



Center for International and Security Studies at Maryland

Satellites, Security, and Scandal: Understanding the Politics of Export Control

Robert D. Lamb

January 2005



CISSM
School of Public Policy
4113 Van Munching Hall
University of Maryland
College Park, MD 20742
Tel: 301-405-7601
ciissm@umd.edu

This paper was prepared as part of the Advanced Methods of Cooperative Security Program at the Center for International and Security Studies at Maryland, with generous support from the John D. and Catherine T. MacArthur Foundation.

ACKNOWLEDGEMENTS

I would like to thank Nancy Gallagher for her close guidance and endless patience as I prepared this study and John Steinbruner for his overall leadership on the project. I am extremely grateful to Joan Johnson-Freese of the U.S. Naval War College for comments on an earlier draft. And many thanks go to the John D. and Catherine T. MacArthur Foundation for generous financial support and to the Center for International & Security Studies at Maryland for providing a graduate fellowship supporting my studies at the University of Maryland. Any errors or omissions that remain are the responsibility of the author.

TABLE OF CONTENTS

Introduction	4
The U.S. export control system	10
The Domestic Politics of U.S.-China Relations.....	16
Engagement during the Cold War	17
Containment and Engagement at the end of the Cold War.....	20
The Politics of Satellite Export Control after the Cold War.....	25
The Clinton administration and the three launch failures	29
The Optus-B2 failure.....	30
The Apstar-2 failure.....	35
The Intelsat-708 failure.....	37
Chinagate and the “Blue Team”	41
Conclusion	51
Appendix A: Company backgrounds.....	62
Appendix B: China’s Long March into space	65
Appendix C: Excerpts from the Cox Committee Report	70

Satellites, Security, and Scandal: Understanding the Politics of Export Control

Introduction

In the pre-dawn hours of 15 February 1996, a Chinese rocket carrying an Intelsat communications satellite tilted off its launch tower during take-off, flew into a hillside village a few miles from Xichang, China, and exploded with a force comparable to 20 tons of TNT. The surviving villagers, jolted out of their sleep by the explosion, soon discovered that more than a hundred of their neighbors had been killed or injured, and that much of their village was destroyed. The People's Republic of China (PRC) tried to cover up the extent of the tragedy, initially claiming that only six people had died. The world learned the truth soon enough. But in the United States, at least, the villagers were quickly forgotten, bit players in a scandal that would soon take the spotlight: An American satellite was destroyed in that blast, and Space Systems/Loral, the company that had built it, was accused of damaging U.S. national security by cooperating illegally with China's launch-failure investigators — assistance, some Americans claimed, that the PRC could use to improve its spy satellites and nuclear missiles.

It wasn't the first such accusation. Chinese Long March rockets carrying American-made commercial satellites had exploded twice before, in 1992 and 1995; in both of those cases, the satellites had been manufactured by Hughes Space & Communications. In all three launch failures, the satellite makers investigated the causes and, at the urging of the launch-insurance industry, shared technical information with Chinese engineers to help them correct the problems so future launches could be insured. In the late 1990s and early 2000s, Loral, Hughes, and Boeing Space Systems (whose parent company, Boeing, acquired

Hughes's satellite business in 2000) were investigated by U.S. export officials, found to have shared their engineers' expertise in missile-launch technology with the PRC, and fined tens of millions of dollars for providing unlicensed defense services in violation of U.S. export control laws (see *Appendix A: Company backgrounds*). During this same period, Boeing was charged with similar violations related to Sea Launch, its satellite-launch joint venture with Russian, Ukrainian, and Norwegian companies.

Congress would respond to what came to be known as the satellite scandals by making U.S. export control laws tougher, forcing American manufacturers of satellites, rockets, and other space-related goods to accept severe limitations on their ability to export their products or share their expertise with international business partners and customers. In a market where U.S. satellite manufacturers were already facing new foreign competitors whose exports were not correspondingly restricted, where exchange rates were already unfavorable to U.S. exports, and where European governments were already adopting policies favorable to the growth of their own space industries, these restrictions made the U.S. space and satellite-components industry even less competitive internationally and contributed to a substantial weakening of its market position in the years that followed.¹ The U.S. armed forces depend on advanced satellite technologies more than any foreign military service, but in the United States today, military satellite programs — for the first time in the Pentagon's history — are increasingly dependent on foreign suppliers for at least some components and services. To the degree it increases that dependence, the restrictive export system Congress put in place in 1999 damages national security.² Whether the benefits of the system have outweighed those costs is a question that will be explored; it is enough to note for now that those restrictions remain largely intact today.

What made that policy change possible was the convergence of three separate, but closely related, battles that were being fought among U.S. policy makers during the late

¹ Lewis 2002 pp. 24-28; Johnson-Freese 2001

² Moorman 2000; Johnson-Freese 2001; Lewis 2002 pp. 27-28

1990s. The first was a longstanding ideological battle between advocates of greater engagement with China and advocates of containment, a battle that informed other disagreements over what purpose export controls should serve. The second was a turf battle between two great bureaucracies, the State Department and the Commerce Department, over jurisdiction for licensing of satellite and computer exports. And the third was a political battle between Congressional Republicans and the Clinton administration. These battles were being fought simultaneously during Clinton's two terms. In each of them, one side or the other had reason to oppose any policy that facilitated satellite exports to China. In all three battles, the export opponents won.

Before Congress got tough on exporters at the end of the 1990s, the Reagan, Bush, and Clinton administrations had progressively *loosened* export restrictions on commercial satellites to keep the American space industry competitive on the world market. By the mid-1990s jurisdiction over such exports had been fully transferred to the Commerce Department. Commerce regulates "dual-use" goods, i.e., those that have both civilian and military uses, and its primary goal in doing so is to balance the country's commercial and trade interests against national security interests. Before the transfer, however, satellite exports had been largely under the jurisdiction of the State Department, which regulates munitions, i.e., items that are generally assumed to have only military value. State's primary focus in export regulation is national security, not commerce or trade, and so export officials there have always tended to be somewhat less sympathetic to American companies hoping to export products to countries that State regarded as national security threats. For that reason, U.S. manufacturers have generally preferred that Commerce regulate exports of their products; they welcomed the transfer of commercial satellite jurisdiction to Commerce.

Bureaucracies tend not to relinquish authority without a fight, however, and the State Department did not give up its influence over export regulation so easily. Moves to transfer jurisdiction to Commerce in the late 1980s and early 1990s were met with counter-moves by State Department export officials determined to exert their full authority wher-

ever they could: by increasingly vigorous enforcement of regulations that they made increasingly onerous, those officials made it increasingly difficult — and costly — for satellite companies to export their products to China if even a single component remained subject to State jurisdiction.³ And when Congress passed the legislation returning jurisdiction to State in 1999, State took its mandate and ran with it:

State declared that not only were communications satellites now munitions, but their components were now munitions as well; that all satellite technology, even fundamental research that had been excluded from control by the Reagan administration, now requires a munitions license for export; and that foreign operators of commercial communications satellites must apply for a technology safeguards agreement even if they had been operating the U.S.-made satellite [already in orbit] for years before the transfer. ... State regards all satellite technology as sensitive and controlled, irrespective of its use, its intended recipient, or its availability from non-U.S. sources. State regards anything having to do with Space [*sic*] as militarily sensitive. The effect of the 1998 legislation was to reinstitute satellite technology controls from the 1970s.⁴

At the time it passed that legislation, Congress was in the midst of a political battle with the Clinton administration over the Clintons' earlier Whitewater investment, the Paula Jones and Monica Lewinsky scandals, and the controversies over "Chinese spies" in U.S. nuclear labs, among other issues. Amid growing concern over evidence of Chinese arms transfers as well, Congress responded to the satellite scandals by including a provision in the Strom Thurmond National Defense Authorization Act of 1999 that, when passed, had the effect of defining all communications satellites — not just certain satellite technologies or components — as munitions, thereby returning full jurisdiction over space exports to the State Department, as noted.

Congressional and other supporters of this strengthened regime of export controls won support for it by arguing that commercial interests should never trump national security and that, because commercial rockets and nuclear missiles use essentially the same technology, any assistance U.S. companies provide to improve the accuracy and reliability of Chinese rockets thereby improves the accuracy and reliability of Chinese ballistic missiles

³ Johnson-Freese 2000

⁴ Lewis 2002 pp. 21-22

— not to mention China’s ability to launch military and spy satellites. As China is not a U.S. ally, is considered by many to be a potential adversary, and has transferred missile and nuclear technology to “rogue” nations, these proponents claimed, any such cooperation endangers American security and should therefore be impermissible. Further, they argued, many of the technologies used in commercial satellites can also be used in satellites designed for military and intelligence purposes, potentially against American targets, and so exports of satellite technologies should be severely constrained. Finally, they pointed out that China is led by an anti-democratic regime guilty of serious human rights violations, such as the massacre of peaceful democracy activists in Tiananmen Square in 1989, and suggested that U.S. policy should simply not aid and support such a regime.

These were all legitimate concerns that needed to be addressed, and continue to require attention today. Nonetheless, some have questioned whether the export control system that was put in place was, on balance, the best policy response available. Free-trade advocates and companies such as Loral, Hughes, and other satellite manufacturers agreed with their opponents in the debate that commercial interests should never trump national security. But they argued that to pit these particular national security concerns so absolutely against commercial, economic, diplomatic, and other foreign policy considerations was to set up a false dichotomy of export policy options. Any policy that neglects to account for the entire range of interests it affects, they suggested, is short-sighted and likely to fail; on export controls, to sacrifice some degree of U.S. commercial strength in the name of national security is to sacrifice some degree of national security, because security depends at least in part on a strong domestic defense industry. Moreover, they argued, commercial cooperation with China — even cooperation that directly improves Chinese military and intelligence capabilities — is not necessarily as damaging to U.S. security as their opponents suggested, especially if the consequences include a better understanding of Chinese capabilities and operating procedures, better relations between the two countries, and a consequent reduction in the probability of Chinese attacks against U.S. interests.

The balance of evidence, this study finds, supports the arguments of this latter group. Presumably, if any U.S. policy were to unduly weaken some aspect of America's national defense or the industrial base supporting it without meaningfully strengthening it in some other way, that policy would be subject to fervent criticism, robust public debate, and, one might expect, timely revision. Rules controlling satellite exports, however, seem to amount to just such a policy — yet criticism has been tepid, public debate has been meager, and, far from providing needed corrections, the 1998-1999 revisions only made the system worse. What advantage does a system of strict controls over such a wide array of items offer if its benefits to security are spurious and its costs to industry unnecessary? If, as this study finds, the policy offers no real advantages — or few advantages that are not outweighed by the costs — then why does it persist? What features of the American policymaking process or of the political structure of the issue itself permitted such a policy to emerge in the first place and subsequently to resist all attempts at meaningful correction?

This study attempts to address these questions. It makes two main observations, with respect to the way the bureaucratic, ideological, and political battles came together over satellite exports to China. First, the ideological battle helped to create the bureaucratic battle. Disagreements over the relationship with China and the policy goals of export controls have existed for decades. As a consequence, export controls initiated at the beginning of the Cold War evolved over time into the complex and at times self-contradictory system of rules and exceptions that President Clinton inherited. These larger disagreements were exemplified by the division of export jurisdiction between the State Department's Office of Defense Trade Controls (ODTC) and the Commerce Department's Bureau of Export Administration (BEA), two agencies whose internal cultures, perceptions of their legislative mandates, and attitudes toward China differed greatly.

Second, the political battle was found to be instrumentally useful to one side in the ideological battle (the China opponents) and one side in the bureaucratic battle (the State Department), making victory possible for proponents of export restrictions. That is, those

who opposed closer ties between the United States and China managed to capture the satellite export policy process during the 1990s by exploiting domestic and international political controversies to divide and silence those who favored closer ties to China and a more permissive system of export controls. They succeeded in part because they shared an intensity of dedication to the issue that was lacking among the opposition, which included free-trade advocates who were focusing on other issues and a small but fragmented industrial sector whose parent companies had an enormous stake in the existing defense-procurement system, a disincentive to active opposition. But they succeeded also because the controversies surrounding the impeachment proceedings made it politically impossible for the Clinton administration to oppose the legislation returning jurisdiction over satellite exports to the State Department in 1999. Even since then, supporters of a more moderate export system have failed to gain political ground — or even to seek any.

After briefly reviewing the U.S. export control system and the domestic politics of U.S.-China relations since the Nixon era, this paper examines the various controversies surrounding the launch failures, accident investigations, and allegations of export violations that led to the establishment of the system in place today. It pays particular attention both to the political environment of the period, especially with respect to developments in U.S.-China relations at the end of the Cold War, and, not insignificantly, to the various domestic political scandals involving sex, money, and espionage.

The U.S. export control system

The system of laws and regulations controlling the export of satellites manufactured by U.S. companies has always been somewhat complex, and to outsiders it has at times seemed bewildering. That's partly because export controls serve competing objectives, balancing national security against commercial interests and other economic or foreign policy concerns. Of course, national security and commercial interests are not necessarily at odds; foreign sales of indigenously produced military and intelligence technologies can provide

capital to the domestic defense industry so it can develop and produce new technologies, which can help the military maintain a technological advantage over potential adversaries. Nevertheless, no military wants to make it easy for its adversaries to acquire advanced technologies, even those that are a generation or so behind its own.

Most generally, export control policies are designed to thwart the transfer of militarily useful technologies and information about those technologies to potential adversaries. During the Cold War, American companies participating in any stage of the development of nuclear weapons, ballistic missiles, computers, radar, and other similarly sensitive technologies were tightly restricted in their ability to share or export any product of their work that the U.S. government believed could strengthen the military capabilities of its Communist adversaries. Restrictions were placed not only on finished products, but in some cases on basic science, test results, data, system designs, production techniques, specialized tools, and even management methods. Defense strategists and policymakers believed that the knowledge and technology resulting from classified, government-funded efforts gave the United States a comparative advantage in military and geopolitical affairs. Export controls, and the severe penalties accompanying their violation, were designed to maintain the strength of that advantage. Internationally, concern over the arms race and the proliferation of weapons of mass destruction (WMD) and related materials and technologies led the international community to craft a number of arms control agreements, which limit the kinds of items certain countries can export. Similarly, some countries have signed bilateral agreements to cover other areas of concern. Several of these multilateral and bilateral agreements have been signed by the United States and incorporated into the U.S. export control system.

The space industry provides products and services related to satellites and spacecraft. In commercial applications, satellites are used for communication (video, audio, and data), remote sensing (photography, spectral imagery), and navigation (GPS, GLONASS). When configured for maximum security and extreme sensitivity, the same products and

services are also useful in military and intelligence applications. The same can be said of the ground stations that control and communicate with satellites, the tools and machines used to build them, and the rockets and guidance systems that carry them into orbit. It is this dual-use nature of the products of the space industry that makes some U.S. policymakers uneasy about permitting commercial exports to unfavorable regimes, out of fear the products might be retooled for military applications.

This paper uses “satellite exports” to refer not only to the sale of satellites by U.S. companies to buyers in foreign countries, but also to international cooperation in the design, manufacture, or transport of dual-use items — and to exchanges of data and expertise — related to (a) satellites, (b) expendable launch vehicles (ELVs), and (c) ground stations, which communicate with satellites. An ELV, it should be noted, is called a *rocket* when its payload, or cargo, is a satellite or other object headed for orbit, and a *missile* when its payload is an explosive device headed for a target in warfare. More broadly, the paper uses “export control system,” “export control regime,” or simply “export controls” as a collective shorthand for government-mandated restrictions, including those deriving from bilateral and multilateral agreements, on the sharing or export of systems, products, components, technologies, tools, information, or expertise related to the design, manufacture, testing, or use of munitions or dual-use items, i.e., goods and services that have legitimate commercial uses but that can be adapted for military applications. “Satellite export controls” refers, for the sake of convenience if not complete accuracy, to those policies within the export control system that restrict satellite exports.

Most relevant to the present study are the Arms Export Control Act (AECA), the International Traffic in Arms Regulations (ITAR), and the U.S. Munitions List (USML); the Export Administration Act (EAA), the Export Administration Regulations (EAR), and the Commerce Control List (CCL); the Missile Technology Control Regime (MTCR); the Wassenaar Arrangement (WA); and the bilateral Satellite Technology Safeguards Agreements between the United States and China.

Arms Export Control Act (AECA). The AECA establishes procedures for both government-to-government and commercial sales of military equipment and services in an effort to control the proliferation of certain categories of munitions, or weapons. It is implemented through the International Traffic in Arms Regulations (ITAR) and administered by the Office of Defense Trade Controls (ODTC) in the State Department's Bureau of Political-Military Affairs. With the concurrence of the Department of Defense, ODTC creates and manages the U.S. Munitions List (USML), which designates certain items and activities as being "defense articles" and "defense services" that U.S. citizens and the staff and agents of U.S. companies may not export or share with foreign individuals or entities without first being granted a license from ODTC's regulators. In controlling exports, the AECA considers only the effect the export would have on national security; it does not take economic or commercial interests into account.

Export Administration Act (EAA). The EAA governs exports of dual-use goods and services. The Bureau of Export Administration (BEA) at the Department of Commerce (DOC) administers the EAA through the Export Administration Regulations (EAR) and the Commerce Control List (CCL), which identifies the dual-use items and services whose export are subject to licensing restrictions. Unlike ODTC regulators, Commerce regulators take not only national security, but also economic, commercial, trade, and foreign policy considerations, into account when making licensing decisions. Under the EAR, "space qualified" goods are any items that are "designed, manufactured, and tested to meet the special electrical, mechanical, or environmental requirements for use in the launch and deployment of satellites or high-altitude flight systems operating at altitudes of 100 km or higher."⁵ Congress enacted the EAA in 1979 to update and formalize a range of export control policies that had been in place since the beginning of the Cold War; the legislation included a sunset provision that would force the government to review the law a decade later. On 30 September

⁵ Offices of the Inspectors General of the Departments of Commerce, Defense, Energy, and State, March 2001, *Interagency Review of the Commerce Control List and the U.S. Munitions List*, p. iii, n. 4, available at <http://www.fas.org/asmp/resources/govern/01092-ig-sum.htm>, accessed 17 August 2004

1990, as the EAA was scheduled to expire, President George H.W. Bush issued an executive order reauthorizing the EAR provisions indefinitely. Subsequently, two laws were passed, in March 1993 and again in July 1994, to extend the EAA for one additional year, but since then no similar legislation has succeeded and the regulations continue to be authorized by executive order.

International Emergency Economic Powers Act (IEEPA). In 1977, Congress granted the president the authority to regulate, on a temporary or emergency basis, a wide range of international commercial transactions via an executive order declaring that doing so would be in the national interest. The IEEPA doesn't regulate export controls directly, but rather gives the president the authority to do so, within certain limits, in the name of national security or economic interests. It is this authority that presidents have used to extend the provisions of the EAA since its expiration.

Bilateral agreements on satellite launches and technology safeguards. In 1988 and 1993, the United States and China signed Satellite Technology Safeguards Agreements, the latter pact superseding the former. These agreements outlined the security procedures, pricing requirements, and insurance provisions for commercial satellite launches in China. China agreed not to steal U.S. aerospace and satellite technology, nor to lowball its launch pricing to undercut competition from private companies, and the United States agreed to allow U.S. companies to export satellites to China for launch into space. In 1995, the two countries signed a Bilateral Agreement on Space Launch Services in which the United States authorized a limited number of new geostationary orbit (GEO) satellite launches from China as long as it didn't charge less than 15 percent lower than equivalent launches by U.S. competitors; it was updated in 1997 to include low-earth orbit (LEO) launches.

Missile Technology Control Regime (MTCR). In 1987, Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States created the MTCR in an effort to limit missile proliferation; today it has 33 member countries. China is not a member, but in

1992 it agreed to abide by the provisions that were in place in 1987. The MTCR's Equipment and Technology Annex lists two categories missile-related items that are subject to controls: Category 1 items, which in the United States are included in the USML, include missile sub-systems and production equipment for missile systems. Category 2 items include dual-use components, materials, and other commodities; U.S. controls over these items are split between the USML and the CCL. In the past few years member states have discussed strengthening the regime by adding, for example, "catch all" requirements enabling nations to control unlisted items when their export is intended for a missile program. In 2002 it published the International Code of Conduct against Ballistic Missile Proliferation and invited member and non-member states to subscribe to what amounts to a multilateral agreement promoting missile non-proliferation.

The Wassenaar Arrangement. The 33 member states of the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies agree voluntarily to share data on exports and regulations of conventional weapons and dual-use items and to work to ensure that such transfers do not lead to destabilizing accumulations of weapons. It was established in July 1996 with the intention of replacing the Coordinating Committee for Multilateral Export Controls (CoCom), which had been established in 1949 by the NATO states to control exports of military equipment and dual-use items to Warsaw Pact countries. With the Cold War over, CoCom member states meeting in November 1993 agreed to disband the organization. At later discussions in Wassenaar, Netherlands, they decided, along with other states that were invited to participate, to replace CoCom with a less rigid and more voluntary system of shared goals and shared information about national-level controls, and the Wassenaar Arrangement began operations in September 1996. Parts of the Wassenaar Arrangement's control lists are incorporated into the USML and the CCL, but the United States has never proposed that the USML restrictions on satellite exports be added to the Wassenaar Arrangement's — and hence other member countries' — control lists.

The Domestic Politics of U.S.-China Relations

The preceding overview of the export control system illustrates a little of the system's complexity and even less of its history as a creature of domestic politics. It evolved as it did because it responded to competing objectives within the American political system and to different ideas about strategies for dealing with the Soviet Union, China, and other Communist nations. In fact, the satellite scandals of the 1990s were themselves a product of the domestic politics of foreign relations with China, and those arguments had roots reaching back to the Cold War. To understand how today's counterproductive system came into being, it may be useful to understand the Cold War politics of China relations.

The relationship between the United States and China has long been unstable, alternately warm and cool at different times and in different aspects throughout and since the Cold War. This is largely because there are conflicting views within the United States and the People's Republic of China (PRC) itself about the demands of national interest vis-à-vis the other country. Within the American political system, some people have been sympathetic to the Nixon Administration's opening to China. During the Cold War they generally viewed strong Sino-American relations as a vital geopolitical counterweight to the expansive ambitions of the Soviet Union. Since the fall of the Soviet Union, some have viewed engagement as a means to ensuring that Sino-American relations would never become as adversarial as the relationship between the two superpowers had been. There have always been those, however, who view the PRC with suspicion, fearing closer ties would only strengthen the communist government and lead to its eventual emergence as a world power, potentially as threatening to the United States in the future as the Soviet Union had been in the past. Still others believe the global promotion of values such as freedom, human rights, and democracy is either an important end in itself or a useful means for protecting U.S. interests in the world, and they consider Sino-American relations primarily in these terms. And of course China offers economic opportunities that some find irresistible.

By no means have these factions been mutually exclusive: some view China with suspicion precisely because of its human rights record, others support stronger ties as a way to promote freedom there, and still others seek the PRC's isolation as a means of undermining the authority of the communist leadership and thereby ultimately promoting democracy. In strategic terms, however, the question for policy makers has been whether *engagement* or *containment* should be the long-term strategy for protecting U.S. national security, and different groups have argued for one side or the other for different reasons at different times.

Engagement during the Cold War

When Richard Nixon took office in January 1969, U.S. policy toward the PRC was primarily one of isolation. The Cold War for the United States was a war against communism, and mainland China was controlled by a communist government. Official policy was that Chiang Kai-Shek and his Nationalists in Taiwan were the legitimate government of China on both sides of the Taiwan Strait; some within the American political system still view Taiwan this way. During Nixon's first year, a series of Sino-Soviet border disputes erupted into armed fighting and there arose a real possibility that the Soviets would invade, a development that neither China nor the United States would have welcomed. Nixon felt that friendship between the two countries could usefully restrain the Soviet Union, and with his national security adviser, Henry Kissinger, he secretly set in motion a plan to initiate talks with the leaders of the PRC. The outcome of those historic talks was a far greater degree of engagement with a communist nation than the United States had ever undertaken before.

The fundamental principle of engagement that Nixon and Kissinger established in 1972 was stated in the Shanghai Communiqué released at the end of that summit: "respect for the sovereignty and territorial integrity of all states, non-aggression against other states, non-interference in the internal affairs of other states, equality and mutual benefit, and

peaceful coexistence." Under the terms of the communiqué, the United States adopted a "one China" declaratory policy, in which it publicly recognized the PRC as the legitimate government of China and Taiwan, and officially opposed independence for Taiwan. But Nixon also secured assurances from the PRC that it wouldn't attack Taiwan and committed the United States to helping defend the island against any invasion from the mainland. After Nixon, the United States supported the PRC's eventual membership in the United Nations, even though Taiwan lost its seat in the process. Trade relations were established between the United States and China, and talk of military and intelligence cooperation became feasible for the first time.

The point of Nixon's engagement with China was not merely, or even primarily, to create a Sino-American alliance that would restrain and antagonize the Soviet Union; the point, arguably, was to improve Sino-American relations as a way of damaging Sino-Soviet relations, which in turn was an incentive to the Soviet Union to *improve* Soviet-American relations, or at least to reduce the mutual threat the superpowers posed to one another. Here there was a division among those Cold War policy makers who favored engagement with China: some favored engagement with China to facilitate *engagement* with the Soviet Union and reduce the threat that both countries posed to the United States, and some favored engagement with China to facilitate *containment* of the Soviet Union, which many considered the greater threat of the two. In both cases, the primary point was to strengthen China enough to damage Sino-Soviet relations but not enough to threaten the United States.

There were some policy makers, mostly to the political right of Nixon, who believed strengthening China would be a mistake in the long term, and they favored containment of both communist countries. But their political star was falling. Still, they were a powerful enough force in American politics that neither the Nixon nor the Ford administrations was able to make good on the Nixon-Kissinger promises of full diplomatic normalization with China. They were not strong enough, however, to prevent the intelligence sharing and tech-

nology transfers that had begun during Kissinger's last years as point man on China policy. There were hardliners in China, too, of course, and it was not until after Mao Zedong and Chou Enlai died in 1976 that the influence of the notorious "Gang of Four" and their supporters waned sufficiently to permit the Chinese political system to begin considering the Ford administration's offer of even greater military, intelligence, and technology cooperation. But by that time it was practically conventional wisdom within the American foreign policy establishment that that kind of engagement with China was useful, even necessary.

Engagement during the Carter and Reagan administrations meant progressively higher levels of trade, technology transfers, cultural and student exchanges, intelligence sharing, and military cooperation. The two countries issued a joint communiqué on 1 January 1979 formally establishing diplomatic relations. In that communiqué, the Americans re-committed to the one-China policy under the formulation, "there is but one China and Taiwan is part of China," while recognizing the right of "the people" of the United States and Taiwan to maintain "cultural, commercial, and other unofficial relations" with one another. Greater trade was made possible in 1980 by the United States's extension of most-favored nation (MFN) status to China, which permitted the trade relationship to be carried out in much the way it was done with most other countries in the world; even though it had to be renewed by Congress every year, renewal was practically automatic throughout the 1980s. Military cooperation was somewhat controversial domestically, as it included high-level visits between the American armed services and the People's Liberation Army (PLA), educational exchanges, and U.S. military-technology transfers, all intended to modernize the PLA's operations and capabilities.

These forms of engagement reached their zenith during the presidency of Ronald Reagan, who, ironically, had entered office as the most pro-Taiwan and anti-China president in recent memory. In August 1982, after acrimonious negotiations — high officials on both sides remained suspicious of one another throughout the 1980s — the Reagan administration signed another communiqué with China spelling out the terms of engagement over Tai-

wan and touching on a number of other issues. In that communiqué, the last of three defining the relationship between the two countries, the United States announced its intention not to sell more or better arms to Taiwan than it had sold since normalization with China. Reagan, however, quietly interpreted this as permitting U.S. sales of arms to Taiwan sufficient to maintain the balance of power between the island and the mainland. In other words, as long as China purchased American weapons, the United States would keep selling arms to Taiwan.

Indeed, arms sales to China, as well as commercial trade, continued throughout the remainder of the Reagan administration. In 1983, the administration began to ease export controls over dual-use goods and services, giving China access to militarily useful technologies that were unavailable to the Soviet Union and its Warsaw Pact allies. By 1984, in fact, China was permitted to buy American weapons directly, and the Reagan administration even allowed the purchases to be financed through the U.S. Foreign Military Sales program — enabling the PLA and its companies to update their factories and purchase fighter jets, torpedoes, missiles, radar, and other military systems. These upgrades, offered as part of Reagan's foreign policy, improved Chinese military capabilities many orders of magnitude beyond any assistance the U.S. satellite manufacturers gave China during the 1990s.

Containment and Engagement at the end of the Cold War

From Nixon's opening to China to the present, many Americans have questioned what the United States was getting out of this kind of engagement with China. During the Carter and Reagan years, U.S. support helped get China into the United Nations. This, combined with normalized relations starting in 1979, helped increase China's international prestige. U.S. intelligence not only gave China more information on the Soviet Union than China could ever give to the United States, but also introduced China to advanced intelligence techniques and technologies with which it had been unfamiliar.⁶ U.S. military technologies

⁶ Mann 1999 pp. 97-98

that were transferred to China — and, before normalization, European technologies transferred at the discreet urging of the United States — substantially strengthened China's own military and intelligence capabilities. What, critics of engagement asked, did the United States get in return?

In fact, the United States did get something out of engagement during the Cold War, albeit in ways that are difficult to measure: primarily, some degree of insurance against the possibility of a Sino-Soviet alliance. It also attained a somewhat clearer, though far from complete, understanding of Chinese military and intelligence capabilities and of Chinese politics and society in general. Plus, a number of domestic businesses profited from warmer relations, most directly in the defense and aerospace industries, but other industries benefited from access to the Chinese market as well, as a source of either cheap labor or new customers. And thousands of Chinese students studying in the United States returned to China after years of exposure to American political values such as democracy and human rights.

Still, not everyone agreed that the overall balance of the benefits enjoyed by both countries as a result of engagement was sufficiently tilted in favor of the United States to justify the approach. Some argued that the benefits accruing to China were grossly disproportionate to its real strategic significance to the United States. Others believed that the U.S. relationship with China was not as important as that with Taiwan, Japan, and other Asian countries. Among these critics of engagement were people who held influential positions within the Reagan administration: George Shultz, the economic policy adviser whom Reagan appointed as Secretary of State after Alexander Haig's resignation in 1982; William Clark, initially Deputy Secretary of State, but named National Security Adviser in early 1982; Richard Armitage, who was Deputy Assistant Secretary of Defense for East Asia and Pacific Affairs until being appointed Assistant Secretary of Defense for International Security Affairs in 1983; Paul Wolfowitz, who headed the policy planning staff at the State Department before his promotion in 1982 to Assistant Secretary of State for East Asian and Pacific

Affairs; Gaston Sigur, a National Security Council (NSC) aide on Asia who later replaced Wolfowitz at DOS in 1986 when the latter became Ambassador to Indonesia; and NSC China specialist James Lilley, who would later replace Winston Lord as Ambassador to China under the first Bush administration.⁷

After the August 1982 communiqué, Wolfowitz, Sigur, and Armitage began meeting regularly to discuss what the administration's overall approach to East Asia should be for the rest of Reagan's two terms, and the containment-oriented "Gang of Three," as they came to be known in some quarters,⁸ became fairly influential in shaping that approach. While engagement with China continued during that period in the form of progressively liberalized trade and technology transfers — including arms sales — the administration did follow the lead of the Gang of Three by increasingly speaking of China's significance in regional, rather than global or strategic, terms and emphasizing stronger relations with Japan and South Korea. It also became increasingly suspicious of Chinese activities outside the region and started paying closer attention to the PLA's own arms sales to nations the United States considered threatening, particularly in the Middle East.

Despite this influence and despite the fact that top officials from both countries remained suspicious of one another throughout both of Reagan's terms, engagement remained the overall approach. By Reagan's second term, Sino-American relations had settled into a businesslike relationship that stood in stark contrast to the warm, strategic partnership of the Nixon-Kissinger era. What China's leadership wanted most from the United States in the 1980s was trade, technology, and arms; within limits, that's what they got.

Those limits were defined primarily by concerns over proliferation of ballistic missiles in the Middle East. In October 1987 the administration instituted sanctions against China by slowing the progressive liberalization of export controls over high-technology products. This came in response to evidence that the PLA had begun to sell Silkworm land-to-sea missiles

⁷ Mann 1999 ch. 6-7

⁸ Paul Wolfowitz, 17 May 2004, remarks at meeting of The Asia Foundation, available at <http://www.dod.gov/speeches/2004/sp20040516-depsecdef0502.html>, accessed 16 August 2004

to Iran, enabling it to hit larger ships in the Persian Gulf than it had previously been able. China never admitted to the transfers, but it agreed early the following year to take steps to prevent sales of Chinese missiles to Iran anyway, and the sanctions were eventually lifted. But that was only the beginning of the missile controversies. Later in 1988, the PLA sold 36 DF-3 (CSS-2) missiles to Saudi Arabia. And it started pitching its solid-fuel M-9 and M-11 missiles to Syria, Pakistan, Libya, and Iran. These M-series missiles had ranges of 375 and 180 miles, respectively, but whether China considered them to be intermediate-range ballistic missiles (IRBMs) or short-range ballistic missiles (SRBMs) remained an open question. And a crucial one: when Secretary of Defense Frank Carlucci went to Beijing in September 1988 he was given assurances that the PLA would stop selling IRBMs in the Middle East.

In exchange for those assurances, the Reagan administration offered China a policy that would set the stage for the satellite scandals of the 1990s: U.S. companies would be permitted, for the first time, to use Chinese launch services to carry commercial satellites into space.

That wasn't merely a concession to the Chinese, however. It was also a concession to U.S. satellite manufacturers. Two years earlier, in January 1986, the Space Shuttle Challenger had exploded off the coast of Florida during liftoff, forcing the Reagan administration to temporarily suspend the Space Shuttle program during the launch-failure investigation. This created a sudden gap in domestic launch capacity, because the United States had previously required U.S. companies to use the Space Shuttle for all commercial satellite launches — a policy that had already had the effect of gutting private launch capacity in the United States while the public Shuttle program was in operation. Now that the public launch program was inoperable, the administration had no choice but to permit satellite makers to begin using private launch services again. At the time, however, the European company Arianespace was the only viable option — and within months of the Challenger disaster, an

Ariane rocket also exploded during liftoff, and the European launch industry likewise ground to a halt.

Because this was at the beginning of the telecommunications boom, when demand for telecom and broadcast services — and hence for communications satellites — was just starting to take off, this meant that demand for launch capacity worldwide would far outstrip available supply, especially in the Western democracies. Consequently, U.S. satellite manufacturers were lobbying the administration to permit more international cooperation in space. As Reagan's second term came to a close, his administration signed the first of the Satellite Technology Safeguards Agreements with the PRC, opening the door to cooperation between American and Chinese space companies.

A few months before the Challenger disaster, the PRC announced plans to begin offering commercial launch services using its fleet of Long March (LM-series) rockets at a substantially lower cost than what the Americans and Europeans could offer. By permitting some of its defense and aerospace companies to begin providing commercial services, China planned to take advantage of the growing worldwide demand for launch services as a new source of revenue. The companies involved were closely linked to the PLA: Commercial launch services were managed by the China Great Wall Industry Corp. (CGWIC) and operated by the China Academy of Launch Vehicle Technology (CALT), the Shanghai Academy of Spaceflight Technology (SAST), and China Satellite Launch & Tracking Control General (CLTC). CALT and SAST oversaw the active Long March rocket fleet, and CLTC managed and operated China's three launch sites on military bases in Xichang, Taiyuan, and Jiuquan. The relationship between all of these defense companies and the PLA was managed by the Chinese government's Commission on Science, Technology and Industry for National Defense (COSTIND). (See *Appendix B: China's Long March into Space* for a short history of the Long March rocket program.)

These relationships would become a source of bitter controversy during the Clinton administration, with accusations that the American satellite makers were selling out national

security to a foreign military for profit. But during the 1980s, when the Reagan administration was working to strengthen Chinese military capacity as part of U.S. foreign policy, commercial cooperation with Chinese defense companies had been officially encouraged. It was the policy of the Reagan administration during the last years of the Cold War to greatly improve China's military capabilities. That's why so few Americans at the time complained that U.S. satellite companies' use of Chinese launch services might threaten U.S. security: the military benefits accruing to China indirectly through commercial cooperation were fantastically miniscule compared to those the Reagan administration provided directly. Of far greater concern during the 1980s was the effect that inexpensive Chinese launch services would have on the ability of the emerging U.S. launch-services industry to be price-competitive.

Near the end of Reagan's presidency, the administration granted Hughes the export licenses it needed to use Chinese launch services to send the satellites it was building for Australia's national satellite company into orbit. Those licenses would get entangled in the moral and political controversies that emerged in the wake of the Tiananmen Square massacre.

The Politics of Satellite Export Control after the Cold War

At the beginning of George H.W. Bush's presidency, political reform within China seemed to be taking hold. The leadership of the Chinese Communist Party (CCP) was tolerating outspoken reformers to a far greater degree than it ever had before, and the democracy movement was growing throughout the country. There were still human rights violations and political oppression, of course, but the evolution of Chinese communism seemed to some observers to be taking the same course as that of Soviet communism under the leadership of Mikhail Gorbachev and his policy of greater freedom and transparency. Bush, who had been chief U.S. liaison officer to China — equivalent to ambassador — during the Ford administration, was not as anti-China as Reagan, so it would be reasonable to ex-

pect that he was as likely as any U.S. president to seek stronger Sino-American relations during his time in office. But events would dictate otherwise.

In April 1989, Chinese students who had gathered in Tiananmen Square in Beijing, initially to mourn the death of a beloved reformist leader, began demonstrating in favor of democratic reforms. The demonstrations grew substantially in the weeks that followed, and in early June the PRC ordered the PLA to retake the square. Hundreds of civilians were killed in one night, and thousands were imprisoned over the next few days.

Reaction in the United States was strong. Over the following days and weeks, the Bush administration responded to intense Congressional and public pressure by announcing the suspension of military sales, multilateral loans, and high-level political and military contacts with the PRC. In the months that followed, Congress formally enacted sanctions against China, forbidding, among other things, exports of satellites, high-speed computers, and munitions — unless granted a waiver by the President for reasons of national interest. The pressure came from a variety of sources, united not by partisan affiliation but by revulsion toward the massacre and, in some cases, long-standing opposition to U.S. engagement with China. Democratic members of Congress — primarily Senate majority leader George Mitchell and Rep. Nancy Pelosi — led the charge on Capitol Hill, but several conservative Republicans also supported the effort to roll back Sino-American engagement. The Congressional sanctions passed in the year following the Tiananmen massacre represented the greatest victory for American proponents of China's containment since Nixon's opening nearly two decades earlier.

The Bush administration, however, was concerned about the effect these sanctions and the rhetoric coming out of Congress were having on relations with China. In the six months following the Tiananmen Square massacre, National Security Adviser Brent Scowcroft and Deputy Secretary of State Lawrence Eagleburger took two secret trips to China to reassure the PRC leadership that despite its condemnatory words the administration continued to desire strong ties between the two countries. Just five weeks after Tiananmen, the

Bush Administration approved the sale of three Boeing jetliners to China, and in October it sent U.S. Ambassador James Lilley to attend a Beijing aeronautics show featuring military aircraft. Two months later, the Bush administration issued the first of two “national interest” waivers of the post-Tiananmen Congressional sanctions so that the satellites Hughes was building for Australia could be exported to China for their scheduled launches in 1992. That first waiver came just a month after Congress included the sanctions in the fiscal 1990 appropriations bill for State, Commerce, and other agencies; the second waiver came a year after the Foreign Relations Authorization Act, which also included post-Tiananmen sanctions, was passed in February 1990.

Meanwhile, American attitudes toward China in general continued to be a maze of ambivalence, and it was not always easy to follow developments in Sino-American relations during the period. In early 1990, China lifted the martial law it had introduced during the Tiananmen demonstrations, but at the end of that year it began a new crackdown on political activity. In May 1990 Bush asked Congress to renew China’s MFN status in trade relations. Evidence that China was transferring the solid-fuel M-11 missiles to Pakistan began to emerge around the same time, and by the summer of 1991 the intelligence was sufficiently persuasive that the Bush administration was compelled to impose new sanctions to enforce the MTCR. The State Department identified CGWIC as one of the Chinese companies responsible for missile proliferation.⁹ These sanctions forbade the approval of new licenses to export high-performance computers and satellites, among other items, to China. But Hughes’s Australian satellites were explicitly excluded from the sanctions, and the company was permitted to export them to China for launch. Meanwhile, the EAA, initially enacted in 1979, expired in September 1990 and President Bush invoked his IEEPA authority to issue an executive order reauthorizing many of the EAA’s regulations indefinitely. But then a month later he pocket-vetoed a bill that both houses of Congress had passed that would have amended and extended the full EAA on a permanent basis. In early 1992, in response

⁹ Smith 2003

to secret promises from the Chinese foreign ministry that the PRC would abide by the MTCR, Bush waived the June 1991 sanctions. By the end of that year, however, the president made the bold and controversial decision to sell F-16 fighter jets to Taiwan, a move China strongly objected to, considering it a violation of the “three communiqués” — under Nixon, Carter, and Reagan — that had defined the U.S.-China relationship for two decades. Within months, China began transferring equipment related to M-11 missiles to Pakistan once again. But during September 1992, in addition to selling the F-16s to Taiwan, Bush also waived sanctions so that five additional U.S.-built satellites could be exported to China for launch.

In April 1992, an interagency team completed its review, ordered by the president in November 1990, of the U.S. Munitions List (USML) and the Commerce Control List (CCL) to determine which of the dual-use items that were still on the USML, and therefore under the State Department’s licensing jurisdiction, could be transferred to Commerce without harming national security. About half of the commercial communications satellites on the USML were transferred to the CCL; those with certain militarily useful characteristics were retained by State. Formalized in October 1992, the transfers made it easier to export some commercial satellites for foreign launches, since the Commerce licensing process was generally more business-friendly. Commerce and State had long argued about which agency had jurisdiction over certain dual-use items, and the interagency review was meant in part to resolve the dispute.¹⁰ Still, some regulators within both departments and some members and staff of the Congressional committees overseeing the departments were unhappy with the new arrangement, some complaining it gave Commerce too much and others that it gave Commerce too little.

When one considers this back and forth of sanctions enacted and sanctions waived during the first Bush administration, one begins to appreciate the complex and increasingly self-contradictory nature of the U.S. export control regime. That complexity, the Reagan

¹⁰ Smith 2003 pp. 10-11

administration's approvals of the satellite export licenses, and the Bush administration's waivers lifting the sanctions blocking those exports all set the stage for the satellite scandals that would open the door to the extreme export policies put in place near the end of the Clinton administration's second term.

Given the final go-ahead by Bush, Hughes exported the first of its Australian satellites, the Optus-B1, to China for launch. But in March 1992 the LM-2E rocket it was sitting on malfunctioned, and the takeoff was aborted. Five months later, there was no such malfunction: the satellite was successfully placed into orbit. But on 21 December 1992, during the last month of the Bush presidency, the next satellite in the Optus constellation, the Optus-B2, was destroyed when an LM-2E rocket exploded during liftoff.

The Clinton administration and the three launch failures

President Clinton entered office facing the "New World Order" his predecessor had foretold. No longer was there any fear of a pan-communist alliance of Chinese and Soviets: the Soviet Union had collapsed a year before Clinton's election and the Chinese economy had become a "socialism with Chinese characteristics" that to most of the rest of the world resembled a weak form of capitalism. International alliances and intergovernmental organizations borne of Cold War exigencies were searching for new mandates, while states throughout Eastern Europe and Central Asia were experiencing the exuberance, and in many cases the pain, of being newly independent. Clinton, the first of the Baby Boom generation to become President of the United States, was to hold office during a period of domestic prosperity and great partisan hostility.

A few weeks after he took office, the United States and China completed negotiations and signed the second Satellite Technology Safeguards Agreement, which superseded the safeguards agreement signed during the last month of the Reagan administration. The February 1993 agreement spelled out the security procedures that were to be used for Chinese launches of American-made satellites, specifying, among other things, that U.S. citizens and

the employees and agents of U.S. companies were prohibited from providing any kind of assistance that might help the Chinese improve their launch systems, whether military or civilian. There have been disagreements within the United States between export regulators and some corporate legal advisers over the legal force of the bilateral agreements. Nonetheless, each license granted to a company under U.S. regulations to export a satellite for launch in China did explicitly require the company to comply with the bilateral agreements. Each company granted such a license was required to submit a plan to ensure the physical security of the satellite awaiting launch and to give staff from the Pentagon's Defense Technology Security Administration (DTSA) full on-site access to monitor compliance both with the specific security procedures written for that launch and with U.S. export regulations in general.

The Optus-B2 failure. In 1982, Australia's national satellite company, Aussat Proprietary Ltd., hired Hughes to develop a three-satellite system to deliver television broadcast and communications services to Australian customers. The first two satellites, Aussat-1 and Aussat-2, were launched in 1985 by the Space Shuttles Discovery and Atlantis. After the Challenger exploded in January 1986 and the Shuttle program was suspended, Hughes turned to Arianespace to launch Aussat-3. Around this time, governments worldwide were beginning to privatize their national telecommunications holdings and deregulate the telecom industries, on the theory that private companies in competition can provide better and cheaper services than debt-ridden government monopolies. As a first step in that process, the government of Australia sold Aussat to Optus Communications Ltd. in early 1992. The name of the second-generation Aussat constellation was changed to Optus, and Hughes was awarded the manufacturing and services contract for the three new Optus satellites that would provide broadcast and communications services to Australia and New Zealand.

After Optus-B1 was launched in the summer of 1992, Hughes exported the Optus-B2 to Xichang, China, for its launch into orbit. On 21 December 1992, the LM-2E rocket that was supposed to take it there exploded during its ascent. The satellite was destroyed.

Hughes worked with investigators from the China Great Wall Industry Corp. (CGWIC), the company responsible for the launch in China, to determine the cause of the failure. The public announcement of the investigation's results, released the following August, failed to identify a cause and both companies denied blame for the explosion; CGWIC had initially blamed the satellite, but Hughes concluded that problems with the rocket's fairing, or nose cone, most likely caused the explosion.

Hughes never sought an export license to participate in the investigation, believing it had received verbal assurance from its DTSA monitor that none was required, since the company had no intention of revealing any sensitive data. Export regulators in the State Department's Office of Defense Trade Controls (ODTC), however, believed that the investigation would violate ITAR restrictions on contact with PRC missile experts and claimed that Hughes knew that. The disagreement between the company and the regulators was never resolved, but in any event ODTC never filed charges against Hughes for the alleged violations.

Ten years later, however, when the same office charged Hughes for violations related to the launch failures in 1995 and 1996, ODTC director William J. Lowell referred back to the Optus-B2 dispute as an example of Hughes's "underlying pattern of misconduct."¹¹ In his December 2002 charging letter, Lowell complained that Hughes had gone ahead with the Optus-B2 investigation in 1992 without a license even though the company had earlier "sought advice from ODTC on whether a license would be granted to hold discussions with the PRC on this matter ... [and] concluded that 'a license request would almost certainly be denied (by ODTC) if even the slightest possibility or inference, real or perceived, remained undisputed (sic) that the technical data could directly or indirectly impact PRC ballistic missile interests.'"¹² In other words, Lowell believed Hughes never requested an export license

¹¹ William J. Lowell, 26 December 2002, State Department charging letter to Hughes and Boeing, p. 4

¹² *Ibid.* pp. 3-4

for the investigation solely because the company suspected ODTC would never approve one under any circumstances.

It should be noted that Hughes's interpretation of its discussions with ODTC differs from ODTC's account. Still, if Hughes did in fact harbor any such suspicions, they were probably not unfounded, given the ODTC's position with respect to contact between American and Chinese launch-failure investigators in general. A footnote to Lowell's 2002 charging letter — in which Hughes and its new parent company, Boeing, were charged with violations related to the Apstar-2 and Intelsat-708 failures — summarizes that position and, furthermore, nicely captures some of the arguments and attitudes present in the debate over export controls during the entire period of the satellite scandals:

While there is information available to the ODTC indicating that violations of the [EAA] and the [ITAR] occurred in the Optus-B2 matter, [ODTC] has decided not to bring charges owing to the passage of time and contradictory recollections of persons involved in these matters, and the further opinion that the charges detailed herein provide an adequate basis for addressing the underlying patterns of misconduct. The Respondents [i.e. Hughes and Boeing] do not deny their failure to obtain a license, but maintain they obtained approval from a Department of Defense monitor prior to making disclosures to the Chinese. Respondents also assert that the Department [of State] "well knows" that their decision not to seek a license "coincided with a decision not to furnish any information that could qualify as technical data or a defense service." However, the Department has no such understanding or knowledge; quite the opposite is true: The Respondents have repeatedly asserted throughout this investigation that none of their conduct in any of the matters touched on in this charging letter qualifies as a "defense service" either because it excluded technical data (in their opinion) or because it is Constitutionally protected "speech," while ODTC has repeatedly admonished Respondents and their attorneys that the AECA and ITAR properly regulate on U.S. security and foreign policy grounds the conduct of U.S. persons who aid and abet the space launch and/or intercontinental ballistic missile programs of foreign powers, that Respondents are improperly conflating the laws and regulations governing the conduct of their corporations abroad in respect to foreign space and missile programs with the laws and regulations governing the exercise of "speech" (which are in no manner at issue here), and that, because of security and foreign policy considerations, the United States has long held by the ITAR (with which regulations Respondents are fully familiar) that a defense service requiring approval by ODTC of a technical assistance agreement may occur even when all the information relied on in furnishing the defense service to a foreign power is in the public domain.¹³

This gives some flavor of the debate. The last line is particularly telling. It implies that the ITAR would require Hughes to get an export license for the Optus-B2 investigation

¹³ Ibid. n. 4

even if the investigation involved nothing secret — raising the question of what the point of such a policy could be. But the footnote also suggests that, beneath the attitudes and arguments that dominated the debate, there lay a great degree of legitimate disagreement over the correct interpretation of some provisions within the export control regime.

A week after Hughes announced the results of its Optus-B2 launch-failure investigation in August 1993, the Clinton administration announced new MTCR sanctions against China in response to new evidence that, despite assurances to the contrary, China had transferred missile-related technology to Pakistan following the Bush administration's sale of F-16 jets to Taiwan a year earlier. The pattern had been consistent since Reagan's second term and would continue through Clinton's second term: The United States would impose sanctions against China for missile or nuclear technology transfers, then lift the sanctions after getting assurances from China against further proliferation, then impose sanctions again after discovering that China had broken its promises (often, apparently, in response to U.S. arms sales to Taiwan), then lift them again after receiving new promises. Along the way, commercial satellites were sometimes included in, and sometimes excluded from, the sanctions, and sometimes the prohibition against exports to China was waived for individual satellites or individual companies, but not always, and not for every one.

The August 1993 sanctions made it impossible for Hughes to use Chinese launch services for the remainder of the Optus and Apstar satellite systems it was under contract to build and manage, because even though the satellites in question were commercial, they contained technologies that were considered munitions whose export was prohibited under the MTCR. Other U.S. aerospace companies, such as Loral and Martin Marietta, were similarly affected.

Immediately, the industry began an intensive lobbying campaign to get the Clinton administration to exempt commercial communications satellites from the sanctions. The aerospace companies were concerned that, because of the sanctions, foreign telecommunications companies were beginning to view American satellite manufacturers as unreliable

suppliers. They feared they were starting to lose business to their European competitors as a result.

The lobbying effort began to pay off in early January, when the administration announced that waivers would be granted for a few of the affected satellites. That cleared the way for successful launches of Hughes's Apstar-1 and Optus-B3 satellites in July and August. By October 1994, when Secretary of State Warren Christopher got Chinese Foreign Minister Qian Qichen to agree to define its M-11 missiles in terms that would cause their export to be prohibited under MTCR guidelines, the Clinton administration was able to lift the sanctions against commercial satellite exports entirely.

In the meantime, a few events in 1994 began to fuel the fires that were heating the political climate in Washington. In January Attorney General Janet Reno appointed an independent counsel to investigate allegations of improprieties by Bill and Hillary Clinton, among others, in the earlier Whitewater investment. That investigation would later be expanded to include Paula Jones's allegations of sexual harassment — she filed charges in May — and eventually lead to impeachment proceedings against President Clinton for lying under oath about his affair with White House intern Monica Lewinsky. By the time the Whitewater hearings began in July, *The Washington Times* — the newspaper of choice for conservatives and Republicans — had begun publishing articles about claims that Chinese spies were attempting to steal advanced nuclear and missile technologies from U.S. military and civilian sources. Some of the stories suggested the administration was lax about claims of Chinese espionage related to a Pentagon-PLA defense-conversion agreement that was signed in October. In September, when Commerce Secretary Ron Brown led a trade delegation to China, he was accompanied by Loral chairman Bernard Schwartz, the Democratic party's top campaign contributor. In December, Clinton appointed C. Michael Armstrong, the chairman of Hughes, as head of his Export Council. Both Schwartz and Armstrong would become a major focus of Clinton's political opponents' ire during the satellite scandals to come.

The Apstar-2 failure. Hughes had been given a free pass, more or less, for any export violations it may have committed during the Optus-B2 failure investigation and its preparations for the successful Apstar-1 and Optus-B3 launches of 1993. But the midterm elections in November 1994 were soon to introduce to Washington a cadre of conservative Republicans who had about as much patience for American companies doing business with “Red China” as they had for bipartisan camaraderie, Democrats, and actual communists. As the new year began and Republicans, having gained 54 seats, took control of the House of Representatives for the first time in decades, the tone in Washington quickly changed. No longer would there be free passes for companies sending technology to a country that, to many critics, represented a growing threat to American security.

Three weeks after Newt Gingrich was chosen as Speaker of the House, the second of the Long March launch failures took place. Like the Optus-B2, the satellite destroyed in the explosion on 26 January 1995 had also been manufactured by Hughes, in this case for APT Satellite Holdings Ltd., a broadcast and communication services company serving parts of the Asian market. APT’s corporate structure would later become a source of concern because its owners included some companies linked to the PLA.¹⁴ Still, Hughes was granted the licenses it needed to build the satellite and export it to China for launch. Initially, in March 1993, the export was licensed by the State Department. But after the August 1993 sanctions were imposed, Hughes substituted a different model of satellite for the prohibited version and applied instead to the Commerce Department in November 1993 for a license to export that one as the Apstar-2 instead. The license was approved, the satellite was shipped, and in 1995 the explosion destroyed it. Within days, after recovering the debris from the explosion, Hughes and CGWIC began separate investigations. Hughes hypothesized that the failure was caused by the same problem affecting the Optus-B2 launch —

¹⁴ APT is jointly owned by: China Telecommunications Broadcast Satellite Corp., China Aerospace Science & Technology Corp. (formerly known as China Aerospace Corporation), SingaSat Pte. Ltd. (a wholly owned subsidiary of Singapore Telecommunications Ltd.), CASIL Satellite Holdings Ltd. (a wholly owned subsidiary of China Aerospace International Holdings Ltd.), and Kwang Hua Development and Investment Ltd. (a Hong Kong corporation jointly owned by the Ruentex Group and China Development Corp.). Source: Apstar, available at <http://www.apstar.com>, accessed 17 August 2004

shear winds damaged the rocket's fairing — while Chinese investigators, as before, focused on the satellite, hypothesizing that shear winds caused resonance that damaged the connection between the satellite and the rocket.

Hughes wanted permission to present its own failure analysis to Chinese engineers so it could convince them its hypothesis was correct and persuade them to fix the problem with the fairing. Having been granted the initial export license by the Commerce Department, the company met in early March 1995 with Gene Christiansen, the department's licensing officer in charge of the Apstar-2 export, and other Commerce officials to discuss whether that department would also have licensing jurisdiction over the sharing of the technical findings. The officials told Hughes that while Commerce had jurisdiction over the satellite export, the State Department would have jurisdiction over any technical data that could be used by the Chinese to improve their rockets. In late April, Hughes officials met with Christiansen again to show him the analysis as it then stood and asked if they could share the technical findings with the Chinese. Christiansen granted Hughes permission to do so, and Hughes engineers began exchanging data and working closely with Chinese engineers to determine the cause of the failure and identify steps that can be taken to correct them; Hughes has also said that the technical exchanges that took place during this period were cleared by the DTSA monitor assigned to ensure that no export regulations were violated.

In the end, American and Chinese investigators could not agree on the cause of the failure and officials from Hughes and CGWIC released a statement in July 1995 noting that both of the hypotheses could be true and stating their intention to “work together to eliminate the above mentioned possible causes of failure and to enhance the monitoring of shear wind aloft before launch.”¹⁵ Two weeks later, Hughes presented its final report, which included recommendations for improving the fairing design, to Christiansen at Commerce and requested a license to release it to China. Christiansen assumed — incorrectly — that the fairing was part of the satellite and not the rocket, and that Commerce and not State there-

¹⁵ Cox 1999 ch. 5

fore had jurisdiction on the matter. His assumption not having been corrected by any of Hughes' staff, Christiansen granted the license. Hughes released the report and continued to work closely with Chinese engineers to correct the various problems both investigations had identified.

Christiansen later acknowledged that his approvals had been a mistake: since the fairing is part of the launch vehicle and not the satellite, the recommendations for improving the fairing were in fact subject to State Department approval. But Hughes had never sought a license from State, and in the process of working with CGWIC's engineers, it released a substantial amount of information the engineers could use to improve the reliability of the fairings on the Long March rockets. In late 1995, after Hughes and CGWIC had completed their launch-failure investigations, two LM-2E rockets launched American-made satellites into orbit. Neither exploded, but the November launch was bumpy, damaging the Asiasat-2 satellite built by Lockheed Martin; the December launch was successful. The fairing design used for these later launches was based in part on Hughes's recommendations.

The Intelsat-708 failure. In March 1995, the United States and China signed an agreement on pricing for future satellite launches, requiring China to charge no less than 15 percent below the prices charged by U.S. launch service providers; in exchange the United States approved up to 11 new satellite launches. But that bit of cooperation would be overshadowed that summer, when the Clinton administration permitted Taiwanese President Lee Teng-hui to enter the United States to give a lecture at his alma mater, Cornell University, in June. It was the first time since the advent of the U.S. one-China policy that a top Taiwanese leader was permitted to visit the United States. China responded angrily: in late July the PLA undertook a week-long artillery exercise in which it fired two Dong Feng-21 and four M-9 missiles near Taiwan.

Opponents of Clinton's China policies took the artillery exercise as further evidence that China was an international menace, especially where missiles and nuclear weapons were concerned, and they reiterated their demand that the administration end its policy of

military engagement with the PLA. In the months to come the media began reporting more heavily on Chinese attempts, both proven and alleged, to steal nuclear secrets from the United States and to transfer nuclear and missile technologies to Pakistan and other countries; *The Washington Times's* coverage was particularly critical of what many perceived to be the Clinton administration's weak response to such allegations. The budget standoff at the end of 1995 — which shut down the federal government for nearly two months after Clinton vetoed the budget bill Congress had sent him — did not help relations between the administration and the House GOP. In 1996 Republicans in Congress would become increasingly vocal in its disapproval of the administration's actions in a variety of areas, particularly in regards to China and satellite exports, but also in Clinton's personal life: by the time the budget standoff ended in January 1996, Clinton had already begun his affair with Monica Lewinsky.

It was around this time that Loral shipped a satellite it had built for Intelsat, the world's largest commercial satellite communications company, to Xichang, China, for its launch into orbit. A few weeks later, the media were reporting that the CIA had found evidence China was selling ring magnets to Pakistan for use in its nuclear program. That put pressure on the Clinton administration to impose new sanctions against China for nuclear proliferation. In the first weeks of February 1996, while the administration was considering new sanctions, it waived existing sanctions so as to permit several additional satellite exports. Then, in the middle of the month, in the middle of the night, in what was supposed to be the maiden voyage of the new LM-3B rocket, a broken wire somewhere in the guidance system caused the rocket to veer off-course during take-off and crash into a village near Xichang, destroying the Intelsat-708 satellite — and dozens of lives — in the incident described at the beginning of this paper.

The crash took place at 3 a.m. on 15 February 1996. Seven hours later, Loral employees were taken to the crash site, but they were forbidden access to the debris until more than 12 hours after the accident. China was suspected, although it was never proven,

of having delayed their access to the debris field to give Chinese investigators the opportunity to search it for sensitive technology controlled under U.S. export policy. Much of that technology was never recovered, but it is not known whether that's because it was stolen or simply destroyed in the explosion.

In any event, after the satellite debris was collected and shipped to California, CGWIC announced that its failure investigation team had preliminarily identified a bad solder joint in a certain section of the guidance system as the cause of the malfunction.

Given China's growing record of launch failures, however, the underwriters and insurance companies responsible for reimbursing satellite purchasers for loss of property refused to accept that conclusion, and in mid-March they demanded an independent review of China's failure investigation. CGWIC and Intelsat asked Loral's top engineering official, Wah Lim, to chair the Independent Review Committee (IRC), and he invited engineers from Loral, Hughes, Daimler-Benz Aerospace, Intelsat, British Aerospace, and General Dynamics to participate as well. After a series of technical meetings with IRC members and Chinese engineers in California and Beijing during the last weeks of April, the IRC identified alternative scenarios that they believed might better explain the failure. A few weeks later, Loral employees faxed the IRC's preliminary report to CGWIC recommending that its engineers perform tests of those scenarios. A DTSA export official read about it in an industry publication¹⁶ in mid-May and called Loral's Washington office to ask if the company had obtained a license to participate in the review. In a meeting the next day, export licensers from the DTSA and ODTC recommended that both Loral and Hughes voluntarily disclose all aspects of their involvement with the IRC.

Politically, the timing was terrible for the companies. While the insurance community was telling CGWIC what it needed to do for the upcoming Apstar-1A satellite launch to be insured — without insurance the satellite wouldn't be launched — Taiwan was preparing for its first-ever presidential election. On the eve of that election in early March, the PLA began

¹⁶ *Space News*, 13-19 May 1995

another series of artillery exercises off the coast of Taiwan to intimidate independence-minded voters, and two days later the United States sent two groups of aircraft carriers to the area to demonstrate its longstanding commitment to defending the island in case of attack. China backed down, promising not to attack, but not before some members of Congress declared that the incident highlighted the need for a national missile defense system and demanded that the Clinton administration impose sanctions against China for nuclear proliferation. In mid-May, as Loral was faxing the IRC report to CGWIC, the Clinton administration announced its decision not to impose sanctions against China, saying China had promised to stop selling nuclear technology to Pakistan, leading to a firestorm of criticism from the House GOP.

CGWIC's tests over the summer showed that one of the alternatives proposed by the IRC was correct: the failure was in a different section of the guidance system from what CGWIC had initially identified. Later investigations by various U.S. government agencies differed over whether or to what degree national security *might have been* harmed as a result of the companies' participation in the IRC, but none concluded that national security was actually harmed. A 1999 Congressional investigation noted:

The most recent review of the Independent Review Committee matter was performed by an interagency review team in 1998 to reconcile differences in the assessments of the other agencies. That interagency team concluded:

- The actual cause of the Long March 3B failure *may have been* discovered more quickly by the PRC as a result of the Independent Review Committee report.
- Advice given to the PRC by the Independent Review Committee *could* reinforce or add vigor to the PRC's design and test practices.
- The Independent Review Committee's advice *could* improve the reliability of the PRC's rockets.
- The technical issue of greatest concern was the exposure of the PRC to Western diagnostic processes, which *could* lead to improvements in reliability for all PRC missile and rocket programs. [Emphasis added]¹⁷

¹⁷ Cox 1999 vol. II ch. 6

Loral believed it was blameless in the matter. It issued a fact sheet in mid-1998 to counter what it considered to be unfair coverage, noting: "As far as [Loral's] engineers can determine, no sensitive information — no significant technology — was conveyed to the Chinese. No 'secret' or 'classified' information was ever discussed with the Chinese or included in any reports provided to the Chinese."¹⁸

In mid-July 1996, the IRC was disbanded because Loral and Hughes could no longer participate in the review while being investigated by the U.S. government. But its most useful work had already been completed: two weeks earlier, an LM-3B rocket successfully launched the Apstar-1A satellite that the insurance underwriters had threatened to abandon if CGWIC hadn't permitted the outside review and carried out its recommendations.

Chinagate and the 'Blue Team'

The months following the Intelsat-708 accident in early 1996 coincided with the Clinton administration's efforts to complete the transfer of jurisdiction over licensing of commercial satellite exports from the State Department to the Commerce Department. The Bush administration in 1992 had transferred to Commerce about half of the commercial satellites that State controlled; State retained jurisdiction over commercial satellites with certain military characteristics. While U.S. carriers were near Taiwan during the PLA's artillery exercises in March 1996, the Clinton administration was preparing to announce the transfer of jurisdiction over the remaining commercial satellites, even those with potential military value, to Commerce. By the time the two departments published regulations in October and November 1996 implementing the change — State's regulations were issued on election day — a political controversy was already beginning to brew about the way the Democrats, and the Clinton-Gore campaign in particular, were raising campaign funds. For those within the U.S. political system who had long opposed greater economic and military ties with China,

¹⁸ Space Systems/Loral, 18 May 1998, *Space Systems/Loral China Issues: Fact Sheet*, available at <http://www.fas.org/news/china/1998/980518-loral.htm>, accessed 22 August 2004

but who had largely been sidelined for two decades, the first of the Clinton administration's China scandals was the beginning of an opportunity to reverse the trend.

Around the beginning of Clinton's second term, a group of national security analysts who believed China was a growing threat to U.S. security and other vital interests began meeting informally to discuss ways to promote their policy agenda. Calling themselves the "Blue Team" — the color the Chinese military's war-gamers assign to the team representing the unnamed enemy — the group soon grew to about 40 Washington "insiders," including "members of Congress, congressional staff, think-tank fellows, conservative journalists, lobbyists for Taiwan, former intelligence officers, and a handful of academics,"¹⁹ all of whom opposed closer ties to China.²⁰ The Blue Team's had a few sympathizers in the mainstream media, and some of its members themselves published articles in the conservative — or, depending on how one defines it, the neoconservative — press.²¹ *The American Spectator*, for example, which published unabashedly biased articles on the Lewinsky scandal and impeachment proceedings, ran a number of rather alarmist stories about the Clinton administration's China policies, many written by long-time opponents of engagement with China. Articles published in *The Washington Times* relied heavily on allegations by House Republicans and unnamed sources, including dissenting export regulators within the administration. And *The New York Times's* Jeff Gerth published scoop after scoop that focused the public's attention on alleged improprieties in the Clinton administration's policies toward China.

By the middle of Clinton's second term, despite the fact that a majority in Congress were not opposed to closer ties to China, the Blue Team and fellow-travelers would succeed in returning satellite-export jurisdiction to the State Department and tightly restricting satellite exports to China, just as they had earlier succeeding in imposing sanctions against China for missile proliferation.

What explains their success?

¹⁹ Johnson-Freese 2003

²⁰ Eric A. McVadon, 21 December 2000, "A Purple China Policy for the U.S.," *Far East Economic Review*

²¹ J. Michael Waller, 4 June 2001, "Blue Team Takes on Red China," *Insight on the News*

They may have succeeded partly because, amid the inflammatory rhetoric and exaggerated claims of some, they offered very simple, very compelling reasons to the public in favor of the policies: the exports were a threat to national security, and China should be punished for its labor laws, human rights abuses, and missile proliferation. At least on satellite exports, the opposing view — which seems the correct view — may have been less compelling to the public simply because it was more subtle and rather more difficult to follow: a policy restricting satellite exports would not damage national security, because China could get the same technology from other countries, but it would put the U.S. space industry at a competitive disadvantage on the world market and harm a key sector of the defense industry in the process.

Still, it's clear that the Blue Team and their allies didn't win the day simply because of the seemingly compelling clarity of their arguments. They used inflammatory rhetoric to set the terms of the debate in the media, used their connections and influence in the government to manipulate the political process and allegedly intimidate the satellite companies with threats of license denials,²² and exploited and fomented political scandals through deceit, alarmist articles,²³ and book-length exposés.²⁴ As an example, one author who was sympathetic to the Blue Team's goals described the deceptive tactics employed by conservative congressional aide William Triplett, who coined the Blue Team's name,²⁵ during both the first Bush and Clinton administrations:

On Capitol Hill, Triplett purveyed a stream of facts, rumors, threats, and legislative maneuvers — all of them designed to expose wrongdoing by China and to frustrate and embarrass those who were trying to improve America's ties with Beijing. ... Triplett was adept at working "across the aisle," cultivating liberal Democrats as assiduously as he did conservative Republicans. He was as responsible as anyone for the unlikely bipartisan coalition that emerged in the 1990s on behalf of tougher policies toward China. ... Triplett was a master of the well-timed leak, the delayed nomination hearing, the planted question at the noontime White House briefing. He would call up State Department officials and urge them to do something because the press was hot on the trail of a story; then he would phone reporters to tell them the State Department was

²² personal communication from industry sources speaking on background

²³ Kenneth R. Timmerman, September 1998, "Long Beach Missile Transfers," *The American Spectator*; Timmerman, May 1999, "Red Star Over Washington," *The American Spectator*

²⁴ Timperlake and Triplett 1999; Mann 1999

²⁵ Nancy Gibbs and Michael Duffy, 16 April 2001, "A 'Blue Team' Blocks Beijing," *Time Europe*, pp. 32-39

about to change its policy. ... Triplett's legislative efforts were aimed primarily at stopping Chinese exports of military technology. ... After these measures were passed, Triplett began publicizing information about Chinese exports that would require the imposition of sanctions. Eventually, the evidence was strong enough that both the Bush and the Clinton administrations were forced to invoke sanctions against China for its exports of missile technology.²⁶

As one Blue Team opponent observed, "They're very passionate" in their opposition to China.²⁷ The other side of the debate lacked such passion, or even any degree of political cohesion. And during the Clinton administration, opponents of stronger export controls were also saddled with the scandals that came to be known collectively as "Chinagate."

Chinagate began with questions about the administration's role in violations of campaign-finance laws. In April 1996 — as Loral and Hughes staff were traveling to Beijing as part of their review of CGWIC's failure analysis — Vice President Al Gore traveled to Hacienda Heights, Calif., outside of Los Angeles, to attend a campaign fundraiser at Hsi Lai Temple, a Buddhist monastery. There, he helped the Democratic National Committee (DNC) raise \$140,000. Most of that money was later returned after the media reported that one of the event's organizers, Maria Hsia, had illegally used the tax-exempt temple's money to reimburse the monks and nuns for their contributions, and that DNC fundraiser John Huang had helped to organize the event. Huang was later fired from the DNC, a month before the election, when it became clear that the various sources for much of the money he had raised for the party could not be identified.

Both Hsia and Huang were among several Asians and Asian-Americans who were later investigated amid allegations they had illegally funneled funds from the Chinese government and foreign businesses to the DNC during the 1996 campaign in what some claimed was an effort by China to influence the presidential election. Huang had been a top executive of the Lippo Group, an Indonesian company with strong ties to the Chinese government, before taking a job at Commerce under the Clinton administration and later at the DNC. Lippo was owned by the Riady family, whose son James Riady had run a Lippo-owned

²⁶ Mann 1999 pp. 242-244

²⁷ Gibbs and Duffy pp. 32-39

bank in Little Rock, Ark., while Clinton was governor; Riady later helped raise hundreds of thousands of dollars for the Democratic campaign. Huang, Riady, and Lippo were investigated for violating campaign-finance laws, but no charges were ever brought against them. Hsia, however, was indicted for laundering campaign contributions from the Buddhist temple to the DNC. Also indicted in the campaign-finance scandals were Johnny Chung, who told prosecutors that some of the money he had donated to the DNC had come from a Chinese military official (who denied the claim), and Yah Lin "Charlie" Trie, a former Little Rock restaurant owner who helped to launder money from foreign business owners to the Clinton-Gore campaign and the Clintons' legal defense fund. Hsia, Chung, and Trie had raised about \$2.2 million for the Democrats during the 1996 campaign, all of which was eventually returned.

The investigations of campaign-finance violations continued throughout 1997 and into 1998, and so did media coverage of the revelations and allegations surrounding that investigation: administration officials supposedly "shaking down" Asian donors; "Friends of Bill" ("F.O.B.") allegedly acting as go-betweens to Chinese military officials; which donors attended "White House coffees"; who slept in the Lincoln bedroom; and so on.

Meanwhile, as Whitewater Independent Counsel Kenneth Starr was beginning to wrap up his investigation of land investments in late 1997 — Jim and Susan McDougal and Arkansas Governor Jim Guy Tucker had been convicted of fraud in May 1996 — he was becoming increasingly interested in Paula Jones's sexual harassment case and in the allegations of subornation of perjury and obstruction of justice that were emerging out of it. In January 1998 the Justice Department gave him permission to investigate. Two days later, Matt Drudge published a rumor that *Newsweek* had killed a story about Clinton's affair with an intern; Monica Lewinsky had visited the president in the White House for the last time three weeks earlier.

The campaign-finance and Monica Lewinsky matters would not be the last scandals of the Clinton administration's two terms; soon to follow were the satellite scandal and the

espionage scandal. Only one of the four had anything to do with sex. The others were part of the longstanding debate over how U.S. foreign policy should deal with China and over the degree to which China was or could be a threat to U.S. national security and other national interests in the world. In the campaign-finance scandal, the concern, among those who believed China represented a potential or growing threat, was over Chinese attempts to influence U.S. politicians for its own purposes; in the satellite scandal, it was over Chinese attempts to acquire advanced ballistic missile technology; and in the espionage scandal, to acquire advanced nuclear technology. Taken together, these scandals — Chinagate — were viewed, by sincere Blue Team sympathizers and political opportunists alike, as further evidence not only that China was truly a threat to the United States but also that the Clinton administration was entirely unable or entirely unwilling to respond to that threat in any responsible or effective manner. Of the four scandals, however, only the one with sex in it would make history, leading to the impeachment of the president. But the impeachment offered a perfect window of opportunity for Blue Team supporters to change U.S. export policy in a way that would severely restrict exports of satellites to China — in the process creating the dysfunctional export control system in place today.

In mid-February 1998, three weeks after declaring on television that he “did not have sexual relations with that woman, Miss Lewinsky,” the president waived post-Tiananmen sanctions so the Commerce Department could grant Loral a license to export the Chinasat-8 satellite, the most powerful commercial satellite China had ever bought abroad, and launch it from China. Loral had lobbied the Clinton administration for the waiver. But because the company’s chairman, Bernard Schwartz, had been the largest personal donor to the Democratic party during the 1996 campaign, the president’s approval of the waiver looked to many like a political favor. This may have been particularly unseemly because the waiver for Chinasat-8 was granted over the objections of the Justice Department’s criminal division, which had been investigating Loral for its Intelsat-708 review and had warned Clinton that any such waiver could damage its case against the company in the eyes of a jury.

On 4 April 1998, *The New York Times* published a front-page story, co-written by Gerth, under the headline, “Companies are investigated for aid to China on rockets.” The story reported that a federal grand jury was investigating Loral and Hughes for their role in the IRC review; it also noted that Schwartz was a major donor to the DNC. In the months that followed, *The New York Times*, *The Washington Times*, and other media published almost daily articles chronicling the resulting storm of allegations of political influence in the administration’s satellite approvals. Related stories reported on evidence of continuing Chinese missile proliferation. The Justice Department began a preliminary inquiry into the allegations of influence-buying, although it ultimately found no improprieties, while the Senate held hearings on the export violations and missile proliferation. The day after Newt Gingrich, the Speaker of the House of Representatives, announced plans to create a committee to *study* the issue of satellite exports to China, the House of Representatives *voted to prohibit satellite exports to China* — suggesting that the committee’s later findings had been foreordained by the prior vote.

Gingrich appointed Rep. Christopher Cox (R-Calif.) to chair the Select Committee on U.S. National Security and Military/Commercial Concerns with the People’s Republic of China. The Cox Committee was charged with studying, among other things, the question of satellite exports to China and China’s efforts to acquire advanced missile and nuclear technologies through commercial partnerships, espionage, and outright theft. It was impaneled right around the time the Commission to Assess the Ballistic Missile Threat to the United States, chaired by former and future Secretary of Defense Donald Rumsfeld, submitted its final report to Congress. That report contradicted the official — and controversial — 1995 National Intelligence Estimate (NIE), which found that countries such as Iran, Iraq, and North Korea would not have ballistic missiles capable of reaching the continental United States for at least 15 years; the Rumsfeld Commission, by contrast, concluded that such missiles could be developed and deployed, without warning, in as early as five years. Consequently, the Cox Committee, whose members were already concerned about Chinese

arms transfers to "rogue states," found in the Rumsfeld report a reason for even greater urgency in their work on satellite exports. The committee's hearings on the satellite exports, and related hearings in the Senate, received wide media attention, just as the hearings on the Monica Lewinsky scandal did. Much of the information in this paper was revealed in the coverage of the satellite scandals beginning in the summer of 1998.

It may have been the case that the Clinton administration, influenced by political donors in the space industry, was too lax in its efforts to protect sensitive technology from falling into the wrong hands, although it seems just as likely that in its export policies it really was trying to find a workable balance between national security and commercial and economic interests. But whatever the president's motives, the satellite scandals coincided with the sex scandals, and this put political pressure on Clinton to abandon his preferred policy options in the export area. Even if President Clinton had had the purest of motives and the greatest of proposals for export controls, his political opponents wanted to stop satellite exports to China, and the sex scandals and impeachment proceedings permitted him neither the time nor the political capital to oppose them. A short timeline of events from the end of the summer of 1998 to the early months of 1999 clearly demonstrates this point:

On 11 September 1998, the House of Representatives released part of the Starr report to the public. On September 17, a House-Senate conference on the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 agreed to a provision, included with dozens of other provisions in a House-approved *en bloc* amendment, that required the transfer of licensing jurisdiction over commercial satellite exports back to the State Department. On September 21, the House Judiciary Committee released more than 3,000 pages of supporting documents from the Starr report, including President Clinton's videotaped grand jury testimony, which was televised nationally; three days later the committee announced its intention to vote on a resolution to impeach the president. A week later, the Strom Thurmond National Defense Authorization Act was presented to President Clinton, who signed it on October 17 despite his strong opposition to the satellite-export provision; in early De-

ember, the chairmen of six House and Senate committees sent Clinton a letter warning him not to delay or contravene the transfer of jurisdiction to State. The House Judiciary Committee approved the four articles of impeachment on December 11 and 12. On December 15, Gerth coauthored another front-page scoop for *The New York Times*, this time reporting that the Justice Department found had evidence that China sought to influence the 1996 campaign so it could acquire high-tech military products. Four days later, the House of Representatives voted to approve two of the four articles of impeachment. Just before the new year, the Cox Committee voted to approve the classified version of its final report, and in the first week of 1999 the House voted to extend the committee's tenure so it could work to declassify its report. The next day, on January 7, the Senate began formal impeachment proceedings. Two weeks later, the administration submitted to Congress its plan to transfer licensing jurisdiction to State. On February 12, the Senate voted to acquit the president of both charges, ending the impeachment. Eleven days later, the administration announced its decision to deny Hughes a license to export a satellite to China for launch, citing concerns by export licensers in the State and Defense Departments; a month later, the transfer of jurisdiction over commercial satellite exports was complete.

Then Gerth dropped another bomb on the front page of *The New York Times* — another Clinton administration China scandal — in early March 1999. Gerth and his coauthors reported that China had stolen top-secret technology for miniaturizing nuclear warheads from U.S. nuclear laboratories. Two days later, nuclear scientist and recent American citizen Wen Ho Lee was fired from his job at the Los Alamos National Laboratory. It was the most serious of the Chinagate allegations — nuclear espionage by a Chinese agent — and the media covered the story heavily. Lee was arrested at the end of the year and spent nine months in solitary confinement on suspicion of espionage. The evidence, however, turned out to be flimsy. After pleading guilty to one charge of violating security procedures, he was released in September 2000 by an apologetic judge who said his prosecutors had embar-

passed the "entire nation"; *The New York Times* apologized the following week for its overblown coverage of the case. Lee was never charged as a spy.

* * *

In the summer of 1999, Chinagate was still in the news. The media were still reporting new developments in the campaign-finance scandal, and Wen Ho Lee had not yet been arrested, so the espionage scandal was still in full bloom. By contrast, the impeachment was over, so the sex scandal was not getting nearly much press as it had the year before. And the Cox Committee had already disbanded and most of its revelations already reported, so the satellite scandal was mostly yesterday's news, too.

But the export control system had already been changed; the State Department was now in control of export licensing for commercial satellites, which, despite all sense and reason, it now regulated as munitions. The previous year, Commerce had approved Loral's request to export the Chinasat-8 satellite after the Clinton administration waived sanctions. Now, in the summer of 1999, the State Department's export regulators sent a letter to Loral informing the company it was not going to permit the export to take place. The satellite is still on the ground.

The Justice Department never filed criminal charges against any of the companies involved in the satellite scandals. The State Department's Office of Defense Trade Controls (ODTC), however, pursued the cases to the end. For its export violations, Loral settled with the State Department in January 2002, agreeing to admit to the export violations and to pay \$20 million in fines, of which \$14 million was to be paid to the U.S. government and \$6 million to be used internally to improve its ability to comply with export control regulations. The following month, GlobalStar, a satellite phone company in which Loral had invested more than a billion dollars over the previous eight years, declared bankruptcy, after spending \$4 billion but failing to make its business plan work. Amid falling demand for satellites worldwide — only four orders for commercial satellites were placed worldwide in 2002 — Loral itself filed for bankruptcy in July 2003.

Similarly, Boeing, which acquired Hughes Space & Communications in 2000, was charged by the ODTC in December 2002 with export violations related to the participation of Hughes staff in the Apstar-2 and Intelsat-708 launch failure investigations and reviews. Boeing and Hughes had long resisted settling with the State Department, but they finally relented in March 2003, agreeing to pay \$32 million in fines: \$20 to the U.S. government, \$8 million to improve its internal processes for export compliance, and a \$4 million credit for such improvements it had already made.

Conclusion

In 1998, Boeing had been fined \$10 million for technical violations of the AECA related to its Sea Launch joint venture, even though the State Department had concluded that its participation in that venture had not resulted in any damage to U.S. national security. The settlement did not require Boeing to withdraw from the partnership, despite concerns of critics that the company had violated the law and risked transferring of sensitive U.S. missile technology to Russian and Ukrainian scientists. Many of those critics were equally concerned, more generally, about transfers of missile technology to China, the concerns at the center of the satellite scandals. An academic study of the Sea Launch case, however, observed that such concerns were not universally shared. Supporters of the satellite companies, it noted, believed that “the violations were of minimal importance and were greatly outweighed by the merits of the project”:

First, those in the American satellite industry, along with their supporters in Congress, argued that American corporations (and presumably the U.S. government) would gain access to Russian and Ukrainian technology on the design and construction of horizontally constructed, liquid fueled rockets, as well as to some of the best rocket engines in the business. Second, [Sea Launch (SL)] had enacted significant safeguards to prevent the outflow of technology. Therefore the net outflow of technology would be significantly less than the influx of new technology. Third, SL contended that if Boeing and other American firms did not participate in these joint launch programs, other Western corporations would. Fourth, without space cooperation the U.S. would not have the necessary leverage to prevent Russia and Ukraine from passing technology to rogue states. Finally, and most importantly, whatever technological violations

occur are vastly outweighed by the commercial benefits of such projects to U.S. industry.²⁸

All of these arguments were as valid in the Long March launch-failure cases as they were in the Sea Launch case — indeed, there are legitimate reasons to contend that toughening the export control system was not the most appropriate response to the concerns raised by either. In the Long March cases, national security was not harmed in any meaningful way; the defense services the companies were accused of providing to China were not secret techniques but rather were publicly available from other sources; the policy response damaged a sector of the U.S. defense industry; and the United State benefited as well as China from the cooperation that took place.

National security was not meaningfully harmed. Export controls are meant to protect national security by limiting the diffusion of technologies and knowledge that can be used to harm the country; the level of harm to national security resulting from such diffusion depends on how the thing being transferred can or will be used by the recipient. Most of the investigations undertaken by the State Department, the Pentagon, the Commerce Department, the CIA, and Congress ultimately concluded that the export violations committed by Boeing, Hughes, and Loral did not damage U.S. national security in any material way. The “defense services” that were provided to the Chinese offered only marginal benefits to the Chinese missile program. After the State Department concluded its investigation of Hughes, for example, it reported that:

The impact and extent of any damage to U.S. national security as a result of the Hughes accident investigation into the [1995] launch failure is difficult to quantify. However, we believe the assistance provided by Hughes to China will prove to be significant *to the degree it contributes* to the increased reliability of their launch vehicles. The recent record of Chinese space launches in fact shows an improvement in reliability. The longer term effect of increased launch reliability will be to improve the rate of successful deployment of Chinese satellites and, in turn, to facilitate China's access to space for commercial and military programs [emphasis added].²⁹

²⁸ Kempton and Balc 2003 p. 7

²⁹ Memorandum to Christopher Cox from Barbara Larkin, Assistant Secretary of State for Legislative Affairs, 18 December 1998, cited in Cox 1999 vol. II p. 84

In other words, the degree to which such export violations can damage national security depends, at least in part, on the degree to which they contribute to the improvements cited.

But in all of the cases under consideration here, such contributions were marginal — and certainly far smaller than the improvements provided by way of official U.S. policy under every president since Gerald Ford. Many of the breaches by the U.S. satellite companies were little more than technical violations of State Department regulations against providing defense services without a license. For the most part, the issue of greatest concern was the Chinese engineers' exposure to advanced Western diagnostic processes and to fairing, or nose-cone, designs. These processes and designs can be used to improve the reliability of rockets that launch Chinese military and intelligence satellites. The fairing designs could also be used to improve the designs of multiple reentry vehicles (MRVs) and multiple independently targeted reentry vehicles (MIRVs) — if China should ever choose to develop such weapons for its nuclear arsenal — or of submarine-launched ballistic missiles (SLBMs) or road-mobile missile warheads. The assistance provided by the Americans, however, did little more than to help the Chinese discover, and so correct, the problems *more quickly*, and those corrections marginally improved only the reliability, and not the accuracy or the range, of the rockets.³⁰

Many opponents of the Clinton administration's China policies, however, loudly overstated the extent of technology transfer that actually took place, acting at times as if the companies had finally given China the ability to "nuke" America, as if China were just itching to do so, and as if official U.S. policy hadn't done the same and far more for nearly two decades: "Some of the industry people ... have betrayed their country. They have provided upgrades to Communist Chinese rockets that threaten to incinerate millions of Americans," declared Dana Rohrabacher (R-Calif.), chairman of the House subcommittee on Space and Aeronautics, in 1999.³¹ But the "upgrades" the "industry people" provided were quality-

³⁰ Cox 1999 vol. II ch. 5-6

³¹ *Aviation Week & Space Technology*, 6 December 1999, "U.S. Must Cut More Red Tape for Satellites" (Editorial)

control recommendations, and recommendations for nose-cone designs that were rather more sophisticated than those used by the Chinese. China already had an indigenous capability to design nose cones; many of its engineers had been trained in the United States. And in any case the designs required for the nuclear weapons cited don't even need to be as sophisticated as the designs that were suggested by the American companies; those designs are more suitable to the commercial satellites for which they were intended.³²

The defense services in question were publicly available. Export controls work only when they limit the availability of technologies and knowledge that are not available either elsewhere or indigenously. Many of the technologies and much of the expertise controlled under the current export system in the United States are readily available overseas. U.S. companies may have been on the forefront of progress in commercial space technology at one time, but that may no longer be the case. Foreign competitors today offer systems, services, and critical components that in many instances can easily substitute for their American counterparts, and the U.S. export control regime gives those competitors an incentive and an opportunity to develop even more. Not only China but India, Japan, and a number of European countries also have placed a high priority on improving domestic manufacturing capacity for satellite technology.³³ The European Space Agency has even begun working with European manufacturers to develop satellite and spacecraft components that they can market as being completely "ITAR-free" — that is, having no "Made in America" components that would be subject to the State Department's International Traffic in Arms Regulations (ITAR) — an attractive feature to customers tired of the delays and red tape associated with purchases of satellites possessing even a single U.S.-made, ITAR-class component.³⁴ As one analysis put it, "The debate over whether these components are as good as U.S.-made components is irrelevant; foreign nations can build capable and com-

³² Franklin 1999 p. 89

³³ Lewis 2002 pp. vii-viii, 4-5

³⁴ European Space Agency, <http://telecom.esa.int/telecom/www/object/index.cfm?fobjectid=13349>; EADS, <http://cs.space.eads.net/sp/SpacecraftPropulsion/BipropellantThrusters.html>; both accessed 16 August 2004

petitive [communication], remote sensing, and navigating satellites without U.S. technology.”³⁵ Germany and Japan, expressing their frustration with the U.S. system after jurisdiction was returned to State, began looking to European providers for future purchases of satellites and components.³⁶

This isn't to suggest that there are no satellite or launch technologies available only from U.S. sources, only that the list of such technologies is getting shorter. It may be reasonable to argue in favor of restrictions against exports of any truly dangerous technology over which the United States has a monopoly. Yet the U.S. export control system limits exports of satellite technologies that are not dangerous and that are readily available from foreign sources. And some of China's best engineers — some of whom, as noted, had been trained in the United States — were also studying the causes of the launch failures and taking steps to address them. While some of the diagnostic processes they were using at the time of the failure investigations were inferior to those recommended by the American companies, the international launch-insurance industry was already putting substantial pressure on the country to improve those processes. If the Americans hadn't given such suggestions, the Chinese engineers could as easily have turned to European engineers for much the same advice. In short, it is disingenuous to suggest that the American companies were the only possible source of the advanced satellite technologies, fairing designs, manufacturing processes, and diagnostic procedures that they were alleged to have put at risk of transfer to the Chinese.

Stronger controls harmed an important sector of the defense industry. Arms proliferation is only one among many threats to national security, albeit an important one, and the tools developed to limit proliferation, including export controls, should never be used in a way that ignores or exacerbates other threats or damages other tools for protecting national security. One scholar noted the dilemma inherent in efforts to control the prolif-

³⁵ Lewis 2002 p. 4

³⁶ Sam Silverstein, 12 July 1999, "Export Laws Jeopardize U.S.-Japan Relations," *Space News*, p. 3; Peter B. deSelding, 5 July 1999, "U.S. Export Rules Frustrate Germans," *Space News*, p. 1; both cited in Smith 2001 n. 83

eration of dual-use goods such as satellites: “On one hand, export controls can strengthen national security by limiting the diffusion of sensitive technology. On the other, those same controls, by reducing the number of profitable exports, can weaken the domestic industrial base that forms the foundation of national security.”³⁷ In fact, there is evidence that U.S. policy toward satellite launches and exports since the mid-1990s has weakened domestic manufacturing capacity for satellite components and subsystems.³⁸ In 1995, according to figures cited in one study, U.S. companies had a 90 percent share of the satellite component market, while Europeans controlled 10 percent; by 1999, the U.S. share had dropped to 56 percent and the European share had jumped to 34 percent.³⁹ Today, U.S. military satellite programs depend on foreign suppliers for some components. Any further weakening of the U.S. satellite industry risks damaging the market for satellite services, the domestic capacity for basic research, and the ability of the entire sector to attract new investment.⁴⁰

By weakening the commercial prospects of a small but important sector of the U.S. defense industry, the current export control system damages national security to the degree it forces the U.S. military to depend increasingly on foreign suppliers for satellite components and services. Loosening restrictions on satellite exports, on the other hand, could enable U.S. satellite companies to recapture some of that market, earning them profits and attracting new financing that could be put back into research and return the U.S. space industry to the forefront of development in space technology — new developments that the United States would control as a monopoly and therefore could legitimately and effectively subject to strict export controls if that were deemed necessary to national security.

Cooperation benefits the United States as well as China. An export control system is only one tool in the national security toolbox. To be most effective, it needs to be used in conjunction with other tools, such as diplomacy, support for research and develop-

³⁷ Smith 2001 pp. 31-32

³⁸ Johnson, Pace, and Gabbard 1998 p. 28; Lewis 2002 pp. 24-26

³⁹ Lewis 2002 p. 26

⁴⁰ Moorman 2000; Lewis 2002 pp. 27-28

ment, and economic cooperation. Even if the U.S. companies had been the sole source of the technology and expertise that was transferred, and even if the benefits the Chinese enjoyed from those transfers had been more than marginal, it still pays to consider what benefits accrued to the American side as a consequence of the relationship. If China used its cooperation with U.S. satellite companies as a means of intelligence gathering, as many critics claim, that should imply that such cooperation could be useful for American intelligence gathering as well. It may in fact be true that a good deal of U.S. expertise was shared with Chinese engineers during the course of the various failure investigations, but it may also be true that the balance of technology transfer was actually in the other direction: the American companies believed they had learned far more about Chinese launch technology and manufacturing processes than the Chinese did about American diagnostic processes. That's good for both U.S. business and U.S. intelligence. It enabled the companies and their insurers to judge the degree of risk they faced in using Chinese launch services and to reduce that risk so that they could try to meet international demand for communications satellites — demand that, at the time, could not be fully met by U.S. launch facilities. And it did not hurt U.S. national security for Americans to learn some details of Chinese engineering practices in companies closely linked to, and in some cases operated by, the Chinese military.

Moreover, even if economic, or even military, cooperation were to result in improvements in Chinese ballistic missiles, it may be worth permitting it if the relationship were to help reduce the risk of China's ever using them against the United States. Proponents of strong restrictions over exports to China often speak as if they either want a confrontation with China or, more often, assume such a confrontation is inevitable. But that is far from certain. Diplomacy and economic cooperation demonstrably make international relations more peaceful; the strategic use of power can do the same, but often only at greater cost. The current export control system is quite punishing to China; a more permissive system, by contrast, could be profitable enough to both sides to keep the risk of war low.

* * *

The export control system today retains the character of its Cold War origins. Even before the legislation that redefined commercial satellites as munitions, that anachronism was evident, as a space industry executive pointed out during Congressional testimony in 1997:

Both [the EAA and the AECA] were written during the Cold War at a time when we dealt with a bipolar world, when military technology was relatively distinct from commercial technology, and when advanced technical knowledge was essentially the province of the industrial democracies and the Soviet bloc. Today, the Cold War is over. Technology and knowledge have become widely dispersed, and the distinction between military and commercial technology is increasingly blurred. The philosophical underpinnings, legal structure, and administrative framework for U.S. export controls have not changed at a comparable pace.⁴¹

That slow pace of change is due to a number of factors, but surely one is the concern among some U.S. policymakers that, despite the demise of the Soviet bloc, there continue to be "rogue," "axis of evil," or otherwise belligerent countries that are controlled or at risk of becoming controlled by regimes that are antagonistic to the United States and that want to develop or improve their nuclear weapons and ballistic missiles capabilities. North Korea and Iran are usually on the short list of such countries, but some would and do add China, Pakistan, Syria, Cuba, and any number of other non-democratic and non-Western countries. Concerns that terrorists might get their hands on such weapons exist as well. Needless to say, these are legitimate concerns. But the complicated system of export controls that Clinton inherited did not adequately address them, and the changes Congress made to that system in 1998 and 1999 only made things worse.

When Congress made those changes, it failed to consider the full range of interests that would be affected. Even if they did not care a whit about the president's lying about his sex life — and many of them did — the Blue Team and their allies in Congress cared deeply about U.S. policy toward China, to the exclusion of other relevant considerations, and they

⁴¹ Joel Johnson, vice president of the International Aerospace Industries Association (IAIA), 13 May 1997, testimony before the House International Relations Subcommittee on International Economic Policy and Trade, available at http://www.fas.org/spp/starwars/congress/1997_h/hfa44879_0.htm, accessed 18 August 2004

knew political weakness when they saw it. They won political points by publicly linking the administration's satellite export and China policies with the controversies over campaign fundraising, China's bad behavior in the Taiwan Strait, and Clinton's bad behavior in the Oval Office. And they were politically savvy. The amendment to the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999 that required the change in satellite export jurisdiction was included in a House *en bloc* amendment, forcing the chamber to vote for or against dozens of unrelated provisions as a group. With little debate, the amendment passed; with the impeachment proceedings under way, the conference working to rectify the House and Senate versions voted to keep it in the final bill. The provision's opponents — primarily Democrats, and certainly the Clinton administration — lacked the political space to argue successfully against it.

In an academic article on government controls over scientific research, the authors observed that, while "Congress is always responsive to public concerns and pressures" on issues such as national security, its response is generally reactive rather than anticipatory, and the result is often suboptimal:

Its legislative response to a perceived national security crisis will likely more resemble a sledge hammer than the precisely sculpted set of rules that would factor the interests of the regulated community into the balance. ... Congress's hurried action to change the export controls [in the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999] occurred without detailed input from the affected community and continues to hamper space-based research and American sales of space-related products today. This episode is but one of many where events sparked legislation that is more blunt than would be optimal, given the complex interests concerned.⁴²

A nation's security requires an economic and industrial base robust enough to support the institutions that defend the nation against threats, as the demise of the Soviet Union demonstrated in dramatic fashion over a decade ago. The U.S. economy is, of course, strong enough to withstand any number of economic assaults and to support a defense establishment capable of protecting U.S. interests in most any situation the nation's leaders decide to confront. But the current export system weakens a sector of the defense industry

⁴² Rindskopf and Jacobs 2003 p. 93

needlessly, controlling exports by U.S. companies but not by U.S. allies. If satellite proliferation were so threatening to national security, one would expect that supporters of strict controls, within the current administration or within Congress during the current and previous administrations, would have made a serious effort to propose adding commercial satellites to the control lists of the Wassenaar Arrangement. But no such effort has been made.

During the 2000 presidential election, when Chinagate had not yet been put to rest, the campaign of George W. Bush proposed a policy of “higher walls around fewer items,” an entirely reasonable approach to export controls that a number of national security experts have recommended. As president, Bush should have been in a strong position to reform the system. His administration has recognized that an export system designed to meet Cold War needs is utterly unsuited to a world where there is no longer consensus among U.S. allies regarding the importance and targets of export controls and where defense procurement depends much more on technological developments funded by the private, rather than the public, sector.⁴³ Unfortunately, much of the Blue Team found work in the administration during the first term, counterbalancing more moderate voices on the issue. Midway through the first term, the President ordered a comprehensive review of defense trade policies, but no reform measures were adopted. He requested waivers to free Great Britain and Australia from certain ITAR restrictions, but the House refused to relax the restrictions even for those “coalition of the willing” partners. Meanwhile, the State Department made some management changes at ODTC, which included replacing Lowell as director, and ODTC implemented an electronic licensing system to speed the export licensing process, but otherwise the department has taken no steps to reform export controls more generally. Consequently, the walls of the export system remain high and continue — needlessly — to surround commercial satellites. Amid the bureaucratic, ideological, and political considerations that have long

⁴³ James J. Jochum, Assistant Secretary of Commerce for Export Administration, 11 November 2002, “Globalization of Export Controls and Sanctions,” prepared remarks, London.

dominated the issue, the practical consideration — the fact that the system isn't working — continues to be lost.

APPENDIX A: Company Backgrounds

Hughes Space & Communications Co.

In 1934, Howard Hughes, the famed aviator, film producer, entrepreneur, and future recluse, created an aircraft division out of his Hughes Tool Co. The Hughes Aircraft Co. manufactured planes, arms, and radios during World War II and soon expanded into radar systems, missiles, and missile guidance systems for the Department of Defense (DOD). In 1959 Hughes began work on Syncom, a communications satellite designed to orbit at about 36,000 kilometers above the equator, the distance above the earth at which objects in orbit appear stationary in the sky; in other words, they don't "rise" and "set" like the sun and the moon, the way satellites orbiting at other heights do. Satellites at this height are said to be in geosynchronous orbit (GEO).

In 1961, the company's space division, recently renamed Hughes Space & Communications Co. (HSC), took a prototype of Syncom to the Paris Air Show in search of buyers, demonstrating the satellite's capabilities by placing it atop the Eiffel Tower and transmitting live television images of the visitors. DOD and NASA ordered three satellites that year, and NASA hired HSC to build the lunar probe for the Surveyor program. Syncom-1 was launched in February 1963, but it failed soon after an electronics test successfully relayed *The Star Spangled Banner* by satellite. Quick design improvements made Syncom-2, launched just five months later, the first functioning commercial communications satellite in GEO. The following year, Syncom-3 transmitted live television coverage of the Tokyo Olympics to American viewers. Syncom-2 and Syncom-3 carried television, telephone, and DOD communication signals over two-thirds⁴⁴ of the planet's surface until 1966 — the year HSC's Surveyor-1 lunar probe made the first-ever soft landing on the moon, the first of the Surveyor program's five successful unmanned lunar missions.

⁴⁴ If the first satellite hadn't failed, coverage would have been nearly 100 percent of the planet's surface.

Hughes Aircraft became Hughes Electronics in 1985, when General Motors acquired the company and merged it with its own electronics division; HSC and Hughes Aircraft then became operating units within Hughes Electronics. In January 1997, Hughes Aircraft merged with Raytheon Co. and the new company took the latter's name. In January 2000, Boeing Co. acquired HSC and related operations from Hughes Electronics, merged it with the Boeing Space & Communications Group (S&CG), and renamed its new subsidiary Boeing Satellite Systems (BSS). BSS was charged in December 2002 with export violations related to the participation of HSC staff in the Apstar-2 and Intelsat-708 launch failure investigations and reviews. Boeing and Hughes settled with the State Department in March 2003, agreeing to pay \$32 million in fines: \$20 to the U.S. government, \$8 million to improve its internal processes for export compliance, and a \$4 million credit for such improvements it had already made.

Loral Space & Communications Ltd.

In 1948, William Lorenz ("Lor-") and Leon Alpert ("-al") founded a small defense company in the Bronx and named it after themselves. Loral Electronics Corp. developed aviation electronics systems for the U.S. Air Force, expanding into aerospace guidance technologies with its acquisition of Beryllium Corp. in 1961. When its current chairman and CEO, Bernard L. Schwartz, joined the struggling company in 1971, he sold off the company's non-defense products lines — medicine packaging, electrical wire, plastic toys, etc. — and over the next 20 years acquired more than a dozen other defense firms, focusing on advanced electronics technologies such as radar surveillance, missile warning systems, battle simulation programs, and "smart" weapons.

In 1990, Ford Motor Co. sold Loral the satellite manufacturing division of Ford Aerospace, which had been manufacturing communications satellites for the DOD since the 1960s. The new division, Space Systems/Loral, marked the beginning of Loral's exit from the defense industry. In 1996, when the company sold its remaining non-space interests to

Lockheed Martin, Loral Electronics changed its name to Loral Space & Communications Ltd. to reflect its new focus. A year later, it bought AT&T's Skynet satellite services division, the first in a series of acquisitions and joint ventures that came to be known as the Loral Global Alliance, which offers fixed satellite services to customers primarily in Europe and the Americas.

As a consequence of its role in the satellite scandals of the 1990s, Loral settled with the State Department in January 2002, agreeing to admit to the export violations and to pay \$20 million in fines, of which \$14 million was to be paid to the U.S. government and \$6 million to be used internally to improve its ability to comply with export control regulations. The following month, Globalstar, a satellite phone company in which Loral had invested more than a billion dollars over the previous eight years, declared bankruptcy, after spending \$4 billion but failing to make its business plan work. Amid falling demand for satellites worldwide — only four orders for commercial satellites were placed worldwide in 2002 — Loral itself filed for bankruptcy in July 2003.

APPENDIX B: China's Long March into Space

"It ain't rocket science" is what we say to people when we want to remind them that a task they're attempting, or a concept they're trying to comprehend, is not as difficult or complicated as they're making it out to be. There's a good reason we use rocketry in this metaphorical sense: it's a difficult and complicated science. It may not be particularly challenging to pack gunpowder into bamboo, light it on fire, and watch it fly into the air, and perhaps explode colorfully, as the Chinese are said to have begun doing thousands of years ago. But if you want a rocket or a missile to hit a particular target or rise to a particular height, you need to factor in gravity, thrust, wind speed and direction, air density, initial angle of launch, the changing weight of the projectile (as the fuel burns, the rocket gets lighter), and numerous other variables. The engineering involved becomes increasingly challenging the farther away the intended target, or the higher the intended orbit. Moreover, tasks such as placing a human into outer space, landing a nuclear warhead on another continent, and putting a satellite into orbit face too many variables to depend on ballistics alone and so require advanced guidance systems to make constant corrections to the rocket's flight path. These systems are themselves challenging to develop, involving a number of highly advanced technologies such as gyroscopes, gimbals, and other positioning devices.

For these and other reasons, a well designed, carefully manufactured, and consistently functioning rocket or missile, capable of precise guidance over long distances, is sufficiently difficult and expensive to produce and launch that any government or business that can do so reliably will have a powerful strategic advantage, in security and business, over its adversaries and competitors that cannot. A limited number of countries has the capability to produce intercontinental ballistic missiles (ICBMs) and space-launch vehicles today, while a handful of others are seeking, or are suspected of seeking, to develop a similar capability. Some of the developing countries with space capabilities try to compete with the West on price by taking advantage of their relatively low labor costs or their ability to partially subsi-

dize commercial launches by using their military facilities or budgets. China is one such country.

In the early 1950s, Col. Qian Xuesen of the U.S. Army Air Force was accused of spying for the PRC. Qian, who had come to North America from China in 1935 to study aviation engineering, was considered one of the world's foremost experts on jet propulsion, and at the time of the espionage allegations he was working on the design of the Titan ICBM. After losing his security clearance and, consequently, his job, Qian was deported to China in 1955 in a deal reached between the U.S. government and the PRC. He took with him several members of the Titan development team and significant expertise in designing ballistic missiles. In China, Qian was put in charge of the newly established Chinese Missile Research Academy (or Fifth Research Academy), where he set up ten research institutions.⁴⁵

The Research Academy's work on the Dong Feng (East Wind) series of ballistic missiles began by copying Soviet R-series missile designs in the late 1950s. Launch testing of the DF-1, DF-2, and DF-2A models took place throughout the 1960s, and in October 1966 a DF-2 armed with a live nuclear warhead was launched successfully, marking the beginning of the development of Chinese's nuclear missile arsenal. The DOD referred to the DF-2 models as CSS-1, for "Chinese Surface-to-Surface"; the Soviet R-series missiles were simply called SS-series.

In 1961, Qian's engineers began an effort to develop an indigenous ballistic-missile capability, beginning with the DF-3 (CSS-2) ICBM program. But he was forced to abandon that program within a few years as technical problems and the economic crisis caused by the Great Leap Forward made progress impossible. DF-3 became the designation for the next generation of IRBMs instead. This DF-3 IRBM, which was successfully tested in 1966, was China's first indigenously designed launch vehicle, and Qian's engineers used it as the

⁴⁵ Information on Chinese rocketry culled from: http://www.nti.org/e_research/official_docs/cia/11599CIA.pdf, <http://www.astronautix.com/lvfm/lonmarch.htm>, http://www.fas.org/spp/guide/china/launch/lm2c/2C_Chapter1.htm, <http://www.cgwic.com/launch/vehicles.htm>, <http://www.fas.org/nuke/guide/china/index.html>, and <http://www.access.gpo.gov/congress/house/hr105851-html/ch4bod.html>, accessed 17 August 2004

basis not only for the DF-4 (CSS-3) ballistic missile — China's first two-stage ICBM, which used the DF-3 as its first stage — but also for the PRC's civilian space launch program, the Chang Zheng, or Long March, program.

The Chang Zheng (CZ), or Long March (LM), rocket program (designated CSL by the DOD) was initiated in late 1965. In 1970, the first LM-1 (CZ-1, CSL-1) three-stage rocket, which used modified DF-3 missiles for its first two stages, launched the Dong Fang Hong (East is Red) communications satellite into low earth orbit, where it transmitted to Earth the Chinese patriotic song "The East is Red." (The Long March was an event in the Chinese Revolution in which the Red Army traveled a long distance and lost most of its troops but won anyway.)

Throughout the remainder of the 1970s, the Long March civilian program and the Dong Feng military program developed in parallel. Testing for the DF-4 (CSS-3) missile began in 1970, but its limited range — technically, it was an ICBM, but it could not reach the U.S. mainland — made it useful primarily as a stopgap measure while the longer-range DF-5 (CSS-4) ICBM was concurrently being developed. In 1971, the results of a DF-5 launch test suggested that the missile's suitability for military applications was limited in the near term but that it could be used immediately for civilian launches. It was not until 1980 that the reliability of both the DF-4 and DF-5 were sufficiently demonstrated that the PRC felt they could be deployed.

The Long March team based the LM-2 (CZ-2, CSL-2) on the DF-5 designs.⁴⁶ After the first LM-2 rocket (designed to lift the FSW-1, aka FHW-1, series of recoverable reconnaissance satellites into LEO) failed at launch in 1974, it was modified and rechristened the LM-2C. Between 1975 and 1993, the LM-2C had a perfect launch record, with 14 successful launches in 14 attempts. Consequently, in 1993, Motorola signed a contract with CGWIC to

⁴⁶ The DF-5 missile was also used in the Feng Bao ("Storm") rocket program — created by the "Gang of Four" to compete with Long March — as the basis for the FB-1 civilian launch vehicle, which had a series of successful tests before being discontinued a few years after Mao's death (and the arrest of the Gang of Four). FB-1 technology was later absorbed into the LM-4 rockets.

use a modified version of the LM-2C to launch its Iridium satellites into LEO. At Motorola's request, CGWIC added a "smart dispenser" (SD) in the third stage that could launch two satellites into two different LEO slots using a single LM-2C/SD launch vehicle.

The LM-2E rocket, based on the LM-2C design and the first that China offered specifically to the world market for commercial launches, had a much less successful run, however, with two failures in seven attempts between 1990 and 1995. The failed launches destroyed two Australian communications satellites, the Optus-B2 (in December 1992) and the Apstar-2 (in January 1995). Earlier, in March 1992, an LM-2E malfunctioned before takeoff, forcing engineers to abort the launch of the Optus-B1. The LM-2F, derived from the LM-2E design, successfully launched China's first manned spacecraft test in November 1999.

The LM-3 rockets fared a little better, but they had problems as well. Designed to boost satellites into geostationary transfer orbit (GTO), the three-stage LM-3 used modified LM-2C rockets for the first and second stages and China's first liquid oxygen/liquid hydrogen engine for the third stage. However, on the first launch attempt in 1984 — and again in December 1991, during the eighth launch attempt — the third stage failed to ignite; however, 11 of the other 13 launches, which took place between 1984 and 2000, were successful. Modifications of the third stage and control system led to the LM-3A model, which to date has a perfect launch record.

Seeking even more power to launch heavier communications satellites into GTO, Chinese engineers developed the LM-3B, the most powerful rocket in the Long March family. It used LM-3A technology but with larger propellant tanks, additional boosters, and other improvements. At its first launch in February 1996, however, the LM-3B's guidance system failed and dozens of people were killed when the rocket crashed into a nearby village. Intelsat lost its Intelsat-7A communication satellite, built by the American company Space Systems/Loral. With some design improvements, four additional LM-3B rockets were launched in 1997 and 1998, all successfully. Development of a proposed LM-3C rocket, based on the LM-3B but with LM-2E boosters, was cancelled after the first LM-3B failure. Also, a more

powerful version of the LM-3B, called either the LM-3B(A) or the LM-3B(E), depending on whom you ask, is under development.

The LM-4, originally conceived as a back-up for the LM-3 program, was designed using the first two stages of the LM-3 rockets and was later modified to launch meteorological satellites into sun-synchronous orbit (SSO). Five launches, between 1988 and 2000, all succeeded.

APPENDIX C: Excerpts from the Cox Committee Report

The following excerpts are from the declassified version of the *Report of the Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China*, commonly referred to as the Cox Committee Report, after committee chairman Rep. Christopher Cox (R-Calif.).⁴⁷ The report has been strongly criticized for factual inaccuracies, exaggerations, and bias in its use of language, which, according to its critics, together have the effect of giving undue credence to speculations about what secrets China *could have* or *might have* acquired as a consequence of the export violations, without giving similar credence to the views of skeptics who questioned what benefits China *actually* acquired and whether those benefits were *actually* threatening to U.S. national security.⁴⁸ The excerpts reproduced below, however, are taken from the factual summaries included in each chapter of the Cox Report and present a reasonably fair description of the actions taken by Hughes and Loral during the launch-failure investigations, the export violations the companies were charged with, and the conclusions of various government investigations with respect to the damage to national security that may have resulted from the violations.

From Chapter 5: Satellite Launches in the PRC: Hughes

Hughes Space and Communications International, Inc. (Hughes) attempted to launch two communications satellites from the PRC on Long March rockets which exploded before reaching orbit, one in 1992 and one in 1995. Allegations regarding technology transfer arose in connection with failure analysis investigations conducted by Hughes employees in the aftermath of these failed launches. Specifically, in 1992 and 1995, China Great Wall Industry Corporation, a PRC government entity, launched two Hughes satellites manufactured for Australian (Optus B2) and Asian (Apstar 2) customers from a PRC launch facility in Xichang, PRC.

⁴⁷ Cox 1999

⁴⁸ see, for example, the essays in May 1999

Both satellites were launched on a Long March 2E rocket. In both cases, an explosion occurred after take-off and before separation of the satellite. Hughes investigated the causes of both of these failed launches and determined that the rocket was the cause of the failures.

In the course of the investigations, Hughes communicated technical information regarding the rocket to the PRC that assisted the PRC in improving the Long March 2E rocket. The activities of Hughes employees in connection with the investigation of the failed launch in 1992 resulted in the transmission to the PRC of technical information that appears to have been approved by a U.S. Government representative but not properly licensed. In the case of the 1995 Hughes failure investigation, Hughes employees exported technical information that also was approved by a U.S. Government representative but should not have been authorized for export to the PRC.

In both cases, Hughes disclosed information to the PRC that related to improving the Long March 2E fairing, a portion of the rocket that protects the payload during launch. Such information was outside the scope of the original licenses Hughes obtained from the State and Commerce Departments, respectively, with respect to the export and launch of the Optus B2 and Apstar 2 satellites. Hughes claims that the 1993 Optus B2 failure analysis disclosures were cleared in advance by U.S. Government officials, but neither Hughes nor the pertinent U.S. Government agencies retained records that would substantiate this claim fully.

The lessons learned by the PRC from Hughes during the 1995 Apstar 2 failure investigation are directly applicable to fairings on other rockets, including those used to launch PRC military satellites.

Although the Long March 2E has not been used since 1995, it is possible that the PRC may have transferred the lessons learned from this launch failure investigation to its ballistic missile programs. These lessons could lead to the development of a more reliable fairing for use with advanced payloads on military ballistic missiles.

Hughes obtained a clearance for the 1995 disclosures that was improperly issued by a Commerce Department official. Hughes was confident that the cause of the 1992 launch failure on the PRC's Long March 2E rocket was the fairing. Hughes then ascertained with more certainty that the fairing was responsible for the 1995 launch failure. Hughes required that the PRC take appropriate corrective measures so that future launches of Hughes satellites on the Long March 2E rocket could occur and be insured.

Hughes employees conveyed to the PRC the engineering and design information necessary to identify and remedy the structural deficiencies of the fairing. At the time of the 1992 failure, the export of both the satellite and any information that might improve the rocket were subject to State Department licensing jurisdiction.

Hughes knew that the fairing was part of the rocket and that a State Department license was required to discuss improvements with the PRC. Although Hughes did not have a license to disclose information to the PRC relating to improvement of the fairing, Hughes, nonetheless, made such disclosures. Hughes claims that each disclosure was authorized by the Defense Technology Security Administration monitor. Contemporaneous Hughes records partially support this assertion. The monitor says he doubts that he in fact approved the disclosure, but says he cannot fully recall these matters.

Neither Hughes nor any relevant U.S. Government agency has been able to produce records substantiating all of the claimed approvals. Even if such approvals were in fact given, they would have exceeded the authority of the Defense Technology Security Administration monitor since he was not empowered to expand the scope of the license granted by the State Department. The monitor also should have known that a separate license was needed for the launch failure analysis activities. By the time of the 1995 failure investigation, partial jurisdiction for commercial satellites had been transferred to the Commerce Department, but licensing for improvements to any part of the rocket, such as the fairing, remained with the State Department.

Hughes officials who were responsible for the launch failure investigation in 1995

knew that technical information that would improve the rocket, including the fairing, was still subject to State Department jurisdiction and was not licensed for export. Nonetheless, Hughes sought Commerce Department approval to disclose information regarding the fairing to the PRC. A Commerce Department official, without consulting with Defense Department or State Department experts, approved that disclosure, he says, on the assumption that the fairing was part of the satellite, not the rocket. He now acknowledges that this decision was a mistake.

The Defense Department recently determined that the information Hughes made available to the PRC was sufficiently specific to inform the PRC of the kinds of rocket changes and operational changes that would make the Long March 2E, and perhaps other rockets, more reliable. In particular, Hughes assisted the PRC in correcting the deficiencies in its models of the stresses or loads (such as buffeting and wind shear) that the rocket and payload experience during flight.

There are differing views within the U.S. Government as to the extent to which the information that Hughes imparted to the PRC may assist the PRC in its ballistic missile development. There is agreement that any such improvement would pertain to reliability and not to range or accuracy. It is not clear, at present, whether the PRC will use a fairing that was improved as a result of Hughes' disclosures in a current or future ballistic missile program. Currently-deployed PRC ballistic missiles do not use fairings, and the PRC's future mobile land-based intercontinental ballistic missiles will probably not use a fairing. However, fairings are used by the PRC in launching military communications satellites and could be used for a submarine-launched ballistic missile.

In the opinion of the Select Committee's independent expert, Dr. Alexander Flax, fairing improvements could also be of benefit to multiple independently-targeted reentry vehicle (MIRV) development, should the PRC decide to move in that direction. (See the Technical Afterword at the end of this chapter for additional details on the possible uses of fairings in intercontinental ballistic missiles.)

Hughes also provided the PRC with practical insight into diagnostic and failure analysis techniques for identifying and isolating the cause of a launch failure. Whether or not the structural improvements to the fairing suggested by Hughes are of immediate use to the PRC's missile programs, that information expanded the PRC's repertoire of available technical solutions to future problems that it may encounter in its space and missile programs.

Finally, the Select Committee's independent expert has concluded that Hughes provided the PRC with the benefit of its engineering experience and know-how. As a result, PRC engineers better understand how to conduct a failure analysis and how to design and build more reliable fairings for rockets: "This will stand them in good stead in developing fairings (or shrouds) for ballistic missiles."

From Chapter 6: Satellite Launches in the PRC: Loral

On February 15, 1996, a Long March 3B rocket carrying the U.S.-built Intelsat 708 satellite crashed just after lift off from the Xichang launch center in the People's Republic of China. This was the third launch failure in 38 months involving the PRC's Long March series of rockets carrying U.S.-built satellite payloads. It also was the first commercial launch using the new Long March 3B. These events attracted intense attention from the international space launch insurance industry, and eventually led to a review of the PRC launch failure investigation by Western aerospace engineers.

The activities of the Western aerospace engineers who participated on the review team — the Independent Review Committee — sparked allegations of violations of U.S. export control regulations. The review team was accused of performing an unlicensed defense service for the PRC that resulted in the improvement of the reliability of the PRC's military rockets and ballistic missiles.

The Intelsat 708 satellite was manufactured by Space Systems/Loral (Loral) under contract to Intelsat, the world's largest commercial satellite communications services provider. Loral is wholly owned by Loral Space & Communications, Ltd.

China Great Wall Industry Corporation, the PRC state-controlled missile, rocket, and launch provider, began an investigation into the launch failure. On February 27, 1996, China Great Wall Industry Corporation reported its determination that the Long March 3B launch failure was caused by a broken wire in the inner frame of the inertial measurement unit within the guidance system of the rocket. In March 1996, representatives of the space launch insurance industry insisted that China Great Wall Industry Corporation arrange for an independent review of the PRC failure investigation.

In early April 1996, China Great Wall Industry Corporation invited Dr. Wah Lim, Loral's Senior Vice President and General Manager of Engineering and Manufacturing, to chair an Independent Review Committee that would review the PRC launch failure investigation. Lim then recruited experts to participate in the Independent Review Committee: four senior engineers from Loral, two from Hughes Space & Communications, one from Daimler-Benz Aerospace, and retired experts from Intelsat, British Aerospace, and General Dynamics.

The Independent Review Committee members and staff met with PRC engineers during meetings in Palo Alto, California, and in Beijing. During these meetings the PRC presented design details of the Long March 3B inertial measurement unit, and the committee reviewed the failure analysis performed by the PRC.

The Independent Review Committee took issue with the conclusions of the PRC investigation because the PRC failed to sufficiently explain the telemetry data obtained from the failed launch.

The Independent Review Committee members proceeded to generate a Preliminary Report, which was transmitted to China Great Wall Industry Corporation in May 1996 without prior review by any U.S. Government authority. Before the Independent Review Committee's involvement, the PRC team had concluded that the most probable cause of the failure was the inner frame of the inertial measurement unit. The Independent Review Committee's draft report that was sent to the PRC pointed out that the failure could also be in two other places: the inertial measurement unit follow-up frame, or an open loop in the

feedback path. The Independent Review Committee recommended that the PRC perform tests to prove or disprove all three scenarios.

After receiving the Independent Review Committee's report, the PRC engineers tested these scenarios and, as a result, ruled out its original failure scenario. Instead, the PRC identified the follow-up frame as the source of the failure. The PRC final report identified the power amplifier in the follow-up frame to be the root cause of the failure.

According to the Department of Defense, the timeline and evidence suggests that the Independent Review Committee very likely led the PRC to discover the true failure of the Long March 3B guidance platform.

At the insistence of the State Department, both Loral and Hughes submitted "voluntary" disclosures documenting their involvement in the Independent Review Committee. In its disclosure, Loral stated that "Space Systems/Loral personnel were acting in good faith and that harm to U.S. interests appears to have been minimal." Hughes' disclosure concluded that there was no unauthorized export as a result of the participation of Hughes employees in the Independent Review Committee.

The materials submitted by both Loral and Hughes in their disclosures to the State Department were reviewed by several U.S. government offices, including the State Department, the Defense Technology Security Administration, the Defense Intelligence Agency, and other Defense Department agencies.

The Defense Department assessment concluded that "Loral and Hughes committed a serious export control violation by virtue of having performed a defense service without a license ...".

The State Department referred the matter to the Department of Justice for possible criminal prosecution.

The most recent review of the Independent Review Committee matter was performed by an interagency review team in 1998 to reconcile differences in the assessments of the other agencies. That interagency team concluded:

- The actual cause of the Long March 3B failure may have been discovered more quickly by the PRC as a result of the Independent Review Committee report.
- Advice given to the PRC by the Independent Review Committee could reinforce or add vigor to the PRC's design and test practices.
- The Independent Review Committee's advice could improve the reliability of the PRC's rockets.
- The technical issue of greatest concern was the exposure of the PRC to Western diagnostic processes, which could lead to improvements in reliability for all PRC missile and rocket programs.

Bibliography

- Cox, Christopher. 1999. Report of the Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China. Washington: House of Representatives.
- Franklin, Lewis R. 1999. A Critique of the Cox Report Allegations of PRC Acquisition of Sensitive U.S. Missile and Space Technology. In *The Cox Committee Report: An Assessment*, edited by M. M. May. Stanford, Calif.: Center for International Security and Cooperation.
- Johnson, Dana, Scott Pace, and Bryan Gabbard. 1998. *Space: Emerging Options for National Power*. Washington: RAND National Defense Research Institute.
- Johnson-Freese, Joan. 2000. Alice in Licenseland: US satellite export controls since 1990. *Space Policy* 16 (3):195-204.
- . 2001. Becoming Chinese? Or, How the U.S. Satellite Export Licensing Process Threatens National Security. *Space Times* 40 (1).
- . 2003. China's manned space program: Sun Tzu or Apollo redux? *Naval War College Review*.
- Kempton, Daniel R., and Susan Balc. 2003. *High Seas Satellite Launches: Paragon of Post-Cold War Cooperation or Unregulated Danger? Case 267, Pew Case Studies in International Affairs*. Washington: Institute for the Study of Diplomacy.
- Lewis, James A. 2002. Preserving America's Strength in Satellite Technology. Washington: Center for Strategic and International Studies.
- Mann, Jim. 1999. *About Face: A History of America's Curious Relationship with China from Nixon to Clinton*. 1st ed. New York: Alfred Knopf.
- May, M.M., ed. 1999. *The Cox Committee Report: An Assessment*. Stanford, Calif.: Center for International Security and Cooperation.
- Moorman, Thomas. 2000. U.S. Space Industrial Base Study. McLean, Va.: Booz-Allen & Hamilton.
- Rindskopf, Elizabeth, and Leslie Gielow Jacobs. 2003. Government Controls of Information and Scientific Inquiry. *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science* 1 (2):83-95.
- Smith, Derek D. 2001. A Double-Edged Sword: Controlling the Proliferation of Dual-Use Satellite Systems. *National Security Studies Quarterly* VII (2):31-68.
- Smith, Marcia S. 2003. Space Launch Vehicles: Government Activities, Commercial Competition, and Satellite Exports. Washington: Congressional Research Service.
- Timperlake, Edward, and William C. Triplett. 1999. *Red Dragon Rising: Communist China's Military Threat to America*. Washington: Regnery Publishing.