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CRS Report for Congress

China: Possible Missile Technology Transfers from U.S. Satellite Export Policy – Background and Chronology

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Shirley A. Kan
Specialist in National Security Policy
Foreign Affairs, Defense, and Trade Division



Congressional Research Service • The Library of Congress



Abstract

Members of Congress are concerned about whether U.S. firms have provided technology or technical expertise to China for use in its ballistic missile program and the Clinton Administration's policies on satellite exports have facilitated legal or illegal transfers of missile-related technology to China. A range of concerns were prompted by reports in the *New York Times* in April 1998 that the Justice Department is conducting an ongoing criminal investigation into whether Loral Space and Communications (of New York), and Hughes Electronics (of Los Angeles) violated export control laws. The firms are alleged to have shared their findings with China on the cause of a PRC rocket's explosion while launching a U.S.-origin satellite in February 1996, and other incidents. In sharing their conclusions, the companies are said to have provided expertise that China could use to improve its ballistic missiles, including their guidance systems. Congressional investigations have also led to media reports in early 1999, confirmed by U.S. intelligence in April and the Cox Committee's report in May 1999, that the PRC obtained information on U.S. nuclear weapons. (See also: CRS Report RL30143, *China: Suspected Acquisition of U.S. Nuclear Weapon Data*, and CRS Report RL30220, *China's Technology Acquisitions: Cox Committee's Report — Findings, Issues, and Recommendations*.) This CRS report provides detailed background information, significant Congressional action, and a comprehensive chronology of major developments since 1988. The events summarized here, based on open sources and interviews, pertain to various aspects of U.S. foreign and security policy. This report may be updated as developments occur.

NOTE

This CRS study was initiated at the request of the Committee on International Relations of the House of Representatives and is adapted for general Congressional use with permission of the Committee.

China: Possible Missile Technology Transfers From U.S. Satellite Export Policy — Background and Chronology

Summary

Congress has been concerned about whether U.S. firms, in exporting satellites, provided expertise to China for use in its ballistic missile and space programs and whether the Clinton Administration's policies have facilitated transfers of military-related technology to China. This CRS report provides background information, Congressional action, and a chronology of major developments since 1988.

Some critics oppose satellite exports to China, while others are concerned that the Clinton Administration relaxed export controls and monitoring of commercial satellites in moving the licensing authority from the State Department to Commerce Department in 1996. A range of concerns were prompted by *New York Times* reports in April 1998 that the Justice Department is conducting an ongoing criminal investigation into whether Loral Space and Communications Ltd. and Hughes Electronics Corp. violated export control laws. The firms are alleged to have shared their findings with China on the cause of a PRC rocket's explosion while launching a U.S.-origin satellite in February 1996. In sharing their conclusions, the companies are said to have provided expertise that China could use to improve the accuracy and reliability of its ballistic missiles, including their guidance systems. At least three classified studies reportedly say that U.S. national security was harmed. Congress and the Justice Department have also investigated Hughes' review of the PRC launch failure on January 26, 1995.

In addition, the press reports alleged that President Clinton in February 1998 issued a waiver of sanctions (for Chinasat-8) that undermined the investigation by allowing the issuance of licenses for the export of assistance similar to that in question. Moreover, the *Times* article alleged that political considerations may have influenced the Administration's decision, since Loral's chairman was the largest individual donor to the Democratic National Committee for the 1996 election.

In the fall of 1998, Congress passed the FY 1999 National Defense Authorization Act that transferred licensing authority over satellites back to the State Department on March 15, 1999. On December 30, 1998, the "Cox Committee" unanimously approved a classified report concluding that PRC technology acquisitions over the past 20 years, not only that associated with satellite launches, have harmed U.S. national security. Congressional concerns also led to media reports in early 1999, confirmed by U.S. intelligence in April 1999, that the PRC obtained information on U.S. nuclear weapons. The Senate Intelligence Committee released its unclassified report on May 7, and the Cox Committee issued a declassified three-volume report on May 25, 1999. On October 5, 1999, the President signed into law (P.L. 106-65) the FY 2000 National Defense Authorization Act in which Congress addressed export controls relating to missile technology, satellites, and other issues. The Justice Department is still conducting investigations and has not brought charges. Loral is waiting for a license to export Chinasat-8, called by Loral "the most powerful satellite China has ever purchased."

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Introduction

Members of Congress are concerned about allegations that U.S. firms provided expertise to the People's Republic of China (PRC) that could be used in its ballistic missile and space programs and that the Administration's policies on satellite exports has facilitated legal or illegal transfers of military-related technology to China. The *New York Times* reported in April 1998 that the Justice Department is conducting an ongoing criminal investigation into whether Loral Space and Communications Ltd. (of New York), and Hughes Electronics Corp. (of Los Angeles) violated export control laws.[1] The firms are alleged to have shared their findings with China, without approval from the U.S. government, on the cause of a PRC rocket's explosion while launching a U.S.-origin satellite in February 1996. In sharing their conclusions, the companies allegedly provided expertise that China could use to improve the accuracy and reliability of its ballistic missiles, including their guidance systems. Several classified government studies reportedly concluded that the U.S. technical assistance provided to China damaged U.S. national security by helping the PRC to improve the guidance systems on its ballistic missiles.

In addition, the media reports allege that President Clinton in February 1998 issued a waiver of sanctions that undermined the investigation by allowing the issuance of licenses for the export of technology or expertise similar to that in question – despite "strong opposition" from Justice. Moreover, political considerations are alleged to have influenced the Administration's decision, with Loral's chairman being the largest individual donor to the Democratic Party in 1996.

This CRS report provides detailed background information, significant Congressional action, and a comprehensive chronology. The events summarized below, based on various open sources and interviews, pertain to various aspects of U.S. foreign and security policy:

- Presidential waivers for exports of satellites, including the latest waiver for Chinasat-8 (built by Loral) during an ongoing criminal investigation into alleged assistance by Loral and Hughes to China's missile program; waivers are for sanctions imposed after China's Tiananmen Square crackdown;

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[1] Gerth, Jeff. "Companies are Investigated for Aid to China on Rockets," and "Aerospace Firms' Ties with China Raise Questions," *New York Times*, April 4 and 13, 1998.

- sanctions imposed for missile proliferation by China's space launch company, China Great Wall Industry Corporation, and other companies;
- quotas on PRC launches of satellites;
- controls on exports of U.S.-origin satellites and/or satellite technology, as well as controls and monitoring of technical exchanges with PRC engineers;
- export controls to prevent technology transfers that could contribute to China's ballistic missile force and/or military satellites.

Background

China Great Wall Industry Corporation

China Great Wall Industry Corporation (CGWIC, or China Great Wall) has been China's commercial space launch company since 1986. It markets the use of rockets developed by the China Academy of Launch Vehicle Technology (CALT) and other aerospace academies. China Great Wall and CALT are part of China's defense-related aerospace industry under the China Aerospace Corporation (abbreviated by China as CASC). CASC, established in 1993, oversees space as well as missile research and development. CASC and its subordinate companies, research academies, and factories develop and produce strategic and tactical ballistic missiles, space launch vehicles, surface-to-air missiles, cruise missiles, and military (reconnaissance, communications, or other) and civilian satellites. CASC was previously known as the Ministry of Aerospace Industry, also known as the Seventh Ministry of Machine Building. Since April 1998, China's military has exercised control over PRC satellites under the new General Equipment Department.

China reportedly launched its first satellite, Dongfanghong ("East is Red") on April 24, 1970. By the end of 1997, China reportedly had launched 40 domestic satellites: 17 retrievable reconnaissance satellites, 3 meteorological satellites, 8 communications and broadcasting satellites, and 12 "experimental" (possibly military) satellites. China is using the satellites and space technology to enhance its national defense, economy, and international prestige.[2] On April 7, 1990, China Great Wall launched a foreign satellite, Asiasat, for the first time.[3] Since then, the company has expanded its foreign business, especially with U.S. firms such as Hughes Electronics, Lockheed Martin, and Loral Space and Communications. China probably seeks foreign capital and technology to apply to its domestic satellite research and development efforts, in part to lessen reliance on purchasing foreign satellites. The president of the Chinese Academy of Space Technology said that the PRC's Dongfanghong (East is Red) satellites match the capacities of advanced satellites built

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[2]Chou Kuan-wu, "China's Reconnaissance Satellites," *Kuang Chiao Ching* (in Hong Kong), March 16, 1998; translated in FBIS.

[3]For commercial space launches in general, see CRS Issue Brief IB93062, *Space Launch Vehicles: Government Requirements and Commercial Competition*, and CRS Report 98-575, *China's Space Program: A Brief Overview Including Commercial Launches of U.S.-Built Satellites*, by Marcia S. Smith.

by Hughes, but are backward in satellite navigation and stabilization technologies. The Academy hopes to sell its satellites at world standards by 2000.[4]

China has experienced a number of embarrassing and costly failed satellite launches. In 1992, a PRC rocket stalled while attempting to launch the Optus-B1 satellite and another rocket exploded and destroyed the Optus-B2 satellite (both built by Hughes). In 1995, A Long March rocket exploded and destroyed the Apstar-2 satellite (built by Hughes). In 1996, another PRC rocket exploded and destroyed the Intelsat satellite (built by Loral). Aside from the dramatic explosions, other problems have prevented the PRC rockets from successfully launching satellites into the correct orbits.

China's aerospace industry has shifted from denying all responsibility in failed launches of foreign satellites to a willingness to work with foreign companies in determining the causes of explosions and other failures. This practice may have been a strategy to learn from foreign companies methods to improve China's rockets, satellites, and other related space technology. China may also have tried to reassure foreign insurance companies and satellite manufacturers that it can solve problems with the Long March rockets.

Missile Technology or Expertise

Security Concerns. One question in the controversy involves the applicability of satellite-launch technology to the modernization of China's ballistic missiles. China Great Wall uses the Long March series of rockets to launch satellites. China's "Long March (LM)" ("*Chang Zheng*") space launch vehicles (SLVs) are related to its "East Wind" ("*Dong Feng*" (DF)) intercontinental ballistic missiles (ICBMs). China has used the LM rockets to launch its own satellites (since 1970) and foreign satellites (since 1990). The Long March boosters are also produced as China's CSS-3 (DF-4) and CSS-4 (DF-5A) ICBMs deployed in the Second Artillery, the strategic missile force of the People's Liberation Army (PLA), China's military. China's launch facilities, such as the Xichang Satellite Launching Center in Sichuan province, are at PLA bases.

Corresponding Designations

	U.S.	PRC
ICBM:	CSS-3	DF-4
ICBM:	CSS-4	DF-5A
SLV:	LM	CZ

A review of open sources finds agreement that the first Long March rockets used to launch satellites were derived from ballistic missiles developed earlier and that there has been parallel research and development for the modernization of the SLVs and ICBMs.[5] The CSS-3 ICBM has also been produced as the booster for the LM-1

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[4]Parker, Jeffrey. "China to Expand Rocket Production," *Reuters*, August 25, 1993.

[5]Defense Intelligence Agency, *Handbook of the Chinese People's Liberation Army*, November 1984; John Wilson Lewis and Xue Litai, *China Builds the Bomb* (Stanford University Press, 1988); Lennox, Duncan, "China's Development of Ballistic Missiles," (continued...)

SLV. The CSS-4 ICBM has also been used as the booster for the LM-2, LM-3, and LM-4 series of SLVs. In a 1984 publication, the Defense Intelligence Agency (DIA) called the LM-1 SLV the "booster variant" of the CSS-3, and LM-2 the "booster variant" of the CSS-4. Indeed, this factor has made it difficult to accurately count the numbers of ICBMs that China has produced and allows for China to increase the potential number of ICBMs available for deployment.

When the Reagan Administration first decided to allow China to launch U.S.-origin satellites, it cited the need to protect "legitimate U.S. national security interests" and promised Congress that an agreement would be concluded with China to safeguard U.S. technology from "possible misuse or diversion."[6] Such an agreement on technology safeguards was signed on December 17, 1988, but apparently required renegotiation. A new agreement was signed on February 11, 1993. One question concerns whether China has abided by these agreements.

After the end of the Cold War and with increase in U.S.-China trade, some say that national security interests need not be sacrificed by commercial interests. Within the current controversy, some argue that launching satellites from China is in the U.S. national security interest because of the benefits to U.S. satellite manufacturers.[7]

Loral's Case. Specifically, the Department of Justice's investigation looks at Space Systems/Loral (SS/L), Loral's subsidiary in Palo Alto, CA, which chaired a review committee on the launch failure of the Intelsat-708 satellite in February 1996. As for Loral's case, Acting Undersecretary of State John Holum confirmed on April 9, 1998, that after the accident in February 1996, the Department of State "became aware that there may have been a violation." The case was referred to the Department of Justice for investigation. He said that there are "strong legal remedies" for violations of export control laws, including a denial of future licenses.

Loral issued a statement on May 18, 1998, saying that allegations that it provided missile guidance technology to China are false. Loral also says that it did not advise China "on how to fix any problems with the Long March rocket." The company states that "the Chinese alone conducted an independent investigation of the launch failure [in February 1996] and they determined that the problem was a

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[5](...continued)
Jane's Intelligence Review, August 1991; Phillip S. Clark, "Chinese Launch Vehicles — Chang Zheng 1," "Chinese Launch Vehicles — Chang Zheng 2," "Chinese Launch Vehicles — Chang Zheng 3," "Chinese Launch Vehicles — The Rest of the Story," "Chinese Launch Vehicles — Further Details," *Jane's Intelligence Review*, November 1991, May 1992, August 1992, October 1992, June 1993; John Wilson Lewis and Hua Di, "China's Ballistic Missile Programs," *International Security*, Fall 1992; Iris Chang, *Thread of the Silkworm* (BasicBooks, 1995); "People's Republic of China: Offensive Weapons, *Jane's Strategic Weapon Systems*, September 1997; *Jane's Space Directory 1997-98*.

[6] "Export of U.S. Satellite to China for Launch," *Department of State Bulletin*, November 1988.

[7]Hirsh, Michael (*Newsweek*), "The Great Technology Giveaway?" *Foreign Affairs*, Sept./Oct. 1998; Clayton Mowry (executive director of the Satellite Industry Association), "Satellites Do No Good Stuck on the Earth," *Washington Times*, Sept. 8, 1998.

defective solder joint in the wiring — a `low-tech' matter." Loral denied that it and Hughes conducted an independent investigation to determine the cause of that launch failure. However, at the insistence of insurance companies, which required non-PRC confirmation of resolutions of problems with Long March rockets, Loral formed a committee of several satellite companies, including Hughes, to review the PRC investigation. According to Loral, the review committee obtained information from the PRC and was not formed to help them solve their problems. The review agreed with the PRC conclusion (that a defective solder joint was responsible), without performing tests or providing any test data to the PRC. The committee did note that further tests by China would be required to establish certainty. Loral says that, during the review, it discussed the committee's work with U.S. officials. As far as Loral's engineer's can determine, the statement says, "no sensitive information — no significant technology — was conveyed to the Chinese."

Loral has further explained that in April 1996, at China's request, Dr. Wah L. Lim, then a senior vice president and engineer at Loral, chaired a review committee to study China's technical evaluation of the cause of the accident on Feb. 15, 1996. Loral says China had identified the problem as residing in the inertial measurement unit (IMU) of the guidance system of the rocket. Loral believed that it did not have to request a U.S. government license and monitoring. The first meeting was held in Palo Alto, CA, but the second, in China. PRC engineers attended the meetings.

Nevertheless, Loral admitted that, contrary to its policies, "the committee provided a report to the Chinese before consulting with State Department export licensing authorities." According to Loral, as soon as its executives found out in May 1996, the company notified the Departments of State and Defense. In June 1996, Loral provided to the U.S. government a detailed, written report concerning all communications with China. Loral adds that it is in full cooperation with the Justice Department in its investigation and with Congressional committees. Loral concludes that based upon its own review, it "does not believe that any of its employees dealing with China acted illegally or damaged U.S. national security." In addition, the statement says that Loral's chairman, Bernard Schwartz, was not personally involved in any aspect of this matter. "No political favors or benefits of any kind were requested or extended, directly or indirectly, by any means whatever." Loral also denies any connection between the launch failure in February 1996 and the Presidential waiver for another Loral-built satellite in February 1998. The export license for the latest launch (for Chinasat-8) "applied the strictest prohibitions on technology transfer and specified that any new launch failure investigation would require a separate license." Loral stresses that it complies strictly with export control laws and regulations.

Administration officials say that export licensing procedures and strict security measures (including monitoring by the Defense Department of pre-launch meetings and the launches) preclude any assistance to the design, development, operation, maintenance, modification, or repair of any launch facility or rocket in China. Moreover, Undersecretary of Commerce William Reinsch testified to Congress on April 28, 1998, that effective export controls on dual-use technology (with military and civilian applications) allow U.S. exporters to compete while protecting U.S. security interests. He disputed that there were objections within the executive branch to allowing recent satellite exports to China, saying that since November 1996 (when

the licensing jurisdiction was transferred from the Department of State to Commerce), the Commerce Department has issued three export licenses for satellites to be launched from China – with the concurrence of all agencies.

However, at least three classified studies have found serious concerns about the U.S. firms' assistance to China's ballistic missile modernization program. A classified report at the Department of Defense's Defense Technology Security Administration (DTSA) reportedly concluded on May 16, 1997, that Loral and Hughes transferred expertise to China that significantly enhanced the guidance and control systems of its nuclear ballistic missiles and that "United States national security has been harmed," according to the *New York Times* (April 13, 1998 and June 27, 1998). These concerns were first raised in a classified report at the Air Force's National Air Intelligence Center (NAIC) in March 1997 and supported by the State Department's Intelligence and Research Bureau (INR), according to the *Washington Post* (June 7, 1998). These reports apparently prompted the Justice Department's investigation.

Also, the Justice Department had expressed concerns about the February 1998 Presidential waiver for the Chinasat-8 satellite. A memorandum, dated February 12, 1998, written by National Security Adviser Samuel Berger for President Clinton, acknowledged that the Justice Department "cautioned" that such a waiver "could have a significant adverse impact on any prosecution that might take place" in Loral's case.[8] Finally, there is little public information on the export licenses issued by the State or Commerce Department for technical assistance agreements (TAAs) concerning the transfer of technical assistance and data needed to mate satellites to launch vehicles (so-called "form, fit, and function" technical data).

Beyond the Loral Case. Beyond the 1996 incident involving Loral and Hughes, there are wider concerns that the policy of allowing China to launch U.S.-built satellites effectively subsidizes and assists China's missile modernization. Observers point out that the same PRC companies and engineers work in both civilian and military programs and that much of the technology used in launching satellites can be used in military programs on missiles, satellites, and other areas.

Future developments in China's ICBM program are believed to be related to that in the space launch program. U.S. intelligence reportedly has gained information about developments in China's ICBMs from information about PRC SLVs.[9] *Jane's Space Directory 1997-98* notes that China is not known to use liquid oxygen/kerosene engines that are used extensively in other countries, "reflecting the space variants' parallel development alongside storable propellant long range missiles." China has used a variant of the LM-2C with a "smart dispenser" to launch two Iridium satellites from one rocket, in several launches. Also, China reportedly will add a new solid-propellant third stage (TS) to introduce a new LM-2E/TS SLV. This third stage may have a multiple-satellite dispenser to launch up to 12 satellites. China's ICBMs are not believed to have MIRVs (multiple independently targeted reentry vehicles), although such a capability is reportedly in development.

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[8] The memorandum was printed in the *New York Times*, May 23, 1998.

[9] Pincus, Walter, "U.S. Gains Intelligence Data in China Launches," *Washington Post*, June 13, 1998.

Some are especially concerned about PRC launches in 1995 and 1996 of three satellites built by Hughes which were not monitored by the Defense Department. On June 18, 1998, Jan Lodal, Principal Deputy Under Secretary of Defense for Policy, testified to a joint hearing of the House National Security and International Relations Committees that there were three launches that were not monitored by the Defense Department, because the satellites did not require State Department licenses and monitoring had been tied to licenses from the State Department for Munitions List items. The Director of DTSA, Dave Tarbell, testified to the Senate Select Committee on Intelligence on July 15, 1998, that the three unmonitored launches took place in January 1995 (Apstar-2), July 1996 (Apstar-1A), and August 1996 (Chinasat-7). The Department of Defense then concluded that full monitoring should be required for satellites licensed by the Commerce Department, and the requirement was added after late 1996, he said. Nevertheless, Tarbell stated that "we are not aware of any transfer of technology from these unmonitored launches that contributed to China's missile or military satellite capabilities." Hughes responds that its security measures prevented unauthorized technology transfers.

However, Air Force Lieutenant Colonel Al Coates, a former Pentagon official who monitored launches in China until he resigned in November 1998, says that even with monitoring, Hughes employees were more concerned about successful launches and were often careless about discussing sensitive information with the PRC. Coates says he did not get responses from superiors in the Pentagon to his reports of security problems, but has now told Congress and the Justice Department.[10]

Some experts say that monitoring of technical exchanges is more crucial than monitoring the launches. Senator Kyl said on July 16, 1998, that, in addition to the three unmonitored launches, there was no monitoring of pre-launch technical exchanges on the mating of satellites to the launch vehicles for three satellite projects: Optus B-3 (Hughes), Echostar-1 (Martin Marietta), and Chinastar-1 (Lockheed Martin).[11]

Congress and the Justice Department are now also investigating Hughes' review of the PRC launch failure on January 26, 1995 (of the Apstar-2 satellite).[12] Testifying before a joint hearing of the House National Security and International Relations Committees on June 18, 1998, Under Secretary of Commerce for Export Administration William Reinsch acknowledged that, in the 1995 case, his department alone had allowed Hughes to provide launch failure analysis to China. He stated that after the Apstar-2 launch failure in 1995,

> the company involved [Hughes] conducted an analysis without the participation of the Chinese launch service provider. The analysis was

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[10] "Did U.S. Companies Share Technology with China?" ABC News, 20/20 Program, December 3, 1998.

[11] *Congressional Record*, July 16, 1998; *Aerospace Daily*, July 21, 1998.

[12] Anselmo, Joseph C. and James R. Asker, "U.S. Broadens Probes of China Tech Transfer" and "Hughes Defends China Security," *Aviation Week and Space Technology*, June 29 and July 6, 1998.

written in order to satisfy insurance requirements. The analysis was reviewed by the Department of Commerce, which determined that it contained only information already authorized for export under the original Commerce license issued in February 1994. The unclassified report was provided first to a consortium of Western insurance companies and later to the Chinese launch service provider.

At that hearing, David Tarbell, Director of the Defense Technology Security Administration (DTSA), confirmed that the Department of Defense (DOD) did not monitor the launch or the launch failure analysis. Reinsch acknowledged that the Commerce Department did not consult with either the Department of State or DOD. The decision to release the report to the PRC was made solely by a Commerce Department licensing officer.[13] Reinsch also acknowledged, however, that the authority for an additional license to conduct launch failure analysis was later specified to be the Department of State, not Commerce, when the licensing jurisdiction was transferred to Commerce in 1996.

At the request of Congress, DOD's DTSA and NAIC prepared and issued, on December 7, 1998, an initial assessment of the documents concerning Hughes' 1995 investigation that the Department of Commerce provided to DOD in July 1998. The unclassified report says that Commerce did not consult with DOD or State (although the technical assistance constituted a "defense service" under State's export control jurisdiction and subject to DOD's monitoring) nor disclosed the documents until the June 1998 Congressional hearings. The report concluded that Hughes' technical exchanges with the PRC raise national security concerns regarding violating standards of not improving PRC satellite or missile capabilities and "potentially contributing to China's missile capabilities." While the report adds that the benefits likely did not alter the U.S.-China "strategic military balance," the report did not look at whether China used the information for the PLA. DOD and State further examined whether the transferred information benefitted China's military.[14] On December 18, 1998, the State Department's Office of Defense Trade Controls (DTC) completed a sensitive but unclassified report, concluding that Hughes, in reviewing the January 1995 launch failure of Apstar-2, provided technical lessons that are "inherently applicable" to PRC missile as well as satellite launch programs.[15]

DOD says that, from February to August 1995, Hughes conducted the investigation closely and jointly with the PRC, specifically, CALT and China Great Wall, that included "significant interaction" and meetings in China. Hughes gave PRC aerospace engineers specific information to make their rockets more reliable. According to DOD, Hughes provided "sufficient know-how to correct the overall

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[13]Transcript of continuation of hearing on June 23, 1998.

[14] Fulghum, David A. and Joseph C. Anselmo, "Pentagon Plans New Look At China Tech Transfer," *Aviation Week & Space Technology*, December 14, 1998.

[15] For text of the Department of State's memo, see the Cox Committee's declassified May 1999 report, volume II, p. 76-84. Gerth, Jeff, "C.I.A. Ignored Report of Payments To Chinese For Satellite Contracts," *New York Times*, December 24, 1998; Warren Ferster, "Export Plan Shrinks Role For Commerce," *Space News*, January 18, 1999.

deficiencies" of "oversimplified" mathematical models used in designing launch vehicles, modifications for launch operations, details about satellite designs, as well as "insights" into U.S. diagnostics for improving rocket and satellite designs. Specifically, Hughes showed China how to improve its coupled loads analysis that is "critically important" for ensuring the integrity of the rocket during flight and "serious flaws" in PRC modeling of aerodynamic loads on the rocket fairing (the top part of the rocket that covers payloads). Hughes denies advancing China's missiles and points out that its report was approved by the Commerce Department.[16]

Beyond the question of whether sensitive technology or technical expertise in connection with satellite launches was transferred to China, there is disagreement on the extent to which such transfers have military benefit in the context of China's modernization of its nuclear-armed ballistic missiles and space systems. China reportedly is developing new land-mobile, solid-fuel DF-31 and DF-41 ICBMs for deployment in the next century.[17]

Some, including officials in the Clinton Administration, stress that there are differences between the PRC SLVs and ICBMs and there have been no *authorized* missile technology transfers to China. On September 17, 1998, Principal Deputy Assistant Secretary of Defense Franklin Miller testified only about *authorized* significant technology transfers and that satellite launches have not provided any benefits to *current generation* PRC ICBMs. He was not able to elaborate publicly on potential improvements to new PRC ICBMs under development.[18] Admiral Joseph Prueher, Commander in Chief of U.S. Pacific forces, said on October 23, 1998, that any transfers of missile technology or know-how in connection with launching U.S. satellites in China have improved PRC ICBMs "only incrementally, not by any quantum leaps and bounds" and "accelerated solution of a technical guidance problem for one of their missiles."[19]

John Pike, Director of the Space Policy Project at the Federation of American Scientists, has argued that there are significant differences between China's ballistic

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[16] "Department of Defense Initial Assessment of Certain Documents Concerning An Investigation by Hughes Space and Communications Company Into the Failure of the Launch of the Apstar II on China's Long March 2E Launch Vehicle," December 7, 1998. Also see: Pincus, Walter and John Mintz, "Report Faults Hughes On Data Given China," *Washington Post*, December 9, 1998; Jeff Gerth, "Pentagon Inquiry Faults Missile Maker's China Aid," *New York Times*, December 9, 1998; David S. Cloud and Robert S. Greenberger, "Commerce Department is Also Criticized in Pentagon Report of Hughes' Dealings," *Wall Street Journal*, December 10, 1998.

[17] On China's ICBMs currently deployed and under development, see: CRS Report 97-391, *China: Ballistic and Cruise Missiles*, by Shirley A. Kan and Robert D. Shuey.

[18] Hearing of the Senate Committee on Commerce, Science, and Transportation, "Transfer of Missile Technology to China," September 17, 1998.

[19] Capaccio, Tony, "U.S. Firms Marginally Helped China ICBMs," *Defense Week*, October 26, 1998; "China Benefitted From Tech Transfer, Adm. Prueher Says," *Aerospace Daily*, October 26, 1998.

missiles and the Long March SLVs.[20] He says that the Long March SLVs are longer than the CSS-4 ICBM, so they flex more during ascent. They also have bigger nose cones to hold satellites that are bigger than warheads. These characteristics have resulted in stresses on the Long March. He also says that deploying two satellites from one Long March (as China has done for Iridium) is very different from launching MIRVs. Warheads, unlike satellites, are designed to survive greater vibrations and the heat of reentering the atmosphere.

Other experts stress that there are commonalities between the technology as well as technical expertise used in rockets and missiles. A Senate subcommittee provided a graphical comparison of the applicability of technology in SLVs and ballistic missiles prepared by the Central Intelligence Agency (CIA).[21] In general terms, the CIA compared 11 categories of technology and equipment. Six, or more than half, of the categories are the same for the SLV and ICBM; four categories are similar; while only missiles contain warheads.

Technology and equipment generally unique to ballistic missiles:
- warhead

Technology and equipment that are similar in SLV and ICBM (comparison requires case-by-case analysis):
- reentry vehicle
- payload separation
- inertial guidance and control systems
- strap-on boosters

Technology and equipment that are same in SLV and ICBM:
- staging mechanisms
- propellants
- air frame, motor cases, liners, and insulation
- engines or motors
- thrust vector control systems
- exhaust nozzles

Henry Sokolski (Executive Director of the Nonproliferation Policy Education Center and a Defense official in the Bush Administration) argues that "all of our satellite transfers have helped China perfect its military rocketry." He also writes that "intangible technology" is critical to the timely, reliable, and accurate placement of satellites into space as well as launches of warheads against targets by ballistic missiles. Intangible technologies include: coupling load analysis, guidance data packages, upper-stage solid rocket propellant certification, upper-stage control design validation, lower-stage design validation, and general quality assurance. Also, multi-satellite dispensers can modified as multiple-warhead dispensers, thus assisting

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[20] "The China Satellite Debate," *Proliferation Brief*, June 23, 1998.

[21] Hearing of the Senate Governmental Affairs Subcommittee on International Security, Proliferation, and Federal Services, "The Benefits of Commercial Space Launch for Foreign ICBM and Satellite Programs," May 21, 1998.

China's reported efforts to develop a capability in MIRVs for its ICBMs.[22] China has used such dispensers to launch multiple satellites for Iridium.

Experts at the Monterey Institute of International Studies also point out that a significant portion of the components, technology, and expertise used in the research and development of SLVs are "virtually interchangeable" with that of ballistic missiles. These overlaps include: launching multiple satellites from a single SLV and delivering multiple warheads on a single missile. Similar technology involves upper stage control systems (separation and ignition of the upper stage, attitude control, and spin release of satellites), satellite dispensers (delivery of multiple satellites to separate orbits), coupling load analysis (to assure launches without damaging payloads), upper stage solid-fuel engines, and kick motors (to deliver satellites into correct orbits).[23]

Nevertheless, they also argue that having the capability to launch multiple satellites does not translate into having a military capability to deliver MIRVs. Delivering multiple reentry vehicles into planned trajectories is more difficult than launching multiple satellites into orbit. MIRV capability requires greater precision. Reentry vehicles, unlike satellites, do not have their own kick motors. A MIRV capability requires rocket motors that can stop and restart.

However, *Jane's Space Directory 1997-1998* reported that China developed a restartable, cryogenic (extremely low temperature) stage 3 for the LM-3 SLV. A classified study by the Air Force's National Air Intelligence Center (NAIC) reportedly concluded that the new PRC-developed "smart dispenser," an upper-stage booster used to launch two satellites for Iridium on one LM 2C/SD rocket, could be modified to deploy multiple re-entry vehicles, according to the *Washington Times*, July 14, 1998. Nevertheless, the report noted that there is no evidence that China is using the dispenser for warheads. A Pentagon spokesman said on July 14, 1998, that Motorola provided data to allow the PRC to attach satellites to the dispenser that they designed without U.S. help and that releasing multiple satellites and targeting multiple warheads require different technology.

Sanctions

China Great Wall has been affected by two categories of sanctions imposed on China: those imposed after the Tiananmen crackdown and those imposed for missile proliferation. In 1990, the United States imposed post-Tiananmen sanctions as required in the Foreign Relations Authorization Act for FY1990 and FY1991 (P.L. 101-246). Sec. 902(a) requires suspensions in programs related to: (1) Overseas Private Investment Corporation, (2) Trade and Development Agency, (3) exports of Munitions List items, (4) exports of crime control equipment, (5) export of satellites for launch by China, (6) nuclear cooperation, and (7) liberalization of export controls. Suspensions (3) and (5) affected export of satellites to China. Sec. 902(b) allows

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[22] Sokolski, Henry, "US Satellites to China: Unseen Proliferation Concerns," *International Defense Review*, April 1994; "Selling China the Rope...," *Weekly Standard*, June 1, 1998.

[23] Lamson, James A. and Wyn Q. Bowen, "'One Arrow, Three Stars:' China's MIRV Program," *Jane's Intelligence Review*, May 1997.

Presidential waivers of those suspensions by reporting that "it is in the national interest" to terminate a suspension.

As for sanctions related to missile proliferation, on April 30, 1991, the Bush Administration denied licenses for the export of U.S. parts for a PRC satellite, the Dongfanghong-3, citing "serious proliferation concerns." On May 27, 1991, President Bush declared sanctions on China for transferring to Pakistan technology related to the M-11 short-range ballistic missile. These sanctions, required by Sec. 73(a) of the Arms Export Control Act (P.L. 90-629) and Sec. 11B(b)(1) of the Export Administration Act (P.L. 96-72), were intended to enforce the Missile Technology Control Regime (MTCR). These sanctions, which took effect on June 16 and 25, 1991, denied export licenses and waivers of sanctions for: (1) high-speed computers to China, which can be used for missile flight testing; (2) satellites for launch by China; and (3) missile technology or equipment. They affected two PRC aerospace corporations: China Great Wall and China Precision Machinery Import Export Corporation. President Bush waived these sanctions on March 23, 1992, after China agreed to abide by the MTCR guidelines.

The Clinton Administration imposed similar sanctions on August 24, 1993, after China was again determined to have transferred M-11 related equipment to Pakistan. A total of 11 PRC defense industrial companies were sanctioned, including China Great Wall again. In 1993-1994, the U.S. aerospace industry and aerospace company executives, including then-CEO of Hughes, C. Michael Armstrong, lobbied against sanctions and for expansion of satellite exports to China.[24] China, on October 4, 1994, agreed not to export "ground-to-ground missiles" inherently capable of delivering at least 500 kg to at least 300 km – an understanding the U.S. side sought to include the M-11 missiles under the MTCR. On November 1, 1994, the Clinton Administration waived those sanctions.

Waivers

Since sanctions for the Tiananmen crackdown were imposed in 1989, Presidents Bush and Clinton have issued 13 waivers for 20 satellite projects (projects may involve multiple satellites), based on "national interest," on a case-by-case basis, to allow the export to China of U.S.-origin satellites or components subject to export controls. (See Table below.) Waivers have been increasingly issued for satellites used by China – not just launched from China. Some waivers under P.L. 101-246 have specified whether sections 902(a)(3) and 902(a)(5), on Munitions List items and satellites, applied; others simply referred to section 902 or 902(a).

The policy of allowing China to launch U.S.-built satellites has been tied to the missile proliferation issue, partly because the same PRC companies are involved in both. Nevertheless, just before the Bush Administration issued missile proliferation sanctions on May 27, 1991, the President issued a waiver of post-Tiananmen sanctions a month before for Australian and Swedish satellites, while denying an

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[24]CRS Report 96-767, *Chinese Proliferation of Weapons of Mass Destruction: Background and Analysis*, September 13, 1996, by Shirley A. Kan; John Mintz, "White House Papers Trace Hughes Executive's Pressure for China Deals," *Washington Post*, July 27, 1998.

export license for U.S. parts for a PRC satellite. The Clinton Administration again imposed missile proliferation sanctions on August 24, 1993, but President Clinton issued a waiver of post-Tiananmen sanctions on July 2, 1993, for the export of Iridium and Intelsat-8 satellites to China. Then, even while sanctions were in place on China Great Wall and other PRC companies for missile proliferation, President Clinton issued another waiver of post-Tiananmen sanctions on July 13, 1994. In addition, the Clinton Administration has considered supporting China as a partner in the MTCR, issuing a blanket waiver of sanctions on satellites, and increasing the quota on the numbers of satellites China is allowed to launch – in return for further cooperation in missile nonproliferation, according to a Secret March 12, 1998, National Security Council memo printed in the March 23, 1998 *Washington Times*.[25]

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[25] See: CRS Issue Brief IB92056, *Chinese Proliferation of Weapons of Mass Destruction: Current Policy Issues*, by Shirley A. Kan.

Table 1. Presidential Waivers of Post-Tiananmen Sanctions for Exports of Satellites or Parts to China

Satellite Project (may have multiple satellites per project)	End-User	Manufacturer	Waiver
Asiasat-1	Asia Satellite	Hughes	12/19/89
* Asia Satellite Telecommunications is a consortium based in Hong Kong and owned by China International Trust and Investment Corporation (CITIC) of China, Cable and Wireless of Britain, and Hutchison Telecommunications Ltd. Of Hong Kong.			
Aussat (Optus)	Australia	Hughes	4/30/91
Freja	Sweden	various U.S.	
* In the first waiver, President Bush had waived sanctions for Aussat satellites, but he reissued a new waiver and licenses. He also denied export licenses for U.S. components for a PRC satellite, Dongfanghong-3 (waived later).			
Asiasat-2	Asia Satellite	Martin Marietta	9/11/92
Apsat (or Apstar)	APT Satellite	Hughes and Loral	
Intelsat-708	Intelsat	Loral	
Starsat		(canceled)	
AfriSat (AfriStar)	Afrispace	Alcatel	
Dongfanghong-3	China	China	
Iridium	Iridium/Motorola	Lockheed Martin	7/2/93
Intelsat-8	Intelsat	Lockheed Martin	
Echostar	Echostar	Martin Marietta	7/13/94
Mabuhay (Agila 2)	Philippines	Loral	2/6/96
Chinastar-1 (Zhongwei-1)	China	Lockheed Martin	2/6/96
* Used by China Oriental Telecom Satellite Co.			
Chinasat-7	China	Hughes	2/6/96
Asia Pacific Mobile Telecommunications (APMT)	APT Satellite	Hughes	6/23/96
* Various PRC state-owned companies invest in the project.			
Globalstar	Globalstar	Loral/Alcatel	7/9/96
Fengyun 1	China	China	11/19/96
SinoSat-1	China	Alcatel/ Aerospatiale	11/23/96
* Cooperative product between Daimler-Benz Aerospace and China Aerospace Corp.			
Chinasat-8	China	Loral	2/18/98

Congressional and Administration Action

Hearings

Since the Reagan Administration's decision in September 1988 to allow U.S.-built satellites to be launched from China, Members of Congress have expressed concerns about the implications for U.S. national security. After press reports in April 1998, the 105th Congress held a number of open and closed hearings, including these by the following committees.

Joint Economic Committee, April 28, 1998.
Senate Governmental Affairs Subcommittee on International Security, Proliferation, and Federal Services, May 21, 1998.
Senate Intelligence Committee, June 4, 1998.
Senate Intelligence Committee, June 5, 1998.
Senate Intelligence Committee, June 10, 1998.
Senate Foreign Relations Committee, June 11, 1998.
House National Security/International Relations Committees, June 17, 1998.
House National Security/International Relations Committees, June 18 and 23, 1998.
Senate Foreign Relations Subcommittee on East Asian/Pacific Affairs, June 18, 1998.
Senate Governmental Affairs Subcommittee on International Security, Proliferation, and Federal Services, June 18 and July 8, 1998.
Senate Intelligence Committee, June 24, 1998.
House Science Committee, June 25, 1998.
Senate Foreign Relations Committee, June 25, 1998.
Senate Governmental Affairs Committee, June 25, 1998.
Senate Intelligence Committee, July 8, 1998.
Senate Armed Services Committee, July 9, 1998.
Senate Intelligence Committee, July 15, 1998.
Senate Governmental Affairs Subcommittee on International Security, Proliferation, and Federal Services, July 29, 1998.
Senate Commerce, Science, and Transportation Committee, September 17, 1998.

Investigations

Cox Committee. In addition to those hearings in the 105th Congress, House Speaker Gingrich announced on May 19, 1998, that he wanted to create a select committee, headed by Congressman Cox, to investigate the various allegations concerning this case. The House voted on H.Res. 463 (Solomon) (409-10) on June 18, 1998, to create the Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China.[26] The committee had nine members: five Republicans (Representatives Cox, Goss, Hansen, Bereuter, and Weldon) and four Democrats (Representatives Dicks, Spratt, Jr., Roybal-Allard, and Scott). The panel held numerous closed hearings and received wide-ranging briefings. The committee expanded its investigations to policies before the Clinton

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[26] Also see CRS Report 98-549, *Transfer of Missile and Satellite Technology to China: A Summary of H.Res. 463 Authorizing a House Select Committee*, by Stephen W. Stathis.

Administration and other dual-use technology exports, including high-performance computers and machine tools.[27]

On December 30, 1998, Rep. Cox and Dicks, the chair and ranking Democrat, said in a news conference that the bipartisan committee unanimously approved a 700-page, classified report on its broad, six-month investigation. The committee was extended for the first three months of the 106th Congress to work with the Administration on a declassified version.[28] Meanwhile, the White House revealed the recommendations in its February 1, 1999 response.

There were then reported disagreements between the Select Committee and the White House on how much to declassify, particularly about the cases at the nuclear weapon labs. Rep. Cox said on March 3, 1999, that the House may vote during the week of March 22 to release an edited, unclassified version of the report, if there is no agreement with the Administration. However, Rep. Dicks described such a move as a "dangerous precedent" to release classified information over the President's objections.[29] The House did not vote to release the report without the Administration's approval, and on March 24, 1999, passed H. Res. 129 to further extend the Select Committee on China for a month, until April 30, 1999. Meanwhile, Representatives Cox and Dicks briefed President Clinton on April 22, 1999, about the findings of the committee's report.[30] The House agreed to H. Res. 153, on April 29, 1999, to further extend the committee until May 14, 1999, and approved H. Res. 170, on May 13, 1999, to extend the date to May 31, 1999. On May 25, 1999, the Cox Committee released the declassified version of its January 3, 1999 classified report on its investigation of U.S. technology transfers to China.[31]

The committee concluded that, over at least the last 20 years, China has pursued a "serious, sustained" effort to acquire advanced American technology — covering "more serious national security problems than the Loral-Hughes cases," and that technology acquisition has harmed U.S. national security. The Committee's report agreed with intelligence assessments that Loral and Hughes helped to improve China's missile capabilities. The committee made 38 recommendations for remedies, including possible legislation, mostly to tighten export controls (e.g., giving the Departments of Defense and State more say) and security at the national labs. The committee apparently did not focus on the question of PRC political donations nor requested the

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[27] Greenberger, Robert S., "House Panel Expands Its China Satellite Probe," *Wall Street Journal*, October 7, 1998.

[28] *Congressional Record*, January 6, 1999.

[29] Pomper, Miles A. and Chuck McCutcheon, "State Department Talks Tough to Beijing As GOP Assails 'Failed' Policy," *CQ Weely*, March 6, 1999; Jeff Gerth and Eric Schmitt, "Political Battle: What to Reveal On China Arms," *New York Times*, March 10, 1999; Vernon Loeb, "CIA Probe Gets Outside Review," *Washington Post*, March 16, 1999.

[30] Risen, James, "U.S. Inquires Why Suspect At Atom Lab Kept Access," *New York Times*, April 23, 1999.

[31] U.S. House of Representatives, Select Committee, Report 105-851, *U.S. National Security and Military/Commercial Concerns with the People's Republic of China*, classified report issued on January 3, 1999; declassified version issued on May 25, 1999.

Justice Department to begin new investigations. Loral and Hughes deny having violated the law.[32]

Shifting attention from missile technology to nuclear weapons, the Cox Committee reviewed the most serious concerns that the PRC had stolen information on nuclear weapons from U.S. national laboratories of the Department of Energy. A third incident has been made public involving the W-88 nuclear warhead (deployed on the Trident II submarine-launched ballistic missile).[33] The Federal Bureau of Investigation (FBI) has investigated that incident in which China reportedly received data from Los Alamos National Lab in the mid-1980s, but the case was uncovered in 1995. Two other cases involving China and U.S. labs were previously reported.[34] Representative Dicks said that the most important matter to be learned from the committee's report will be "that for 20 years, starting in the 1980s, we had a major counterintelligence failure at Los Alamos and at other national labs that is now being corrected."[35] Allegations of the PRC's acquisition of nuclear weapon secrets were publicly confirmed by U.S. intelligence on April 21, 1999.[36]

According to the Cox Committee, "the PRC has stolen or otherwise illegally obtained U.S. missile and space technology that improves the PRC's military and intelligence capabilities."[37] After three failed satellite launches in 1992, 1995, and 1996, U.S. satellite makers (Hughes and Loral) transferred missile design information and know-how to China without required export licenses from the Department of State "in violation of the International Traffic in Arms Regulations." The U.S. firms gave technical information that has improved the "reliability" of PRC rockets used to launch satellites with civilian and military purposes. The information is also useful for the design and improved reliability of "future PRC ballistic missiles." Specifically, the committee found that in 1993 and 1995, Hughes "illegally" recommended to the PRC

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[32] Press conference of Representatives Cox and Dicks, December 30, 1998; Gerth, Jeff and Eric Schmitt, "House Panel Says Chinese Obtained U.S. Arms Secrets," *New York Times*, December 31, 1998; John Mintz, "China Aid Hurt U.S. Security, Panel Says," *Washington Post*, December 31, 1998; Robert S. Greenberger, "Hughes, Loral Sales Hurt U.S., Panel Says," *Wall Street Journal*, December 31, 1998.

[33] See CRS Report RL30143, *China: Suspected Acquisition of U.S. Nuclear Weapon Data*, by Shirley Kan.

[34] Mintz, John, "Atomic Labs Criticized For Security Conditions," *Washington Post*, January 1, 1999; Carla Anne Robbins, "China Received Secret Data On Advanced U.S. Warhead," *Wall Street Journal*, January 7, 1999; James Risen and Jeff Gerth, "China Stole Nuclear Secrets From Los Alamos, U.S. Officials Say," *New York Times*, March 6, 1999. On whether China may have passed nuclear weapon design information to Pakistan, see CRS Report 96-767, *Chinese Proliferation of Weapons of Mass Destruction: Background and Analysis*, September 13, 1996, by Shirley A. Kan.

[35] Interview on NBC's "Meet the Press," March 14, 1999.

[36] CIA, "The Intelligence Community Damage Assessment On The Implications Of China's Acquisition of U.S. Nuclear Weapons Information On the Development of Future Chinese Weapons," unclassified release, April 21, 1999.

[37] See CRS Report RL30220, *China's Technology Acquisitions: Cox Committee's Report — Findings, Issues, and Recommendations*, June 8, 1999, by Shirley A. Kan.

improvements to the fairing (nose cone that protects the payload), and in 1996, Loral and Hughes helped the PRC improve the guidance of a failed rocket, and in so doing, "deliberately acted without the legally required license and violated U.S. export control laws."

Regarding Hughes, the committee's report printed an unclassified assessment completed on December 18, 1998, by the State Department's Office of Defense Trade Controls. That office concluded that, in reviewing the PRC launch failure of January 1995 that involved a LM-2E space launch vehicle (SLV) and the Apstar II satellite, Hughes engaged in technical discussions with the PRC, without U.S. government monitors, that resulted in "significant improvement to the PRC spacelift program and contributed to China's goal of assured access to space." Moreover, "the lessons learned by the Chinese are inherently applicable to their missile programs as well, since SLVs and ICBMs share many common technologies."

As for Loral and Hughes' activities in 1996, the committee reported that a 1998 interagency review determined that 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." The improvements to China's missile program could come from "increased production efficiency, and improved reliability through adoption of improved quality control and reliability-enhancing measures in design and manufacturing that were introduced after the accident investigation, including some that the [Loral-led] Independent Review Committee advocated." The committee judged that the guidance system of the Long March 3B rocket, reviewed by Loral and Hughes in 1996, is "among the systems capable of being adapted for use in the PRC's planned road-mobile intercontinental ballistic missiles" (i.e., the DF-31).

There were previous concerns that after the explosion that destroyed the Loral-built Intelsat 708 satellite in 1996, classified U.S. encryption boards were lost to China. The committee reported that while the two FAC-3R encryption boards were not recovered from the crash site by Loral, they "most likely were destroyed in the explosion." While it is not known whether the PRC recovered the boards, even if they did, "it would be difficult for the PRC to determine the cryptographic algorithm that was imprinted on them," and "reverse-engineering of a damaged board would be even more difficult." Thus, "the National Security Agency remains convinced that there is no risk to other satellite systems, now or in the future, resulting from having not recovering the FAC-3R boards from the PRC."

Contrary to earlier allegations of U.S. assistance for China's development of multiple satellite dispensers and MIRVs, the committee determined that "Motorola did not provide the PRC with information on how to design the Smart Dispenser; rather, the PRC built the Smart Dispenser indigenously to Motorola's specifications."

The Cox report agreed with earlier public assessments of the Administration that, in the 1990s, the PRC has deployed a total of approximately 20 CSS-4 ICBMs in silos, but contrary to the White House's June 1998 announcement of a detargeting agreement with China, "most" of those ICBMs remain targeted on the United States. Nonetheless, the report noted previous statements by U.S. intelligence that the "CSS-4s are deployed in their silos without warheads and without propellants during day-to-

day operations." The committee judged that "within 15 years," China's missile modernization program could result in the deployment of up to 100 ICBMs. Moreover, if China aggressively developed MIRVs, it could deploy "upwards of 1,000 thermonuclear warheads on ICBMs by 2015." Confirming suspicions of problems in China's SLBM force, the committee reported that while China developed a JL-1 SLBM to be launched from the PLA's Xia-class nuclear-powered submarine, the PRC has not yet deployed the JL-1 SLBM.

In June 1999, Loral Space and Communications published a full-page response to the Cox report. Loral said that its employees "acted in good faith and did nothing to violate export control regulations or the law or to harm national security." Nonetheless, Loral's statement acknowledged that "mistakes were made." Loral also referred to sensitive information that could have been conveyed at the meetings, saying that "unfortunately, the [Review] Committee secretary, a Loral engineer, had already faxed a copy of the report [reviewing the launch failure] to the Chinese in the process of sending it to the Committee members. However, prior to doing so, the secretary took measures to delete all sensitive material from the report."[38]

In its recommendations related to satellite exports, the Cox Committee:

- Expected that the executive branch will aggressively implement the Satellite Export Control provisions of the Strom Thurmond National Defense Authorization Act for FY 1999.
- Stated that the congressional judgment that the Department of State is the appropriate agency for licensing both exports of satellites and any satellite launch failure investigations must be faithfully and fully implemented.
- Stated that the Department of State must ensure, consistent with national security, that satellite export licenses and notices to Congress are acted on in a timely fashion and that exporters are informed about the progress of their applications and have access to appropriate dispute resolution procedures. The executive branch and Congress should ensure that the Department of State has adequate personnel and resources devoted to processing export license applications.
- Recommended that congressional committees report legislation to ensure that satellite manufacturers are not disadvantaged in collateral areas such as tax credits by the transfer of licensing responsibility to the Department of State.
- Stated that DOD must give high priority to obligations under the Strom Thurmond National Defense Authorization Act, including requirements for monitoring launches and technology control plans.
- Recommended that congressional committees report legislation providing that, in connection with foreign launches of U.S. satellites, DOD shall contract for security personnel who have undergone background checks to verify their loyalty and reliability. The number of guards shall be sufficient to maintain 24-hour security of the satellites and all related missile and other sensitive technology. The satellite export licensee shall be required to reimburse DOD for all associated costs of such security.

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[38] *Washington Post*, June 15, 1999, p. A27; *Space News*, June 28, 1999.

- Recommended that DOD shall ensure sufficient training for space launch campaign monitors and the assignment of adequate numbers of monitors to space launch campaigns.
- Recommended that DOD monitors shall maintain logs of all information authorized for transmission to the PRC, and such information shall be transmitted to DOD, State, Commerce, and the CIA.
- Recommended that relevant departments and agencies ensure that the laws and regulations on export controls are applied in full to communications among satellite manufacturers, purchasers, and the insurance industry, including communications after launch failures.
- Recommended that, in light of the impact on U.S. national security of insufficient domestic, commercial space launch capacity and competition, congressional committees report legislation to encourage and stimulate further the expansion of such capacity and competition.

Administration's Response. The Clinton Administration has concerns about implications of the House Select committee's recommendations for U.S. exports. Under Secretary of Commerce William Reinsch said in a speech on export controls to high-tech companies that there are those in Congress who "do not understand" the "political and economic transformations" in recent years and "respond to them by trying to return to the simpler era of the Cold War and a single bipolar adversary. Only this time, it is China. A good example of this is the Cox Committee. . ."[39]

On February 1, 1999, the National Security Council (NSC) of the White House issued a 32-page unclassified version of its response to the House Select Committee's 38 recommendations,[40] even before the committee's report is declassified. Those issues pertain to several broad areas:

- security on nuclear weapons at national labs;
- multilateral export control and weapon nonproliferation efforts;
- satellite launches;
- high-performance computers;
- export controls; and
- counter-intelligence.

The White House said it agreed with some of the recommendations or has already addressed those concerns. The NSC, however, opposed other recommendations, including the following objections:

- assessments at the Departments of State, Defense, Energy, and Justice, and the CIA on security risks in U.S.-PRC lab-to-lab exchanges should be conducted by intelligence experts, not inspector generals;
- the United States should not deny exports of high-performance computers if China does not permit effective end-use verification, including surprise on-site inspections, by an "arbitrary deadline" of September 30, 1999;

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[39] Speech to the Silicon Valley Forum, Commonwealth Club, California, January 14, 1999.

[40] NSC, response to recommendations, (unclassified), February 1, 1999; John Mintz, "Clinton: Panel's Export Rules May Delay Deals," *Washington Post*, February 2, 1999.

- export control procedures do not need longer review periods where an agency's mid-level officials may "stop the clock" on national security grounds with "indefinite" and "unjustified" delays;
- export control procedures requiring consensus of reviewing agencies would "hinder the deliberative process;"
- new legislation, beyond the Hong Kong Policy Act of 1992, is not needed to require examination of trade flows to China through Hong Kong, U.S. export control policy of treating Hong Kong differently from China, and unmonitored border crossings by PRC military vehicles;
- legislation that would amend the Defense Production Act of 1950 to require mandatory notifications to the Committee on Foreign Investment in the United States (CFIUS) by any U.S. national security-related business of any planned mergers, acquisition, or takeovers by a foreign or foreign-controlled entity could "chill legitimate foreign investment" that is strongly in U.S. interests;
- the Department of Justice deems it "unnecessary" to have legislation directing it to promptly share national security information with other agencies through the establishment of an interagency mechanism.

Senate Intelligence Committee. In the Senate, Majority Leader Lott announced, on May 20, 1998, the creation of a Task Force, led by Senator Shelby (chairman of the Intelligence Committee) and includes Senators Thurmond, Helms, Thompson, Cochran, Kyl, and Hutchinson. On May 29, 1998, Senate Democratic Leader Daschle approved a Democratic Task Force, with Senators Kerrey, Biden, Sarbanes, Glenn, Leahy, Levin, Kerry, and Feinstein.

On July 14, 1998, Senator Lott made a floor statement on interim findings that sensitive U.S. technology relating to satellite exports has been transferred to China and that those transfers provided military benefits. He reported five "major interim judgments:"

- the Clinton Administration's export controls on satellites are wholly inadequate;"
- sensitive technology related to satellite exports has been transferred to China;
- China has received military benefit from U.S. satellite exports;
- the Administration has ignored overwhelming information regarding PRC proliferation and has embarked on a de facto policy designed to protect China and U.S. satellite companies from sanctions under U.S. proliferation laws;
- new information has come to light about China's efforts to influence the U.S. political process.

Senator Shelby stated on July 14, 1998, that "some of the tendencies of the evidence tend to support" Senator Lott's statement, but that "the Intelligence Committee has not reached any preliminary judgment." The Pentagon's spokesman, Kenneth Bacon, responded to Senator Lott by saying that this Administration has submitted requested documents to Congress and had inherited safeguards from previous Administrations that prevent inappropriate technology transfers to China.

The Senate Intelligence Committee's investigations covered two categories:

- U.S. export control policies, since 1988, on PRC launches of U.S.-built satellites and implications for U.S. national security;

- any secret PRC program to contribute political donations and influence the U.S. political process in 1996.[41]

On May 7, 1999, the Senate Committee on Intelligence released its 45-page, unclassified report that it had approved two days before in a bipartisan 16-1 vote.[42] The office of Senator Graham, who dissented, explained he was concerned that the process did not allow sufficient time for the members to review the report before the vote. As urged by Senator Levin, the sections on possible missile technology transfers and PRC efforts to influence U.S. policies were kept separate, because no evidence of a link between the two issues was found.[43] The report included a number of findings and recommendations.

On security implications of any U.S. technology transfers for China's military and missile programs, the committee found no evidence that U.S. technology has been incorporated into the deployed PRC ICBM force, while noting that such integration may not be apparent for several years if at all. The report also stated that "extensive assistance from non-U.S. foreign sources probably is more important" than technology transfers associated with satellite launches. Nonetheless, the committee concluded that "the technical information transferred during certain satellite launch campaigns enables the PRC to improve its present and future ICBM force that threatens the United States," as well as short-range and intermediate-range ballistic missiles that threaten U.S. military forces and allies in Asia. Further, U.S. national security may be harmed, according to the report, if China proliferated missile systems improved by U.S. technology. The committee also found that improvements to China's space launch capability also enhanced its use of space for military reconnaissance, communications, and meteorology, posing challenges to U.S. national security. The committee found, that despite assurances of government monitoring and security safeguards, there were security violations and "significant weaknesses" in the implementation of the satellite export policy since the Reagan Administration. U.S. satellite exports to China, the committee concluded, have "created a tension between U.S. national security interests and U.S. commercial interests," and "this tension and conflict of interests have been problematic throughout the U.S.-PRC satellite launch relationship."

The Committee made 10 recommendations related to strengthening controls over satellite exports. These include:

- authority for monitors from the Defense Threat Reduction Agency (DTRA) to suspend launch-related activities;
- strengthening DTRA to monitor satellite launches overseas;
- annual reports from DTRA to Congress on implementation of technology safeguards;

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[41] Senate Select Committee on Intelligence, "Investigation of Impacts to U.S. National Security From Advanced Satellite Technology Exports to China and Chinese Efforts to Influence U.S. Policy: Terms of Reference," June 2, 1998.

[42] Senate Select Committee on Intelligence, "Report On Impacts To U.S. National Security Of Advanced Satellite Technology Exports to the People's Republic of China (PRC), and Report on the PRC's Efforts to Influence U.S. Policy," May 1999.

[43] Schmitt, Eric, "Panel Finds Harm in China Launchings," *New York Times*, May 7, 1999.

- adherence by the Department of State to strict timetables in reviewing license applications;
- intelligence review in the licensing process;
- intelligence assessments of foreign efforts to acquire U.S. technology;
- consideration of investigations for export control violations associated with satellite exports;
- call for the Administration to use all available means to obtain PRC compliance with the MTCR;
- efforts by the Administration and Congress to encourage expansion of the U.S. commercial launch industry; and
- reappraisal of the policy to export satellites to China, including whether it should be phased out.

Export Controls and Intelligence. In addition, Congressional investigations appear to have expanded to include concerns about politicization of export control and intelligence in the Administration. Export control specialists skeptical of liberalizing controls on dual-use technology transfers to China have complained that decision-makers, in approving exports, have ignored evidence of U.S. firms helping China's military. One manager in DTSA, Michael Maloof, reportedly kept a diary of export control cases critical of the Commerce Department and his superiors at DTSA, including David Tarbell. Maloof's information was shared with the House Select Committee in August 1998 and also with the Department of Justice and Customs Service. His criticisms reportedly cover alleged close ties between Tarbell and Hughes. Tarbell denies showing favoritism to Hughes. The Pentagon's spokesman dismissed Maloof's charges as "ideological differences" about U.S. policy toward China, while Peter Leitner, another DTSA employee who briefed Congress, criticized "long-time ideological opponents" of export controls.[44]

Meanwhile, at the request of the Senate Intelligence Committee, the Justice Department is conducting a unusual criminal investigation into whether the CIA obstructed justice when it allegedly warned Hughes about the committee's interest in some of its employees. CIA officials agreed to testify before a federal grand jury in Washington in December 1998. In April 1996, a CIA analyst, Ronald Pandolfi, had reportedly prepared a National Intelligence Estimate (NIE) on how Hughes may have helped to improve China's missile capabilities, but the CIA did not approve the NIE. In September 1998, Pandolfi briefed the committee on what he found in 1995 (after Hughes reviewed the explosion of a Long March rocket in January 1995). The CIA then told Hughes about Pandolfi's briefing for the committee. Officials say the CIA advised Hughes about providing names of Hughes executives to the committee and denies that it tried to hinder the committee's investigation. However, the committee is now questioning whether the Clinton Administration's policy of engagement with China has influenced intelligence assessments about China.[45]

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[44] Cloud, David S., "Beijing Export Battle: Case Study of One Hard-Liner," *Wall Street Journal*, November 27, 1998.

[45] Loeb, Vernon and John Mintz, "CIA Faces Criminal Probe in China Case," *Washington Post*, December 5, 1998; Jeff Gerth, "Old Concerns Over Data Transfer to China Get New Attention," *New York Times*, December 7, 1998; Robert S. Greenberger and David S. Cloud,

(continued...)

In another case, the House Select Committee asked the CIA to provide a classified cable written in March 1996 on Hughes and Loral that had not been provided to the Justice Department until these Congressional investigations began. The CIA's inspector general is investigating the failure to pass the cable to Justice. The message is said to have reported on an American consultant, Bansang Lee, who worked for Hughes from 1989 to 1995, when Loral hired him. Lee allegedly made illegal payments to and received payments from PRC aerospace executives. He played roles in deals to sell satellites to China and to launch satellites from there.[46]

Legislation to Revise Export Controls

105th Congress. In the 105th Congress, the House-passed National Defense Authorization Act for FY 1999 (H.R. 3616) included amendments (sections 1206-1209) passed on May 20, 1998, that sought to express the sense of Congress that the United States should not enter into new agreements with China involving space or missile-related technology (Spence, agreed 417-4); prohibit U.S. participation in investigations of PRC launch failures (Bereuter, agreed 414-7); prohibit transfers of missile equipment or technology to China (Hefley, agreed 412-6); and prohibit the export or re-export of U.S. satellites to China (Hunter, agreed 364-54). Also, section 1212 sought to return control over licensing export of satellites from the Commerce Department to the State Department (under the Munitions List controlled under the Arms Export Control Act).

On June 4, 1998, Senator Hutchinson submitted an amendment to the Senate-passed Defense Authorization Act for FY 1999 (S. 2057), which was ordered to lie on the table. It sought to amend the language authorizing Presidential waivers of post-Tiananmen sanctions by substituting a narrower basis ("in the vital national security interest") for the current language ("in the national interest"), and add a requirement for the President to submit a detailed justification for each waiver.

On July 22, 1998, Senator Hutchinson filed but did not offer Amendment 3250 to the Senate-passed Defense Appropriations Act for FY 1999 (S. 2132/H.R. 4103) to transfer the export control of satellites back to the State Department and require a detailed justification for Presidential waivers of post-Tiananmen sanctions for exports of satellites or defense articles. On July 30, 1998, Senator Kyl proposed Amendment 3398 to this bill to limit the use of funds pending the establishment of the position of Deputy Under Secretary of Defense for Technology Security Policy who would also serve as the director of DTSA.

As agreed to by conferees, the National Defense Authorization Act for FY 1999 (**P.L. 105-261**) transfers the licensing authority over commercial satellites back to the State Department in an effort to strengthen export controls. The act did not ban further satellite exports to China or help the U.S. satellite launch industry, as some

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[45](...continued)
"Justice Department Examines CIA Role in Probe Into Hughes' China Dealings," *Wall Street Journal*, December 7, 1998.

[46] Gerth, Jeff, "C.I.A. Ignored Report of Payments to Chinese For Satellite Contracts," *New York Times*, December 24, 1998.

have advocated in calling for a reassessment of the policy of allowing China to launch U.S.-origin satellites.[47] Others say that it is up to Congress to assess the state of U.S. dual-use export controls by passing a law to replace the Export Administration Act that expired in 1994.[48] U.S. policy might also distinguish between exports of satellites for PRC launch only and satellites for PRC use. Some say it is difficult to prevent the PLA from using commercial satellites owned by China.

Section 1511 of the act expresses the sense of Congress, among other views, that the President should not issue any blanket waiver of post-Tiananmen sanctions (in **P.L. 101-246**) for satellite exports to China. Section 1512 requires the President to certify to Congress before exporting missile technology to China that such export will not be detrimental to the U.S. space launch industry and will not measurably improve PRC missile or space launch capabilities. Section 1513 transfers satellites controlled under the Commerce Department's Commerce Control List back to the State Department's Munitions List, effective March 15, 1999. That section also requires a report from the Secretary of State on implementation, improvement to the timeliness and transparency of the license review process, adequacy of resources, and recommendations for amending the Arms Export Control Act. Section 1514 mandates additional requirements to strengthen national security controls over satellite exports, including mandatory licenses for launch failure investigations, mandatory intelligence review of license applications and TAAs considered by the Departments of Commerce and State for foreign launches of satellites, and notification to Congress of export licenses that are issued for satellite launches; with the exception of satellites exported for launch by members of the North Atlantic Treaty Organization (NATO) or a major non-NATO ally. Section 1515 requires a detailed justification to accompany the President's waiver of post-Tiananmen sanctions for satellite exports to China. Section 1521 requires the establishment of a Deputy Under Secretary of Defense for Technology Security Policy who serves as the director of DTSA.

There had been concerns in Congress about how the Administration would implement the requirement to shift licensing authority back to State. Despite signing the act on October 17, 1998, President Clinton said he "strongly opposed" the transfer of authority. He also warned that he would "take action to minimize the potential damage to U.S. interests" and order appropriate agencies to implement the change "in a manner consistent with current dual-use export license processing."[49] National Security Adviser Samuel Berger reportedly urged a veto and included the strong language.[50] In coordination with the U.S. satellite industry which prefers

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[47] Sokolski, Henry, "Protecting High Tech," *Washington Times*, September 30, 1998.

[48] "Export Act Inertia" (Commentary), *Defense News*, November 2-8, 1998; "Reinsch Says Congress Needs to Revise EAA," *Export Practitioner*, November 1998; Henry Sokolski, "What Now For China Policy?," *Wall Street Journal*, March 15, 1999.

[49] President William J. Clinton's statement on the FY 1999 Defense Authorization Act.

[50] Lelyveld, Michael S., "Clinton Ripped On Satellites To China," *Journal of Commerce*, December 14, 1998.

speedier and more predictable licensing procedures,[51] the White House's National Security Council reportedly drafted an executive order for the President to issue to accord the Commerce Department a continuing role in licensing satellite exports, perhaps the authority to appeal the decisions of the State Department on Munitions List items, including satellites.[52] In response, the chairmen of six House and Senate committees (National Security, Armed Services, International Relations, Foreign Relations, Intelligence) wrote a letter on December 9, 1998, warning the President against "direct contravention" of the legislation.

As required by section 1513, the Secretary of State submitted to Congress on January 21, 1999, the plan on regaining licensing authority over commercial satellites as Munitions List items on March 15, 1999. It includes a goal (but not a limit) of timely review of licenses within 90 working days; procedures for Commerce to comment, but not veto, licensing reviews; and veto authority for the Defense Department (that is not subject to appeal by the Commerce Department). It stated that "no new Executive Order is needed," and decisions on defense exports are made exclusively by the Departments of State and Defense and "solely on the basis of national security and foreign policy."[53] The Defense Department's new Space Launch Monitoring Division of the Defense Threat Reduction Agency is reportedly hiring 39 engineers and other staff to review licenses for satellite exports and monitor foreign launches. U.S. firms are to reimburse the costs of monitoring.[54]

106th Congress. In the 106th Congress, Rep. Sweeney introduced **H.R. 281** on January 6, 1999, to prohibit the export to China of satellites and related equipment. On May 19, 1999, he sponsored an amendment to the NASA authorization bill (**H.R. 1654**) to require NASA to certify, before any agreement with the PRC, that the technology transfer will not improve PRC missile or space launch capabilities. The House agreed to the amendment.

During the mark-up of the Foreign Relations Authorization Act for FY 2000, **H.R. 1211**, by the Committee on International Relations on April 14, 1999, Representative Rohrabacher introduced an amendment to give preferential treatment in licensing for export of satellites and related items to NATO allies, major non-NATO allies, and other friendly countries; but not for China, countries that potentially pose a security threat to the United States, or countries likely to proliferate satellite

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[51] "Conferees' Decision Draws Ire of Satellite Industry," *Aerospace Daily*, September 21, 1998; Interview with John Douglass, President/General Manager, Aerospace Industries Association, *Defense News*, November 2-8, 1998; Interview with Clayton Mowry, Director, U.S. Satellite Industry Association, *Space News*, November 9-15, 1998; "A License to Do Mischief (commentary)," *Space News*, February 1, 1999.

[52] Opall-Rome, Barbara, "White House Plots To Skirt Congress On Exports," *Defense News*, December 7-13, 1998.

[53] "Report by The Secretary of State Pursuant to Section 1513(d) of the NDAA for FY 1999," January 21, 1999; Robert S. Greenberger and David S. Cloud, "State Department Seeks to Allay Fears With 90-Day Satellite-License Reviews," *Wall Street Journal*, January 29, 1999; NSC unclassified response to the Cox Committee's recommendations, February 1, 1999.

[54] Ferster, Warren, "Pentagon Hires Staff For Review Office," *Space News*, April 26, 1999.

technology to countries of security concern. (The FY 1999 National Defense Authorization Act already exempts NATO and non-NATO allies from the more stringent export controls.) As amended by Representative Gejdenson, however, the approved section 210 of **H.R. 1211** (H. Rpt. 106-122) does not have references to China and other countries not subject to preferential treatment. Rohrabacher's amendment also directs the Secretary of State to obligate $2 million to the Office of Defense Trade Controls to expedite the review of satellite export licenses.[55]

On May 27, 1999, the Senate agreed by voice vote to Senator Lott's amendment to the National Defense Authorization Act for FY 2000 (**S. 1059**). The amendment sought to improve the monitoring of satellite exports and strengthen safeguards, security, and counterintelligence at DOE facilities.[56] On June 9, 1999, Representative Cox introduced an amendment[57] to the House's version (**H.R. 1401**). The amendment consisted of 27 sections, with 25 sections requiring reports or other actions, or amending the law; a section simply providing a short title; and a section providing a definition of "national laboratory." The sections or subsections of the Cox amendment addressed fully or partially 21 of the 38 recommendations of the Cox Committee. The House agreed to the Cox amendment by 428-0 on that day and passed H.R. 1401 on June 10, 1999. In September 1999, Congress approved the conference report (H. Rpt. 106-301) on S. 1059. The act, signed into law (**P.L. 106-65**) on October 5, 1999, includes sections 1401-1412 that addresses export controls as they relate to missile technology, satellites, high-performance computers, multilateral export controls, monitoring of foreign satellite launches, State Department licensing, improved intelligence consultation, and notification to Congress of investigations into possible export control violations by satellite makers. In addition, section 1612(b) expressed the sense of Congress that the policy of exporting satellites to the PRC for launch should be reexamined, with a review of whether to phase out that policy. Congress did not require a report on this review.

Denied and Pending Satellite Exports

In addition to the FY 1999 Defense Authorization Act, Congress also passed omnibus legislation (**P.L. 105-277, Sec. 101(b)**) appropriating funds for the Department of Commerce in FY 1999 that required notification to Congress before expending funds to process licenses for satellite exports to China. On November 20, 1998, the Commerce Department reported processing of two export license applications. Commerce again notified Congress on February 1, 1999, that it was processing three additional applications to export satellites to China. Those five satellite projects considered by Commerce were: Chinasat-8R, Asia Pacific Mobile Telecommunications (APMT), Asiasat-3sb/4, Command and Control Software for Satellites, and Iridium.

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[55] House Report 106-122; "$2 Million Pushed For State Tech Transfer Office; Attempt to Add Controls on China is Stymied," *Spacebusiness Today*, April 20, 1999; Warren Ferster, "Pentagon Establishes Office To Review Satellite Export Requests," *Defense News*, May 3, 1999.

[56] For language of amendment, see *Congressional Record*, May 26, 1999, p. S6073-6074.

[57] *Congressional Record*, June 8, 1999, p. H3862-3866.

APMT. However, at least one of these, the APMT satellite project, has encountered controversy. On July 2, 1998, the State Department suspended a license issued in 1996 to Hughes that permitted Shen Jun, son of a PLA lieutenant general, to work on the $450 million deal for the APMT consortium. Shen Jun's father, Lt. Gen. Shen Rongjun, was a Deputy Director of the Commission on Science, Technology, and Industry for National Defense (COSTIND) from 1985 to 1998, with special responsibility for aerospace. Also, the Administration re-examined the APMT project, in part because the PRC governmental investors include those with ties to the military: COSTIND, China Launch and Tracking Control, CASC, Ministry of Information Industry, and China Telecommunications Broadcasting Satellite Corp. (Chinasat). (In April 1998, COSTIND was reorganized as a civilian organization under the State Council, while the PLA retained control over satellites under the new General Equipment Department.) Some are concerned that the APMT satellite (with powerful spot beams) could be used by the PLA to improve command and control and that the satellite contains sensitive technologies, including a huge 40-ft.-wide antenna and on-board digital processor, also used in Hughes' classified, communications satellites used by the U.S. military. There have also been concerns about Hughes' past record of interaction with PRC aerospace engineers, including the review of the January 1995 launch failure.[58]

As for the PLA's possible use of ostensibly civilian communication satellites, a DTSA official, Michael Maloof, wrote a July 1998 memo about his concerns that the PRC military has used U.S.-made satellites to improve its encrypted command, control, communications, and intelligence (C4I), using the Asiasat and Apstar satellites built by Hughes.[59] In an unclassified report submitted as required by FY 1999 appropriations legislation, the Secretary of Defense reported on February 1, 1999, that China's military and civilian leaders are paying "specific attention" to the C4I infrastructure. The report further said that "the military's lack of communications satellites could force the PLA to rely on foreign satellite services to meet military needs in wartime or a crisis" and that, in a crisis, "the military would preempt the domestic satellite systems for combat operations."[60]

On February 23, 1999, the Clinton Administration announced that it decided to deny approval to Hughes for the export of the APMT satellite, after the Departments of Defense and State objected to the export, while Commerce Department favored

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[58] Also see: CRS Report 96-889, *China: Commission of Science, Technology, and Industry for National Defense (COSTIND) and Defense Industries*, by Shirley A. Kan; Bruce Dorminey and Michael Mecham, "China-led Asian Team Buys Hughes Geomobile Satellites," *Aviation Week & Space Technology*, May 18, 1998; Jeff Gerth, "Administration Rethinking $650 Million China Satellite Deal," *New York Times*, June 18, 1998; John Mintz, "Hughes Corp. Pressing White House to Clear New Deal with China," *Washington Post*, Aug. 9, 1998; Steven D. Dorfman, Vice Chairman of Hughes, July 13, 1998, letter to the State Department.

[59] Capaccio, Tony, "China Military Benefitted from U.S. Technology, U.S. Aide Says," *Bloomberg News*, February 16, 1999.

[60] Secretary of Defense, "Report to Congress Pursuant to the FY99 Appropriations Bill," February 1, 1999.

it.[61] The Administration cited concerns that the end-user would be the PLA. Hughes responded on March 15, 1999, asking the Administration for a detailed justification for the denial. But on April 14, 1999, Hughes said that the APMT consortium dropped Hughes as the satellite supplier.[62]

Chinasat-8. Meanwhile, Loral has reportedly encountered a delay in obtaining approval from the Department of State for the export to China of the Chinasat-8 satellite, the subject of the latest Presidential waiver in February 1998, which started this controversy.[63] In a full-page ad in the May 6, 1998 *Washington Post*, Loral had boasted that Chinasat-8 is the "most powerful satellite China has ever purchased." Chinasat-8 had been scheduled for launch in May 1999. The PRC government entity buying the satellite is the China Telecommunications Broadcast Satellite Corporation, subordinate to the Ministry of Information Industry (MII).[64] The MII represents a PRC defense industrial sector that was formed in March 1998 in a reorganization that merged the Ministry of Electronics Industry and the Ministry of Posts and Telecommunications.[65] Loral's chairman, Bernard Schwartz, argued that the government's delay in granting a technical assistance agreement (TAA) for Chinasat-8 risks the "commercial viability" of the whole U.S. satellite manufacturing industry in Asia.[66] The trade publication, *Space News*, alleged in September 1999 that "the State Department is delaying approval of the Chinasat 8 TAA to punish Loral for the still unproven allegation that the company broke the law while participating with Hughes in an independent review of a Chinese launch accident investigation." It also protested that "the export licensing process should not be used as a substitute for the judicial system."[67]

On May 10, 1999, as required by section 1512 of the FY 1999 National Defense Authorization Act (P.L. 105-261), President Clinton issued certifications for the export of satellite fuels and separation systems for the Iridium satellite project (owned by Motorola). He certified that the export is not detrimental to the U.S. space launch industry and that the material and equipment, including any indirect technical benefit

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[61] Cloud, David S., "Hughes' Sale of a Satellite to China is Imperiled by Concerns at Pentagon," *Wall Street Journal*, February 22, 1999; Jeff Gerth and David E. Sanger, "Citing Security, U.S. Spurns China On Satellite Deal," *New York Times*, February 23, 1999.

[62] "Singapore Customer Drops Hughes After Export License Delay," *Aerospace Daily*, April 15, 1999.

[63] *Space News*, April 12 and 26, 1999.

[64] Lawrence, Susan V., "Clipping Their Wings," *Far Eastern Economic Review*, April 8, 1999.

[65] Defense Intelligence Agency, "China's International Defense-Industrial Organizations," Defense Intelligence Reference Document DI-1921-60A-98, June 1998.

[66] Silverstein, Sam, "Loral: Chinasat Delay Threatens U.S. Suppliers' Credibility in Asia," *Space News*, August 23, 1999.

[67] "Free Chinasat 8," (commentary), *Space News*, September 6, 1999.

that could be derived from such export, will not measurably improve PRC missile or space launch capabilities.[68]

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[68]Jefferson, William J., "Certification Regarding Export of Satellite Fuels to China," *Congressional Record*, May 11, 1999, p. H2955; S5029.

Chronology

Note:[69]

Date	Event
1988	
9/9/88	The Reagan Administration notified Congress that it will approve the first export licenses for the use of PRC space launch services (for one Asiasat and two Aussat satellites), subject to conditions.
12/17/88	The United States and China signed agreements to establish technology safeguards on launching satellites from China and on insurance liability; and initialed an agreement on international commercial launch services.
1989	
Jan. 1989	The United States and China signed an agreement for six years under which China agreed to charge prices for commercial launch services "on a par" with Western competitors and to allow China to launch nine U.S.-built satellites through 1994.
6/4/89	Crackdown on peaceful, political demonstrators in Beijing.
12/19/89	President Bush waived sanctions for export of Aussat-1, Aussat-2, and Asiasat communications satellites for launch from China, under sec. 610 of the Department of Commerce, Justice, and State, the Judiciary, and Related Agencies Appropriations act 1990 (P.L. 101-162).
1990	
2/16/90	P.L. 101-246 enacted to require post-Tiananmen sanctions, including suspensions in approving exports to China of Munitions List items and satellites.
4/7/90	China Great Wall Industry Corporation, using a LM-3 rocket, launched a foreign satellite, Asiasat (built by Hughes), for the first time.
1991	
4/30/91	President Bush waived sanctions under Sec. 902(b) of P.L. 101-246 to allow exports of Aussat-1 and -2 and Freja satellites for launch from China in part because China was not the end-user. President Bush denied a license to export U.S. satellite components for a PRC

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[69] For overview of U.S.-China relations, see CRS Report 97-484, *China-U.S. Relations: Chronology of Developments During the Clinton Administration*, by Kerry Dumbaugh.

satellite, Dongfanghong-3, citing "serious proliferation concerns." In addition, *Space News* (May 6-12, 1991) reported that President Bush's denial was to punish China for attempting to obtain classified missile-related technology. The license to export parts for Dongfanghong-3 was requested by a German firm, but the U.S. components were produced by M/A-COM, Inc. (Burlington, MA).

6/16/91 The Bush Administration announced sanctions to be imposed on China for transferring missile related technology to Pakistan. The sanctions affected high technology trade with China, covering (1) high performance computers, (2) satellites for launch from China (except for the Freja and Aussat satellites), and (3) sanctions for missile proliferation as required by the Arms Export Control Act and Export Administration Act (imposed on China Great Wall Industry Corp. and China Precision Machinery Import/Export Corp.). The U.S. sanctions were intended to enforce the MTCR.

6/25/91 The sanctions on the two PRC state-owned companies for missile proliferation in Pakistan took effect.

11/21/91 After Secretary of State James Baker visited Beijing, the PRC foreign ministry issued a vague statement that China "intends to abide" by the MTCR.

1992

2/1/92 According to the Bush Administration, the PRC foreign minister sent a secret letter to the U.S. Secretary of State promising to abide by the MTCR.

2/22/92 The PRC foreign ministry issued a statement saying that "China will act in accordance with the guidelines and parameters of the existing missile and missile technology control regime in its export of missiles and missile technology," after the United States effectively lifts the June 1991 sanctions.

3/22/92 Aborted launch of Aussat (Optus-B1) satellite from China after LM-2E rocket malfunctioned and the rocket stalled on the launch pad. *Beijing Review* (Nov. 2-8, 1992) reported that the rocket's malfunction was caused by a fault in the ignition system which triggered an emergency shut-down.

3/23/92 The Bush Administration effectively waived the sanctions imposed in June 1991 on China for missile proliferation.

8/14/92 China successfully launched the Optus-B1 satellite (built by Hughes).

9/11/92 President Bush waived sanctions under P.L. 101-246 to allow exports of five satellites (Asiasat-2, Apsat, Intelsat-7A, Starsat, and AfriStar) for launch from China and parts for China's Dongfanghong-3.

10/23/92 Under the Bush Administration, the State Department issued a rule to amend section 38 of the Arms Export Control Act. The rule transferred commercial communications satellites that do not have certain sensitive characteristics (under nine categories) to the export licensing control of the Commerce Department. Military satellites and communications satellites with any of the nine categories of sensitive characteristics remained on the State Department's Munitions List.

Nov. 1992 China may have supplied M-11 short-range ballistic missiles or related technology to Pakistan, according to President Clinton's report to Congress submitted in May 1993. This transfer may have been taken in retaliation for President Bush's decision in September 1992 to sell F-16 fighters to Taiwan.

12/21/92 A PRC LM-2E launch vehicle exploded and destroyed the Australian Optus-B2 satellite (built by Hughes) it was carrying. After the explosion, PRC officials denied that PRC rockets were responsible, blaming the satellite built by Hughes. *Aviation Week and Space Technology* (Jan. 30, 1995) reported that Hughes and China Great Wall Industry Corp. agreed to declare the cause of that failure to be undetermined. Some experts, however, reportedly identified the premature opening of the launch vehicle's payload fairing as causing the accident.

1993

2/11/93 After renegotiating security procedures, the United States and China signed a new agreement on satellite technology safeguards, superseding the agreement of 12/17/88.

5/28/93 President Clinton decided to extend most-favored-nation trade status to China with conditions on human rights, but no linkage to weapons proliferation. Nonetheless, after persistent reports that China was continuing to transfer missile components to Pakistan — if not complete M-11 short-range ballistic missiles, the President also reported to Congress that "at present, the greatest concern involves reports that China in November 1992 transferred MTCR-class M-11 missiles or related equipment to Pakistan."

7/2/93 President Clinton waived sanctions under P.L. 101-246 to allow exports to China of Iridium and Intelsat-8 satellites for launch from China.

8/16/93 Hughes and CGWIC issued a joint statement after seven months of "vigorous and cooperative investigation" into the cause of the explosion on 12/21/92. The statement did not identify a cause, with each side denying blame.

8/24/93 The Clinton Administration determined that China had shipped M-11 related equipment (not missiles) to Pakistan and imposed sanctions

required by the Arms Export Control Act and Export Administration Act. The sanctions were imposed on Pakistan's Ministry of Defense and 11 PRC defense industrial aerospace entities, including China Great Wall Industry Corp. The Category II sanction denied U.S. government contracts and export licenses for missile equipment or technology (items in the MTCR annex) for two years. The Department of State argued that the sanction banned all licenses for satellite exports, but the Department of Commerce argued that the sanction did not cover satellites.

8/26/93 The U.S. aerospace industry lobby, including the Aerospace Industries Association, called on the Clinton Administration to weaken the missile proliferation sanctions.[70]

8/31/93 One week after imposing sanctions, Assistant Secretary of State Winston Lord said that "we're ready at any time to sit down with the Chinese, both to try to find a way to lift the sanctions if they cooperate but also to explain more fully the MTCR and its revised guidelines."

9/25/93 National Security Adviser Anthony Lake told the PRC ambassador that the Clinton Administration was willing to negotiate a waiver of the sanctions, but a more formal and binding PRC commitment than the one made in November 1991 was needed.

10/20/93 The *Washington Post* reported that top executives of U.S. satellite manufacturers, Martin Marietta Corp. and Hughes Aircraft Co., were lobbying intensively for the Clinton Administration to waive the export ban for satellites. Reportedly due to these objections from private industry (which were supported by the Commerce Department), the National Security Council (NSC) reviewed the decision to implement the sanctions. In September 1993, Norman R. Augustine, chairman of Martin Marietta, wrote a letter to Vice President Al Gore, arguing that the sanctions "present U.S. companies as an unreliable supplier." Some Members of Congress supported the export of satellites for launch from China.

11/9/93 The CEO of Hughes Aircraft Company, C. Michael Armstrong, delivered a speech in which he objected to the inclusion in the sanctions of commercial communications satellites. He also said that he "asked the President of the United States to review the situation."

11/16/93 National Security Adviser Anthony Lake wrote a memo to President Clinton proposing the NSC's interpretation of the sanctions imposed in August to allow the export of two satellites controlled by the

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[70]"Statement by Don Fuqua, President of the Aerospace Industries Association, on the Imposition of U.S. Economic Sanctions on China," August 26, 1993; Steven Greenhouse, "Aerospace Industry Seeks Weaker Sanctions on China," *New York Times*, August 28, 1993.

Commerce Department, but not the five controlled by the State Department. State had argued that all satellite licenses were suspended under the sanctions, but Commerce argued that sanctions did not cover any licenses. The President approved the NSC's recommendation.

11/19/93 President Clinton met with PRC President Jiang Zemin at the Asian Pacific Economic Cooperation (APEC) meeting in Seattle. On the eve of the meeting, press reports said that the Administration had formally proposed waiving the sanctions in return for another PRC promise, in more detail and with more authority, not to export MTCR-class missiles.

1994

1/6/94 The Clinton Administration announced a new policy exempting commercial communication satellites from sanctions for missile proliferation imposed on 8/24/93, facilitating export licenses for one Hughes and two Martin Marietta satellites.

4/2/94 A PRC weather satellite exploded in a plant.

7/13/94 President Clinton waived sanctions under P.L. 101-246 for the Echostar satellite to be exported for launch from China.

7/21/94 A PRC LM-3 rocket launched the Apstar-1 satellite (built by Hughes).

8/28/94 A PRC LM-2E rocket launched Australia's Optus-B3 satellite (built by Hughes).

Sept. 1994 Secretary of Commerce Ron Brown led trade delegation to China, including Bernard Schwartz, Loral's chairman.

10/4/94 Secretary of State Warren Christopher and Foreign Minister Qian Qichen issued a joint statement in which the United States agreed to waive the August 1993 sanctions (for missile proliferation) and China agreed not to export "ground-to-ground missiles" that are "inherently capable" of delivering at least 500 kg to at least 300 km (an important understanding meant in part to include the M-11 missiles under the MTCR guidelines).

11/1/94 The Administration's waiver of the sanctions for missile proliferation took effect.

11/30/94 China launched its Dongfanghong-3 satellite, but failed to launch it into the correct position due to a fuel leak.

Dec. 1994 President Clinton selected Armstrong of Hughes to head the Export Council.

1995

1/26/95 — A PRC LM-2E launch vehicle exploded after liftoff, destroying the Apstar-2 satellite (built by Hughes) it was carrying. Hughes and China Great Wall Industry Corporation were reported as planning to determine the cause of the explosion. (*Aviation Week and Space Technology*, Jan. 30, 1995)

2/9/95 — The *Wall Street Journal* reported that PRC aerospace industry officials contradicted an official PRC newspaper's account that blamed Hughes for the explosion on January 26, 1995. Instead of blaming Hughes, as *Ta Kung Pao* (in Hong Kong) did, officials from China Great Wall Industries Corp. and the China National Space Administration said that the article did not reflect China's official view and that the investigation had not concluded. A spokesman for Hughes said that a thorough investigation into the cause of the explosion would take months to complete.

3/13/95 — The United States and China concluded a new agreement for 7 years to allow China to launch up to 11 new satellites to geostationary orbit at prices not less than 15 percent below that charged by Western competitors.

7/21-28/95 — The PLA Second Artillery test-fired M-9 short-range ballistic missiles toward Taiwan, after Taiwan's president visited Cornell University in June.

7/25/95 — Hughes and CGWIC issued a joint statement on separate findings of six-month investigations into the cause of the explosion on 1/26/95. CGWIC blamed strong winds for shaking Hughes' satellite apart, while Hughes said that severe winds caused the PRC rocket's fairing to collapse.

8/15/95 — Hughes provided to the Department of Commerce the final report on the investigation of the launch failure of Apstar-2. The report included a summary of information conveyed to China Great Wall during several meetings that took place from February to June 1995.

10/9/95 — Secretary of State Warren Christopher initialed a classified memorandum to retain the State Department's licensing authority over commercial communications satellites (cited in *New York Times*, May 17, 1998).

11/28/95 — A PRC LM-2E rocket launched the Asiasat-2 satellite (built by Martin Marietta), but the bumpy launch knocked the satellite's antenna-feed horns out of alignment, resulting in a loss of signal power. Asiasat company claimed $58 million in insurance for the damage. (*Flight International*, Oct. 2-8, 1996).

12/6/95	President Clinton issued Executive Order 12981 giving the Departments of State, Defense, and Energy, and the Arms Control and Disarmament Agency authority to separately review export license applications submitted to the Department of Commerce under the Export Administration Act and relevant regulations.
12/28/95	A PRC LM-2E rocket launched the Echostar-1 satellite (built by Martin Marietta).
1996	
2/6/96	President Clinton waived sanctions under P.L. 101-246 for the Chinasat-7 satellite to be exported for launch from China.
2/6/96	President Clinton waived sanctions under P.L. 101-246 for 2 Cosat (later called Chinastar) satellites to be exported for launch from China.
2/6/96	President Clinton waived sanctions under P.L. 101-246 for the Mabuhay satellite to be exported for launch from China.
2/15/96	A LM-3B rocket exploded after liftoff, destroyed the Intelsat-708 satellite (built by Loral), and smashed into a village. The death toll was probably higher than the official report of six deaths and 57 injured.
3/8-15/96	Despite the dramatic explosion of a PRC rocket one month before, the PLA's Second Artillery again test-fired M-9 short-range ballistic missiles toward targets close to Taiwan's ports, on the eve of Taiwan's first presidential election.
3/10-11/96	In further deterioration of U.S.-China relations, the United States deployed two carrier battle groups to waters off Taiwan, calling China's live-fire exercises "reckless" and "risky."
3/12/96	President Clinton approved a memo written by then deputy national security adviser Samuel R. Berger to reverse Secretary Christopher's decision of October 1995 and transfer export control authority over commercial satellites from the State Department to the Commerce Department (*New York Times*, July 18, 1998).
3/14/96	The Clinton Administration announced a decision to move commercial communications satellites from the Munitions List to the Commerce Control List of dual-use items, so that the export license jurisdiction was moved from the Department of State to the Department of Commerce (implemented in November 1996).
March 1996	The CIA had a classified cable on an American consultant, Bansang Lee, who worked for Hughes and later Loral, and possible payments exchanged between him and PRC aerospace executives, but the CIA

did not pass the cable to the Justice Department until 1998 (*New York Times*, December 24, 1998).

April 1996 — A CIA analyst, Ronald Pandolfi, had reportedly prepared a National Intelligence Estimate (NIE) on how Hughes may have helped improve China's missile capabilities in reviewing the explosion of a Long March rocket in January 1995, but the CIA did not approve the NIE (*New York Times*, December 7, 1998).

April 1996 — At China's request, Dr. Wah L. Lim, then a senior vice president and engineer at Loral, chaired a review committee to study China's technical evaluation of the cause of the accident on Feb. 15, 1996. Loral says China had identified the problem as residing in the inertial measurement unit (IMU) of the guidance system of the rocket. Loral believed that it did not have to request a U.S. government license and monitoring. The first meeting was held in Palo Alto, CA, and the second, in China. PRC engineers participated in the two meetings.

5/7/96 — A draft preliminary report of Loral's review committee was sent to all participants of the meetings. The report confirmed that the cause of the accident was an electrical flaw in the electronic flight control system. The report allegedly discussed weaknesses in the PRC rocket's guidance and control systems (*New York Times*, April 13, 1998).

5/10/96 — Loral's executive in charge of export controls told Dr. Wah Lim not to send the report to China.

5/13/96 — Loral's executives provided the report to the Departments of State and Defense.

6/17/96 — Loral provided a voluntary disclosure to the Department of State, concerning all communications with China. The company argues that its policy of consultation with the Department of State was not implemented, but it did not violate U.S. laws.

6/23/96 — President Clinton waived sanctions under P.L. 101-246 for the Asia Pacific Mobile Telecommunications (APMT) satellite to be exported for launch from and use by China.

7/3/96 — China launched the Apstar-1A satellite (built by Hughes) on a LM-3 rocket.

7/9/96 — President Clinton waived sanctions under P.L. 101-246 for a Globalstar satellite to be exported for launch from China.[71]

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[71] China Telecom will invest $37.5 million to become a full partner in Globalstar, according to *Aviation Week & Space Technology*, October 5, 1998.

8/18/96	China failed to launch its Chinasat-7 satellite (built by Hughes) into the correct orbit, after the third stage of the LM-3 rocket shut down early, reported the *Far Eastern Economic Review* (Aug. 29, 1996).
10/15/96	President Clinton issued an Amendment to Executive Order 12981 (issued on 12/6/95) concerning export licensing procedures for commercial communications satellites and hot-section technologies for commercial aircraft engines that are transferred from the State Department's Munitions List to the Commerce Department's Commerce Control List (of dual-use items).
10/21/96	The Bureau of Export Administration of the Department of Commerce issued regulations to implement the transfer of commercial satellites from control under the Munitions List to the Commerce Control List.
11/5/96	The Department of State issued regulations to implement the transfer of commercial satellites from control under the Munitions List to the Commerce Control List, even if the satellites include individual components or technologies on the Munitions List.[72]
11/19/96	President Clinton waived sanctions under P.L. 101-246 for U.S. parts for the PRC Fengyun-1 (FY-1) meteorological satellite. The waiver cited suspensions under sections 902(a)(3) and 902(a)(5), indicating that technologies controlled under the Munitions List were involved.
11/23/96	President Clinton waived sanctions under P.L. 101-246 for the Sinosat satellite to be exported for launch from China. The waiver cited suspensions under sections 902(a)(3) and 902(a)(5), indicating that technologies controlled under the Munitions List were involved.
1997	
March 1997	The Air Force's National Air Intelligence Center (NAIC) reportedly concluded in a classified report that Loral and Hughes provided expertise that helped China to improve the guidance systems on its ballistic missiles and that U.S. national security was damaged (*Washington Post*, June 7, 1998). NAIC's report was sent to DTSA, the State Department, and the Justice Department.
5/12/97	China successfully launched its Dongfanghong-3 communications satellite, built by China Aerospace Corp. on a LM-3A rocket, prompting personal congratulations from top government and military leaders.

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[72] Also see GAO report GAO/NSIAD-97-24, *Export Controls: Change in Export Licensing Jurisdiction for Two Sensitive Dual-Use Items*, January 1997.

5/16/97	A classified report at DTSA concluded that Loral and Hughes had transferred expertise to China that significantly enhanced the reliability of its nuclear ballistic missiles and "United States national security has been harmed" (*New York Times*, April 13, 1998 and June 27, 1998).
May 1997	The U.S. Trade Representative (USTR) reported that China had violated the pricing provisions of a bilateral agreement on the Mabuhay launch.
6/10/97	China successfully launched its Fengyun-2, a second-generation PRC meteorological satellite, on a LM-3 rocket.
8/19/97	China launched the Agila 2 (formerly called Mabuhay) satellite (built by Loral).
9/1/97	China launched two test satellites for Iridium to demonstrate the technical viability of the new Long March variant, LM-2C/SD.
9/10/97	The *Washington Times*, citing Israeli and U.S. intelligence sources, reported that China Great Wall Industry Corporation was supplying key telemetry equipment (for sending and collecting guidance data during flight tests) to Iran for its development of the Shahab-3 and Shahab-4 medium-range ballistic missiles.
Sept. 1997	Likely prompted by DTSA's report, the Department of Justice began its criminal investigation into allegations that Loral and Hughes illegally passed technical assistance to China. The investigation is still ongoing.
10/17/97	China launched Asia Pacific Telecommunications Satellite (ApStar-2R) (built by Loral) on LM-3B rocket.
10/27/97	The USTR announced that the United States and China agreed on new provisions for the Bilateral Agreement on Space Launch Services (signed in 1995). The new provisions set clear terms for PRC pricing of launch services to low earth orbit.
11/2/97	After a summit in Washington, PRC President Jiang Zemin toured a Hughes satellite plant in Los Angeles, California.
12/8/97	China launched two satellites for Iridium (built by Motorola) on one Long March 2C/SD rocket to low earth orbit. The rocket had two stages and a "smart dispenser" on top that deployed the two satellites.
1998	
2/12/98	National Security Adviser Samuel Berger wrote a memorandum for President Clinton on whether to waive post-Tiananmen sanctions for the export of a Loral-built Chinasat-8 satellite. Berger noted that the Department of State, with the concurrence of the Department of

Defense and the Arms Control and Disarmament Agency, recommended the waiver. However, "the Criminal Division of the Justice Department has cautioned that a national-interest waiver in this case could have a significant adverse impact on any prosecution that might take place, based on a pending investigation of export violations" by Loral. (printed in the *New York Times*, May 23, 1998)

2/18/98 President Clinton waived sanctions under P.L. 101-246 for the Chinasat-8 satellite (built by Loral) to be exported to China. Loral says that it is the most powerful satellite that China has ever bought.

3/12/98 Gary Samore, Special Assistant to the President and Senior Director for Nonproliferation and Export Controls in the National Security Council, wrote a Secret memo proposing to support PRC membership in the MTCR, issue a "blanket waiver" of the post-Tiananmen sanctions to cover all future satellite launches, and increase the number of space launches from China — in return for PRC cooperation in missile nonproliferation. (The classified memo was printed in the March 23, 1998, *Washington Times*.)

3/16/98 Loral Space and Communications signed an agreement with China Great Wall Industry Corp. to launch five of Loral's communication satellites between March 1998 and March 2002 using Long March-3B rockets.

3/22/98 China Aerospace Corp. kicked off a Quality Promotion Plan to help ensure success in its commercial launch business in research, production, and testing.

3/26/98 China launched two Iridium satellites, built by Motorola, on a LM-2C/SD rocket. (According to China, this launch was China's 15th "successful" commercial launch for foreign customers since 1990.)

3/26/98 John Holum, Acting Under Secretary of State for Arms Control and International Security Affairs, concluded his visit to China and confirmed that he discussed increasing the quota on the number of satellite launches from China.

3/29/98 A Hong Kong newspaper owned by the PRC government reported that China Aerospace Corporation found in its investigations into past failed launches of satellites that all the failures were caused by problems in production and management related to quality control. A previous explosion of an LM-3B rocket (on 2/15/96) was found to have been caused by a defect in a power pack nodal point which caused a short circuit when the rocket ignited, resulting in a malfunction in the inertial platform.

4/3/98 China's official news agency quoted Zhang Haiming, general-manager of a division of Lockheed Martin, as saying that the company is "consulting with the PRC on satellite manufacturing."

4/4/98 The *New York Times* reported that a Federal grand jury is investigating whether Loral Space and Communications of New York and Hughes Electronics of Los Angeles provided expertise to China that "significantly advanced" the guidance systems of its ballistic missiles in studying the accidental destruction in February 1996 of a satellite built by Loral. Administration officials reportedly said that the Department of Justice, fearing that its criminal investigation would be undermined, opposed the President's February 1998 waiver and approval for export of similar technology to China (for Chinasat-8). Loral's chief executive was reported as the largest personal donor to the Democratic National Committee for the 1996 election.

4/9/98 John Holum, Acting Undersecretary of State for Arms Control and International Security Affairs, stressed that exports of satellites to China for launch occur with an export license and strict security measures to "preclude assistance to the design, development, operation, maintenance, modification or repair of any launch facility or rocket in China, and we monitor that very carefully." He also confirmed that after the accident in February 1996, the Department of State "became aware that there may have been a violation." The case was referred to the Department of Justice for investigation. He said that there are "strong legal remedies" for violations of export control laws, including a denial of future licenses.

4/13/98 The *New York Times* again reported on the criminal investigation of Loral and Hughes, adding that a highly classified Pentagon report concluded in May 1997 that the companies had transferred expertise to China that "significantly improved" the reliability of China's nuclear ballistic missiles.

4/15/98 Loral's president and chief operating officer, Gregory Clark, stated that Loral "did not divulge any information that was inappropriate."

4/16/98 A PRC Foreign Ministry spokesman stated that "the exchange of technical information about satellite launchings between U.S. companies and the PRC aerospace department was a normal activity and fell under international rules." He also said that the companies "did not provide technical information about missile technology."

4/21/98 Loral's chairman and CEO, Bernard Schwartz, said that "we have done our own internal investigation, and I'm satisfied that our people acted well — good behavior and in compliance [with U.S. export control regulations]."

4/28/98 Under Secretary of Commerce for Export Administration William Reinsch testified to the Joint Economic Committee that satellite exports to China have shown how effective dual-use export controls allow U.S. exporters to compete and "win without risk to our national security." He said that controls on satellite exports to China are extensive and include measures to "reduce the risk" of illicit

technology transfers. Since November 1996 (when the licensing jurisdiction was transferred from the Department of State to Commerce), Commerce issued three export licenses for satellites to be launched from China — "with the concurrence of all agencies."

4/30/98 — A spokesman at the State Department, James Foley, denied a *Washington Times* report that the Administration presented China with a draft agreement for space cooperation. He admitted, however, that officials have considered scientific space cooperation as one way to encourage PRC cooperation in missile non-proliferation. He also stressed that "there still is not any U.S. plan or proposal to offer China access to missile technology."

5/2/98 — A PRC Long March 2C/SD rocket launched two Iridium satellites (built by Motorola) to low earth orbit.

May 1998 — The Justice Department began a preliminary inquiry into whether political donations influenced President Clinton's approval of satellites to China.

5/15/98 — The *New York Times* reports that fund-raiser Johnny Chung told the Justice Department that part of his donations to the Democratic Party in the summer of 1996 came from the PLA through Liu Chaoying, a PLA lieutenant colonel and a senior manager and vice president for China Aerospace International Holdings, Ltd. (a subsidiary of China Aerospace Corporation in Hong Kong). She is also a daughter of retired General Liu Huaqing, formerly a vice chairman of the PLA's command, the Central Military Commission, and formerly a member of the Standing Committee of the Politburo.

5/18/98 — Loral issued a statement saying that allegations that it provided missile guidance technology to China are false. The company states that "the Chinese alone conducted an independent investigation of the launch failure [in February 1996] and they determined that the problem was a defective solder joint in the wiring — a `low-tech' matter." Loral denied that it and Hughes conducted an independent investigation to determine the cause of that launch failure. It was at the insistence of insurance companies, which required non-PRC confirmation of resolutions of problems with Long March rockets, that Loral formed a committee of several satellite companies, including Hughes, to review the PRC investigation. However, Loral admitted that, contrary to its policies, "the committee provided a report to the Chinese before consulting with State Department export licensing authorities." Loral adds that it is in full cooperation with the Justice Department in its investigation and with Congressional committees. Loral concludes that based upon its own review, it "does not believe that any of its employees dealing with China acted illegally or damaged U.S. national security." In addition, the statement says that Loral's chairman, Bernard Schwartz, was not personally involved in any aspect of this matter. "No political favors or benefits of any kind were requested or

extended, directly or indirectly, by any means whatever." Loral also denies any connection between the launch failure in February 1996 and the Presidential waiver for another Loral-built satellite in February 1998. The export license for the latest launch (for Chinasat-8) "applied the strictest prohibitions on technology transfer and specified that any new launch failure investigation would require a separate license." Loral stresses that it complies strictly with export control laws and regulations.

5/30/98 — China launched its Chinastar-1 (Zhongwei-1) (built by Lockheed Martin) on a LM-3B rocket.

June 1998 — The Justice Department expanded its investigation to examine whether Hughes violated export control laws in transmitting a report to China on the failure on January 26, 1995 that destroyed the Apstar-2 satellite. The Commerce Department had approved Hughes' report.

6/18/98 — The House voted on H.Res. 463 to create the Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China (chaired by Rep. Cox). The committee was comprised of five Republicans and four Democrats.

7/2/98 — The State Department suspended the license issued in 1996 to Hughes that permitted Shen Jun, son of a PLA lieutenant general, to work on a $450 million satellite deal for the APMT consortium.

7/7/98 — A DTSA official, Michael Maloof, wrote a memo about his concerns that the PRC military has used U.S.-made satellites to improve its encrypted command, control, communications, and intelligence (C4I), using the Asiasat and Apstar satellites built by Hughes.

7/18/98 — China launched its Sinosat-1 (built by French companies, Alcatel and Aerospatiale) on a LM-3B rocket.

8/19/98 — A PRC Long March 2C/SD rocket launched two replenishment satellites for Iridium (owned by Motorola).

9/17/98 — Conferees on the National Defense Authorization Act for FY 1999 (H.R. 3616) agreed to transfer the export licensing authority over commercial satellites back to the State Department, among other provisions, but did not ban further satellite exports to China.

Sept. 1998 — A CIA analyst, Ronald Pandolfi, briefed the Senate Intelligence Committee on what he found in 1995 about Hughes' review of the explosion of a Long March rocket in January 1995. The CIA then reportedly alerted Hughes about Pandolfi's briefing.

10/17/98 — President Clinton signed the National Defense Authorization Act for FY 1999 (P.L. 105-261), but said he "strongly opposed" the

provisions on shifting controls over satellite exports back to the Department of State.

11/16/98 China Great Wall Industry Corp. failed to receive bids and information from any U.S. satellite manufacturers for a PRC proposal to set up a joint satellite production facility, in part because of Congressional concerns over sensitive technology transfers (*Space News*, November 23-29, 1998).

11/20/98 The Department of Commerce notified Congress, as required in FY 1999 appropriations legislation (P.L. 105-277), that it is processing two applications for licenses to export satellites to China.

Dec. 1998 CIA officials agreed to testify before a federal grand jury in Washington in the Justice Department's unusual criminal investigation into whether the CIA obstructed justice when it allegedly warned Hughes about the Senate Intelligence Committee's interest in some of its employees. The investigation began at the request of that committee (*Washington Post*, December 5, 1998).

12/7/98 *Aviation Week & Space Technology* reports that the Department of Commerce granted permission for the launch of the APMT satellite to proceed.

12/7/98 DOD issued an initial assessment of documents provided by the Department of Commerce in July 1998 on Hughes' review the January 1995 launch failure (for Apstar-2). The report prepared by DTSA and NAIC concluded that Hughes provided information to China that potentially helped its missile program and violated standards of not improving PRC satellite and missile capabilities.

Dec. 1998 The Departments of Defense and State began a study after the December 7, 1998 Pentagon report on Hughes' technical exchanges with China in 1995. The follow-up study will assess any military benefit to China of the technical exchanges.

12/9/98 The chairmen of six House and Senate Committees (National Security, Armed Services, International Relations, Foreign Relations, and Intelligence) wrote a letter to President Clinton, warning against "direct contravention" of legislation passed by Congress to have the State Department regain control over the export of satellites.

12/15/98 The *New York Times* reports that the Department of Justice's investigation of China's role in the political campaigns of 1996 has found new evidence that the PRC goal was acquisition of U.S. high technology, especially that with military uses.

12/18/98 The State Department's Office of Defense Trade Controls (DTC) completed a sensitive but unclassified report, concluding that Hughes, in reviewing the January 1995 launch failure of Apstar-2, provided

technical lessons that are "inherently applicable" to PRC missile as well as satellite launch programs. (Printed in the Cox Committee's report, volume II, p. 76-84)

12/19/98 A PRC Long March 2C/SD rocket launched two replenishment satellites for Iridium (owned by Motorola).

12/30/98 The House Select Committee on technology transfers to China unanimously approved a classified report on its six-month investigation. According to Rep. Cox and Dicks, the chair and ranking Democrat, PRC technology acquisitions, not only that associated with satellite launches, have harmed U.S. national security.

1999

1/6/99 The House extended the Select Committee on China for three months in the 106th Congress to work on the declassification of its report.

1/14/99 Under Secretary of Commerce William Reinsch said in a speech that the Cox Committee is a good example of those in Congress who "do not understand" the "political and economic transformations" in recent years and "respond to them by trying to return to the simpler era of the Cold War and a single bipolar adversary. Only this time, it is China."

1/21/99 The Secretary of State submitted her plan to Congress on regaining licensing authority over satellites on March 15, 1999, as required in section 1513(d) of the National Defense Authorization Act for FY 1999.

2/1/99 The NSC issued a 32-page, unclassified response to the House Select Committee's recommendations.

2/1/99 As required in FY 1999 appropriations legislation (P.L. 105-277), Commerce again notified Congress (after the Nov. 20, 1998 notice) that it is processing three additional applications to export satellites to China. The total of five satellite projects under consideration were: Chinasat-8R, APMT, Asiasat-3sb/4, Command and Control Software for Satellites, and Iridium.

2/1/99 The Defense Secretary reported that China's military and civilian leaders are paying "specific attention" to the C4I infrastructure and that "the military's lack of communications satellites could force the PLA to rely on foreign satellite services to meet military needs in wartime or a crisis."

2/23/99 The Clinton Administration announced that it decided to deny approval to Hughes for the export of the APMT satellite, after the Departments of Defense and State voted against the Commerce

	Department's support for the export. The administration cited concerns that the end-user of the satellite would be the PLA.
3/8/99	The Department of Energy fired a U.S. scientist, Wen Ho Lee, who was allegedly involved in the third public case of nuclear weapon secrets disclosed to China (concerning the W-88 warhead), but the FBI has not charged him with any crime.
3/15/99	DCI George Tenet announced that he appointed retired Admiral David Jeremiah to conduct an independent review of the assessment of an inter-agency team on any damage to U.S. national security resulting from alleged leaks of nuclear weapon secrets to China.
3/15/99	The Department of State regained authority over the licensing of satellite exports, pursuant to the National Defense Authorization Act for FY 1999 (P.L. 105-261).
3/15/99	Hughes responded to the Administration's decision to deny an export license for the APMT satellite by asking for a detailed justification.
3/18/99	The Department of Commerce published a rule in the *Federal Register* on removing commercial communication satellites and related items from the Commerce Control List.
3/22/99	The Department of State published a rule in the *Federal Register* on reinstating commercial communication satellites on the Munitions List on March 15, 1999.
3/24/99	The House passed H.Res. 129 (Cox) to extend the Select Committee on China until April 30, 1999.
4/4/99	The *Los Angeles Times* reports that Democratic fund-raiser Johnny Chung told federal investigators that Liu Chaoying, executive of China Aerospace International Holdings, Ltd., helped to funnel $300,000 from General Ji Shengde, head of the PLA's intelligence department, to Chung for President Clinton's re-election campaign in 1996, but most of that money did not go to the Democratic Party.
4/14/99	Hughes reported that the APMT consortium dropped Hughes as the satellite supplier, after it failed to obtain the export licenses.
April 1999	Loral has reportedly encountered a delay in obtaining approval from the Department of State for the export to China of the Chinasat-8 satellite, the subject of the latest Presidential waiver in February 1998, which started this controversy.
4/21/99	The Director of Central Intelligence reported to Congress and the White House on the Intelligence Community's damage assessment on PRC acquisitions of information on U.S. nuclear weapons.

4/22/99	Representatives Cox and Dicks briefed President Clinton on the findings of the Select Committee's report.
4/29/99	The House agreed to H. Res. 153 (Cox) to extend the Select Committee on China until May 14, 1999.
5/7/99	The Senate Select Committee on Intelligence released its report on security implications of U.S. satellite exports to China and on PRC political donations to U.S. political campaigns. The committee had approved the report on May 5, 1999, in a 16-1 vote, with Senate Graham dissenting. There are 10 recommendations related to the policy of satellite exports to China.
5/10/99	As required by section 1512 of the FY 1999 National Defense Authorization Act (P.L. 105-261), President Clinton issued certifications (for the Iridium satellite project) that the export of satellite fuels and separation systems is not detrimental to the U.S. space launch industry and that the material and equipment, including any indirect technical benefit that could be derived from such export, will not measurably improve PRC missile or space launch capabilities.
5/10/99	China launched two PRC satellites (Fengyun-1 weather satellite and Shijian-5 unspecified scientific satellite) using a LM-4B rocket for the first time.
5/13/99	The House approved H. Res. 170, on May 13, 1999, to extend the Select Committee on China until May 31, 1999.
5/25/99	The House Select Committee (Cox Committee) released the declassified version of its January 3, 1999 classified report on its investigation of U.S. technology transfers to China.
6/11/99	A LM-2C rocket launched two Iridium satellites (owned by Motorola).
10/5/99	The President signed into law (P.L. 106-65) the FY 2000 National Defense Authorization Act in which Congress addressed export controls relating to missile technology, satellites, and other issues.
10/14/99	A LM-4B rocket launched the China-Brazil Earth Resources Satellite (CBERS), or Zi Yuan-1.
11/20/99	A Long March 2F rocket launched the Shenzhou spacecraft in the PRC's first successful unmanned flight test of a manned spacecraft.
12/15/99	Four experts at Stanford University's Center for International Security and Cooperation issued a critique of the Cox Committee report. Alastair Iain Johnston, W. K. H. Panofsky, Marco Di Capua, and

Lewis R. Franklin, edited by M. M. May, "The Cox Committee Report: An Assessment," December 1999.

2000

1/25/00 A Long March 3A rocket launched a PRC Zhongxing-22 communications satellite.