

Foreword

Deep in China's Henan province, a hundred miles from the ancient city of Xi'an, the People's Liberation Army guards China's small fleet of intercontinental ballistic missiles. The aging Dong Feng-5 missiles are scattered on their launch pads. They are deployed with their liquid fuel tanks empty and with their 4- and 5-megaton nuclear warheads detached and stored separately. Although each has enough explosive power to vaporize an average city, the force pales in comparison to the 5,500 warheads the United States deploys on its modern, highly accurate missiles, or even to the 144 warheads the United Kingdom carries on its Trident sea-launched ballistic missiles. Of the five recognized nuclear powers (the United States, Russia, Britain, France, and China), China has the oldest, least capable, and most stable nuclear-deterrent force. China deployed the first Dong Feng-5 (or "East Wind") in 1981. Slowly, the fleet has grown to the approximately twenty DF-5 missiles deployed today at Luoning and further north at the Xuanhua military base. For two decades, this atomic arsenal, along with dozens of intermediate- and short-range nuclear missiles and air-dropped bombs, has served China's strategic interests.

But China is stirring. Plans to modernize the missile force are under way. China's military and political leaders want modern, solid-fueled missiles like those deployed by the other nuclear powers, perhaps with multiple warheads atop each missile. The Chinese nuclear force may increase in number and will become more accurate. But the exact characteristics of China's future nuclear forces will depend to a great extent on developments to the south and east of China.

Over the Himalayas, India and Pakistan are also stirring. Nuclear tests rocked the Rajasthan Desert and the Chagai Hills in May 1998. Despite international protests, months of delicate U.S. diplomatic efforts, and a recent warming of relations between the two South

Asian neighbors, government leaders in both India and Pakistan say they plan to deploy nuclear weapons. The exclusive five-member club of nuclear-weapon states may soon add countries six and seven, with serious repercussions for China, a member of the club since its first nuclear test in 1964. Although India remains engaged in a shooting war with Pakistan over the disputed territory of Kashmir, it currently regards China as its main strategic adversary. India has announced plans to renew tests of its Agni missile and to develop a new, longer-range Agni II missile capable of reaching most potential targets in China.

Across the Taiwanese Straits and the Sea of Japan, the United States has encouraged both Japan and Taiwan to develop and deploy ballistic missile defenses. After North Korea launched its Taepodong intermediate-range ballistic missile over Japanese territory on August 31, 1998, Japan committed a token one billion yen (\$8 million) to missile-defense research. Taiwanese leaders, who had rejected missile defenses as a technical gamble and a budgetary sinkhole, are now reexamining the concept as a means of strengthening political ties to the United States. These mere declarations of intent have provoked powerful condemnation from China. Japan and Taiwan may view their potential deployment purely as a defensive measure (and, in the case of Japan, one aimed more at North Korea than China). But Chinese leaders see these defenses as potentially neutralizing the one military advantage they have, as encouraging Taiwanese independence sentiments and, worse, as symbolic of a new, aggressive U.S.-Japan-Taiwan military posture.

How will these events affect China's nuclear forces? Will we see a measured, relatively nonthreatening modernization consistent with the established Chinese nuclear doctrine of fielding only the minimum necessary nuclear deterrent? Or will the deployments of new DF-31 and DF-41 missiles signal the beginning of a nuclear buildup that could realize the world's worst fears of an aggressive, belligerent China seeking to claim its rightful place in a global struggle for power?

Author and analyst Ming Zhang guides us through the debates and profiles the institutions that will determine China's nuclear future. He tracks the history of China's turbulent relations with India and the reaction of top Chinese political and military leaders to the nuclear shocks of 1998. Despite the initial exchange of harsh retorts

between the two Asian powers, Zhang believes that China will likely maintain its current policy of limited nuclear deterrence over the next five years. "Beijing still considers economic development its top priority," he argues. "To achieve a higher level of economic modernization, China needs both time and a stable environment. The Chinese leadership has long decided how to apportion its financial resources between economic development and improvements in its nuclear force." Nor does Zhang believe that China will export its nuclear know-how to its neighbors. "At the same time," he writes, "China seems to believe that it is not in its interest to assist any new nuclear weapons power along its borders, including Pakistan."

Unfortunately, this is merely the most likely scenario. International events and internal power struggles could lead to a more ominous nuclear future. Zhang's discussion of these more troubling possibilities is reinforced by remarks made by Ambassador Sha Zukang, China's leading arms-control official, to the Carnegie International Non-Proliferation Conference held in Washington in January 1999 (included here as Appendix B). Ambassador Sha, who is the director-general of the Department of Arms Control and Disarmament at China's Ministry of Foreign Affairs, warned:

"If a country, in addition to its offensive power, seeks to develop advanced theater missile defense or even national missile defense in an attempt to attain absolute security and unilateral strategic advantage for itself, other countries will be forced to develop more advanced offensive missiles. This will give rise to a new round of arms race which will be in no one's interest."

Reflecting these possible future confrontations, Zhang details three variations on China's nuclear posture. Relying on extensive interviews conducted in China in late 1998, Zhang provides not only informed estimates of possible force deployments, but a guide to the institutions that will frame the internal Chinese debate. China is just beginning to learn that international security regimes can both favor and constrain Chinese interests, Zhang suggests, and there are important differences in how civilian and military institutions approach these regimes.

In addition to Ambassador Sha's speech, other appendices include background information on China's participation in international

non-proliferation regimes, excerpts from the chapter on China in the Carnegie Endowment's *Tracking Nuclear Proliferation, 1998*, and a map of China's key nuclear installations.

Ming Zhang is a consultant to the Non-Proliferation Project at the Carnegie Endowment for International Peace. We are deeply grateful for the insights he has provided in this monograph and in his continuing consultations with the Project.

Joseph Cirincione
Non-Proliferation Project Director

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Washington, D.C.

Preface

As this monograph went to press, a controversy that may significantly impact Sino-U.S. relations and analyses of China's nuclear posture erupted in Washington following news reports of Chinese nuclear espionage against the United States. While this controversy has been brewing for some time, the recent furor deserves some brief comment.

In the past several years, China reportedly has taken advantage of President Clinton's 1995 decision to deregulate technology exports by purchasing forty-six American-made supercomputers. For the first time, China appears to have gained access to a large number of high-performance computers that could help its military conduct simulated nuclear tests and design smaller and more efficient nuclear weapons—including warheads mounted on missiles capable of reaching the United States.

In 1998, several news media reported that Loral Space & Communications Corporation and Hughes Electronics Corporation may have illegally transferred technology to the Chinese rocket program. In February 1996, the two American firms assisted in an investigation of why a Chinese space launch failed. In the process, they reportedly shared technical information with Chinese rocket scientists without obtaining clearance from U.S. officials. If this information has been acquired by the Chinese military, it could be used to improve China's space-launch vehicle guidance and control systems, thus increasing the accuracy of Chinese nuclear missiles.

Finally, in early 1999, new details emerged in the case of a nuclear scientist at Los Alamos National Laboratory who allegedly passed nuclear secrets to China. The House of Representatives concluded in a 700-page, classified report that the espionage had occurred and that it had harmed U.S. national security. Although the incident took place in the mid-1980s, it was not unearthed until 1995, when

American intelligence agents acquired a top-secret Chinese document specifically mentioning the U.S.-designed W-88 warhead. (The W-88, one of America's most advanced warheads, allows a large yield to be packaged in a small container. Eight to ten W-88 warheads fit atop U.S. Trident II submarine-launched missiles.) Most observers thought that China was not capable of developing this type of small warhead, but experts monitoring recent Chinese nuclear tests have detected characteristics similar to those of the W-88. Thus, it is possible that information obtained illegally from Los Alamos enabled China to achieve such a significant breakthrough.

If these three developments are true, it implies that China has been able to improve the accuracy of its missile guidance and control systems and to develop multiple-warhead missiles in less time than experts predicted. China may have made a qualitative leap in its nuclear-weapons technology.

What remains unclear is whether China has actually developed the multiple, independently targetable reentry vehicles (MIRVs) that the other four nuclear powers deploy on their nuclear missiles. There are some indications that China is testing this capability, but no missiles have actually been deployed with multiple warheads.

China currently has approximately twenty long-range ballistic missiles capable of hitting the United States. It intends to replace or supplement this arsenal with newer, land-based missiles over the next ten years. If equipped with multiple warheads, the arsenal would grow from twenty warheads with payloads in the megaton range to, perhaps, 100 warheads with payloads in the kilotons. In the Chinese view, increasing the number of its missiles would enhance the ability of its nuclear force to survive a nuclear attack and to launch a second strike (thus deterring such an attack in the first place). It does not, however, give China a first-strike capability against the United States. The United States will retain, for the foreseeable future, more destructive nuclear power in one Trident submarine alone than China has in its entire long-range missile fleet (each Trident carries 192 warheads on twenty-four missiles). One U.S. submarine, therefore, is more than adequate to deter or respond to any conceivable Chinese nuclear threat.

These controversies, though politically charged, have not reversed current U.S. policy toward China. President Clinton said recently, "I do not believe that the evidence justifies an isolated, no-contact

relationship with China.” Dennis Hastert, speaker of the House of Representatives, concurred, noting that, “The more we’re involved with China, the better off we are—for us and for China and the Pacific area.” U.S.-China military exchanges are likely to continue, including top U.S. defense officials’ visits to China and a possible visit to Sandia National Laboratory by Chinese military officers in 1999.

Whatever the eventual outcome of these recent controversies, they have stimulated an important new debate about the current capabilities and future direction of China’s nuclear-weapons program. I hope that this brief monograph will give policy makers in the United States and elsewhere both essential information and a fresh perspective on China’s changing nuclear posture.

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The original version of this study was presented at the July 16, 1998, conference, “The Impact of the South Asia Nuclear Crisis on the Non-Proliferation Regime,” organized by the Carnegie Endowment for International Peace. I am grateful to Joseph Cirincione, director of the Non-Proliferation Project at Carnegie, who encouraged me to undertake this challenging project and whose sound advice contributed much to the final publication.

During my research, I visited many arms-control specialists in Chinese government, military, and academic institutes in Beijing in October 1998. I am grateful to those whom I visited both for the hospitality and for the insights they afforded me, even as I respect their desire to remain anonymous.

Many colleagues in the United States commented on the manuscript in whole or in part, especially Bates Gill, Bonnie Glaser, Brad Roberts, and Karen Sutter. I thank them for constructive criticisms that helped me sharpen and improve my analysis. Jennifer Little, Kathleen Daly, Changsheng Lin, and Monte Bullard provided important research assistance. Toby Dalton of the Carnegie Non-Proliferation Project offered numerous valuable suggestions on matters of substance and style, and his colleague Matthew Rice helped with the tables and map. Thomas W. Skladony edited the text. I appreciate their kind assistance and the good cheer with which it was provided.

I am, of course, fully responsible for the substantive arguments of the study and for any errors it may contain.

I dedicate the work to my son, Oak, and to his generation.

Ming Zhang

March 1999
Oakton, Virginia

List of Abbreviations

AMS	Academy of Military Science
ASEAN	Association of Southeast Asian Nations
BJP	Bharatiya Janata Party
CASS	Chinese Academy of Social Sciences
CBM	confidence-building measure
CDSTIC	China Defense Science and Technology Information Center
CICIR	China Institute of Contemporary International Relations
CISS	China Institute for International Strategic Studies
COSTIND	Commission of Science, Technology, and Industry for National Defense
CTBT	Comprehensive Test Ban Treaty
CWC	Chemical Weapons Convention
FMCT	Fissile Material Cut-off Treaty
GSD	General Staff Department
IAPCM	Institute of Applied Physics and Computational Mathematics
IAEA	International Atomic Energy Agency
ICBM	intercontinental ballistic missile
IRBM	intermediate-range ballistic missile
JWG	China-India Joint Working Group
LAC	Line of Actual Control
MIRV	multiple, independently targeted reentry vehicle
MPC&A	material protection, control, and accounting
MTCR	Missile Technology Control Regime
NATO	North Atlantic Treaty Organization
NDU	National Defense University
NPT	Non-Proliferation Treaty
NSG	Nuclear Suppliers Group
PLA	People's Liberation Army

SIIS	Shanghai Institute for International Studies
SLBM	submarine-launched ballistic missiles
SSBN	nuclear-powered ballistic missile submarine
START	Strategic Arms Reduction Treaty
WMD	weapons of mass destruction