the nuclear forces of China and the United States raises basic questions about their deterrent relationship, as the United States currently possesses overwhelming nuclear superiority. The United States has in excess of 2,000 warheads capable of hitting China on short notice. A small percentage of the U.S. arsenal could be targeted against all Chinese strategic nuclear systems, Command and Control (C2) sites and major conventional military assets. Although not thought to be part of the current U.S. war plans, an even smaller percentage of the U.S. strategic nuclear arsenal could be targeted against Chinese cities to cause massive civilian and industrial damage.

China deploys an estimated 20 ICBMs capable of targeting U.S. cities. In the future, the U.S. National Missile Defense system may undermine China's nuclear deterrent against the United States. Given the imbalance of forces, how effective would a first strike be against China's long-range ICBMs, and what

would be the effects on Chinese civilians and the environment? Some have argued that “the United States [today] stands on the verge of attaining nuclear primacy” and “could conceivably disarm the long-range nuclear arsenals of Russia or China with a nuclear first strike.”⁴⁸⁶ But our realistic calculations of what effects would occur if only a few Chinese ICBM warheads survived indicate that the United States would need to have complete confidence that a preemptive strike had managed to destroy all of China’s long-range missiles.

Calculating the Effects of Nuclear Weapons

In order to quantitatively explore these scenarios in greater depth, we utilized a combination of Geographical Information System (GIS) software, including GoogleEarth and the U.S. government computer code, Hazard Prediction Assessment Capability (HPAC versions 3.2.1 and 4.04).⁴⁸⁷ Scenarios that can be simulated using HPAC include the use of a radiological, biological, chemical or nuclear weapon, accidents involving such weapons, and accidental releases at WMD facilities. For this study we utilized the component models of HPAC that calculate the effects of nuclear explosions and are based on legacy code developed during the Cold War. Casualties are calculated in HPAC using the LandScan world population database developed by the U.S. Oak Ridge National Laboratory.⁴⁸⁸

HPAC version 4.04, the Nuclear Weapons Special Edition (NWPNSE) model calculates the effects of a single nuclear explosion, for example, terrorists using a nuclear device in an urban setting. Interestingly, at least one previous version of HPAC (version 3.2.1) had a nuclear weapons model that was compatible with DOD nuclear targeting software. The parameters of a nuclear strike – including the latitude and longitude of the ground zero, weapon yield, height-of-burst and fission fraction – could be read from a “strike file” to calculate the combined effects of as many as 8,000 nuclear detonations. Figure 86 displays an example of a STRATCOM-formatted strike file provided as a sample file in the HPAC help documentation. The coordinates of the ground zeros are listed in the first column – actual ICBM silos in Russia.⁴⁸⁹

**Figure 86:
STRATCOM-Formatted Nuclear Strike File For HPAC**

R8562340N0373900E	1000.0	600	400	99	W1	V01	20000UN0180101
R8561740N0373400E	900.0	500	400	99	W1	V21	20000UN2182121
R8561840N0374700E	800.0	400	300	99	W1	V01	20000UN0180101
R8561240N0374100E	700.0	300	300	99	W1	V21	20000UN2182121
R8561420N0382030E	600.0	200	200	99	W1	V01	20000UN0180101
R8561420N0382630E	500.0	100	200	99	W1	V01	20000UN0180101
R8561420N0383400E	400.0	200	200	99	W1	V01	20000UN0180101
R8561420N0383830E	300.0	300	300	99	W1	V01	20000UN0180101

A STRATCOM-formatted nuclear strike file for input to HPAC. The columns of numbers refer to the coordinates of the target, nuclear explosive yield, height-of-burst and other weapon and target parameters.

We created sets of such strike files for the scenarios modeled in this chapter to more efficiently track various parameters. For example, one key variable for fall-out calculations are the prevailing winds at elevations from ground level to the top of the initial “mushroom cloud.” HPAC provides both historical weather data and the capability to access real-time meteorological data and forecasts from both classified and unclassified DOD servers.

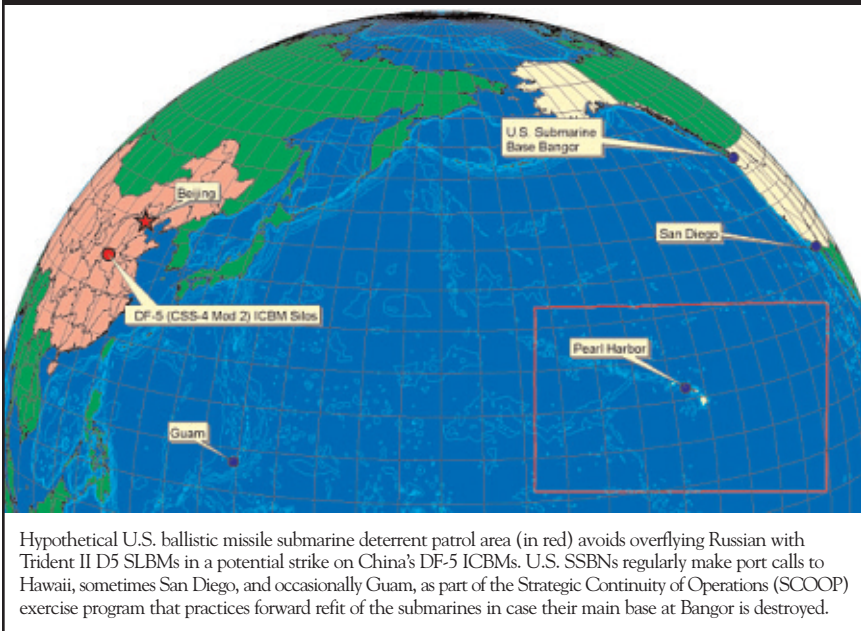
Scenario One: U.S. Nuclear Strike Against Chinese Long-Range ICBMs

In the first hypothetical nuclear attack scenario, U.S. ballistic missile submarines stationed in the Pacific Ocean fire Trident II D5 submarine launched ballistic missiles (SLBMs) at Chinese DF-5A missile silos. As discussed above the U.S. Trident force has evolved to become the main element in U.S. nuclear war plans against China. U.S. long-range bombers based in the Pacific region or flown from the United States would require a relatively long time to reach their targets and would have to penetrate China’s airspace. The U.S. ICBM force, based in silos in the upper Midwest, would have to over-fly Russia and risk triggering the remnants of the Soviet early-warning system, or worse. Since the end of the Cold War, U.S. nuclear forces have been shifted to the Pacific in the form of additional Trident SSBNs based at the Submarine Base at Bangor, Washington. For these reasons we developed a scenario involving a Trident strike against the DF-5A, the sole Chinese nuclear weapon system capable of hitting the continental United States (CONUS) and China’s primary deterrent against the United States.

U.S. Trident SSBNs based at the Naval Submarine Base Bangor in Washington deterrent patrols in the Pacific Ocean, and cover targets in China and in the Russian Siberian and Far East regions. The missiles on two submarines on Hard Alert are within range of their targets and ready for launch with short notice (on 15-minute launch readiness). Each submarine is loaded with 24 missiles with up to six warheads each for a total of as many as 288 warheads on patrol at a given time. Additional deployed submarines could be placed on Hard Alert within relatively short time.

For this scenario we have chosen a hypothetical deployment area for U.S. ballistic missile submarines, as the actual deployment areas of these boats are classified. We chose the hypothetical deployment area to surround the island of Hawaii. Figure 87 shows a map of the bathymetry of the Pacific Ocean (light blue lines) overlaid with the hypothetical deterrent patrol area shown in red. This hypothetical deterrent patrol area measures 386,100 square miles (1 million square km) and the center of the patrol area is approximately 1,860 miles (3,000 km) from the vessels' homeport at Naval Submarine Base Bangor.

Figure 87:
Hypothetical U.S. SSBN Deterrent Patrol Area in Pacific



The targets for these nuclear submarines include the DF-5A ICBM silo launch area at Lunong (in China's Henan Province). The Luoning DF-5A launch

group is reportedly “buried deep in the mountains 150 miles (240 km) east of Xian ... near the town of Luoning.”⁴⁹⁰ These targets are approximately 4,350 miles (7,000 km) from the hypothetical U.S. SSBN deployment area and Trident II D5 launch site. The time-of-flight of the U.S. Trident SLBMs to the Chinese targets would be therefore be about 30 minutes.⁴⁹¹

Unfortunately we have not yet positively identified Chinese silo locations based on the available GoogleEarth high-resolution imagery or additional QuickBird imagery purchased from DigitalGlobe for this project. Above-ground structures associated with an ICBM silo may not be readily apparent even at the resolution offered by the QuickBird satellite. For example, Figure 88 shows a GoogleEarth-hosted QuickBird image of a U.S. and Russian ICBM silo, where the location was previously published in the START data exchange.

In order to construct specific silo target locations for a U.S. hypothetical nuclear attack scenario against the Chinese DF-5 force, we used satellite imagery data from GoogleEarth combined with map data from the Operational Navigation Chart (ONC) map series published by the U.S. Geological Survey (USGS) National Imagery and Mapping Agency (NIMA). Figure 89 displays a map of 20 hypothetical silo target locations overlaid on a GoogleEarth background, consisting of NaturalVue (a 49-foot (15-meter) resolution Landsat composite) and a swath of QuickBird imagery 2.3-foot (0.7-meter) resolution). The hypothetical Chinese silo targets at Luoning were selected with a separation distance of approximately 6.2 miles (10 km), consistent with the separation distance of U.S. and Soviet-built ICBM silos presumably to preclude the possibility of one attacking warhead damaging more than one target silo.

A fundamental parameter of a nuclear strike scenario is the height-of-burst (HOB) of the attacking warheads. The HOB, along with the nuclear warhead yield and accuracy, determines the probability of achieving a certain level of damage to a target, referred to as the “kill probability” or “PK.” It is known that the ICBM silos in the United States and Russia have been engineered to withstand a certain amount of damage from nuclear attacks. Indeed, for the most modern, hardened Russian ICBM silos the target must effectively lie in the crater created by the nuclear explosion to achieve a high kill probability. In general, to destroy a hardened silo it is necessary to attack with an accurate, high-yield nuclear weapon detonated on the ground.

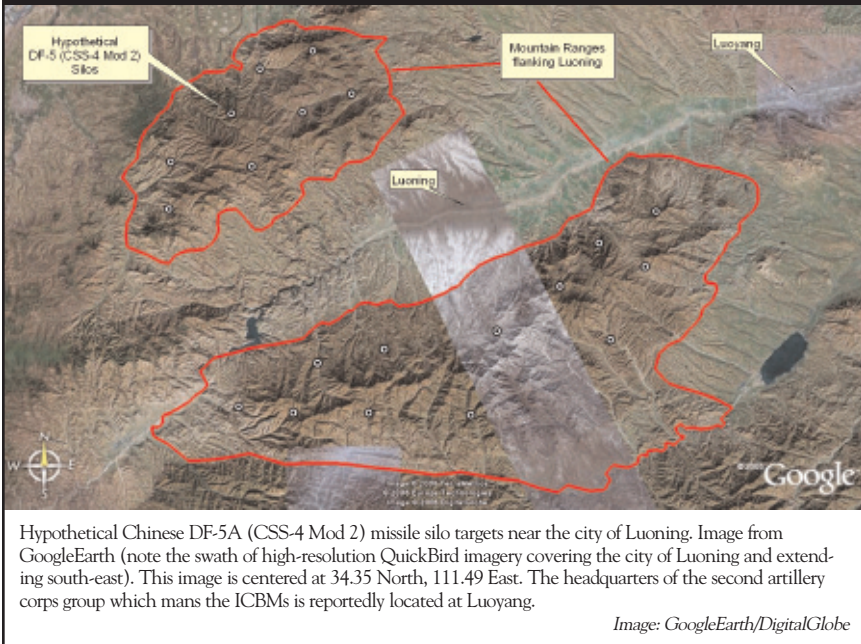
Figure 88:
Satellite Images of U.S. and Russian ICBM Silos



U.S. and Russian ICBM silos as seen in QuickBird high-resolution satellite imagery provided by GoogleEarth. The upper figure Minuteman III ICBM Silo #E-11 in McLean County, North Dakota associated with 91st Space Wing at Minot. The lower figure is SS-19 Launch Group #4, Silo #8 at the Kosel'sk missile field located approximately 155 miles (250 km) south-west of Moscow. The United States and Russia provided each other ICBM silo coordinates and other data as part of START I.

Images: GoogleEarth/DigitalGlobe

Figure 89:
Hypothetical DF-5A Silo Targets



In a 2001 report, NRDC used the Pentagon's own methodology to calculate the probability of achieving severe damage to Russian ICBM silos in strikes by U.S. attacking warheads.⁴⁹² The report found that both ground bursts and multiple strikes were necessary to achieve a high probability of destroying the newest hardened Russian silos with W88 or W76 warheads. We do not know the hardness of Chinese DF-5A silos, but given their design and construction in the late 1970s and 1980s, we assume that Chinese silos are hardened to at least the extent of first or second generation Russian ICBM silos.

The HOB of a nuclear detonation also is an important factor determining the intensity and extent of fallout. If a nuclear explosion occurs above a certain altitude – and the resulting fireball is well above the surface of the Earth – then the radioactive debris from the explosion is in the form of very light particles that are lofted high into the atmosphere, circulate around the hemisphere in which the explosion takes place, and return to the Earth days or weeks later much weaker and diluted. If the nuclear fireball touches the Earth's surface then the radioactive debris from the explosion mixes with material gouged from the ground and the resulting heavier radioactive particles are deposited in the region of the explosion.⁴⁹³ For a

455 kt nuclear explosion (the yield of the U.S. W88 warhead) the threshold for fallout is a HOB of 2,116 feet (645 meters), and for a 100 kiloton nuclear explosion (the yield of the U.S. W76 warhead) the threshold for fallout is 1,135 feet (346 meters).⁴⁹⁴ These HOB thresholds are much higher than required to severely damage known ICBM silos, so our scenario assumes ground bursts in the nuclear strikes.

Our base case for this hypothetical scenario examines the consequences of 20 W88 warheads (each W88 warhead has a yield of 455 kt) striking the hypothetical DF-5A silo targets as ground bursts. We examined additional cases that looked at variations in the number of attacking W88 warheads and the use of lower-yield (100 kt) W76 warheads.

We begin to examine the results of the HPAC calculations with the first case: 20 Trident W88 warheads attacking 20 DF-5A silos. As noted above, the selection of ground bursts maximizes the extent of fallout. We sampled historical weather data for the region around Luoning for each month of the year, and found that the prevailing winds blow the fallout east-south-east of the silo target locations. It should be noted we did not include elevation data in these calculations. For lower-yield weapons this approximation would have a significant effect on the fallout pattern in a mountainous region (the radioactivity could be contained by mountains in the path of the drifting fallout cloud). However, for a warhead yield of 455 kt the height of the “mushroom cloud” reaches approximately 39,370 feet (12,000 meters), and for a warhead yield of 100 kt the cloud height is calculated to be 29,530 feet (9,000 meters).⁴⁹⁵ According to GoogleEarth’s elevation data the height of the mountains flanking the city of Luoning only reaches approximately 5,900 feet (1,800 meters).

The effects of a nuclear explosion are commonly divided into “prompt” effects and fallout. The prompt effects are the blast wave (including high winds), thermal (heat) radiation, and the initial radiation, which is a burst of neutrons and gamma rays occurring within the first minute after the nuclear explosion. Fallout may continue as long as 24 hours after the nuclear explosion and potentially cover a much larger area than impacted by the prompt effects. In HPAC, casualties are calculated separately for prompt nuclear weapons effects and for fallout, and under separate input assumptions that people exposed to the nuclear weapons effects are either inside building structures (sheltered) or out in the open. In general, casualty estimates from prompt nuclear effects are slightly higher for people in structures and casualty estimates from fallout are much higher for people out in the open. These trends are reflected in the current calculation.

Roughly 100,000 casualties from prompt nuclear effects are estimated for nearby populations – 6.2 to 12.4 miles (10 to 20 km) from the target silos. For people out in the open at the time of the attack, and estimated 75 percent of the casualties would be fatalities, while for people in building structures at the time of the attack, 40 percent of casualties would be fatalities. HPAC's estimate of prompt casualties clearly relies on the rough assessment of the region's population in LandScan – the zone within 6.2 to 12.4 miles (10-20 km) of the hypothetical silo locations does not include any major towns as viewed in GoogleEarth.

However, the most widespread result of the attack would be fallout. The extent of the fallout pattern is determined by the quantity of radioactive material produced in the explosion and the prevailing wind speed and direction for elevations reached by the initial fallout cloud. For all HPAC cases run, we found that the historical data on prevailing winds in the region blew fallout in an easterly-south-easterly direction. For the months of March and February, we found that higher-speed winds created a longer, narrower fallout pattern, and for other months crosswinds widened and shortened the fallout pattern. Given that a crisis leading to a nuclear strike on these Chinese targets could occur in principle at any time, either fallout pattern could be relevant to a casualty analysis.

With respect to the accuracy of the fallout calculation, the zones of more intense fallout are more accurately reproduced with fallout codes by comparing them with measured fallout patterns from the U.S. and British above-ground nuclear testing program. This is in part because the zones of more intense fallout occur closer to the ground zero sooner after the nuclear explosion – involving less spatial and temporal variations in the prevailing winds and modeling the behavior of relatively heavier fallout particles.

Table 18 lists the health effects for a given radiation exposure (REM). The output of the HPAC calculations used in the study integrated the dose to people over the first 48 hours after the strike. Much of the radiation dose to survivors would occur in this time period, as the intensity of the fallout radiation drops to one percent of its initial value after two days (of course for the most intense zones of fallout – more than 100 times the threshold for health effects – continued exposure would be dangerous). Long-term effects of fallout include contamination of the environment and agriculture, displacement of refugees – many of whom would require medical attention and access to uncontaminated food and water, and the concentration of fallout in “hot spots” over time from precipitation, as occurred in the Chernobyl accident.

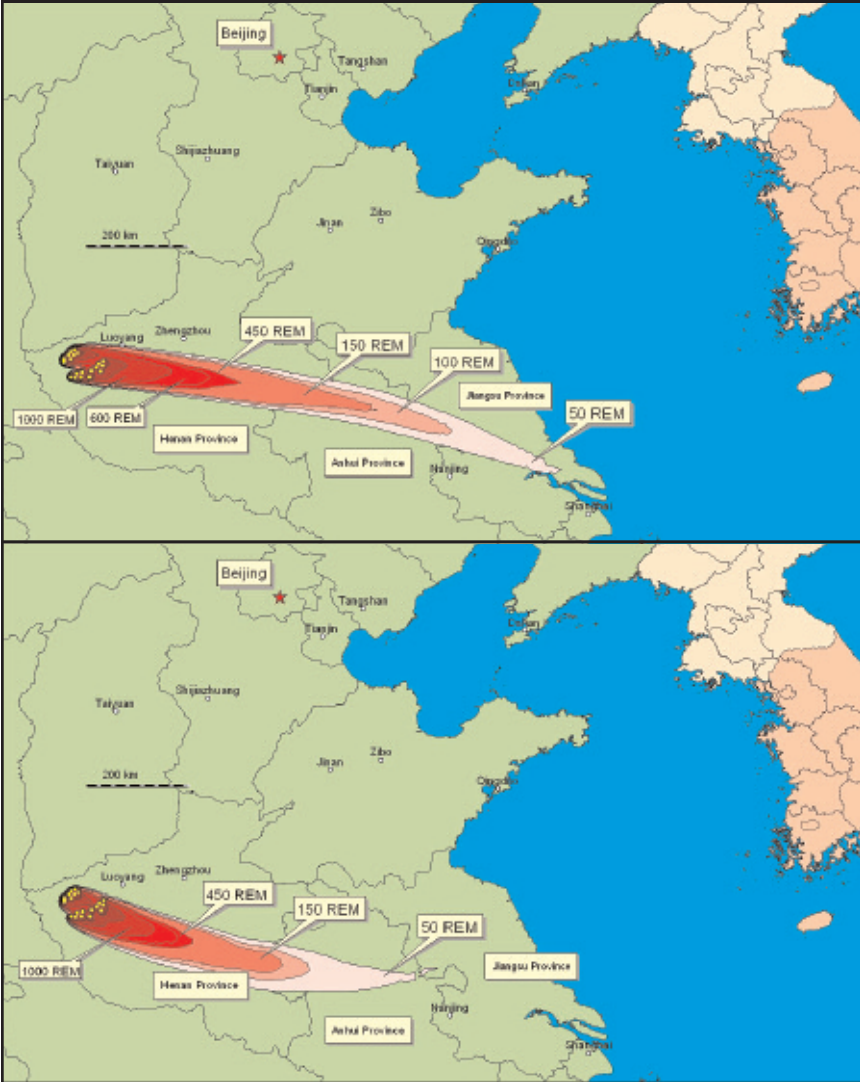
**Table 18:
Effects of Radiation⁴⁹⁶**

Dose range (REM free air)	Onset & duration of initial symptoms	Medical care & disposition
0 – 70	6 - 12 hr; none to slight transient headache, nausea; vomiting in 5% at upper end of dose range.	No medical care, return to duty.
70 – 150	2 - 20 hr; transient mild nausea and vomiting in 5 - 30%.	No medical care, return to duty.
150 – 300	2 hr - 3 days: transient to moderate nausea and vomiting in 20-70%; mild to moderate fatigability and weakness in 25 - 60%.	3 - 5 wk: medical care for 10 - 50%. High end of range death in > 10%. Survivors return to duty.
300 - 530	2 hr - 3 days: transient nausea & vomiting in 50 - 90%; moderate fatigability in 50 - 90%.	2 - 5 wk: medical care for 10 - 80%. Low end of range < 10% deaths; high end death > 50%. Survivors return to duty.
530 - 830	2 hr - 2 days: moderate to severe nausea & vomiting in 80 - 100%. 2 hr - 6 wk: moderate to severe fatigability and weakness in 90 - 100%.	10 days - 5 wk: medical care for 50 - 100%. Low end of range death > 50% at 6 wk. High end death for 99%.
830 - 3000	30 min - 2 days: severe nausea, vomiting, fatigability, weakness, dizziness, disorientation; moderate to severe fluid imbalance, headache.	1000 REM: 4 - 6 days medical care for 100%; 100% deaths at 2 - 3 wk. 3000 REM: 3 - 4 days medical care for 100%; 100% death at 5 - 10 days.
3000 – 8000	30 min - 5 days: severe nausea, vomiting, fatigability, weakness, dizziness, disorientation, fluid imbalance, headache.	4500 REM: 6hr to 1 - 2 days; medical care for 100%; 100% deaths at 2 - 3 days.
over 8000	30 min - 1 day: severe prolonged nausea, vomiting, fatigability, weakness, dizziness, disorientation, fluid imbalance, headache.	8000 REM: medical care immediate - 1 day; 100% deaths at 1 day.

In the case of 20 W88 warheads detonating on the Luoning ICBM silos, we found that the combined fallout patterns would create hazardous conditions reaching over 620 miles (1,000 km) from ground zero. Fallout zones where the 48-hour dose to exposed people exceeds 150 REM would cover 12,360 to 21,620 square miles (32,000 to 56,000 km²). In those zones, survivors would experience severe radiation sickness from hours to days after the explosion, or death. This land mass exceeds the area of the states of Massachusetts and Connecticut. The fallout zone for a 48-hour exposure exceeding 450 REM (death 50 percent likely) cover 6,950 to 14,670 square miles (18,000 to 38,000 km²), and the most intense zone of fallout exceeding 600 REM (death likely) would cover an area of 4,633 to 5,405 square miles (12,000 to 14,000 km²). The two types of fallout patterns (June and December or all other months of the year) calculated for the 20 W88 are shown in Figure 90.

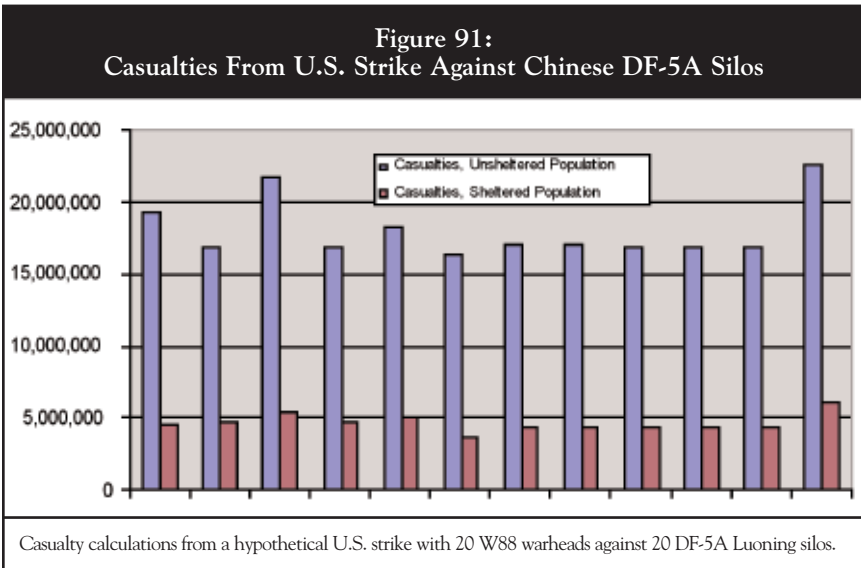
The calculated numbers of casualties depends strongly on whether people downwind of the nuclear explosions are sheltered for the first 48 hours after the attack

Figure 90:
Fallout Patters For Hypothetical U.S. Strike On Chinese DF-5A Silos



Calculated fallout patterns from the 20 W88 warhead strike on the DF-5A (CSS-4 Mod 2) silos at Luoyang for winds typical of December (above) and June (below). Note: The precise locations of Chinese DF-5A silos are not known.

or are out in the open. The average dose received is likely to be some averaging of the two estimates, as survivors move to other areas. A smaller variation in the number of calculated casualties results from monthly changes in the average prevailing winds. We found that winds typical of the months of March and December more efficiently dispersed the fallout from the nuclear strike. Figure 91 plots the calculated casualties as a function of month of the year and sheltering. The average number of casualties under the assumption of no sheltering would be 18 million, and the average number of casualties – assuming all people were sheltered in structures – would be 4.7 million. Thus because the strike occurs in a sparsely populated area, more than 98 percent of expected casualties would arise from fallout instead of the prompt nuclear effects of blast, thermal radiation and initial radiation. For unsheltered people, we found that two-thirds of the casualties would be fatalities, while in the calculation assuming sheltering, only 20 percent of the casualties would be fatalities.



If we assume that the net result of the strike is an average of the two assumptions regarding sheltering, then the expected fatalities from the strike on the Luoning silo field by 20 U.S. W88 warheads would be 3.5 million, and the number of injuries (predominantly radiation sickness) would be 7.7 million.

The base case for the strike on the Luoning DF-5A silos involved a total yield of 9.5 Mt. We also considered the use of two or three times as many W88 warheads

and the use of the W76 warhead instead of the W88. Therefore, these other cases looked at total nuclear explosive yields of 2 Mt through almost 30 Mt. Table 19 illustrates the casualty calculation given these other cases.

**Table 19:
Casualties For Variations of U.S. Hypothetical Strike
Against Chinese DF-5A Silos**

Targets	Number and Type of Attacking U.S. Warheads	Total Yield of Nuclear Strike	Average Casualties	Average Fatalities	Average Injuries (radiation sickness)
20 DF-5A silos	20 W76 Warheads	2.0 Megatons	1.58 million	460,000	1.12 million
20 DF-5A silos and 20 decoy silos - or multiple strikes on silos	40 W76 Warheads	4.0 Megatons	2.85 million	900,000	1.95 million
20 DF-5A silos and 20 decoy silos - or multiple strikes on silos	W76 Warheads	6.0 Megatons	4.0 million	1.3 million	2.6 million
20 DF-5A silos - Base Case	20 W88	9.5 Megatons	11.2 million	3.5 million	7.7 million
20 DF-5A silos and 20 decoy silos - or multiple strikes on silos	40 W88	19 Megatons	20.3 million	7.7 million	12.5 million
20 DF-5A silos and 20 decoy silos - or multiple strikes on silos	60 W88	28.5 Megatons	26.2 million	11 million	15.2 million

As would be expected, the numbers of casualties from a nuclear strike on the missile silos at Luoning increases with larger weapon yield because more fallout would be produced. Most of the casualties are predicted to occur in three Chinese provinces: Henan (where the silo targets are located), Anhui and Jiangsu. For the largest-yield case considered – 60 W88 warheads – the 50 REM contour would extend to the city of Nanjing.

Depending on the U.S. estimate of the hardness of the Chinese DF-5A silos, more than one attacking warhead could be allocated to each target. Furthermore, the Chinese may employ “decoy” silos that do not contain missiles but may nonetheless be targeted by U.S. forces. Assuming 14 percent (2/14) of all 400 W88 in the U.S. arsenal are on the two SSBNs on Hard Alert patrol in the Pacific, then approximately 60 W88s are available on short notice (the last case considered in Table 19). A larger number of W76s would be available, and

these are being retrofitted with a ground-burst capability to enhance their effectiveness against a wider spectrum of targets (see Chapter 3).

The overall effect of these calculations is that a highly accurate, counterforce strike against the 20 Chinese ICBMs capable of attacking the U.S. homeland would cause millions of casualties and radioactive contamination over a very large area. Other basic questions about a U.S. strike against Chinese DF-5A ICBMs that are not answered in this study include: How does the flight time of U.S. SLBMs compare with Chinese early warning and launch preparedness? How far apart are the DF-5A targets spaced – are the distances between targets greater than the “footprint” of the MIRVed warheads from one U.S. SLBM? Could some of the Chinese targets be on the “wrong side of the mountain” with respect to U.S. targeting (i.e., the mountains obstruct a direct hit)? Could the Chinese forces ride out a strike and successfully launch missiles weeks or months later?

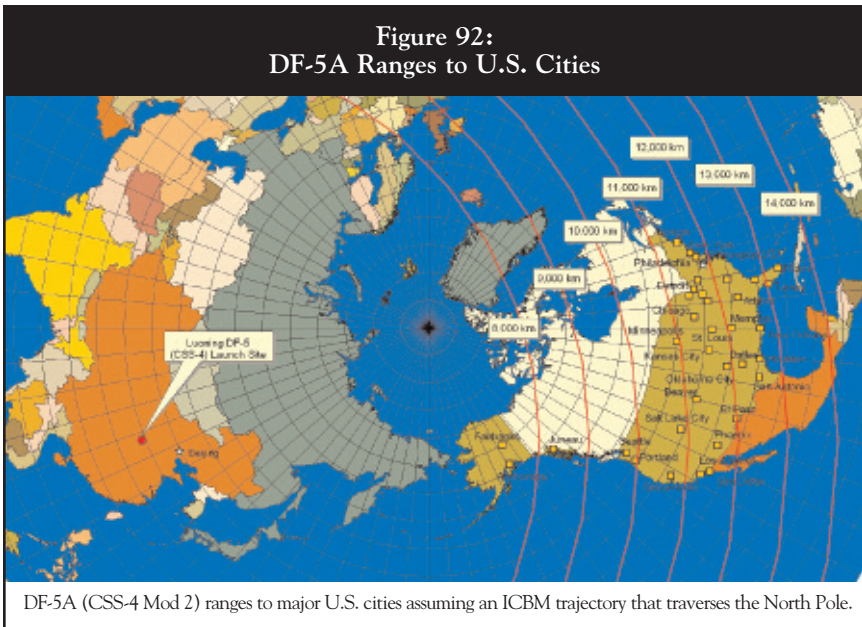
Scenario Two: Chinese Nuclear Strikes Against U.S. Cities

China’s main nuclear deterrent against the United States has been described as a retaliatory minimum deterrent against countervalue targets with forces on very low or no alert. “Retaliatory” and “countervalue” refer to the fact that the Chinese nuclear doctrine is one of no-first-use, and consistent with that stated policy, the Chinese nuclear weapons capable of attacking the continental United States are not of a quantity or an accuracy that could threaten U.S. nuclear forces, but instead would be capable of targeting population centers.

We calculated the effects of a Chinese strike against U.S. cities with warheads from the 20 DF-5A ICBMs that were hypothetical targets in the scenario discussed above. We did this analysis to better quantify China’s current deterrent against the U.S. homeland and examine different potential future Chinese nuclear force postures against the United States. We also explored parameters of the calculation, such as missile range, warhead yield, and warhead height-of-burst and targeting.

In Chapter 2 we quoted a range for China’s DF-5A ICBM of at least 8,000 miles (13,000 km). Assuming a circumpolar trajectory for the missile, Figure 92 illustrates which areas of the United States are within range assuming the DF-5A is launched from silos near the city of Luoning in China’s Henan Province. A range of at least 6,835 miles (11,000 km) is required to put cities at

risk on the West Coast and in the north-central region of the United States. A range of 7,456 miles (12,000 km) puts cities on the East Coast at risk, including New York City and Washington, D.C. If the range of the DF-5A exceeds 8,000 miles (13,000 km) then all of the continental United States could be targeted. Note that a near-polar intercontinental ballistic missile trajectory toward the United States from Luoning is the shortest distance but would necessitate an overflight of Russia and possibly activate Russia's early warning system. Missile trajectories from China to the continental United States which do not overfly Russia would require a range exceeding 10,560 miles (17,000 km).



The yield of the warhead mounted on the DF-5A is believed to be from 3 Mt to 5 Mt – a substantially higher-yield warhead than the U.S. W88 or W76. In HPAC, the effects of a nuclear explosion in the 3 Mt to 5 Mt range on a city are estimated from an extrapolation of the effects seen at Hiroshima and Nagasaki, but the damage due to fire storms from such a high-yield nuclear explosion may be more pervasive.⁴⁹⁷

It is unknown whether the Chinese warheads on the DF-5A can be fuzed to detonate as a ground burst. The U.S. nuclear weapons dropped on Hiroshima and Nagasaki at the end of World War II were fuzed to detonate at an altitude of approximately 1,640 feet (500 meters) to maximize the area exposed to the blast

wave produced in the nuclear explosion. The DOD defines the “optimum height of burst” as: “For nuclear weapons and for a particular target (or area), the height at which it is estimated a weapon of a specified energy yield will produce a certain desired effect over the maximum possible area.”⁴⁹⁸ In the case of the “Fat Man” and “Little Boy” nuclear weapons dropped on Japan, a height of burst of 1,640 feet (500 meters) maximized the area exposed to 10 pounds-per-square inch (psi) for nuclear explosive yields of about 15 kilotons, and the radius of a circle exposed to 10 psi or greater from these nuclear explosion is calculated to be about 0.62 miles (1 km). In the case of a 4 Mt weapon, the optimum height of burst to maximize an area exposed to 10 psi or greater is 9,840 feet (3,000 meters), and the radius to which 10 psi extends is 3.9 miles (6.2 km). Table 20 contrasts the effects of a Hiroshima nuclear bomb with that of the 4 Mt warhead on the Chinese DF-5A.

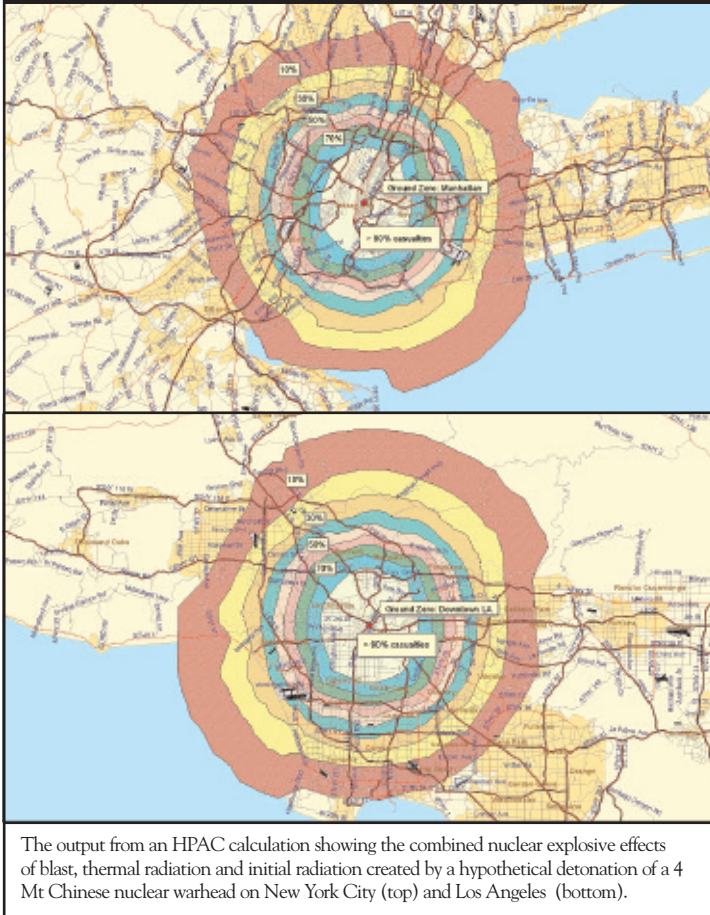
**Table 20:
DF-5 Warhead and Hiroshima Bomb Parameters**

	Chinese DF-5A (CSS-4 Mod 2)	U.S. “Little Boy” as at Hiroshima	Ratio: DF-5A Warhead/Little Boy
Yield	4 Megatons (4,000 kilotons)	15 kilotons	320 times greater yield
Optimum Height of Burst (to maximize area subject to 10 psi or greater blast)	3,000 meters	500 meters	6 times higher altitude for optimum height of burst
Area subject to 10 psi or greater blast overpressure	121 square km (6.2 km radius)	3 square km (980 meter radius)	40 times the area exposed to high blast
Area subject to > 25 cal/cm ² thermal flux	3.1 square km (1 km radius)	707 square km (15 km radius)	228 times the area exposed to very high thermal flux
Area subject to > 10 cal/cm ² thermal flux	2,000 square km (25 km radius)	9 square km (1.7 km radius)	218 times the area exposed to high thermal flux
Area subject to 50 rads initial radiation	9 square km (1.7 km radius)	11.3 square km (1.9 km radius)	About equal areas exposed to initial radiation
Calculated Fatalities: Los Angeles, CA	2.8 – 3.0 million	33,000 - 58,000	About 65 times the total fatalities in LA
Calculated Casualties: Los Angeles, CA	4.6 – 4.8 million	94,000 - 115,000	About 50 times the total casualties in LA
Calculated Fatalities: New York, NY	2.9 – 5.0 million	175,000 - 240,000	About 19 times the total fatalities in NYC
Calculated Casualties: New York, NY	7.7 – 7.8 million	322,000 – 366,000	About 22 times the total casualties in NYC

The calculated effects of a single 4 Mt nuclear airburst over a major U.S. city are staggering. Figure 93 illustrates the combined nuclear explosive effects of blast, thermal radiation and initial radiation in the form of an overall probability of

being killed or injured while inside a building structure at the time of the explosion in New York City (top) or Los Angeles (bottom). An inner zone of near complete destruction (more than 90 percent casualties) would extend 16.2 miles (10 km) from ground zero, and blast and fire damage would extend as far as 21.8 miles (35 km) or more from the ground zero. A blast wave as strong or stronger than that directly under the Hiroshima explosion (35 psi) would cross the island of Manhattan. A firestorm could potentially engulf all of New York City or Los Angeles.

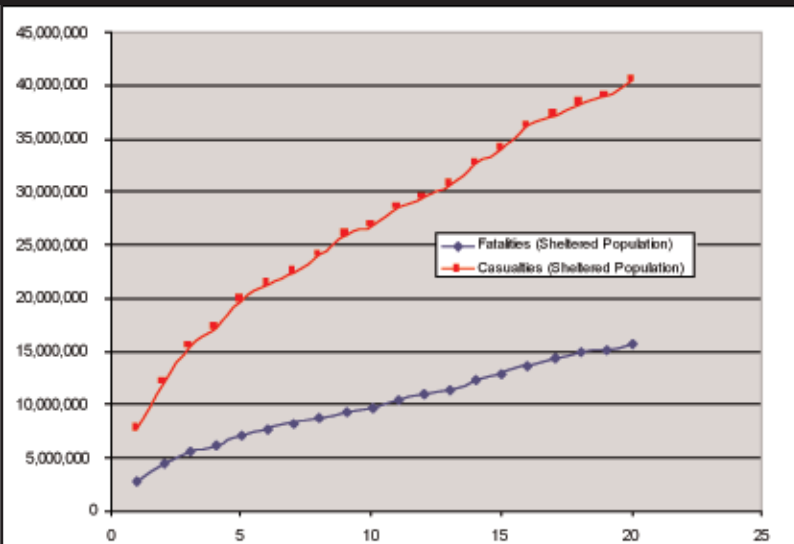
Figure 93:
Nuclear Explosive Effects of DF-5 Strikes Against
New York and Los Angeles



Using HPAC, we calculated the combined effects of 4 Mt nuclear detonations on 20 populous U.S. cities, including Washington, D.C. From 15.8 million to 26.1 million fatalities and 40.6 million to 41.3 million casualties would result. We found that varying the yield of the Chinese DF-5A nuclear weapon from 3 Mt to 5 Mt only changed the predicted casualties by 10 percent – any multi-megaton weapon threatens a large urban area. The results also were relatively insensitive to varying the commonly-estimated accuracy (Circular Error Probable, or CEP) of these weapons.

Figure 94 plots the numbers of casualties and fatalities from a Chinese strike as a function of the number of U.S. cities attacked. Using HPAC, we found that the average number fatalities per attacking weapon is about 800,000, and the average number of casualties per weapon is about two million for these nuclear airbursts. It is evident from this analysis that the threat of even a few weapons reaching the United States should serve as a robust deterrent. U.S. war planners would have to have complete confidence in the success of both a counterforce strike against the DF-5A launchers and the capabilities of a National Missile Defense (NMD) system, otherwise a huge toll would be exacted on the United States.

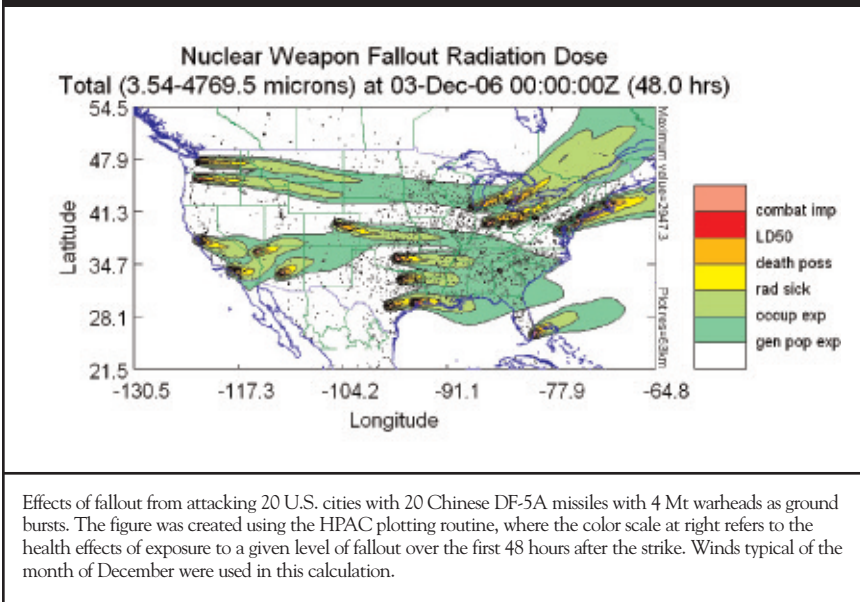
Figure 94:
Casualties and Fatalities From 20 DF-5A Airburst Attacks on US Cities



A plot of the number of casualties (red) and fatalities (blue) as a function of the increasing number of U.S. cities (x axis) attacked by 4 Mt warheads delivered by Chinese DF-5A (CSS-4 Mod 2) ICBMs, assuming a sheltered population at the time of the airburst strikes. The calculated numbers of casualties would be a factor of two to four times higher if the attacks were ground burst and cause very widespread fallout contamination throughout the United States and in Canada (Figure 95).

We also explored the effects of fallout, should the Chinese warheads be detonated as ground bursts. Because ground burst significantly increases radioactive fallout, they represent worst-case scenarios. Figure 95 illustrates the pervasive reach of the fallout clouds from such a scenario: The total yield of this attack is 80 Mt – about 10 times more powerful than the U.S. strike considered above. The calculated numbers of casualties are two to four times higher than for the air burst scenario (Figure 94), and very widespread fallout contamination would occur across the United States and Eastern Canada.

Figure 95:
Fallout From Attack On 20 US Cities With
20 DF-5A 4-Mt Ground Burst Warheads



As mentioned in Chapter 2, China is developing a new ICBM, the DF-31A, that the DOD projects will become operational sometime before the end of the decade. At first the mobile DF-31A is expected to supplement the silo-based DF-5As, but may eventually replace the older missiles altogether. As a solid-fueled missile, the DF-31A will have less throwweight than the DF-5A and therefore be forced to carry a smaller warhead to reach targets throughout the United States. The yield of the DF-31A warhead is not known but 200 kt to 300 kt is probably a reasonable guess.

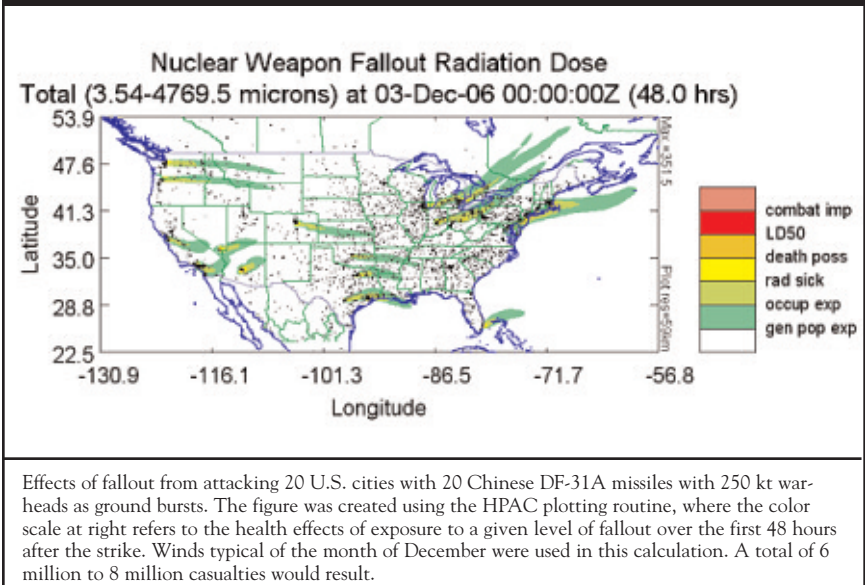
The U.S. intelligence community estimates that by 2015 China will deploy 75 to 100 warheads “primarily targeted” against the United States. As described in Chapter 2, the lower end of this estimate envisions a mix of 20 4-Mt warheads on DF-5As and 55 250-kt (our yield assumption) warheads on DF-31As (see Table 4 in Chapter 2). By adding 55 250-kt warheads to the existing 20 4-Mt warheads in its arsenal, China can potentially use the 250-kt warheads to hold at risk an additional 55 U.S. cities with populations ranging from 250,000 to 750,000 (Austin, Memphis, Tucson, Atlanta, etc.) while continuing to hold at risk the largest U.S. metropolitan areas with the 4-Mt warheads (New York, Los Angeles, Chicago, etc. – cities with a population in the range of 750,000 to several million). The casualties from a countervalue strike with these 75 warheads (93.75 Mt total yield, air burst) would cause a total number of casualties in excess of 50 million, or over 16 percent of the current U.S. population.⁴⁹⁹

Although such an increase in China’s countervalue deterrent capability (above the current 20 4-Mt warheads, 80 Mt total yield) would put many more U.S. cities at risk, it would not significantly increase the number of casualties in the strikes calculated in Figure 94. The reason is that there are only a limited number of very large metropolitan areas and that – once they have been destroyed by the 4-Mt warheads – the additional 250-kt warheads would have to be targeted on smaller cities causing comparatively fewer additional casualties. Of course launching more missiles also would mean more warheads reaching their targets, assuming each missile has comparable vulnerability of pre-emptive destruction, probability of technical failure or interception by the U.S. National Missile Defense system.⁵⁰⁰

Another option is that China decides to deploy multiple warheads on its DF-5A missiles, a possibility frequently highlighted by news media and private analysts. This scenario also is the basis for the high-end of the U.S. intelligence community’s estimate of 100 Chinese warheads primarily targeted against the United States by 2015. With such a force consisting of 20 DF-5As and 40 DF-31As (all with 250-kt warheads for a total yield of 25 Mt), a quantitatively lower yet qualitatively similar countervalue deterrent capability (20 million to 30 million casualties) could be achieved by targeting the additional 25 250-kt warheads on the current target set of the largest U.S. metropolitan areas and hold medium-sized cities at risk with the other 55 warheads. Interestingly, this high-end projection for China’s deterrent would cause the least total casualties of the three potential future scenarios for China’s nuclear forces structure considered here, yet potentially damage a larger set of urban areas and so still pose a robust deterrent to U.S. nuclear use.

As mentioned in Chapter 2, there is of course also a possibility that the U.S. intelligence community's projection of 75 to 100 Chinese warheads "primarily targeted" against the United States by 2015 turns out to be wrong, and that China instead decides to replace the DF-5A with the DF-31A on a one-by-one basis. To examine such a scenario and its effect on China's deterrent, we ran the HPAC code using the same U.S. city targets as in the DF-5A countervalue strike scenario above. The optimum height of burst for a 250 kt warhead (16 times smaller than the 4 Mt warhead on the DF-5A) to maximize the area exposed to 10 psi or greater overpressure is 4,593 feet (1,400 meters). For airbursts, we found that about 12 million casualties would result from the use of 20 250-kt warheads on 20 U.S. cities, including 3 million to 6 million fatalities. If these 250 kt warheads were detonated as ground bursts, the fallout patterns shown in Figure 96 combined with the prompt nuclear effects would produce from 6 million to 8 million casualties.

Figure 96:
Fallout From Attack On 20 US Cities With DF-31A
Ground Bursts Warheads



Discussion of Nuclear Strike Simulations

The nuclear strike scenarios presented in this chapter using the HPAC computer code provide insight into what is certainly the most significant and problematic aspect of the current nuclear deterrent relationship between the United States and China.

From the perspective of Chinese nuclear war planners, the destruction inflicted by just a few DF-5A ICBMs delivering their warheads to their intended city targets ought to represent a robust deterrent. From these calculations, which Chinese war planners can easily do themselves, it becomes apparent why China determined that its relatively small number of ICBMs is an adequate deterrent against the United States and anyone else. The Chinese deterrent may be called “minimum,” but there’s nothing minimum about the destruction it can inflict, and a no-first-use policy could naturally evolve from a quantitative assessment of the nuclear weapons effects.

The forthcoming modernization of the Chinese ballistic missile force with the introduction of the DF-31, DF-31A and JL-2 will significantly affect the deterrent against the United States. But not in ways normally assumed in the public debate. A “several-fold” increase in the number of warheads “primarily targeted” against the United States would not also result in a “several-fold” increase in the number of casualties that China could inflict in the United States. Our calculations described above show that if China decided to deploy the maximum number of warheads envisioned by the U.S. intelligence community (100) due to the replacement of large-yield warheads with smaller-yield warheads, the results would be a nearly 70 percent *reduction* of the total megatonnage on the force and a 25 percent to 50 percent reduction in the number of potential casualties resulting from a countervalue strike against the continental United States. Although this ought to be more than adequate to deter the United States (or anyone else) from using nuclear weapons against China, it suggests that the objective of the current Chinese modernization may not be so much to increase the threat as to ensure the continued effectiveness of the force.

From the point of U.S. nuclear planners, it may not matter much whether China can hit the United States with 94 Mt or 25 Mt. Their job is to implement White House guidance and hold Chinese nuclear forces at risk. Yet the hypothetical Chinese strike scenarios described above underscore that even a pre-emptive U.S. first strike against China’s DF-5A ICBMs would need to disable all of the missile silos (and in the future all of the DF-31As as well) or risk a retaliatory Chinese attack on U.S. cities resulting in millions of casualties. The fallout from such a U.S. strike – even against purely military targets in a remote area – would cause millions of civilian casualties and widespread radioactive contamination across three large Chinese provinces. As if such a level of destruction would not be sufficient to deter the Chinese leadership, the 1997 Presidential Decision Directive (PDD-60)

ordered the U.S. military to broaden nuclear targeting against Chinese facilities, and the U.S. Navy has since moved several strategic submarines from the Atlantic into the Pacific, upgraded the submarines to carry the more accurate Trident II D5 missile, and begun equipping W76 warheads with a new fuze to enable the weapon to strike a wider range of targets. The effects from a wider U.S. attack against China's entire nuclear force structure and political leadership would be significantly greater than the scenario described in this report and also result in fallout on allied countries in the region.

Other potential scenarios, that are not examined in this report, include a U.S. strike on all of China's offensive nuclear forces and leadership, a U.S. limited regional strike on Chinese forces off Taiwan, a Chinese strike against U.S. bases in the region as part of a retaliatory strike against the continental United States, and a Chinese limited strike against U.S. bases in the region in a conflict over Taiwan. Below such levels are potential uses of nuclear weapons in limited tactical strikes under the assumption that the other side will not be prepared to escalate to strategic nuclear use.

The U.S. counterforce strategy is based on the deployment of advanced weapons and planning capabilities that make it possible to target military facilities rather than cities as the Chinese are believed to target with their countervalue strategy. STRATCOM reportedly has concluded that countervalue targeting violates the Law of Armed Conflict (LOAC):

Many operational law attorneys do not believe "countervalue" targeting [against selected enemy military and military-related activities, such as industries, resources, and/or institutions that contribute to the enemy's ability to wage war]...is a lawful justification for employment of force, much less nuclear force. Countervalue philosophy makes no distinction between purely civilian activities and military related activities and could be used to justify deliberate attacks on civilians and non-military portions of a nation's economy. It therefore cannot meet the "military necessity" prong of the Law of Armed Conflict (LOAC). Countervalue targeting also undermines one of the values that underlies LOAC – the reduction of civilian suffering and to foster the ability to maintain the peace after the conflict ends. For example, under the countervalue target philosophy, the attack on the World Trade Center Towers on 9/11 could be justified.⁵⁰¹

Whether STRATCOM rejects countervalue targeting or not, the calculations cited above about the effects of the nuclear strikes do not even begin to describe what would actually occur if nuclear weapons were employed. The EMP produced by just two 4 Mt high-altitude atmospheric explosions, for example, would disable communications and electronic equipment across the entire United States. Several million Chinese expatriates also would die in a Chinese countervalue attack against U.S. cities. Even if the United States conducted a first strike on China's long-range ICBMs, and there was no immediate retaliation, there would still be massive suffering for refugees. And when this unprecedented humanitarian crisis was broadcast back to the United States, the social and economic chaos that would follow from Americans fleeing cities in fear of an eventual Chinese retaliatory strike would deepen the suffering.

Regardless of intentions and moral values, however, the simulations underscore that both a Chinese countervalue strike and a U.S. counterforce strike (even more so the expanded targeting directed by PDD-60) would inflict millions of civilian casualties and fatalities. If this is not sufficient to deter either side, it is hard to imagine what would.

Conclusions and Recommendations

Some in the United States argue that China is the next great threat and therefore new weapons and increased military spending are necessary. Some in China see recent U.S.-led wars, military modernizations, and aggressive strategies and policies as proof of American “hegemony” and argue that this requires them to modernize their military. Both countries are investing large sums of money in planning for war, and any U.S.-Chinese war comes with the potential of escalating to use of nuclear weapons. China is in the final phase of modernizing its ballistic missile forces, and the United States continues to enhance its remaining nuclear weapons and war plans. Indications of a nuclear arms race between the two giants are mounting, accusations fly, and suspicion permeates all aspects of relations.

It is true that China is modernizing its conventional military forces and its nuclear systems. Much of the effort is cloaked in secrecy and there is an increasing need for Chinese authorities to explain their plans and intentions. But the fact that China is modernizing is hardly surprising. All the other nuclear powers are doing so as well. What is clear in the Chinese case is that the pace of the nuclear effort is taking a long time and is not being carried out on a crash basis. Even after China introduces its nuclear forces currently under development the overall size of its nuclear arsenal likely will not be significantly greater than it is today.

It goes without saying that the United States also is modernizing its forces and improving its capabilities and is years ahead of the Chinese. The quantitative and qualitative disparities that have characterized the two nuclear arsenals for decades are likely to remain for the foreseeable future. The U.S. ballistic missile defense program only adds a new element, to which other nations – including China and Russia – will respond by upgrading their offensive forces and measures to overwhelm the defenses.

The first U.S. ballistic missile defense system in the 1970s, combined with deployment of highly accurate ballistic missiles on high alert, helped trigger a Chinese development of mobile long-range ballistic missiles that are now the cause for great concern at the Pentagon. Unlike the highly offensive U.S. nuclear counterforce posture with accurate and flexible weapons maintained on high alert and capable of conducting decapitating first strikes on short-notice with little or no warning,⁵⁰² the Chinese so far have avoided the temptation to change their minimum deterrence posture consisting of nuclear forces on low or no alert.

The Pentagon often depicts the Chinese military in general, and their new mobile nuclear forces in particular, as looming threats and uses those threats to justify its own programs and plans. This approach was used with the Soviet Union during the Cold War but might prove counterproductive in the more complex integrated relationship that the United States has and is seeking to deepen with China. The U.S.-Chinese relationship is vastly different than that with the Soviet Union. Economically, China supplies the United States with an enormous array of goods and holds billions of dollars of its debt. China enjoys an infusion of technology and know-how from U.S. companies profiteering from cheap labor in China. A large Chinese ethnic community thrives in the United States and provides an important human and emotional link between the two nations. The countries are bound together in ways that were inconceivable in the U.S.- Soviet relationship.

The United States has an awkward and self-contradicting approach to the Chinese security issue. After having spent most of the 1980s actively encouraging China to modernize its military forces, the United States insists it must modernize and forward-deploy significant forces to counter the Chinese capabilities. Yet when China responds to that encouragement and posturing by modernizing its own forces, the United States insists that China is a threat. In terms of U.S. policy-making, it is as if one hand doesn't know what the other is doing. China, a undemocratic state that may potentially one day rise from decades of one-party dictatorship, hides its military modernization behind a cloak of secrecy that is causing considerable concern and suspicion in other countries. In both the United States and China, those who profit from the military posturing need to be moved to the back row and civil interests must take charge of shaping the future relationship.

The predictions by the U.S. intelligence community and the Pentagon about the future developments of the Chinese nuclear arsenal need to be improved. They have traditionally been inflated, self-contradictory, and the estimated timelines for introduction of new Chinese systems have been almost consistently wrong. Likewise, some lawmakers, private institutions and certain news organizations frequently inflate the Chinese threat even beyond the worst-case estimates made by the Pentagon, which further poisons the atmosphere.

Inflated and worst-case descriptions of China's nuclear programs feed on the lack of or inadequate information. The Chinese could counter this process by being more open and transparent about their military budget and the scale and scope of weapons programs. For its part, the United States must also improve and explain why it is deploying additional strategic submarines in the Pacific and bombers to Guam and improving the effectiveness of its strategic warheads and war-planning capabilities.

Since the end of the Cold War, military posturing has been allowed to dominate the development of U.S.-Chinese relations to an extent that undermines the security of both countries and the Pacific region as a whole. It would serve China's and the United States' interests to avoid a continued arms race that will only heighten tensions, fuel animosity, be wasteful to both economies and increase chances of a military confrontation. The stakes are high indeed. In the potential nuclear strike scenarios we examined for this report we saw how potentially destructive even a limited attack would be.

A U.S. strike against China's 20 ICBM silos would result in up to 26 million casualties, depending upon the type and number of warheads used. Strike plans maintained by the Pentagon probably include options for significantly larger attacks against a broader target base. The declassified documents we examined reveal that U.S. nuclear war planning against China traditionally has involved much larger strikes against a broad range of facilities. Even so, the Pentagon has advocated – and the White House has authorized – additional targeting against China. It is hard to see where deterrence ends and nuclear warfighting begins, and with U.S. planners pursuing “more discriminate capabilities for selected target types through lower yields, improved accuracy, and enhanced penetration,”⁵⁰³ the quest of the never sufficiently “credible deterrent” seems to be entering its next phase.

A Chinese attack on the continental United States with 20 ICBMs would result in as many as 40 million casualties. As if that is not enough, China is in the final phase of a nuclear facelift that the U.S. intelligence community has predicted will result in 75 to 100 warheads “primarily targeted” against the United States by 2015. Whether this projection will come true remains to be seen, and we have our doubts, but Chinese leaders apparently have decided that its antiquated long-range ballistic missile force is becoming vulnerable and a new generation of ICBMs is needed to ensure the credibility of China’s minimum deterrent. Our calculations show that the increase in warheads anticipated by the U.S. intelligence community could potentially inflict in excess of 50 million casualties in the United States.

Whatever number of warheads China eventually decides to deploy, the new situation will almost certainly alter the deterrent relationship with the United States (and others), but not necessarily in ways normally assumed in the public debate. A “several-fold” increase in the number of warheads “primarily targeted” against the United States would not necessarily result in a “several-fold” increase in the number of casualties that China could inflict in the United States. In fact, our calculations show that if China decided to deploy the maximum number of warheads envisioned by the U.S. intelligence community, the result would be a nearly 70 percent *reduction* in the megatonnage due to replacement of high-yield warheads with smaller-yield warheads, and a 25 percent to 50 percent *reduction* in the number of potential casualties that would result from a Chinese countervalue strike against the continental United States.

Even if China decided on the option with the most megatonnage that could inflict an additional 10 million casualties, what does this say about the Chinese intentions? In the arcane world of nuclear war planning, 50 million casualties are not that much different from 40 million casualties. Since the United States would probably be equally deterred by either number, it begs the question to the Chinese: Why the extra 10 million? Or to put it another way, why does the Pentagon imply that a China that can inflict 50 million casualties rather than 40 million is a greater threat? Of course there are many nuances to answering these questions, but since the ability to inflict casualties is fundamental to the Chinese countervalue strategy, it strongly suggests that the primary objective of the current Chinese modernization is to ensure the effectiveness of the deterrent rather than to increase the ability to inflict casualties and destruction.

The nuclear war scenarios we examined are a stark reminder to policy-makers and military planners that a modest-sized arsenal on low or no alert can suffice as a deterrent. The additional nuclear capabilities that advocates in both countries argue are necessary to ensure a “credible” deterrent add nothing to either side’s security, but would, if ever used, only increase the insecurity. Even if the weapons are not used, the continued nuclear competition they will provoke will not benefit either country but only heighten tensions, fuel animosity, harm both economies, and increase the chance of a military confrontation.

At the current juncture in their nuclear relationship, both the United States and China need to make careful decisions about the future of their nuclear forces and the way they are deployed.⁵⁰⁴ China should clearly communicate its intentions for the size and purpose of its future nuclear arsenal, reaffirm its commitment to its no-first-use policy and a strictly minimum deterrent, and resist the temptation to develop additional capabilities to make the arsenal more “credible.” The United States should pull back its strategic submarines from the Pacific, visibly relax its nuclear posture against China, and stop enhancing its nuclear weapons under the guise of Life Extension Programs. An important step would be to take nuclear weapons off high alert, a move that is long overdue, and commit to deep reductions in the number of nuclear weapons beyond the force level set by the Moscow Treaty.

Both countries should engage directly in talks about their nuclear forces and publicly show leadership in advancing disarmament and nonproliferation goals by diminishing the number and role of nuclear weapons against each other (and others) and in national security policy in general. With the end of the Cold War and a more direct adversarial relationship between China and the United States, the traditional claim by China that it doesn’t need to engage in direct arms reductions until the United States and Russia have reduced their arsenals to the Chinese force level is outdated and counterproductive.⁵⁰⁵ The Bush administration, for its part, needs to get over its aversion against nuclear arms control and begin a long-term focused effort to engage China (and the other “smaller” nuclear powers) directly in talks about limitations on the role and numbers of nuclear weapons.

Appendix A: Chinese Nuclear Forces, 2006

China Designation	U.S./NATO designation	Year deployed	Range (kilometers)	Warhead x yield	Missiles deployed	Warheads deployed
<i>Land-based missiles*</i>						
DF-3A	CSS-2	1971	3,100 ^a	1 x 3.3 Mt	16	16
DF-4	CSS-3	1980 ^b	5,500	1 x 3.3 Mt	22	22
DF-5A	CSS-4 Mod 2	1981	13,000	1 x 4-5 Mt ^c	20	20
DF-21A	CSS-5 Mod 1/2	1991	2,150	1 x 200-300 kt	35	35
DF-31	(CSS-X-10)	2006 ?	7,250+	1 x ?	n.a.	n.a.
DF-31A	n.a.	2007-2009 ?	11,270+	1 x ?	n.a.	n.a.
Subtotal					93	93
<i>Submarine-launched ballistic missiles (SLBMs)**</i>						
JL-1	CSS-NX-3	1986	1,770+	1 x 200-300 kt	12	12
JL-2	CSS-NX-4	2008-2010 ?	8,000+ ^d	1 x ?	n.a.	n.a.
Subtotal					12	12
Total strategic ballistic missiles					105	105
<i>Aircraft***</i>						
Hong-6	B-6	1965	3,100	1-3 x bomb	100	20
Attack	(Q-5, others?)			1 x bomb		20
Subtotal						40
<i>Short-range tactical weapons</i>						
DF-15 ^e	CSS-6	1990	600	1 x low	~300	?
DH-10 ^f	(LACM) ^g	2006-2007 ?	~1,500?	1 x low ?	n.a.	n.a.
TOTAL						~145^e

* DF stands for Dong Feng, which means “east wave.” JL stands for Julang. The single SSBN equipped with the JL-1 has never sailed on a deterrent patrol *** Figures for aircraft are for nuclear-configured versions only. Hundreds of aircraft are deployed in non-nuclear versions. Aircraft range is equivalent to combat radius. Assumes 20 bombs for the force, with yields estimated between 10 kilotons and three megatons.

^a U.S. Air Force, National Air Intelligence Center, “China Incrementally Downsizing CSS-2 IRBM Force,” *Foreign Missile Update*, NAIC-1030-098B-96, November 1996, p. 12. Reproduced in Bill Gertz, *The China Threat: How the People’s Republic Targets America* (Washington, D.C.: Regnery, 2000), pp. 233-234.

The unclassified range is 2,800 km. See: U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People’s Republic of China*, 2005, July 20, 2005, p. 45; U.S. Department of the Air Force, National Air Intelligence Center, *Ballistic and Cruise Missile Threat*, NAIC-1031-0995-03, August 2003, p. 10. The longer classified range makes the DF-3A a “long-range” missile rather than a “medium-range” missile as is normally reported.

^b The DF-4 may have become operational already in 1975. U.S. Central Intelligence Agency, *PRC Defense Policy and Armed Forces*, National Intelligence Estimate 13-76, November 11, 1976, p. 47.

^c The U.S. intelligence community says that China might decide to deploy multiple warheads (up to three) on each DF-5A in an effort to overcome the U.S. missile defense system.

^d The DIA stated in February 2006 that the range of the JL-2 is “8,000+ kilometer”. Lieutenant General Michael D. Maples, U.S. Army, Director, Defense Intelligence Agency, *Current and Projected National Security Threats to the United States*, statement for the record before the Senate Armed Services Committee, February 28, 2006, p. 11.

^e Mainly used as a conventional missile. May have nuclear capability.

^f The DOD says that one of China’s forthcoming land-attack cruise missiles may be nuclear.

^g Additional warheads are believed to be in storage for a total stockpile of approximately 200 nuclear warheads. Extra fissile material is also in storage.

ENDNOTES

- ¹ Below the strategic level of nuclear employment more limited scenarios could also be simulated, including a Chinese regional nuclear attack against U.S. forward deployed military forces in Northeast Asia, or a U.S. limited nuclear attack on Chinese conventional or nuclear forces in a war over Taiwan. Both countries have probably drawn up such (or similar) plans for limited nuclear use under the assumption that the other side would be deterred from escalating to strategic war. But wars never go according to plan, and the scenarios in this report are intended to remind the reader of the stakes of miscalculation.
- ² For detailed overviews of U.S. nuclear forces, see our annual status reports in the Nuclear Notebook published in the *Bulletin of the Atomic Scientists* at http://www.thebulletin.org/nuclear_weapons_data/.
- ³ The history of China's role in U.S. nuclear planning during the Cold War is surprisingly poorly described in the open literature and seems to have eluded most analysts and scholars who have focused almost exclusively on the U.S.-Soviet deterrence relationship. According to one report: "Experts in China recall a history of U.S. nuclear blackmail and a slow but steady progress in bringing a credible deterrent posture into being. Experts in the United States seem barely to recall this history at all, recalling China as little more than a footnote in the history of the nuclear era. This leads to very different views of the strategic balance between the two, the principles of nuclear strategy, and the constraints on future developments." Brad Roberts, *China-U.S. Nuclear Relations: What Relationship Best Serves U.S. Interests?*, Institute for Defense Analysis/Defense Threat Reduction Agency, IDA Paper P-3640, September 2001, p. ES-2. Available online at www.au.af.mil/au/awc/awcgate/dtra/china_us_nuc.pdf.
- ⁴ Recent efforts to increase communication between the two countries include military-to-military discussions about nuclear policy, reciprocal military visits, and invitation of observers to military exercises.
- ⁵ For a thoughtful analysis of this trend, see: Alastair Iain Johnston, "China's New 'Old Thinking': The Concept of Limited Deterrence," *International Security*, Vol. 20, No. 3 (Winter 1995/96), pp. 5-42.
- ⁶ "China's Endeavors for Arms Control, Disarmament and Non-Proliferation," Information Office of the State Council of the People's Republic of China, Beijing, September 2005, pp. 3, 6, 9. Emphasis added.
- ⁷ For three informative works on Chinese nuclear force developments and their impact on doctrine, see: Michael S. Chase and Evan Medeiros, "China's Evolving Nuclear Calculus: Modernization and Doctrinal Debate," Kenneth Allen and Maryanne Kivlehan-Wise, "Implementing PLA Second Artillery Doctrinal Reforms," both in James C. Mulvenon and David Finkelstein (eds.), *China's Revolution in Doctrinal*

Affairs: Emerging Trends in the Operational Arts of the Chinese People's Liberation Army, Alexandria: Center for Naval Analysis, 2005, pp. 119-157, 159-219, respectively; Bates Gill, et al., "The Chinese Second Artillery Corps: Transition to Credible Deterrence," in James C. Mulvenon and Andrew N.D. Yang (eds.), *The People's Liberation Army as Organization*, Santa Monica, CA: RAND, 2002, pp. 510-586.

- ⁸ U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China 2003*, July 30, 2003, p. 31.
- ⁹ Keith Crane, et al., *Modernizing China's Military: Opportunities and Constraints*, RAND Project Air Force, 2005, p. 202.
- ¹⁰ U.S. Department of Defense, Office of the Secretary of Defense, *Military Power of the People's Republic of China, 2006*, May 23, 2006, pp. 2, 13-14, 28.

A box in the 2006 DOD report cites three Chinese articles to question whether China will maintain its no-first-use policy, including an interview with Chu Shulong at Qinghua University:

While affirming 'no first use,' Chu Shulong, from the prestigious Qinghua University, also stated in a July 2005 interview printed in a state-owned media that "if foreign countries launch a full-scale war against China and deploy all types of advanced weapons except nuclear weapons, China may renounce this commitment [to no first use] at a time when the country's fate hangs in the balance.

Yet according to Jeffrey Lewis at *armscontrolwonk.com*, the FBIS translation apparently used by the Pentagon was wrong. The FBIS headline was "PRC Expert Warns PRC May Renounce 'No First Use' of Nuclear Weapons in War Time, but the translation of the Chinese title is "PRC Expert: China's Policy on Nuclear Weapons Remains Unchanged." The Pentagon's excerpt above appears to misrepresent what the Mr. Chu said by including one part of the interview but ignoring another:

The Director of Tsinghua University's Institute of Strategic Studies, in an interview with a reporter from Da Gong Bao expressed, [sic] China's promise not to be the first to use nuclear weapons was extremely clear and firm. As of now, their [sic] isn't the slightest indication that China's government will let go of this promise. "(I) have not heard any leader on any occasion state China will change or let go of this position. Never."

At the same time Chu Shulong provided a hypothetical, except in the case of a foreign power launching a full scale war against China, using all of their advanced (precision) weaponry except nuclear weapons, and the Chinese nation were facing the fanger of extermination, China may let go of this promise. But he considered the possibility not very great. "I think what Zhu Chenghu said is the worst possible circumstance, and the worst possible circumstance should not happen."

See: Jeffrey Lewis, "China and No First Use," *armscontrolwonk.com*, May 31, 2006, URL <http://www.armscontrolwonk.com/1082/china-and-no-first-use>

¹¹ Peter W. Rodman, Assistant Secretary of Defense for International Security Affairs, *The Military Power of the People's Republic of China*, prepared statement before the House Armed Services Committee Thursday, June 22, 2006, p. 5.

¹² Confidence in the capability of the U.S. offensive nuclear capability appears to be high. According to the Rear Admiral Eric A. McVadon, former Deputy Director for Strategy, Plans and Policy (Navy Staff) and Defense and Naval Attache at the American Embassy in Beijing, "even with the augmented nuclear arsenal [of DF-31 and JL-2 missiles], China's minimal deterrent is useful only when unused." Rear Admiral (USN, Ret.) Eric A. McVadon, Director of Asia-Pacific Studies, Institute for Foreign Policy Analysis, "Recent Trends in China's Military Modernization," prepared statement before the U.S.-China Economic and Security Review Commission, September 15, 2005, p. 6.

¹³ Though it should be said that Russia has not completely left the field. See Stephen F. Cohen, "The New American Cold War," *The Nation*, July 10, 2006, pp. 9-17.

¹⁴ Mark Mazzetti, "Pentagon Says China Seeks to Extend Military Reach," *Los Angeles Times*, July 20, 2005, p. 1.

¹⁵ Robert S. Dudley, "What It Means To Be No. 1," *Air Force Magazine*, February 2006, p. 2.

¹⁶ "China's Endeavors for Arms Control, Disarmament and Non-Proliferation," Information Office of the State Council of the People's Republic of China, Beijing, September 2005, p. 16.

The 2006 DOD report on China's military forces attributed a slightly different range to DIA for the Chinese defense budget, saying that the "DIA estimates that China's total military-related spending will amount to between \$70 billion and \$105 billion in 2006." U.S. Department of Defense, Office of the Secretary of Defense, *Military Power of the People's Republic of China, 2006*, May 23, 2006, p. 20.

¹⁷ Peter W. Rodman, Assistant Secretary of Defense for International Security Affairs, *The Military Power of the People's Republic of China*, prepared statement before the House Armed Services Committee Thursday, June 22, 2006, p. 3.

¹⁸ Keith Crane, et al., *Modernizing China's Military: Opportunities and Constraints*, (The Rand Corporation, 2005), esp. 91-134.

¹⁹ Lt. Gen. Michael D. Maples, USA, Director, Defense Intelligence Agency, "Current and Projected National Security Threats to the United States," Statement For the Record before the Senate Armed Services Committee, 28 February 2006, pp. 17-18.

²⁰ U.S. Department of Defense, Office of the Secretary of Defense, *Quadrennial Defense Review*, February 6, 2006, p. 29.

²¹ Stephen I. Schwartz, ed., *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons since 1940* (Washington, DC: Brookings Institution, 1998).

- ²² U.S. Department of Defense, Office of the Secretary of Defense, *Quadrennial Defense Review*, February 6, 2006, p. 29. The QDR's assessment of China as the primary large-scale military threat is repeated in the Pentagon's 2006 report on China's military forces. U.S. Department of Defense, Office of the Secretary of Defense, "Military Power of the People's Republic of China, 2006," May 23, 2006, p. I.
- ²³ U.S. Department of Defense, *Proliferation: Threat and Response*, November 1997, p. 15.
- ²⁴ Kenneth H. Bacon, Assistant Secretary of Defense (Public Affairs), DOD News Briefing, September 12, 2000, 2:41 p.m. EDT.
- ²⁵ U.S. Department of Defense, Office of the Secretary of Defense, *Quadrennial Defense Review*, February 6, 2006, pp. 29-30.
- ²⁶ Strategic Deterrence Requirements 2020 Study, Joint Requirements Oversight Council Memorandum (JROCM) 132-03, 17 June 2003, enclosure, pp. 2-3. Released under FOIA.
- ²⁷ Donald H. Rumsfeld, Secretary of Defense, Remarks as Delivered by Secretary of Defense Donald H. Rumsfeld, Shangri-La Hotel, Singapore, June 4, 2005, available on-line at <http://www.defenselink.mil/speeches/2005/sp20050604-secdef1561.html>
- Rumsfeld's point about equating Chinese modernizations with offensive intentions is similar to the language used in Ronald Reagan's famous Star Wars speech in March 1983, where he said that "the Soviet Union is acquiring what can only be considered an offensive military force. They have continued to build far more intercontinental ballistic missiles than they could possibly need simply to deter an attack. Their conventional forces are trained and equipped not so much to defend against an attack as they are to permit sudden, surprise offensives of their own." Ronald Reagan, Address to the Nation on Defense and National Security, March 23, 1983, available on-line at <http://www.reagan.utexas.edu/archives/speeches/1983/32383d.htm>
- ²⁸ In addition to the U.S. influence, it is important to also mention the Chinese-Soviet standoff in the early 1980s which also had a strong impact on Chinese military planning.
- ²⁹ Keith Crane, Roger Cliff, Evan S. Medeiros, James C. Mulvenon, William H. Overholt, *Modernizing China's Military: Opportunities and Constraints*, (The Rand Corporation, 2005), p. 193.
- ³⁰ Douglas J. Feith, U.S. Under Secretary of Defense for Policy, "Prepared Statement of Under Secretary of Defense for Policy Douglas J. Feith Before [the] Senate Foreign Relations Committee," July 24, 2001, pp. 7, 8. STRATCOM commander Admiral James O. Ellis echoed this assessment in his response to advanced questions for his nomination as CINCSTRAT in September 2001 when he said: "The overall effectiveness of Russian forces would not be significantly diminished by U.S. deployment of a limited missile defense." U.S. Senate, Committee on the Armed Services, "Advanced Questions for Admiral James O. Ellis, Jr., Nominee for the Position of Commander in Chief, U.S. Strategic Command," September 25, 2001, p. 9.
- ³¹ U.S. Department of Defense, Office of the Secretary of Defense, "*The Military Power of the People's Republic of China, 2002*," 2002, pp. 27-28.

- ³² Ann Scott Tyson, "U.S. Missile Defense Being Expanded, General Says," *Washington Post*, July 22, 2005, p. A10.
- ³³ U.S. Department of Defense, Office of the Secretary of Defense, "*The Military Power of the People's Republic of China, 2004*," 2004, pp. 12-16.
- ³⁴ *The National Security Strategy of the United States of America*, The White House, March 2006, p. 41.
- ³⁵ U.S. Department of Defense, Office of the Secretary of Defense, *Nuclear Posture Review Report*, January 8, 2002 (Submitted to Congress on December 31, 2001), pp. 16-17. Excerpts available via <http://www.GlobalSecurity.org>.
- ³⁶ William M. Arkin, "America's New China War Plan," *Early Warning (Washington Post)*, May 24, 2006.
- ³⁷ U.S. Department of Defense, Office of the Secretary of Defense, *Quadrennial Defense Review*, February 6, 2006, p. 29.
- ³⁸ Ibid.
- ³⁹ Annual reports from 1995-2005 are available at http://www.defenselink.mil/execsec/adr_intro.html
- ⁴⁰ U.S. Department of Defense, Office of the Secretary of Defense, *Quadrennial Defense Review*, February 6, 2006, p. 29.
- ⁴¹ U.S. Department of Defense, Office of the Secretary of Defense, *Military Power of the People's Republic of China, 2006*, May 23, 2006, n.p (third sheet).
- ⁴² Peter W. Rodman, Assistant Secretary of Defense for International Security Affairs, *The Military Power of the People's Republic of China*, prepared statement before the House Armed Services Committee Thursday, June 22, 2006, p. 3.
- ⁴³ U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 1997*, April 8, 1998, pp. 1-2.

That is not to suggest that the United States did not have concerns about China's nuclear (and general military) development at the time. In testimony to the Senate Armed Services Committee in April 1999, Assistant Secretary of Defense for Strategy and Threat Reduction Edward L. Warner stated that the United States was trying to make China become a positive force for regional stability and peace, but cautioned that "we are not now assured that this will be the case, and that our nuclear forces will not be needed at some future point to deter China. China has a much smaller nuclear force than Russia's, but one that is still formidable, consisting of about 20 CSS-4 ICBMs capable of reaching the United States in addition to several dozen theater-range nuclear ballistic missiles. And China continues to make steady efforts to modernize these forces." Nonetheless, Warner continued, "Given the overall positive trends in Russia and China over the past decade, however, one of our most critical security challenges today is the proliferation of weapons of mass destruction (WMD) and systems for their delivery." Statement of the Honorable

Edward L. Warner, III, Assistant Secretary of Defense for Strategy and Threat Reduction, Before the Senate Armed Services Subcommittee on Strategic Forces, April 14, 1999, pp. 1-2.

- ⁴⁴ U.S. Department of Defense, Office of the Secretary of Defense, *Military Power of the People's Republic of China, 2006*, May 23, 2006, p. 26. The 2005 report also mentioned Australia and New Zealand, but these countries were removed from the 2006 list and appear not to be relevant anyway to Chinese nuclear targeting. U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2005*, July 30, 2005, p. 28.
- ⁴⁵ John D. Negroponte, Director of National Intelligence, Statement to the Senate Select Committee On Intelligence," February 2, 2006, pp. 1-2, 20, 21.
- ⁴⁶ *Ibid.*, pp. 2, 20, 21. Emphasis added.
- ⁴⁷ U.S. Central Intelligence Agency, Director of Central Intelligence, Foreign Missiles Developments and the *Ballistic Missile Threat Through 2015*, National Intelligence Council, December 2001, p. 3.
- ⁴⁸ Michael D. Maples, Lieutenant General, U.S. Army, Director, Defense Intelligence Agency, *Current and Projected National Security Threats to the United States*, Statement For the Record before the Senate Armed Services Committee, 28 February 2006, p. 4.
- ⁴⁹ *Ibid.*, p. 5.
- ⁵⁰ Rowen Scarborough, *Rumsfeld's War: The Untold Story of America's Anti-Terrorist Commander* (Washington, DC: Regnery Publishing Co., 2004).
- ⁵¹ Dan Stober and Ian Hoffman, *A Convenient Spy: Wen Ho Lee and the Politics of Nuclear Espionage* (Simon & Schuster, 2002).
- ⁵² Bill Gertz, "China Tests New Long-Range Missile," *Washington Times*, August 3, 1999, p. 1.
- ⁵³ *Report of the Select Committee on U.S. National Security and Military/Commercial Concerns With the People's Republic of China* (U.S. Government Printing Office, Washington D.C., 1999), Volume I, p. 193. Emphasis added.
- ⁵⁴ *Ibid.*, p. 180.
- ⁵⁵ "China's Endeavors on Arms Control, Disarmament and Non-Proliferation," Information Office of the State Council of the People's Republic of China, Beijing, September 2005, p. 9.
- ⁵⁶ U.S. Central Intelligence Agency, *Key Findings: The Intelligence Community Damage Assessment on the Implications of China's Acquisition of US Nuclear Weapons Information on the Development of Future Chinese Weapons*, Press Release, April 21, 1999.
- ⁵⁷ Jonathan D. Pollack, "The Cox Report's 'Dirty Little Secret'," *Arms Control Today*, April/May 1999, n.p. (electronic version).
- ⁵⁸ Richard L. Garwin, "Why China Won't Build U.S. Warheads," *Arms Control Today*, April/May 1999.

The claim that smaller Chinese warheads on new mobile missiles were “in part influenced by US technology gained through espionage” was echoed in Central Intelligence Agency, *National Intelligence Council, “Foreign Missile Developments and the Ballistic Missile Threat to the United States Through 2015*, September 1999, n.p. [Internet version page 3 of 14].

- ⁵⁹ Alastair Iain Johnston, et al., *The Cox Committee Report: An Assessment*, Center for International Security and Cooperation, Stanford University, December 1999, pp. 11-12. Emphasis added.

For a description of the difference between minimum and limited deterrent, see “China’s Nuclear Weapons Policy” on p. 30.

- ⁶⁰ *Ibid.*, p. 26.

- ⁶¹ Bill Gertz, “U.S. Secrets Aboard Latest Chinese Sub,” *Washington Times*, December 6, 1999, p. 1. Emphasis added.

A statement by former STRATCOM commander General Eugene Habiger (who at the time of the article served as the DOE’s security chief) that “the jury is still out” on whether China’s new strategic weapons will contain stolen U.S. nuclear weapons secrets, was buried at the end of the article and did not soften the story or headline.

- ⁶² The Cox report resulted in the FY 2000 Defense Authorization Act establishing the U.S.- China Economic and Security Commission to monitor, investigate, and submit to congress an annual report on the national security implications of the bilateral trade and economic relationship between the United States and the People’s Republic of China, and to provide recommendations, where appropriate, to Congress for legislative and administrative action. Three Annual Reports have been submitted in 2002, 2004 and 2005. The conclusions are largely consistent with other intelligence reports, including that “By 2015, China’s intercontinental nuclear force is projected to grow to 75 to 100 warheads.”

- ⁶³ Admiral William J. Fallon, Commander, U.S. Pacific Command, statement before the Hearing of the Senate Armed Services Committee Military Strategy and Operational Requirements in the FY 2007 Defense Budget, March 7, 2006, p. 31.

- ⁶⁴ “Chinese Spokesman lists Agreements Reached in Military’s Leader’s US Trip,” *BBC*, July 20, 2006.

- ⁶⁵ Unfortunately, CRS reports are not made available to the public but only to members of Congress. Yet many CRS reports are available from the Federation of American Scientists Government Secrecy project at <http://www.fas.org/sgp/crs/nuke/index.html>

- ⁶⁶ Shirley A. Kan, *China: Suspected Acquisition of U.S. Nuclear Weapon Secrets*, RL30143, updated February 1, 2006. Available at <http://www.fas.org/sgp/crs/nuke/RL30143.pdf>

- ⁶⁷ *Ibid.*, pp. 18-19. The report is available at <http://www.fas.org/sgp/crs/natsec/RL33607.pdf>

- ⁶⁸ Christopher Bolkcom, et al., *U.S. Conventional Forces and Nuclear Deterrence: a China Case Study*, Congressional Research Service, RL33607, August 11, 2006, p. 20. The report is available at <http://www.fas.org/sgp/crs/natsec/RL33607.pdf>

⁶⁹Ibid., p. 26. The report is available at <http://www.fas.org/sgp/crs/natsec/RL33607.pdf>

⁷⁰Ibid., pp. 20, 22. The report is available at <http://www.fas.org/sgp/crs/natsec/RL33607.pdf>

⁷¹For a thoughtful analysis of this trend, see: Alastair Iain Johnston, “China’s New ‘Old Thinking’: The Concept of Limited Deterrence,” *International Security*, Vol. 20, No. 3 (Winter 1995/96), pp. 5-42.

⁷²Yet some suggest that the combined effect of the security challenges facing China and the capabilities evolving as part of China’s current modernization of its nuclear forces and supporting capabilities almost inevitably will drive Chinese nuclear policy beyond the current minimum deterrent. For example, while concluding that “dramatic departures in Chinese doctrine, strategy, and capability seem unlikely...[f]or the moment at least,” a report published by the Institute for Defense Analysis in 2003, predicted:

To be sure, qualitative and quantitative improvements to China’s forces have long been under way and would likely occur in the absence of a U.S. BMD program. But this historical review suggests that those improvements will be tailored to meet the new requirements of survivable second strike posed by U.S. BMD. China’s quantitative options are numerous: to increase missiles, to increase launchers (both land- and sea-based), to increase the number of warheads atop missiles. Its build-up will be constrained in part by the fear of being drawn into an arms race with the United States of the kind that helped destroy the Soviet Union, and in part by the desire not to increase the perception of China as a major military threat. Qualitative improvements include deployment of mobile intercontinental strike systems, enhanced protection of non-mobile systems, more efficient attack operations, enhanced command and control, and defense penetration aids. These quantitative and qualitative factors will combine in ways to give China’s force new operational capabilities and may reinforce the move away from “minimum deterrence.” The impact of factors beyond U.S. BMD, such as the New Triad and China’s strategic relationships with Russia and India among others, is highly uncertain but seems likely to drive China’s understanding of nuclear sufficiency away from its historical foundations in minimalism and small numbers.

See: Brad Roberts, *China and Ballistic Missile Defense: 1955 to 2002 and Beyond*, Institute for Defense Analysis, IDA Paper P-3826, September 2003, p. ES-4, available online at www.fas.org/nuke/guide/china/doctrine/bmd.pdf.

⁷³*China’s Endeavors for Arms Control, Disarmament and Non-Proliferation*, Information Office of the State Council of the People’s Republic of China, Beijing, September 2005, pp. 9, 10.

⁷⁴“China’s National Statement on Security Assurances,” April 5, 1995 (available at <http://www.nti.org/db/china/engdocs/npt0495a.htm>) and “Working Paper by the Chinese Delegation to the Conference on Disarmament,” (CD/207) August 6, 1981 (available at <http://www.nti.org/db/china/engdocs/chsa0881.htm>).

- ⁷⁵ For three informative works on Chinese nuclear force developments and their impact on doctrine, see: Michael S. Chase and Evan Medeiros, “China’s Evolving Nuclear Calculus: Modernization and Doctrinal Debate,” Kenneth Allen and Maryanne Kivlehan-Wise, “Implementing PLA Second Artillery Doctrinal Reforms,” both in James C. Mulvenon and David Finkelstein (eds.), *China’s Revolution in Doctrinal Affairs: Emerging Trends in the Operational Arts of the Chinese People’s Liberation Army*, Alexandria: Center for Naval Analysis, 2005, pp. 119-157, 159-219, respectively; Bates Gill, et al., “The Chinese Second Artillery Corps: Transition to Credible Deterrence,” in James C. Mulvenon and Andrew N.D. Yang (eds.), *The People’s Liberation Army as Organization*, Santa Monica, CA: RAND, 2002, pp. 510-586.
- ⁷⁶ U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People’s Republic of China 2003*, July 30, 2003, p. 31.
- ⁷⁷ Keith Crane, et al., *Modernizing China’s Military: Opportunities and Constraints*, RAND Project Air Force, 2005, p. 202.
- ⁷⁸ U.S. Department of Defense, Office of the Secretary of Defense, *Military Power of the People’s Republic of China, 2006*, May 23, 2006, pp. 2, 28.
- ⁷⁹ *Ibid.*, pp. 2, 13-14, 28.

A box in the 2006 DOD report cites three Chinese articles to question whether China will maintain its no-first-use policy, including an interview with Chu Shulong at Qinghua University:

While affirming “no first use,” Chu Shulong, from the prestigious Qinghua University, also stated in a July 2005 interview printed in a state-owned media that “if foreign countries launch a full-scale war against China and deploy all types of advanced weapons except nuclear weapons, China may renounce this commitment [to no first use] at a time when the country’s fate hangs in the balance.

Yet according to Jeffrey Lewis at *armscontrolwonk.com*, the FBIS translation apparently used by the Pentagon was wrong. The FBIS headline was “PRC Expert Warns PRC May Renounce ‘No First Use’ of Nuclear Weapons in War Time, but the translation of the Chinese title is “PRC Expert: China’s Policy on Nuclear Weapons Remains Unchanged.” The Pentagon’s excerpt above appears to misrepresent what the Mr. Chu said by including one part of the interview but ignoring another:

The Director of Tsinghua University’s Institute of Strategic Studies, in an interview with a reporter from Da Gong Bao expressed, [sic] China’s promise not to be the first to use nuclear weapons was extremely clear and firm. As of now, their [sic] isn’t the slightest indication that China’s government will let go of this promise. “(I) have not heard any leader on any occasion state China will change or let go of this position. Never.”

At the same time Chu Shulong provided a hypothetical, except in the case of a foreign power launching a full scale war against China, using all

of their advanced (precision) weaponry except nuclear weapons, and the Chinese nation were facing the fanger of extermination, China may let go of this promise. But he considered the possibility not very great. “I think what Zhu Chenghu said is the worst possible circumstance, and the worst possible circumstance should not happen”.

See: Jeffrey Lewis, “China and No First Use,” [armscontrolwonk.com](http://www.armscontrolwonk.com/1082/china-and-no-first-use), May 31, 2006, URL <http://www.armscontrolwonk.com/1082/china-and-no-first-use>

⁸⁰ Peter W. Rodman, Assistant Secretary of Defense for International Security Affairs, The Military Power of the People’s Republic of China, prepared statement before the House Armed Services Committee Thursday, June 22, 2006, p. 5.

⁸¹ U.S. Department of Defense, Office of the Secretary of Defense, *Military Power of the People’s Republic of China*, 2006, May 23, 2006, pp. 13-14.

⁸² U.S. Defense Intelligence Agency, *People’s Republic of China Nuclear Weapons Employment Policy and Strategy*, March 1972, n.p. [sheet 8]. URL: http://www.fas.org/irp/dia/product/prc_72/dia_discussion.htm

⁸³ Statement of the Government of the People’s Republic of China on July 30, 1971, New China News Agency report, August 7, 1971, as quoted in U.S. Defense Intelligence Agency, *People’s Republic of China Nuclear Weapons Employment Policy and Strategy*, March 1972, Annex A: Force Development and Deployment , n.p. [sheet 4]. URL: http://www.fas.org/irp/dia/product/prc_72/app_a.htm; U.S. Defense Intelligence Agency, *People’s Republic of China Nuclear Weapons Employment Policy and Strategy*, March 1972, Annex A: Force Development and Deployment , n.p. [sheet 4]. URL: http://www.fas.org/irp/dia/product/prc_72/app_a.htm

⁸⁴ Cited in Robert S. Norris, et al., *Nuclear Weapons Databook Volume V: British, French, and Chinese Nuclear Weapons* (Boulder, CO.: Westview, 1994), pp. 335-336.

⁸⁵ U.S. Defense Intelligence Agency, *Nuclear Weapons Systems in China*, DEB-49-84, April 24, 1984, p. 4. Partially declassified and released under FOIA.

⁸⁶ Ibid.

⁸⁷ Ibid., p. 1. Partially declassified and released under FOIA.

⁸⁸ U.S. Defense Intelligence Agency, *Handbook of the Chinese People’s Liberation Army*, DDB-2680-32-84, November, p. 70. Released under FOIA. Unofficial sources estimated in 1984 that China possessed approximately 117 land-based ballistic missiles. See: *The Military Balance 1984-1985* (London: International Institute for Strategic Studies, 1984), p. 91.

⁸⁹ Foreign Ministry of the People’s Republic of China, Fact Sheet: *China: Nuclear Disarmament and Reduction of [sic]*, April 27, 2004, p. 1.

⁹⁰ U.S. Department of Defense, Office of the Secretary of Defense, *Proliferation: Threat and Response*, April 1996, p. 12. Emphasis added.

- ⁹¹ U.S. Department of Defense, Office of the Secretary of Defense, *Proliferation: Threat and Response*, November 1997, p. 16. Emphasis added.
- ⁹² Lt. Gen. Michael D. Maples, USA, Director, Defense Intelligence Agency, “Current and Projected National Security Threats to the United States,” Statement for the Record before the Senate Armed Services Committee, 28 February 2006, p. 4. Emphasis added. One source estimates that China produced a total of two to five tons of plutonium before it ceased production around 1990. David Wright and Lisbeth Gronlund, *Estimating China’s Production of Plutonium for Weapons*, Union of Concerned Scientists, January 16, 2003, p. 1.
- ⁹³ Foreign Ministry of the People’s Republic of China, Fact Sheet: *China: Nuclear Disarmament and Reduction of* [sic], April 27, 2004, p. 1.
- ⁹⁴ Some analysts believe the Chinese arsenal may be even smaller. See: Jeffrey Lewis, “China’s Ambiguous Arsenal,” *Bulletin of the Atomic Scientists*, May/June 2005.
- ⁹⁵ U.S. Department of Defense, Office of the Secretary of Defense, *Military Power of the People’s Republic of China, 2006*, May 23, 2006, p. 50. Colors and notes added.
- ⁹⁶ Vice Admiral Lowell E. Jacoby, U.S. Navy, Director, Defense Intelligence Agency, *Current and Projected National Security Threats to the United States*, statement for the record before the Senate Select Committee on Intelligence, February 16, 2005, p. 9.
- ⁹⁷ Defense Intelligence Agency, *The Decades Ahead: 1999-2020, A Primer on the Future Threat*, July 1999, p. 38. Reprinted in Rowen Scarborough, *Rumsfeld’s War: The Untold Story of America’s Anti-Terrorist Commander* (Washington, DC: Regnery Publishing Co., 2004), pp. 194-223. This 2020 estimate assumes a Chinese build-up in response to U.S. deployment of the missile defense system.
- ⁹⁸ U.S. Central Intelligence Agency, Director of Central Intelligence, *Foreign Missiles Developments and the Ballistic Missile Threat Through 2015*, National Intelligence Council, December 2001, p. 8.
- ⁹⁹ U.S. Department of Defense, Office of the Secretary of Defense, “*The Military Power of the People’s Republic of China, 2002*,” 2002, p. 27.

This forecast appears to include only that portion of the ICBM force that is primarily targeted against the United States. The role currently served by the DF-5A. The language used by the DOD is: “China currently has around 20 ICBMs capable of targeting the United States. This number will increase to around 30 by 2005 and may reach 60 by 2010.” Ibid.

- ¹⁰⁰ U.S. Central Intelligence Agency, Director of Central Intelligence, *Foreign Missiles Developments and the Ballistic Missile Threat Through 2015*, National Intelligence Council, December 2001, p. 8; Robert D. Walpole, Strategic and Nuclear Programs, National Intelligence Council, Central Intelligence Agency, testimony before the International Security, Proliferation and Federal Services Subcommittee of the Senate Governmental Affairs Committee hearing on CIA National Intelligence Estimate of Foreign Missile Developments and the Ballistic Missile Threat Through 2015, March 11, 2002, p. 6.

- ¹⁰¹ U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2004*, 2004, p. 37. The estimate of 30 ICBMs by 2005 was first made by the DOD in the 2002 report on China's military capabilities and repeated in subsequent reports. The estimate is not included in the 2005 or 2006 reports. See also: U.S. Central Intelligence Agency, Director of Central Intelligence, *Foreign Missiles Developments and the Ballistic Missile Threat Through 2015*, National Intelligence Council, December 2001, p. 8.
- ¹⁰² Richard Fisher, "China's 'Power Projection,'" *Wall Street Journal*, April 13, 2006.
- ¹⁰³ U.S. Central Intelligence Agency, Director of Central Intelligence, *Foreign Missiles Developments and the Ballistic Missile Threat Through 2015*, National Intelligence Council, December 2001, p. 8. The variables for the estimate are explained in Robert D. Walpole, Strategic and Nuclear Programs, National Intelligence Council, Central Intelligence Agency, testimony before the International Security, Proliferation and Federal Services Subcommittee of the Senate Governmental Affairs Committee hearing on CIA National Intelligence Estimate of Foreign Missile Developments and the Ballistic Missile Threat Through 2015, March 11, 2002, p. 6.
- ¹⁰⁴ Defense Intelligence Agency, *The Decades Ahead: 1999-2020*, A Primer on the Future Threat, July 1999, p. 38. Reprinted in Rowen Scarborough, *Rumsfeld's War: The Untold Story of America's Anti-Terrorist Commander* (Washington, DC: Regnery Publishing Co., 2004), pp. 194-223.
- ¹⁰⁵ U.S. Central Intelligence Agency, Director of Central Intelligence, *Foreign Missiles Developments and the Ballistic Missile Threat Through 2015*, National Intelligence Council, December 2001, p. 8; Robert D. Walpole, Strategic and Nuclear Programs, National Intelligence Council, Central Intelligence Agency, testimony before the International Security, Proliferation and Federal Services Subcommittee of the Senate Governmental Affairs Committee hearing on CIA National Intelligence Estimate of Foreign Missile Developments and the Ballistic Missile Threat Through 2015, March 11, 2002, p. 6.
- ¹⁰⁶ U.S. Central Intelligence Agency, Director of Central Intelligence, "Foreign Missiles Developments and the Ballistic Missile Threat Through 2015," National Intelligence Council, December 2001, p. 8; Robert D. Walpole, Strategic and Nuclear Programs, National Intelligence Council, Central Intelligence Agency, testimony before the International Security, Proliferation and Federal Services Subcommittee of the Senate Governmental Affairs Committee hearing on CIA National Intelligence Estimate of Foreign Missile Developments and the Ballistic Missile Threat Through 2015, March 11, 2002, p. 6.
- ¹⁰⁷ Even if one assumes that China was capable of equipping (and decided to do so) each DF-5A with as many as eight smaller 250 kt warheads and the DF-31A with three 250 kt warheads each (the most extreme estimates we have seen made by private analysts), the total Megatonnage on China's ICBM force primarily targeted against the United States in 2015 would still be less than it is today (70 Mt vs. 80 Mt).
- ¹⁰⁸ U.S. Department of Defense, *Selected Military Capabilities of the People's Republic of China*, April 8, 1997, p. 4.

- ¹⁰⁹ Michael D. Maples, Lieutenant General, U.S. Army, Director, Defense Intelligence Agency, *Current and Projected National Security Threats to the United States*, Statement For the Record before the Senate Armed Services Committee, 28 February 2006, p. 4.
- ¹¹⁰ U.S. Central Intelligence Agency, *PRC Defense Policy and Armed Forces*, NIE 13-76, November 11, 1976, p. 13.
- ¹¹¹ Yue Xiaolin and Zhang Jianchu, "Second artillery brigade steps up only night confrontation exercise," *PLA Daily*, Chinese People's Liberation Army, January 27, 2005.
- ¹¹² Wang Xuezhong and He Tianjin, "Brigade of Second Artillery tempers support for actual war," *PLA Daily*, Chinese People's Liberation Army, March 31, 2005.
- ¹¹³ Li Yongfei and He Tianjin, "Second artillery signal regiment improves wartime capabilities," *PLA Daily*, Chinese People's Liberation Army, October 10, 2004.
- ¹¹⁴ Gao Zhiwen and Li Yongfei, "Second Artillery base raises overall combat effectiveness through combined training," *PLA Daily*, Chinese People's Liberation Army, July 20, 2006.
- ¹¹⁵ Zhang Jianzhong and He Tianjin, "Mobile support capability of SAF base boosted by a large margin," *PLA Daily*, Chinese People's Liberation Army, July 21, 2005.
- ¹¹⁶ Robert D. Walpole, Strategic and Nuclear Programs, National Intelligence Council, Central Intelligence Agency, testimony before the International Security, Proliferation and Federal Services Subcommittee of the Senate Governmental Affairs Committee hearing on CIA National Intelligence Estimate of Foreign Missile Developments and the Ballistic Missile Threat Through 2015, March 11, 2002, p. 26. Emphasis added.
- ¹¹⁷ Memo, SAC (SOBFB), "Holding Relocatable Targets (RTs) at Risk," February 17, 1987. Secret. Partially declassified and released under FOIA.
- ¹¹⁸ Strategic Air Command, "History of the Strategic Air Command 1 January-31 December 1987," Volume III, November 9, 1988, pp. III-31, III-32; Memo, SAC(XOBF), "Relocatable Targets in the SIOP," October 24, 1986. Both documents partially declassified and released under FOIA.
- ¹¹⁹ Admiral John T. Mitchell, U.S. Navy, Director, Strategic Systems Program Office, in U.S. Congress, Senate, Committee on Armed Services, Hearings on Department of Defense Authorization for Appropriations for Fiscal Year 1994 and the Future Years Defense Program, Part 7: Nuclear Deterrence, Arms Control and Defense Intelligence, 103rd Cong., 1st sess., 11 May 1993, p. 17.
- ¹²⁰ U.S. Department of Defense, Office of the Secretary of Defense, *Nuclear Posture Review Report*, January 8, 2002 (Submitted to Congress on December 31, 2001), pp. 47-48. Excerpts available via <http://www.GlobalSecurity.org>.
- ¹²¹ One notable exception is a report published by the Ballistic Missile Defense Organization in 1995: "Although missile inventories may not have expanded appreciably, this modernization includes the development and deployment of a new generation of IRBMs and ICBMs, and the transition from surface-to-surface missiles

(SSMs) mounted with single or *multiple reentry vehicle (MRV) nuclear warheads* to multiple independently targetable reentry vehicle (MIRV) warheads.” Ballistic Missile Defense Organization, BMDO Countermeasure Integration Program, “Country Profiles: China,” April 1995, p. 3. Emphasis added.

- ¹²² *Report of the Select Committee on U.S. National Security and Military/Commercial Concerns With the People’s Republic of China* (U.S. Government Printing Office, Washington D.C., 1999), Volume I, pp. ix, 77, 78, 186.

The conclusion of the intelligence community’s damage assessment was much more sober: “U.S. information acquired by the Chinese could help them develop a MIRV for a future mobile missile.” U.S. Central Intelligence Agency, “Key Findings: The Intelligence Community Damage Assessment on the Implications of China’s Acquisition of US Nuclear Weapons Information on the Development of Future Chinese Weapons,” Press Release, April 21, 1999.

- ¹²³ See for example James Risen and Jeff Gerth, “China Is Installing A Warhead Said To Be Based On U.S. Secrets,” *New York Times*, May 14, 1999, pp. A1, A10.

- ¹²⁴ Richard R. Fisher, *China Increases its Missile Forces While Opposing U.S. Missile Defense*, The Heritage Foundation, Backgrounder No. 1268, April 7, 1999, pp. 4-5, 6.

The author, it turns out, was also senior analyst for Chairman Chris Cox’s Republican Policy Committee that supported production of the Cox report, and a consultant on PLA issues for the Congressionally chartered *US China Security & Economic Review Commission*. Later, in a publication in 2002, the author scaled back his projection for multiple warheads on the DF-5 from eight to five. Richard Fisher, “New Pentagon Report: A Change in U.S. Attitude,” *Jamestown Foundation China Brief (Volume 2, Issue 16)*. Yet in a prepared testimony before Congress in July 2005, Fisher repeated the incorrect (compared with U.S. intelligence community statements) claim that three of China’s four types of long-range ballistic missiles “may contain multiple warheads” and become “active before 2010.” Richard Fisher, International Assessment and Strategy Center, “China’s Military Power: An Assessment From Open Sources,” prepared testimony before the House Armed Services Committee, July 27, 2005, p. 3.

In July 2006, Fischer’s claim about multiple warheads on the DF-31A were perpetuated once more in an interview *Jane’s Defence Weekly* made with him in response to the publication of the 2006 DOD report on China’s military forces. According to the magazine, Fischer said the DF-31A “may in fact be able to carry up to three payloads,” a conclusion he based on his belief that “the DF-31A is similar to the KT-2A” space launch vehicle, which is capable of carrying up to three space payloads. Caitlin Harrington, “US experts warn on China’s ICBM moves,” *Jane’s Defence Weekly*, July 19, 2006, p. 15.

MIRV claim was also repeated in the front-page story *Defense News* published in response to the 2006 DOD report. The story, which also incorrectly suggested that the DF-31A will have a longer range than the DF-5A, claimed that the DF-31A will have a payload of “up to 5 MIRVs.” Wendell Minnick, “China Speeds ICBM Plans: To Debut Missiles With Longer Reach in 2007,” *Defense News*, July 10, 2006, p. 1.

- ¹²⁵ David R. Tanks, *National Missile Defense: Policy Issues and Technological Capabilities*, Institute for Foreign Policy Analysis, July 2000, pp. 1.12, 1.13.
- ¹²⁶ The illustration to the left (DF-31) is from *Military.China.com* and the illustration to the right (DF-5) is from Richard R. Fisher, *China Increases its Missile Forces While Opposing U.S. Missile Defense*, The Heritage Foundation, Backgrounder No. 1268, April 7, 1999, p. 5.
- ¹²⁷ U.S. Central Intelligence Agency, Director of Central Intelligence, *Foreign Missiles Developments and the Ballistic Missile Threat Through 2015*, National Intelligence Council, December 2001, p. 8.
- ¹²⁸ U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2002*, 2002, pp. 27-28.
- ¹²⁹ Robert D. Walpole, Strategic and Nuclear Programs, Central Intelligence Agency, Statement for the Record to the Senate Subcommittee on International Security, Proliferation, and Federal Services on the Ballistic Missiles Threat to the United States, February 9, 2000, pp. 4, 7. Emphasis in original. See also: U.S. Central Intelligence Agency, Director of Central Intelligence, *Foreign Missiles Developments and the Ballistic Missile Threat Through 2015*, National Intelligence Council, December 2001, p. 8.
- Despite these predominant U.S. government assessments that China has not developed multiple warhead payloads for its ballistic missiles and that a MIRV capability for mobile missiles is many years away, an internal Ballistic Missile Defense Organization (BMDO) document in 1995 described the Chinese missile development as a “transition from surface-to-surface missiles (SSM) mounted with single or multiple reentry vehicle (MRV) nuclear warheads to multiple independently targetable reentry vehicle (MIRV) warheads. U.S. Ballistic Missile Defense Organization (BMDO), BMDO Countermeasure Integration Program, *Country Profiles: China*, April 1995, p. 3.
- ¹³⁰ U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2002*, 2002, pp. 27-28.
- ¹³¹ Robert D. Walpole, Strategic and Nuclear Programs, National Intelligence Council, Central Intelligence Agency, testimony before the International Security, Proliferation and Federal Services Subcommittee of the Senate Governmental Affairs Committee hearing on CIA National Intelligence Estimate of Foreign Missile Developments and the Ballistic Missile Threat Through 2015, March 11, 2002, p. 27. Emphasis added.
- ¹³² U.S. Central Intelligence Agency, Director of Central Intelligence, *Foreign Missiles Developments and the Ballistic Missile Threat through 2015*, National Intelligence Council, December 2001, p. 8.
- ¹³³ U.S. Central Intelligence Agency, Key Findings: *The Intelligence Community Damage Assessment on the Implications of China's Acquisition of US Nuclear Weapons Information on the Development of Future Chinese Weapons*, Press Release, April 21, 1999.
- ¹³⁴ Bill Gertz and Rowan Scarborough, “China Missile Threat,” *Washington Times*, Inside the Ring, September 9, 2005, p. A6. Emphasis added.

¹³⁵ The Chinese define ballistic missile ranges as:

Short-range: less than 1,000 km;
 Medium-range: between 1,000 and 3,000 km;
 Long-range: between 3,000 and 8,000 km;
 Intercontinental-range: above 8,000 km.

The Pentagon, in contrast, defines ballistic missile ranges as:

Short-range: less than 1,100 km;
 Medium-range: between 1,100 and 2,750 km;
 Intermediate-range: between 2,750 and 5,500 km;
 Intercontinental range: above 5,500 km.

U.S. Department of Defense, Joint Staff, *Department of Defense Dictionary of Military and Associated Terms*, Joint Publication 1-02, April 12, 2001 (As Amended through April 14, 2006), pp. 332, 485.

The 2006 update does not define intermediate- and intercontinental-range but these definitions were included in the 1998 version. See: U.S. Department of Defense, Joint Staff, *Department of Defense Dictionary of Military and Associated Terms*, Joint Publication 1-02, March 23, 1994 (As amended through June 10, 1998), pp. 221, 222.

¹³⁶ Wendell Minnick, “China Speeds ICBM Plans: To Debut Missiles With Longer Reach in 2007,” *Defense News*, July 10, 2006, p. 1.

The article also repeated the inaccurate (compared with the U.S. intelligence community) prediction that the DF-31A will carry “up to 5 MIRVs.”

¹³⁷ The DF-15 (CSS-6) short-range ballistic missile may also have a nuclear capability, although the vast majority of the deployed missiles are thought to be armed with conventional warheads.

¹³⁸ Sources: ; Mark A. Stokes, “The People’s Liberation Army and China’s Space and Missile Development” Lessons from the Past and Prospects for the Future,” in Laurie Burkitt (ed.), et al., *The Lessons of History: The Chinese People’s Liberation Army at 75* (U.S. Army War College, Strategic Studies Institute, July 2003), p. 203; Bates Gill, et al., “The Chinese Second Artillery Corps: Transition to Credible Deterrence,” in James C. Mulvenon and Andrew N.D. Yang (eds.), *The People’s Liberation Army as Organization*, Santa Monica, CA: RAND, 2002, pp. 541-542; U.S. Air Force, National Air Intelligence Center, “China Incrementally Downsizing CSS-2 IRBM Force,” *Foreign Missile Update*, NAIC-1030-098B-96, November 1996, pp. 12-13. Reproduced in Bill Gertz, *The China Threat: How the People’s Republic Targets America* (Washington, D.C.: Regnery, 2000), pp. 233-234.

¹³⁹ Training levels at Dengshahe dropped from 5-8 months per year in late-1980s to 4 months per year in the mid-1990s.

¹⁴⁰ By the mid-1990s, four DF-3A and four DF-21 (Mod 1) launch sites were operational at Jianshui.

- ¹⁴¹ Of 16 launch site garrisons built at Lianxiwang, up to 10 were operating DF-3A in 1996, two were under conversion to DF-21 (Mod 1), and DF-3A training was being reduced. Four garrisons may remain until DF-3A is retired.
- ¹⁴² Of the 12 launch site garrisons at Tonghua in 1996, only 4 (with 8 launchers) still operated the DF-3A, and 3 of those four were candidates for conversion to DF-21.
- ¹⁴³ Yidu may have been converted to DF-21. See Figure 16 for image of possible launch site.
- ¹⁴⁴ See Figure 20 and 21 for images of DF-4 launch sites at Delingha.
- ¹⁴⁵ U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2003*, 2003, p. 23.
- ¹⁴⁶ U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2000*, 2000, p. 17.
- ¹⁴⁷ The unclassified range of the DF-3A appears to be 2,800 km, which makes it a “long-range” missile rather than a “medium-range” missile as is normally reported. See: U.S. Air Force, National Air Intelligence Center, “China Incrementally Downsizing CSS-2 IRBM Force,” *Foreign Missile Update*, NAIC-1030-098B-96, November 1996, p. 12. Reproduced in Bill Gertz, *The China Threat: How the People's Republic Targets America* (Washington, D.C.: Regnery, 2000), pp. 233-234; U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2005*, July 20, 2005, p. 45; U.S. Department of the Air Force, National Air Intelligence Center, *Ballistic and Cruise Missile Threat*, NAIC-1031-0995-03, August 2003, p. 10.
- ¹⁴⁸ U.S. Defense Intelligence Agency, *Nuclear Weapons Systems in China*, DEB-49-84, April 24, 1984, p. 4. Partially declassified and released under FOIA. Mark Stokes sets the peak at 120 missiles. Mark A. Stokes, “The People's Liberation Army and China's Space and Missile Development” Lessons from the Past and Prospects for the Future,” in Laurie Burkitt (ed.), et al., *The Lessons of History: The Chinese People's Liberation Army at 75* (U.S. Army War College, Strategic Studies Institute, July 2003), p. 203.
- The CIA predicted in 1976 that the number of DF-3 launchers would level off at 40 by 1977. U.S. Central Intelligence Agency, *PRC Defense Policy and Armed Forces*, National Intelligence Estimate 13-76, November 11, 1976, p. 23.
- ¹⁴⁹ U.K. Ministry of Defence, Statement of Defence Estimates 1992 (London: HMSO, July 1992), Cmnd 1981, p. 21, as cited in Robert S. Norris, et al., *Nuclear Weapons Databook Volume V: British, French, and Chinese Nuclear Weapons* (Boulder, CO.: Westview, 1994,) p. 7.
- ¹⁵⁰ U.S. Department of Defense, Office of the Secretary of Defense, *Military Power of the People's Republic of China, 2006*, May 23, 2006, p. 50.
- ¹⁵¹ U.S. Air Force, National Air Intelligence Center, “China Incrementally Downsizing CSS-2 IRBM Force,” *Foreign Missile Update*, NAIC-1030-098B-96, November 1996, p. 12. Reproduced in Bill Gertz, *The China Threat: How the People's Republic Targets America* (Washington, D.C.: Regnery, 2000), pp. 233-234.

¹⁵² U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2004*, 2004, p. 37.

¹⁵³ Ibid.

¹⁵⁴ U.S. Air Force, National Air Intelligence Center, "China Incrementally Downsizing CSS-2 IRBM Force," in *Foreign Missile Update*, NAIC-1030-098B-96, November 1996, p. 12. Reproduced in Bill Gertz, *The China Threat: How the People's Republic Targets America* (Washington, D.C.: Regnery, 2000), pp. 233-234.

¹⁵⁵ Ibid.

¹⁵⁶ U.S. Department of Defense, Office of the Secretary of Defense, *Military Power of the People's Republic of China, 2006*, May 23, 2006, p. 50.

¹⁵⁷ U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2005*, July 20, 2005, p. 45.

It is also curious that the 2005 DOD table shows far fewer DF-21 missiles than launchers. It is a possibility, although this has not been confirmed, that the DF-21 information in the report table has been reversed by mistake so that it shows 19-23 missiles for 34-38 launchers instead of 34-38 missiles for 19-23 launchers.

¹⁵⁸ U.S. Department of the Air Force, National Air and Space Intelligence Center, *Ballistic and Cruise Missile Threat*, NAIC-1031-0985-06, March 2006, p. 10.

This estimate has not changed since 2003. See: U.S. Department of the Air Force, National Air and Space Intelligence Center, *Ballistic and Cruise Missile Threat*, NAIC-1031-0985-03, February 2002 (Revised August 2003), p. 10.

¹⁵⁹ Robert S. Norris, et al., *Nuclear Weapons Databook Volume V: British, French, and Chinese Nuclear Weapons* (Boulder, CO.: Westview, 1994), p. 388.

¹⁶⁰ Bates Gill, et al., "The Chinese Second Artillery Corps: Transition to Credible Deterrence," in James C. Mulvenon and Andrew N.D. Yang (eds.), *The People's Liberation Army as Organization*, Santa Monica, CA: RAND, 2002, p. 510.

¹⁶¹ U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2000*, 2000, p. 17.

¹⁶² U.S. Central Intelligence Agency, *PRC Defense Policy and Armed Forces*, National Intelligence Estimate 13-76, November 11, 1976, p. 23.

¹⁶³ U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2005*, July 20, 2005, p. 45.

¹⁶⁴ U.S. Central Intelligence Agency, Director of Central Intelligence, *Foreign Missiles Developments and the Ballistic Missile Threat Through 2015*, National Intelligence Council, December 2001, p. 8.

¹⁶⁵ U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2005*, 2005, p. 28; ; U.S. Department of Defense,

Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2002*, 2002, p. 27.

- ¹⁶⁶ U.S. Department of Defense, Office of the Secretary of Defense, *Military Power of the People's Republic of China, 2006*, May 22, 2006, p. 50.
- ¹⁶⁷ U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2005*, 2005, p. 28. The 2000 DOD report stated that "China reportedly has built 18 CSS-4 silos." U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2000*, 2000, p. 17.
- ¹⁶⁸ U.S. Defense Intelligence Agency, *China's Evolving Nuclear Strategies*, Special Defense Intelligence Estimate, DDE-2200-321-85, pp. 1, 8, 10. Document is available at <http://www.armscontrolwonk.com>.
- ¹⁶⁹ Richard Fisher, International Assessment and Strategy Center, "China's Military Power: An Assessment From Open Sources," prepared testimony before the House Armed Services Committee, July 27, 2005, p. 8.
- ¹⁷⁰ Robert S. Norris, et al., *Nuclear Weapons Databook Volume V: British, French, and Chinese Nuclear Weapons* (Boulder, CO.: Westview, 1994), p. 364.
- ¹⁷¹ U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2002*, 2002, p. 27.
- ¹⁷² U.S. Department of Defense, Office of the Secretary of Defense, *The Military Power of the People's Republic of China, 2005*, 2005, p. 29.
- ¹⁷³ General Eugene Habiger, Command of U.S. Strategic Command, DOD News Briefing, June 16, 1998, 2:15 pm.
- ¹⁷⁴ The DOD stated in 2001 that the range of DF-5A is "over 13,000 kilometers." U.S. Department of Defense, Office of the Secretary of Defense, *Proliferation: Threat and Response*, January 2001, p. 15.
- ¹⁷⁵ U.S. Defense Intelligence Agency, *Handbook of the Chinese People's Liberation Army*, DDB-2680-32-84, November, pp. 71, A-44. Released under FOIA.
- ¹⁷⁶ U.S. Department of Defense, Office of the Secretary of Defense, *Military Power of the People's Republic of China, 2006*, May 23, 2006, pp. 27, 50.
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- ³⁰⁴ U.S. Department of Defense, Office of the Secretary of Defense, *Nuclear Posture Review Report*, January 8, 2002 (Submitted to Congress on December 31, 2001), pp. 46, 47. Excerpts available via <http://www.GlobalSecurity.org>.
- ³⁰⁵ See Robert S. Norris et al., *British, French and Chinese Nuclear Weapons* (Boulder, CO: Westview Press, 1994), pp. 349-350; Barry Naughton, "The Third Front: Defence Industrialization in the Chinese Interior," *China Quarterly*, No. 115 (September 1988), pp. 351-386; Barry Naughton, "Industrial Policy During the Cultural Revolution: Military Preparation, Decentralization, and Leaps Forward," in William A. Joseph, Christine P. W. Wong, and David Zweig, eds., *New Perspectives on the Cultural Revolution* (Cambridge, MA: Harvard University Press, 1991), pp. 153-181. The first line is the industrialized coastal region that is vulnerable to attack. The second line is the inland region and the third line is the secure base area deep in the interior of the country. Naughton translates *san xian* as "third front" instead of third line.
- ³⁰⁶ Mao placed Deng Xiaoping in charge of the Third Line project. "The cost of the Third Line was nearly 40 percent of China's capital budget from 1963-65, 53 percent in the next five years, and 45 percent up to 1975 No project of Mao's was to prove so costly, so labor-intensive, so economically unfeasible, or so disruptive as the Third Line." Harrison E. Salisbury, *The New Emperors: China in the Era of Mao and Deng* (Boston: Little Brown and Company, 1992), pp. 126, 127.
- ³⁰⁷ U.S. Defense Intelligence Agency, *People's Republic of China Nuclear Weapons Employment Policy and Strategy*, March 1972, Annex A: Force Development and

Deployment, n.p. [sheet 2]. URL:
http://www.fas.org/irp/dia/product/prc_72/app_a.htm

- ³⁰⁸ Dr. Lyle Goldstein and Bill Murray, “From Humble Origins: China’s Submarine Force Comes of Age,” *Undersea Warfare*, Winter 2004, n.p. [html version p. 5].
- ³⁰⁹ Wilson Lewis and Xue Litai, *China’s Strategic Seapower* (Stanford University Press, 1994), p. 123.
- ³¹⁰ Desmond Ball and Jeffrey Richelson, ed., *Strategic Nuclear Targeting* (Cornell University Press: 1986), pp. 62, 82.
- ³¹¹ U.S. Pacific Command, CINCPAC Command History 1960, 1961, pp. 19-20. Secret. Partially declassified and released under FOIA.
- ³¹² *Ibid.*, p. 42.
- ³¹³ Desmond Ball and Jeffrey Richelson, ed., *Strategic Nuclear Targeting* (Cornell University Press: 1986), p. 82.
- ³¹⁴ Carl Kaysen to General Maxwell Taylor, Military Representative to the President, “Strategic Air Planning and Berlin,” 5 September 1961, Top Secret, excised copy, with cover memoranda to Joint Chiefs of Staff Chairman Lyman Lemnitzer. Partially declassified and released to National Security Archive. Available on the Internet at <http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB56/BerlinC1.pdf>
- ³¹⁵ U.S. Strategic Air Command, *History of the Strategic Air Command, 1 January 1958-30 June 1958*, Historical Study No. 78, Volume I, p. 108. Partially declassified and released under FOIA appeal.
- ³¹⁶ Director of Central Intelligence, *Communist China’s Advanced Weapons Program*, Special National Intelligence Estimate No. 13-2-63, July 24, 1963, pp. 1-2. Released under FOIA to the National Security Archive. The document is available on the Internet at [<http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB19/01-01.htm>].
- ³¹⁷ U.S. Department of Defense, Office of the Assistant to the Secretary of Defense (Atomic Energy), “History of the Custody and Deployment of Nuclear Weapons: July 1945 Through September 1977,” February 1978, p. 180. Top Secret. Partially declassified and released under FOIA to Robert S. Norris, Natural Resources Defense Council; Robert Norris, et al., “Where They Were,” *Bulletin of the Atomic Scientists*, November/December 1999, Vol. 55, No. 6, p. 30. Available on the Internet at <http://www.thebulletin.org/issues/1999/nd99/nd99norris.html>
- ³¹⁸ B. F. Jaeger and M. Weiner, “Military Aspects of a Study of the Implications of a Communist Chinese Nuclear Capability,” RAND Memorandum RM-3418-PR, March 1963, p. v. Released under FOIA.
- ³¹⁹ In addition to a more “pure” strategic targeting, non-strategic nuclear forces continued to provide support to smaller contingencies in the region. PACOM’s analysis in support of the annual Nuclear Weapons Requirements Study from April

1962 for the Fiscal Year 1965, for example, contained a “greater recognition of the Allied nuclear capable delivery vehicles to give fire support in the Taiwan and Korean area.” U.S. Pacific Command, *CINCPAC Command History 1962*, Volume I, April 30, 1963, p. 38. Emphasis added. Partially declassified and released under FOIA.

³²⁰ U.S. Strategic Air Command, *History of Strategic Air Command January-June 1962*, Historical Study No. 91, Vol. I, p. 86. Partially declassified and released under FOIA.

³²¹ U.S. Strategic Air Command, *History of the Strategic Air Command July-December 1963*, Historical Study No. 93, Volume I, August 1964, pp. 102, 103. Partially declassified and released under FOIA.

³²² U.S. Strategic Air Command, *History of the Strategic Air Command January-June 1964*, Historical Study No. 95, Volume I, January 1965, p. 106. Partially declassified and released under FOIA.

³²³ *Ibid.*, p. 107.

The program, however, was effected on a scheduled basis, and the B-52 Reflex operation did not completely replace the B-47 Air Mail force until the second week of April 1964.

³²⁴ U.S. Strategic Air Command, *History of the Strategic Air Command July-December 1965*, Volume I, December 1966, p. 200. Partially declassified and released under FOIA.

³²⁵ *Ibid.*, pp. 200, 201.

³²⁶ U.S. Pacific Command, *CINCPAC Command History 1966*, Volume I, June 3, 1967, pp. 64-65. Partially declassified and released under FOIA.

China was described as a “disruptive element in underdeveloped countries and a military threat in Asia.” *Ibid.*

³²⁷ U.S. Pacific Command, *CINCPAC Command History 1967*, Volume I, March 28, 1968, p. 96. Partially declassified and released under FOIA.

³²⁸ *Ibid.*, p. 93.

³²⁹ U.S. Department of State, *A Study of U.S.-Soviet Military Relationships 1957-1976: Foreign Policy Implications*, Staff Study, December 18, 1967, Appendix A, p. 7.

³³⁰ Joint Staff, *Joint Staff Briefing of the Single Integrated Operational Plan (SIOP)*, January 27, 1969, Top Secret, p. 5. Partially declassified and released under FOIA to the National Security Archive. Available at <http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB173/index.htm>

³³¹ For the Soviet portion of the option, this would involve roughly 1,750 warheads. Memorandum, Laurence E. Lynn, Jr. to Dr. Kissinger, “The SIOP,” November 8, 1969, Top Secret, p. 2. Mandatory Review Release to the National Security Archive. Available at <http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB173/index.htm>

- ³³² Memorandum, Laurence E. Lynn, Jr. to Dr. Kissinger, “The SIOP” November 8, 1969, Top Secret, p. 2. Mandatory Review Release to the National Security Archive. Available at <http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB173/index.htm>
- ³³³ U.S. National Security Council, Memorandum of Conversation, “Subject: Minutes of NSC Meeting of Defense Strategy,” August 13, 1971. At U.S. Department of State, Foreign Relations, 1969-1976, Volume I, Foundations of Foreign Policy, document 96.
- ³³⁴ National Security Council, Defense Program Review Committee, “U.S. Strategic Objectives and Force Posture Executive Summary,” January 3, 197[2], Top Secret, p. 29. Partially declassified and released under FOIA to National Security Archive.
- ³³⁵ *Ibid.*, p. 101.
- ³³⁶ *Ibid.*, pp. 100, 101.
- ³³⁷ *Ibid.*, pp. 102, 103.
- ³³⁸ *Ibid.*, p. 103.
- ³³⁹ Robert S. Norris, et al., “‘Appendix B:’ Deployments by Country, 1951-1977,” *Bulletin of the Atomic Scientists*, November-December 1999, p. 67. From January 1958 to June 1962 Matador missiles were deployed on Taiwan.
- ³⁴⁰ National Security Council, Defense Program Review Committee, *U.S. Strategic Objectives and Force Posture Executive Summary*, January 3, 197[2], Top Secret, pp. 34, 101. Partially declassified and released under FOIA to National Security Archive.
- ³⁴¹ U.S. Pacific Command, *CINCPAC Command History 1974*, Volume I, n.d. [1975], p. 265. Partially declassified and released under FOIA to Peter Hayes.
- ³⁴² *Ibid.*, pp. 150, 263, 264-265; Office of the Assistant to the Secretary of Defense (Atomic Energy), *History of the Custody and Deployment of Nuclear Weapons: July 1945 Through September 1977*, February 1978, p. B-3. Partially declassified and released under FOIA to Robert S. Norris.
- ³⁴³ The denuclearization of the Philippines in June 1977 followed an earlier withdrawal of 140 nuclear weapons in 1976 when, in accordance with the FY 1977 Nuclear Weapons Deployment Plan, 140 nuclear weapons were loaded onto USS Flint (AE-32) at Cubi Point and sailed on December 1st. U.S. Pacific Command, *CINCPAC Command History 1976*, Volume I, 1977, p. 197. Partially declassified and released under FOIA to Peter Hayes; Office of the Assistant to the Secretary of Defense (Atomic Energy), *History of the Custody and Deployment of Nuclear Weapons: July 1945 Through September 1977*, February 1978, p. B-4. Partially declassified and released under FOIA to Robert S. Norris.
- ³⁴⁴ Department of the Navy, Strategic Systems Programs Office, *Facts/Chronology: Polaris-Poseidon-Trident*, 1996, p. 31.
- Construction of the POMFPAC facility at Bangor, WA, commenced on March 5, 1963. *Ibid.*, p. 33.

³⁴⁵ The USS Ethan Allen (SSBN-608) was not homeported in the Pacific but at Charleston in South Carolina, and the Navy had originally intended to conduct the Frigate Bird test in the Atlantic Ocean with target area near Ascension Island mid-way between South American and Africa. The Joint Chiefs of Staff granted approval in March and USS Ethan Allen departed Charleston on April 19th with four of the 16 standard Polaris A2 missiles slightly modified with tracking beacons and command-destruct systems. Transit with the nuclear weapons was made through the Panama Canal. Originally planned for May 5th, technical and weather problems delayed Frigate Bird one day and the first two Polaris missiles failed to launch. After completion of the test, the USS Ethan Allen was rushed back to North Carolina, and on June 26th the submarine departed Charleston for its first deterrent patrol in the Atlantic. Edward C. Whitman, "The Other Frigate Bird," *Undersea Warfare*, U.S. Navy, Office of the Chief of Naval Operations, Fall 2004, n.p.; Department of the Navy, Strategic Systems Programs Office, *Facts/Chronology: Polaris-Poseidon-Trident*, 1996, p. 31.

³⁴⁶ U.S. Pacific Command, *CINCPAC Command History 1962*, Volume I, April 30, 1963, p. 38. Partially declassified and released under FOIA.

³⁴⁷ U.S. Pacific Command, *CINCPAC Command History 1963*, April 27, 1964, p. 34. Partially declassified and released under FOIA to Peter Hayes.

³⁴⁸ Department of the Navy, Strategic Systems Programs Office, *Facts/Chronology: Polaris-Poseidon-Trident*, 1996, p. 32.

³⁴⁹ U.S. Strategic Air Command, *History of the Joint Strategic Target Planning Staff: Revisions 1-8 to SIOP-64*, January 1967, p. 28. NOFORN/TOP SECRET. Partially declassified and released under FOIA. Available at National Security Archive, Washington, D.C.

³⁵⁰ Department of the Navy, Strategic Systems Programs Office, *Facts/Chronology: Polaris-Poseidon-Trident*, 1996, p. 33.

Subsequent deterrent patrols in 1965 in the Pacific included: USS Tecumseh (SSBN-628) departing Apra Harbor, Guam, on January 24; USS Ulysses S. Grant (SSBN-631) departing Pearl Harbor, HI, on February 6; and USS Stonewall Jackson (SSBN-634) departing Bangor, WA, on April 9. *Ibid*, pp. 34-35. R. B. Byers, ed., *The Denuclearisation of the Oceans* (Kent: Croom Helm, 1986), p. 244.

Less than six months after the SSBNs began to depart from Guam on deterrent patrols in the Pacific, China formally authorized development of the DF-4 (CSS-3), the first Chinese ballistic missile capable of targeting Guam. Bates Gill, et al., "The Chinese Second Artillery Corps: Transition to Credible Deterrence," in James C. Mulvenon and Andrew N.D. Yang (eds.), *The People's Liberation Army as Organization*, Santa Monica, CA: RAND, 2002, p. 510.

³⁵¹ Department of the Navy, *United States Navy Submarine Centennial Chronology*, n.d. [last entry September 2, 1999]. Available online at <http://www.chinfo.navy.mil/navpalib/ships/submarines/centennial/chrono.html>

³⁵² U.S. Pacific Command, *CINCPAC Command History 1971*, Volume I, May 31, 1972, p. 214. Partially declassified and released under FOIA.

The last operational Polaris A3 missiles left the Atlantic on August 10, 1973, as the USS Robert E. Lee (SSBN-601) sailed through the Panama Canal to commence deterrent patrols in Pacific. Tim VeArd, U.S. Navy (Ret.), USS Robert E. Lee Blue crew (NavET, 1965-70), *History of the USS Robert E. Lee*, n.d. [downloaded July 19, 2000]. Available online at <http://www.ssb601.com/history.htm>

³⁵³ Memorandum, General Haig to the President's Files, August 10, 1971. National Archives, Nixon Presidential Materials, President's Office File, box 85, beginning August 8, 1971.

³⁵⁴ U.S. Pacific Command, *CINCPAC Command History 1965*, Volume I, 1966, pp. 32-33. Top Secret. Partially declassified and released under FOIA to Peter Hayes.

³⁵⁵ U.S. Congress, Senate, Hearings on Department of Defense Authorization for Military Procurement, Research and Development for Fiscal Year 1973, Part 5, 90th Cong., 1972, p. 2844; as cited in Bruce G. Blair, *Strategic Command And Control: Redefining the Nuclear Threat* (The Brookings Institution, Washington, D.C., 1985), p. 169.

³⁵⁶ Bruce G. Blair, *Strategic Command And Control: Redefining the Nuclear Threat* (The Brookings Institution, Washington, D.C., 1985), p. 172.

³⁵⁷ U.S. Strategic Command, *History of the Strategic Air Command July-December 1969*, Volume I, 1970, p. 208. Partially declassified and released under FOIA.

³⁵⁸ U.S. Pacific Command, *CINCPAC Command History 1972*, Volume I, n.d. [1973], pp. 43, 44. Partially declassified and released under FOIA.

³⁵⁹ U.S. Pacific Command, *CINCPAC Command History 1973*, Volume I, n.d. [1974], p. 71. Partially declassified and released under FOIA.

³⁶⁰ Bruce G. Blair, *Strategic Command And Control: Redefining the Nuclear Threat* (The Brookings Institution, Washington, D.C., 1985), p. 198.

³⁶¹ Deployments to Taiwan were discontinued in 1974 following withdrawal of U.S. forces from the island.

³⁶² U.S. Pacific Command, *CINCPAC Command History 1974*, Volume I, n.d. [1975], pp. 97-98. Partially declassified and released under FOIA.

³⁶³ U.S. Pacific Command, *CINCPAC Command History 1973*, Volume I, n.d. [1974], p. 71; U.S. Pacific Command, *CINCPAC Command History 1974*, Volume I, n.d. [1975], p. 98. Both documents partially declassified and released under FOIA to Peter Hayes.

The VLF/LF capability of the ABNCP aircraft, which made direct communication with the submarines possible without the TACAMO aircraft, had been installed on ABNCP aircraft in 1969 despite the objection of CINCPAC. JCS ordered the equip-

- ment installed as part of the Minimum Essential Emergency Communications Net, although CINCPAC worried that the EC-135P ABNCP aircraft would be too heavy. With the extra weight, ABNCP in Hawaii would be able to reach Guam all times a year but only Yokota AB in good weather. Clark AB in the Philippines and Andrews AFB in Washington would be out of reach without refueling. U.S. Pacific Command, *CINCPAC Command History 1969*, Volume I, n.d. [1970], pp. 44-45. Partially declassified and released under FOIA.
- ³⁶⁴ U.S. Pacific Command, *CINCPAC Command History 1975*, Volume I, n.d. [1976], p. 63. Partially declassified and released under FOIA to Peter Hayes; Bruce G. Blair, *Strategic Command and Control: Redefining the Nuclear Threat* (The Brookings Institution, Washington, D.C., 1985), p. 170.
- ³⁶⁵ Department of the Navy, PMA-271: *Airborne Strategic Command, Control, and Communications (C3 Program*, n.d. [downloaded 2/9/00], n.p. ["ECX (TACAMO aircraft, Future) STUDIES"]. Available online at http://pma271.navair.navy.mil/history/history_txt.html
- ³⁶⁶ U.S. Pacific Command, *CINCPAC Command History 1978*, Volume II, n.d. [1979], p. 329. Partially declassified and released under FOIA.
- ³⁶⁷ U.S. Congress, Senate, Committee on Appropriations, Hearings on Department of Defense Appropriations for Fiscal Year 1982, Part 7, 99st Cong., 1983, p. 4724; as cited in Bruce G. Blair, *Strategic Command And Control: Redefining the Nuclear Threat* (The Brookings Institution, Washington, D.C., 1985), p. 270.
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- ³⁷⁰ David M. Kunsman and Douglas B. Lawson, *A Primer on U.S. Strategic Nuclear Policy*, Sandia National Laboratories, SAND2001-0053, January 2001, p. 17.
- ³⁷¹ William Burr, *The Nixon Administration, the SIOF, and the Search for Limited Nuclear Options, 1969-1974*, National Security Archive Electronic Briefing Book No. 173, November 23, 2005, URL <http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB173/index.htm>. Jack Kangas, et al, *U.S. Nuclear Weapons Policy Toward China 1985-1995*, DNA-5895F, February 10, 1981, p. 88. Partially declassified and released under FOIA to Peter Hayes.
- ³⁷² Memorandum, Henry Kissinger to President Richard Nixon, *Nuclear Policy*, January 7, 1974, p. 3. Declassified and released to National Security Archive.

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- ³⁷⁶ U.S. Department of Defense, Office of Secretary of Defense, *Policy Guidance for the Employment of Nuclear Weapons*, April 3, 1974, pp. A-5, A-6; U.S. National Security Council, *Analytical Summary; DOD Targeting Study Results and Proposals*, n.d. [January 1973], pp. 4-6; Attachment C to Memorandum, Phil Odeen to Henry Kissinger, *Secretary Laird's Memo to the President Dated December 26, 1972 Proposing Changes in U.S. Strategic Policy*, January 5, 1973. Top Secret/Sensitive. Obtained by National Security Archive. Both documents are available at <http://www.gwu.edu/~nsarchiv/NSAEBB/NSAEBB173/index.htm>.
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- ³⁸² This was the first foreign port visit in the PACOM of a Fleet Ballistic Missile nuclear submarine. U.S. Pacific Command, *CINCPAC Command History 1976*, Volume I, October 18, 1977, p. 196. Partially declassified and released under FOIA.
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- ³⁸⁵ This visit reportedly was a mid-patrol break. Tim VeArd, U.S. Navy (Ret.), USS Robert E. Lee Blue crew (NavET, 1965-70), *History of the USS Robert E. Lee*, n.d. [downloaded July 19, 2000]. Available online at <http://www.ssb601.com/history.htm>
- ³⁸⁶ This was the last visit before conversion to attack submarine on November 20, 1981. Norman Friedman, *U.S. Submarines Since 1945* (Annapolis, Maryland: Naval Institute Press, 1994), p. 235.
- ³⁸⁷ This reportedly was a “mid-patrol break” during a deterrent patrol from Guam. During its subsequent 55th and final patrol, which was also the US Navy’s last A3T Polaris patrol, the submarine reportedly crossed the Equator and International Date Line at the same time. *History of the USS Robert E. Lee*, Unofficial SSBN 601 Web Site, updated as of January 22, 2003, URL <<http://www.ssb601.com/history.asp>>.
- ³⁸⁸ Barbara Gilmore, Chronology of U.S. Naval Events, 1979, Operational Archives, U.S. Naval History Division, 20 January 1980, 26 October entry; U.S. Department of the Navy, *1979-1980 Western Pacific-Indian Ocean Deployment Report, USS Kitty Hawk (CV-63)*, n.d., enclosure to 1980 Command History, p. 3.
- ³⁸⁹ Department of the Navy, Office of the Chief of Naval Operations, *Visits by U.S. Navy ships to foreign countries*, OPNAVINST 3128.3P, March 18, 1982, Enclosure 1, pp. 1, 7, 18.
- The only other country where SSBNs could occur without clearance was Canada. Beyond South Korea and Canada, CNO involvement was also not required for visits to Morocco (Agadir), Portugal (Lisbon), and West Germany.
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- ³⁹¹ Desmond Ball and Jeffrey Richelson, ed., *Strategic Nuclear Targeting* (Cornell University Press: 1986), pp. 77, 78; Leon Sloss, “Nuclear Policy, Then and Now,” *Washington Post*, December 9, 1997, p. A24.
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- ³⁹⁴ Colonel K. P. Watts, USAF/J54, “Subject: Nuclear Targeting Policy Review (NTPR),” Point Paper, October 25, 1979, p. 2. Partially declassified and released under FOIA.

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- ³⁹⁷ U.S. Pacific Command, *CINCPAC Command History 1980*, Volume II, September 17, 1981, p. 612. Secret. Partially declassified and released under FOIA.
- ³⁹⁸ U.S. Pacific Command, *CINCPAC Command History 1981*, Volume I, September 30, 1982, pp. 11, 221. Secret. Partially declassified and released under FOIA; U.S. Department of the Navy, USS Proteus (AS-19), *Command History 1981*, n.d. (1980), Enclosure 1, p. 7.
- ³⁹⁹ Robert S. Norris, et al., *Nuclear Weapons Databook Volume V: British, French, and Chinese Nuclear Weapons* (Boulder, CO: Westview, 1994), p. 363.
- ⁴⁰⁰ U.S. Department of the Navy, Naval Historical Center, *Dates in American Naval History: December*, n.d. [as of January 6, 2000], n.p. Available online at <<http://www.history.navy.mil/wars/datesdec.htm>>; U.S. Pacific Command, *CINCPAC Command History 1983*, Volume II, September 27, 1984, p. 284. Partially declassified and released under FOIA; Natural Resources Defense Council, "Table of US Ballistic Missile Submarine Forces: 1960-96," n.d. Available on the NRDC website at <<http://www.nrdc.org/nuclear/nudb/datab5.asp>>.
- ⁴⁰¹ Jack Kangas, et al, *U.S. Nuclear Weapons Policy Toward China 1985-1995*, DNA-5895F, February 10, 1981, p. 11. Partially declassified and released under FOIA to Peter Hayes.
- ⁴⁰² China's increasing emphasis on economical development may make it easier in the future to project "traditional" deterrence strategy onto that country. *Ibid.*, p. 37.
- ⁴⁰³ *Ibid.*, pp. 37-38.
- ⁴⁰⁴ *Ibid.*, pp. 38, 45.
- ⁴⁰⁵ *Ibid.*, pp. 87-88.
- ⁴⁰⁶ *Ibid.*, p. 17.
- ⁴⁰⁷ *Ibid.*, p. 26.
- ⁴⁰⁸ *Ibid.*, p. 80.
- ⁴⁰⁹ *Ibid.*, pp. 80, 81.
- ⁴¹⁰ U.S. Pacific Command, *CINCPAC Command History 1976*, October 18, 1977, Volume I, pp. 91, 92. Secret. Partially declassified and released under FOIA to Peter Hayes.
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- ⁴¹⁴ James A. Kelly, Deputy Secretary of Defense for East Asian and Pacific Affairs, Statement before the House Foreign Affairs Committee, May 6, 1984; as referenced in William M. Arkin and Richard W. Fieldhouse, *Nuclear Battlefields: Global Links in the Arms Race* (Cambridge: Ballinger, 1985), p. 117.
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- ⁴¹⁶ William M. Arkin and Robert S. Norris, *Nuclear Alert after the Cold War*, Natural Resources Defense Council, NWD 93-4, October 18, 1993, pp. 6, 11 (footnote 38); Bruce Blair, *Global Zero Alert for Nuclear Forces*, Brookings Occasional Papers, the Brookings Institution, Washington, D.C., 1995, p. 7.
- ⁴¹⁷ U.S. Pacific Command, *CINCPAC Command History 1984*, Volume I, September 27, 1985, p. 171. Partially declassified and released under FOIA.
- CONPLAN (Concept Plan) is an Operation Plans (OPLAN) in Concept Format. An OPLAN is an operational plan for the conduct of military operations that could be translated into an operation order with minimum alteration. Complete plans include deployment/employment phases, as appropriate. A CONPLAN, conversely, is an operation plan in an abbreviated format that still requires expansion into a formal OPLAN or Operational Order (OPORD) prior to implementation. An OPORD is a directive, usually formal, issued by a commander to subordinate commanders for the purpose of effecting the coordinated execution of an operation. Generally, each OPLAN requires a complete, annual logistic appraisal for supportability as prescribed in the Joint Strategic Capabilities Plan. *Ibid.*, p. 179.
- ⁴¹⁸ U.S. Pacific Command, *CINCPAC Command History 1983*, Volume II, September 27, 1984, p. 284. Partially declassified and released under FOIA.
- ⁴¹⁹ PACOM/J321, *Staff History Submission March 1983*, April 8, 1983; PACOM/J321, *Staff History Submission June 1983*, July 6, 1983. Both documents released under FOIA.
- ⁴²⁰ U.S. Pacific Command, *CINCPAC Command History 1984*, Volume I, September 27, 1985, p. 171. Partially declassified and released under FOIA.
- ⁴²¹ *Ibid.*, p. 170.
- ⁴²² The White House, *The President's Visit to the People's Republic of China*, National Security Decision Directive 140, April 21, 1984, p. 1. Obtained under FOIA by National Security Archive.
- ⁴²³ *Ibid.*, p. 4.

⁴²⁴ U.S. Strategic Air Command, *History of the Strategic Air Command 1 January-31 December 1987*, Volume III, November 9, 1988, p. III-24. Partially declassified and released under the Freedom of Information Act.

The SRF forces were subdivided into the Secure Reserve Force (SRF) and residual forces on the one hand, and the Designated Reserve Forces (DRF) plus residual forces on the other hand. Residual forces included strategic and non-strategic nuclear forces, with the former consisting of recovered/reconstituted, uncommitted, and unexecuted forces. Non-strategic Residual Forces, in turn, consisted of uncommitted and not NATO designated nuclear forces. Chairman of the Joint Chiefs of Staff, J-5, *Nuclear Supplement to Joint Strategic Capabilities Plan for FY 1996 (JSCP FY 96)*, CJCSI 3110.04, 12 February 1996, pp. D-26, D-28. Partially declassified and released under the FOIA.

⁴²⁵ Chairman of the Joint Chiefs of Staff, J-5, *Nuclear Supplement to Joint Strategic Capabilities Plan for FY 1996 (JSCP FY 96)*, CJCSI 3110.04, 12 February 1996, pp. D-26, D-28. Partially declassified and released under the FOIA.

⁴²⁶ U.S. Strategic Air Command, *History of the Strategic Air Command 1 January-31 December 1987*, November 9, 1988, Volume I, p. I-5. Partially declassified and released under FOIA.

⁴²⁷ U.S. Department of the Navy, Commander Submarine Group SEVEN, to Commander Submarine Force, U,S, Pacific Fleet, "Submission of Fiscal Year 1986 Battle Efficiency and Departmental Awards Nominations for USS Proteus (AS-19)," n.d. [1986], pp. 2, 3, 20.

⁴²⁸ Admiral Richard W. Mies, Command in Chief, U.S. Strategic Command, "The SSBN in National Security," *Undersea Warfare*, Fall 1999, Vol. 2, No. 1, n.p. [pp. 6, 8].

⁴²⁹ Memo, SAC (SOBFB), "Holding Relocatable Targets (RTs) at Risk," February 17, 1987. Secret. Partially declassified and released under FOIA.

⁴³⁰ Memo, SAC(XOBF), "Relocatable Targets in the SIOP," October 24, 1986. Secret. Partially declassified and released under FOIA.

⁴³¹ U.S. Department of the Navy, *Command History for USS Alabama (SSBN-731) (Blue)*, March 1986-March 1987, April 8, 1987, pp. 3, 4; U.S. Department of the Navy, *Command History for USS Alabama (SSBN-731)(Gold)*, January 1987-February 1988, February 27, 1988, pp. 1, 2.

⁴³² U.S. Department of the Navy, Strategic Systems Programs Office, *Facts/Chronology: Polaris-Poseidon-Trident*, 1996, p. 9.

⁴³³ U.S. Department of the Navy, *Command History for USS Alabama (SSBN-731) (Gold)*, February 1988-February 1989, February 15, 1989, p. 2.

⁴³⁴ U.S. Strategic Air Command, *History of the Strategic Air Command 1 January-31 December 1987*, November 9, 1988, Volume I, p. I-5. Partially declassified and released under FOIA.

⁴³⁵ Ibid.

⁴³⁶ Ibid., Volume III, pp. III-31, III-32; Memo, SAC(XOBF), "Relocatable Targets in the SIOP," October 24, 1986. Both documents partially declassified and released under FOIA.

⁴³⁷ U.S. Pacific Command, *CINCPAC Command History 1984*, Volume I, September 27, 1985, p. 70. Partially declassified and released under FOIA.

⁴³⁸ "Need for U.S. Forces in South Korea May Pass by Mid-90s, General Says," Reuters-Kyodo, August 14, 1989; cited in Peter Hayes, *Pacific Powderkeg: American Nuclear Dilemmas in Korea* (Massachusetts: Lexington Books, 1991), pp. xlv-xlv.

This view was echoed in the Joint Chiefs of Staff's annual Joint Military Net Assessment from 1990 which stated: "As ROK forces grow stronger, a reduction of US forces may be warranted. However, continuous retention of US troops in Korea will be required as long as the US and Korean governments and people want them there." U.S. Joint Chiefs of Staff, *1990 Joint Military Net Assessment*, 20 January, 1990, p. IV-3.

⁴³⁹ U.S. Joint Chiefs of Staff, *1991 Joint Military Net Assessment*, March 1991, pp. 44, 6-1 to 7-2; U.S. Joint Chiefs of Staff, *1992 Joint Military Net Assessment*, March 15, 1992, pp. 7-1 to 7-12.

⁴⁴⁰ The initiative also withdrew non-strategic nuclear weapons (except bombs) from Europe and from surface ships and attack submarines.

⁴⁴¹ U.S. Pacific Command, *USCINCPAC Command History 1991*, October 30, 1992, p. 90. Secret. Partially declassified and released under FOIA.

⁴⁴² Ibid.

⁴⁴³ U.S. Pacific Command, *USCINCPAC Command History 1991*, October 30, 1992, pp. 91-92. Secret. Partially declassified and released under FOIA.

⁴⁴⁴ Don Oberdorfer, "Airborne U.S. A-Arms To Stay in South Korea," *Washington Post*, October 12, 1991, p. A20; Don Oberdorfer, "U.S. Decides to Withdraw A-Weapons From S. Korea," *Washington Post*, October 20, 1991, p. A1.

⁴⁴⁵ Deborah Zabarenko, "Pentagon Official: U.S. Can Still Defense Against North Korea," *Reuter* (Washington), September 30, 1991.

⁴⁴⁶ "Seoul Certain Of Remaining Under U.S. Nuclear Umbrella," *Reuter* (Seoul), October 19, 1991; David E. Rosenbaum, "U.S. to Pull A-Bombs From South Korea," *New York Times*, October 29, 1991, p. 3.

⁴⁴⁷ U.S. Pacific Command, *USCINCPAC Command History 1991*, October 30, 1992, pp. 91-92. Secret. Partially declassified and released under FOIA.

⁴⁴⁸ Paul Blustein, "U.S. Nuclear Arms All Withdrawn, South Korea Says," *Washington Post*, December 12, 1991, p. A43; Robin Bulman, "No A-Arms In S. Korea, Roh Says," *Washington Post*, December 19, 1991, p. A38.

- ⁴⁴⁹ Dual-capable fighter wings in the Continental United States also maintained a nuclear capability and were tasked to forward deploy to Northeast Asia if necessary.
- ⁴⁵⁰ U.S. Pacific Fleet, n.t. [*U.S. Pacific Command History for 1991*], n.d. [1992], p. 8. Partially declassified and released under FOIA.
- ⁴⁵¹ Department of the Navy, Commander Submarine Force U.S. Pacific Fleet, *Command History for 1991*, p. 7. Partially declassified and released under FOIA.
- ⁴⁵² For an overview of the shift in U.S.-Chinese relations, see: Jonathan D. Pollack, “The Cox Report’s ‘Dirty Little Secret,’” *Arms Control Today*, April/May 1999, n.p. (electronic version).
- ⁴⁵³ Thomas C. Reed and Michael O. Wheeler, *The Role of Nuclear Weapons in the New World Order*, Strategic Advisory Group, U.S. Strategic Air Command, January 13, 1992, p. 13 and Appendix B.
- ⁴⁵⁴ Joint Strategic Target Planning Staff, *Minutes of the Forty-Seventh JSTPS Strategic Advisory Group Meeting 2-3 April 1992, Offutt AFB, Nebraska*, May 1, 1992, p. v. Partially declassified and released under FOIA.
- ⁴⁵⁵ U.S. Strategic Command, *Sun City Extended: A USSTRATCOM Study of Future Force Structures*, February 1, 1994, p. 39. Secret. Partially declassified and released under FOIA. Available online at <http://www.nukestrat.com/us/stratcom/suncityex.htm>
- ⁴⁵⁶ U.S. Senate, Armed Services Committee, *Threat Assessment, Military Strategy, and Defense Planning*, 102d Congress, 2d Session, January 22, 1992, p. 34.
- ⁴⁵⁷ U.S. Department of the Navy, *Chinese Exercise Strait 961: 8-25 March 1996*, n.d. [1996], pp. 1, 3, 4, 7. Obtained by National Security Archive.
- ⁴⁵⁸ Brfg (S/US & Japan Only/Formerly OADR, 14 Jul 96), PACAF/AIS, “Chinese Exercise Summary (U),” 14 Jul 96; as cited in U.S. Pacific Air Forces, *History of Pacific Air Forces, 1 January 1996 – 31 December 1996*, Volume I (Narrative), n.d. [1997], p. 14. Secret. Partially declassified and released under FOIA.
- The Chinese news agency Xinhua reported in August 2006 that China had conducted its “first joint exercise involving troops from a PLA area command, the Air Force, the Second Artillery, and the Chinese People’s Armed Police.” The exercise, known as North Sword – 0607(S), was held at an unidentified northern training base, involved a thousand tanks, armored vehicles and troops carriers, and covered 1,000 square kilometers. “PLA holds high-technology war exercise,” *Xinhua*, August 24, 2006.
- ⁴⁵⁹ U.S. Department of the Navy, Joint Intelligence Center Pacific, *South China Sea: Spratly Islands Summary*, OS-021-96, July 19, 1996 (reviewed on February 1, 1997), n.p. [page 4]. Secret. Partially declassified and released under FOIA.
- ⁴⁶⁰ U.S. Department of Defense, *Annual Report on the Military Power of the People’s Republic of China*, June 22, 2000, n.p.

- ⁴⁶¹ R. Jeffrey Smith, "Clinton Changes Nuclear Strategy," *Washington Post*, December 7, 1997, page A1.
- ⁴⁶² Ibid.
- ⁴⁶³ U.S. Department of Defense, *Transforming Defense: National Security in the 21st Century*, Report of the National Defense Panel, Washington, D.C., December 1997, p. 50. The National Defense Panel was established by the Congress as part of the Military Force Structure Review Act of 1996 as an independent body to review the findings of the Defense Department's Quadrennial Defense Review (QDR). The members were appointed by the Secretary of Defense.
- ⁴⁶⁴ See: Bruce Blair, *Removing The Hair Trigger On Nuclear Forces*, The Brookings Institution, remarks at the Carnegie International Non-Proliferation Conference, January 12, 1999, p. 3; Elaine Grossman, "SIOP List Reportedly Grew 20 Percent: Nuclear Weapons Expert Says U.S. Warfighting Plan Now Targets China," *Inside the Pentagon*, Volume 15, Number 2, January 14, 1999. Bruce Blair, *Cold War Era Assumptions Drive U.S. Nuclear Force Levels: Why the Target List Should Shrink*, Coalition to Reduce Nuclear Dangers/Center for Defense Information, Issue Brief, Volume 4, Number 7, May 18, 2000.
- ⁴⁶⁵ The White House, Office of the Press Secretary, Press Briefing by Mike McCurry and National Security Advisor Sandy Berger, Shangri-la Hotel, Xian, People's Republic of China, June 26, 1998.
- ⁴⁶⁶ Bill Gertz, "China targets nukes at U.S.," *Washington Times*, May 1, 1998.
- ⁴⁶⁷ Bill Gertz, "China adds 6 ICBMs to Arsenal," *Washington Times*, July 21, 1998.
- ⁴⁶⁸ Kenneth H. Bacon, Assistant Secretary of Defense (Public Affairs), DOD News Briefing, July 7, 1998, 1:45 p.m. (EDT).
- ⁴⁶⁹ China has, for its part, continued to use the word "detargeting" to describe the agreement. "China's Endeavors on Arms Control, Disarmament and Non-Proliferation," Information Office of the State Council of the People's Republic of China, Beijing, September 2005, p. 10.
- ⁴⁷⁰ Bruce G. Blair, Senior Fellow, Foreign Policy Studies, Brookings Institution, Statement before Subcommittee on Military Research and Development, House National Security Committee, March 17, 1997.
- ⁴⁷¹ Bruce G. Blair, "Where Would All the Missiles Go?," *Washington Post*, June 3, 1998.
- ⁴⁷² U.S. Department of Defense, Office of the Secretary of Defense, *Nuclear Posture Review Report*, January 8, 2002 (Submitted to Congress on December 31, 2001), pp. 16-17. Excerpts available via <http://www.GlobalSecurity.org>.
- ⁴⁷³ Eugene E. Habiger, USAF (Ret.), "Strategic Forces for Deterrence," *Joint Forces Quarterly*, Winter 1996-1997, p. 68.
- ⁴⁷⁴ See: U.S. Department of the Navy, Office of the Chief of Naval Operations,

“Submarine Forward Presence as of November 1998,” *Undersea Warfare*, Vol. 1, No. 2, Winter 1998/1999, n.p.; Department of the Navy, Office of the Chief of Naval Operations, “Submarine Forward Presence as of May 1999,” *Undersea Warfare*, Vol. 1, No. 4, Summer 1999, n.p.; Department of the Navy, Office of the Chief of Naval Operations, “Submarine Forward Presence as of August 1999,” *Undersea Warfare*, Vol. 2, No. 1, Fall 1999, n.p.; Department of the Navy, Office of the Chief of Naval Operations, “Submarine Forward Presence as of November 1999,” *Undersea Warfare*, Vol. 2, No. 2, Winter 1999, n.p.; Department of the Navy, Office of the Chief of Naval Operations, “Submarine Forward Presence as of February 2000,” *Undersea Warfare*, Vol. 2, No. 3, Spring 2000, n.p.; Department of the Navy, Office of the Chief of Naval Operations, “Submarine Forward Presence as of February 2000 [sic; July 2000],” *Undersea Warfare*, Vol. 2, No. 4, Summer 2000, n.p.; Department of the Navy, Office of the Chief of Naval Operations, “Submarine Forward Presence as of September 2000,” *Undersea Warfare*, Vol. 3, No. 1, Fall 2000, n.p.; Department of the Navy, Office of the Chief of Naval Operations, “Submarine Forward Presence as of January 2001,” *Undersea Warfare*, Vol. 3, No. 2, Winter 2001, n.p.; Department of the Navy, Office of the Chief of Naval Operations, “Submarine Forward Presence as of April 2001,” *Undersea Warfare*, Vol. 3, No. 3, Spring 2001, n.p.; Department of the Navy, Office of the Chief of Naval Operations, “Submarine Forward Presence as of July 2001,” *Undersea Warfare*, Vol. 3, No. 4, Summer 2001, n.p.

These publications are available on the Chief of Naval Operations’ website at <<http://www.chinfo.navy.mil/navpalib/cno/n87/mag.html>>. Submarine Forward Presence maps were discontinued after September 11, 2001, due to new submarine security guidance.

⁴⁷⁵ U.S. Department of the Navy, Office of the Chief of Naval Operations, *Strategic Deterrence*, n.d. [downloaded May 3, 2000]. Available online at http://www.chinfo.navy.mil/navpali..._3/pullout/submarine_strategic.htm

⁴⁷⁶ U.S. Department of the Navy, Naval Submarine Base, Bangor, *TRIDENT* Program, n.d. [downloaded May 10, 2000]. The document is available from the base website at <http://www.bangor.navy.mil/welcome/trident.html>.

Despite its long range, however, Trident weapon system planning in the 1990s have continued to involve “time to move into range,” indicating that the submarines still need to transit for some time to be in range of some targets. See for example: U.S. Strategic Command/ J5, *Sun City*, 1993, p. 21. Partially declassified and released under FOIA.

⁴⁷⁷ See: Robert S. Norris and William M. Arkin, “NRDC Nuclear Notebook: U.S. Nuclear Forces 2000,” *Bulletin of the Atomic Scientists*, May/June 2000, Vol. 56, No. 2, p. 69. Available online at <http://www.bullatomsoci.org/issues/nukenotes/mj00nukenote.html>; Dr. Bruce Blair, *Cold War Era Assumptions Drive U.S. Nuclear Force Levels: Why the Target List Should Shrink*, Center for Defense Information/Coalition to Reduce Nuclear Dangers, Issue Brief, Volume 4, Number 7, May 18, 2000, n.p. [p. 2].

⁴⁷⁸ U.S. Pacific Command, n.t. [*U.S. Pacific Fleet History 1991*], n.d. [1992], p. 15. Partially declassified and released under FOIA.

⁴⁷⁹ Captain William Norris, U.S. Navy (Ret.), “START III: Do We Need Bangor,” *The Submarine Review*, October 1997, p. 12.

⁴⁸⁰ See for example: William M. Arkin and Richard W. Fieldhouse, *Nuclear Battlefields: Global Links in the Arms Race* (Ballinger/Institute for Policy Studies, Washington, D.C., 1985), p. 45.

The General Accounting Office in 1979 stated that of 41 strategic submarines, 23 (56 percent) were at sea at any given time, and 12 of these (52 percent, or 29 percent of total force) were on station at full alert capable of launching their missiles within minutes. The remaining 11 submarines at sea were not on full alert but could be brought to that condition probably within hours. U.S. General Accounting Office, *An Unclassified Version of a Classified Report Entitled ‘The Navy’s Strategic Communications System – Need for Management Attention and Decisionmaking,’* PSAD-79-48A (May 2, 1979), p. 2. Released under FOIA. Note: the unclassified report does not reveal the number of SSBNs deployed in each ocean. The numbers are, however, disclosed by Mr. Bruce G. Blair in *Strategic Command And Control: Redefining the Nuclear Threat* (The Brookings Institution, Washington, D.C., 1985), p. 173, footnote 100.

⁴⁸¹ Mary Popejoy, U.S. Navy, Public Affairs, “USS Alaska Departs Bangor for Final Time,” *Navy News*, July 19, 2006.

⁴⁸² Charles B. Young, RADM U.S. Navy, Director, *Strategic Systems Program, Strategic Importance to the United States*, speech at Strategic Weapons Facility Pacific, n.d. [August 2002], p. 1. Obtained under FOIA.

⁴⁸³ U.S. Department of Energy, Office of Defense Programs, *Stockpile Stewardship and Management Plan: First Annual Update, October 1997*, p. 1-14. Partially declassified and released under FOIA.

⁴⁸⁴ Personal conversation, June 16, 2005.

⁴⁸⁵ William M. Arkin, “America’s New China War Plan,” *Early Warning (Washington Post)*, May 24, 2006.

⁴⁸⁶ Keir A. Lieber and Daryl G. Press, “The End of MAD? The Nuclear Dimension of U.S. Primacy,” *International Security*, vol. 30, No. 4 (Spring 2006), pp. 7-44.

⁴⁸⁷ Hazard Prediction Assessment Capability (HPAC), software developed by SAIC under contract to the DOD. According to the HPAC user’s manual: “Hazard Prediction and Assessment Capability (HPAC) is a counter proliferation, counterforce tool that predicts the effects of hazardous material releases into the atmosphere and its collateral effects on civilian and military populations.” See: <http://www.dtra.mil/toolbox/directorates/td/programs/accec/hpac.cfm>.

⁴⁸⁸ The LandScan 2000 Global Population Database – the second release – was developed by Oak Ridge National Laboratory for the United States Department of Defense. This dataset consists of a worldwide population figures compiled on a 30” X 30” latitude/longitude grid, where census numbers are assigned to grid cells based on a number of criteria, including persistent nighttime lights. See <http://www.ornl.gov/sci/landscan/>.

- ⁴⁸⁹ STRATCOM – the United States Strategic Command – is one of the nine unified U.S. commands under the Department of Defense and has responsibility for U.S. nuclear strike planning and execution. In addition, on January 10, 2003, Change 2 to the Unified Command Plan (UCP) assigning four additional missions to STRATCOM: missile defense, global strike (which includes nuclear strikes), information operations, and global C4ISR. Finally, on March 1, 2005, Unified Command Plan 2004 assigned STRATCOM a sixth mission area: coordinating the Pentagon’s efforts to combating Weapons of Mass Destruction. See: <http://www.stratcom.mil/>.
- ⁴⁹⁰ Will Beijing’s Nuclear Arsenal Stay Small or Will It Mushroom?, David E. Sanger and Erik Eckholm, *New York Times*, March 15, 1999, p. A1.
- ⁴⁹¹ Lisbeth Gronlund and David Wright, “Depressed Trajectory SLBMs: A Technical Evaluation and Arms Control Possibilities,” *Science and Global Security*, Vol. 3, Nos. 1-2 (1992), pp. 101-159.
- ⁴⁹² Matthew G. McKinzie, Thomas B. Cochran, Robert S. Norris and William M. Arkin, *The U.S. Nuclear War Plan: A Time for Change*, Natural Resources Defense Council, June 2001 (available at <http://www.nrdc.org/nuclear/warplan/index.asp>)
- ⁴⁹³ Samuel Glasstone and Philip J. Dolan, *The Effects of Nuclear Weapons* (US Department of Defense and Department of Energy, 1977), pp. 387-460.
- ⁴⁹⁴ In HPAC, the formula for calculating the minimum HOB of a nuclear explosion causing no local fallout is: $HOB \text{ (feet)} > 180 \times \text{Yield(kilotons)}^{0.4}$.
- ⁴⁹⁵ The initial height of a fallout “mushroom” cloud for nuclear weapon yields greater than 1 kiloton is given by the following formula: $\text{Height of Cloud (thousands of feet)} = 44 + 6.1 \times \ln(\text{Yield(kt)}/1000) - 0.205(\ln(\text{Yield(kt)}/1000) + 2.42) \times \text{ABS}(\ln(\text{Yield(kt)}/1000) + 2.42)$, where ABS is the absolute value. This formula was found in the “Help” file for the computer code WE (“Weapons Effects”), created for the U.S. Defense Nuclear Agency by Horizons Technology in December 1984. For example, at the 15 Mt U.S. nuclear test “Bravo” conducted on Bikini Atoll in 1954 the mushroom cloud reached a height of 50,000 feet. The above formula predicts a cloud height of 55,000 feet.
- ⁴⁹⁶ From HPAC 4.04.011 documentation: *Casualty Estimation and Performance Decrement*, Table 8-6.
- ⁴⁹⁷ Lynn Eden, *Whole Worlds on Fire: Organizations, Knowledge, and Nuclear Weapons Devastation*, Ithaca, NY: Cornell University Press, 2003).
- ⁴⁹⁸ U.S. Department of Defense, Joint Electronic Library, *Dictionary of Military Terms*, <http://www.dtic.mil/doctrine/jel/doddickt/data/o/03901.html>.
- ⁴⁹⁹ The actual number of warheads reaching their targets would likely be less due to missile failures, duds, and a possible U.S. anti-ballistic missile system.
- ⁵⁰⁰ Actually mobile systems such as the DF-31A would likely have a smaller probability off pre-emptive destruction than the DF-5A.
- ⁵⁰¹ CJCS, “JP 3-12, “Joint Staff Input to JP 3-12, *Doctrine for Joint Nuclear Operations* (Second Draft),” as of 042803, pp. 34-35.

- ⁵⁰² Confidence in the capability of the U.S. offensive nuclear capability appears to be high. According to the Rear Admiral Eric A. McVadon, former Deputy Director for Strategy, Plans and Policy (Navy Staff) and Defense and Naval Attache at the American Embassy in Beijing, “even with the augmented nuclear arsenal [of DF-31 and JL-2 missiles], China’s minimal deterrent is useful only when unused.” Rear Admiral (USN, Ret.) Eric A. McVadon, Director of Asia-Pacific Studies, Institute for Foreign Policy Analysis, “Recent Trends in China’s Military Modernization,” prepared statement before the U.S.-China Economic and Security Review Commission, September 15, 2005, p. 6.
- ⁵⁰³ U.S. Department of Defense, *Strategic Deterrence Requirements 2020* Study, Joint Requirements Oversight Council Memorandum (JROCM) 132-03, 17 June 2003, enclosure, pp. 2-3. Released under FOIA.
- ⁵⁰⁴ For a review of future directions of the U.S.-Chinese nuclear relationship, see: Brad Roberts, *China-U.S. Nuclear Relations: What Relationship Best Serves U.S. Interests?*, Institute for Defense Analysis/Defense Threat Reduction Agency, IDA Paper P-3640, September 2001, p. ES-2. Available online at www.au.af.mil/au/awc/awcgate/dtra/china_us_nuc.pdf.
- ⁵⁰⁵ China argued in the 1980s that it didn’t have to get involved in nuclear arms limitations until the United States and the Soviet Union reduced their nuclear arsenals by 50 percent. When the United States and Russia in the 1990s cut back 60 percent, the Chinese switched to arguing that the two superpowers would have to come down to China’s level (approximately 200 warheads) before arms control discussions could begin. This observation is presented in Brad Roberts, et al., “China: The Forgotten Nuclear Power,” *Foreign Affairs*, July/August 2000, p. 62.

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1717 K St. NW, Suite 209 • Washington, DC 20036

Voice: 202-546-3300 • Fax: 202-675-1010

Email: fas@fas.org • Web: www.fas.org

Natural Resources Defense Council

1200 New York Avenue, NW Suite 400 • Washington, DC 20005

Voice: 202-289-6868 • Fax: 202-289-1060

Email: nrdc@nrdc.org • Web: www.nrdc.org

