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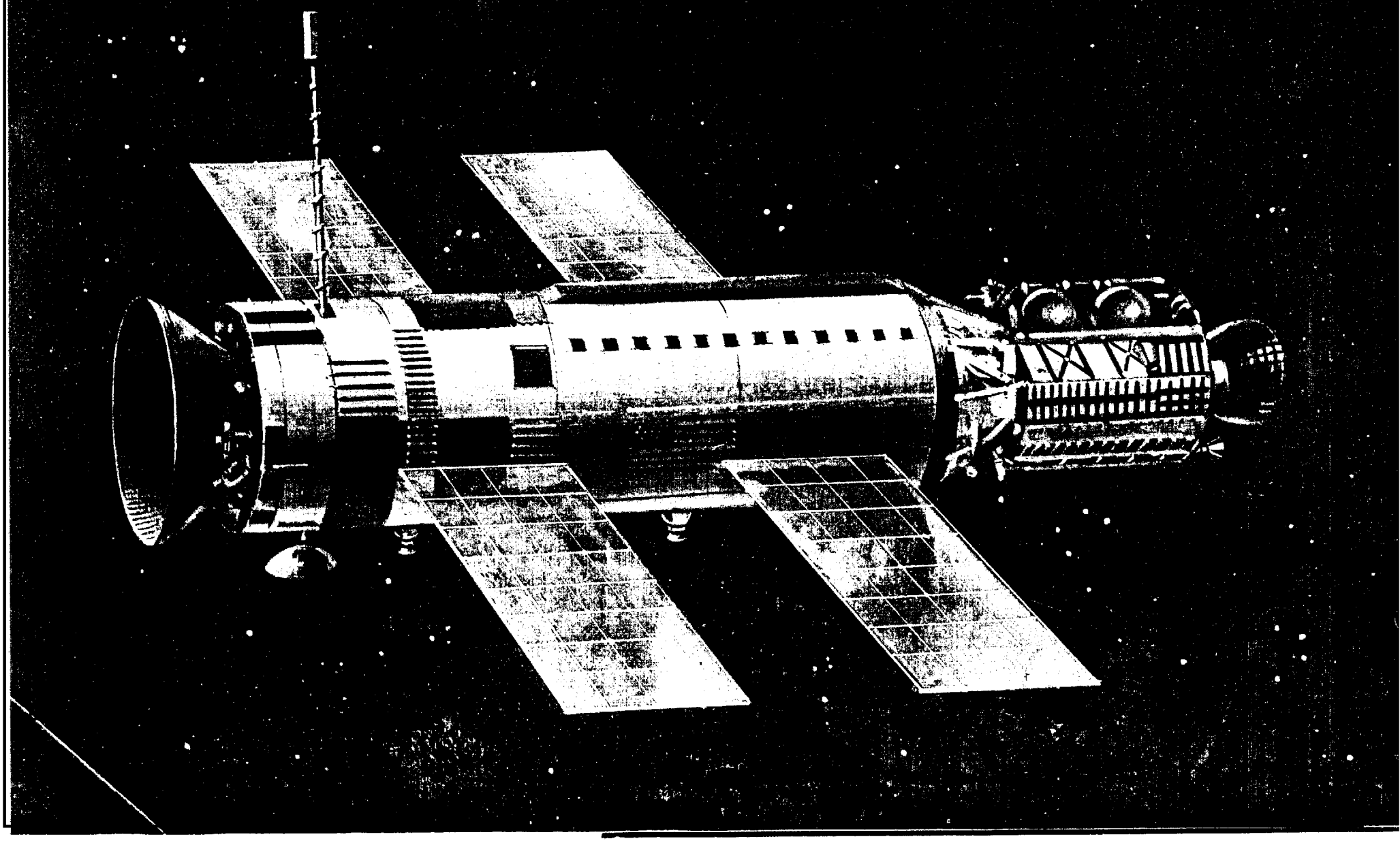

CPYRGHT

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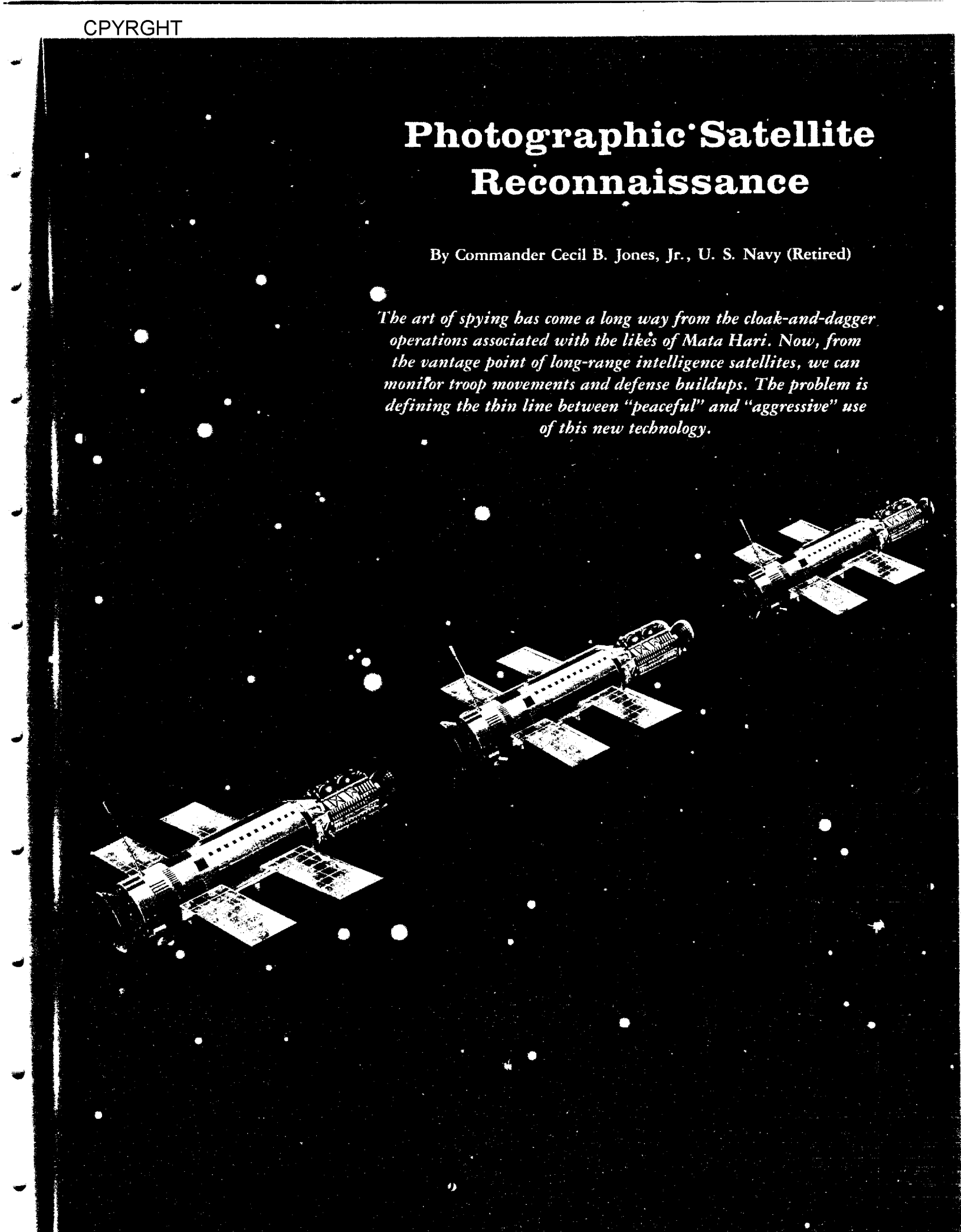
Photographic Satellite Reconnaissance

By Commander Cecil B. Jones, Jr., U. S. Navy (Retired)

The art of spying has come a long way from the cloak-and-dagger operations associated with the likes of Mata Hari. Now, from the vantage point of long-range intelligence satellites, we can monitor troop movements and defense buildups. The problem is defining the thin line between "peaceful" and "aggressive" use of this new technology.



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When President Jimmy Carter quietly, but officially, opened the closet door on one of the nation's most coveted intelligence collection systems in a Cape Canaveral speech on 1 October 1978, he publicly marked the beginning of the end of an era. His announcement was part of the preparation for the expected battle with the Senate over approval of the SALT II agreement. It was anticipated that the battle might eventually include the release of photographic satellite reconnaissance materials to establish both the verifiability of the provisions of the SALT II treaty and the reasonableness of some of the treaty's provisions. If this had occurred, the president may have had in mind a restricted use of these materials by the U. S. Senate. However, the House of Representatives probably would have insisted upon equal treatment, and once the process was started, the president may have been forced to go (or would have seen considerable advantage in going) to the general public with his supportive evidence.

The Iranian crisis and the Soviet invasion of Afghanistan froze the SALT approval process in the United States. The currently negotiated SALT II treaty is now more than likely a dead document. Whatever the timetable and in whatever manifestation arms control negotiations might resume, any administration of the future should anticipate a most difficult problem in gaining congressional approval of a SALT-type treaty. The pendulum swing away from accommodation toward confrontation strongly suggests that this will be the case. Another possibility is that any SALT approach is dead for many years to come, so that no administration will find it prudent to pursue this path. Instead, increasing tension and serious preparations for the use of force may cause the current or next administration to present, to the American public and the world, hard intelligence evidence that justifies the action being taken.

Whatever the basis, attempted accommodation or anticipated confrontation, if it happens, the taxpayer will have the opportunity to see examples of what has been one of the most valuable sources of strategic, scientific, and technical intelligence for 19 years: U. S. satellite intelligence collection systems. The degree of success in controlling specific knowledge about these systems has been high. The conviction of a former CIA employee, William P. Kampiles, of espionage in November 1978, when the court found him guilty of selling a top secret manual of one of the country's operational photo satellite systems, represents an important exception to this success. According to news accounts which cited unnamed "U. S. officials," the Soviets first learned that the KH-11 spy satellite was photographing their territory when they purchased a stolen copy of the satellite's manual. On 23 November 1978, *The Washington Post* reported, "The KH11 'was misclassified' by the Soviets as a nonphotographic satellite, . . . so they did not bother to try to hide sensitive weapons or operations from it when it passed overhead." News reports about the spy trial and the KH-11 revealed that KH was an abbreviation of the CIA code name. If correct, the selection of "Keyhole" to name a system that secretly and silently peeked down from space is apt. The code word was probably too suggestive to be openly used, so it was abbreviated. There is no way for anyone outside of the U. S. and Soviet intelligence communities to judge the claim that the Soviets did not recognize the KH-11 for what it actually was. The Soviets, however, with their large land-based optical and electronic systems, will probably be able to determine whether the manual they purchased for $3,000 is authentic or a U. S. plant in an attempt at misinformation.

A more important point is that the court effectively ruled to keep the American public from knowing what the Soviets know. Reporters covering the trial petitioned U. S. District Court Judge Phil M. McNagny to release all evidence submitted to the jury. A copy of the manual with certain parts censored was admitted into evidence, but Judge McNagny refused to release it to the media. Apparently the United States may have decided that it is unavoidable or even worthwhile for the Soviets to know about our capability in this field, but that such knowledge is not to be shared with our other enemies and the American public. This does not reflect a desire to keep the American public in the dark. There is no practical way of sharing with Americans and not with the rest of the world.

The problem for the government during the trial of Kampiles was to be able to make its case well enough to get a conviction without being placed in a position of revealing intelligence information beyond that alleged in the charges against the accused. Press interest was high, and reporters pressed for details and explanation of testimony. Compromise of the system's technical photographic capability may not have been the government's most serious concern. It would be highly upsetting if the compromised document enabled the Soviets to enter the satellite's command and control links in order to insert false data, cause the satellite to dump data upon command, or to cause system malfunctions.

As for the material which did reach the press, it may have been slightly confusing for the general reader. On 23 August 1978, the headline in *The Washington Post* was "CIA 'Big Bird' Satellite Manual

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Was Allegedly Sold to Soviets." The accompanying article described Big Bird as no more than five years old and reported that a dozen such satellites had been placed in orbit. Its photo capability was described as being so precise that it could pick out the makes of automobiles and even read their license plates. The article presented additional details, "Intelligence sources said yesterday that KH-11 was the CIA code name for Keyhole-11, which is the Big Bird photographic reconnaissance satellite . . . 'The Russians know this satellite has been in orbit taking pictures for some time,' the source said, 'Getting their hands on the manual doesn't stop the satellite and doesn't stop the pictures.' "

Clues that the U. S. Government may have initiated a misinformation effort appeared in a 23 November 1978 *Washington Post* article. It alleged that the KH-11 had looked down on Russia for more than a year without the Soviets realizing that it was a photo satellite. Compare the following quotation with that which appeared in the 23 August news item:

> "The Soviets have known for years that the United States has been sending a number of different spy satellites over their territory, with those known as Samos and Big Bird among the ones it identified as picture-taking ones. But for some reason, the KH11 was not picked out from the clutter of U. S. satellites as a new eye in the sky."

Are KH-11 and Big Bird one and the same? One report, apparently heavily dependent upon "official sources," said that they are. A second report clearly indicates that they are different. The point is not earth shaking, but it is instructive about the willingness of U. S. officials to plant seeds of doubt or perhaps deliberately to mislead.

What new information entered the public domain about U. S. photo satellites as the result of the Kampiles trial? On the matter of system identification, Samos had been in the news officially in the early 1960s until it was "disinvented" by security fiat around December 1961. At that time, the Department of Defense stopped identifying the name and mission of certain satellites when they were launched. Since all others were identified, the reasonable assumption was that those about which there was no publicity or "no comment" were launches for satellites with a national security mission. Big Bird was prominently in the news in January 1978 at the time of the crash in Canada of the Soviet Cosmos 954 satellite. In its issue of 6 February 1978, *Time* magazine carried a report of Big Bird's capability and a color sketch of the satellite. Much earlier, speculation on the system was published in Philip Klass's *Secret Sentries in Space* (New York: Random House, 1971, pages 170-171), the most definitive book available on U. S. photo satellite systems. It cannot be discounted that the 1978 news accounts to some degree were based upon Klass's 1971 research. In the Klass book Big Bird is identified as the first of the fourth-generation photo satellites. Klass identified the fifth-generation satellite by the code number 1010, indicating that the U. S. Air Force was going to call for industry proposals for the 1010 satellite during early 1971. The significant new capability of 1010, according to Klass, would have been the integration of a "real-time" reconnaissance capability. This would allow controllers to observe the satellite's view as it overflies the globe. Such a capability

NASA

On a clear day from a U-2 you can see Washington, D. C. . . . In the center of the picture, diagonal streets converge on the Capitol; on the left bank of the Potomac River is the Pentagon, and near the right side of the photo is the circular Robert F. Kennedy Stadium.

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would have required institutional and bureaucratic adjustments not only to manage the system, but to exploit it fully. The existence of a bureaucracy for that role was indicated in a 1976 report by the Senate Select Intelligence Committee: ". . . the National Reconnaissance Office, an Air Force intelligence agency only recently disclosed to exist, . . . reportedly operates satellite intelligence programs for the entire intelligence community. . . ."

A summary view of the system needed to support and exploit photographic intelligence from satellite sources mandates that it is not one of those compartments for which only a handful of people are cleared. Discounting the thousands of personnel who would have knowledge and responsibility about parts of the overall system, there remains the potential for thousands of others who would be actively involved in one phase or another of video production, negative handling, and printing of the photographic and other sensor material. In the first category are personnel of supporting industries—the builders of rockets, missiles, cameras, film, tape, and electronics. Few of these people need see the final product except to observe coverage of a calibrated U. S. target to determine sensor performance. It would be in the second category of photo analysts, technicians, and intelligence estimators, where the largest number of cleared people would be found. Alternatively, the largest group of clearances could be held by the legion of civilian and military planners and operators, the decision-makers, and their supporting staffs at the national level. The number can thus reasonably be expected to be large, and the potential over the years for specific leaks to the media is great. Security has been good, though, and Congress and the media appear to be playing active roles in this regard. This does not mean that knowledge about the systems—particularly specific knowledge gained from the systems—has not appeared in the public domain.

U. S. Presidents have been the most notable "leakers." An argument can be made that the president cannot be liable for any security leaks or violations, since the whole classification system is his. One of the most publicized references to photo satellite material came from President Lyndon Johnson. Speaking off the record to about 100 educators in Nashville on 15 March 1967, Johnson said that because of satellite reconnaissance, "I know how many missiles the enemy has." He claimed that this system alone had justified spending ten times what the nation had already spent on space, $35-$40 billion up to that time (*The New York Times*, 17 March 1967). President Dwight Eisenhower had also gone public on this intelligence capability. He and Premier Nikita Khrushchev had a short discussion about satellite reconnaissance in Paris in May 1960. The ill-fated summit conference foundered over the issue of the downed U-2 aircraft over Russia. Before the conference broke up, there was one meeting. Eisenhower wrote afterward that he ordered a stop to further U-2 flights over the Soviet Union. Two reasons were cited. The first was the belief that the Soviets could shoot down the high-flying U-2. "The second was that considerable progress was now being made in photography of the earth from satellites." (*Waging Peace: 1956-1961*, [Garden City, N.Y.: Doubleday & Company, Inc., 1965, page 552.]) The president told Khrushchev that he had plans to submit to the United Nations a proposal for the creation of a U.N. aerial surveillance capability. He committed the United States not only to accept such aerial

NASA

This satellite view of the Middle East shows the easily recognizable shapes of the Sinai Peninsula, Gulf of Suez, and Gulf of Aqaba. At the upper left is the Mediterranean, and at the lower right is the northern end of the Red Sea.

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surveillance, but to contribute to the establishment and operation of such international surveillance. Following Eisenhower's statement, French President Charles de Gaulle observed to the select gathering that within recent days a Soviet satellite had passed over France, and that reconnaissance photography might have been taken of the whole of France. Eisenhower wrote that "Khrushchev broke in to say he was talking about airplanes, not about satellites. He said any nation in the world who wanted to photograph the Soviet areas by satellite was completely free to do so."

This may suggest that the Soviets have held a casual attitude on the subject of intelligence satellites streaking over Mother Russia. The opposite is the case. Until they obtained a similar reliable capability, they bitterly opposed the successful U. S. programs. The turning point came in September 1963. To a large degree, Soviet sensitivities probably explain the U. S. refusal to acknowledge our own programs from 1961 until the present time. However, technical advances concerning space sensors not exclusively related to the Department of Defense have seriously eroded the security curtain. The vast amount of imagery available since 1972 from the LandSat system (before 1975, this program was called Earth Resources Technology Satellites, ERTS) available for commercial exploitation has served for most to dull the edge of curiosity about the capabilities of other satellite systems. It also served as a benchmark from which reasonable assumptions about still classified systems have been made.

Everyone who has written on the subject of intelligence satellites has addressed the area of capability. For the photographic satellite the area of greatest interest has been the degree of ground resolution possible. A news report cited earlier in this article claimed that products from Big Bird were so precise as to enable the identification of particular makes of automobiles. In addition, it was alleged that license plates could be read. Are we being informed or misinformed? It would take many pages to discuss the automobile claim in terms of feet and inches of resolution. Remember that there are hundreds of different car models and many of them are very close in size. The license plate claim would be easier to discuss in terms of inches of resolution if we could get by the fact that automobile plates are conventionally displayed so as to provide a top edge view to satellite cameras. The Director of Central Intelligence, Stansfield Turner, was reported in the 6 February 1978 *Newsweek* to have told White House aides that our photos were so good as to enable the CIA to distinguish between Guernseys and Herefords on the range. Why the CIA would want to identify these bovine cousins is a small mystery, but what can we learn from the statement? Guernseys are fawn and white and slightly larger than Herefords. The Hereford is red and frequently has a white blaze mark extending from the white face to across the withers. From a satellite view the Hereford would be more rectangular in form than the more triangular shaped Guernsey. They are rarely herded together. Perhaps Turner's statement meant that our color photography was good enough to have color separation for a target the size of a cow. To speculate beyond reason, he may have identified one of our photo satellite calibration areas, the precisely fenced holding areas of farms engaged in artificial insemination operations. Here one would find almost all breeds of cattle grazing expectantly side by side. More than likely, Turner was adding one more story to those that say something but tell nothing.

There is a good deal more unsubstantiated but clear information on the subject of resolution. On 8 December 1963, *The Washington Post* published a long feature article on the Samos program. Author Howard Simons claimed that one released photograph, taken by a U-2 in 1956, demonstrated 4-inch resolution of painted stripes in a parking lot. He surmised that technological improvements up to 1963 might permit similar resolution from a satellite 150 miles overhead. James A. Fusca, writing in *Space/Aeronautics* in June 1964, was quite positive in his statements concerning Samos: "Photographs obtained have a ground resolution of 16-20 in. at altitudes between 100-120 miles, sufficiently good to detect the dark shadow of a telegraph pole, and equivalent to the photographs taken by U-2s at extreme altitudes." It is the estimate of the previously mentioned Philip Klass that Samos-2, which was launched on 31 January 1961, had a ground resolution of 20 feet from its orbit of 300 miles. He further stated that the "unidentified" satellite launched on 22 December 1961 (possibly Samos-5), with half the altitude of the earlier Samos-2, perhaps had resolution as good as 5-10 feet. It is Klass's informed technical opinion that the second generation of U. S. satellites, those which sent their imagery to earth by radio transmission, could discern objects as small as 7 feet in diameter. The United States probably orbited 25 of this generation satellite during 1964 and 1965. Resolution in itself is not an objective. It is an expression of some ability to communicate intelligence via graphic form. It would be misleading to expect that each subsequent generation of reconnaissance satellite provided better ground reso-

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lution. In fact, even though some improvements were probably technically possible with advancements in camera designs and optics, film and film processing, and computer-supported interpretations, other objectives may have competed with the costs of obtaining such improvements. While the third-generation reconnaissance satellites may have had a higher resolution camera system, it had other significant new attributes. According to Klass the satellites of 1966-1967 were equipped with an infrared scanner that enabled them to take reconnaissance pictures during night passes. The number of satellites launched from this generation equipment was fewer than previous generations. The suggestion is that they carried a larger film supply and had an improved data transmission capability to ground stations.

The fourth-generation reconnaissance satellite has had more of a public character than any of its predecessors. This was the Big Bird, first launched in 1971, capable of both radio transmission of imagery and ejectable film packs. To handle its all-weather and nighttime role, Big Bird reportedly is equipped with side-looking radar that, from an orbit of 100 miles, would provide ground resolution of a few feet. At least some of the Big Bird satellites essentially have a "real-time" reconnaissance capability. By direct and communication satellite relay from Big Bird, ground personnel can see through the zoom-type telephoto lens as if they were on board the satellite. Big Bird's orbiting time has been around 220 days. Much of its payload weight is propellant used to maneuver both in altitude and in orbit. This maneuverability capability enables it to respond to the need for coverage of rapidly developing crisis situation. The trade-off cost is total time in orbit.

Application of "real-time" reconnaissance has been reported in the book *Satellite Spies* (Indianapolis: Bobbs-Merrill Co., 1976) by Sandra Hockman with Sybil Wong. The following is attributed to a "highly classified person":

> "We used satellite television to monitor the Yom Kippur war in October and November 1973. We were there day and night. We watched everything that was happening, especially over the Syrian front, and we gave the Israelis all the information we could. It helped them. . . . [W]e have given a few Israelis a general idea of what we have. The British and the West Germans know. The necessary personnel in NATO know. We are planning to build the system into the NATO command function. . . . [T]he Soviets learned about it in 1973. As soon as we started operations."

The difficulty with this statement is the suggestion of continuous coverage. This could be accomplished by a synchronous satellite stationed over a geographical point, or by a stream of satellites maneuvered to make repeated passes over the same area. So far as is known, there is no photo reconnaissance synchronous satellite capability. The very high altitudes associated with synchronous orbit would appear to be beyond sensor capability to monitor battlefield action. The records do not show sudden increases in classified launches during this crisis. Three explanations suggest themselves: the report is in error, at least as far as the continuity of coverage is concerned; an unidentified satellite with a unique capability was at work; or the unidentified source defined "continuous" as repeated orbits over the same ground area, i.e., a maneuverable Big Bird-type satellite.

The term "photographic satellite" should not be taken in a literal sense. The point to be made is an important one and one that is abundantly documented in open literature. All regions of the electromagnetic spectrum, from ultraviolet through far infrared, have been carefully investigated for intelligence potential. We associate photography with cameras, negatives, prints, and slides. Radiometers are the instruments used to sense and capture data in the nonvisible (to the human eye) electromagnetic spectrum. What may be confusing is that, in fact, a visible presentation can be made of data received in what is labeled the nonvisible spectrum. For example, an infrared thermal image certainly communicates intelligence. The whole of Italy with scattered cloud coverage might be presented. The brain and eye are not confused by the presentation, and much can be interpreted, but not nearly as much as would be possible by a computer using digital techniques. We have gone through at least two generations of multispectral satellite sensor systems. Analysis and interpretation of these materials are principally by computers. Perhaps one measure of the potential of this intelligence is the commercial application already established. Commercial marketing of LandSat products is presently being done by a number of companies including General Electric, Bendix, Earth Satellite Corporation, and IBM, with others coming in the field.

Three years before the first LandSat satellite was orbited, the 22 June 1970 issue of *Aviation Week & Space Technology* presented a discussion of the hopeful future of such a venture. It was speculated that a functional earth resources observation satellite system would represent the greatest potential return on a dollar investment of any space project. Sixteen potential earth survey sensors were identified in a matrix

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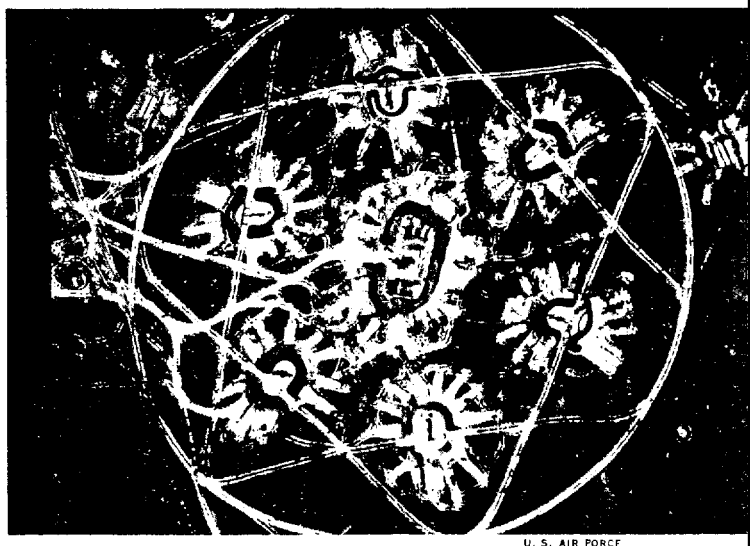
that associated each with objectives in the five categories of agriculture, geography, geology, hydrology, and oceanography. From the beginning of this project, the Department of Defense was a supporter and participant. It would not be surprising if a series of military intelligence collection efforts have been secretly associated with all of the publicly identified multispectral satellites and some that were classified launches. In conjunction with the best of our space and ground photographic capabilities, signature recognition criteria for all spaceborne sensors would have been well established long ago. The survey rate of various sensors differs greatly. If, for example, the signature for concrete was reasonably distinctive and detectable with a rapid rate sensor (a sensor capable of viewing large areas of the earth's surface at one pass), it could provide and maintain an index of man-made structures. New findings and enlargement of previous structures could then be targeted for photo reconnaissance and other types of coverage that would reveal adequate details for assessment.

The persuasive power of aerial and space photography must be rated high. The best public example concerned the use of U-2 photos to support the U. S. position during the 1962 Cuban Missile Crisis. Concerned about any possible irresolution on the part of our NATO allies, President Kennedy dispatched senior diplomatic personnel with photo interpreters and copies of U-2 photography. The purpose was to give foreign heads of state a briefing on the evidence before the president went to the American public and the world with our facedown of the Soviets over the missiles in Cuba.

Dean Acheson delivered to Charles de Gaulle a letter from Kennedy and offered to show the photographs. "A great government such as yours does not act without evidence," responded the French President. After he told Acheson, "You may tell your President that France will support him," he asked to see the photographs.

Roger Hillsman, who during the Cuban Missile Crisis was the Director of the Department of State's Bureau of Intelligence and Research, writes that the intelligence community objected to the release of U-2 photography on the grounds that its high-quality resolution would reveal too much about our intelligence capability. The president decided that the photography had to be used and authorized its release to the general public. A similar argument for release is currently in full bloom. It has been reported that a White House panel started working in March 1977 to review the policy that governs what could be released in order to achieve more civilian benefits from our photo intelligence satellites (*The Washington Post*, 13 November 1978). The argument is in progress again with the U. S. intelligence community, perhaps joined by counterparts in allied nations who may share at least in part the bounty from these collection systems. There is serious concern that if the decision is reached to release materials from our less capable older systems, it will lead to inevitably successful demands for the release of materials from the current and best systems.



U. S. AIR FORCE

Shots like this one, taken in 1962, gave President Kennedy the proof he needed of Soviet missiles on Cuban launch sites. They were enough to convince Charles de Gaulle, too.

There are and have been other proposals for releasing satellite intelligence. In "The International Control of Disarmament" (*Scientific American*, October 1974), Alva Myrdal outlined a detailed proposal for the creation of a new U.N. agency that would be charged with the collection and dissemination of intelligence regarding the compliance of nations with disarmament agreements. Mrs. Myrdal assumed that such a U.N. agency would have to depend at first upon the satellite photography from "national sources." At the time of writing, this would have to have been either or both the United States and the Soviet Union. This idea was officially updated during the 1978 Special Session of the General Assembly Devoted to Disarmament. France presented at this session a proposal for the establishment of an international satellite monitoring agency. The proposal acknowledged that consent would be required from any nation before it could be monitored for com-

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pliance of a disarmament agreement. A possible exception was suggested if the Security Council invoked Article 34 of the U.N. Charter which authorizes the Council to investigate disputes or situations that might lead to international friction or give rise to a dispute. Three technical stages were identified. The first capability the new agency was to establish would be a processing center where materials provided by nations having operational satellite systems would be interpreted. During the second stage, the agency would establish data-receiving stations that would be directly linked to national observation satellites. In the final stage, the agency would have its own satellites.

The attitude of the United States on this proposal may be inferred from a speech given at the 1978 U.N. Disarmament Session by delegation member Paul Newman. Mr. Newman gave details of the U.S. aerial photographic surveillance provided to Egypt and Israel in the Sinai. He made a general invitation:

> "The United States is prepared to consider requests for similar monitoring services in situations where they might be applicable. To the extent possible U. S. assistance would be provided under the auspices of the United Nations or of regional organizations but, in any event, only upon the joint request of the affected states." (*Department of State Bulletin Reprint,* August 1978)

If, for whatever reason, the United States and the U.S.S.R. are unwilling to share their observation satellites with the United Nations, France may offer to develop and launch a satellite series in support of its own proposal. President Valéry Giscard D'estang told the disarmament delegates that France would have a photo satellite capability within five years. D'estang was too modest about his country's existing capability in this field. The report of a well-informed discussion group on problems of international security in outer space concluded that France uses satellites for reconnaissance, geodetic studies, and other activities necessary to the development of its land- and sea-based missile nuclear deterrent force.

One public Soviet response to opening dialogue on the possible U.N. use of observation satellite material appeared in an article by Yuri Kolosov in the November 1978 *New Times:*

> ". . . if these photos have a sufficiently high resolution they can be used to obtain information about the defense potential of a country and its resources. That is why such photographs should be made available to all only with the consent of the countries whose territory is probed. Soviet scientists hold that photographs with a linear resolution of 50 metres or better can be used to obtain information the distribution of which could be detrimental to the national interests of states. This criterion was proposed for dividing photos taken from satellites into two categories: photos that can be distributed freely and photos that can be distributed only with the consent of the state concerned. Such an approach is vigorously supported by the socialist and developing countries and is opposed by the imperialist countries led by the United States."

Apparently the Soviet view is that ground resolution of around 160 feet is too poor to be of much value; hence it can be tolerated as "legal" for distribution. The Soviets do leave the door open for photos with better resolution, provided the involved country gives consent for release.

Recently, the United States has gone public on the general legal standing of satellite photographic reconnaissance. Major General Walter D. Reed, Air Force Judge Advocate General, said in a speech on 31 October 1978 that the U. S. position is that under current outer space treaty provisions, the term "peaceful" means "non-aggressive" and that space reconnaissance from a satellite is a non-aggressive, passive function of a satellite. Two different points are at issue here. The Soviets are not saying that satellite reconnaissance with excellent ground resolution is illegal. They are saying that the use of reconnaissance materials is not without some legal sanction and control. Their suggestion that 50 meters is the break point is obviously arbitrary, but one that may stand if it allows the use of the bulk of the U. S. LandSat material already collected. On the other hand, the United States may insist that this figure be reduced to whatever the average linear resolution is expected to be for our next generation LandSat system. The new LandSat system should generate many millions of dollars for companies commercially exploiting its materials, and an unpredictable amount for companies and countries that then successfully exploit the resources identified by LandSat. The Soviets are sure to label this as technological imperialism and tout themselves as the guardian of the resources of underdeveloped nations that would be taken advantage of by U. S. industry with superior knowledge of the location and extent of raw material resources.

The U. S. military also has adjusted to the new reality following Carter's October 1978 confirmation of photo satellite operations. The fiscal year 1980 Military Posture statement from the U. S. Joint Chiefs of Staff includes this comment on the subject:

> "The purposes of the US reconnaissance and surveillance program are: to provide strategic early warning; to monitor enemy forces; to assess

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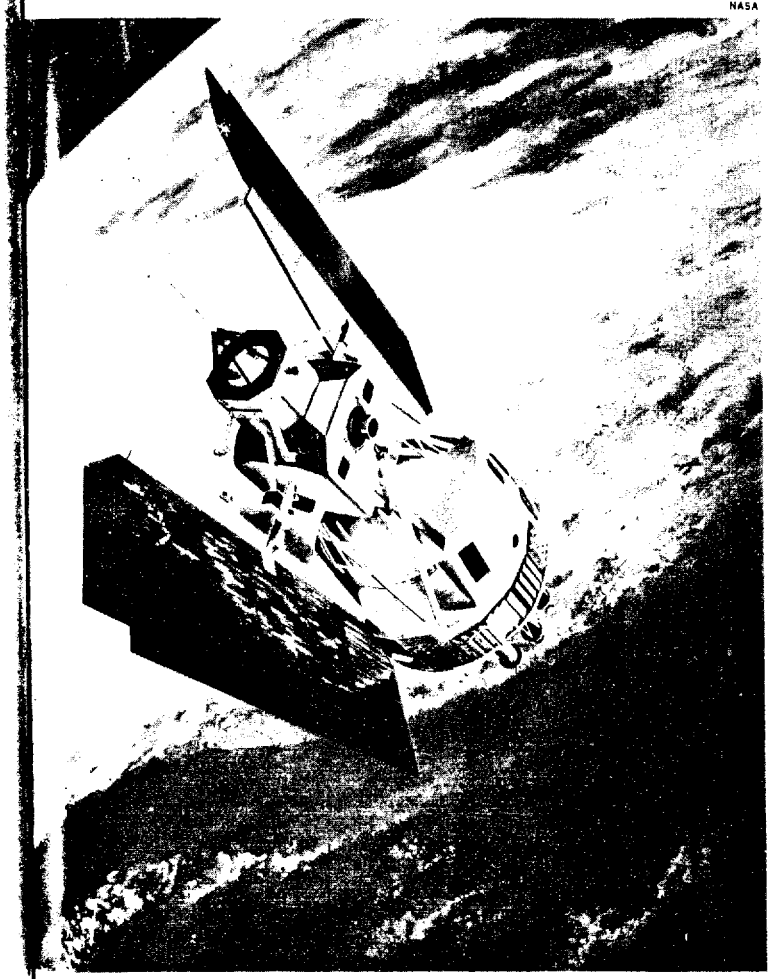
weapon systems characteristics; to develop and maintain a data base for operations planning; to conduct ocean surveillance; to monitor compliance with strategic arms limitation agreements; and to support crisis monitoring and decisionmaking. The US collection effort employs ground-based, airborne, shipboard, and satellite systems. . . . Space technology has contributed importantly to the reconnaissance and surveillance program."

This document provides some additional specific information on satellite reconnaissance systems. In the glossary two acronyms are identified: EORSAT (ELINT Ocean Reconnaissance Satellite) and RORSAT (Radar Ocean Reconnaissance Satellite). A RORSAT system was identified in Navy testimony released by the Senate Armed Services Committee. The Clipper Bow project was described as a satellite equipped with an active radar that was being designed to provide a tactical all-weather capability of detecting surface vessels. The Navy's White Cloud project uses clusters of EORSATs. When Clipper Bow is fully operational, the EORSATs will allow correlation of signal emissions with radar targets obtained from that system's radar satellites (see *Aviation Week & Space Technology*, 10 May 1976, page 21; 12 February 1977, page 9; 19 December 1977, page 18; 10 July 1978, page 22; 28 August 1978, page 50).



NASA

In yet another use of satellites, the Navy gained favorable publicity during operation Stopgap for its radar ocean surveillance. In July 1978, a news report credited the use of information provided by Navy ocean surveillance satellites in the tracking and seizure of 40 oceangoing ships attempting to smuggle more than a million pounds of marijuana into the United States. For four and a half months, the Navy Ocean Surveillance Information Center (NOSIC) relayed its intelligence to the Drug Enforcement Agency which then passed it on to the Coast Guard for enforcement action.

The point of the real and potential political impact of high-altitude and satellite photography has been made in the case of the U-2 incident and the Cuban Missile Crisis. The impact that such material has already had in the SALT negotiations, and will have if there are future efforts to get a SALT treaty approved, is yet to be revealed. There may be another historical example of high political use of such material. A potential for such use would have been during the 1972 Nixon visit to China. The following scenario is, as far as the author knows, a complete fabrication. There is only one very thin reed upon which to base any speculation concerning the possibility of its real occurrence. This will be identified later. The action opens on 2 June 1971 in the Oval Office of the White House during the planning phase of Henry Kissinger's 9-11 July secret visit to Peking.

President Nixon: "Henry, we know from our Warsaw talks that the Chinese are ready for more public discussions, higher visibility, heads of state meeting. But I want you to make it perfectly clear that in no way is the United States going to China with apologies or humility. We are the premier power in the world, and I want you to be careful to point that out . . . in a diplomatic way, of course."

Kissinger: "I understand, Mr. President. It is a bold and imaginative move you are planning."

Although not used for intelligence, the earth resources observation satellite, LandSat, offers potential for information gathering in the areas of agriculture, geography, geology, hydrology, and oceanography.

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Scene 2, 13 July 1971. The Oval Office after Kissinger's visit.

Kissinger: "Mr President, the trip went exceedingly well. As you note in my report, I found the Chinese leadership to be aging but very pragmatic. There was an absolute minimum of rhetoric in our private conversations. They are vitally concerned about their security problem with the Soviet Union. It is an area in which we can gain great leverage, but we must not overplay our hand. I have a suggestion that will demonstrate our understanding of their problem, our power to monitor worldwide military events, and to place them in our debt for covertly assisting them vis-à-vis the Russians."

Scene 3: The National Photographic Interpretation Center.

Technician 1: "Why the hell does anyone want so many high-resolution graphics of sites along the Sino-Soviet border?"

Technician 2: "At least this gets us off the French medium-range ballistic missile cave search. I'm beginning to feel like the mushroom king of Southeast Washington. Let me have the first stack, and I'll start annotation of Soviet troop deployment and equipment identification."

Act II, Scene 1, 22 February 1972: Anteroom off the Great Hall of the People's Palace in Peking.

President Nixon: "As Mr. Lord has indicated during the last 40 minutes, the Soviet troop dispositions and equipment were, on the days of photo coverage, in defensive positions. Obviously, we have the capability to observe changes in their position and thereby infer some degree of Soviet intentions. I hope that this briefing has been helpful and that you accept these photos as a token in the quest for peace and stability in the world—a goal I am sure both of our great countries share."

Scene 2: The lakeside state guest house, 18N, Northeast edge of Peking.

President Nixon: "What do you think, Henry, how did it go?"

Kissinger: "It was an excellent beginning; we have the initiative."

Act III, Scene 1, 28 November 1975: Oval Office.

Chief of Staff Cheney: "There are several items on your upcoming China visit. The Agency reports frantic Chinese activity in their second attempt to get a photo satellite in successful orbit. Henry has annotated the report with a comment that for once the Agency is probably correct."

President Ford: "Henry is convinced that the Chinese will try to balance the account from the Nixon visit."

Act IV, Scene 1, evening of 3 December 1975: Lakeside guest house, Number 18N, Peking.

Chinese Briefing Officer: ". . . one final item, as the People's satellite reveals, the Imperialist Socialists continue to test the "cold-launch" technique of the SS-18 from Tyuratam. We estimate that these missiles will be placed in the SS-9 complexes south of Novosibirsk and in other areas known to both our countries."

Deputy Premier Teng Hsiao-Ping: "The threat of hegemony to the world has never lacked visibility. These photographs merely confirm the specific reality of it and established how capable we are of detecting any danger. It is lamentable that some nations believe they gain security by planting ICBMs in the ground and, while watering them with the sweat of the oppressed worker and the tears of the misguided proletariat, are ever fearful of their sudden sprouting. We see no stability in such acts and prepare for the inevitable bitter fruits from such a harvest."

Chinese Briefing Officer (aside): "If we could have launched four days sooner, we could have shown him 105,543 people watching Ohio State beat Michigan 21 to 14 at Ann Arbor."

The facts that could support Act IV are that the People's Republic of China launched a photo satellite on 26 November 1975 and recovered it on 2 December, during President Ford's visit.

As previously noted, the United States has on occasion used the fruits of its reconnaissance programs for political purposes. There is no public evidence that Nixon did so in China during his February 1972 visit. It is speculated that the temptation to do so was present. Whether or not it was acted upon is not publicly known. What the public does know is that a smiling Vice Premier Teng Hsiao-ping artfully ducked a question on the number of Chinese troops committed to the Sino-Vietnamese border war in February 1979, by noting that "as regards the estimate of the size of forces involved, your satellites offer accurate information, and that's about the size of it." (*The Washington Post,* 28 February 1979.)

Whether or not we have shared any hard photo intelligence with the Chinese about the Soviets should remain in genuine secrecy. The possibility of this must be of serious concern to the Soviet Union, and it seems to be in our best interest to avoid relieving their tension one way or another. In the meantime, the Chinese are working to achieve their own independent capability in this field. The Soviets have orbited an impressive number of intelligence-related satellites, and we know that they have enjoyed at least one striking espionage success in finding out about the capability of the KH-11. This failure notwithstanding, the prodigious efforts of the United

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States to protect this technical intelligence system appear to have been a long-run success.

There certainly will be a secret future for Soviet, Chinese, U. S., and other countries' military intelligence satellites. Whether or not some of the U. S. materials are released for domestic political purposes, the world appears to be on the threshold of a burgeoning use of space-derived sensor material. The United Nations may get into the business of verification of treaty provisions. Equally important, the United Nations may have a paramount role to play in managing LandSat-type materials for the general benefit of all member nations, but for the specific protection of Third and Fourth World nations. The United States will have to make a decision on the type of role it will play. We have many years' worth of collection of worldwide graphics in our military archives and improving capabilities for more of the same. Additionally, we lead the world in experience and capability with earth resource materials gleaned from our LandSat systems. Plans have been announced for advanced LandSat systems, and the exploitation of these materials has high commercial interest. If it has not already been done, the development of an integrated optics data processor capable of satellite on-board comparison of sensor output with stored reference data should provide capability in our reconnaissance satellites to dually accomplish military missions and those missions dedicated to support the United Nations as well as some commercial enterprises.

The incredible capability of these technical intelligence collection systems has been vital to our national security. This view is also probably shared by the Soviet Union from its own security perspective. More than 17 years ago, Deputy Defense Secretary Roswell Gilpatric addressed the ironic consequences of Soviet secrecy and American openness, "The Soviets are forced to work very hard to keep up with what they know we are doing to keep up with what we think they are doing." In 1962, that was a reasonable statement. In 1980, the Soviet Union should be well over the shock of being on the wrong side of the "missile gap." Both countries for some time have had the technical capability of knowing with reasonable accuracy what each other's strategic offensive strength actually is. We concede that the Soviets know what we are doing, and we claim that we know what they are doing. Such statements appear to be adequate explanations for expected dampening of the strategic arms race. Something has not worked out. Some of our national security managers who have been supported by satellite intelligence systems that have provided evidence that the Soviets have not been satisfied merely to close the gap of strategic weapon systems, are now nervous that in order to obtain a SALT treaty, these vital intelligence systems to some degree may be compromised.

I think that there is another equally important consideration. If any U. S. President uses satellite photographic materials to make his case on the verifiability of a SALT treaty, or to justify potential military action, he will be taking unpredictable risks in public response. The same proof that SALT can be verified may also be interpreted by a suspicious public that SALT II is many years too late, and that we now should not be limiting our strategic options in the face of graphic Soviet capabilities. In the case of justification of potential military action, what would the American public response be when presented with a larger portion of truth of graphic danger to the country? One would like to think that Americans can take the truth and would thereby be galvanized in support of whatever sacrifice is necessary to meet the peril. If this occurs, it will be a dangerous moment for the world. The Soviets will be placed at a critical point of decision. If war is avoided, the eclipse of their power someday may be measured from such a moment. In the United States, one response can be safely predicted. In this case, "One picture will provoke more than ten thousand words." There will be many, many words. More importantly, there should be a quickly developing vision of many additional applications of a technical system now primarily serving the national security community. That may be considered by a few as an unacceptable loss of monopoly over precious technical resources. There is, of course, the potential of strong counterweight arguments. But these can reasonably be made only when the closet door of satellite photographic system capability is further ajar.

Commander Jones was commissioned in 1950 following flight training in the Aviation Midshipman program. He made two combat tours in VF-191 flying the F9F-2 Panther from the USS *Princeton* (CV-37). He received his A.B. degree at George Washington University in 1961 and also has an M.A. from the University of Maryland (1963), and a Ph.D. from American University (1975). A variety of intelligence assignments rounded out the latter part of his career. These included intelligence officer, Carrier Division 14; assistant naval attaché, New Delhi, India; Navy Scientific and Technical Intelligence Center; and J-2, U. S. European Command. Since retirement he has taught at the University of Wyoming and Casper College. Currently he is research director with R. F. Cross Associates, Ltd., in Alexandria, Virginia.

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